

Public Comment/Input from September 14, 2009 Terminal Groin Study Kickoff Meeting  
New Bern

The following oral comments were received during the September 14 meeting:

Andy Sayre, Village Council of Bald Head Island, stated much of what I have read about terminal groins refers to them as an added tool for beach renourishment or stabilization. For Bald Head Island this is a gross understatement. A terminal groin or terminal groin field may be essential for the sustainability of Bald Head Island. If this is not a perfect terminal groin, we do not want to see Bald Head Island on the cutting room floor. This is an issue that is very important to us.

Marty Cooke, Brunswick County Commissioner, stated I am not here as a scientist or an expert. I am a county commissioner and as a commissioner I have some concerns. We were discussing terminal groins and the stability of beaches at a meeting in Hickory at the North Carolina Association of County Commissioners meeting. We were talking about the stability of beaches and I stated that terminal groins are something that I am concerned about because I think that it has a viable answer. There was an effective study regarding coastal resources dynamics of terminal groins presented in June. The Pea Island example at Oregon Inlet was shown and the only way to save the bridge was to put in a terminal groin. After seeing this and other studies about six months earlier it made me a believer. I went from a disbeliever to a believer after I saw that a terminal groin has sand that you put around it and it causes stability. If you look at Oregon Inlet in the twenty year study, every two months they were able to show that there was no erosion except for two years which were not back to back. They went down mile by mile for six miles and showed that there was no impact for six miles. I am a layman, not a scientist, I don't know if there is global warming or global cooling. I hear there is global warming and then I hear there is global cooling. Then I see pictures and they say that we will be under water in ten years and then I talk to another geologist and they say that it means two inches. I can't tell. But what I can tell is that there seems to be stability at Fort Macon and at Oregon Inlet. I know we keep pouring money into trying to renourish these islands, the infrastructure, roads, the electrical, and sewage. While I was at the NCACC in Hickory, I had two other county commissioners say to me that they own property down there too. We built based upon the guidelines of the thousand year flood, we had to have all these permits, jumped through all of the hoops and did everything they asked us to do and they act like we have stuck our property on the end of the beach and expected it to erode out. If you look at Bald Head Island on the south end they have a three hundred foot parallel soft groin. When the COE turned on their dredge back in February they eroded out 300 feet. I am not an expert but I do know there is cause and effect. When they turned on the pump they ended up losing 300 feet of sand. We have to find a way to make it stable. The other thing about it is there is a mischaracterization. They are termed as jetties and they are not jetties. My undergraduate was at the Citadel and I do know about Folly Beach. I went down to Folly all the time and I know all those perpendicular to the shoreline are not what we are talking about. We are looking for something that will be viable. As public servants and individuals that are involved in the State's matters we have to be able to show everybody, regardless of whether they are experts or of the scientific community or anything else for that matter, that there is a level playing field. I have heard environmentalists say that there shouldn't be any development any further east than Charlotte, North Carolina. Actually, I have literally heard that it should be a mile from the beach. I am not saying whether it should or shouldn't, but what I am saying is that there must be objectivity and a level playing field or we will be disenfranchised by the general public.

Frank Iler, North Carolina Representative for Brunswick County, stated that I may be one of the guys that has to vote on this next May. This process today will take a lot of mystery out of what goes around

Raleigh. I am very impressed with the brain power that I have seen in the room that will be brought to bear on the subject. This is something that we need to look at and the interest is there. There were four mayors from Brunswick County that I thought would be here today, there are some council members that are part of the process today and I appreciate them coming. There is a lot of interest in this. The study bill passed 40-1 in the Senate and 92-21 in the House. The permitting bill, which has floated around in Raleigh for months and is in the environmental committee, passed the Senate 37-10. It has been stalled in the House for reasons that we will not go into today. Take the politics out of it and it is something that needs to be looked at. We appreciate all of the effort that will go into this. It will give me and my colleagues the guidance down the road. This will give the CRC another tool to solve some of our problems. All we are asking is to look for another tool to solve some of the things that we run into in Brunswick County and all up and down the coast of North Carolina. To do nothing, which some folks don't want to do, no dredging, no shipping channels, no Intracoastal Waterway, loss of state roads on land, loss of beach assets and access for loss of tourism and tourism dollars. In today's Wilmington paper there is an article with the word "terminal groins" and then the picture is of the 200-foot soft groin on Bald Head Island which is not a terminal groin. It also talks about trapping sand and robbing sand from downdrift. This is all misinformation. I am not a scientist, but I have been told that you can pump sand in there and not take any sand from other sources. It will just hold sand in. We need a lot of guidance and I thank everyone involved in the process.



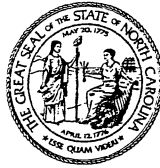
# **Resolution to the Coastal Resources Commission**

**September 14, 2009**

**From:**

**Carteret County Crossroads  
Conservation Council of North Carolina  
Cypress Group of the Sierra Club  
Keep Greenville Beautiful  
New River Foundation  
No Port Southport  
North Carolina Coastal Federation  
North Carolina Conservation Network  
North Carolina Chapter of the Sierra Club  
Pamlico-Tar River Foundation  
PenderWatch and Conservancy  
White Oak-New Riverkeeper Alliance**

**The organizations listed above endorse comments by Senator Marc Basnight in his September 4, 2009 letter (attached) that encourage the Coastal Resources Commission to focus its study of terminal groins to ones that could potentially be placed at inlets. Examining additional locations for placement along the beach will dilute the quality of the study, and result in confusing results.**



## NORTH CAROLINA GENERAL ASSEMBLY

PRESIDENT PRO TEMPORE

SENATOR MARC BASNIGHT

RALEIGH 27601-2808

September 4, 2009

Bob Emory, Chairman  
Coastal Resources Commission  
112 Cameila Road  
New Bern, NC 28562

Chairman Emory:

As you well know, much of the coast of North Carolina is in a crisis. With the continued economic pressures from a global recession pushing down home values and freezing the real estate market, many residents and business owners along our coast can barely make ends meet.

The beach is the economic engine of our coastal region. We do not have the manufacturing base or research campuses like the Piedmont. Our future depends on preserving the beach. North Carolina's coast is world-renowned for its unaltered beauty, with Ocracoke being selected as the best beach in America. It is our job to maintain this status.

To relieve some of the pressure on our coast, I have twice pushed legislation to allow the Coastal Resources Commission the ability to permit the construction of terminal groins at our inlets. I firmly believe, and studies have shown, that terminal groins, when-strategically placed at our inlets, protect our beaches and do not harm neighboring islands. Both bills passed by the Senate would require constant monitoring of these structures with removal required if adverse impacts are determined to be occurring. I believe this is a reasonable approach to beach management.

It has come to my attention that the United States Army Corps of Engineer's definition of terminal groin was used in the recent Senate bill. Under this definition, a terminal groin could be constructed at the end of a littoral cell. This definition is in direct conflict with the legislative intent of where these structures should be placed. I, along with the members of the General Assembly who passed this measure, were supporting a bill that allowed terminal groins to only be placed at our inlets. I do not want there to be any confusion as to what the purpose of the legislation was. I will not support the construction of groins anywhere on our coasts except at inlet locations.

I am confident that you share the same concerns about the future of our coast. As the Commission moves forward with its study of this issue, I am confident you will take these thoughts into account. I look forward to seeing the results of your study and thank you for your service.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Marc Basnight", with a stylized, cursive script.

Marc Basnight

Cc: Coastal Resources Commission  
Jim Gregson  
Todd Miller



## COASTAL SCIENCE & ENGINEERING

PO BOX 1643 MOREHEAD CITY NC 28557 • TEL 252-222-0976 • FAX 252-222-0967 • EMAIL [cse@coastalscience.com](mailto:cse@coastalscience.com)

September 14, 2009

Mr. Jim Gregson, Director  
N. C. Division of Coastal Management  
400 Commerce Avenue  
Morehead City, North Carolina 28557

Phone (252)808-2808  
Fax (252) 247-3330

Re: Terminal Groins  
Regulatory and Technical Recommendations  
to NCCRC, September 14, 2009

Dear Mr. Gregson:

The following is a brief summary of comments I propose to make before the NCCRC Science Panel discussion on terminal groins on September 14, 2009 in New Bern. For the sake of these comments, terminal groins and groins (a groin field) are used here interchangeably. All groin fields have two terminal groins. The letter addresses both regulatory aspects and forefront technical advances in groin design and construction which CSE has incorporated into on-the-ground projects.

CSE has been involved on the following work directly related to groins:

- Completed studies of downdrift impacts of terminal groins: Folly Beach County Park and Hunting Island State Park, S.C.
- Completed construction projects for groin installation and rehabilitation at Edisto Beach, and Hunting Island State Park and Folly Beach Terminal Groin Project.
- Refereed technical publications regarding groin design and management planning (Journal of Coastal Research, Special Issue on Groins).
- Prepared the first draft and co-authored the ASBPA position paper on terminal groins.

The South Carolina Beachfront Management Act (S. C. Code of Laws, Title 48, Section 48-39-290) specifically addresses construction of groins. A copy of the section is attached. The law has certain requirements which we endorse as good law and should be included in any regulation adopted in North Carolina. Those recommendations are as follows:

- Groins should only be permitted as part of a beach nourishment project.
- Groins should be allowed on beaches which have high erosion rates.
- Groins should be allowed only after an extensive analysis quantifies down drift impacts and determines those impacts to be acceptable.
- Measures should be in place as part of groin permitting that can cause removal or modification of the groins should the actual impacts end up to be different from predicted impacts.

CSE has implemented groin design technology referred to as low profile groins. Basically, this technology determines the beach profile that is desired up drift of a groin and then designs a groin structure to maintain that beach profile while sand in excess of that profile bypasses the groin structure.

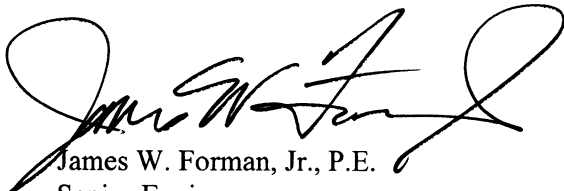
Low profile groins have been constructed at Hunting Island State Park where the erosion rate was 25 feet per year. CSE, together with the Department of Parks and Tourism, constructed six low profile groins after some 400,000 cubic yards of beach sand was added to the profile. Sections of those groins and the beach nourishment profiles are attached.

Also attached are profiles of a terminal groin proposed for Folly Beach, SC. That groin was a terminal groin and also a low profile groin. It was to be built in conjunction with a large beach nourishment project.

This information is provided to assist the NCCRC in making recommendations for regulation of terminal groins in North Carolina. It is only a brief summary of recommendations and experience of CSE in groin engineering. We would welcome the opportunity to provide additional information to the Science Panel and NCCRC.

Sincerely,

COASTAL SCIENCE & ENGINEERING



James W. Forman, Jr., P.E.  
Senior Engineer

# **Beachfront Management Act from the S.C. Code of Laws**

## **Title 48 - Environmental Protection and Conservation**

### **CHAPTER 39.**

#### **COASTAL TIDELANDS AND WETLANDS /**

##### **SECTION 48-39-250. Legislative findings regarding the coastal beach/dune system.**

The General Assembly finds that:

(1) The beach/dune system along the coast of South Carolina is extremely important to the people of this State and serves the following functions:

(a) protects life and property by serving as a storm barrier which dissipates wave energy and contributes to shoreline stability in an economical and effective manner;

(b) provides the basis for a tourism industry that generates approximately two-thirds of South Carolina's annual tourism industry revenue which constitutes a significant portion of the state's economy. The tourists who come to the South Carolina coast to enjoy the ocean and dry sand beach contribute significantly to state and local tax revenues;

(c) provides habitat for numerous species of plants and animals, several of which are threatened or endangered. Waters adjacent to the beach/dune system also provide habitat for many other marine species;

(d) provides a natural healthy environment for the citizens of South Carolina to spend leisure time which serves their physical and mental well-being.

(2) Beach/dune system vegetation is unique and extremely important to the vitality and preservation of the system.

(3) Many miles of South Carolina's beaches have been identified as critically eroding.

(4) Chapter 39 of Title 48, Coastal Tidelands and Wetlands, prior to 1988, did not provide adequate jurisdiction to the South Carolina Coastal Council to enable it to effectively protect the integrity of the beach/dune system.

Consequently, without adequate controls, development unwisely has been sited too close to the system. This type of development has jeopardized the stability of the beach/dune system, accelerated erosion, and endangered adjacent property. It is in both the public and private interests to protect the system from this unwise development.

of substantiating evidence, must be granted a review of the setback line, baseline, or erosion rate, or a review of all three. The requests must be forwarded to the department board in accordance with Section 44-1-60 and the final decision of the board may be appealed to the Administrative Law Court as provided in Chapter 23 of Title 1.

**SECTION 48-39-290.** Restrictions on construction or reconstruction seaward of the baseline or between the baseline and the setback line; exceptions; special permits.

(A) No new construction or reconstruction is allowed seaward of the baseline except:

(1) wooden walkways no larger in width than six feet;

(2) small wooden decks no larger than one hundred forty-four square feet;

(3) fishing piers which are open to the public. Those fishing piers with their associated structures including, but not limited to, baitshops, restrooms, restaurants, and arcades which existed September 21, 1989, may be rebuilt if they are constructed to the same dimensions and utilized for the same purposes and remain open to the public. In addition, those fishing piers with their associated structures which existed on September 21, 1989, that were privately owned, privately maintained, and not open to the public on this date also may be rebuilt and used for the same purposes if they are constructed to the same dimensions;

(4) golf courses;

(5) normal landscaping;

(6) structures specifically permitted by special permit as provided in subsection (D);

(7) pools may be reconstructed if they are landward of an existing, functional erosion control structure or device;

~~(8) existing groins may be reconstructed, repaired, and maintained. New groins may only be allowed on beaches that have high erosion rates with erosion threatening existing development or public parks. In addition to these requirements, new groins may be constructed and existing groins may be reconstructed only in furtherance of an on-going beach renourishment effort which meets the criteria set forth in regulations promulgated by the department and in accordance with the following:~~

~~(a) The applicant shall institute a monitoring program for the life of the project to measure beach profiles along the groin area and adjacent and downdrift beach areas sufficient to determine erosion/accretion rates. For the first five years of the project, the monitoring program must include, but is not necessarily limited to:~~

~~(i) establishment of new monuments;~~

~~(ii) determination of the annual volume and transport of sand; and~~

(iii) annual aerial photographs.

Subsequent monitoring requirements must be based on results from the first five-year report.

(b) Groins may only be permitted after thorough analysis demonstrates that the groin will not cause a detrimental effect on adjacent or downdrift areas. The applicant shall provide a financially binding commitment, such as a performance bond or letter of credit that is reasonably estimated to cover the cost of reconstructing or removing the groin and/or restoring the affected beach through renourishment pursuant to subsection (c).

(c) If the monitoring program established pursuant to subsection (a) shows an increased erosion rate along adjacent or downdrift beaches that is attributable to a groin, the department must require either that the groin be reconfigured so that the erosion rate on the affected beach does not exceed the pre-construction rate; that the groin be removed, and/or that the beach adversely affected by the groin be restored through renourishment.

(d) Adjacent and downdrift communities and municipalities must be notified by the department of all applications for a groin project.

(e) Nothing in the section shall be construed to create a private cause of action, but nothing in this section shall be construed to limit a cause of action under recognized common law or other statutory theories. The sole remedies, pursuant to this section, are:

(i) the reconstruction or removal of a groin; and/or

(ii) restoration of the adversely affected beach and adjacent real estate through renourishment pursuant to subsection (c).

An adjacent or downdrift property owner that claims a groin has caused or is causing an adverse impact shall notify the department of such impact. The department shall render an initial determination within sixty (60) days of such notification. Final agency action shall be rendered within twelve months of notification. An aggrieved party may appeal the decision pursuant to the Administrative Procedures Act.

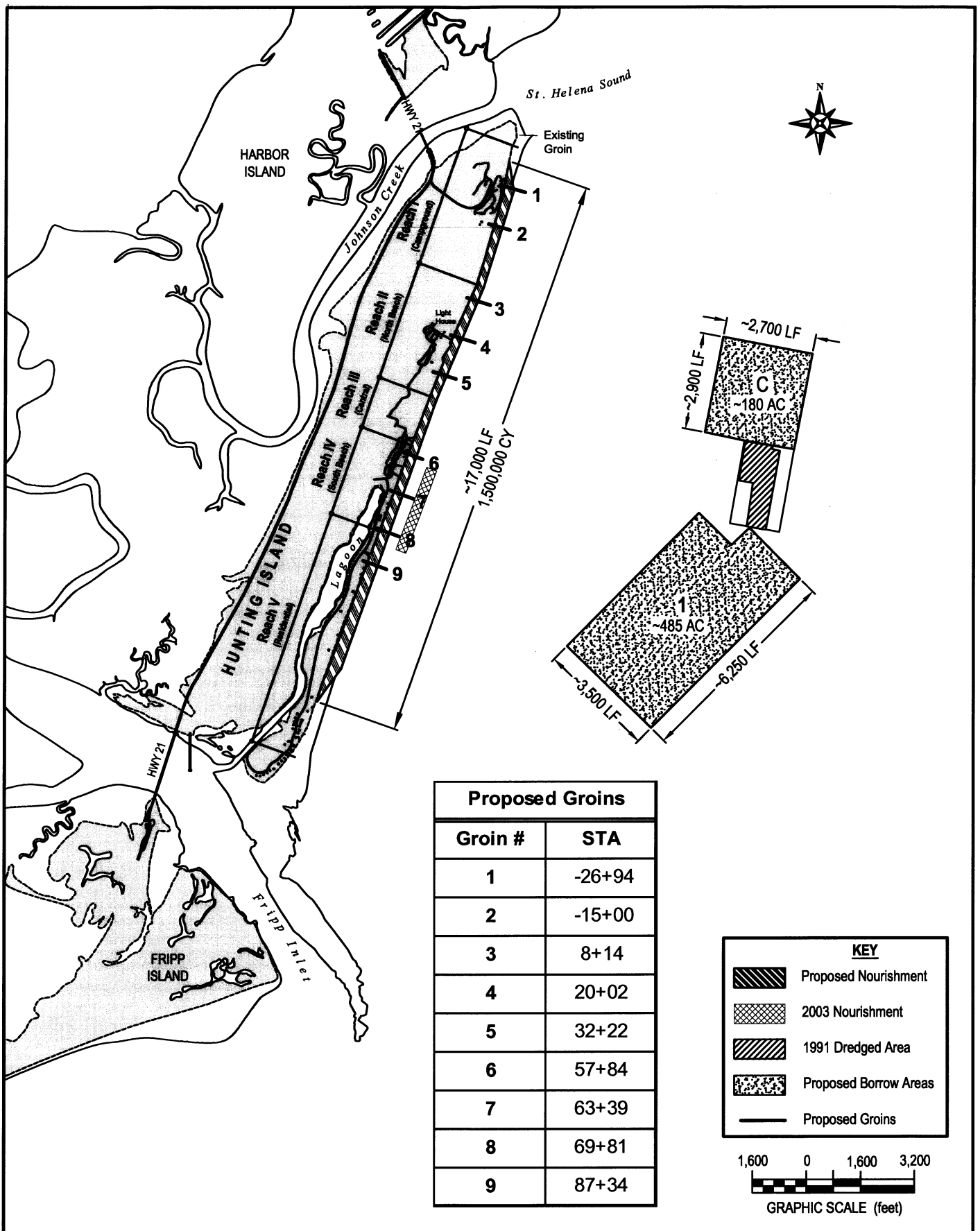
A permit must be obtained from the department for items (2) through (8).

(B) Construction, reconstruction, or alterations between the baseline and the setback line are governed as follows:

(1) Habitable structures:

(a) New habitable structures: If part of a new habitable structure is constructed seaward of the setback line, the owner must certify in writing to the department that the construction meets the following requirements:





**Project Name:**  
Hunting Island  
Beach Restoration Plan

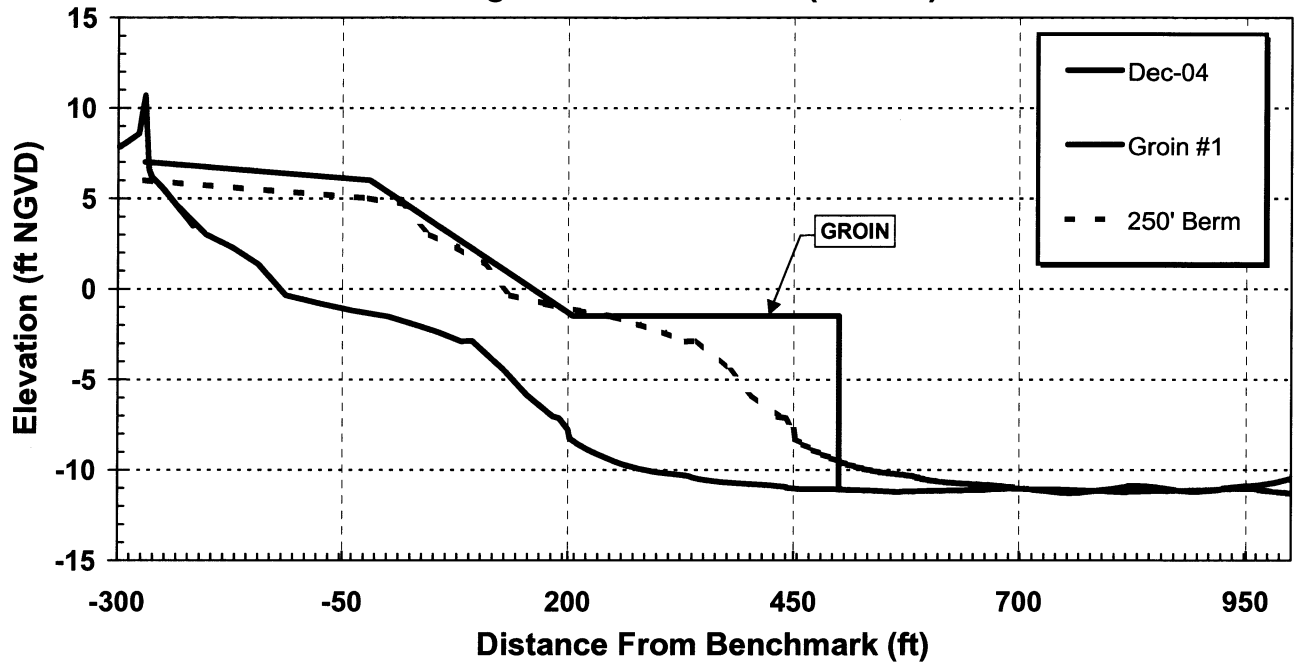
**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

30 March 2005

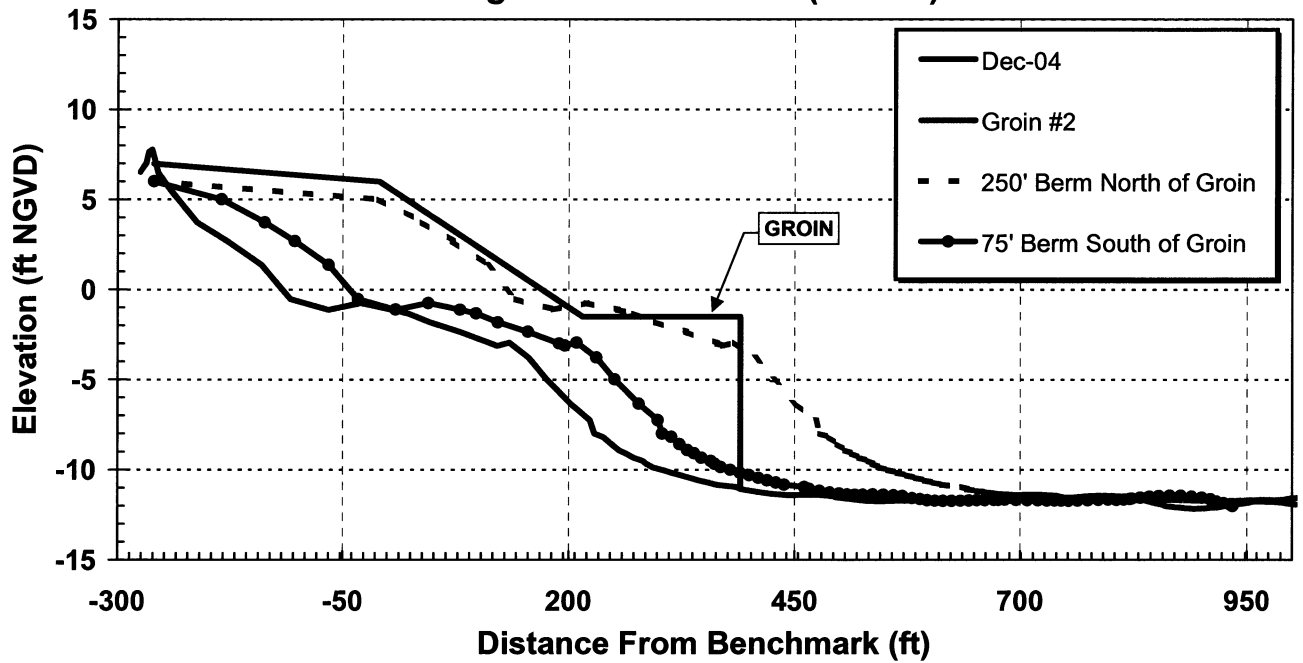
**Project Plan**

Sheet 2 of 12

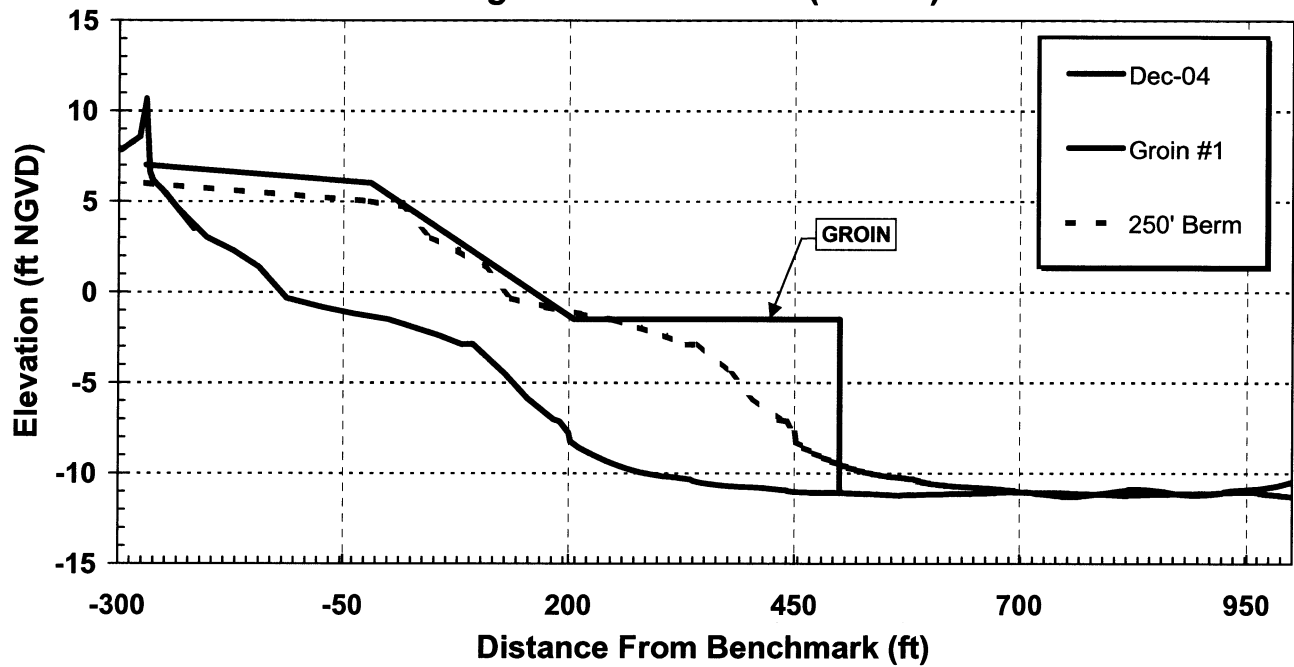
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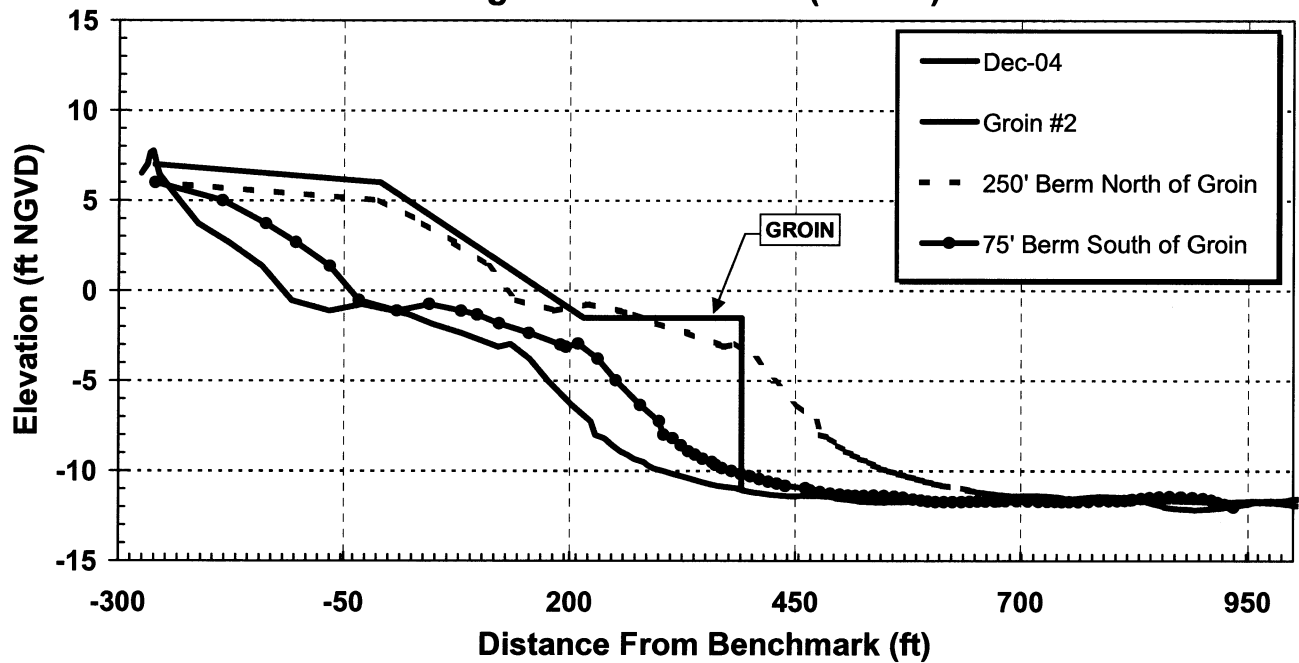
**Hunting Island Station 30 (-15+00)**



### Hunting Island Station 26 (-25+00)



### Hunting Island Station 30 (-15+00)



**Project Name:**  
Hunting Island  
Beach Restoration Plan

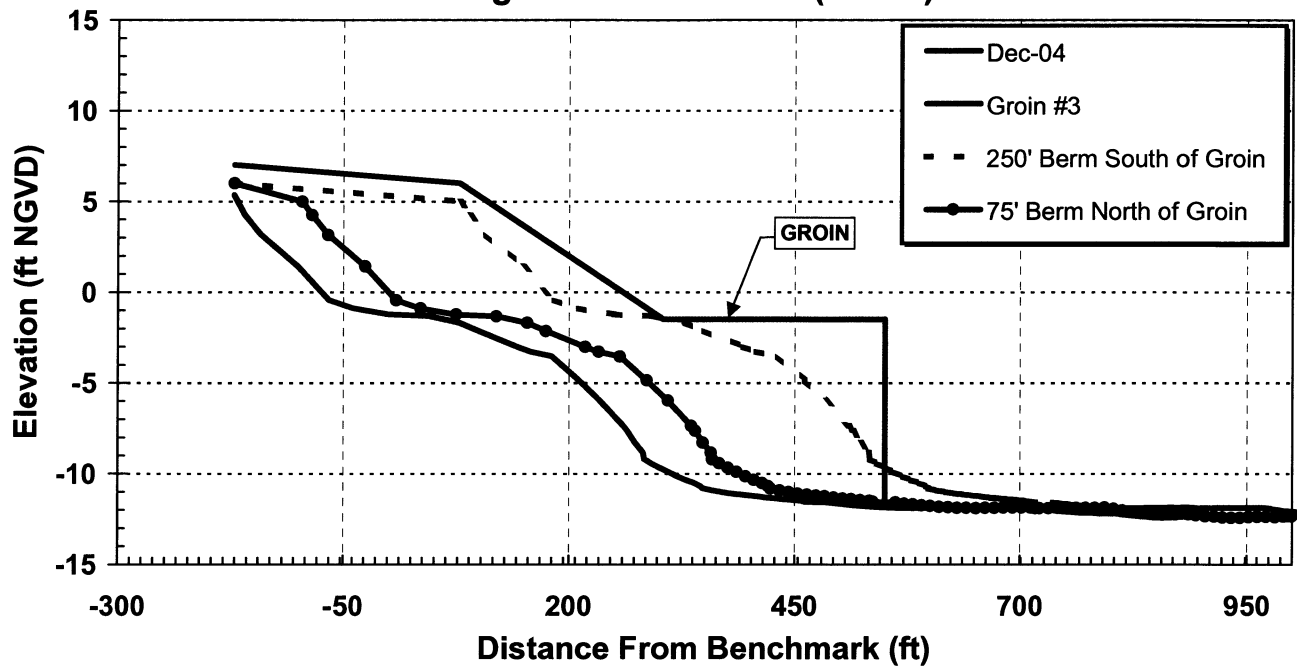
**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

**Typical Nourishment Sections**

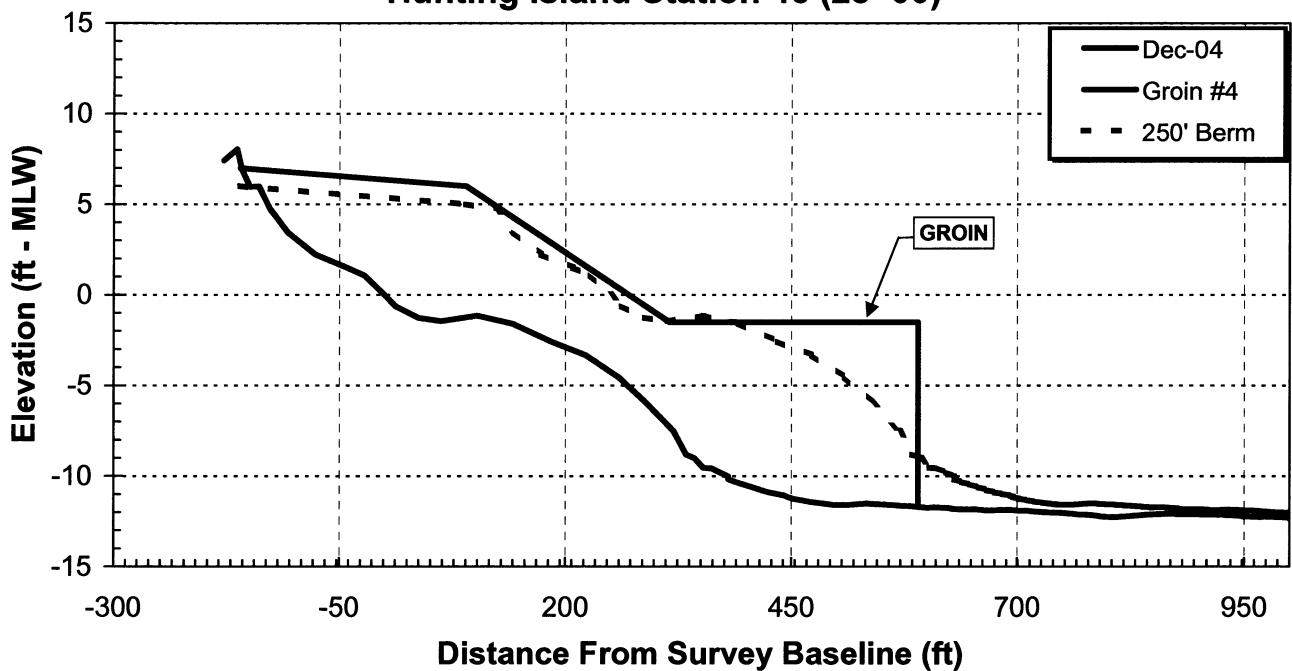
30 March 2005

Sheet 5 of 12

### Hunting Island Station 40 (10+00)



### Hunting Island Station 46 (25+00)



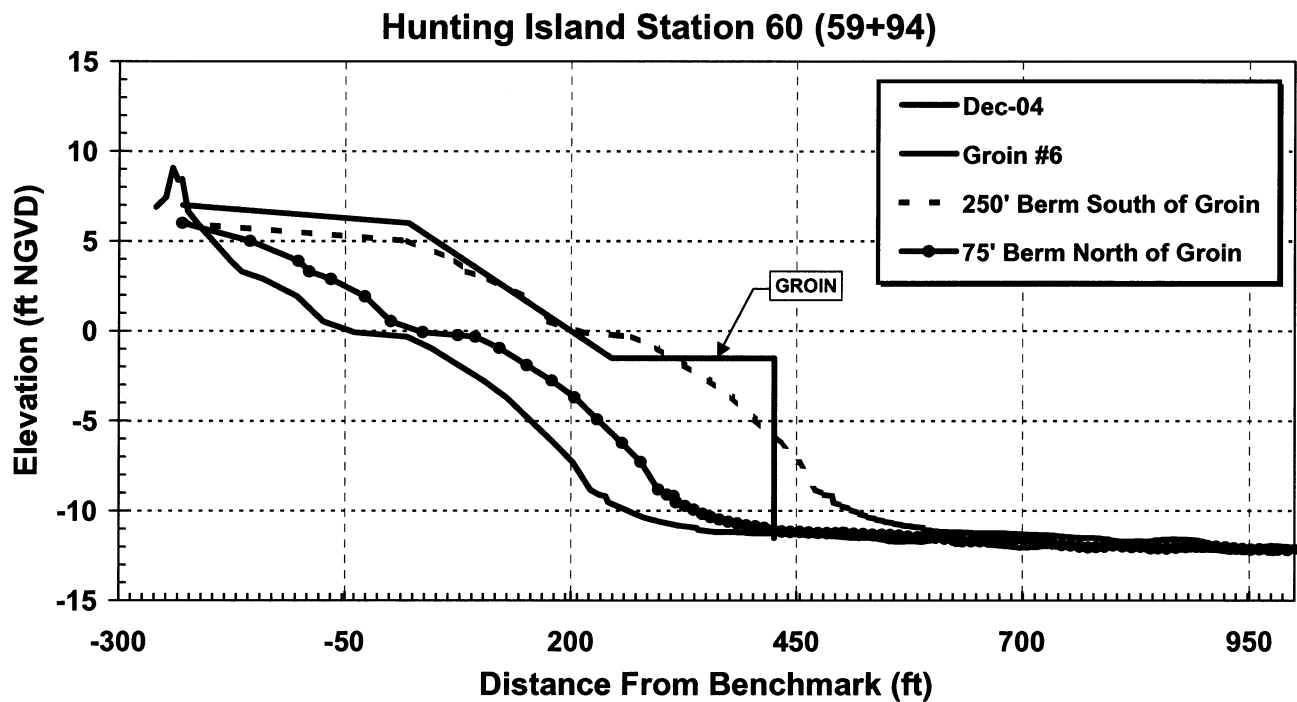
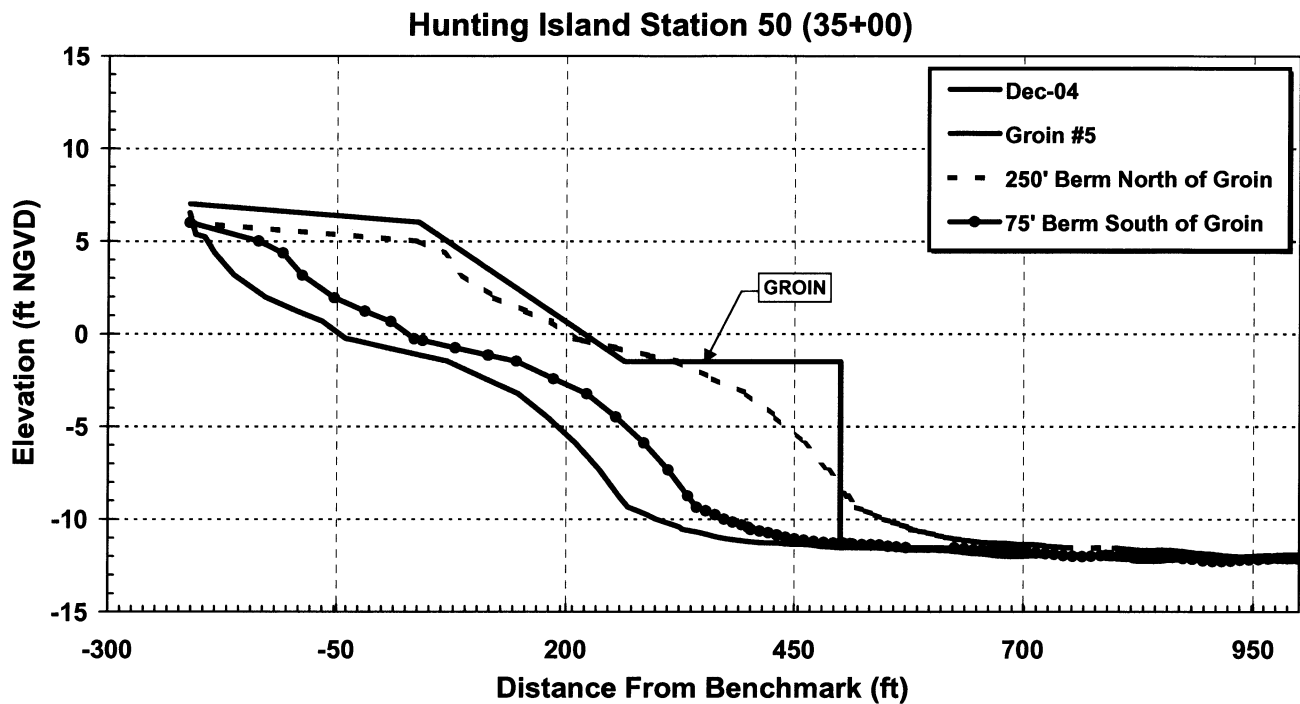
**Project Name:**  
Hunting Island  
Beach Restoration Plan

**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

**Typical Nourishment Sections**

30 March 2005

Sheet 6 of 12

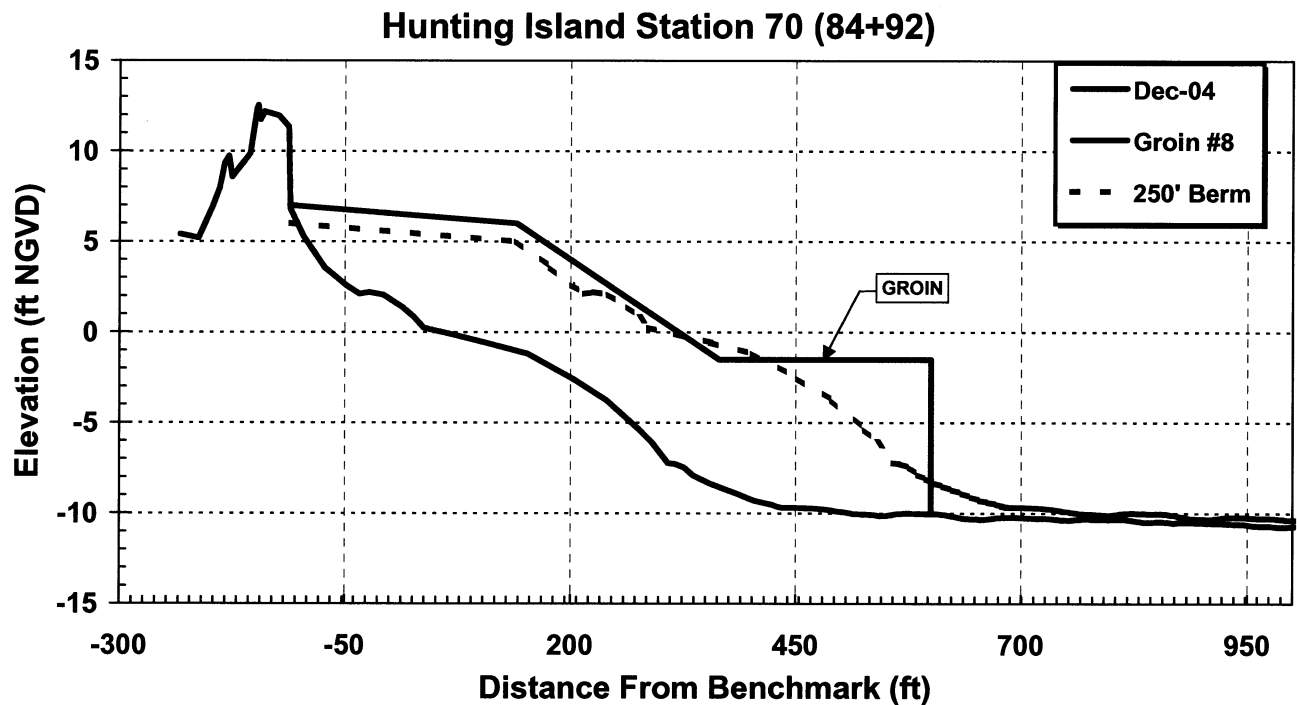
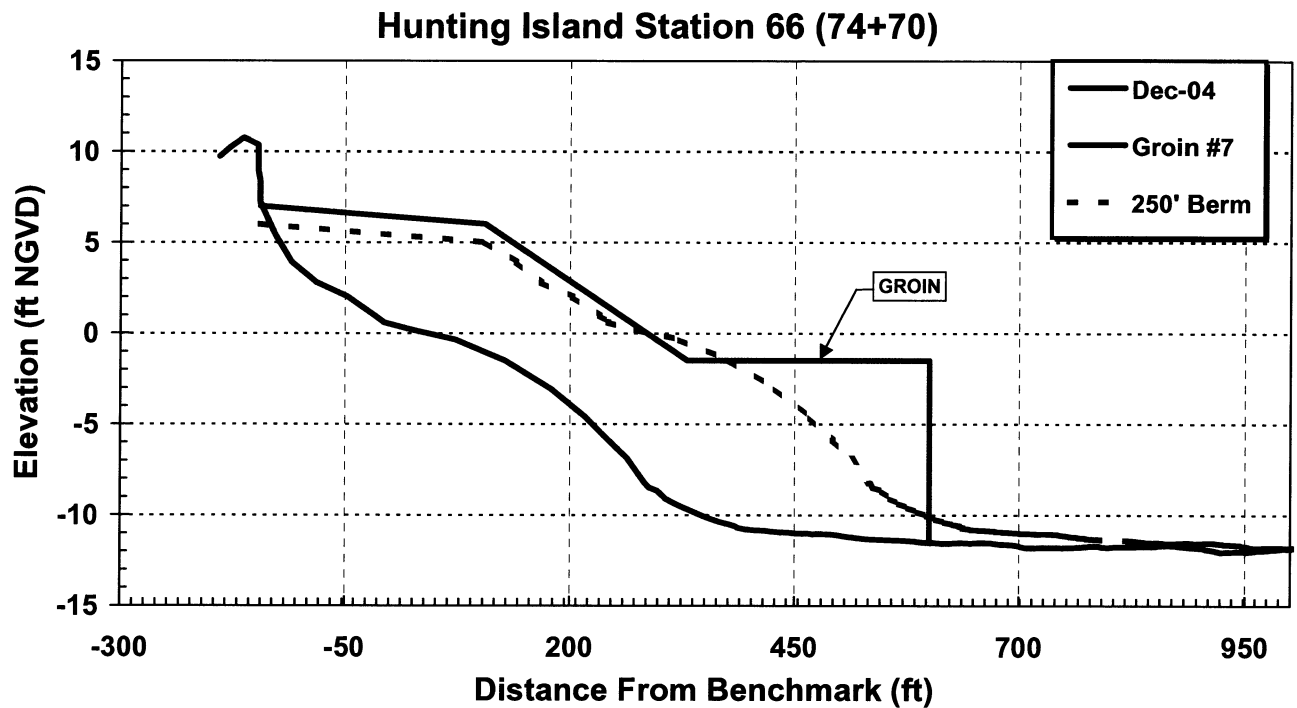


**Project Name:**  
Hunting Island  
Beach Restoration Plan

**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

**Typical Nourishment Sections**  
30 March 2005

Sheet 7 of 12



**Project Name:**  
Hunting Island  
Beach Restoration Plan

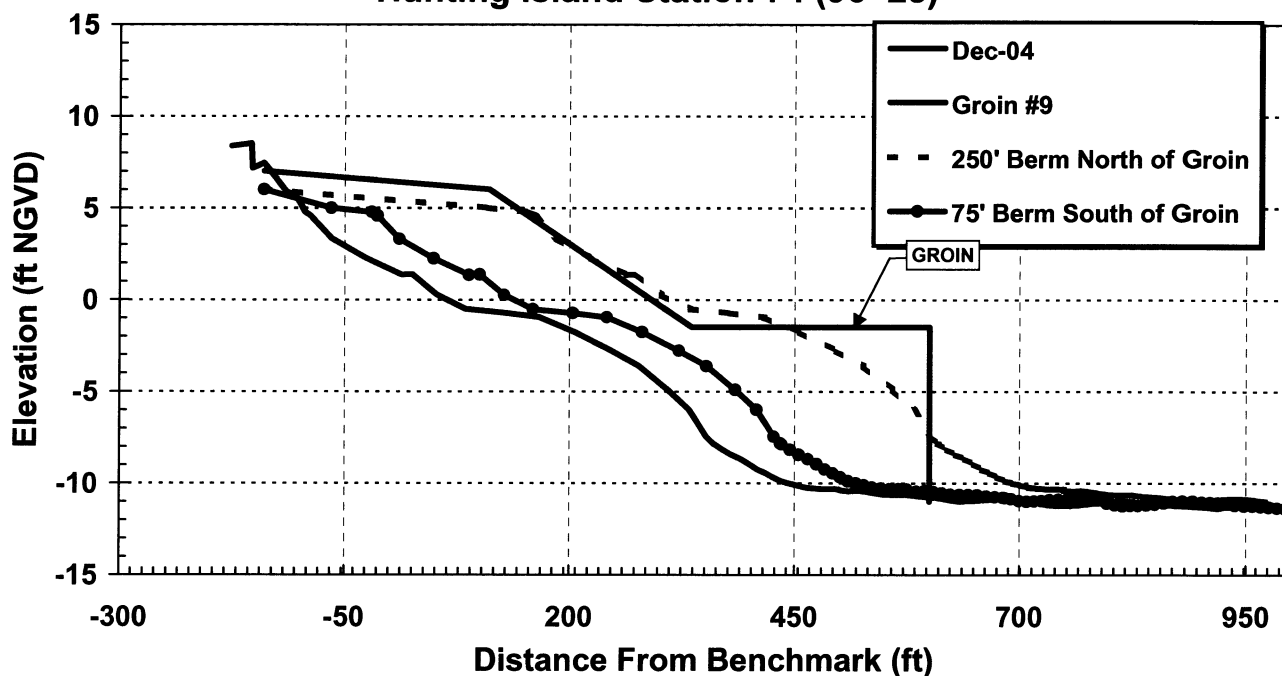
**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

**Typical Nourishment Sections**

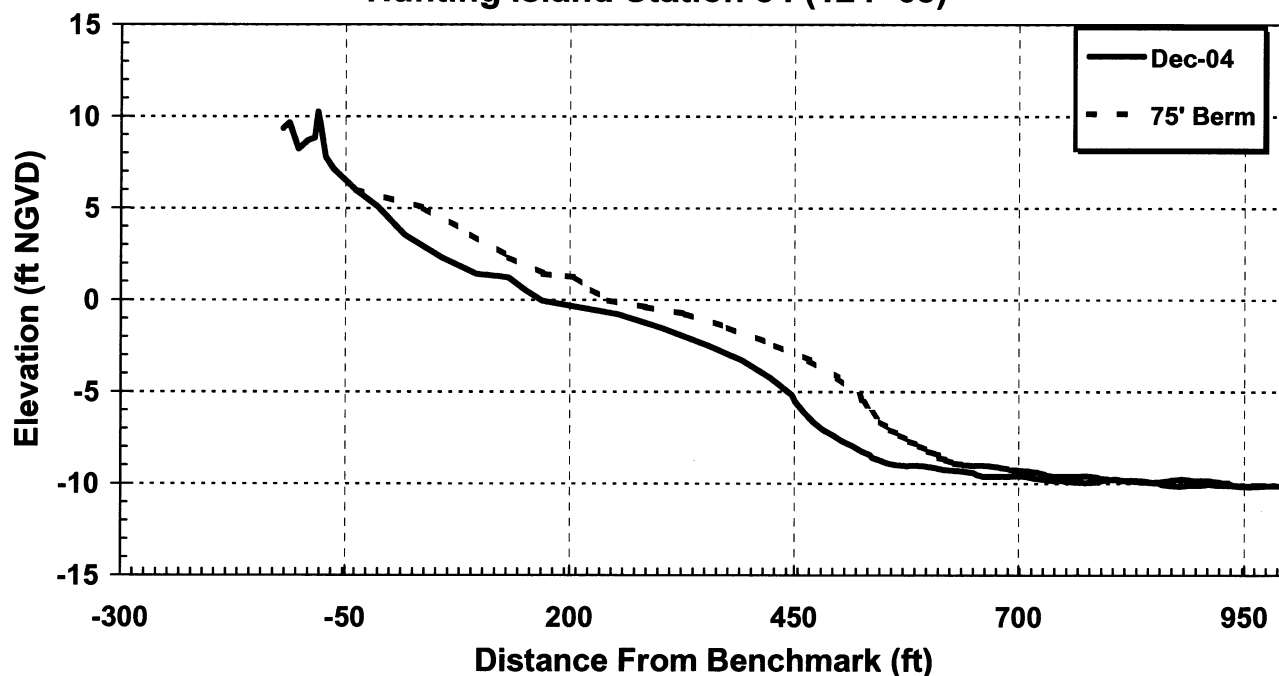
30 March 2005

Sheet 8 of 12

### Hunting Island Station 74 (96+28)



### Hunting Island Station 84 (124+68)



**Project Name:**  
Hunting Island  
Beach Restoration Plan

**Prepared For:**  
South Carolina Department of  
Parks, Recreation, and Tourism

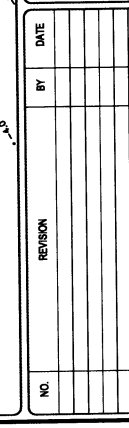
**Typical Nourishment Sections**

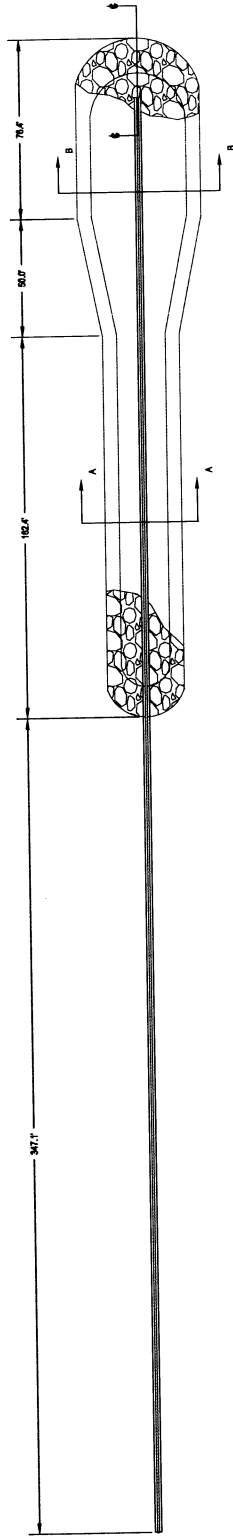
30 March 2005

Sheet 9 of 12

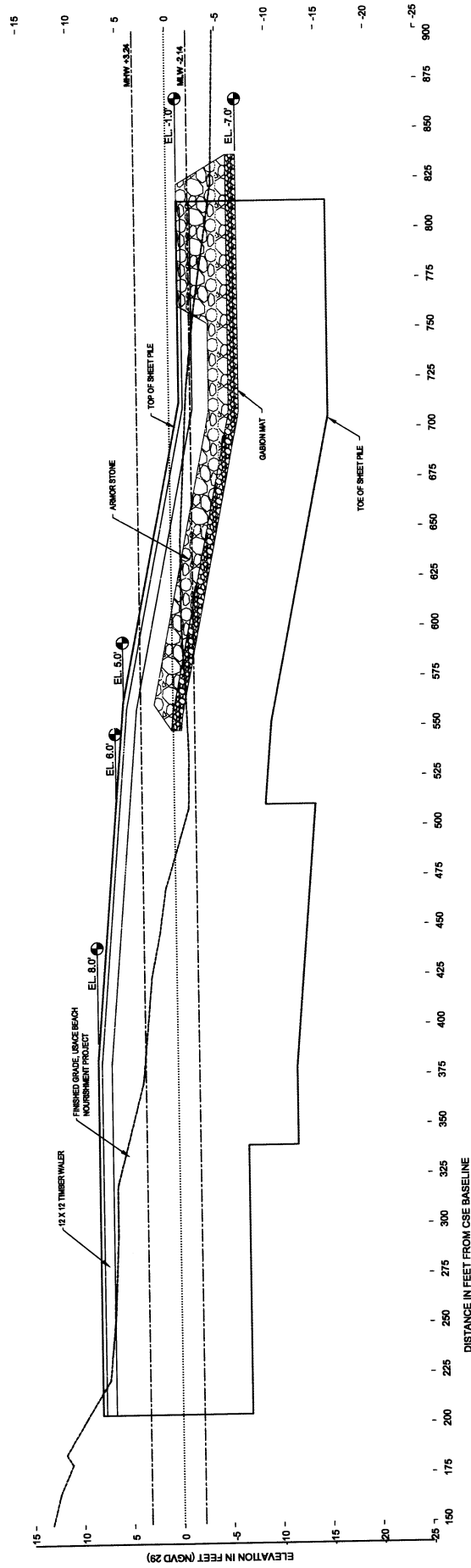








PLAN  
SCALE: 1"=25'



PROFILE  
SCALE: 1"=10' H, 1"=5' V

<b>04</b> SHEET	
SCALE: AS SHOWN DATE: OCTOBER 11, 2006 DRAWN BY: BMF/JLM APPROVED BY: JMF PROJECT: 2119	OF 4
<b>Preliminary Drawing Not For Construction</b>	
DRAWING TITLE: <b>Groin Plan/Profile</b>	
PROJECT: 2005 Terminal Groin Project No. 03-04-B Folly Beach County Park Charleston County, South Carolina	
CLIENT: Charleston County Park & Recreation Commission 861 Riverland Dr Charleston, SC 29412	
CSE COLUMBIA ENGINEERING & DESIGN Coastal Science & Engineering, LLC PO Box 180 Myrtle Beach, SC 29577 Tel: 252-222-0067 Fax: 252-222-0067	
NO. REVISION	BY DATE

## Willis, Angela

---

**From:** Gregson, Jim  
**Sent:** Monday, September 14, 2009 9:25 PM  
**To:** 'jmartin@moffattnichol.com'  
**Cc:** Willis, Angela  
**Subject:** Fw: Terminal structure site list

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

----- Original Message -----

From: Calvin Peck <cpeck@villagebhi.org>  
To: Jim Gregson <[Jim.Gregson@ncmail.net](mailto:Jim.Gregson@ncmail.net)>  
Sent: Mon Sep 14 15:20:44 2009  
Subject: Terminal structure site list

Jim  
Recommend you also consider Bonita Beach, Fl and Hilton Head, SC for your site list.

Calvin Peck  
Sent via BlackBerry



# COUNTY OF DARE

Office of the Board of Commissioners  
P.O. Box 1000, Manteo, North Carolina 27954

Warren Judge  
Chairman

Allen Burrus  
Vice-Chairman

Virginia Tillett  
Mike Johnson  
Richard Johnson  
Max Dutton  
Jack Shea

(252) 475-5700  
Fax (252) 473-6312

Katie V. Smith  
Clerk to the Board

Robert L. Outten  
County Attorney

September 23, 2009

RECEIVED  
SEP 24 2009

Morehead City DCM

NC Division of Coastal Management  
Coastal Resources Commission  
400 Commerce Ave.  
Morehead City, NC 28557

RE: **RESOLUTION REQUESTING CRC SUPPORT FOR SENATE BILL 832-AN ACT TO PROVIDE THAT THE  
CRC MAY AUTHORIZE THE CONSTRUCTION OF A TERMINAL GROIN BY VARIANCE IF CERTAIN  
CRITERIA ARE MET**

TO WHOM IT MAY CONCERN:

At their meeting held on September 21, 2009, the Dare County Board of Commissioners unanimously adopted the enclosed resolution.

Please call if you have questions.

Sincerely,

Rhonda L. Creef  
Deputy Clerk

Enclosure



# COUNTY OF DARE

Office of the Board of Commissioners  
P.O. Box 1000, Manteo, North Carolina 27954

Warren Judge  
Chairman

Allen Burrus  
Vice-Chairman

Virginia Tillett  
Mike Johnson  
Richard Johnson  
Max Dutton  
Jack Shea

(252) 475-5700  
Fax (252) 473-6312

Katie V. Smith  
Clerk to the Board

Robert L. Outten  
County Attorney

**RESOLUTION REQUESTING CRC SUPPORT FOR  
SENATE BILL 832  
AN ACT TO PROVIDE THAT THE COASTAL RESOURCES  
COMMISSION MAY AUTHORIZE THE CONSTRUCTION OF A TERMINAL  
GROIN BY VARIANCE IF CERTAIN CRITERIA ARE MET**

**WHEREAS**, North Carolina's 320 miles of coastal shoreline are national treasures and one of North Carolina's most precious natural resources, providing recreational opportunities for all North Carolina residents and visitors worldwide; and

**WHEREAS**, the shorelines of North Carolina are a valuable economic resource to the State, contributing millions of tourism dollars to the State of North Carolina, and to the coastal counties and towns of North Carolina that heavily depend upon the economic vitality of the beach communities for tourism revenue and as their critical tax base; and

**WHEREAS**, coastal erosion of the oceanfront shoreline is one of the most serious challenges facing the North Carolina coastal communities, affecting millions of dollars of public and private infrastructure, diminishing the tax base which is the life blood of coastal local governments and thereby threatening a vital and significant part of the State's coastal economy; and

**WHEREAS**, under current rules, coastal communities have few, if any, tools available to protect the shoreline infrastructure within their community and are losing both public and private infrastructure annually at alarming rates; and

**WHEREAS**, the State of North Carolina has constructed terminal groins as an inlet management tool while ensuring proper consideration of environmental issues; and

**WHEREAS**, such inlet management strategies protect wildlife habitat, wetlands, sound and creek environments while creating stable, safe and beautiful beaches, preserving the public and private infrastructure and protecting the State and local economies.

**WHEREAS**, Senate Bill 832 authorizes the Coastal resources Commission to, under certain criteria, grant variances to authorize the construction of terminal groins as a

tool to protect North Carolina's rapidly eroding shoreline and to help resolve many of the issues created by shoreline erosion.

**NOW THEREFORE BE IT RESOLVED** that the Dare County Board of Commissioners does hereby support the passage of Senate Bill 832 and strongly encourages every member of the Coastal Resources Commission to support this bill to protect the coast of North Carolina and the local economies that are dependent upon stabilized coastal beaches.

This 21<sup>st</sup> day of September, 2009.

[SEAL]

  
\_\_\_\_\_  
Chairman, Dare County Board of Commissioners

ATTEST:

  
\_\_\_\_\_  
Clerk



# The Village of Bald Head Island

September 24, 2009

**VIA E-MAIL** ([jim.gregson@ncmail.net](mailto:jim.gregson@ncmail.net))

Mr. James H. Gregson, Director  
Division of Coastal Management  
400 Commerce Avenue  
Morehead City, North Carolina 28557

Re: Village of Bald Head Island  
Terminal Groins Study

Dear Mr. Gregson:

The Village of Bald Head Island ("Village") submits this letter in support of a change in North Carolina law which would permit terminal groins as an additional tool in the regulatory toolbox of the Coastal Resources Commission. For many years, Bald Head Island has benefitted from a soft/fabric terminal groinfield to slow the loss of sand caused by shipping channel erosion.

The beneficial effects of this groinfield are well documented. In fact, the Corps of Engineers required the groinfield as a necessary condition for the 2004-2005 Clean Sweep renourishment project. However, this fabric terminal groinfield is not as robust/effective a structure as those at Oregon Inlet and Fort Macon and, therefore, potentially not as effective. Additionally, the fabric deteriorates approximately every 4-5 years (barring a severe storm event) and must be replaced at a cost of approximately \$1.0 million. To date, this cost has been borne by the taxpayers of the Village, notwithstanding contractual commitments from the Corps of Engineers to address erosion issues caused by the Wilmington harbor shipping channel. Additionally, because of rapid sand loss into the channel, the Village has borne substantial cost for beach renourishment, including approximately \$1.0 million in 1998 and \$15.0 million in 2009-2010.

The economic harm to Bald Head Island extends far beyond the recurring groinfield replacement and beach renourishment costs. Since 2002, the Village has lost

numerous lots and properties. Houses were relocated. Critical infrastructure, including utilities and roads, were damaged. Extensive sandbag placement was required to protect properties and roads. This resulted in lost property use, lost rentals, decreased tax base and revenues, and substantial reallocation of public and private resources and dollars. The property loss and damages would have been much worse had the groinfield not slowed the rate of sand loss.

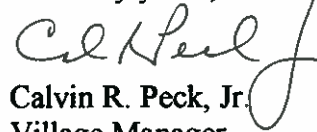
As shown by the positive experiences at Oregon Inlet, Fort Macon and numerous other locations in southern states, terminal groins can be used effectively on a long-term basis without harming the environment or adjacent properties. Attached in this regard are two studies prepared by Kevin Bodge, Ph.D.

We urge that the study being conducted by Moffat & Nichol consider, if possible, the use of a hardened terminal groin structure at Bald Head Island. I understand that our coastal engineer, Erik Olsen, P.E., previously submitted substantial data to Moffat & Nichol.

The failure to use reasonable measures, such as a terminal groin, to control man-made erosion caused by a shipping channel unnecessarily results in extensive environmental and economic damage. Attached are the reports of the Bald Head Island Conservancy (Paul Hearty, Ph.D. and Suzanne Dorsey, Ph.D.) documenting the extensive loss of rare habitat and harm to threatened species caused by recent dredging of the toe of Bald Head Island for the Wilmington harbor channel. Also attached are recent aerial and other photos documenting the erosion.

The Village supports the Division of Coastal Management's and Coastal Resources Commission's efforts to study and consider the prudent use of terminal groins to combat man-made erosion. Please contact me if any additional information would be helpful.

Sincerely yours,



Calvin R. Peck, Jr.  
Village Manager

**Attachments**

pc: Jeffrey D. Warren, Ph.D.  
Lawrence L. Lammert, Mayor  
J. Andrew Sayre, Mayor Pro Tem  
Charles S. Baldwin, IV, Esquire





ENDANGERED AND THREATENED SPECIES HABITAT  
ON “THE POINT”, BALD HEAD ISLAND

16 April, 2009

By: Suzanne E. Dorsey, Ph.D. Executive Director BHI Conservancy and Maureen Dewire,  
Senior Naturalist, Director of Education BHI Conservancy

The “Point” of land at the juncture of West Beach and South Beach, BHI is of significant and unique ecological importance. The Point is used by many different species of plants and animals in the dune/beach ecosystem and is particularly valuable habitat because of the extensive dune crest habitat – the area above the high-tide line and below the major vegetation. This wide sandy area on BHI is unique, in part, because humans rarely trespass. The dune crest habitat at the Point has been most impacted by the semiannual dredging off the coast of BHI. This year, when dredging has not been complemented by renourishment to replace eroded sand from the Point, essential habitat has disappeared—either eroded away or washed over. There is no longer any sea turtle, shorebird, or endangered plant habitat in the area known as the Point as well as adjacent beaches along West and South Beaches. According to the Endangered Species Act, any listed species are protected from take, and take includes destruction of habitat. Loss of nesting and foraging habitat would certainly fall under the definition of take. Restoration and preservation of habitat is essential for the long term survival of federally endangered or threatened species.

Affected state and federally listed flora/fauna by loss of beach at the South/West “Point”:

**SEA TURTLE:**

Loggerhead Sea Turtle: Federally listed as Threatened

Green Sea Turtle: Federally listed as Endangered

**PLANT:**

Seabeach Amaranth: Federally listed as Endangered

**BIRD:**

Least Tern: Species of Special Concern

Piping Plover: Federally listed as Threatened

Wilson’s Plover: Listed in North Carolina as a Species of Special Concern

American Oystercatcher: Species of Special Concern

Common Tern: Species of Special Concern

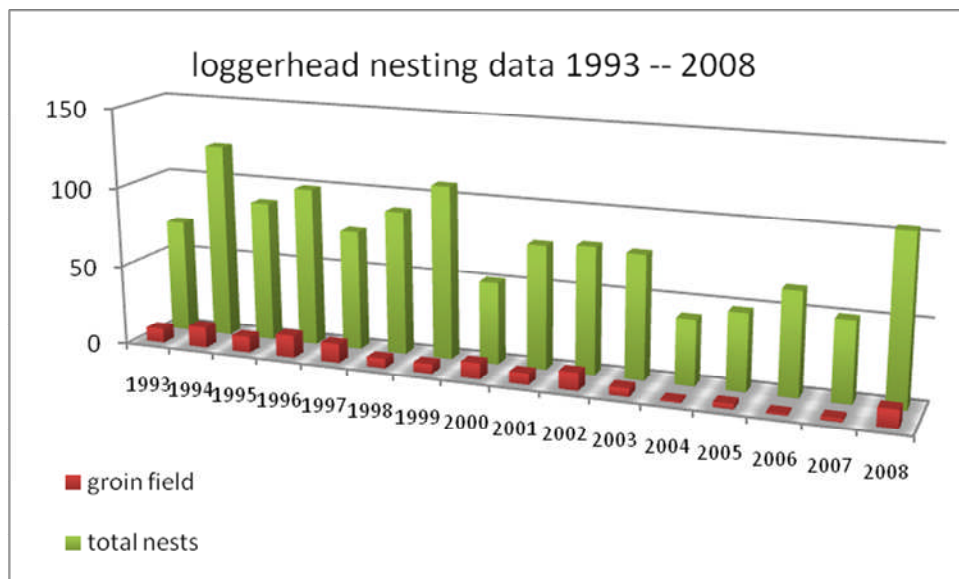
Caspian Tern: Species of Special Concern

Brown Pelican: Significantly Rare

Sandwich Tern: Watch List  
Forster's Tern: Watch List

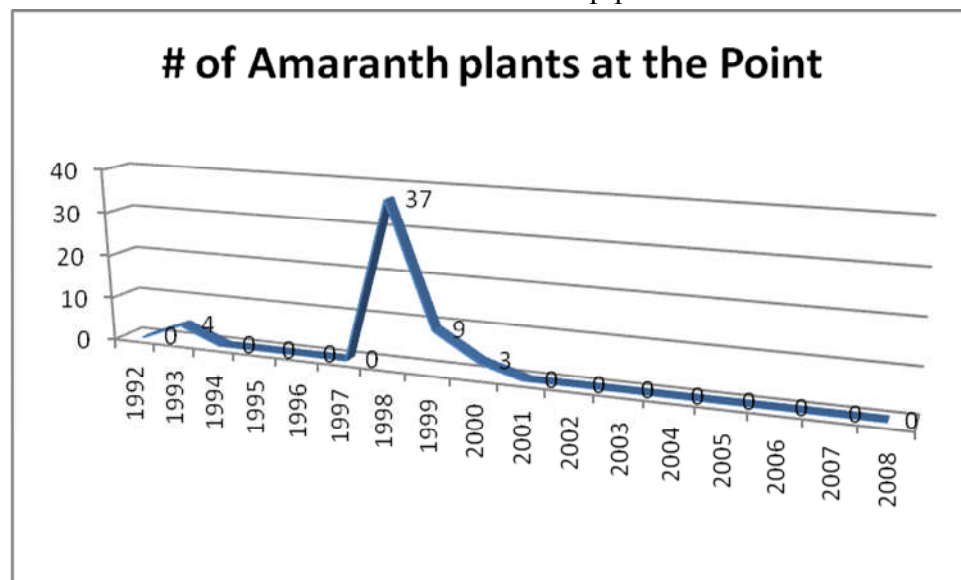
## **SEA TURTLES**

- Loggerhead and green sea turtles have both been documented nesting on Bald Head Island's beaches, including those that run east, south and west. The great majority of nests are laid by the federally threatened loggerhead sea turtle, with a handful of nests laid by the federally endangered green sea turtle. Ocean beaches in the Cape Fear region have the highest density of nesting sea turtles in North Carolina; so maintaining the integrity of their nesting habitat is key to successfully managing sea turtles in the state. These species require a sufficient amount of sand between the high tide line and dune line in order to nest successfully. The more narrow the area between the high tide line and the dune line, the more likely their nests will become inundated with water during a storm event or a simple extreme high tide caused by a full moon or strong onshore winds. Nesting beaches appropriate for sea turtles are becoming more infrequent as development encroaches on what was once suitable habitat.
  - Preliminary analysis of sea turtle nesting data show an increased variance and decreased overall number of sea turtle nests throughout the island and along the groin field from 2000 to 2008 when compared to 1993 to 1999. T-test show significant differences in nesting in both categories between these dates  $P < 0.05$ . Although sea turtles have an internal 2-3 year nesting cycle, the data below seem to demonstrate that nesting improves after nourishment—although further analysis will be needed to support this contention. Additional analysis of nesting trends on the Point will be forthcoming.



## **PLANTS:**

- Seabeach amaranth, a federally endangered plant occurring on barrier island beaches, has been documented on the beaches of BHI in scattered locations. This plant is sporadic in its appearance but has been documented by Conservancy staff annually for the past 5 years. Seabeach amaranth's primary habitat "consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of noneroding beaches. This species appears to need extensive areas of barrier island beaches and inlets functioning in a relatively natural and dynamic manner." (FWS: <http://www.fws.gov/nc-es/plant/seabamaranth.html>). It will often times occur with other mixed vegetation including sea rocket and dune spurge. Seabeach amaranth is also considered to be an effective sand binder, helping to build dunes (USFWS website, same as above).
  - Data collected by the Corps of Engineers indicates that Seabeach Amaranth was found on the "Point" until 2000. After the realignment no examples were noted. The survey was conducted in "Reach C from the area NW of the lighthouse around West Beach and South Beach to Sandpiper Trail."



- Seabeach Amaranth occurs in open sands where there is little or no competition from perennials. It is definitely much more prevalent as a colonizer of the upper beach and unvegetated sand flats above the high tide. Thus it has almost exactly the same habitat as sea rocket, piping plover nesting areas, and loggerhead turtle nesting areas. Intact dunes are highly beneficial in maintaining suitable habitat on a more constant and consistent manner for all these organisms.
  - Alan Weakley, Curator and Adjunct Asst. Professor, University NC Herbarium, NC Botanical Garden Department of Biology UNC-Chapel Hill.
- The erosion of at least 100' on the Point has likely removed a significant portion of the seed bank for this endangered species. The seed bank, seeds stored and protected underground, would have provided a source for new plants when and if conditions

improved on the Point. The level of erosion on the Point has made recolonization Seabeach amaranth unlikely without a restoration program.

## **BIRDS**

- **NESTING HABITATS**

- Least terns, piping plovers and Wilson's plovers all use similar beach habitat to lay their eggs. Nesting occurs above the high tide line but below the dune line in fairly open and un-vegetated habitat. Too much vegetation will actually deter the birds from nesting, as that vegetation will hide potential predators and the birds prefer to be in more exposed, open beach habitat. A sand/shell substrate is preferable for successful nesting. The birds lay their eggs in a small depression in the sand with the egg shell closely matching the color of the surrounding sand. This affords the birds protection against predators but also leaves them susceptible to being crushed by unknowing humans or dogs. As beach habitat is quickly being swallowed up by development and a rapid increase in human populations along the coast (53% of the United States' population lives in coastal counties), protection of essential nesting habitat for shorebirds is critical to their continued survival.

- **FORAGING HABITATS**

- Habitat such as that found on the Point are ideal for foraging and resting for dozens of species of birds. During low tide, large sand flats are exposed which provide excellent areas for foraging for a number of shorebird species. Worms, crustaceans and other invertebrates are all present below the sand and birds take advantage of this habitat, feeding for hours each day. Areas from the high tide line to the vegetation line are equally important, providing a resting spot for birds, whether they are year-round residents or migratory species in desperate need of an area to rest and re-fuel. Some of the species forage in the water just offshore (all of the tern species and brown pelican), searching for small bait fish. In between foraging trips, they will most often rest on the beach. The tern species use the sandy beach area for mating purposes as well during the months of April and May. Many of the species documented using the south/west point of the beach are here for the majority of the year (April-October) and in some cases, are year-round residents. Several are also colonial birds, preferring to be in large flocks, therefore requiring large expanses of beach to accommodate the birds.
- The Point on Bald Head Island is important foraging and resting habitat for several bird species listed in the state of North Carolina as Threatened, Species of Special Concern, Significantly Rare or Watch List. One of these species is also listed as Federally Threatened.
  - Threatened in NC:

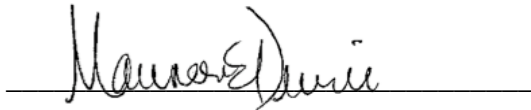
- Piping Plover (Federally Threatened as well)
- Species of Special Concern in NC:
  - American Oystercatcher – upgraded from Significantly Rare in 2006 to Species of Special Concern in 2008
  - Wilson’s Plover – upgraded from Significantly Rare in 2006 to Species of Special Concern in 2008
  - Common Tern
  - Least Tern
- Significantly Rare in NC:
  - Caspian Tern
  - Brown Pelican
- Watch List:
  - Sandwich Tern (W2 & W5)
  - Forster’s Tern (W2)

W2= Species rare to uncommon

W5 = Species with increasing amount of threats to its habitat



Suzanne E. Dorsey, Ph.D.  
Executive Director, BHI Conservancy



Maureen Dewire  
Senior Naturalist/Director of Education, BHI Conservancy

## Village of Bald Head Island – Terminal Groin Study Comments



Sandbags and Overwash – Aug. 22, 2009



Sandpiper Trail – Aug. 25, 2009

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Sunday, November 01, 2009 7:20 PM  
**To:** Walker, Michele  
**Subject:** Fw: Rushed terminal groin study already questioned

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** epdoherty  
**To:** Gregson, Jim  
**Sent:** Sun Nov 01 18:21:12 2009  
**Subject:** Rushed terminal groin study already questioned

Mr. Gregson, the below article appeared in today's Wilmington StarNews newspaper. I chaired the North Topsail Beach Beach Erosion Study Team (BEST) from April 2008 to February 2009, and have some familiarity with this issue. Terminal groins, although adamantly opposed by numerous coastal scientists, have shown to be effective in controlling beach erosion around inlets in selected North Carolina locations and elsewhere. I encourage the NCCRC to recommend approval of terminal groins with two stipulations: (1) the proposed terminal groin(s) must satisfy a stringent Environmental Impact Study (EIS); and (2) Towns interested in implementing a terminal groin would be required to commit the financial resources to remove the terminal groin if, within a specified timeframe, the groin creates economic or environmental harm. Adopting these requirements would appropriately recognize the positions of both those in favor and those opposed to terminal groins.

Thanks for your consideration of this suggestion.

Ed Doherty  
169 Old Village Lane  
North Topsail Beach, NC 28460  
(910) 328-0417

## Rushed terminal groin study already questioned



By [Gareth McGrath](#)  
[Gareth.Mcgrath@StarNewsOnline.com](mailto:Gareth.Mcgrath@StarNewsOnline.com)

Published: Saturday, October 31, 2009 at 7:23 p.m.  
Last Modified: Saturday, October 31, 2009 at 7:23 p.m.

The terminal groin study, launched last month, is in its infancy.

But the need to have a finished report on the controversial and politically charged subject for the General Assembly in just over five months – and a draft report by February – is worrying some members of the N.C. Coastal Resources Commission.

They're concerned the narrow time frame, which includes squeezing in several mandated public hearings and meetings with coastal researchers, will limit the report's ability to gauge the feasibility and environmental, economic and material impacts of the proposed erosion-control devices along the North Carolina coast.

Jim Leutze, a commission member and former chancellor of the University of North Carolina Wilmington, said he expects the study will find that terminal groins would work well in some places and not in others, hamstringing the ability of the commission to offer a definitive recommendation.

"I can't imagine we're going to hear anything substantially different from that," he said.

Terminal groins are low-slung structures, generally made of rocks or sheet metal, that extend out from a beach. Like traditional groins, the structures work by capturing sand moving along with the near-shore currents, building up the beach behind the groin. But unlike their bigger brethren, terminal groins allow material to flow over them after a certain amount has been trapped.

North Carolina has had a long-standing ban on most hardened structures along its coast. The thinking is that seawalls, groins and other hardened structures don't solve erosion woes but simply relocate them to other places along the beach.

But some coastal officials say the state's current erosion-control methods, namely expensive beach nourishment projects and ugly temporary sandbags, are ineffective around inlets.

Communities that have expressed interest in terminal groins to help protect threatened oceanfront homes and infrastructure include North Topsail Beach, Figure Eight Island, Bald Head Island, Holden Beach and Ocean Isle Beach.

The new study has generated its own controversy, first because the state hired a coastal engineering firm to lead it.

Now there are worries about how much real analysis can be done so quickly.

Commission member David Webster, who also is a UNCW biologist, said he was concerned that the five terminal groin-like structures chosen to be studied – three of which are in Florida – don't include an example of a terminal groin structure that's failed.

"So how do we measure success if we're not looking at one that's been an abysmal failure?" he said.

But Thursday parties on both sides of the issue stressed that they hoped the study, even with all of its challenges, would be fair and transparent.



“Let’s just all keep an open mind,” said Ocean Isle Beach Mayor Debbie Smith.

Todd Miller, executive director of the N.C. Coastal Federation, said it was important that the evaluation and analysis be thorough enough to give the study’s findings credibility.

But State Rep. Frank Iler, who represents Brunswick County, echoed the sentiment of many worried and frustrated coastal officials and residents in stating that the need for another “tool” in the beach-management toolbox was sooner rather than later.

“If not this, then what?” he said. “If not now, then when?”

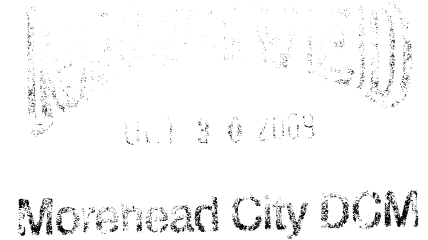
Gareth McGrath: 343-2384

On Twitter.com: @Gman2000



October 29, 2009

Mr. Jim Gregson, Director  
Coastal Resource Commission  
400 Commerce Avenue  
Morehead City, NC 28557



Dear Mr. Gregson:

Bald Head Island has benefitted from a successful groin field for many years and we believe that a more robust structure may be helpful and more cost-effective than the fabric bags which must be replaced. Much of this groin field has been located directly adjacent to Bald Head Island Club property and has been beneficial in retaining and maintaining the beach and protective dunes for years.

The Club has substantial assets at risk, not to mention the income generated by those assets. Our infrastructure appraises at over \$12 million alone not including the golf course. Because of where we are located, we would be greatly affected if the public infrastructure such as roads and utilities were compromised.

The impact of erosion on new memberships can not be understated and the same can be said for potential rental property income loss for our members who rent their homes.

It is the Club's belief that there is a necessity for a terminal groin(s) and we support the efforts of the Village of Bald Head Island to protect all assets of Bald Head Island residents, property owners and businesses.

The Bald Head Island Club commends the CRC for its study of terminal groins in suitable locations and looks forward to the study results.

Sincerely,

A handwritten signature in cursive script that reads "Gene Ramm".

Gene Ramm  
President  
Bald Head Island Club Board of Governors

October 26, 2009

To: Members, North Carolina Coastal Resources Commission

Subject: **CRC Feasibility Study – Terminal Groins**

I am a resident of North Carolina residing on Bald Head Island and offer the following comments that I hope will be considered by the full CRC during deliberations considering the advisability of allowing Terminal Groins in North Carolina.

My comments are made as a concerned resident of a barrier island that has experienced more than 1 million cu. yds. of localized public beach erosion in the past 10 to 11 months alone. We are of the opinion that this accelerated erosion is associated with the Wilmington Harbor Channel which, at its new depth, breadth, and proximity to Bald Head Island has significantly altered the historic sediment flow patterns in the mouth of the Cape Fear River.

The southwestern tip of Bald Head is demonstrably the end of a small sediment movement cell that is heavily influenced by tides, wave action, and the navigation channel; down drift sediment flow simply acts to fill the 42 foot deep man-made navigation channel and then blocks the channel or moves with the rapidly flowing flood and ebb tides onto shoals across the channel from Bald Head in the mouth of the river or into the estuarine waters to the north. At least one North Carolina geologist has stated that the navigation channel has completely changed the littoral flow of sediment in the waters around Bald Head Island.

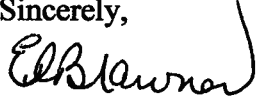
For academics to generalize and reach a conclusion that Terminal Groins are **ALWAYS BAD** is to create a position that is almost certainly wrong. It is likely, for example, that the “taking” of the southwestern corner of Bald Head Island by the Wilmington Harbor Project, can only be addressed by additional man-made structures that will retain sand on the southern tip of Bald Head Island and prevent the rapid filling of the navigation channel that is so costly to maintain.

The feasibility of terminal groins must be made real, available, and achievable for the several portions of the North Carolina coast that can logically support their use and ensure minimal and manageable downstream erosion impact. To deny consideration of Terminal Groins is to unnecessarily restrict the extremely limited arsenal of potential actions available to address a given problem.

It is simply incomprehensible that North Carolina could allow only sandbags as a remedy for any damages that might result to private or public property as a result of the accelerated erosion resulting from the navigation channel.

Thank you for allowing my comments to be heard and considered. North Carolina is a wonderful State with wonderful beaches; please do all that you can to facilitate protection of these beaches by recommending that Terminal Groins be allowed in North Carolina where appropriate and positively functional.

Sincerely,

A handwritten signature in black ink, appearing to read "E. I. Brawner". The signature is fluid and cursive, with a large, sweeping loop at the end.

E. I. Brawner  
Post Office Box 3060  
6 Pintail Court  
Bald Head Island, NC 28461

910-454-9103

Public Hearing  
CRC Study of the Feasibility and Advisability of the Use of Terminal Groins  
Thursday, October 29, 2009

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A presentation was given by Paul Tschirky of Moffatt and Nichol prior to the public hearing.

Paul Tschirky stated this study comes from House Bill 709. The Bill specified six items that should be considered in this study. Three public hearings are required during this study. The final report and CRC recommendations are due to the General Assembly and the Environmental Review Commission on April 1, 2010. The contract study team to look at data gathering and information of the feasibility of terminal groins is made up of Moffatt and Nichol. Dial Cordy and Associates will handle the environmental aspects. Dr. Duncan Fitzgerald from Boston University will help with the coastal geology and Dr. Chris Dumas of UNCW will look at the economic aspect. The scope of work consists of eight tasks which follow along with the six items identified in HB709. The study team will look at the information and the CRC and CRAC will provide guidance to the team. The CRC will be responsible for any policy conclusions and recommendations that are supplied to the ERC and General Assembly. The Science Panel has been involved in the scoping and will be involved in the peer review of the documents. The team will provide the Science Panel with memos describing methodologies and analysis for their review and comment. The team met with the Science Panel on September 29 and five sites were chosen. There are four public hearings currently scheduled. The Division of Coastal Management's website will contain the terminal groin presentations, meeting summaries, and public comments. In his role as Executive Secretary of the CRC, Jim Gregson is the e-mail contact for any comments. The draft report is due at the beginning of February and the final report is due to the CRC on March 1, 2010 so they can give their input to the Legislature by April 1. The team is ending the first phase of data collection mode. The team will finalize the data collection, meet with the Science Panel to discuss the data collection and methodology, and the next CRC meeting and public hearing will be in Raleigh on January 13.

The following public comments were received:

Andy Sayre stated he represents the Village Council of Bald Head Island. In preparation for the nourishment project we had some survey information that we would like to share with the CRC. As you know, in the springtime, we had the dredging of the Wilmington Harbor Channel with the sand dredge going over to Caswell Beach and not on Bald Head Island. From May 2009 to September 2009, actually less than five months we lost 700,000 cubic yards of sand. For the eleventh month period of November 2009 to September 2009 we lost 1,050,000 cubic yards of sand. Our historical loss is 300,000 cubic yards of sand per year. We are in a critical situation. In anticipation of what we projected to be a much less serious situation, knowing that the dredged material would not be put on our beaches in this cycle, the Village recently sold general obligation bonds of \$15,000,000.00 to be paid off over six years. This money plus more from general revenue will fund a private sand placement project which has been five years in the planning. This completely privately funded project will deposit about 1,500,000 cubic yards of sand on our beaches. In other words we are barely keeping up and it has become obvious that the present strategy for shoreline stabilization along this federal navigation channel is ineffective and unsustainable. One of our goals is to have the channel moved westward to diminish this impact. However, it is our firm belief that a robust terminal groin or groin field is essential in order for us to manage the unnatural erosion caused by the channel.

Marty Cooke of the Brunswick County Commission stated there are many people who are very passionate on both sides of this issue, but not only do I serve as a county commissioner I have a business at Ocean Isle Beach and have seen through the years the realities of beach renourishment and erosion. I believe that terminal groins from what I have seen based on reports that were presented to this board in June as well as other research that we have seen from other terminal groins up and down the coast that they show to be a stable and establishment of a permanent structure that will allow us to have stability with respect to our beaches. We see this with respect to the evidence that was presented in June regarding the Pea Island Oregon Inlet bridge. We know the state of North Carolina had to find a viable and effective means to be able to stabilize the bridge structure. We also see it at Fort Macon with respect to the stability of that area and to present a way of preserving that historic fort. We see the same thing with respect to the aspects of our area beaches and we feel like it would do a variety of things. The beaches are not just beaches they are towns. The inlets aren't just inlets, they are highways. We have a stability issue whereas we would like to be able to retain the tax base and infrastructure and we would like to see this board look past the mischaracterization that we see in the media as it being presented as jetties. We would like to see the agendas by some individuals and organizations to go past that and look at scientific studies. We would like for this to be brought forth so this board can look at this as a viable means as an option to the situations that we see throughout North Carolina.

Frank Iler, N.C. House of Representatives District 17, stated District 17 includes about ninety percent of Brunswick County including all of the coastal area of Brunswick County. We almost had an opportunity to vote on a Bill that would authorize this Commission to permit terminal groins this year. The next opportunity will be in May after the report from the CRC. What we have been hearing is there is a need for another tool for the CRC in the toolbox to stabilize inlets, protect turtle habitat, protect property, etc. As you know I represent Brunswick County of which there are citizens and officials who are very interested in this subject. As far as the study we are discussing today, I appreciate the extra hearing being scheduled in Wilmington February 17. I hope there will be at least two things considered. One would be an exercise of smart planning to consider all viable alternatives as opposed to the continued expense of dredging and other temporary solutions. Number two would be that the study be driven by facts, by the science and not by personal or group agendas. As a member of the House of Representatives I am pretty frustrated that the Bill authorizing the tool for the CRC, not the study, to have terminal groins as an option passed the Senate with about eighty percent of the vote. It was held up in a House Committee by agendas based on bad science. It has been endorsed by the Senate President Pro-Tem Marc Basnight; I believe he recently transmitted a letter to the CRC Chairman. He has been in support of it and it has been very bipartisan in nature as far as the House is concerned as well as the Senate. What we are asking for is for the people's representatives in the House to be given a chance to vote on the issue. We would like to debate just like the Senate did and if it passes the House it would be another tool in the toolbox for this group to permit or decide not to permit. If not this then what? If not now then when?

Debbie Smith, Mayor of Ocean Isle Beach, stated there are emotions on both sides of this issue. We are faced with a unique opportunity right now to look at the science and to study situations where there have been terminal groins in place for short periods of time and for long periods of time. I hope we will all keep an open mind that we will do what is the best for the coast of North Carolina. You know I am a proponent and think a terminal groin will be a useful tool. But, if this study proves that it is not, then I am not in favor of doing what is not the best for our coast. Let's just all keep an open mind and know that we do the right thing. There was much discussion this morning about exactly what a

terminal groin is and you have all seen pictures, but I would challenge you that while you are on this island today to drive north five or six miles and walk out on the beach and see what the actual effect is of a terminal groin on the public strand and what it can do to protect what it is designed to protect.

Win Batten, Mayor Town of Warsaw, stated I don't know if I am for groins or not because I don't really know how they work. I have seen Fort Macon and I have visited some other places and they seem to be working fine in certain locations. I don't know how they might work in our location. I am from the Town of Warsaw but I also own property on North Topsail Beach. I am concerned more about that situation. I think that any approach that we take to this is going to have to be somewhat site specific. I think that if you look at a particular inlet or a particular area there are different economic factors that are involved and different uses involved and if you don't get down to site specifics I don't know how you can equate those economic issues into it. For example, the group that I am associated with spent over \$353,000.00 this past year hauling sand in to put in front of our buildings and that is certainly an economic factor that we have to be concerned about. I think that we need to be able to look at things and say that this inlet or that inlet or that area of the beach deserves protection more or less than some other area does. Site specific may be something that we need to consider. The other thing is that I hope that we will get input that will tell us if this is the way to go or is it not the way to go. If it is the way to go then let's start doing something with it and if it isn't the way to go then let's figure out some other way. Today we have heard from the engineering firm that is doing the study, but we have not heard from any other components of the study committee. I hope that we will have input from them so that we can understand what their factors and issues are in the use of groins.

Charles Baldwin of Rountree Losee and Baldwin representing the Village of Bald Head Island stated he wanted to reiterate some of the concerns that you have heard that we study this issue properly and that if it is appropriate in certain locations that this be considered another tool in the toolbox. Obviously the Island is very concerned about what it does next. We have spent all of our money to put sand on our beach and now what? We are hoping that this study might be an opportunity to look more specifically at Bald Head, but understand after the presentation today the limitations of what this study can and cannot achieve. I commend the Commission for the thought that has been put into this and the process that has been put in place and look forward to seeing results. The Village sent a letter to that effect to Mr. Gregson on September 24. I also have a letter dated October 26 from Bald Head Island resident, Mr. Joe Garner and I will submit that to Mr. Gregson.

Todd Miller, North Carolina Coastal Federation, stated he would like to endorse some of the comments that have been made by several people here today that right now the most important thing is that we have a thorough study and evaluation of the feasibility of these proposed structures. The critical issue at this stage in the CRC's deliberations in carrying out this study is to make sure that the process has been well thought through and that everyone will have confidence in the outcome of the study. I want to congratulate Bob and other members of the Commission who have put a lot of effort into making sure that the process is visible. As this goes forward, the work that has gone into thinking about how to structure this so that all views get heard and that the analysis is credible is very important. In that vein I would encourage as quickly as possible to focus on the calendar that you will be following and specifically meeting dates as you have a lot of really busy people involved in this with the science panel and other parties and scheduling meetings at the last minute is unfair in terms of getting the full participation that is needed. I would encourage members of the Commission to attend the science panel meetings to hear the discussion that goes on. The science panel as it is comprised has broad representation and interest in the meetings that have been held so far on this study. The more you can take in of the discussions the better equipped you will be to make policy recommendations when you

get the report. It was interesting to me that when we really got down to where is there experience with terminal groins that we found through the work of the science panel that there are actually very few places with any relevance to North Carolina's situation. The five sites that were selected were really stretching it in terms of experience and how these five case studies are carried out and how thorough they are will really be some of the best information in terms of what groins do and what the experiences have been. There is a lot of emphasis being placed on the peer review that will occur. There is one area that the science panel is very weak in being able to do the peer review and that is the economic analysis. As most if not all of the members have a natural science or engineering background and the panel does not have any economists. This should be circulated out more broadly and I know you will do this through public comment. In my opinion so far this has been the least talked through element in terms of what will be done with the limited resources that have been provided for the economics and making sure that it is relevant to the decisions that have to be made. In closing I would just state that the science and the economics will be important in the final policy making, but when you receive this information you will need to look at your permitting authorities and how you have to make decisions because the expectation to the public is that you are going to be able to make correct decisions on these proposals if you are given the authority to do it on a consistent basis to protect the public trust beach. The level of certainty that comes out of this information is going to be pretty important in terms of whether or not the CRC is in a position based on the Coastal Area Management Act to make good permit decisions.

Harry Simmons, Town of Caswell Beach, stated I have been to and seen four of the five terminal groins that are in the study collection and there is a lot that can be learned for North Carolina by those sites. I was at John's Pass about two weeks ago from the boat side and from the land side of the terminal groin and it is a marvelous structure. The one that is in Amelia Island, which is the one that I haven't seen, on paper seems to be a fabulous opportunity for North Carolina to consider something like it. A leaky terminal groin if you will. I encourage you as did Todd to seek all the input that you can possibly get in the time that you have to do it in and good luck.

Don Martin, Mayor North Topsail Beach, stated our inlet is very unique in that we could probably use this terminal groin on our beach to stop beach erosion. To the north is Camp Lejeune and it will not affect Camp Lejeune a bit. But to the right is our beach and it has beach erosion very badly so we hope that you will take this into consideration and do the best you can.

Public Hearing was closed at 6:07 p.m.



**Bob Oakes**  
Mayor

**Wayne Gray**  
Mayor Pro Tem

**Cliff Ogburn**  
Town Manager



**Town of Nags Head**  
Post Office Box 99  
Nags Head, North Carolina 27959  
Telephone 252-441-5508  
Fax 252-441-0776  
[www.townofnagshead.net](http://www.townofnagshead.net)

**Doug Remaley**  
Commissioner

**Anna D. Sadler**  
Commissioner

**Vacant**  
Commissioner

December 16, 2009

Bob Emory, Chair  
NC Coastal Resources Commission  
112 Camelia Road  
New Bern, NC 28562

Dear Mr. Emory:

The Town of Nags Head Board of Commissioners supports the study and use of terminal groins as a sand management and beach nourishment preservation tool. In conjunction with a nourishment project, a terminal groin has the potential to better protect our beach, and retain sand that will be placed on the beach. A terminal groin can be a valuable tool for our community and other coastal communities that seek to preserve their beaches.

The State of North Carolina has authorized and constructed terminal groins in select cases. With proper environmental considerations, terminal groins at the end of littoral cells can become a part of our beach and sand management plan for the coast of North Carolina.

Please consider the dramatic potential improvement in the effectiveness and longevity of a local beach nourishment project with the addition of a terminal groin to anchor such a project.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Oakes", is written over the word "Sincerely,".

Bob Oakes  
Mayor  
Town of Nags Head

December 16, 2009

Attached are documents showing erosion problems downstream from two terminal groins. The first groin, built in the Ocean City, Maryland, Inlet in 1934 and 1935, has caused severe erosion on Assateague Island to the south. The enclosed flyer shows the erosion that has pushed Assateague substantially to the west.

At Oregon Inlet, construction of a terminal groin in 1991 has exacerbated erosion, despite beach nourishment on Pea Island that totaled hundreds of thousands of cubic yards of sand from the maintenance dredging of Oregon Inlet. These photos show the loss of a stable, vegetated area east of Highway 12 since the groin's construction. Instead of stable vegetation, the east side is now characterized by blow-outs and migrating dunes. If not for the nourishment, the erosion would have been much worse.

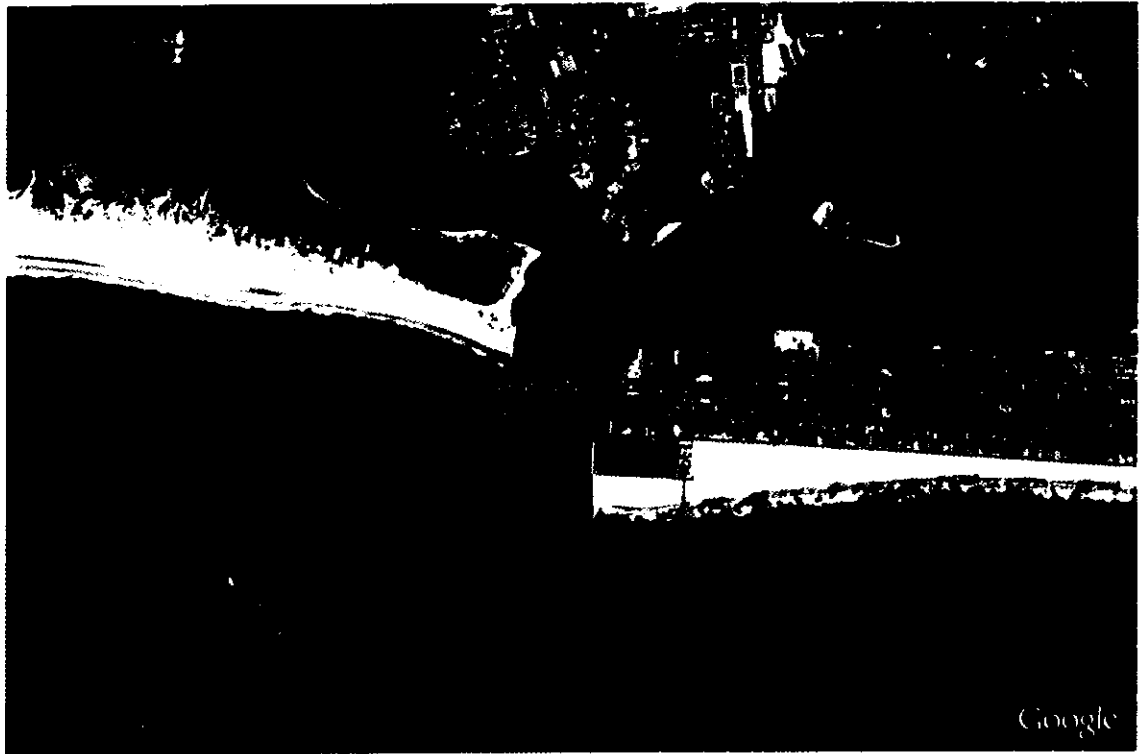
Terminal groins have been known for decades to cause downstream erosion. The Oregon Inlet groin is no different.



Jan DeBlieu  
Cape Hatteras Coastkeeper



## OCEAN CITY INLET, MARYLAND FACT SHEET



**Figure 1.** Ocean City Inlet (2005)

Source: GoogleEarth

**Origin:** Opened in 1933 during a storm, separates Fenwick Island (Ocean City) from uninhabited Assateague Island

### **History of Hardened Structures:**

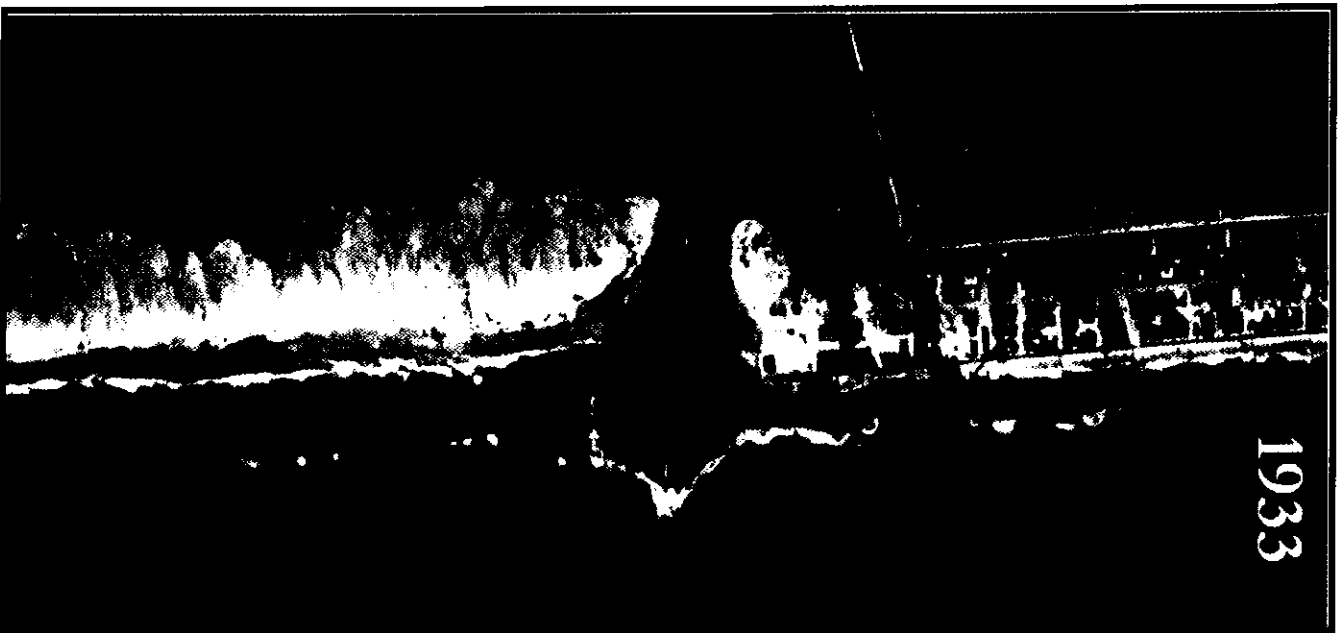
- An inlet had been authorized by Congress at a site 8 km south of the Ocean City inlet. Congress decided instead to stabilize the newly formed inlet.
- The 1,100 ft. north jetty was completed in 1934 and the 2,380 ft. south jetty was completed in 1935.

### **Jetty Impacts:**

- The littoral drift was interrupted:
  - Erosion along the northern part of Assateague Island increased from an average of **3 ft./year** to approximately **40 ft./year**.
  - The Assateague Island ocean shoreline has receded westward more than **350 meters (1148 ft.)** since 1935.

### **Cost of Impact to Assateague Island:**

- The first phase of the Assateague Island Restoration Project was completed in 2002 at a cost of **\$13.2 million**.
- The second phase began in 2004 is estimated to cost a total of **\$50 million** and is attempting to bypass **180,000 cu. yds** of sand per year.



The Ocean City inlet shortly after its opening; there are no jetties present. Uninhabited Assateague Island (bottom of photograph) closely resembled Fenwick Island in width and shoreline location.

Photo source: <http://www.oceanscience.net/intetsonline/>



Fenwick and Assateague Islands, less than 30 years after construction of dual jetties. Assateague Island, starved of sand, retreated landward and lost substantial beach width.

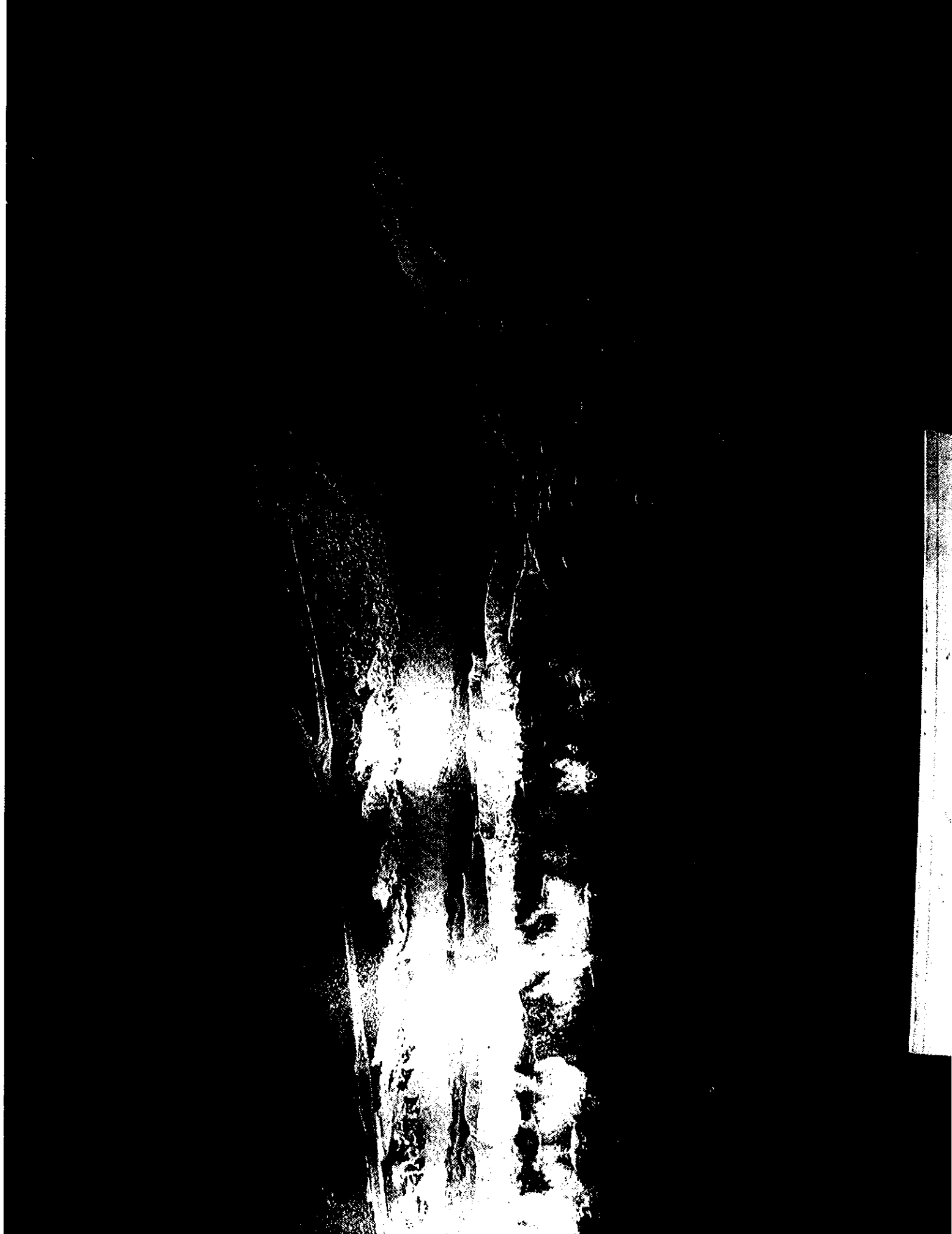


A comparison of Assateague Island and Fenwick Island shoreline movement. Assateague Island has receded a distance greater than its original width.

Source: USGS











NCDO

1"=400' 08-06 RC-30

4-28-54  
10-1-54  
20-1-54

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Sunday, December 20, 2009 11:30 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Public comments  
**Attachments:** terminal groins New Jersey.JPG

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** Ray  
**To:** Gregson, Jim  
**Sent:** Sun Dec 20 10:29:49 2009  
**Subject:** Public comments  
Mr. Gregson,

Please enter these comments into public record.  
Thanks,

Ray Midgett  
Southern Shores, NC 27949

[www.eyondare.blobspot.com](http://www.eyondare.blobspot.com)

Many comments offered by proponents of ocean groins along North Carolina's coastline ([see story here](#)) are ludicrous, to say the least, and self-serving at best. And, why on earth did the Division of Coastal Management chose three of five existing groins for their study when two of them are located on the Gulf coast of Florida and the other on the east side? Do they really believe conditions there are anywhere near what we have on the Outer Banks?

Duke University Professor Orrin Pilkey is correct. An ocean groin is a seawall; and a seawall is an ocean groin. The terms are inter-changeable and these hard structures will have the same bad effects on our shoreline.

Even Jim Gregson, Director of Coastal Management got it wrong when he said....**"The concern is that this (groin idea) will open the door to other things, such as seawalls and revetments."** And here's why.

The Virginian Pilot article states....**"Terminal groins are low-slung barriers of steel or rock that are designed to trap sand in near-shore currents, and allow excess sand to pass over them.."** And we all

agree there is a **groin** at Oregon Inlet. Well now, wait a minute folks. Has anyone seen sand "passing over" that 10+ ft high rock groin? We don't think so. Has sand accumulated on the south side? Yes. Is the water deeper on the north side of that groin? You bet. And some sand will accumulate on the south side of any Outer Banks beach where one is placed; but, it will rob sand from the northside and leave deeper, eroded holes in its place. You can count on it.

EOD is beginning to believe it would be poetic justice if the Town of Nags Head and its oceanside, investor residents with properties on Old Oregon Inlet Road get the "groins" they want so badly. Then, they could rename that section of town " Jersey Beach" and promote it as such.



However, EOD, like most of the silent majority in Dare County doesn't want to see our beaches ruined in this manner. And our elected leaders are not listening to us. As with Nags Head Commissioner, Anna Sadler, they continue to ignore our votes and push forward. It needs to stop.

In short, we have a choice here, folks. We can have a **revitalized, natural and clean beach** in south Nags Head, void of rundown rental shanties with exposed septic tanks, sandbags and concrete boulders in the surf; or, we can have continue down the same road and trap all that debris inside of useless groins. There is no in-between.

Ray Midgett  
154 Duck Woods Drive  
Southern Shores, NC 27949

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Monday, December 21, 2009 12:42 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: Blair Meads <bameads@yahoo.com>  
To: Gregson, Jim  
Sent: Mon Dec 21 12:36:38 2009  
Subject: Terminal Groins

I support the construction of terminal groins as a measure of erosion control.

Thanks,  
Blair Meads

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Monday, December 21, 2009 12:52 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** Skip Jones  
**To:** Gregson, Jim  
**Sent:** Mon Dec 21 12:48:40 2009  
**Subject:** terminal groins

Jim,  
I am a licensed contractor in Dare County. Since the mid seventies I have lived and worked from Kitty Hawk to Ocracoke. I also lived on the coast of Florida. I support the use of groins to stabilize inlets (especially Oregon Inlet). Although I do feel there should be sand pumped to the leeward (South) side to prevent erosion there. However I do not believe they are beneficial as a tool to stop typical beach erosion. I think we need beach nourishment or possibly some type of artificial reefs to slow down the beach erosion problem.  
Just one opinion,  
Nelson (Skip) V. Jones, Jr.  
Kill Devil Hills, NC

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Monday, December 21, 2009 7:14 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** Michael O'Steen  
**To:** Gregson, Jim  
**Sent:** Mon Dec 21 17:22:38 2009  
**Subject:** terminal groins

Mr. Gregson,

I do not support terminal groins for coastal stabilization efforts along the northern Outer Banks of NC; with the sole exception of the north side of Oregon Inlet. However, if such a structure is to be installed there must be a properly designed "bypass" system integrated with the project such that the beaches to the south continue to receive "natural" amounts of sediment due to littoral sediment transport processes. It is well observed that these beaches to the south of Oregon Inlet already exhibit an extremely significant annual erosion rate. Any future developments along this region of shoreline must be done so with the intent of not accelerating the erosion rate. This section of coastline is unique in and of itself. It is imperative that an accurate and true understanding of the dynamics which will affect such a proposal are established and proven.

Sincerely,  
Mike O'Steen

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, December 22, 2009 6:39 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Banx Support

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: mlgreenwood1@juno.com <mlgreenwood1@juno.com>  
To: Gregson, Jim  
Sent: Mon Dec 21 22:32:11 2009  
Subject: Banx Support

Dear Mr. Gregson,  
I'm for using terminal groins to control beach erosion. I have seen how powerful the longshore currents are. When you see a powerful current in a creek bed the creek bed is deepened under the current. Terminal groins would stop the erosive effect on the beach shoreline.  
the best,  
Ken

Ken and Melva Greenwood  
73 Gravey Pond Lane  
Southern Shores, NC 27949 / PH [252] 261-6563; Cell 252-489-0166

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, December 22, 2009 8:43 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins in North Carolina

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.ncccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** Gray Berryman  
**To:** Gregson, Jim  
**Sent:** Mon Dec 21 17:00:40 2009  
**Subject:** Terminal Groins in North Carolina  
Hi Jim—

As a resident of Southern Shores, a realtor who specializes in the rentals and sales of oceanfront and resort property, and a father of two, I urge you to keep legislation and rules in place that prevent the addition of hardened structures on our shoreline.

Beach nourishment, terminal groins, jetty's and sand bags are no match for the Atlantic Ocean on the Outer Banks. I watch the effects of storms on our shores, and have a keen understanding of how various local and state regulations affect property values, owners, beach users and the various government entities.

Fighting mother nature on this issue will not work. A terminal groin will take sand from one owner to give it temporarily to another. Duck Pier is a good example—the homes north of the pier are losing sand at an artificially increased rate and this is having a very negative affect on those owners.

The only effective solution to beach erosion is proper planning. In high risk areas (the southern part of South Nags Head comes to mind) everyone would be better off financially if we accept the inevitable and move the homes, buy out the owners, and restore the beach to its natural and dynamic (migrating) state. Having the state or town buy the property will be much more effective in terms of results—a nice beach—and costs to the taxpayers.

The possibility of a groin is giving false hope to beachfront owners who made poor decisions when choosing where to build. The loss of tax revenue to the town is unfortunate, but must be accepted. Spending millions to save thousands does not make good business sense for our governments.



Please feel free to call or write with any questions. 252 573 9503.

Sincerely,

Gray Berryman

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, December 22, 2009 8:46 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
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---

**From:** Monica Thibodeau  
**To:** Gregson, Jim  
**Sent:** Mon Dec 21 15:34:22 2009  
**Subject:** Terminal Groins

Mr. Gregson: I was not able to attend the public meeting held in Kill Devil Hills, but I would like to express my opinion that I am NOT in favor of terminal groins as a standard practice on North Carolina beaches. I am glad you are having a study done to see scientific facts about the effects.

I do support the use of terminal groins to keep a waterway such as the Oregon Inlet open, but I do not support the use of hardened structures along the beach simply for erosion control. As a resident of Duck for over 20 years and a visitor to the Outer Banks since the early 1970's, I know that our natural beaches are what people come here to see and enjoy. Thank you for the opportunity to voice my opinion.

Monica Thibodeau  
Principal Broker  
Carolina Designs Realty, Inc.  
252-255-6200  
[monica.thibodeau@carolindesigns.com](mailto:monica.thibodeau@carolindesigns.com)

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, December 22, 2009 12:04 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.ncccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** Frank Jakob  
**To:** Gregson, Jim  
**Cc:** 'Jerri Getty'  
**Sent:** Tue Dec 22 11:25:04 2009  
**Subject:** Terminal Groins  
Hello Jim,

I have lived on Hatteras island for over 33 years and am in favor of Jetties and Terminal Groins. I was disappointed that Oregon Inlet never was properly constructed with a jetty on both sides as originally proposed in the 1980's..One terminal groin on the south side is not adequate.

I lived in New Jersey prior to moving to the Outer Banks and have seen the benefits of these infrastructures; particularly in Barnegat Inlet, Manasquan Inlet, Shark River Inlet and Indian River Inlet in Delaware. It made these inlets navigable with minor maintenance and helped save the beaches with the installation of numerous groins along the beach. I live in Salvo and our beach is wide; however, the Rodanthe beach has been eroding for the past 100 years and has nothing to do with the terminal groin. It was once an inlet and Mother Nature wants to reclaim it, same as in Buxton. Another thing that contributes to the erosion is the unnatural man made high dunes. Wave action erodes the beach in Pea Island because it can't over wash. Many an old times told me when they were young they could see the ocean from the sound before the dunes were built by the conservation corp. They actually caused more damage than leaving it alone. A prime example of a natural beach is Portsmouth island just across the inlet from Ocracoke. It has a natural dune that allows ocean over wash which brings in sand. However, Ocracoke Inlet requires much dredging to maintain navigation because it does not have a jetty or groin. I have noticed that beaches facing north and south require more maintenance than beaches facing northeast and southwest. This too affects the rate of erosion.

I have reviewed the maps of the Outer Banks for the past 200+ years and realize these Islands are moving dynamically to the west. Inlets are opened and closed by either wave action or natural causes. One time Hatteras and Ocracoke were one with inlets at Rodanthe and Whalebone junction. It is m y understanding that Oregon Inlet was created during a hurricane in the mid 1860's.We can only help maintain a natural beach with a sand collection system of jetties and groins or let Mother Nature open another inlet.

Please feel free to contact me at any time.

Thanks !

*Frank A. Jakob*, President/Broker/Auctioneer

**Cape Hatteras Realty & Construction Corp**

P.O. Box 249

Salvo, NC 27972

Office: 252-987-2799

**Cell: 252-305-1184**

Fax: 252-987-2012

**Web:** [www.capehatterasrealty.com](http://www.capehatterasrealty.com)

**E-mail:** [capehatreal@yahoo.com](mailto:capehatreal@yahoo.com)

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, December 22, 2009 1:45 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw:

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** Steve Bonday  
**To:** Gregson, Jim  
**Sent:** Tue Dec 22 13:34:02 2009  
**Subject:**  
Hi Jim,

I am sorry I missed the meeting.

I am in support of terminal groins.

I am also in support of beach nourishment.

The beach along the S-Turns and Mirlo Beach in Rodanthe must be enlarged.

Thank you,

Steve Bonday, CBIA, AIP

Gateway Insurance Services, Inc.  
P. O. Box 3100  
Kitty Hawk, NC 27949-3100

Phone (252) 255-2583  
Toll Free (888) 806-0508  
Fax (252) 384-6976

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## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Wednesday, December 23, 2009 9:45 AM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** FW: No Groins

-----Original Message-----

From: Olie Bedell [mailto:[oliebedell@embarqmail.com](mailto:oliebedell@embarqmail.com)]  
Sent: Wednesday, December 23, 2009 9:24 AM  
To: Gregson, Jim  
Subject: No Groins

Please do NOT allow groins on the NC coast. That would be a mistake and cause more harm to our seashore.

Olie Bedell  
[oliebedell@embarqmail.com](mailto:oliebedell@embarqmail.com)  
Buxton, N.C.

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Wednesday, December 23, 2009 9:46 AM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** FW: Terminal Groin Study

---

**From:** tom.haddonhomes [mailto:tom.haddonhomes@mindspring.com]  
**Sent:** Wednesday, December 23, 2009 8:51 AM  
**To:** Gregson, Jim  
**Subject:** Terminal Groin Study

Jim,  
I had a previous commitment which prevented me from attending the meeting in Dare County last week.  
I hope the terminal groin study by the CRC will give us some useful data to gauge the pros/cons of terminal groins in our area. I am open-minded about their use as an erosion control device and support the idea of considering all options to protect our beaches.  
Tom Haddon

HADDON HOMES, INC  
POBOX 1868  
NAGS HEAD, NC 27959  
252-267-2287

OUTER BANK HOME BUILDERS ASSOCIATION  
CHAIR – GREEN BUILDING COUNCIL  
DIRECTOR AT LARGE

NAGS HEAD PLANNING BOARD MEMBER

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, December 29, 2009 1:54 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Terminal groins

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**From:** steven clarke [mailto:stevenfclarke@hotmail.com]  
**Sent:** Tuesday, December 29, 2009 1:11 PM  
**To:** Gregson, Jim  
**Subject:** Terminal groins

I do not support the use of terminal groins for erosion control. I understand the arguments made by those concerned with beach erosion on the Outer Banks, and its effect on properties, particularly in South Nags Head, and just south of the Oregon Inlet Bridge. But I've seen no evidence that these groins do much other than shift the erosion.

Having lived and worked in Florida, and still owning property there, I have followed this debate closely. The state of NC made the correct decision in banning hardened shoreline structures; while there is significant pressure to change course now, I do not believe that decision would be in the long term interests of our coastline, the residents who live near it, the vacationers who enjoy it, or those who live in our state.

Thanks.

**Steve Clarke**

Broker, ABR, GRI, CRS, REALTOR®

**the outerbanks4sale team**

*"opening doors at the beach"*

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internet fax 1.866.233.7259



Please consider the environment before printing this email.



## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Wednesday, December 30, 2009 9:19 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: groin  
**Attachments:** dick thompson.vcf

---

**From:** dick thompson [mailto:rthompson1@charter.net]  
**Sent:** Wednesday, December 30, 2009 9:15 AM  
**To:** Gregson, Jim  
**Subject:** groin

Jim,  
I'll be as brief as possible. In 1972 my old friend Jim Bunch(local) graduated from University of Miami with a degree in Marine Science and Oceanography. He took a position with the COE and his first assignment was to draft plans for jetties at Oregon Inlet. They've been on the shelf since and just look at us compared to many areas to the north and south of us. Hello people my family has been here since 1938 and I still live on the oceanfront here in Kitty Hawk and am thoroughly convinced that although we would still have problems, they would not be as extreme had a jetty or groin been placed on the north side of the inlet years ago....  
Thanks,  
Dick Thompson

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Monday, January 04, 2010 1:29 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** FW: terminal groins

---

**From:** piratergr@aol.com [mailto:piratergr@aol.com]  
**Sent:** Monday, January 04, 2010 10:55 AM  
**To:** Gregson, Jim  
**Subject:** terminal groins

Jim,

As a former U.S. Coast Guardsman and a current home builder on the Outer Banks of NC I support the construction of terminal groins. I also support open and free beaches for all legal citizens of the US. I find that the issue of global warming has proven that no matter what we do the beaches are going to be lost more and faster as sea level rises. Whatever we can do to slow the progression of this loss would do a lot to lessen the pain that the economies of beach towns feel. As homes are encroached upon by the sea the government should purchase homes that are within a certain distance of the high water line and those homes demolished or torn down. As the loss of beach increases the areas that the public has to use on the beach becomes smaller and smaller and makes it more difficult to enjoy. Also I feel that a study should be done to see whether it would be in the best interest of these towns to change from septic waste systems to township processed sewage system. As more of the land goes under water the quality of the water will suffer as more old septic areas are exposed. I feel that this could be helped by enacting a change over to a sewage processing system. That way when beach is lost water quality will not be affected by the exposed septic beds and opened tanks. But that is just my opinion. I spent months in the Antarctic and Arctic listening to the scientists tell me what was happening and how they were checking to see if in fact it was. Now 30 years later their information has shown fruit. On a side note I am an unemployed award winning builder who could use a job. Been out of work now for 7 months. I would love to work any job for the government. Park Service or whatever.

Regards,  
Rodger Schwartz  
R. Schwartz Construction  
rscobx.com

**CRC Study of Feasibility and Advisability of the Use of Terminal Groins**  
**Public Hearing #2**  
**Kill Devil Hills Town Hall**  
**December 16, 2009**

Jim Gregson, Director Division of Coastal Management, welcomed all in attendance and stated this is the second of five public hearings on the terminal groin study that was mandated by House Bill 709. The contractor the Department hired to conduct the study, Moffatt and Nichol, will have a brief presentation and then the public hearing will be opened. CRC Commissioner Renee Cahoon will be the hearing officer. DCM Staff, the contractor and a subcontractor will be available to answer questions after the hearing.

Johnny Martin of Moffatt and Nichol stated direction was given to the Coastal Resources Commission in House Bill 709 to conduct a study on the feasibility and advisability of the use of terminal groin structures as erosion control devices. The items listed in the Bill to be considered during the study were the scientific data regarding the effectiveness of terminal groins constructed in North Carolina and other states in controlling erosion, scientific data regarding the impact of terminal groins on the environment and natural wildlife habitats, information regarding the engineering techniques used to construct terminal groins, current and projected economic impacts, costs of construction and maintenance of terminal groins, and whether the potential use of terminal groins should be limited to navigable dredged inlet channels. The legislation asked for three public hearings but we will conduct five. A report is due no later than April 1 to the ERC and the General Assembly. Moffatt and Nichol will lead the study performing the coastal engineering tasks, Dial Cordy will help with the environmental portion, Dr. Duncan Fitzgerald of Boston University will help with the coastal geology aspects, and Dr. Chris Dumas will help with the economics. The CRC and CRAC have been involved and have provided guidance to the project team during the study. The project team is responsible for coming up with technical study to look at the effectiveness of these structures. The CRC and CRAC will take the study and make the final policy recommendations. The Science Panel has been helping with the study. They have helped select the sites that will be studied and have done peer review on the methodologies on the aspects of the different tasks. Oregon Inlet and Fort Macon are the sites selected in North Carolina. John's Pass, Captiva Island and Amelia Island are the sites selected in Florida. The Division has a section on the Coastal Management website under "What's New" which has all of the information loaded. Any written comments should be sent to Jim Gregson. A draft report will be out by February 1. The final report will be submitted to the CRC by March 1. The CRC and CRAC will have their recommendations for the ERC and General Assembly by April 1.

Jim Gregson stated the schedule of upcoming science panel meetings, the upcoming public hearing dates, CRC meetings, and any comments received are on the DCM website.

Renee Cahoon stated she urges everyone in attendance to speak tonight. There were only originally three public hearings and Dare County was added later. *The public hearing was opened at this time and the following comments were received.*

Jan DeBleu, Cape Hatteras Coastkeeper for the North Carolina Coastal Federation, stated I would like to thank you and others who made it possible for the hearing to be held in Dare County because we were being left out at one point. I wanted to start by saying that our understanding at the Coastal Federation is that the study is to look at terminal groins at the end of islands and not at the end of littoral cells. There was some question about that. A littoral cell could be on a beach. But as made clear in a letter by Senator Basnight to the CRC the intent of the legislation became very clear. Terminal groin means at the end of an island such as the terminal groins at Ocean City Maryland or at Oregon Inlet. These are terminal groins. At the end of beach it is just a groin. There are massive differences in what that means. Are we looking at stabilizing inlets, stabilizing the end of islands, or are we looking at embarking on a rocking the beach project like they have in New Jersey and Maryland and places to the north? I wanted to enter into the hearing some documents. The first document is from the terminal groin built in Ocean City Maryland on the inlet 1934-1935. It caused severe erosion on Assateague Island to the South to the point that Assateague Island actually eroded inland. Where you once had barrier islands out even with each other on a longitudinal line, now Assateague Island is much further over to the west because of the erosion caused by the terminal groin at that inlet. This document has photos that show this. Some other documents that I found that are not known quite so well to the population are the D.O.T. photos of Oregon Inlet taken from 1990, before the terminal groin was constructed, and on into 2006. There are probably some later ones but I haven't unearthed those yet. What I want you to see and to pay attention to here is the very high vegetated area just south of where the terminal groin is being built. It is a very thin area of the island, but you can see very clearly that it is vegetated and stable. In 1990 when there is no groin the system is just fine. The next photo is taken February 1991 when the groin is in the process of being built and will actually extend out into the ocean. You still have a lot of stable vegetation. The next photo was taken in February 2002. The groin is in place and as you can see erosion is starting to develop south of the groin and instead of a stable vegetation line we have dune fields that have been caused by erosion right along the beaches. It may be that there would have been some erosion anyway, but this particular erosion was being caused in spite of the fact that the Army Corps of Engineers has been renourishing this beach from dredge spoil taken from Oregon Inlet. Consistently there have been hundreds of thousands of cubic yards of sand put on this beach and yet the erosion has been absolutely severe downstream from the groin. The next photo is Oregon Inlet in June 2004 and as you can see the vegetation has been overwashed by sand. Finally we have 2006 where you have an entire dune field where you once had stable vegetation. I wanted to submit these tonight as evidence that terminal groins do cause erosion downstream and they will continue to cause erosion downstream. I know that the science panel is looking at trying to do some sort of sand bypass, but it is an uphill climb. The Coastal Federation feels very strongly that the best way to control or manage a barrier island is to allow it to be open and natural.

Bob Oakes, 319 S. Virginia Dare Trail, stated I am the Mayor of Nags Head. To me a picture is worth a thousand words. The Virginian Pilot hit it pretty well with the sandbags that are on the beach in South Nags Head. That is a result of our natural erosion processes at work and the

Town would like to support the potential use of terminal groins and I have a letter to that effect which I will read to you all. It is addressed to Bob Emory, the Chair of the North Carolina Coastal Resources Commission. Dear Mr. Emory, the Town of Nags Head Board of Commissioners supports the study and use of terminal groins as a sand management and beach nourishment preservation tool. In conjunction with a nourishment project a terminal groin has the potential to better protect our beach and retain sand that we've placed on the beach. A terminal groin can be a valuable tool for our community and other coastal communities that seek to preserve their beaches. The State of North Carolina is authorizing constructive terminal groins in select cases. With proper environmental considerations, terminal groins at the end of littoral cells can become a part of our beach and sand management plan for the coast of North Carolina. Please consider the dramatic potential improvement and the effectiveness and longevity of a local beach nourishment project with the addition of a terminal groin to anchor such a project. Sincerely, Bob Oakes, Mayor, Town of Nags Head. A picture is worth a thousand words and this is one of our alternatives if we don't do beach nourishment. With respect to the Senator, the legislation said at the end of littoral cells so I am looking for one at the end of South Nags Head to assist in retaining a future beach nourishment project for the Town.

Willo Kelly stated she is speaking on behalf of Willo Kelly, citizen of Nags Head. I also work for the Outer Banks Association of Realtors and the Outer Banks Home Builders Association as their government affairs director, but those two organizations will be submitting written comments separately. I am here as a citizen, but given the fact that in my job I've been exposed to a lot of meetings on the issue of erosion, beach nourishment, etc. Johnny Martin and I know each other very well due to several meetings over the past year such as the Beach and Inlet Management Plan, Ocean Policy draft report meetings, etc. What struck me as kind of unusual but interesting in developing the Beach and Inlet Management Plan it was based on current state policy which does not allow hardened structures at all. So our current state policy allows beach nourishment or retreat. I think Jan DeBleu mentioned at a meeting that we also need to add in relocate because our options are such now that retreat is not an option and we need to look at relocation. With regard to the statement made by Jan that we need to allow our barrier island to remain natural and open; one of the comments that I made at the Beach and Inlet Management Plan Meetings was that you see a map and see red dots all over and you need to take into account Coastal Habitat Protection Plan and species and we tend to forget the human species factor of all of this. We do live here and people have lived here for years and generations and we tend to overlook that and think the option is to relocate and that is not as easy as it sounds. And it is not as easy as let's go to Hatteras and tell everybody that you need to start thinking of moving now. We need to look at other options that are available to us. Terminal groins are an option as an erosion control measure. I think we certainly need to support that. After that, there are other technological advances out there that are being used in Australia, California, and Hawaii with breakwater systems and whatnot. What is made today is certainly different than what was used in 1935 or 1990. We need to look at how we can look at the balance between man and his environment and protect what we have and allow the human species to survive here. There is infrastructure in place. When do we say enough is enough for that sand to continue to erode and come up to the beach road? Then once it overwashes the beach road then the people on the west side of the highway will see that this is a huge concern and we need to do something now. I am in total support of terminal groins.

John Ratzenberger stated I live in South Nags Head and I didn't intend to say anything, but I'd feel bad if you all didn't get a little something after having made the effort to come up here. Thank you very much for coming. I am not going to offer any emotional advice or any scientific advice or anything, but there are a whole bunch of us down there in South Nags Head who obviously see Mayor Oakes picture on a daily basis. We just kind of wonder in discussing amongst ourselves why a terminal groin at the north end of Oregon Inlet, theoretically terminal groins hold sand in the north and scour on the south, why that wouldn't also solve the problem of Oregon Inlet filling up. We are at the mercy of the Corps of Engineers ever having money to dredge it. If they can't dredge it then all the fishing industry and the boat industry in Wanchese has got problems. From the simple citizen's point of view, that sounds like an ideal test case. It's not at the south end eating up the beach. It's on the north side maybe keeping the inlet clear and letting our fishing boats out in there. We have had to take them all the way down to Ocracoke to get out. You know all the problems there. We are turning all of our fish into Virginia Beach and they get the catch count. It's a bad deal. That is my input. We would love to see an experiment done at the north end of the Oregon Inlet.

Keith Sawyer stated I live at 10351 S. Colony S. Drive in South Nags Head. I am in favor of terminal groins, but they need to be on the north side of Oregon Inlet. Not on the south side on the North end of Pea Island. That's not going to benefit us any. And there needs to be more than just one. One is going to be a great big help, but there needs to be more up the coast to the state line. So I am all in favor for it, but I believe the placement of them need to be at the north end of Oregon Inlet.

The public hearing was closed.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, January 04, 2010 7:37 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Possibly spam: COASTAL GROINS

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** Bob Hartis  
**To:** Gregson, Jim  
**Sent:** Mon Jan 04 19:10:59 2010  
**Subject:** Possibly spam: COASTAL GROINS

I support the construction of terminal groins at inlets (specifically Oregon Inlet). An old coastal engineer from the Outer Banks who is now deceased, explained them&the various styles/designs he had used and evaluated. The permeable nature of groins was the main design component that had to be included for them to be effective, yet not merely transfer erosion effects downshore. The stabilization of Oregon Inlet and its' 35+year battle to become a reality is a shame on our federal government and the supporting state laws/regulations that have denied us safe passage & economic security thru access to the Atlantic Ocean. PLEASE ALLOW GROINS ON OUR COASTAL INLETS !

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Monday, January 04, 2010 7:37 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: Carol Hayhoe <[chayhoe@embarqmail.com](mailto:chayhoe@embarqmail.com)>  
To: Gregson, Jim  
Sent: Mon Jan 04 17:33:27 2010  
Subject: terminal groins

I am a Realtor on the Outer Banks - where can I read any info or studies on the use of terminal groins and how they have worked, or not worked, elsewhere. I would like to have an informed opinion.

Thanks,

Carol Hayhoe  
Shore Advantage Realty



## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, January 04, 2010 10:18 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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---

**From:** actionkdh@aol.com  
**To:** Gregson, Jim  
**Sent:** Mon Jan 04 22:05:30 2010  
**Subject:** Terminal groins

I can see both sides of the coin as far as the groin aurgument goes...however I do believe something should be done to preserve our beaches which are our most important resource. Thank you, John Osborn

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Sunday, January 10, 2010 7:10 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: No beach hardening please

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: Scott Cobourn <[scobourn@nc.rr.com](mailto:scobourn@nc.rr.com)>  
To: Gregson, Jim  
Sent: Sun Jan 10 18:55:39 2010  
Subject: No beach hardening please

I also am against beach and inlet hardening structures and groins on North Carolina's beaches. Please leave the ban against such structures in place. It is not the state's responsibility to ensure that coastal speculators earn a profit. Our beaches are unique and should be left as they are. The "coastal erosion" arguments are inherently dishonest.  
Dr. Scott D. Cobourn, Raleigh NC.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Thursday, January 07, 2010 9:00 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
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E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** susie bell  
**To:** Gregson, Jim  
**Sent:** Thu Jan 07 08:38:07 2010  
**Subject:** Terminal Groins

Dear Sir:

I want to again express my opposition to terminal groins for Holden Beach or any NC beach. I have seen these in Florida and in S.C. at Folly Beach and find them very unattractive. They spoil the beauty of the natural setting which is the main attraction of beach communities. Beach communities are a huge part of tourism and vacation economy in NC and terminal groins would detract and affect this important source for our state. Please do not make the mistake others have made in ruining the beauty of our NC beaches.

Sincerely,  
Susie Bell

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Wednesday, January 06, 2010 9:14 AM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Terminal Groins - Erosion Control Measure?

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
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Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** Cara Muglia  
**To:** Gregson, Jim  
**Sent:** Wed Jan 06 09:07:12 2010  
**Subject:** Terminal Groins - Erosion Control Measure?

Hello Mr. Gregson-

I am a resident on the Outer Banks of NC and I am just writing to inform you that I do not support the construction of terminal groins as an erosion control measure. I also do not support sandbags (maybe as a very temporary measure, but not as a long term measure as they have been allowed here in S Nags Head - it is obvious the erosion they cause after long term to the neighboring properties) or beach nourishment for our specific area. There may be other locations that could benefit from a specific engineered method of renourishment, but our coastline is very unique. How about considering artificial off shore reefs - there are options that would help "save/prolong" our shoreline that could be explored!

Thank you for your time!

Cara Muglia  
Nags Head, NC

**From:** Gregson, Jim  
**Sent:** Wednesday, January 06, 2010 6:29 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Beach Enhancement  
**Attachments:** image001.jpg

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** Paul M Sabadash LLC  
**To:** Gregson, Jim  
**Sent:** Tue Jan 05 22:09:46 2010  
**Subject:** Beach Enhancement

Jim,

“I do not support the construction of terminal groins as an erosion control measure.” Terminal groins destroy the Beach in the long run. I am in favor of Beach Nourishment, just like Va Beach did over the past few decades.

Thanks, Paul

E-Mail Address:	<a href="mailto:PaulSabadash@SunRealtyNC.com">PaulSabadash@SunRealtyNC.com</a>
Office / Cell Contact #:	
1- 800- 820- 8810 x 232	Your Name & Phone Number in a Voice Mail Message activates a Pager, so I can call you as soon as possible.
Office / Fax #	
1- 252- 453- 8811 x 232	FAX: 252- 453- 4114

Voice Mail is Always Best / as Corolla Internet ( EMail ) & Cell Phone Reception is Not always Available.

Paul M. Sabadash LLC, with Sun Realty      Paul M. Sabadash, LLC General Manager  
1135 Ocean Trail, PO Box 580, Corolla NC 27927



3609 Highway 24 (Ocean) Newport NC 28570

January 15, 2010

MEMORANDUM

TO: NC Division of Coastal Management, Moffatt and Nichol  
FROM: Todd Miller, Executive Director  
RE: Comments on Economic Analysis Approach for NC Terminal Groin Study

Please consider these comments on the proposed approach for determining the economic impact of terminal groins.

Overall Comment:

The validity of this proposed methodology rests heavily on one assumption: **That it will be possible to determine from the five case studies being conducted at Oregon Inlet, Beaufort Inlet, Amelia Island, Captiva Island, and John's Pass what the actual relationship is between these terminal groin structures and the condition of adjacent beaches.** This does not appear to be the case. This assumes that the case studies will be able to distinguish between the effects of the groins and other factors, such as beach renourishment, channel dredging, normal inlet and channel migrations, storm activity, sea level rise, and other natural and human-related factors.

If the case studies are not able to clearly separate these various causes and effects, then it will be impossible to determine the economic consequences of building terminal groins using this methodology. Before too much effort and money is spent working on various elements of this methodology, the CRC Science Panel needs to determine whether this is a reasonable assumption to be making. Otherwise, the time and effort will be spent producing meaningless information.

More specific comments about the methodology include:

1. The proposed economic methodology does not address one of two aspects of the legislative mandate given to the CRC. It does not document "current" economic impacts resulting from shifting inlets.

The study legislation directs the CRC to collect and evaluate:

*Information regarding the current and projected economic impact to the State, local governments, and the private sector from erosion caused by shifting inlets, including loss of property, public infrastructure, and tax base.*

The methodology proposed to the science panel attempts to look forward regarding economic impacts, but it does not document “current” impacts as required by the law. The study should document actual economic impacts to help gauge the extent of the problem that needs to be addressed. The methodology should look back 30 years as well as forward 30 years. To do this historic analysis, the methodology should document the extent of land lost and gained directly as a result of inlet migration, and then estimate the value of economic losses and gains that have occurred over the past 30 years.

2. Use of proposed Inlet Hazard Area (IHA) maps and DCM raw erosion rates to determine the 30-year shoreline position mixes normal oceanfront erosion with inlet processes, and is scientifically unsound. This methodology focuses on oceanfront erosion, and not specifically on erosion caused by inlet migration as required by the law.

Inlets shift back and forth, and predicting future positions of shorelines that result from shifting inlets is more of an art than science. The methodology proposes to examine the economic impact caused by more general shoreline erosion for 30 years by using the current DCM raw rates within the regions defined by the proposed IHAs. It will determine the 30-year shoreline position by multiplying the DCM raw erosion rate by 30 years.

DCM’s raw erosion data reflect overall changes along the entire oceanfront resulting from sea level rise, and is not calibrated with inlet processes. Therefore, it makes no sense to use this oceanfront erosion data to determine future shoreline positions next to inlets. These Inlet Hazard Area maps are meant to simply identify areas of land that are subject to increased hazards as a result of their proximity to inlets, and do not illustrate areas of land that are expected to erode within any specific time period. A single terminal groin located at the tip of an island is likely to influence only a small portion of the oceanfront areas within an IHA, especially if the structure is located on only one side of an inlet. Inlets typically migrate either in one direction or the other, and while land on one side of an inlet erodes, the other side of the inlet benefits from sand accretion. The methodology only projects loss of beach resulting from inlet movements, and not the fact that overall, shifting inlets typically result in a zero sum gain and loss of property if allowed to migrate naturally.

This methodology will generate astronomically high potential economic loss values that have very little relationship to actual erosion losses that might occur as a result of shifting inlets, and which have never been experienced in the past as a result of natural inlet processes.

The second approach outlined in the methodology that uses typical land loss as documented by past aerial photography and historic shoreline positions should provide a more realistic picture of how shifting inlets impact their adjacent boundaries.

Each approach outlined is meant to generate an economic value of land that might be subject to erosion over the next 30 years. This part of the methodology does not estimate how much of that value will be protected and/or lost as a result of placing a terminal groins at inlets.

3. The CRC Science Panel needs to evaluate whether it can “estimate” with any degree of confidence the potential aggregate impact of the five terminal groin structures in the case studies.

The methodology proposes that the potential aggregate impact of terminal groin structures in the areas of ‘shifting inlets’ be assessed by using the average up-drift and down-drift changes in erosion rates (weighted by distance) observed at the five sites (Oregon Inlet, Fort Macon, Amelia Island, Captiva Island, and John’s Pass) analyzed in the other part of the study. The averages would be applied to all the IHAs to determine the 30-year shoreline and the economic impacts compared to the 30-year erosion shoreline without structures to obtain a possible net economic impact.

At each of the case study sites, there are a number of factors that are influencing up-drift and down-drift changes in erosion, including inlet dredging, beach renourishment, and other human actions that have influenced erosion patterns. The impact of all these additional factors influencing erosion rates must be understood before any meaningful estimate can be derived of the “aggregate” impact of terminal groins.

As peer reviewers, the Science Panel needs to support “aggregate” estimates of the influence of the terminal groins as being accurate and meaningful, or this portion of the methodology should be abandoned. It makes no sense to use numbers that aren’t scientifically valid.

The second approach proposed by the methodology for estimating economic impact of terminal groins is to use the ratio of pre- and post-structure areas as determined by the historic photographs over a 30- year time period at the five selected sites (extrapolated as necessary). This approach only works if you can separate out the land changes that have occurred because of the groin from changes that have resulted from other factors, such as beach renourishment, inlet dredging, and other human influences. Again, the Science Panel needs to determine if it can attribute current and past conditions at the case study sites directly to the terminal groins, or whether there are simply too many other factors that make it impossible to evaluate what caused what at these sites. If the Science Panel is not comfortable with attributing pre- and post-structure areas directly to the influences of the groins, then this estimate becomes meaningless.

It might be that some of the case study sites have better data than others, and there is more confidence in estimates that are derived from those locations. It is important to determine if the coastal processes of the sites used can be compared those of North Carolina inlets before using this data as well.

If the Science Panel will not stand behind the estimates of “cause and effect” directly attributable to the terminal groins at the five case study locations, then using these estimates in the economic analysis is scientifically unsound, and will result in meaningless conclusion from this aspect of the study. The science panel should be asked weigh in on this issue before too much work goes into conducting other parts of the economic analysis, since this is the critical part of the methodology for estimating the actual benefits and costs of groins. At its last meeting, the CRC science panel expressed



great uneasiness with making an assumption that it will be able to determine just how much an impact terminal groins have on the beach in locations where many other factors are also influence beach changes. If it can't make this judgment, it will be impossible to determine the economic consequences of terminal groins no matter what methodology is used.

4. The study methodology fails to address variable natural and human factors that could completely overshadow and dwarf any economic impacts that can be attributed to terminal groins.

The methodology does not account for other natural and human factors that will have significant economic impacts on coastal development whether or not groins are constructed. Natural factors include rising sea levels, storms, and fluctuating sand supplies. Human factors include a political willingness to pay for continued protection of beach property and economic troubles that are already depressing property values. The methodology needs to discount economic impacts that these forces cause. For example, a category four or five hurricane will cause huge economic losses with or without groins, and there's a high probability that such a storm will occur within the next 30 years. Likewise, sea level is expected to rise at least one foot in the next 30 years, and the economic consequences of such a sea level rise needs to be factored into the analysis. It is critical that the methodology be clear about how much "margin of error" is associated with any future economic predictions, and state probabilities.

5. The components of economic value that will be considered in all parts of the economic analysis are incomplete or will be difficult to relate simply to land loss at inlets.

The methodology proposes to evaluate:

- Residential, commercial, and government property value
- Infrastructure value (roads, water & sewer, power)
- Changes in property tax collections
- Changes in sales and occupancy tax collections

This approach undervalues state- and federally-owned property that is present at many inlets. Publicly owned lands used for state parks, wildlife refuges, and national seashores typically are not valued for tax purposes, but are "priceless" in terms of their worth. The impact on these values needs to be given equal weight to land that is taxed, and to roads, water and other public infrastructure.

Gauging impacts on tourism is a lot more complicated than looking at changes in sales and occupancy tax collections. There are both positive and negative economic consequences of shifting inlets that should be documented. For example, Bogue Inlet has shifted in recent years adding nearly a hundred acres of land to Hammocks Beach State Park. What is the economic value of the land gained, how has it benefited tourism and boating throughout Onslow and Carteret counties, and what is the economic value of the essential endangered species habitats that the newly formed land has created? In addition, economic costs that have been avoided by allowing inlets to shift need to be estimated as well, including the costs to construct and maintain groins with associated beach renourishment.

Dear CRC Members:

This letter is in support of allowing terminal groins and jetties at NC inlets.

Opponents of the use of hardened structures, jetties and groins have legitimate concerns. There are egregious examples of where these structures have been used to the peril of our ocean beaches. Unfortunately, opponents of inlet groins use these examples as the rule to buttress their opposition. There are many excellent examples up and down the east coast of properly designed jetties and groins that do what they are designed to do... and do it well.

Opponents have likened NC jetties and groins at inlets to the New Jerseyization of our beaches...That they would spoil our “natural” beaches. This is a cleaver, misleading argument based on a false statement. Through the practice of beach renourishment, we are supporting the illusion of a natural beach. Our so called natural beaches are the products of pumping hundreds of millions of cubic yards of sand out of the Intra Coastal Waterway and ocean inlets for miles. There is nothing natural about that!

My family owns a house at 459 E Third St, Ocean Isle Beach, five houses from the east end of the island. We are almost oceanfront. First and Second Streets (and their homes) are in the ocean. This end of OIB has been deemed “too unstable” for beach renourishment. Yet, for as unstable as it is, the Army Corps of Engineers dredges Shallotte Inlet for navigation and pumps the sand up the beach for miles. The east end of OIB is collapsing into the ocean at an accelerated rate as a result. This is being done to preserve the illusion of the “natural” look of our beaches and for navigation.

Taking sand from an area deemed unstable is an environmentally torturous practice. This practice is expensive (both for taxpayers and homeowner losses) and unsustainable. For as much good as it does up the beach, it is an uncompensated “taking” from east end property owners. My point is this...

Permitting groins and jetties at inlets will be no more natural or unnatural than our man made Intra Coastal Waterway, our dredged inlets or our perpetually renourished beaches. Properly designed, groins and jetties will do no more damage and will help stabilize unstable inlets. They will reduce the need for inlet dredging saving taxpayer money and homeowner losses. They will not impede the natural movement of sand up and down the coastline **(Please see attached supporting information from Tim W. Kana, Phd, Coastal Science & Engineering, Columbia, SC).**

In addition, groins and jetties at inlets that fail in design or that cause ancillary beach erosion elsewhere can be redesigned or removed. Properly designed, groins will not spoil the illusion of our natural beach.

Please urge the CRC to move swiftly with a strong endorsement for allowing terminal groins and jetties at North Carolina Inlets.

With best regards

Michael S. Young and Family  
459 E. Third St. OIB, NC 28469  
Attachment

**From:** Tim Kana [<mailto:tkana@coastalscience.com>]

**Sent:** Saturday, August 22, 2009 3:22 PM

**To:** [dgninc@dgninc.com](mailto:dgninc@dgninc.com)

**Subject:** Re: CRC to permit groins at inlets

Michael, Here is a link to the ASBPA web page where you can find the terminal groin position paper. I wrote the first draft of the statement and many other committee members provided their input and edits before we formally adopted it. A common thread with Pilkey statements is they never provide quantification--whether it is the rate of erosion/sand loss, or volumes that are trapped by groins. A terminal groin for OIB would have dimensions of the order ~300-400 ft long and a trapping capacity of ~50-100,000 cy. Compare that volume with the 1-2 million cy trapped in Shallotte Inlet. Once filled to capacity, the groin can not trap any additional sand. His claim that a groin at the north end will prevent sand from migrating south is incorrect. Net sand transport at the eastern (northern)-most house on the island is directed into the inlet (i.e. NE). Sand does not move south at that point because of the sheltering of the ebb tidal delta. The way sand moves from the Shallotte Inlet to the oceanfront, is via the process of shoal bypassing, wherein bars break off from the south margin of the inlet, migrate onshore and attach to the beach some 1000-2000 ft south of the main channel of the inlet throat. From the attachment point on the beach, sand will migrate back to the inlet as well as "downcoast" to the southwest. A properly positioned terminal groin for OIB would be close enough to the inlet that net longshore transport in its vicinity would be directed northeast. The groin would be filled via nourishment on it's southwest side (locally, the "Updrift" side of the groin). Pilkey has further confused the public by suggesting that the southwest side of the groin is the downcoast side and therefore the structure will prevent inlet sand from moving south. It's unfortunate that he does not understand the major pathways for sediment exchange around tidal inlets. TK

[http://asbpa.org/publications/pubs\\_fact\\_sheets.htm](http://asbpa.org/publications/pubs_fact_sheets.htm)

**Timothy W. Kana, PhD**

President

**Coastal Science & Engineering**

PO Box 8056

Columbia SC 29202-8056

803-799-8949 - Office

803-799-9481 - Fax

803-361-3583 - Mobile

[www.coastalscience.com](http://www.coastalscience.com)

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, January 18, 2010 7:53 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Construction of a terminal groin at Ocean Isle Beach

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**From:** Linda Webb [mailto:webblv@yahoo.com]  
**Sent:** Sunday, January 17, 2010 6:42 PM  
**To:** Gregson, Jim  
**Subject:** Construction of a terminal groin at Ocean Isle Beach

Dear Mr. Jim Gregson,

We are property owners on Ocean Isle Beach, NC and wish to ask for your support for the construction of a terminal groin in our area that would help reduce the effects of the beach erosion that has been getting more severe over the past several years.

As we understand the situation, NC is one of 2 only states that do not allow these structures that could protect our coastline. We believe that it is in the public's best interest to protect this natural resource that we as a state enjoy.

We approach the problem from the prospective of home owners in the affected area, but it is in the best interest of the entire coastal community and the state to do everything in our power to protect our beautiful coastline. From a purely economic position it only makes sense to do everything we can to protect the tax revenue generated not only from local property taxes but more importantly from the tourism industry.

We as individuals and our local government have invested a great deal of time and money to protect and re-nourish our local beaches and are only asking for the state support that will help us help ourselves.

Thank you for taking the time to hear our concerns and we will appreciate your support in helping us protect our beautiful beaches.

Linda and Arley Webb  
445 E. 2nd ST, #B8  
Ocean Isle Beach, NC 28469  
[arleywebb@yahoo.com](mailto:arleywebb@yahoo.com)

P.S.

Please accept our apologies for an incomplete copy of this message that you may have received. Computers do some strange things at times.

**Walker, Michele**

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**From:** Gregson, Jim  
**Sent:** Monday, January 18, 2010 7:53 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Terminal Groin Study

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**From:** Frances Kelly [mailto:fkelly7734@yahoo.com]  
**Sent:** Sunday, January 17, 2010 2:13 PM  
**To:** Gregson, Jim  
**Subject:** Terminal Groin Study

Dear Mr. Gregson,

My family has been vacationing on Ocean Isle Beach, NC for over 20 years. We also have many of our friends and extended family coming here several times a year. My husband and I enjoy 4-5 months out of the year here.

The east end of the island used to be a particularly beautiful spot. In fact, we found it to be so beautiful, we purchased a condo so we can enjoy it in our retirement. Please note this is not an expensive condo, but it was all we can afford. This condo is our dream come true.

Unfortunately, over the years the east end has eroded to the point where at least 3 rows of houses have been destroyed. Many more are at risk. Even with constant renourishment projects since 2001, the rate of erosion seems to be increasing yearly. Now our condo complex and the one next door is at risk. This represents 40 total units, many of which are the only affordable rental options available to the public in this part of North Carolina. Without these units, many vacationers will head to South Carolina.

We have been holding onto hope that the terminal groin study being conducted at this time will result in a favorable report to the NC legislature.

The addition of terminal groins in NC will not cause our beaches to be like New Jersey. The groin structures under study for NC are quite different from what New Jersey has used in the past. Rather, these new structures will allow millions of visitors to continue to enjoy the beautiful North Carolina beaches.

Please do all you can to ensure that the study is completed on time and with full information to the legislature.

Respectfully

Fran Kelly  
740 587-3287

**Walker, Michele**

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**From:** Gregson, Jim  
**Sent:** Monday, January 18, 2010 7:54 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: TERMINAL GROIN STUDY

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**From:** browningwh@aol.com [mailto:browningwh@aol.com]  
**Sent:** Sunday, January 17, 2010 10:06 AM  
**To:** Gregson, Jim  
**Subject:** TERMINAL GROIN STUDY

JIM GREGSON

MY WIFE AND I ARE LIFE TIME RESIDENTS OF BRUNSWICK COUNTY AND BOTH OF US HAVE BEEN VERY POLITICALLY ACTIVE, WE UNDERSTAND THAT THE TASK YOU HAVE BEFORE YOU IS GREAT---HOWEVER PLEASE CONSIDER THE BENEFIT THAT THE TERMINAL GROIN WILL BE TO ALL OF NORTH CAROLINA --IT IS AN OPPORTUNITY FOR US THE HELP PROTECT A BEAUTIFUL AREA FROM FURTHER DESTRUCTION.

THANKS FOR YOUR SUPPORT

BILL & GLENDA BROWNING

LELAND & OIB, NORTH CAROLINA

**Walker, Michele**

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**From:** Gregson, Jim  
**Sent:** Wednesday, January 20, 2010 3:12 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: NC coast terminal groin

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**From:** Jo [mailto:joso94702@netzero.net]  
**Sent:** Wednesday, January 20, 2010 3:02 PM  
**To:** Gregson, Jim  
**Subject:** NC coast terminal groin

**Mr. Gregson,**

**I would appreciate your support for the North Carolina coastal terminal groin.**

**Erosion on the east end of Ocean Isle Beach continues to move closer to our homes.**

**Differing opinions about the benefits of terminal groins only delay a chance to try a new solution to resolve an ongoing problem.**

**A favorable recommendation for the terminal groin would benefit the environment and residents of Ocean Isle Beach and other coastal areas.**

**Sincerely, Dan Souther (336-210-3175)**

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Thursday, January 21, 2010 11:41 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Nags Head Terminal Grion

-----Original Message-----

From: Jim Frain [mailto:jpfrain@verizon.net]  
Sent: Thursday, January 21, 2010 11:06 AM  
To: Gregson, Jim  
Subject: Nags Head Terminal Grion

Mr. Gregson,

I own a property in Nags Head at 218 E. Altoona St. and support terminal groins. There is too much sand from the Nags Head's beach that is ending up in the Oregon Inlet. Properly placed terminal grions will help limit erosion to the beaches. I also feel a jetty should be placed on the North side and South South of the Inlet to limit erosion and the constant cleaning out of the Inlet.

Thank you,  
Jim Frain  
218 E. Altoona St  
Nags Head, NC 27959



## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Thursday, January 21, 2010 2:15 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Comment on Terminal Groins in Nags Head

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**From:** PipersDream [mailto:piper@pipersdream.net]  
**Sent:** Thursday, January 21, 2010 1:50 PM  
**To:** Gregson, Jim  
**Cc:** piper@pipersdream.net  
**Subject:** RE: Comment on Terminal Groins in Nags Head

**Subject:** Comment on Terminal Groins in Nags Head

It would make so much sense to do a Groin [north of](#) Oregon Inlet

Would stop the sand from filling up the inlet and it would hold down the expense of dredging it every year

It would also save the sand on the beach at South Nags Head

They have jetties everywhere you go and it works—why not here???

Thanks  
Butch Stone  
Nags Head  
252-480-1533

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Thursday, January 21, 2010 11:21 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** MILDRED OGLETREE  
**To:** Gregson, Jim  
**Sent:** Thu Jan 21 21:18:48 2010  
**Subject:** terminal groins

Dear Mr. Gregson,

I am writing in opposition to any proposal to allow terminal groins, jetties, or any form of hardened structures on our beaches. As studies have pointed out, these groins cause beach erosion in areas adjacent to them. We cannot stop the forces of nature on the North Carolina coast, but we can work to utilize scientific research to responsibly protect as much of the coast as we can. Long-term planning is much more productive for both human and natural existence than short-term reactions.

Thank you,

Midge Ogletree

PO Box 102

Columbia, NC 27925

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Friday, January 22, 2010 4:27 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal Groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.ncccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** tom.haddonhomes  
**To:** Gregson, Jim  
**Sent:** Fri Jan 22 16:13:43 2010  
**Subject:** Terminal Groins  
Mr. Gregson,

I urge you to push forward with this study and publish the findings as soon as possible. Many citizens and homeowner's in Nags Head have lost their homes to Beach erosion. I view terminal groins as a possible integral part of a Beach Nourishment strategy that can save our homes, our infrastructure and our tax base.  
Thanks for your time.

Best Regards,  
Tom Haddon

157 W Waterside Lane  
Nags Head, NC 27959

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Sunday, January 24, 2010 5:15 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** Hal Goodman  
**To:** Gregson, Jim  
**Sent:** Sun Jan 24 15:06:51 2010  
**Subject:** Terminal groins  
Jim:

As an engineer involved in shoreline stabilization and dune restoration projects on the Outer Banks, I would like to see terminal groins added to the list of available means and methods for combating erosion. Properly designed and constructed terminal groins can be a very effective and useful tool to stabilize eroding beach areas. We really need to consider approving them to help preserve our barrier islands.

Hal Goodman, P.E.  
Construction Engineering Services, Inc.  
P.O. Box 665  
Manteo, NC 27954  
(252) 473-9733  
[halgoodman@aginet.com](mailto:halgoodman@aginet.com)

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, January 25, 2010 9:20 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: TERMIAL GROINS

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**From:** Carl "Pogie" Worsley [mailto:pogiew@carlworsleycompany.com]  
**Sent:** Monday, January 25, 2010 8:24 AM  
**To:** Gregson, Jim  
**Subject:** TERMIAL GROINS

I SUPPORT THE EFFORT TO PLACE TERMINAL GROINS... IN DARE COUNTY....

Carl "Pogie" Worsley  
Carl Worsley & Associates  
252-480-1224 (w)  
252-423-0445 (c)

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, January 25, 2010 3:02 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Groins/jetty's

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**From:** wayne c cummings [mailto:waynecc@ix.netcom.com]  
**Sent:** Monday, January 25, 2010 12:47 PM  
**To:** Gregson, Jim  
**Subject:** Groins/jetty's

I am a property owner and have been vacationing at the Outerbanks of NC since 1976. I have lost an ocean front home as a result of the ongoing beach erosion.

Long Beach Island New Jersey is a barrier island that is about 20 miles long and at some places less then 200 yards wide.

There has been a jetty system there for at least 35 years.

Granted, the weather there is not as consistently severe as OBX, but they are subject to Hurricanes and N'or Easters. The 5 day 1989 N'or easter that caused heavy beach erosion and property damage to the Outerbanks also hit Long Beach Island, creating beach erosion.

The Outer Banks has not recovered from that storm and in fact, South Nagshead, has suffered even more severe beach erosion since the 1989 storm.

I was Vacationing at Long Beach Island NJ. in the mid 70's and recently made a visit to that area, and the beaches have not changed as a result of the protection offered

by the Jetty System and the ability to help rebuild the beaches.

Starting with a Groin at the North side of Oregon Inlet, and perhaps developing a Jetty System similar to that of Long Beach Island would help

stabilize the quickly disappearing beaches at the OBX, especially those in South Nagshead NC.

I am a proponent of groins and jettys do to the positive results of the jetty system at Long Beach Island NJ.

I respectfully ask that CAMA takes a positive approach and help develop a plan that would allow the installation of a groin/jetty system to help stabilize

the beaches at the OuterBanks of North Carolina and those in South Nagshead NC.

Respectfully,  
Wayne Cummings  
423 Camelot Drive  
Brookhaven Pa. 19015.  
610-876-2600  
9818 Chawanook Ct  
South Nagshead NC  
252-480-6367

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, January 26, 2010 11:50 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Groins

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**From:** John Booth [mailto:John@brindleybeach.com]  
**Sent:** Tuesday, January 26, 2010 11:04 AM  
**To:** Gregson, Jim  
**Subject:** Groins

Jim, I live in Southern Shores and have been a resident here since 1976. I am all for terminal groins in our area. They work; enough said.

*John R. Booth*  
*Associate Broker*  
*Brindley Beach Vacation and Sales*  
*Direct 252-457-1210*  
*252-453-3000 x 1063*  
*Cell 252-207-3588*  
[john@brindleybeach.com](mailto:john@brindleybeach.com)

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, January 26, 2010 10:04 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: terminal groins

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.ncccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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**From:** carey kelley  
**To:** Gregson, Jim  
**Sent:** Tue Jan 26 21:53:50 2010  
**Subject:** terminal groins

Hi,

I am a ocean front home owner in Nags Head NC and I am watching as my house as it is getting closer and closer to being a memory and all the debris that will be dumped in the ocean along with all the other houses will pollute the environment.

The attitude of having the ocean continue to claim house is worst for the environment then placing groins into the ocean to manage the sand loss. I am from Maryland and Ocean City has a beach at the inlet that is extremely wide and it has built up against a rocky out crop that was placed there years ago. I am not a scientist or an environmentalist but the course that the ocean front areas where I have my HOME seems to be missing the fact that every time a storm gets over what little beach is left tons of debris enters the ocean. If groins can help please move this forward before my HOME is part of that debris field.

Carey kelley  
4109674637



## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, February 01, 2010 3:26 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** FW: terminal groins

-----Original Message-----

From: bowend@carolina.rr.com [mailto:bowend@carolina.rr.com]  
Sent: Monday, February 01, 2010 3:08 PM  
To: Gregson, Jim  
Subject: terminal groins

Dear Mr. Gregson,

I am writing to voice my strong support of coastal terminal groins.

I have owned and maintained a condo on the east end of Ocean Isle Beach for almost 30 years. Myself and 40 other owners have watched as the ocean creeps closer and closer to our homes. The re-nourishment efforts have helped and have been appreciated but they do not appear to be the solution.

We have heard of many successful installations of the terminal groins believe they would be the solution to our island's continuing erosion problem.

A favorable report for the terminal groin would benefit the environment and residents of Ocean Isle Beach. We would appreciate your support.

Thank You,  
DB Bowen and residents of Sandwellers Condominiums.

# SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450

200 WEST FRANKLIN STREET, SUITE 330  
CHAPEL HILL, NC 27516-2559

Facsimile 919-929-9421

February 10, 2010

RECEIVED

FEB 12 2010

Morehead City DCM

James H. Gregson, Director  
Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557

**Re: Terminal groins and designated critical habitat for piping plovers at North Carolina inlets**

Dear Mr. Gregson,

These comments are submitted on the NC Terminal Groin Study – Draft Report (February 2010). Our comments focus on the failure of the Draft Report to convey the significance and implications of critical habitat designation for piping plovers under the Endangered Species Act as an environmental consideration and constraint in the construction of terminal groins at nearly all of North Carolina's coastal inlets. The Draft Report generally identifies the adverse impacts of inlet stabilization and groins and jetties on piping plover habitat and the specific adverse impacts of the Pea Island terminal groin on piping plover habitat, but fails to discuss the considerations that must go into permitting terminal groins in designated critical habitat. The Draft Report also fails to identify the inlet areas with designated critical habitat or discuss the environmental prohibitions associated with that designation. Our comments provide a more complete discussion of critical habitat designation and its requirements and include specific recommendations for conclusions in a final report.

Coastal North Carolina is at the southern end of the breeding range and northern end of the wintering range of piping plovers. In 1986, the piping plover was listed as threatened and endangered under provisions of the Endangered Species Act. The Great Lakes breeding population is endangered; the Atlantic Coast and Northern Great Plains breeding populations are threatened; and all three wintering populations are threatened. All three populations winter on the North Carolina coast.

- 1. Terminal groins adversely modify habitat for threatened piping plovers by eliminating intertidal flats, allowing encroachment of vegetation in stabilized areas, and generally impeding inlet dynamics that create and maintain habitats piping plovers require.**

Piping plovers are known to utilize all inlet areas on the North Carolina coast for breeding and/or wintering. The Draft Report should more clearly state the consensus of state and federal agency wildlife biologists and other experts that the direct and indirect impacts of terminal

groins adversely affect inlet habitats important for this threatened species. Piping plovers depend on the natural barrier island and inlet processes that create and maintain broad flats and intertidal areas, overwash zones, and maintain early successional habitats. The purpose of a terminal groin is to interfere with these dynamics and inlet processes with a resulting degradation of habitats piping plovers require.

The U.S. Fish & Wildlife Service has issued recovery plans for all three threatened and endangered piping plover populations. These recovery plans must be based on the best scientific information available and include citations to many scientific references on the piping plover and its habitat needs. All three recovery plans identify inlet shorelines and associated sandflats as a primary habitat for wintering and breeding piping plovers. All three recovery plans identify inlet stabilization projects and jetties and groins as activities that destroy piping plover habitat:

#### Atlantic Coast Piping Plover Recovery Plan

"In general, wintering plovers on the Atlantic Coast are found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets. Plovers appear to prefer sandflats adjacent to inlets of passes, sandy mudflats along prograding spits, and overwash areas as foraging habitats." (U.S. Fish & Wildlife Service 1996. Revised Recovery Plan, Piping Plover Atlantic Coast Population p15).

"The wide, flat, sparsely vegetated barrier beaches preferred by the piping plover are an unstable habitat, dependent on natural forces for renewal and susceptible to degradation by development and shoreline stabilization efforts." (USFWS 1996 p33).

"Jetties and groins may cause significant [piping plover] habitat degradation by robbing sand from the downdrift shoreline." (USFWS 1996 p35).

"Wintering habitat, like Atlantic Coast breeding habitat, is dependent on natural forces of creation and renewal. Man-made structures along the shoreline or manipulation of natural inlets can upset this dynamic process and result in habitat loss or degradation. For example, dredging of inlets can affect spit formation adjacent to inlets, while jetties can cause widening of islands and subsequent growth of vegetation of inlet shores. Over time, both result in loss of plover habitat." (USFWS 1996 p43).

#### Great Lakes Piping Plover Recovery Plan

"Shoreline development in the Great Lakes region and throughout the wintering grounds poses a threat to the Great Lakes population of piping plovers. ... Inlet dredging and artificial structures, such as breakwalls and groins, can eliminate breeding and wintering areas and alter sedimentation patterns leading to the loss of nearby habitat". (U.S. Fish & Wildlife Service 2003. Recovery Plan for the Great Lakes Piping Plover pp22-23).

#### Northern Great Plains and Great Lakes Recovery Plan

"Loss of sandy beaches and other littoral habitats due to recreational/commercial developments and dune stabilization on the Great Lakes, Atlantic Coast, and Gulf of Mexico are partially responsible for the decline of the species. ... The stabilization of barrier island sand flats also has been identified as a potential threat to piping plover

habitat. Stabilization may result in encroachment of vegetation that reduces the quality of, or eliminates altogether, wintering sites (Currier et al. 1985), (U.S. Fish & Wildlife Service 1988. Recovery Plan for Piping Plovers of the Great Lakes and Northern Great Plains pp34.36)

The NC Terminal Groin Study – Draft Report draws similar conclusions regarding the adverse impacts of terminal groins generally on piping plover habitats and the adverse impacts of the Pea Island terminal groin specifically. These conclusions are buried amidst largely useless information on piping plover sightings that provide no analysis of observation effort by years or within a given year to enable any conclusions on abundance or use of areas. This information at best only establishes that piping plovers use areas where sightings have been recorded. The Draft Report does include the following general conclusion:

“As described in Cohen (2008), inlet stabilization with rock jetties and channel dredging for navigation alter the dynamics of sediment transport and affect the location and movement rate of barrier islands (Camfield and Holmes 1995), which might in turn affect the availability of plover habitat.” (Draft Groin Study Report 2010 pIV-13).

With respect to the effects of Pea Island terminal groin on piping plovers and piping plover habitat, the Draft Report draws the following specific conclusions based on expert opinion from state and federal agency wildlife biologists:

“In fact, the number of piping plovers that use the site [Pea Island south of the terminal groin] during migration and winter has declined as the vegetation has encroached into the site (Personal communication, D. Allen, NCWRC, October 2009). Terns, oystercatchers, and piping plovers depend on overwash habitats that are being converted to vegetated dune communities as a result of the terminal groin (Personal communication, D. Stewart, USFWS, February 2010). (Draft Groin Study Report 2010 pIV-34). ... As described by USFWS (2008) and depicted in Figure IV-8 and Figure IV-9, habitat behind the terminal groin has undergone succession due to wind and water-borne sand, and it is no longer as suitable for piping plover nesting and foraging habitat. Since the piping plover is primarily a winter resident at Oregon Inlet, the major threat to this species in the vicinity of the inlet is the degradation of beach foraging habitat (USACE 2001).” (Id.)

With respect to potential impacts of the Fort Macon terminal groin on piping plovers, the Draft Report provides no information on the occurrence of piping plovers on the west side of Beaufort Inlet prior to construction of the groins.. The Draft Report does conclude:

There have been few recorded observations of piping plovers at Fort Macon. Fort Macon records are limited to one individual in 1996 and 3 individuals in 2006. (NC Terminal Groin Study IV-59)

Based on the lack of pre-groin information on piping plovers on the Fort Macon side of Beaufort Inlet, the only conclusion that can be drawn is piping plovers rarely if ever use the side of the inlet where the groin is present but there is some evidence of use of the other side of the inlet on Shackleford Banks. Any other specific conclusion on the effects of the Fort Macon terminal groin based on the information in the Draft Report is pure speculation.

In summary, the science is clear, and should be more clearly stated in the Draft Report, that terminal groins adversely modify habitats important to piping plovers by eliminating intertidal flats, allowing encroachment of vegetation in stabilized areas, and generally impeding inlet dynamics that create and maintain habitats piping plovers require.

## **2. Nearly all North Carolina inlets are designated critical habitat for piping plovers.**

The Draft Report mentions that Pea Island is designated under the Endangered Species Act as critical habitat for piping plovers but fails to identify other inlets that are designated critical habitat or explain the implications of that designation. Critical habitat is defined in section 3(5)(A) of the Act as:

- (i) The specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and
- (ii) Specific areas outside the geographic area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species.

Section 4(b)(2) of the Act requires that critical habitat designations be based on the best scientific and commercial data available.

In designating critical habitat for wintering piping plovers, the U.S. Fish & Wildlife Service identified the following primary constituent elements for the conservation of wintering piping plovers:

“Those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. The primary constituent elements are found in geologically dynamic coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide.

...

These habitat components are a result of the dynamic geological processes that dominate coastal landforms throughout the wintering range of piping plovers. These geologically dynamic coastal regions are controlled by processes of erosion, accretion, succession, and sea level change. The integrity of the habitat components depends upon the daily tidal events and regular sediment transport processes, as well as episodic, high-magnitude storm events; these processes are associated with the formation and movement of barrier islands, inlets, and coastal landforms.”

66 Fed. Reg. 36064-36065. In sum, the primary constituent elements of wintering piping plover critical habitat designated by the U.S. Fish & Wildlife Service are the elements a terminal groin is constructed to manage or eliminate.

Applying these primary constituent elements, the U.S. Fish & Wildlife Service designated specific areas as critical habitat for wintering piping plovers in July 2001. 66 Fed. Reg. 36038 (July 10, 2001); 50 C.F.R. Part 17. Critical habitat for wintering piping plovers in Dare and Hyde Counties was vacated by a court and subsequently revised and re-designated in

October 2008. 73 Fed. Reg. 62815; 50 C.F.R. Part 17. The following inlet areas on the North Carolina coast are designated critical habitat for wintering piping plovers (see attached maps):

Oregon Inlet  
Hatteras Inlet  
Ocracoke Inlet  
New Drum Inlet  
Lookout Bight  
Beaufort Inlet  
Bogue Inlet  
New Topsail Inlet

Rich Inlet  
Mason Inlet  
Masonboro Inlet  
Carolina Beach Inlet  
Lockwood Folly Inlet  
Shallotte Inlet  
Sunset Beach/Ocean Isle Inlet

Given the environmental and legal implications of construction of terminal groins in designated critical habitat, the Draft Report should identify all designated areas of critical habitat in the vicinity of inlet areas on the North Carolina coast.

**3. Federal law prohibits federal agencies from funding or permitting terminal groin projects that destroy or adversely modify critical habitat for threatened or endangered species.**

Section 7 of the Endangered Species Act prohibits federal agencies from taking any actions that would “jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined ... to be critical.” 16 U.S.C. 1536(a)(2). Terminal groins and associated beach nourishment activities may require federal action through funding and will require federal action through permits and authorizations (e.g., Section 404 of the Clean Water Act; Section 10 of the Rivers and Harbors Act). Federal agencies are prohibited from issuing these authorizations for terminal groin projects that destroy or adversely modify designated critical habitat for piping plovers. Since as discussed previously, existing terminal groins have adversely modified critical habitat for piping plover (Pea Island terminal groin) and future terminal groins at inlet areas designated critical habitat would likely destroy or adversely modify these habitats, the Draft Report should identify the obstacle to terminal groin construction on the North Carolina coast.

For example, the attached photograph taken January 1, 2010 shows a piping plover foraging on the intertidal flats on the south side of Rich Inlet on the north end of Figure 8 Island. This area is designated critical habitat for wintering piping plovers. It is also the site of a proposed terminal groin that would destroy the intertidal flats on the south inlet shoreline and adversely modify the critical habitat in the areas by interfering with the inlet dynamics that maintain the habitat required by piping plovers and increasing vegetation on the “stabilized” south inlet shore making the area unsuitable for piping plovers. It is of note that the piping plover in the photograph is from the endangered Great Lakes population, identified by the color bands on the legs.

In proposing critical habitat designation for wintering piping plovers, the U.S. Fish & Wildlife Service again identifies “inlet and shoreline stabilization” and “beach maintenance and renourishment” as activities that “may affect plover survival or utilization of wintering habitat.” 66 Fed. Reg. 36039 (July 10, 2001). The NC General Assembly has requested a complete review of the environmental issues associated with construction of terminal groins in North Carolina. The Draft Report should include the following information and conclusions:

Identification of all areas in the vicinity of North Carolina inlets that are designated critical habitat for the federally threatened piping plover.

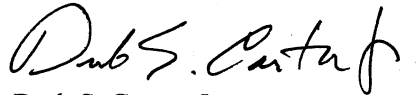
Terminal groins may destroy or adversely modify designated critical habitat for piping plovers by eliminating intertidal areas, allowing vegetation to grow on "stabilized" shoreline areas, and generally interfering with barrier island and inlet processes and dynamics that create and maintain the habitat piping plovers require.

Federal agencies are prohibited from funding, permitting, or authorizing terminal groin projects that destroy or adversely modify critical habitat for any threatened or endangered species.

It is important that these conclusions be included in the draft report to fully apprise the Coastal Resources Commission, General Assembly, and public of this environmental constraint on terminal groin construction in on the North Carolina coast.

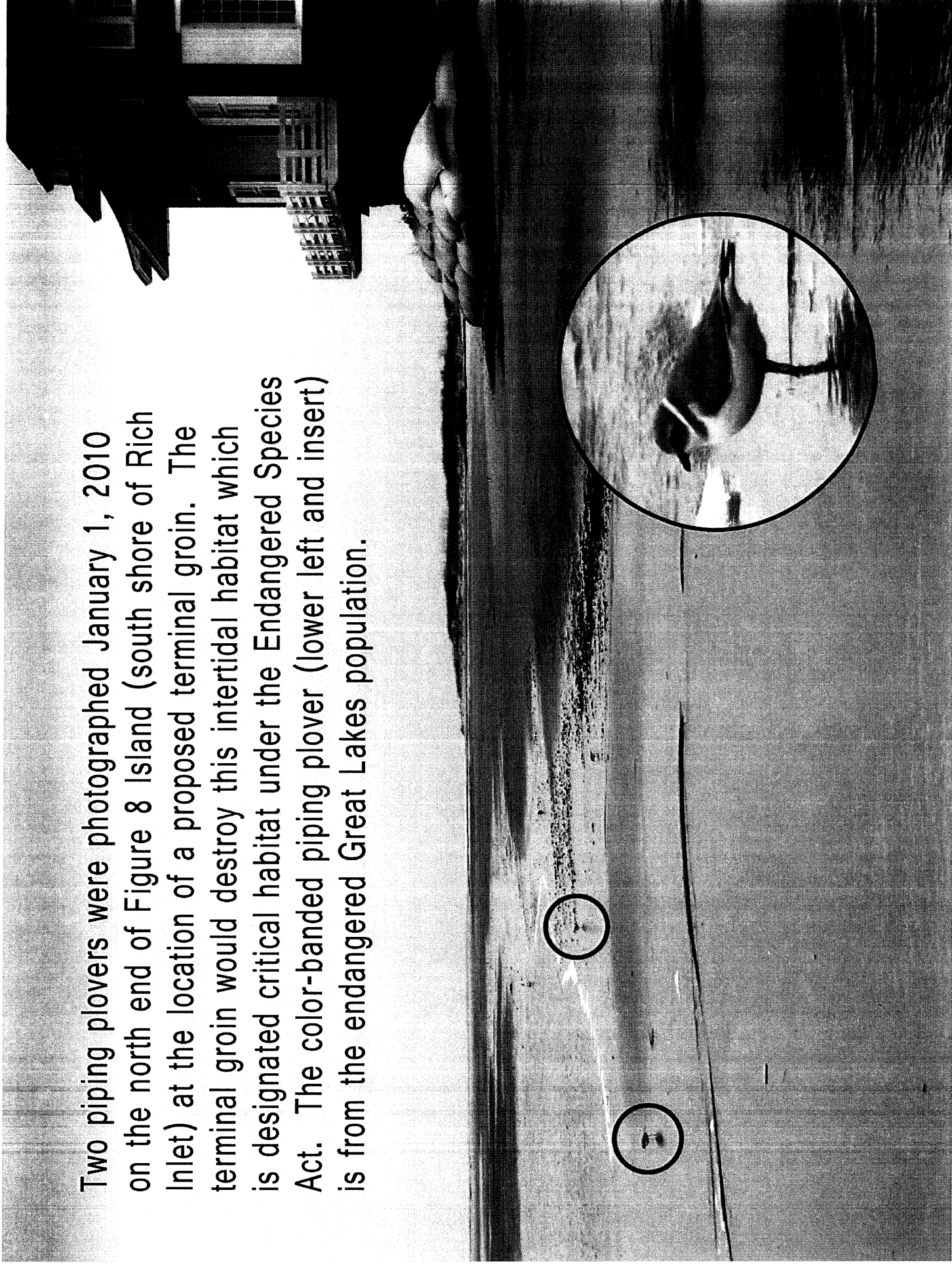
We appreciate the opportunity to submit these comments on the Draft Report.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Derb S. Carter, Jr.", with a stylized flourish at the end.

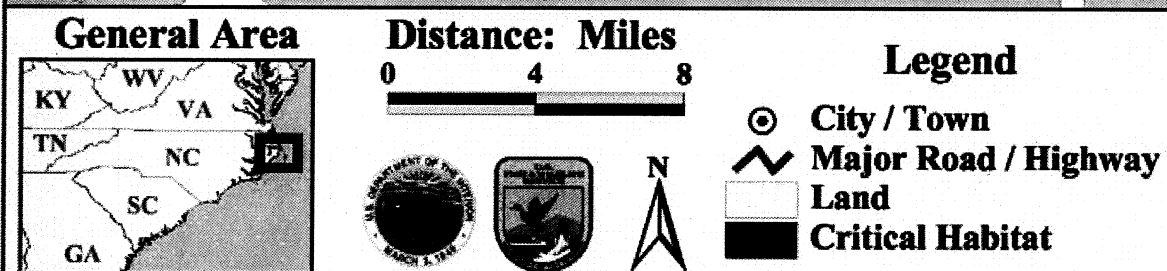
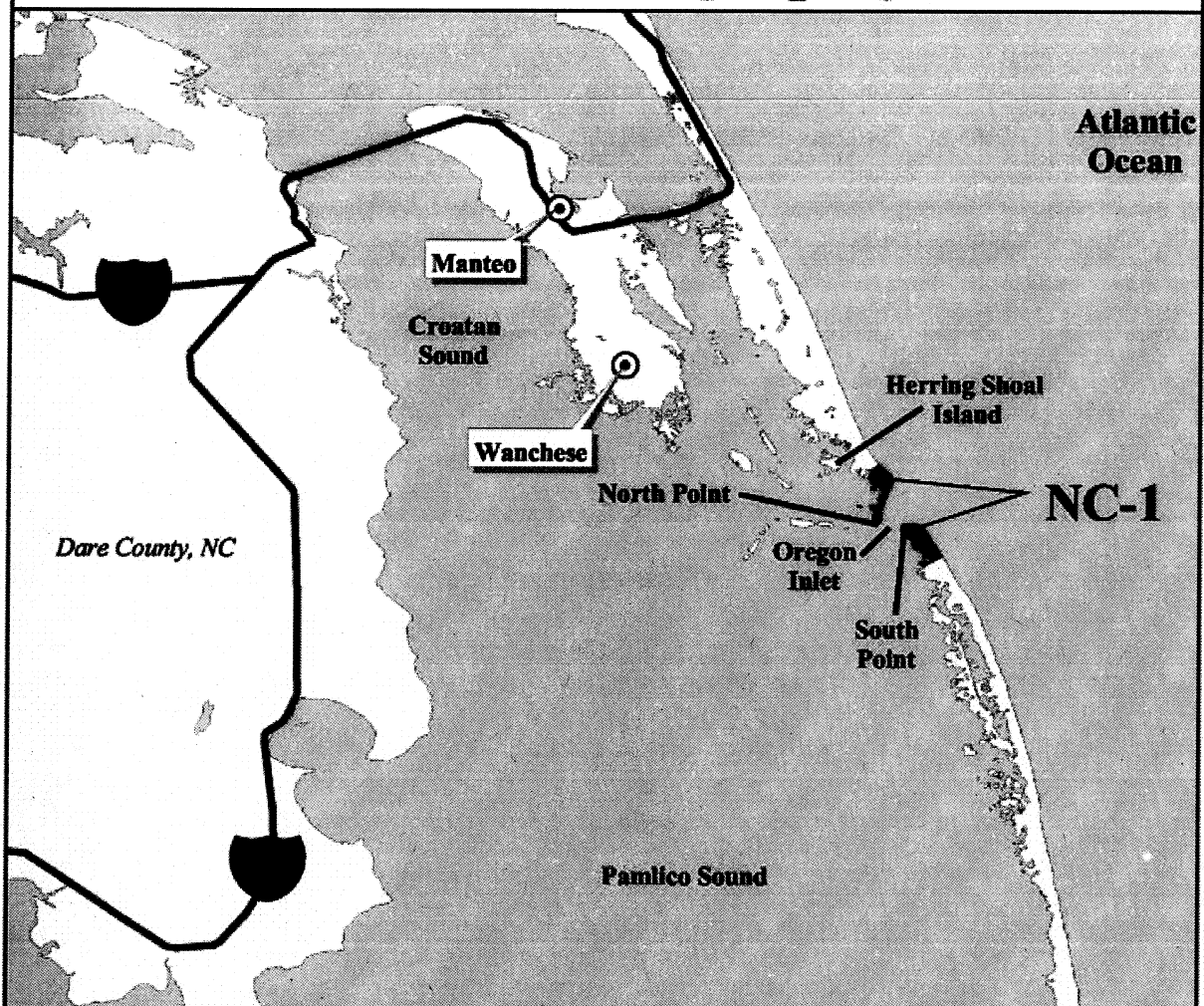
Derb S. Carter, Jr.  
Director, Carolinas Office

Two piping plovers were photographed January 1, 2010 on the north end of Figure 8 Island (south shore of Rich Inlet) at the location of a proposed terminal groin. The terminal groin would destroy this intertidal habitat which is designated critical habitat under the Endangered Species Act. The color-banded piping plover (lower left and insert) is from the endangered Great Lakes population.





## General locations of the designated critical habitat for the Wintering Piping Plover.

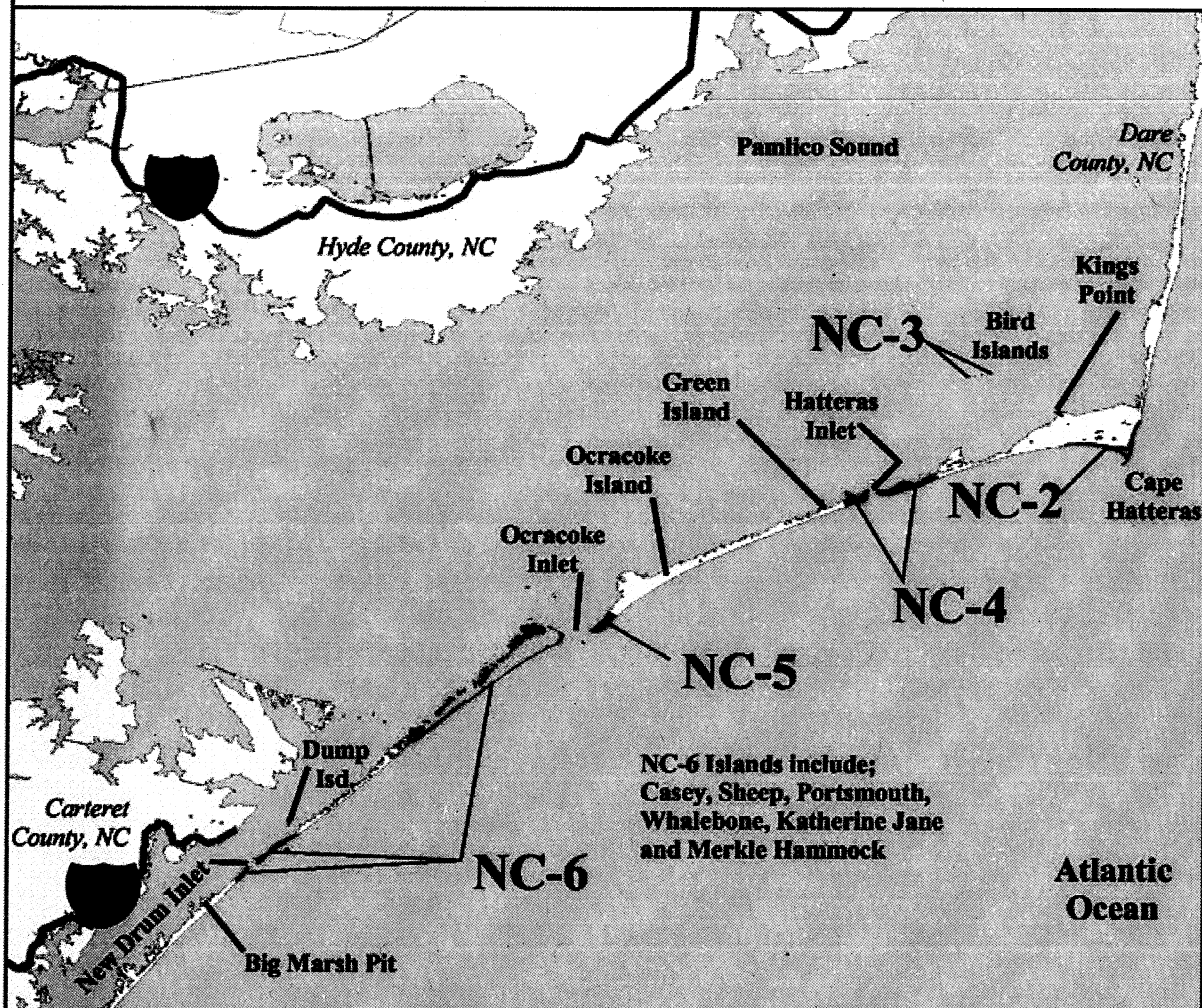


**Use Constraints:** This map is intended to be used as a guide to identify the general areas where Wintering Piping Plover critical habitat has been designated. Included within the designation of critical habitat are all land areas to the mean lower low water. Refer to the narrative unit descriptions as the precise legal definition of critical habitat.

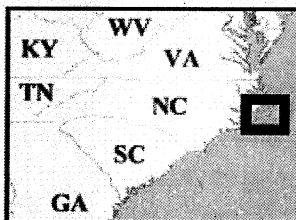
## North Carolina Unit: 1

Some locations have been slightly enlarged for display purposes only.

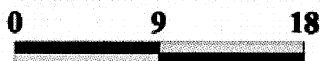
# General locations of the designated critical habitat for the Wintering Piping Plover.



## General Area



## Distance: Miles



## Legend

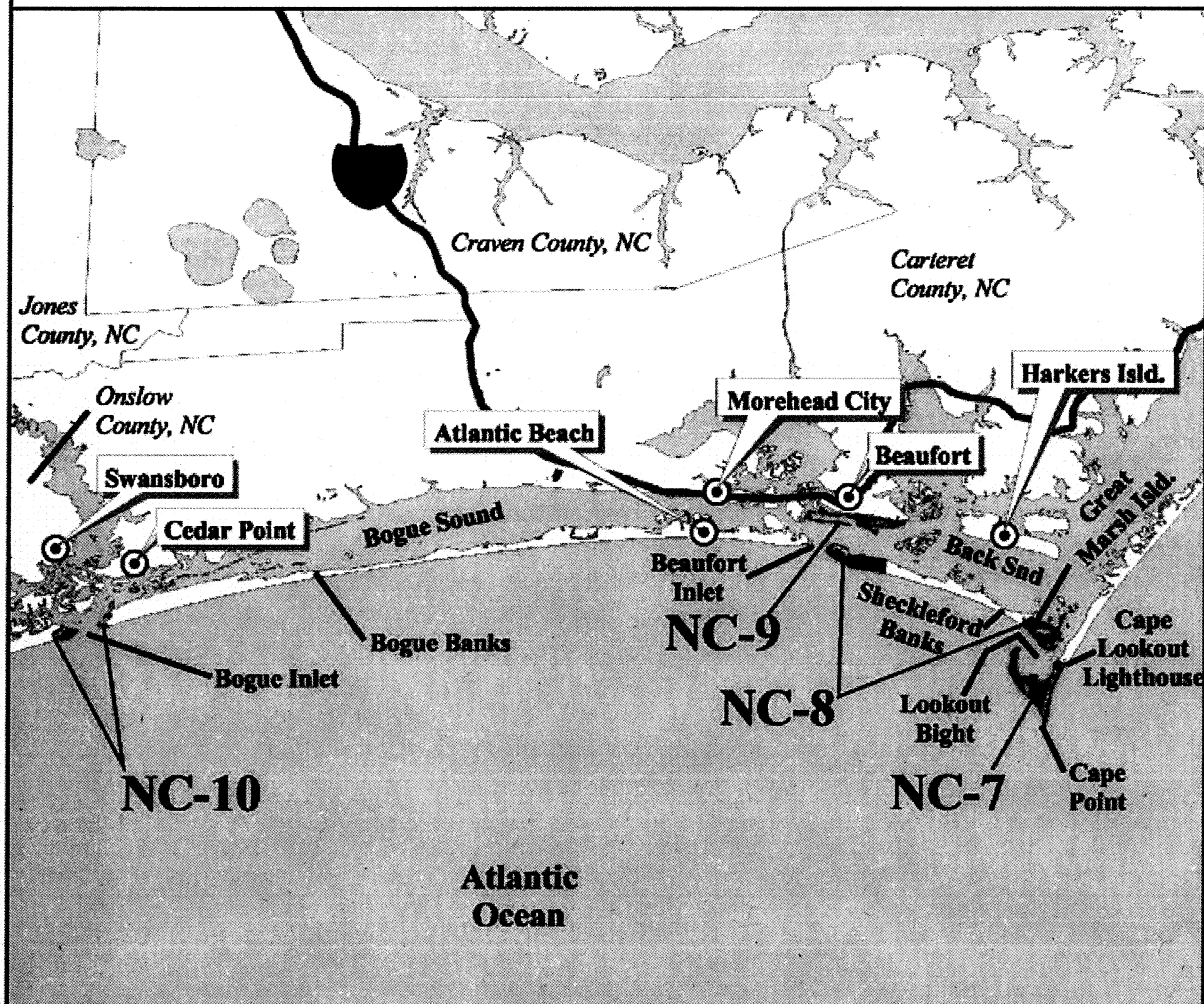
- City / Town
- Major Road / Highway
- Land
- Critical Habitat

**Use Constraints:** This map is intended to be used as a guide to identify the general areas where Wintering Piping Plover critical habitat has been designated. Included within the designation of critical habitat are all land areas to the mean lower low water. Refer to the narrative unit descriptions as the precise legal definition of critical habitat.

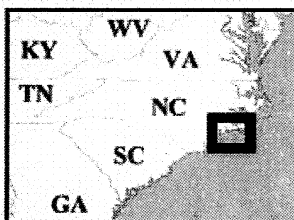
# North Carolina Units: 2, 3, 4, 5 & 6

Some locations have been slightly enlarged for display purposes only.

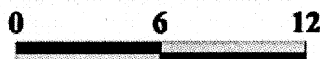
# General locations of the designated critical habitat for the Wintering Piping Plover.



## General Area



## Distance: Miles



## Legend

- City / Town
- Major Road / Highway
- Land
- Critical Habitat

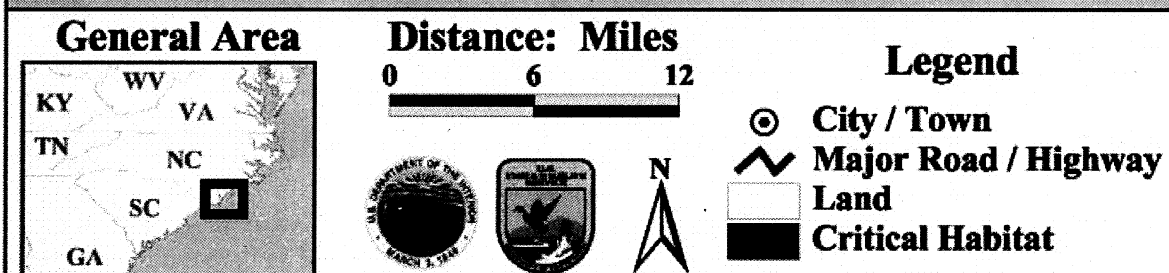
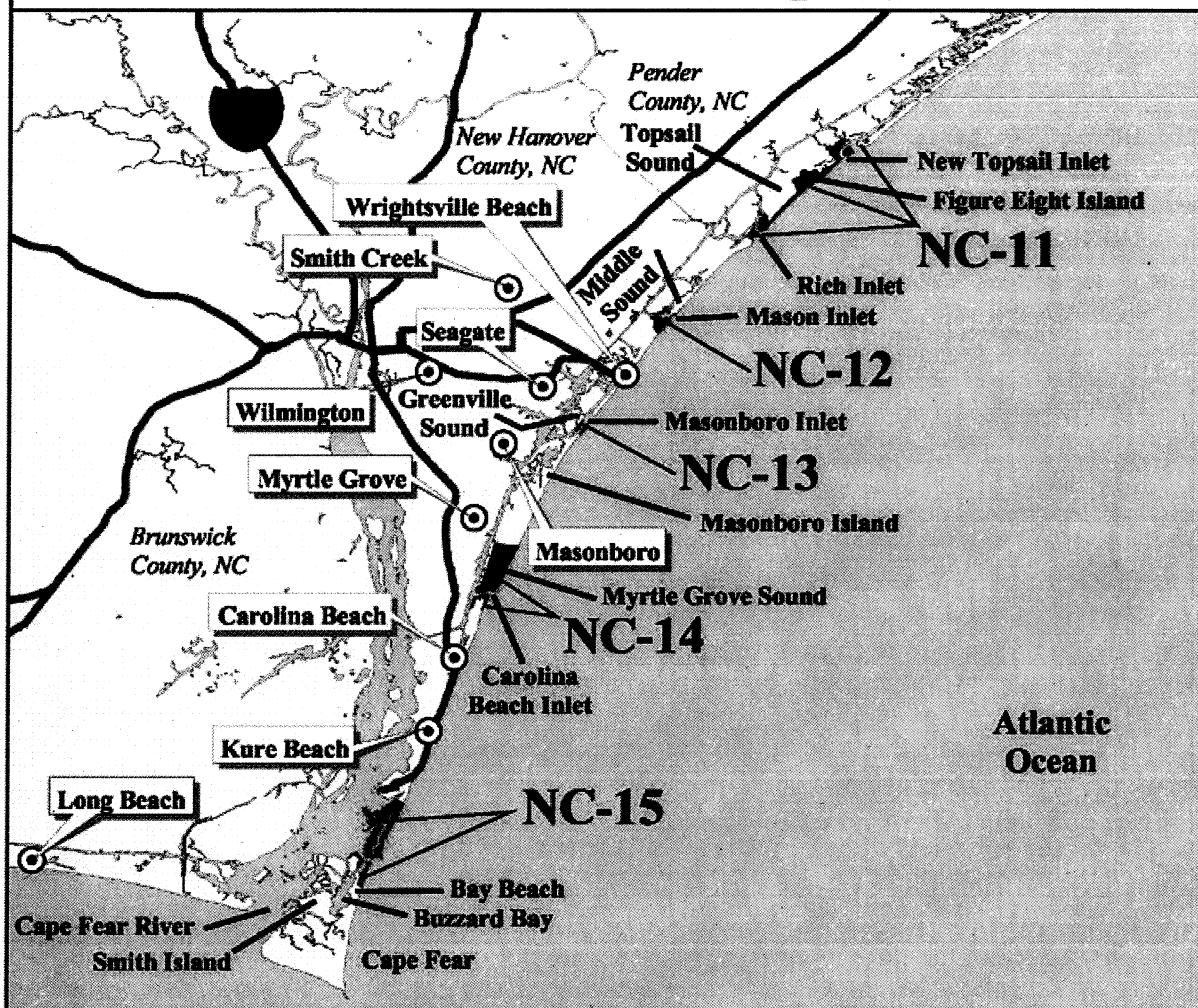
**Use Constraints:** This map is intended to be used as a guide to identify the general areas where Wintering Piping Plover critical habitat has been designated. Included within the designation of critical habitat are all land areas to the mean lower low water. Refer to the narrative unit descriptions as the precise legal definition of critical habitat.

# North Carolina Units: 7, 8, 9 and 10

Some locations have been slightly enlarged for display purposes only.



## General locations of the designated critical habitat for the Wintering Piping Plover.

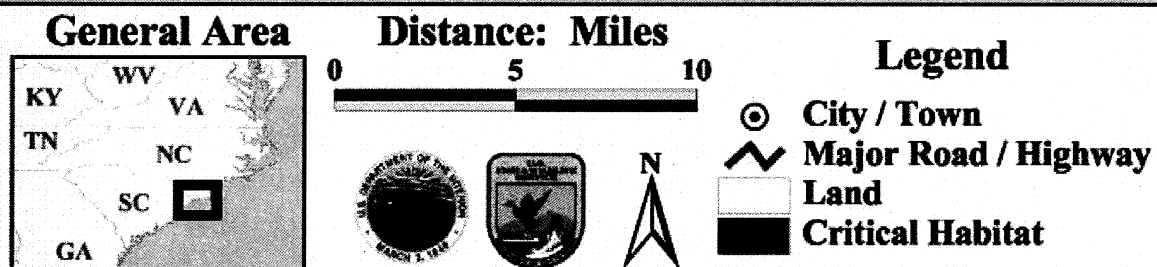
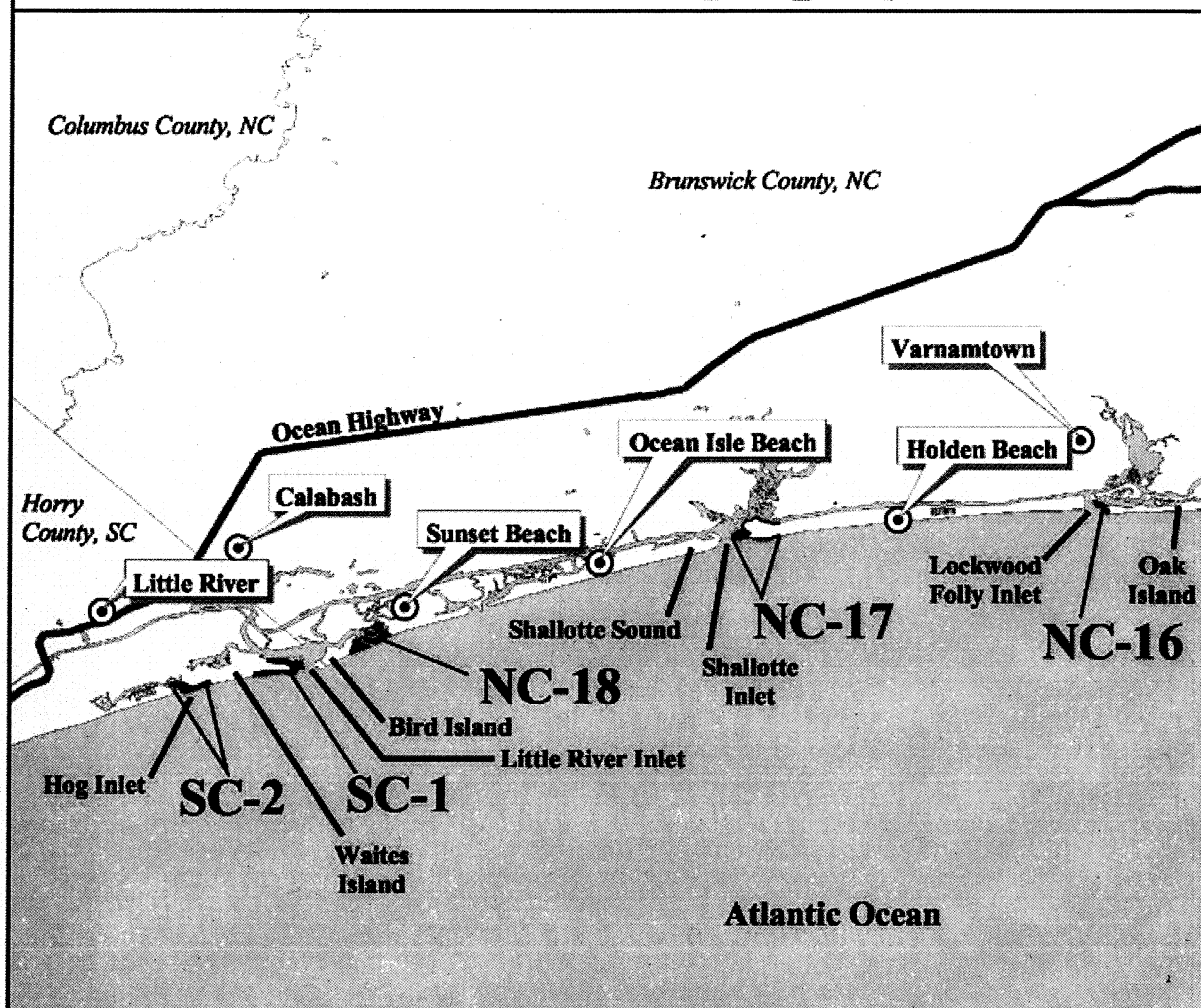


**Use Constraints:** This map is intended to be used as a guide to identify the general areas where Wintering Piping Plover critical habitat has been designated. Included within the designation of critical habitat are all land areas to the mean lower low water. Refer to the narrative unit descriptions as the precise legal definition of critical habitat.

## North Carolina Units: 11 to 15

Some locations have been slightly enlarged for display purposes only.

# General locations of the designated critical habitat for the Wintering Piping Plover.



**Use Constraints:** This map is intended to be used as a guide to identify the general areas where Wintering Piping Plover critical habitat has been designated. Included within the designation of critical habitat are all land areas to the mean lower low water. Refer to the narrative unit descriptions as the precise legal definition of critical habitat.

## NC Units: 16 to 18, SC Units: 1 & 2

Some locations have been slightly enlarged for display purposes only.



## United States Department of the Interior

NATIONAL PARK SERVICE  
Southeast Regional Office  
Atlanta Federal Center  
1924 Building  
100 Alabama St., SW.  
Atlanta, Georgia 30303



IN REPLY REFER TO:  
(SER-NR)

RECEIVED

FEB 12 2010

Morehead City DCM

Mr. Jim Gregson  
Director, North Carolina Division  
of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557

Dear Mr. Gregson:

The National Park Service (NPS) has reviewed the Working Draft Report, Terminal Groin Study (report), dated February 1, 2010, and appreciates the opportunity to provide comments and request revisions to this document. These are presented below:

1. The report should be amended to include the purposes, resources, and values of Cape Lookout National Seashore (CALO) and Cape Hatteras National Seashore (CAHA).

Two of the five terminal groins that are considered in the study are located near or within the NPS-administered lands and waters. The NPS administers CALO, which is adjacent to Beaufort Inlet, and CAHA, which includes and is adjacent to Oregon Inlet. These sites contain nationally significant natural and cultural resources and values that play a vital role in the state's ecosystem and local economics and they are also home to many of the federally protected species that depend upon inlet shoreline habitat. For example, at CAHA, the inlet shorelines are among the few remaining areas where natural barrier island processes occur relatively unimpeded within the Seashore. As a result, the inlets within the Seashore have become even more important as protected wildlife habitat.

Therefore, a section on each Seashore should be included in Chapter VI, Section C discussion of Recreation and Environmental Value. Not only should this new discussion present the legal, regulatory, and policy requirements applicable to CAHA and CALO, but it should include the economic value of both Seashores to the local economies. Our data shows that in 2008 CAHA experienced 2.15 million visitors, filled 2,243 local jobs, and contributed \$211 million to the



local economy. The CALO had 487,000 visitors, filled 745 local jobs, and contributed \$70.5 million to the local economy.

Additionally, we strongly recommend that Chapter VIII of the draft report be amended to contain a serious discussion of the land management context in which hardened structures may or may not be considered appropriate relative to the purposes for which the particular land area is authorized and managed. While no definitive decision can be made in advance of an actual project proposal or permit request, a request to the NPS for permission to construct a terminal groin on NPS lands and waters would not likely be approved or permitted by the NPS.

2. The report should correct inaccuracies in the data.

First, in Chapter IV (p. 27 and pp. 37-39), we note that there are some minor inaccuracies in the natural resource data used in reference to seabeach amaranth and piping plover nesting on the Bodie Island side of Oregon Inlet. The piping plover discussion on pp. 37-39 should distinguish between migrating/wintering (i.e., nonbreeding) piping plovers, which appear to be the majority of the numbers reported, and breeding piping plovers. For correct data on CAHA's seabeach amaranth and piping plover data, we refer you to the latest annual reports, which include data for previous years and are available at:

<http://parkplanning.nps.gov/document.cfm?parkID=358&projectId=13331&documentID=31872>

Second, in Chapter VI Section B, it may not be valid to use all 30-Year Risk Areas (30YRAs) equally in considering the economic impact of shifting inlets. The risk level may not be equal in all 30YRAs. While most of the inlet areas within 30YRAs are eroding, some, such as the west end of Shackleford Banks, are actually accreting. The 30-yr Risk Line as drawn on Shackleford (p. VI-5) is close to where the shoreline would have been in the late 1800's - early 1900's. The soundside end of the line is where the old sea wall and jetties were built in the early 1900's, which were adjacent to the inlet at that time. The west end of Shackleford Banks has accreted into the federal channel and that process is not likely to reverse. Therefore, the report should revise the 30YRA classification for the west end of Shackleford.

3. The report underestimates the impacts of the terminal groins in the study sites.

The terminal groin structures considered in the study range drastically in size (the length and crest height of the structure at Oregon Inlet are more than twice as big as any other site), and these structures have varying levels of impact on the surrounding environment. Any study that proposes a new terminal groin must consider the impacts of similarly sized structures elsewhere.

We request that the report clearly describe how the impacts vary based on the structure size. Specifically, the conclusions on page II-90 should be reworded to reflect the actual results of the volume analysis, i.e., there is not an average annual increase in beach volumes post terminal groin construction on the terminal groin side of the inlet for 40% of the 5 study sites, and for 75% of the study sites with larger structures. Additionally, the NPS requests that the statement

on page II-90 that “opposite side of the inlet the trends are mixed” be reworded to show that 75% of the studied sites and 100% of the study sites with large terminal groin structures show impacts.

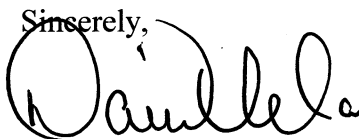
In addition, the report should clarify the difference between a jetty and a terminal groin, since the more substantial structures in the study sites are serving some of the purposes of jetties and it may not be appropriate to classify them as a terminal groin.

Third, the report shows that the success of some terminal groins is largely dependent upon periodic beach nourishment and that the adjacent navigation channel is largely dependent upon periodic dredging to remain functional. There are no case studies in the report where terminal groins are independent of beach nourishment and dredging. Therefore, the NPS requests that the report clearly point out that the impacts of terminal groins cannot, in reality, be separated from these other two activities.

Fourth, please provide any data that would support the assumptions in the report that 25% to 50% of dredged sediments would be deposited on the beach in the absence of dredging, and a reference where a similar analysis has been used to consider impacts of a specific structure isolated from dredging.

In closing, we appreciate the opportunity to comment and would welcome the opportunity to participate in further discussions. If you have any questions about our comments, please contact Linda York, Coastal Geomorphologist, or Sherri Fields, Chief, Science & Natural Resources Division, of my staff at (404) 507-5822 or (404) 507-5807, respectively.

Sincerely,

A handwritten signature in black ink, appearing to read "David Vela", written over the word "Sincerely,".

David Vela  
Regional Director  
Southeast Region

cc: Dr. Margery Overton, Chair CRC Science Panel



## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Tuesday, February 09, 2010 5:17 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Comments on Terminal Groin Report  
**Attachments:** inlet structures.xls; TJ Comments on T Groin Study.doc; Vol equiv factor BB.xls

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

---

**From:** Jtomjarrett@aol.com  
**To:** William.Birkemeier@usace.army.mil ; overton@eos.ncsu.edu ; Warren, Jeff; esciaudone@nc.rr.com ; rogerssp@uncw.edu ; Greg.L.Williams@usace.army.mil ; wcleary@charter.net ; RIGGSS@ecu.edu ; mallinsond@ecu.edu ; cpeters@email.unc.edu ; abrodrig@email.unc.edu ; jmartin@moffattnichol.com ; PTschirky@moffattnichol.com ; Walker, Michele; Gregson, Jim; bob.emory@weyerhaeuser.com ; Underwood, Steve; Stefanski, Guy; Richardson, Ken; Miller, Tancred; Lopazanski, Mike; sbenton45@earthlink.net ; ryoung@email.wcu.edu  
**Sent:** Tue Feb 09 17:10:12 2010  
**Subject:** Comments on Terminal Groin Report  
Attached are my review comments on the report. This was a quick review so I am sure, given more time, I would have many more.

Also attached is the spreadsheet referenced in the review comments which shows computations of the volumetric equivalent factors I determined for the east end of Bogue Banks. This clearly demonstrates my concerns on the used of this methodology to adjust for beach fills.

Finally, there had been some discussion in the news media that very few inlets have terminal groins. I made an inventory of 154 inlets using Google Earth (see second attached spreadsheet) from Long Island, NY to the pan handle of FL and noted the number of inlets that have terminal groins (on one side or both), jetties (on one side or both), or some other type of shoreline treatment (radial groins, groin fields, or revetments). Of the 154 inlets, 71 have some type of structure. Of these, 24 inlets have what I would classify as terminal groins (on one or both sides), and 41 have one to two jetties. The other 6 have a mishmash of shoreline treatments. Thus, of the 154 inlets in the sample, 42% have terminal structures in the form of terminal groins or jetties.

So the difficulty in finding suitable case studies was not due to the lack of inlet shoreline treatments, it was due to the limited number of applications that would meet our criteria for a terminal groin.

Tom

Tom Jarrett Comments on State Terminal Groin Study  
February 9, 2010

Comments on Terminal Groin Study  
By  
Tom Jarrett, Member  
Coastal Hazards Science Panel

**General Comment.** The same information about each of the 5 sites is repeated throughout the report. Suggest the general information be provided in Section I and if need be, referenced in the other sections.

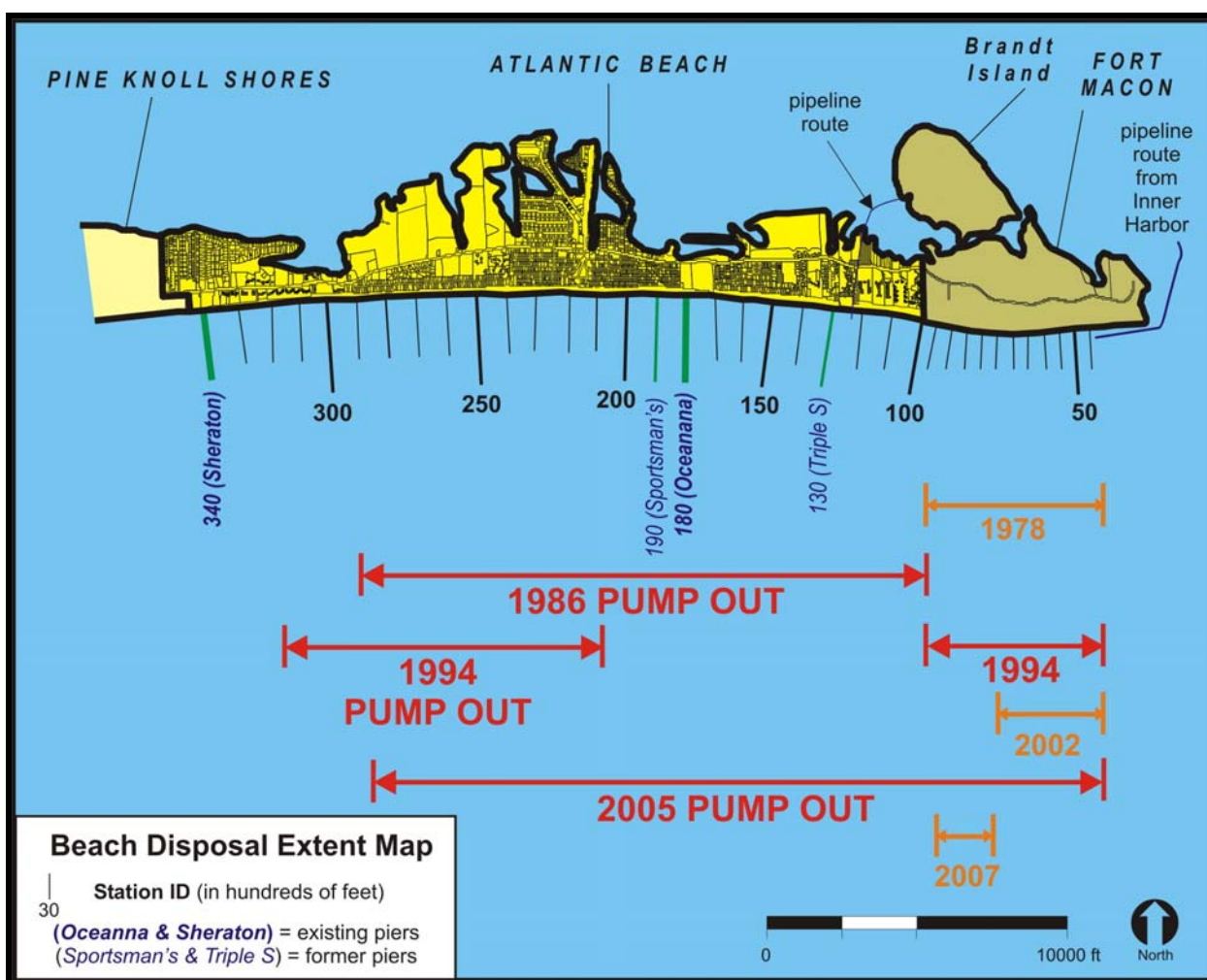
**Comments on Section II:**

- a. Provide a table or figure showing the percent wave energy from each direction.
- b. Include published information of sediment transport rates (by direction and gross).
- c. Include an estimate of the volume of material confined within the fillet.
- d. Move table of storms to an appendix. Provide summary of storm frequency and some measure of storm intensity for pre- and post-groin periods.
- e. Include a table that only lists the dredging events that were used to compute averages for each period and show computations on how averages were computed. The same is true for beach nourishment volumes.
- f. Break the tables of shoreline change and volume change to show only the right or left sides of the inlet in each table.
- g. An explanation is needed as to why two shoreline change periods were used for Oregon Inlet for both the pre- and post-terminal groin conditions while only one pre- and post- period was used for the other cases. In other words, what is the significance of the different periods used for Oregon Inlet?
- h. I still have major concerns on the conversion factors used to convert shoreline changes to volume changes. I have included a spreadsheet for Bogue Banks that gives unit volume changes (cy/lf) for each USACE baseline station, the average change in the foreshore position (average of +6 and 0 contours) for each station, and the computed volumetric equivalent factor (unit volume change/average foreshore change) for stations along Bogue Banks from Beaufort Inlet (~Sta 40+00) to near the west boundary of Atlantic Beach (~ Sta 340+00). The computed volumetric equivalent factors vary over a wide range including some negative factors.
- i. For Fort Macon, Appendix C shows a beach nourishment event in 1973 yet I have no record on such an event. The map below (provided by the Carteret County Shore Protection Office) graphically summarizes when and where material has been deposited west of Beaufort Inlet.

Tom Jarrett Comments on State Terminal Groin Study  
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j For Fort Macon, the table showing how the average beach fills were determined needs to show how the actual distribution of the material was taken into account. Note several of the operations placed material farther than 3 miles from the inlet. In this regard, the 1978 disposal cover the area 0 to 1.9 miles west of the inlet (area within Fort Macon State Park), the 1986 disposal extended from 1.9 to 4.7 miles west of the inlet, and the 1994 disposal covered two areas, one from 0 to 1.9 miles and the other from 3.8 to 6.4 miles west of Beaufort Inlet. Since shoreline and volume changes are only being presented for the first 3 miles from the inlet, the report needs to show the adjustments in the volumes placed within this 3-mile area.

k. The computational procedures used to determine dredging averages and beach fill averages is not trivial as this forms the basis of the shoreline change and volume change adjustments made for all of the 5 cases.



Site map depicting the geographic areas, general dates, and USACE stationing for beach disposal/nourishment events associated with dredging activities at the MHCH project. (Atlantic Beach has been the nourished three distinct times – 1986, 1994, and 2005.)

**Comments on Section III.**

a. As was discussed during the Science Panel meeting on February 8, the geological section should focus on inlet process not shoreline changes. As they now stand, Sections II and III are not complementary nor are they related as each sections presents shoreline change information over different temporal and spatial scales.

b. A summary of changes in the ocean bar channel pre- and post-groin would provide some insight as to how the inlet was impacting the adjacent shorelines.

c. Changes in the inlet characteristics such as width, cross-sectional areas (where available), the size of the ebb tide delta, etc., would be very useful in assessing changes associated with the terminal structures.

**Comments on Section IV.**

a. This section presents a lot of general information that is not particularly relevant to the question at hand, i.e., what are the environmental consequences associated with terminal groins? Perhaps most of the information should be moved to an appendix and only the information relevant to each of the 5 cases presented in Section IV.

b. Not surprisingly, most of the discussion seems to focus on the impacts of beach fill not terminal groins. While beach fill should be tied to any terminal groin project, beach fill is not the primary focus of the report.

**Comments on Section V.**

a. With only 5 cases, developing parametric relationships for groin length and height is problematic.

b. The definition of structure length is critical in evaluating the impacts of this parameter. Generally, the shoreline configuration adjacent to a tidal inlet prior to the groin installation is curved in toward the inlet as a result of sediment transport properties dictated by marginal flood/ebb tidal currents and wave transformation over the ebb tide delta. Once the structure is put in place, the shoreline adjacent to the structure will assume an alignment comparable to the alignment of the shoreline not directly impacted by the presence of the inlet. The straightening of the shoreline will occur over a relatively short time period and the degree of pre-groin shoreline curvature will have an impact on the length of shoreline directly impacted by the groin. Once this initial shoreline adjustment occurs, the effective length of the groin is reduced to only that which projects beyond the adjusted shoreline, i.e., that portion of the structure that is subjected to continual interaction with waves and currents.

For example, the severe curvature of the north end of Pea Island in 1988, or just prior to the construction of the terminal groin, necessitated the extension of the groin well beyond the 1988 shoreline in order to reach the point where it would intersect with a straight line

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extension of Pea Island shoreline south of Oregon Inlet. The area between the groin and the 1988 shoreline filled rapidly thus reducing the effective length of the groin. The report states the effective length of the Oregon Inlet terminal groin was 1,500 feet but does not show how this length was derived. How the groin length was determined for the other 4 cases should also be provided in the report.

d. The plots of structure length versus shoreline and volume changes should be shown for varying distance from the structure not just for the entire 3 miles used for each case. Obviously, the shorter the effective length of the structure the closer the direct impacts would be to the structure and vice a versa.

e. Groin height should be measured relative to the natural height of the beach berm not mean tide level. The natural berm elevation generally defines the upper limit of significant littoral transport so the lower the structure relative to the natural berm height the greater the volume of sand moving over the structure.

f. Given the limited amount of data (5 cases), the relationships shown by the plots is statistically meaningless. Furthermore, both structure length and height (as well as porosity) all play a role on impacts of the structures on the adjacent shoreline and are not mutually exclusive.

**Comments on Section VI.**

Hopefully, the analysis will satisfy the legislative mandate but otherwise, the analysis is basically worthless. In many instances, the inlet hazards areas provided by the Science Panel to the study team include significant lengths of shoreline up-coast and down-coast of the inlet and are far removed from any direct and possibly indirect impact of a terminal groin. Granted, the areas may be protected with a beach fill that would accompany a terminal groin, but to imply the terminal groin by itself would affect these shorelines is misleading.

**Comments on Section VII.**

a. I find it difficult to believe that a properly designed rubble-mound structure would cost less than a steel sheet pile structure. Stones to build the structures in NC must be shipped by either truck or rail from the interior of the State to the coast. It must then be offloaded to a barge for transport to the site. Once at the site, the stones are either offloaded to shore to construct the landward portion of the structure or placed directly off the barge once the structure reaches depths sufficient to float the barge. All of this handling adds cost to each stone. While I have not estimated the cost of stone in some years, my guess is the cost per ton would probably be in the range of \$70 to \$150/ton.

b. Maintenance costs seem to be excessive. In the case of both the Pea Island and Fort Macon terminal groins, which have been in place almost 20 and 40 years, respectively, little to no maintenance has been required for either structure.

Inlet Structure Inventory	Note: Right or Left refers to looking into inlet from the ocean						
From Google Earth							
State	Inlet	Terminal Groins?		Jetties?		Groin Field	
		Left	Right	Left	Right	Left	Right
New York	Mecox						
	Shinnecock			Y	Y		
	Mriches			Y	Y		
	Fire Island				Y		
	Jones				Y	Y	
	East Rockaway				Y	Y	
	Rockaway				Y	Y	
New Jersey	Shark River			Y	Y	Y	Y
	Manasquan			Y	Y		Y
	Barnegat			Y	Y		
	Little Egg						
	Brigantine						
	Absecon	Y	Y			Y	
	Great Egg Harbor		Y			Y	
	Corson						
	Townsend's	Y	Y				Y
	Hereford	Y					
	Cape May			Y	Y		
Delaware	Rehoboth Bay						
	Ocean City			Y	Y		
Virginia	Chincoteague						
	Assawoman (closed)						
	Gargathy						
	Metompkin						
	Wachapreague						
	Quinby						
	Great Machipongo						
	Sand Shoal						
	New Inlet						
	Ship Shoal						

	Little Inlet						
	Smith Island						
	Rudee			Y	Y		
total number of inlets	33	3	3	8	12	6	3
inlets with some type structure	16						
State	Inlet	<b>Terminal Groins?</b>		<b>Jetties?</b>		<b>Groin Field</b>	
		Left	Right	Left	Right	Left	Right
North Carolina	Oregon	Y					
	Hatteras						
	Ocracoke						
	Old Drum						
	New Drum						
	Barden						
	Beaufort	Y					
	Bogue						
	Bear						
	Brown						
	New River						
	New Topsail						
	Rich						
	Mason						
	Masonboro			Y	Y		

USACE BL Sta	Jul-91			Nov-00			Volume Change 91 to 00 cy/ft	Volume Change 91 to 00 Cu. Yds.
	Volume to 3500 ft offshore cy/ft	Distance to +6 ft msl from BL ft	0 ft msl from BL ft	Volume to 3500 ft offshore cy/ft	Distance to +6 ft msl from BL ft	0 ft msl from BL ft		
33	2694.1	282	378	2390.1	342	451	-304.0	
40	2444.0	12	115	2234.5	148	233	-209.5	-179,725
50	2322.3	-6	73	2043.8	49	159	-278.5	-244,000
60	2253.8	23	100	1912.9	-18	38	-340.9	-309,700
70	2238.4	65	125	1866.0	-6	101	-372.4	-356,650
80	2241.5	38	163	1806.4	-51	68	-435.1	-403,750
90	2057.3	22	149	1700.6	-34	69	-356.7	-395,900
100	2015.3	66	161	1627.2	45	179	-388.1	-372,400
110	2014.9	130	223	1658.6	77	209	-356.3	-372,200
120	1996.6	174	242	1657.9	50	209	-338.7	-347,500
130	1954.6	177	334	1541.6	52	172	-413.0	-375,850
140	1964.4	219	293	1561.5	99	201	-402.9	-407,950
150	2006.6	235	336	1589.3	111	232	-417.3	-410,100
160	2011.0	280	381	1587.0	146	221	-424.0	-420,650
170	2059.1	273	414	1519.8	151	234	-539.3	-481,650
181	2015.5	244	392	1572.3	162	223	-443.2	-540,375
190	1909.1	169	309	1584.9	155	241	-324.2	-345,330
200	1924.5	204	292	1483.7	159	219	-440.8	-382,500
210	1856.1	170	313	1584.0	180	274	-272.1	-356,450
219	1811.0	168	337	1494.6	184	249	-316.4	-264,825
230	1794.6	175	348	1487.0	190	271	-307.6	-343,200
240	1751.0	111	284	1525.0	88	270	-226.0	-266,800
250	1695.4	50	203	1464.3	170	235	-231.1	-228,550
260	1643.8	42	183	1419.1	154	222	-224.7	-227,900
270	1594.6	28	175	1356.0	146	203	-238.6	-231,650
280	1577.4	23	138	1332.1	158	213	-245.3	-241,950
290	1566.2	26	150	1319.1	107	198	-247.1	-246,200
300	1533.3	42	177	1279.7	103	160	-253.6	-250,350
318	1554.7	84	253	1331.1	148	195	-223.6	-429,480
342	1575.4	106	250	1259.7	147	268	-315.7	-647,160
ave vol ch							<b>-329.6</b>	
Total vol change								-10,080,745
Rate vol change								-1,120,083



Change in contour 91 to 00		Ave Change in contour	Ave contour change btwn BL stas	vol change div by ave contour change
+6 ft msl ft	0 ft msl ft	ft		
60	73	67		-4.57
136	118	127		-1.65
55	86	71		-3.95
-41	-62	-52		6.62
-71	-24	-48		7.84
-89	-95	-92		4.73
-56	-80	-68		5.25
-21	18	-2		258.73
-53	-14	-34		10.64
-124	-33	-79		4.31
-125	-162	-144		2.88
-120	-92	-106		3.80
-124	-104	-114		3.66
-134	-160	-147		2.88
-122	-180	-151		3.57
-82	-169	-126		3.53
-14	-68	-41		7.91
-45	-73	-59		7.47
10	-39	-15		18.77
16	-88	-36		8.79
15	-77	-31		9.92
-23	-14	-19		12.22
120	32	76		-3.04
112	39	76		-2.98
118	28	73		-3.27
135	75	105		-2.34
81	48	65		-3.83
61	-17	22		-11.53
64	-58	3		-74.53
41	18	30		-10.70
ave contour change		-21.6		15.28 ave vol equiv factor

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Wednesday, February 10, 2010 9:26 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Additional Comments on Terminal Groin Report  
**Attachments:** TJ Additional comments on TG report.doc

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
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E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** Jtomjarrett@aol.com  
**To:** William.Birkemeier@usace.army.mil ; overton@eos.ncsu.edu ; Warren, Jeff; esciaudone@nc.rr.com ; rogerssp@uncw.edu ; Greg.L.Williams@usace.army.mil ; wcleary@charter.net ; RIGGSS@ecu.edu ; mallinsond@ecu.edu ; cpeters@email.unc.edu ; abrodrig@email.unc.edu ; jmartin@moffattnichol.com ; PTSchirky@moffattnichol.com ; Walker, Michele; Gregson, Jim; bob.emory@weyerhaeuser.com ; Underwood, Steve; Stefanski, Guy; Richardson, Ken; Miller, Tancred; Lopazanski, Mike; sbenton45@earthlink.net ; ryoung@email.wcu.edu  
**Sent:** Wed Feb 10 08:26:12 2010  
**Subject:** Re: Additional Comments on Terminal Groin Report  
Attached are a few other thoughts on the report. Most important point is the report fails to adequately address the critical issue of beach fill performance near an inlet with and without a terminal structure.

Tom

In a message dated 2/9/2010 5:10:16 P.M. Eastern Standard Time, [Jtomjarrett@aol.com](mailto:Jtomjarrett@aol.com) writes:

Attached are my review comments on the report. This was a quick review so I am sure, given more time, I would have many more.

Also attached is the spreadsheet referenced in the review comments which shows computations of the volumetric equivalent factors I determined for the east end of Bogue Banks. This clearly demonstrates my concerns on the used of this methodology to adjust for beach fills.

Finally, there had been some discussion in the news media that very few inlets have terminal groins. I made an inventory of 154 inlets using Google Earth (see second attached spreadsheet) from Long Island, NY to the pan handle of FL and noted the number of inlets that have terminal groins (on one side or both), jetties (on one side or both), or some other type of shoreline treatment (radial groins, groin fields, or revetments). Of the 154 inlets, 71 have some type of structure. Of these, 24 inlets have what I would classify as terminal groins (on one or both sides), and 41 have one to two jetties. The other 6 have a mishmash of shoreline treatments. Thus, of the 154 inlets in the sample, 42% have terminal structures in the form of terminal groins or jetties.

So the difficulty in finding suitable case studies was not due to the lack of inlet shoreline treatments, it was due to the limited number of applications that would meet our criteria for a terminal groin.

February 10, 2010

Additional comments/thoughts on the terminal groin study.

I believe any discussion on the impacts of beach fill should be excluded from the report. Rational for this is one of the primary alternatives to a terminal groin is beach fill and any application of a terminal groin should also be accompanied by beach fill. Thus the impacts of beach fill for each alternative would essentially cancel each other, i.e., the impacts of beach fill is not a determining factor as to whether or not to allow consideration of a terminal groin. This cancellation of the impacts of beach fill is true provided the nourishment requirements in both quantity and frequency are the same for both alternatives.

In this regard, the report is remiss in not evaluating beach fill performance near tidal inlets that do not have a terminal groin or other type of terminal structure. Pete Peterson hit the nail on the head when he questioned if the application of a terminal groin would indeed reduce the need for beach nourishment. This is **THE** critical question and one that should have been a primary focus of the report.

In NC we have at least 4 good examples of how a beach fill performs near an inlet; namely, the north end of North Topsail Beach, the north end of Figure 8 Island, the east end of Holden Beach, and the east end of Ocean Isle. While the beach fill efforts are not “designed” beach fills in that most are the result of the disposal of navigation maintenance material, the performance of the fills provides some insight on what to expect from an engineered beach fill in these areas.

Unfortunately, documented evidence on the performance of these four fills may be difficult to find but there is adequate antidotal evidence based on visual observations. So the question then is: “if these four inlets had terminal groins would nourishment requirements be less or would the application of the terminal groin simply shift the erosion to some other area on the island as often quoted in the news media?” If the erosion hot spot was shifted away from the inlet would the nourishment rate needed to counter the newly created erosion hot spot be equal to or exceed the erosion rate immediately adjacent to the inlet? If the newly created erosion hot spot does require more nourishment, then the news media and others are correct. However, if a new hot spot is created away from the inlet and the erosion rate is not excessive, this impact could be addressed through the routine application of beach fill. As I have recommended, any consideration of a terminal groin should include a beach nourishment component.

My personal opinion, which obviously doesn't carry much weight, is any newly created erosion hot spots would require less nourishment than that needed to maintain the shoreline next to the inlet and the hot spots could be countered with the beach nourishment component included as part of the terminal groin option.

Tom Jarrett, P.E.  
Coastal Hazards Science Panel Member

## Walker, Michele

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**From:** Rogers, Spencer [rogerssp@uncw.edu]  
**Sent:** Wednesday, February 10, 2010 10:33 AM  
**To:** 'Jtomjarrett@aol.com'; William.Birkemeier@usace.army.mil; overton@eos.ncsu.edu; Warren, Jeff; esciaudone@nc.rr.com; Greg.L.Williams@usace.army.mil; wcleary@charter.net; RIGGSS@ecu.edu; mallinsond@ecu.edu; cpeters@email.unc.edu; abrodrig@email.unc.edu; jmartin@moffattnichol.com; PTschirky@moffattnichol.com; Walker, Michele; Gregson, Jim; bob.emory@weyerhaeuser.com; Underwood, Steve; Stefanski, Guy; Richardson, Ken; Miller, Tancred; Lopazanski, Mike; sbenton45@earthlink.net; ryoung@email.wcu.edu  
**Subject:** RE: Comments on Terminal Groin Report

Folks,

If sand is not trapped on the Fort Macon shoreline it ends up at the Coast Guard pier. What is the dredging history at the pier?

Spencer

## **Review of 1 February 2010 version of M&N Terminal Groin Report**

By Charles H. “Pete” Peterson, Science Panel member

I submit these comments as part of my “peer” review of the draft study on terminal groins. I may follow-up these comments with additional thoughts as I see the need to submit them.

In my comments, I have attempted to point out significant concerns I have with the document, and have suggested possible findings and/or conclusions that could be drawn from the information that has been gathered.

Before outlining more specific comments on the document, I provide general observations about the major sections and elements of the report:

1. This report is critically flawed by the failure to achieve the necessary interdisciplinary interactions among authors of the various sections, which would be required to conduct an intrinsically interdisciplinary scientific analysis: The critical sections on Engineering, Geology, Environmental Assessment, and Economics show clear indications of being prepared largely independently – in parallel instead of in series with multiple interdisciplinary interactions. This produces redundancies and, far worse, inconsistencies among sections. It also results in various people having to go beyond their own areas of expertise to answer basic questions from other disciplines in order to address questions in their own disciplines. For example, the Environmental Assessment section includes conclusions about whether beach nourishment needs are reduced after installation of terminal groins, which requires expertise, input, and data generated by the engineers and geologists to support such conclusions. In the Engineering and Geology sections, those data, analyses, and conclusions are currently absent. The Economic Assessment was done without understanding of what the 30-year hazard line crafted by the Science panel meant and this section fails to deliver what was promised in the contract, which was analysis of economic risk at inlets with and without a terminal groin under multiple scenarios of sea-level rise and coastal storminess. The explanation for absence of these scenarios was lack of definitive communication with the geologists and engineers to provide necessary projections on which to base the scenarios. The Geology section is redundant of much of what appears in the Engineering section and includes claims and conclusions that conflict with those in the Engineering section. The participating geologist should have been integrated into the engineering such that the consequences of intervening in the natural system with a structure could have been evaluated and explained in the context of how that structure interacted with dynamic processes of sediment erosion, transport, and deposition.

The nature of the scientific and technical problem presented by the challenge of assessing impacts of terminal groins requires fully integrated interdisciplinary collaboration, not independent disciplinary treatises. The core discipline on which all other components of this report must be built is the geology of sediment dynamics. The engineering analyses must use physical and geological principles to understand how engineered structures of various characteristics interact with sediment dynamics – erosion, transport, and deposition around

ocean and inlet shorelines. Then the environmental assessment must depend on the conclusions reached by the geologists and engineers on the physical and geomorphological changes induced by the terminal groins under a range of conditions to be able to base analyses of habitat and organism responses upon the dynamics of sediment transport changes and geomorphological transformations that are detailed by experts in those disciplines. Similarly, the economic impacts of erection of terminal groins depend upon the consequences of natural sediment movement and shoreline change as compared to modifications induced by the presence of the terminal groins. The failure to conduct an interdisciplinary assessment in this fashion seriously diminishes the accuracy, internal consistency, and usefulness of this report for the intended purposes. This appears to represent a process failure for which there is inadequate time to remedy.

2. No meaningful conclusions can be drawn about the effects of groins from the case studies: None of the case studies are based upon adequate and sufficiently reliable data that could withstand rigorous scientific review. The quality of the data used is too variable, and the number of unmeasured confounding factors influencing inlet behavior too numerous to give confidence that any valid conclusions can be reached. The data analysis presented in the various tables includes assumptions, effects of confounding processes, and uncertainty levels that make it impossible to draw definitive conclusions and thus dangerous to use in making policy changes. I found no compelling evidence in any of the case studies for documented benefits to beaches that have resulted from the terminal groin structures, except for spatially restricted stabilization in absence of major storms that has occurred at the tips of the islands where they have been built. Findings and conclusions should be limited to what can be rigorously concluded from the cases studies. What the information does not reveal about the performance of terminal groins is often the most meaningful conclusion that can be reached.

The case study section is the most important of the entire report because it provides actual data on responses to the establishment of existing structures that can perhaps be considered terminal groins. Many readers will prefer empirical information and here is where M&N assemble such information. I applaud and welcome this empirical approach. The present draft is incomplete, however, in several important ways. First, there were decisions made about various data and how to include them, and this report fails to provide and defend the complete methodology used in making these decisions. For example, beach fill data exist for at least one period south of Oregon Inlet that refer to a 6-mile stretch of beach but this information must be used to compute how much of that fill was applied to the first 3 miles to match the down-drift range used in the assessment protocol. Readers cannot learn how the fraction applied to the first three miles was determined. Similar even more challenging decisions were made about how to treat various dredging activities – whether the source location was or was not within the coastal sand-sharing system and whether or not the deposition location was or was not within the coastal sand-sharing system. All this detail of what was done and the rationale for why needs to be added. Second, there is no attempt to compute whether more or less beach nourishment is done on down-drift beaches after establishment of a terminal groin. This is critical information for environmental assessments of impacts and for economic costing of projects. Third, the engineering computations are presented without any indication of the huge uncertainty associated with them. This issue especially affects the level of confidence possible in the conclusions that may be reached from the empirical computations and thus affects whether a conclusion can be reached. Part

of the explanation for why uncertainty is excluded is the failure to integrate the coastal geologist into the interpretation and writing of this section. For example, the site-specific contributions of confounding processes are not explicitly detailed and have huge impacts on the ability to isolate out effects of the groin alone. Beaufort Inlet is dredged to such a depth (47 feet) that over time a large fraction of the ebb-tidal delta has been lost at the west side of the inlet. This has a huge effect on the sediment budget, the wave energy now reaching the shore, and thereby the shoreline erosion and sediment volumes near and on shore. Similarly, each inlet examined has other major influences that confound the ability to isolate the effects of the groin alone. Assessing whether dredged materials were retained within the coastal sand-sharing system or not is impossible to do with accuracy in any case study. Inadequate presentation of these other sources of change creates a work product that is misleading because it implies that the questions were readily answered without serious uncertainty. In reality these sources of change in the system render the task of assessing impacts of terminal groins impossible at these sites, except perhaps at Amelia Island although that groin possesses only two years of after-construction information.

3. Geologic analysis is elementary and fails to address in any meaningful way the fundamental questions that this study should be answering: The central question that should be answered by this section is the geologic consequences of attempting to “stabilize” inlets and barrier island systems that depend on highly dynamic natural processes as adaptations to sea-level rise and storms. The geologic analysis contained in the report is similar to an introductory textbook in coastal processes, and provides little substance for policy making. What little information exists that is of real value should be integrated into the case studies. The section is woefully inadequate in addressing the consequences of sea level rise (it should use the state’s new adopted projections for sea level by 2100) and the consequences of more intense storm activity.

4. Environmental assessment is bloated with data that provide no basis for reaching conclusions or making policy: The environmental assessment can only be done effectively by building upon the conclusions reached by the (now non-existent) partnership between the engineers and geologists in answering the critical questions about impacts of terminal groins. These questions are: (1) Are terminal groins effective in stabilizing the position of the inlet and its shoreline; (2) Do terminal groins influence the balance between erosion and deposition on either side of the inlet and for a distance of 3 miles away; and (3) Does beach nourishment increase, decrease, or stay the same after erection of a terminal groin. Answers to each of these questions have implications for geomorphology, ecological succession, disturbance, and habitat availability, through which all changes to the biological resources flow. Instead of using the results of collaboration between the engineers and geologists to answer these critical questions, the biologists provided their own attempts to answer these questions, producing conclusions that differ from what the data and conclusions are or can be in the engineering section. The conclusions reached by the biologists on these physical, engineering, and geological issues of sediment transport are based on inadequate scholarship and not on rigorous meta-analyses of available information of the sort attempted in the case studies of the earlier sections. As a result, a large fraction of the conclusions in the environmental assessment are either wrong or unsupported by rigorous science. For example, the claim that need for and thus amount of beach nourishment down-drift declines after installation of a terminal groin is based on a personal communication and not a rigorous

data review. All the conclusions in the environmental assessment section need to be completely redone based upon what is rigorously concluded in the analyses done earlier by the engineers in concert with the geologist about these changes in sediment transport. Because the most rigorous conclusion that can be reached by the engineering-geological analyses of the case studies is that the data are insufficient to reach definitive conclusions, except perhaps on the ability of the terminal groin to fix an inlet shoreline in place and limit migration of a migrating inlet, many of the environmental impacts would also need to reflect this uncertainty and be couched as conditional impacts. That is, these should say, for example, that if more beach nourishment occurs down-drift after installation of a terminal groin, then the beach invertebrates would more often be depressed in abundance and the shorebirds and fishes that feed upon them would be deprived of food for longer periods of time.

This environmental section is greatly bloated by inclusion of endless amounts of observational data on sea turtle nesting and bird counts, for which methodologies are not presented that would allow conclusions to be reached about the nature of change before and after installation of a terminal groin. For example, one would need to show that the search effort and approach was held constant across the years and also need information identifying the search area and relating counts to area to provide comparable densities. It is possible that some of the data would meet the criteria for constant methodology over time, but this is not clear from the insufficient information provided. For any data set that might meet these criteria for allowing a rigorous temporal comparison, then a BACI-type of analysis is needed in which the change in density from before to after groin construction at the putative impact site around the terminal groin is compared statistically to the analogous temporal change at one or more reference sites where no groin was installed. This obviously entails some effort but without it, the extensive presentation of descriptive counts can answer no question about potential impacts.

Impacts can be rigorously inferred based upon geomorphological consequences of the presence of a terminal groin and its physical consequences on habitat. However, this interdisciplinary approach based on first principles is not adequately done in the report. For example, the stabilization of an inlet (not ocean beach) shoreline that may result from a terminal groin installation inhibits natural physical processes of sand flat formation, washover to some degree, and creation of new unvegetated habitat for shorebirds. These missing sand flats remove critical foraging habitat for shorebirds and the stabilization of the end of the barrier island can allow vegetational succession to fill in overwash areas, which are critical and limited nesting habitats for many shorebirds and seabirds, including the endangered piping plover. These first-principles relationships to the biological resources and to piping plovers in particular produce a sufficiently compelling prediction of injury that the high likelihood of Endangered Species Act violations would likely preclude construction of a terminal groin at any inlet where piping plovers are known to nest or is suitable for nesting. Yet, nowhere does this or similar analyses and conclusions exist in this environmental assessment section. This section is grossly inadequate for all the reasons documented in my review.

Much of the data and discussion in this section should be removed because it includes no analysis of the consequences of building terminal groins. This section needs to address



directly the question of whether it will ever be possible to receive a permit for a terminal groin at what is now a natural inlet given the endangered species that depend on highly dynamic systems to live and nest.

5. The engineering cost analysis is textbook in its approach but gives little insight into what it will really take to build groins and maintain them over the long term, especially within barrier island systems that are already largely starved for sand: Designing and permitting a terminal groin will become a very complicated process and the estimated costs of this part of the analysis are optimistic at best. The section does not address the increased costs and difficulties of building terminal groins in shallow-water inlets without easy access for barges or perhaps even trucks. The analysis does not factor in the long-term costs of providing for beach nourishment, especially if groins are constructed where there is a documented shortage of suitable sand available for beach nourishment. If sand must be mined from inlets to provide for nourishment, then the total costs of such structures should be compared to the case studies where active inlet dredging is now occurring. Removal costs are grossly underestimated. It will cost \$700,000 in legal fees before any removal could even begin.

6. Economic information lacks analysis, and is highly misleading and subject to being abused as disinformation: The economic assessment is really not an assessment at all. This section merely catalogues the assessed value of undeveloped property, structures, and infrastructure within the 30-year hazard zones recently redrawn by the Science Panel for each inlet of the state and totals them. This falls far short of assessing economic risk and will lead to misuse and misinterpretation of the data. It is inconceivable that all the 1.4 billion dollars worth of property within the 30-year hazard zones of all North Carolina inlets will be lost in the next 30 years. Typically, if erosion happens at one side of an inlet, accretion occurs at the other side. So a reasonable scenario is not loss of property on both sides but a pairing of loss and gain in each inlet. This realistic scenario is not pursued, again because the economic assessment was done in a vacuum, not in collaboration with the engineers and geologist in an appropriately interdisciplinary fashion. Even the way in which the Science Panel constructed the 30-year hazard zone was unknown to the economist in writing this section.

By providing only a listing of property values in the state's 30-year inlet hazard zones, the economics section fails also to deliver on the contract, which promised an analysis of economic risk under a suite of different scenarios of sea-level rise and coastal storminess. This analysis is critical because we know that sea level is rising and that the frequency of intense storms is likely increasing as a consequence of global climate change. Furthermore, this appropriately interdisciplinary analysis would also include a comparison of risk of loss without a terminal groin to risk of loss with a terminal groin in place. Absent that analysis under a range of environmental scenarios, the economic assessment fails to answer the fundamental question of the value of terminal groins in protecting property at inlets. The loss of property within the 30-year inlet hazard zone will not occur from inlet movement alone. Even more loss of property is likely to be a consequence of flooding, erosion, and wave damage arising from the ocean shoreline during intense storms and such losses are more likely under higher stands of sea level. Thus again, a simple listing of value of all property in each 30-year inlet hazard zone is grossly misleading in that not only will a large fraction of this property survive the next 30 years but also the property that is lost will include a major contribution from ocean processes during storms, which the terminal groin does not

influence. This point would become clear with inclusion of results of the promised scenarios of loss with and without the presence of terminal groins under multiple sea-level and storm frequency conditions. One viable means of inferring the potential benefits of the presence of terminal groins would be to conduct a retrospective analysis of the past 30 years of property losses in inlet hazard zones to determine what percentage of the property within the 30-year hazard zones was actually lost and how that fraction varied with presence and absence of a terminal groin. That could help place this misleadingly huge 1.4 billion dollars in a true and realistic perspective. That perspective is lacking now and the economics section lacks a comprehensive discussion of these issues.

Since there is no analysis in this section that links the numbers presented to shifting inlet processes that have and will occur, the information presented is useless for policy makers. It should be removed from the main part of the report, and included in a technical appendix as background data. The information presented will be distorted and misunderstood as being somehow related to the terminal groin debate. The consultant has not performed most of the tasks agreed upon in his contract, and how to fulfill the scope of work needs to be addressed.

7. The science panel's role in the study does not adhere to the protocol typically associated with rigorous peer review: Because no process is in place for the Science Panel to guarantee that modifications made to the report after review are sufficient, the role of the panel must be redefined to reflect this. It was my understanding that a commitment was made at the outset of the study for the science panel to conduct a peer review (see PowerPoint Presentation presented at kickoff meeting), and that our role was established to provide public confidence that the technical report would adequately integrate the scientific and technical knowledge to produce a rigorous set of conclusions. Now it is unclear if substantive issues raised in review will be adequately addressed in the final report, lacking a process to insure it.

My specific comments and suggested conclusions follow:

### **Case Studies:**

The five case studies show that factors contributing to the condition of the beaches adjacent to a terminal groin include repeated beach nourishment, inlet dredging, channel depth, tidal forcing, storm activity, sea-level rise, natural erosion and accretion processes including longshore transport of sand, along with erosion and accretion as a result of groin presence. Because so many natural and human-related factors interact to influence inlet and beach processes, in my opinion the study found that:

- No simple terminal groins have been built and function anywhere on the East or Gulf Coasts to provide any actual real-life experience with the type of structures that have been suggested for the shallow-water inlets of North Carolina. (Table VIII-1 on page VIII-2 inaccurately implies that most of the structures listed are terminal groins. The Science Panel determined that most of these structures are jetties or are part of groin fields, and did not meet our definition of a terminal groin. The table must be changed. In addition, two figures showing a picture of the Oregon Inlet possess a caption that calls the structure a terminal groin, when this is not so. The terminal groin is attached to a wrap-around revetment going back into the sound. This misleading caption must be modified.)

- Detailing the effects of the terminal groins in the case studies with any high degree of confidence is not possible with data that are currently available. This has been the consensus of the science panel at every meeting, and the case studies need to clearly reflect this consensus.
- Terminal groins can stop inlet migration, at least temporarily. However, long-term stability of dynamic inlet and barrier island systems cannot be achieved by these structures because of effects of intense storms and sea-level rise.
- Beach nourishment is necessary when a terminal groin is constructed. It was impossible to determine if the amount of beach nourishment that is required after a groin is constructed will increase or decrease as a result of building the structure.
- Terminal groins do not stop beach erosion.
- Terminal groins do not ensure that beaches and development will be protected against the impacts of sea-level rise and intense storm activity.

### **Geologic Assessment:**

The geologic assessment concludes that in the high-energy environment that characterizes the North Carolina oceanfront, wave energy, tidal inlet dynamics, storms, dredging, and beach nourishment were all major factors in the sand distribution of these barrier island systems. The chapter concludes that terminal groins do not have a big impact on regional sand transport when looked at in conjunction with the other major natural and anthropogenic effects on the inlet, but can anchor (not stabilize) an inlet shoreline at least temporarily. There is no evidence that a terminal groin decreases beach erosion except in the very near-shore area around the fillet. The assessment fails to address the implications of interrupting natural inlet and barrier island migrations and what consequence that has for the ability of inlets and the barrier islands to maintain themselves in a period of rapid sea-level rise and increased intense storm activity.

Other conclusions that should be clearly stated in this analysis include:

- Terminal groins contribute to narrowing of inlets and the loss of natural inlet shoals and sand spits.
- Terminal groins, by narrowing inlets, funnel storm surge ebb and enhance storm impacts by increasing the likelihood of new inlet creation.
- The terminal groin should be the zero point for measuring beach profiles in the case studies. If not, the way that shoreline change is calculated for distance 0-.25 needs to be modified. Using change calculated off the current baseline that extends along the inlet beach produces problematic data. Furthermore, the profile data need to be evaluated based on when they were collected relative to storms and beach nourishment activities. Similarly, when each photograph was taken for shoreline position information needs to be examined relative to recently preceding storm or beach nourishment events.
- Summary results presented at the science panel meeting on Feb 8 include a conclusion that after netting out beach nourishment and nearshore disposal, the beach along 3 miles generally displayed a reduction in eroded volume. The science panel reached a consensus that given the quality of data and the confounding with a number of unmeasured variables involved in these inlet systems, it is impossible to draw this conclusion from this analysis. These

conclusions should be stricken from the report.

- The study also concludes that if 25% of dredged material had naturally bypassed the inlet and deposited on the beach, no negative impacts would be shown on Pea Island or Shackleford Banks. The use of the 25% and 50% by-pass sand scenarios was not supported by the science panel, and should be removed from the document.

## **Environmental Assessment**

The inconclusive results of the analyses of the physical and geological effects of terminal groins, together with a lack of rigorous site-specific conclusions from the five study sites, make it almost impossible to draw conclusion on the effects of terminal groins on habitat. Dial Cordy was charged in the scope of work with the task of assessing the effects of a terminal groin on the natural resources including marine, terrestrial, associated biota, habitats, and protected species. They were also tasked with describing possible mitigation approaches that could be considered as terminal groin permitting requirements. In the conclusions presented at the last science panel meeting, they reported included two additional findings: (1) that terminal groins can reduce the number of “beach placements” needed to manage an erosional hot spot by retaining littoral and placed material; and (2) proper terminal groin designs and placements can minimize littoral transport effects thus maximizing resource use effects. No reliable data analysis is presented to support either of these conclusions, and they should be removed from the report.

All data presented in the report that cannot be used to evaluate the effects of groins should be removed. For instance, the chart in section IV-59, shows counts as do many of the tables and figures contained in the section. Counts tell us nothing about population size: they tell us only that some unknown number of observers went out with unknown sampling effort, and recorded numbers of birds over some area. The information does not include the exact location of the observations, or relate it back to a terminal groin. But an untrained reader might look at this type of chart and think that it is indicative of bird populations near terminal groins. In addition, the Dial Cordy conclusion that a terminal groin “can restore degraded habitat” oversimplifies the modification of a very complex barrier island process and could mislead readers to conclude that terminal groins have net positive influences on bird and plant species. This is not true. Terminal groins mostly degrade habitat by blocking natural geological processes that create, maintain, and renew tidal flats and terrestrial dunes with low vegetation cover.

If no good data exist on which to complete the tasks outlined in the scope of work, then the report should simply say that it was impossible to draw meaningful conclusions based upon the data available and the time frame available for in-depth data analysis. In addition, based upon what is provided in the draft report, I would conclude that:

- Terminal groins have the potential to adversely affect habitat.
- Terminal groins have the potential to adversely affect ecological conditions.
- Fill material used in conjunction with construction of the groin and with later beach nourishment requires compatibility to existing conditions or habitat is destroyed.
- The source of sand for required beach nourishment could cause significant environmental concerns in locations where adequate quantities of beach-compatible sand are limited.
- Most of the study sites did not have sufficient historical information to assess the impacts of the groin on the local ecology and habitat.

- Terminal groins could adversely affect the flux of estuarine dependent finfish larvae through inlets and into primary nurseries.
- Interrupting natural inlet migration will have detrimental impacts on the ability of inlets to maintain themselves and critically important adjacent habitat through natural inlet processes.

### **Engineering Construction Technique**

This section needs to address the fact most groins and jetties at inlets are constructed adjacent to navigable channels, and there is no experience with designing, building, and maintaining such structures in shallow, highly dynamic mostly un-dredged inlets. The Amelia Island structure so far does not appear to be benefiting the beach in any meaningful manner, and calls into question the concept of a “leaky” groin.

### **Economic Impacts of Shifting Inlets Not Evaluated**

The legislature asks the CRC to study *“information regarding the current and projected economic impact to the state, local governments and the private sector from erosion caused by shifting inlets including loss of property, public infrastructure, and tax base.”*

The study’s scope of work said the contractor would conduct his economic analysis to include three policy scenarios:

- (1) A baseline erosion management policy using dredging, nourishment and temporary structures;
- (2) An alternative policy using terminal groins; and
- (3) An unimpeded inlet shifting with a retreat/removal policy option.

These three policy options were to be applied to a section that projects the actions of federal, state, and local government and private sectors in each case. These same three policy options were to be used to assess likely future property value appreciation scenarios. These options were to be used by Moffatt and Nichol to identify likely locations and magnitudes of future erosion events. Finally, these three policy scenarios were to be applied to the largest task (90 hours) in the scope of work: the assessment of the current and future (50-year horizon) economic value of property losses. None of this work was completed. The contractor was obligated to consult with climate experts, and coastal engineers to identify future sea level, storm event, and erosion potential scenarios. He did not attend most of the science panel meetings when these issues were discussed, and this alone could have provided him with needed information for conducting this scenario analysis.

The finished product only provides values for all property and infrastructure in projected inlet hazard areas, uses a 30-year time line, and assumes no policy scenarios at all. Given that inlets typically move in one direction or another, adding up the value of all properties within the inlet hazard areas on both sides of an inlet is more reflective of catastrophic property losses that would be associated with an intense storm event, during which the terminal groin is not designed to provide any meaningful protection.

In addition to the issues noted above, economic information presented generally fails to give the reader a sense of perspective regarding the relative size of the numbers, and uncertainty (or confidence) in them.

The aggregate value of roughly \$1.4 billion in property sounds huge, but the context is lacking. What are the total property values on barrier islands? How much property lies on these islands is at risk? What percentage of the developed values on these islands lies in these areas, and how much lies outside? How does the economic activity associated with these areas compare to that of these coastal economies taken as a whole?

How sensitive are the estimates to various assumptions made about relevant parameters, including inlet processes, catastrophic storms, structural effectiveness (maintenance in lean budget times), other policy efforts (dredging, beach re-building), and future development activities? What do we really know, and how likely is it that we're going to be substantially incorrect?

Ordinary beach erosion (as a consequence of rising sea level, dredging and the catastrophic effects of large storms) is occurring everywhere along the coast. No attempt is being made in the current document to separate out the effects of those forces. Property in inlet hazard areas will be lost during the next 30 years for reasons unrelated to inlet movement, irrespective of whether the groins are in place. It is very clear that the property value that is truly at risk from shifting inlets alone, and which could conceivably be protected by groins, is far lower than the aggregate inventory value presented in the study.

The presentation made at the Feb 8<sup>th</sup> science panel meeting concluded with four major points including a conclusion that a terminal groin will protect not all areas denoted by the 30-year risk line. These are the economics conclusions that can be drawn from the study:

- It is impossible to determine the economic benefits or costs of terminal groin construction since no one can accurately predict the consequences of building such structures.
- Positive economic values associated with the natural inlet migration processes (fishing, tourism, habitat creation and maintenance, etc.) are quite large, and should be studied. (Inlets are very popular recreational sites because of their natural characteristics, and the value of this recreation is not estimated.)
- Building terminal groins will create a false sense of economic security that might result in greater investments in property in highly hazardous inlet locations, and more extreme economic losses over time.
- Huge economic losses will occur to private property as a result of catastrophic storm events, independent of the presence of a terminal groin. That is why these areas are located in high "hazard" zones.

### **Construction and Maintenance Costs**

The study does not consider the cost of ongoing dredging and beach nourishment, just initial beach nourishment even though it has been discussed and accepted throughout the process that beach nourishment must be part of an ongoing maintenance program for terminal groins. It is impossible to provide such an estimate since the benefits and risks associated with building a

groin cannot be accurately and reliably estimated, but assuming no cost is misleading. The study should discuss how required beach nourishment is going to occur in locations where there is very limited compatible sand available. It should also discuss the implications of mining inlets for sand when no other source of compatible material is available for nourishment that a groin will require.

### **Major Finding**

**The major finding of this study is that we do not have sufficient data with sufficiently reliable analyses to predict with confidence the consequences of building terminal groins.**

The North Carolina Coastal Resources Commission in 1984 (and later the North Carolina General Assembly) adopted a ban on oceanfront hardened erosion control structures to reflect the conclusion that there was no way to fully anticipate the consequences of building such structures. The Commission has the burden of proof in its permitting process to show unacceptable harm of proposed structures.

The CRC should not be forced to issue permits when it cannot reliably predict impacts of proposed projects. Putting the CRC in such a position will doom the future of our public trust beaches. This report does not provide any additional assurances that the science of predicting impacts from terminal groin construction has advanced substantially since 1984. It is still a guessing game as to whether or not groins will have a positive or negative impact on beaches in the short-term, and the current evidence is even more solid than ever that with sea level rise and storms groins will have negative impacts on public trust beaches and natural living resources.

## **Comments and suggestions for the Draft Terminal Groin Study (February 1, 2010)**

Submitted by Rob Young  
Program for the Study of Developed Shorelines

I will try to keep these comments as brief and to the point as possible. Some of these issues were raised in the Science Panel meeting of Feb. 8.

### Overall Comments

I think that the summary conclusions need to be very frank in laying out what the available data and time constraints allow you to conclude, and what they do not allow you to conclude. The fact that there are many things that we would like to know that have not, and cannot be addressed by this report is no reflection on the work done by Moffatt and Nichol. We have to work with what is available. We must also be brutally honest regarding what we have not been able to accomplish in the limited amount of time.

- 1) The analysis can draw no conclusions regarding the impacts (positive or negative) that a terminal groin will have on beach nourishment within the vicinity of a project, although it is very clear that large scale beach nourishment has been required post-project in all locations. Any attempt to work this out with the five available data points will be of indeterminable accuracy and dubious value.
- 2) The analysis can draw no conclusions regarding how far down the beach the impacts (positive or negative) of a terminal groin will be felt. After netting out nourishment several sites show post-project accretion near the structure and increased erosion in miles 2 and three. But, Captiva shows the reverse.
- 3) The analysis can draw no conclusions regarding the impacts that a terminal groin, placed on the downdrift side of an inlet, would have on natural sediment bypassing across the inlet onto the downdrift island. It is acknowledged that some percentage of dredged sediment would bypass the inlet and make it onto the downdrift beach, but we have no data indicating whether or not a terminal groin could interfere with this process, a major concern of the scientific community in North Carolina. This gap in understanding would be particularly problematic at inlets that are not currently dredged or managed for navigation (e.g. Rich Inlet).
- 4) The report acknowledges that the morphology of the inlet channel and ebb tidal delta are major controls on the adjacent shorelines. The report also indicates that there can be major changes to the channel; and thus ebb delta, as a result of stabilizing the inlet shoreline using a terminal groin in certain locations (e.g. Oregon Inlet). Yet, an analysis of this important feedback is also beyond the scope of this study. How does a terminal groin alter the dynamics of the inlet and ebb delta, and how does that alteration impact shoreline accretion and erosion? We don't know.



- 5) The report cannot, and should not make any assertions regarding the economic harm or benefit of building terminal groins in North Carolina. This analysis is not possible with the available data.
- 6) The report does not address the historical or recent losses of property along North Carolina's inlet shorelines, a critical piece of information in judging the "current" economic impact of shifting inlets in the State.

### Specific Section Comments

#### Section II:

I would recommend pulling out all of the extraneous information that is not used in the analysis (Wave data, wind data, storms, etc) and placing it in the Appendix. It just gets in the way of reading the report and it is not a part of the analysis or discussion. I would rather see the dredging data and renourishment data that is being used for analysis moved from the Appendix and engineering log to the front of the report.

- 1) Please create a table with all beach nourishment data used in the analysis and indicate where it was placed and how your number differs from the number in the engineering log.
- 2) I am still troubled by the way that the dredged material is handled at OI. After one nets out beach nourishment from shoreline change one then must ask, is there anything else that might be causing that shoreline change other than beach nourishment. Obviously, at Fort Macon, there is significant sand unaccounted for as a result of dredging and offshore disposal. So one can assume that some of the shoreline change has been a result of the dredging. But, if almost all of the dredge material is, in fact, placed on the beach (as at OI), one cannot assume that the net shoreline change is a result of dredging in the same way that one would at Fort Macon. These two scenarios should be treated differently, and the rationale clearly explained and justified.
- 3) I am also troubled by the level of uncertainty in the dredging analysis. I am not sure what you expect non-experts to do with your three scenarios of 0%, 25%, 50%. There is so much uncertainty in all of the analysis that the final number becomes guesswork. It is very dangerous to produce a report that allows experts and non-experts alike to "choose a scenario" that best fits their expectations. The truth is, we don't know what percentage of the dredge volumes listed in the engineering logs would have made it onto the first three miles of beach, and we don't know how it would distribute itself. In addition, we don't know how much of that sand would have been blocked by a terminal structure if no dredging were occurring. This results in the final "volumes net dredging and nourishment" being of completely indeterminable accuracy, and therefore, not very useful. I understand that you are working with very little available data, but let's not over-extend what we do have. I think that the most valid approach would be to net out the nourishment and simply discuss dredging impacts qualitatively. For example, indicating that, although we don't know the exact percentage that would have bypassed at Ft. Macon, it would likely have been more than enough to offset and overwhelm any other impacts.

- 4) For Johns Pass, is there no pre-project shoreline change data better than 1873-1926? Can you discuss the quality of that data? Also, we are missing 13 years of data immediately post construction. Why? The 1974-2007 post-construction period that you use includes 7 years when there were two structures. I thought that we were trying to examine the site when there was only one structure.
- 5) Sure would be nice to have some analysis of why the first quarter mile at Captiva had a higher post-project erosion rate than pre-project (net nourishment). This seems counter intuitive. Is there anything to learn here?
- 6) How can Amelia Island be judged as a success when we have so little data, and the data we have indicates massive renourishment and increased erosion? Please explain.

### Section III:

There is much in this section that tries to duplicate the analysis in Section II, but only serves to complicate things. The section references two additional unpublished studies of erosion rates at OI and references a public lecture for other shoreline change rates. All of that should be removed. You were tasked with gathering peer-reviewed literature and conducting original, unbiased analysis.

- 1) This section indicates that there have been significant changes to the inlet channel, ebb delta, and sub-tidal sand bodies of OI since the terminal groin was constructed. This section also indicates that “perturbation” of this inlet system morphology can impact “erosional and depositional changes to the northern tip of Pea Island”. Further analysis of these points would be nice. Would the changes resulting from stabilizing one side of the inlet at OI likely result in increased erosion or accretion on Pea Island? This is a more important question for the Geology section to address than to rehash shoreline change rates.
- 2) Page III-27,28: There is no basis laid in this section for the conclusion that the first 1.5 miles of shoreline have been stable (nourishment, etc not discussed). There is no basis laid for the conclusion that the terminal groin “contributes little to the long-term erosion of the PINWR shoreline south of the fillet”. Please define little. The analysis in this section does not support this statement, please remove it.
- 3) At Fort Macon, this section once again references un-peer-reviewed shoreline change data from a public talk. This is inappropriate. All conclusion based on this data should be removed from the Summary on pg. III-44. Talking about the changes in delta geomorphology is fine, but you have already addressed shoreline change in Section II. There should not be a second discussion based on a second data set without presenting all of that data in detail.
- 4) There are many instances where Section III tries to make the point that sand is occasionally making its way around these structures to form a small beach or inter-tidal flat. This seems a strained effort to suggest that these are all functioning as “leaky” groins. The problem is that we have no perspective on the degree of beach or the nature of the sand bodies before structure construction. The fact that some sand occasionally makes it around a structure is not surprising, but we learn nothing about the DEGREE of impact the structures have had on this sand movement. Therefore, none of this visual assessment is particularly useful.

- 5) You should not be using shoreline change data from Olsen and Associates to ensure unbiased analysis. Please remove.
- 6) Page III-68: Please remove the last paragraph. There is no basis laid for this sweeping conclusion in the Florida section. In fact, many of the conclusions drawn in Section III do not jibe with the analysis in Section II.
- 7) Section III-70: Please remove the last paragraph. There has been no basis laid for the sweeping conclusion that terminal groins had little effect on the regional sand transport regime. Saying that sand moves past the groin is not the same as saying that the groin has not had an impact on beach or intertidal habitat. This conclusion is very misleading.
- 8) This section seems to rely much on professional opinion and little on new data analysis (unlike Section II).

#### Section IV:

I will not comment in detail on this section since it is somewhat out of my area of expertise. I do wish that more effort had focused on examining potential habitat loss, rather than simple counts of organisms.

- 1) The environmental section should have no independent conclusions regarding the impacts of terminal groins on shoreline change. Any discussion of this should refer to conclusion drawn from Section II.
- 2) Page IV-68: remove paragraph referencing Olsen Associates indicating groin is meeting its goals. Not appropriate here.
- 3) Remove all of the engineering design information. Duplicates other sections.
- 4) Please remove all paragraphs (5,6, and 7) in the Summary and Conclusions that draw conclusions about the benefits of terminal groins for shoreline stabilization and beach nourishment. DC&A is not qualified to evaluate the references they site, nor are they charged with drawing those conclusions, nor is their evaluation of the literature comprehensive, nor are the conclusions supported by analysis within your own report.

#### Section V:

It was clearly the consensus of the Science Panel that the attempts to derive simple relationships for groin impacts based on only five data points (using volumes averaged over three miles of shoreline where there has been a variable response) is inappropriate and provides data of dubious value. I understand your desire to be able to draw some conclusion from your data, but I do not believe that it is possible given the vastly different settings for each structure, the degree of unquantifiable human impact, the uncertainty in all of your data, and the small number of data points. Based on the time you had, and the availability of data, you will not be able to establish simplistic cause and effect.

#### Section VI:

Please add the following caveats to your calculations of property values:

- 1) With the available data, we cannot determine the financial benefits (or economic harm) that may come from the construction of terminal groins.

- 2) We cannot determine how far down the shoreline a terminal groin may provide benefits (or cause harm).
- 3) The report should clearly state that in no way is it appropriate to take the total value for property at inlets and assert that all of this property could be lost in the next 30 years or that terminal groins could protect all of it.
- 4) It would be nice to place the value of property at inlets placed into a larger context of the value of property on each barrier island or the coastal economy in general.

Section VII:

Does not consider the costs of acquiring easements or other legal costs associated with what is likely to be a controversial project in NC.

# Comments on Working Draft Report Terminal Groin Study

February 15, 2010

Attached, please find some brief comments on the draft Terminal Groin Study produced by Moffatt & Nichol, Dial Cordy, and Duncan Fitzgerald for the NC Coastal Resources Commission. The comments are brief because of the short review time allotted and other demands on my time. My overall impression of the report is that a noble effort was made but that because of the lack of time and financial resources necessary to produce the study necessary to adequately address the questions and issues posed by the NC General Assembly, the best use of the existing study is to help design a study that would provide the answers necessary.

Stephen B. Benton, NC Coastal Resources Commission's Science Panel on Coastal Hazards,

General -

A number of comments were made by various members of the Science Panel at the last two Science Panel meetings about the tables and figures provided in the report. I will not repeat these here, but do support the comments made. They should be available in the minutes/notes of the meetings and will no doubt also be provided in comments by other members of the Panel.

Section II -

The use of shore parallel baselines for measuring shoreline change works well if the shoreline remains relatively parallel to the baseline. This is how the shoreline change studies used by the NC Coastal Resources Commission for the oceanfront management program and building setbacks were determined since 1979.

However, because of the complex forces affecting shoreline behavior in and adjacent to inlets and technological limits to accurately measuring shoreline position in them, the State of North Carolina has just recently begun to attempt to evaluate shoreline movement at inlets.

There are a number of special problems associated with accurately measuring shoreline behavior in and adjacent to inlets that affected how the North Carolina Coastal Management handled them. Where shorelines curved around the end of the island or where ebb shoals created significant bulges in individual shorelines used for the study, transects perpendicular to the baseline which were not also nearly perpendicular to the shoreline were deleted from the shoreline change measurement data set. This is because the measurements would be apparent changes rather than actual changes and the values not an accurate reflection of shoreline behavior. Similarly, the shoreline datum used for the oceanfront (wet/dry line) was not suitable for inlet shorelines because of the significantly lower slopes typically found on tidally dominated inlet shorelines.

Recent advances in mapping techniques have allowed North Carolina to develop accurate measurement of shoreline position in and adjacent to our inlets. These new studies involve shoreline changes based on baselines that wrap around the curving inlet shorelines and utilize the MHW datum that is much more suitable for inlets than the wet/dry line used along the oceanfront. Using these new shoreline studies, the NC CRC Science Panel on Coastal Hazards has been revising the Inlet Hazard Areas of Environmental Concern. For the first time since the inception of the program more than 30 years ago, we may have shoreline data at the NC inlets that is accurate enough to be used in a management strategy.

Unfortunately, the current study draft is attempting to use the 1970s methodology to determine shoreline change data that is then used to estimate sediment volume changes related to the complex natural and man-made influences such as groins, jetties, seawalls, navigation channel dredging and dredged material disposal or beach nourishment. The questionable accuracy of portions of the shoreline data and sediment volumes computed from them makes any study conclusions based on them questionable and vulnerable to challenge.

Page II-20. In the report, the argument is made that "detailed analysis of sediment budgets is beyond the scope of this study". While it is certainly true that a detailed sediment budget analysis would not be possible with the budget and time allowed for the study, it is clear that the analysis technique utilized for the report is not sensitive enough to be able to determine the impacts of terminal groins, particularly at the two North Carolina sites reviewed. Most importantly, the study does not provide the information needed to evaluate the use of terminal groins at other potential sites in North Carolina.

Fort Macon -

The historical summary is basically shot-gunned, dates are thrown out but no analysis of the relations of dates to other data is provided. For example, wave, tide and storm data is provided in tables, but are not related to pre and post terminal groin construction shoreline change data. There is no apparent effort to determine the effect of earlier structures or dredging impacts.

It is very difficult to document the effects of such a minor element of the total impact of much more significant activities. This is particularly evident at Beaufort Inlet, which has a history of engineered structures that goes back to the Civil War. The navigation channel at the inlet has been dredged clear across the ebb delta well onto the Continental Shelf. This channel completely cuts off all natural bypass of sand in the longshore transport system. The channel also has significantly altered the hydrology on the ebb delta, at the inlet, and well back in the estuaries behind it. This significantly alters sedimentation rates and patterns in areas affected all the way from the estuary through the inlet to the ebb tidal delta.

While the impacts of alterations to the inlet have been substantial, there are several situations unique to the inlets that make these alterations necessary. This inlet provides the entry to one of North Carolina's only two major ports. Dredging a channel across the shelf into the port was essential for the port to function. The terminal groin at the inlet was largely constructed to protect the earthen Civil War fort, a major historical structure. Relocation is not an option for

an earthen historic structure, so a hard structure is basically the only way to provide needed protection. This is a situation similar to the rock revetment allowed for protecting the earthen Civil War fort at Fort Fisher. These situations represent good examples of the flexibility that is built into the NC Coastal Management Program. Though these types of structures are not generally allowed in North Carolina, where there is no alternative, the need is clearly real, and there is a significant public interest, the need can be accommodated. However, with the possible exception of the entrance to the Cape Fear River and Oregon Inlet (which already has a terminal groin), there is no other inlet in North Carolina with comparable public interest issues.

Where major impacts are the result of such a complex mix of players and actions over such a long time period, an important question is what has been the total cumulative impact of all the activities on island processes; including the inlet related process, the habitats they provide, and the offsite island sediment budget. If we understand the system and the impacts to it, a minimization plan could be developed and significant island process and habitat impacts mitigated. Developing this level of understanding could help us better manage other coastal sites that have not been as altered.

The long history of a complex of numerous alterations and structures at Beaufort Inlet also illustrates another issue that has a bearing on the question of the appropriateness of changing the North Carolina rules, which prohibit hard structures such as terminal groins within the Ocean Hazard AEC. No action seems to be effective alone. Some new structure(s), or modification to the structure(s), or increased dredging, or additional nourishment is invariably required to "fix" some unanticipated effect of the original action. Similarly, though not necessarily illustrated at Beaufort Inlet because uplands on both sides of that inlet are publicly owned, the stabilization of uplands adjacent to inlets changes them from properties at significant risk to properties that appear to be stable and safe. In reality, they are at best temporarily safer and at worst, a huge liability on disaster assistance, flood insurance and the local tax base when the inevitable storm impacts them.

#### Amelia Island -

The data available at this site is not adequate to provide answers to the questions posed by the North Carolina Legislature. My impression was that many more questions about the terminal groins effects were raised than answered.

#### Overall Findings... -

I am sure the other members of the Science Panel will be commenting in detail about the numbers generated and their significance here so I will not "pile on". One point is made in the report about the shoreline of northern Pea Island becoming accretional after construction of the terminal groin that I do want to comment on, however. Though the shoreline adjacent to the groin may have become accretional during the time periods studied, some of the worst erosion along the Northern Outer Banks occurs to the south of the 3-mile study area. Though this area is beyond the defined study boundaries, the possible effects on this far-field phenomenon of the groin and subsequent activities along the shoreline needs to be investigated.

### Section III -

In general, this section provided far more light on the questions raised by the legislature. The report would be much more helpful in responding to these questions had there been more coordination between this section and the coastal engineering and the environmental assessment sections.

#### III-1 -

The statement is made that "processes are evaluated as to their impact on the terminal groin located at each of the study sites". My understanding is that the focus was to be on the effects of terminal groins on geologic processes and morphology, etc.

#### III-4 -

The statement is made that "movement of sediment into the backbarrier represents a long term sequestration of sand from the littoral zone, which will not become part of the active inlet and nearshore system until the shoreline transgresses to this backbarrier site." No mention is made that transgression is an ongoing process and sand sequestered in the past is actively being incorporated into the active inlet and nearshore system as it is eroded from the shoreface. This is not a "steady state" process, however. Over time sections of the barrier island system may experience periods of sediment starvation or sediment overfeed. At any rate, sediment sequestering is not an absolute unmitigated disaster but part of the ongoing process of island evolution. Sequestering is integral to the formation of new habitat that a number of coastal plant and animal communities are dependent on. Sequestering is also essential to the formation of a platform on the backside of island systems such as the Northern Outer Banks are dependent on as part of their transgression in response to rising sea level. Oregon Inlet, for example, originally opened approximately 3 km north of its current location. As it has migrated south to its current location, its flood tide delta has formed a platform behind the island that entire distance.

### III Conclusions -

This section provides a good summary of short-term and intermediate-term processes as they relate to terminal groins, dredging, etc. It should also discuss the issues relating to longer-term geologic processes. For example, it does not address the impact of stopping the migration of Oregon Inlet on habitat over time, particularly the impacts of plant succession etc. on the northern spit. It does not mention the role of inlet migration on island migration and its response to sea level rise. Stopping the migration of Oregon Inlet has had a significant impact.

### Economic Assessment -

The 30-year setback zones within the Inlet Hazard AECs that are currently being developed by the Science Panel for the CRC are very different from the 30-year zone on the oceanfront. Island transgression makes shoreline loss on the oceanfront permanent in the long term. Potential losses here involve both the structures and land under them. In the inlet hazard areas, the coastal processes affecting the adjacent lands are much more complex. Except where an inlet is actively migrating in one direction, structures can be expected to be lost, but the lands will come and go.



Comments on Draft Terminal Groin Report  
Bill Birkemeier, 12 February 2010

General Comments

The general explanation of terminal groins that leads off the Geology section should be moved to the front of the report as the introduction and expanded as to be clear as to what terminal groins do (i.e. collect longshore drift, etc) and don't do (i.e. prevent cross-shore transport, etc), how terminal groins are different than other groins and groin fields, and what characteristics/parameters define the length of shoreline they influence. This section and its diagrams can then be used to introduce the analysis performed and can be used as a reference in each of the case studies. For example – in the introduction it can be mentioned that one way to look at the length of shoreline influenced by the groin is to examine the change in shoreline change rates before and after construction and to try to identify a distance from the groin at which the shoreline erosion rate is unchanged from what it was before construction.

The engineering and geology sections have to be merged (I think there was consensus on this) and the results must agree – i.e. the new analysis should agree with the published results or explain why they disagree. The geology section will provide a good lead into each of the analyses.

The report uses a number of arbitrary amounts. For example, use of 3 miles. This length should be longer than needed to compute the influence of the structure, but not too long that it begins to include the influence of something else – an offshore shoal, relic geologic feature, next inlet, etc. Ideally strong conclusions should be independent of arbitrary amounts – i.e. the same conclusion is reached using ~2.5, 3, or 3.5 miles.

This report will not tackle the many sea level rise/climate change issues facing the NC coast. However the impact of sea level rise on the design of a terminal groin and the associated fillet can be addressed. The Corps' has recently released guidance on sea level rise and coastal structures which may be useful.

Groins are known to have an updrift and downdrift impact. Identifying the affected distance is a primary objective of the study, and once defined for each site, that computation should be reflected in the other aspects of the study. If it is difficult to identify the impact because of the complexity, that too is a useful result.

I'm interested in the habitat discussion. Can areal coverage of a habitat, say open beach, be used as a surrogate for the nesting bird population data? The population studies are difficult from the standpoint of consistency of observer and sampling plan – and don't appear to be detailed enough to separate the area affected by the groin from the general area. On the other hand, aerial photographs are available. Would this also provide a way to address Rob Young's comment about computing habitat loss? At Oregon Inlet, Fort Macon, and Amelia Island – the most recent photos show more open beach than in earlier photos. Are these new areas significant for habitat? At Amelia Island, the 2008 shoreline appears similar to the 1994 shoreline, but the 2008 beach is

wider, replacing eroded maritime forest. At Oregon Inlet, the preconstruction shoreline (see Fig IV-8) had no real fillet into the inlet, whereas the post-construction is open beach.

I also agree with Pete Peterson and others that a terminal groin's influence on inlet migration should be better discussed. From a habitat standpoint – is there less open beach habitat on the eroding side of an inlet (look at the inside shoreline at Oregon Inlet just before construction)? Similarly when a terminal groin is placed, do we expect new open beach habitat to form as the inlet narrows (Bodie Island and inside the inlet)? I now know how important elevation is to open beach habitat – but if knowing the amount of open beach within the impact area is useful, it can be computed.

### Specific Comments

1)Page II-12 - Fig II-5 shows 1 mi of shoreline but 3 mi is used in the analysis. These photos of shorelines should be full page and show the entire 6 mile region considered.

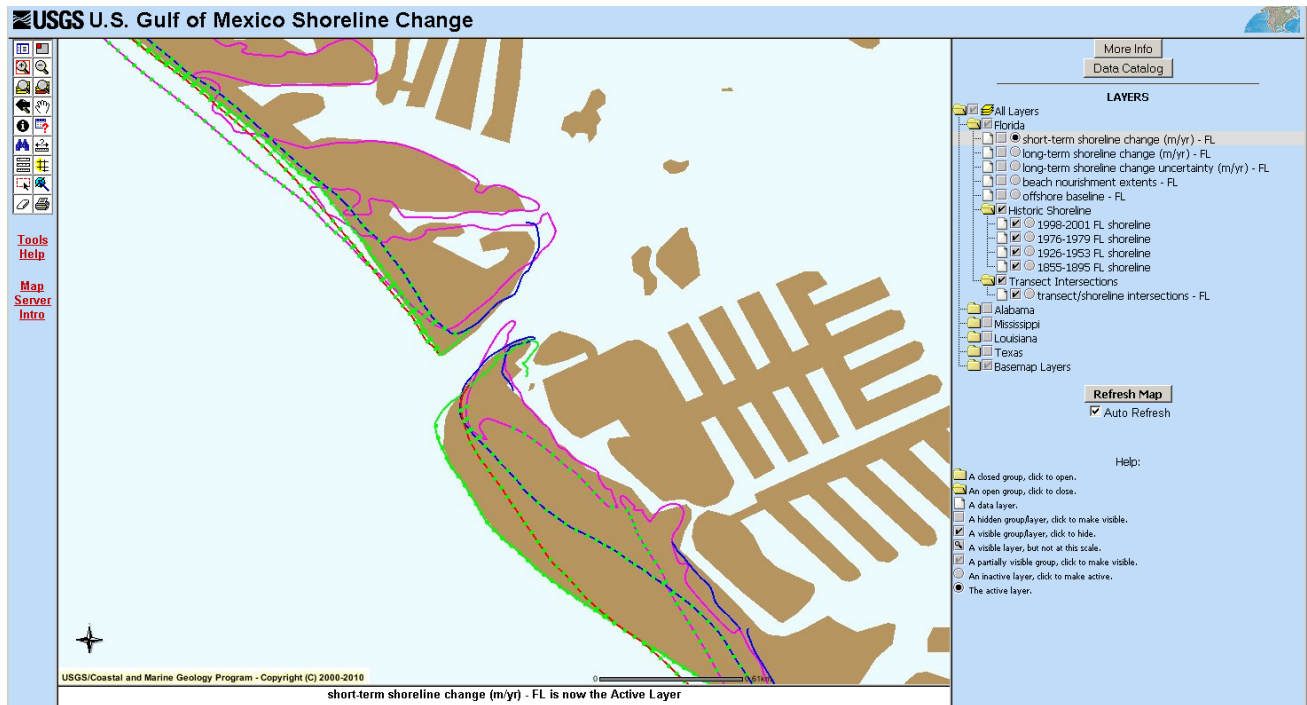
2)Page II-13 – Oregon fillet filled “naturally”, also needs correction in Section III. Should also note that the shape of the Oregon Inlet terminal groin was designed to return the shoreline to the 1988(?) or the 1989(?) shoreline. This also explains the wrap-around design of the structure, (see Figure IV-8).

3) Page II-17 – The computations using discrete alongshore intervals are difficult to interpret (at least to interpret “quickly”) and since the longshore intervals are arbitrary – it's not always evident what influence the sampling scheme has on the results. Consider showing the raw data and then banding it according to some defined scheme (i.e. inside or outside the zone of influence). For example, Figure III-14 is more informative than figure II-8. The associated tables can be banded if the supporting figures show the brackets over the raw data indicating the banded intervals.

4) Page II-19 – the interval data are plotted at the same vertical scale as the cumulative data, but as a result are too small to see the variation.

5) Page II-20 – as mentioned in the meeting, sidecasted dredge volumes are not included in the computations – this should be mentioned in the text, and denoted in the appendices.

6) Page II-79 – The Florida DENR profile lines are pretty far apart to extrapolate 50-m spaced shoreline intersects, especially on the south side of John's Pass. What impact does that have on the results? Would the USGS shoreline data found here: <http://pubs.usgs.gov/of/2004/1089/gis-data.html> be useful? Change rates and uncertainty values are also available.



7) Page IV-2 – A Rob Young, personal communication reference is used for the downdrift adverse effect of groins. Many published works also state this (i.e. USACE Shore Protection Manual, 1984)

8) Page IV-2 – from the bottom 2 paragraphs until the start of section 2 seemed out of place.

9) Page IV-117 – top sentence compares hardened to non-hardened shorelines. Is the impact referred to here due to “hardening” or development?

10) Page IV-117 – second paragraph seems out of place.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, February 16, 2010 10:26 AM  
**To:** Walker, Michele  
**Subject:** Fw: Subcommittee Presentation

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

----- Original Message -----

From: Rob Young <[ryoung@email.wcu.edu](mailto:ryoung@email.wcu.edu)>  
To: Gregson, Jim; [overton@eos.ncsu.edu](mailto:overton@eos.ncsu.edu) <[overton@eos.ncsu.edu](mailto:overton@eos.ncsu.edu)>  
Cc: [jmartin@moffattnichol.com](mailto:jmartin@moffattnichol.com) <[jmartin@moffattnichol.com](mailto:jmartin@moffattnichol.com)>; [PTschirky@moffattnichol.com](mailto:PTschirky@moffattnichol.com) <[PTschirky@moffattnichol.com](mailto:PTschirky@moffattnichol.com)>; [bob.emory@weyerhaeuser.com](mailto:bob.emory@weyerhaeuser.com) <[bob.emory@weyerhaeuser.com](mailto:bob.emory@weyerhaeuser.com)>;  
Underwood, Steve  
Sent: Mon Feb 15 23:13:47 2010  
Subject: Subcommittee Presentation

Hi Folks: Several individuals at today's CRC Subcommittee meeting indicated that M&N is still presenting results from the graphs in Section V pages 15-21. It was my opinion that the science panel reached consensus that it was inappropriate to attempt to establish any generalized relationship using five data points, with volume change averaged over three miles (and showing different trends within that three miles). In addition, you are comparing very different inlet settings with different terminal structures, and varying human impacts. You have no idea of the uncertainty in any of your datasets, or the uncertainty in your conversion from shoreline change to volume change. We have no idea whether or not averaging that volume change over three miles is meaningful or not, because you have not been able to establish how far down the shoreline the groin has an impact. In some cases, dredging is masking any impact the groin may be having. YOU ABSOLUTELY CANNOT ESTABLISH ANY GENERALIZED RELATIONSHIP FROM THESE DATA SUGGESTING THAT THE STRUCTURES, ON AVERAGE, HAVE IMPACTED VOLUME CHANGE BY \_\_\_\_\_. I ask that you abandon this effort. It is not good science or good engineering. I thought that the science panel has reached clear consensus on this point.

Best  
Rob

Robert S. Young, PhD (Licensed Professional Geologist in NC, SC, FL) Director, Program for the Study of Developed Shorelines Professor, Coastal Geology Western Carolina University Belk 294 Cullowhee, NC 28723 828-227-3822, FAX 828-227-7163 [ryoung@email.wcu.edu](mailto:ryoung@email.wcu.edu) psds.wcu.edu

## Comments on the Draft Terminal Groin Study by Moffitt and Nichol

Submitted by Anne Deaton

NC Division of Marine Fisheries, Terminal Groin subcommittee member

February 16, 2010

### Plan overall

The organization made it difficult to draw conclusions. There was a lot of redundancy regarding general information and site description between sections and inconsistent conclusions between sections. I would recommend that all the general information about the background, history, and sites be in one general introductory section. Because each terminal groin site has unique characteristics, it might be easier to follow if you keep general or literature based information in each section – coastal engineering, geology, environmental, followed by a separate case study section. So under Oregon Inlet, it would begin with the specific coastal engineering information, followed by geological and environmental, etc. That might make it easier to integrate all information for one location, and draw a conclusion for that one site overall. If you don't reorganize, the redundant information and unnecessary information still needs to be moved. Also more clear summaries of findings in easily understood terms are needed after each major section.

The study needs to include all of the other engineering efforts that have occurred to each groin site. The document does not mention that the Amelia Island groin project was done in concert with a breakwater, which the engineers recommended was necessary for the groin to be effective. They should also mention that a second non-leaky groin was added on the inside of the inlet to compensate for sand deficits and offset impacts on the adjacent wetlands and bridge.

It should also be pointed out in the conclusions that none of the terminal groins studied, even though they represented the most comparable, consisted of only a single groin, and all but one had hardened structures other than terminal groins, associated with them. This points out the concern that a terminal groin alone is not effective and allowing one terminal groin, that then fails, could lead to the need for additional hardened structures, further exasperating impacts on coastal processes and habitats.

The summary should clearly state if nourishment increased or decreased after terminal groin construction. This is needed to determine the "advisability of use of terminal groins" and to assess the environmental impacts. While the contractor indicated that this can't be determined because nourishment generally didn't occur prior to the groin construction, but does after, this in itself indicates nourishment and the environmental impacts associated with nourishment are greater after a groin is constructed. It should be clearly stated that once a terminal groin is constructed, there is a sand management commitment.

### Environmental section

Need to address the link between stopping inlet migration on barrier island evolution and what the long term effects will be on fish and wildlife habitat. There is currently insufficient information on the effect of groins on sand flats and overwash areas, and how this will affect shorebirds and colonial waterbirds. These potential effects based on expected habitat change are known and should be included, even if the bird data isn't adequate to show the change. The terminal groin structure will cause habitat trade-offs. Which species will have negative habitat tradeoffs and which positive? The general section in the

beginning of the Environmental section needs to be comprehensive in describing potential environmental impacts. As written, it understates many of the potential impacts, particularly from beach nourishment associated with groins and from long-term effects on altering inlet and island migration processes. Also need to add information on potential impact to wetlands. A loss of back barrier wetlands would have a negative impact on estuarine dependent juvenile fish.

p. 5 – change “last several years, moving from hardened structures” to last several decades. Use of terminal groins will be a major shift in policy back to pre- 1985.

p. 6 - benefit of the rocky habitat. Rocky habitat is not natural to NC ocean shorelines and is not needed by the native fish or bird community, and therefore not necessarily a positive benefit, rather than a habitat trade-off. There is also information available that creating rocky habitat has led to introductions of non-native invasives (Chapman and Bulleri 2003). The report should incorporate these potential impacts.

p.7 – benthic resources – states you can’t distinguish impacts from hardened structures to invertebrates near inlets due to high variability. The impacts from nourishment will extend along the shoreline and there are many studies that have documented a decline in abundance and diversity of invertebrates (Walker et al. 2008, Dolan et al. 2006). This is important since the benthos are the base of the food chain for many important surf fish as well as shorebirds.

p. 7-8- Invertebrate impacts at borrow areas – sites one Florida study with no impacts. There are multiple studies in NC and SC that found recovery ranged from 3 mo to multiple years to recover. Refer to CHPP for references.

Invertebrate impacts at beach fill – again, many studies show reduced invertebrate abundance and diversity for at least one growing season at beach fill areas. Refer to CHPP for references. The report states impacts are a “localized impact”. Also, Bishop et al. (2006) found invertebrate impact extended over 1 km from the area of deposition.

p.8 – Fish and fisheries – while you discuss this in detail in Oregon Inlet, would like to see more in the general description since this is a potential impact of great concern for fisheries. It would be nice if the NOAA models used to determine the impact of the Oregon Inlet jetty on larval fish transport could be used to assess different groin configurations at different inlets. Or it could be a recommendation to do such an assessment prior to approval of any such structure. Also, report should include potential impact to pompano and kingfish, which use the surf zone as a nursery area and have high site fidelity, making them vulnerable to localized impacts to the benthos (Ross and Lancaster 2002).

Listed fish species – Atlantic sturgeon has been nominated for listing as endangered. Public comment on the proposed change has closed. Should the status change, it would be potentially impacted, since the species occurs in nearshore ocean waters.

Oregon Inlet – should state more conclusively there has been a loss of overwash habitat and sand flats resulting from the terminal groins. Should use the USFWS recovery plans as primary references for impacts to listed species.

**Lynn & Joe Barnard**  
**PO Box 3321 1 Dogwood Ridge Lane, Bald Head, NC 28461**

*January 14, 2010*

*Bob Emory  
Chairman, Coastal Resources Commission  
112 Camelia Road  
New Bern, NC 28562*

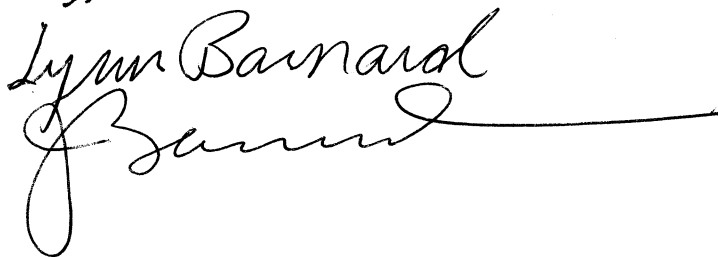
*Dear Mr. Emory:*

*As a property owner on Bald Head Island, I am asking for your support in legalizing terminal groins in the State of North Carolina. You may be aware that our island lost more than 700,000 cubic yards of sand between May and September of this year following the latest channel dredging by the U.S. Army Corps of Engineers. The Island is doing everything possible to save our beaches. Taxpayers have approved a special tax assessment to fund a \$17 million dollar private sand placement project.*

*However, we realize this only a short-term solution. A long-term fix is infinitely more complicated. While it is not proven that terminal groins should be part of a long-term fix, we feel it is important to have the option of using groins should studies prove that they could be beneficial. Legalizing terminal groins would allow us to conduct such studies.*

*I hope we will have your support. Thank you for your consideration.*

*Sincerely,*

*Lynn Barnard*  


*email: LRBARNARD@  
BELL SOUTH.NET*



**John & Louise Chamberlain  
P.O.Box 3162  
305-37 South Bald Head Wynd  
Bald Head Island, NC 28461  
(910) 454-0884**

January 17, 2010  
Mr. Bob Emory  
Chairman, Coastal Resources Commission  
112 Camelia Road  
New Bern, NC 28562

Dear Mr. Emory:

As a property owners on Bald Head Island, we are asking for your support in legalizing terminal groins in the State of North Carolina.

You may be aware that our island lost more than 700,000 cubic yards of sand between May and September of last year following the latest channel dredging by the U.S. Army Corps of Engineers. The Island is doing everything possible to save our beaches. Taxpayers have approved a special tax assessment to fund a \$17 million dollar private sand placement project.

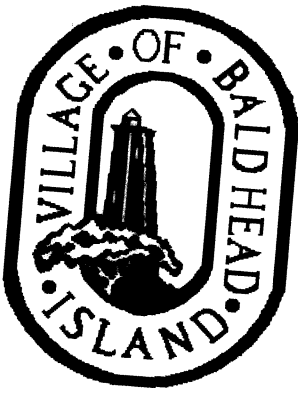
We realize that is only a short-term solution. A long-term fix is infinitely more complicated. While it is not proven that terminal groins should be part of a long-term fix, we feel it is important to have the option of using groins should studies prove that they could be beneficial. Legalizing terminal groins would allow us to conduct such studies. I hope we will have your support.

Thank you for your consideration,

Sincerely,

John and Louise Chamberlain

A handwritten signature in black ink, appearing to be 'John & Louise Chamberlain', with a long horizontal line extending to the right.



# The Village of Bald Head Island

February 17, 2010

Mr. Bob Emory, Chairman  
Coastal Resources Commission  
112 Camelia Road  
New Bern, North Carolina 28562

Mr. James H. Gregson, Director  
North Carolina Division of Coastal Management  
400 Commerce Avenue  
Morehead City, North Carolina 28557

Re: Village of Bald Head Island  
Support for Terminal Groin Legislation

Gentlemen:

The Village of Bald Head Island ("Village") appreciates the hard work that the Coastal Resources Commission ("Commission"), Steering Committee, Science Panel, Advisory Council and Division of Coastal Management ("DCM") Staff and their consultants have put into the terminal groin Report.<sup>1</sup> In light of the Report conclusions, the Village encourages the Commission to recommend to the North Carolina General Assembly legislation that allows terminal structures at or near North Carolina's inlets in appropriate circumstances. When used in a proper location—such as adjacent to the dredged shipping channel that lies immediately west of Bald Head Island—a terminal structure, designed through good engineering practices and constructed with proper materials and techniques, is an effective tool in mitigating erosion damage. Conversely, the Report shows no quantitative evidence of a substantial adverse impact on adjacent shorelines.

Bald Head has a unique shoreline history, as the Cape Fear River shipping channel entrance lies to the immediate west of the Island. Since the construction and widening of the shipping channel close to the Island in 2000,<sup>2</sup> the Island has struggled to maintain its south and west public beaches, rare habitat, homes, roads and utilities.<sup>3</sup> The erosion of Bald Head Island

<sup>1</sup> Moffatt & Nichol, *et al.*, "Working Draft Report: Terminal Groin Study", Feb. 1, 2010 (herein "Report").  
<sup>2</sup> See Exhibits A, B and C (attached).  
<sup>3</sup> See Exhibits D-H (attached).

into the Cape Fear River is affected by the dredging practices of the U.S. Army Corps of Engineers (USACE) in maintaining North Carolina's most active shipping channel.<sup>4</sup>

Recognizing that the new channel location and dredging activities would erode Bald Head's beaches, the Village and the USACE, among others, agreed in 2000 to a Sand Management Plan ("SMP"). Under the SMP, Bald Head receives sand placement on its beaches approximately every two years, during two biennial dredge events, and then experiences a four-year hiatus when Oak Island and Caswell Beach receive the dredged sand during the third dredge event. The SMP also contemplates amending the plan or taking other action if the beach renourishment fails to protect Bald Head Island. The SMP has failed in this respect, particularly during the four year gap period and any other delay, such as that caused in 2003-04 by lack of USACE dredge funds.

As a result, Bald Head is under constant siege from erosion, resulting in a permanent change in the Island's morphology and loss of sand shoals, which protect the Island from waves and storms. Worse, the erosion is devastating during the four years in which Bald Head receives no sand. For example, during the past year—which was part of a four-year hiatus—the Village was forced to organize and fund a beach renourishment project that cost approximately \$17.0 million dollars.

Although the cost of the Village project was high, the cost of inaction was higher. Bald Head's irreplaceable environment, rare sea turtles, Plover birds and SeaBeach Amaranth plant species<sup>5</sup>, homes and public infrastructure<sup>6</sup> were all in jeopardy and remain so. For the time being, the Village dredging project has helped protect these invaluable resources.

However, it has been the Village's longstanding opinion, based on its "front line" experience, that a terminal structure should be studied for installation at the Island's south terminus to protect Bald Head from the dredged inlet. The harm to the Island from non-natural erosion is well documented.<sup>7</sup> Consistent with the Report findings, the terminal structure will not be a complete solution; instead, it will be part of a comprehensive inlet management plan that will include periodic beach nourishment under the SMP. However, the terminal structure may help manage and mitigate the erosion problem. In the absence of legislation allowing terminal structures, the battle will wage indefinitely, causing great property, recreational and financial loss, as well as irreversible harm to Bald Head's unique environment. Bald Head Island's beaches, turtles and birds belong to the State and people of North Carolina and are worthy of protection.

In substantial part, the Moffatt & Nichol Report is consistent with Bald Head's experiences with terminal structures and erosion, and with our coastal engineer's

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<sup>4</sup> See Exhibit I (attached).

<sup>5</sup> See BHI Conservancy Report, Exhibit J (attached).

<sup>6</sup> See Map of southwest Bald Head Island, Exhibit K (attached).

<sup>7</sup> See Olsen Associates, Inc., "Shoreline Assessment at Bald Head Island, NC" (March 27, 2009), Exhibit L (attached).

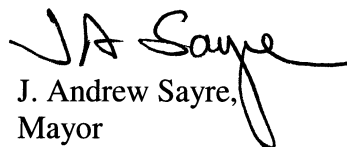
recommendations. While Bald Head has been fortunate to benefit from the geotextile, sand-filled groin tubes lying near the inlet, this groinfield has proven inadequate and costly. Not only do sand-filled tubes of limited dimensions not provide sufficient robustness to combat the problem, they require expensive replacement because the fabric fails. Also, the sand filled tubes cannot meet the preferred design criteria identified by the Report, i.e., structure permeability, longevity, low elevation, wave absorption characteristics, etc. In the Village's experience, these tubes require frequent maintenance, as well as replacement every four or five years (and possibly more frequently if impacted by a major storm). Replacing the tubes this year is costing the Village over \$1,100,000.00.

A potentially more effective and cost-efficient solution for study is the construction of a rock terminal structure such as that now in place at Amelia Island, Florida. The Amelia Island structure was examined by Moffatt & Nichol in the Report. The structure slows the rate of sand loss but is a "leaky" structure, in that some sand is allowed to bypass the structure to nourish the adjacent beach. The Amelia Island terminal structure has proven to be a very successful sand management tool.

In sum, the Commission should recommend to the General Assembly enactment of legislation that allows use of terminal structures in locations—such as Bald Head Island—where such structures are part of a comprehensive inlet management plan and can help ameliorate erosion at or near North Carolina's inlets. Both the Report and Bald Head Island's history support this recommendation. The legislation should require proper oversight and compliance with good engineering practices. Further, legislation allowing terminal structure permit decisions to be made by DCM (consistent with permitting rules developed by the CRC) or by the CRC itself (through variance procedures) would be preferable to such decisions being made at the legislative level.

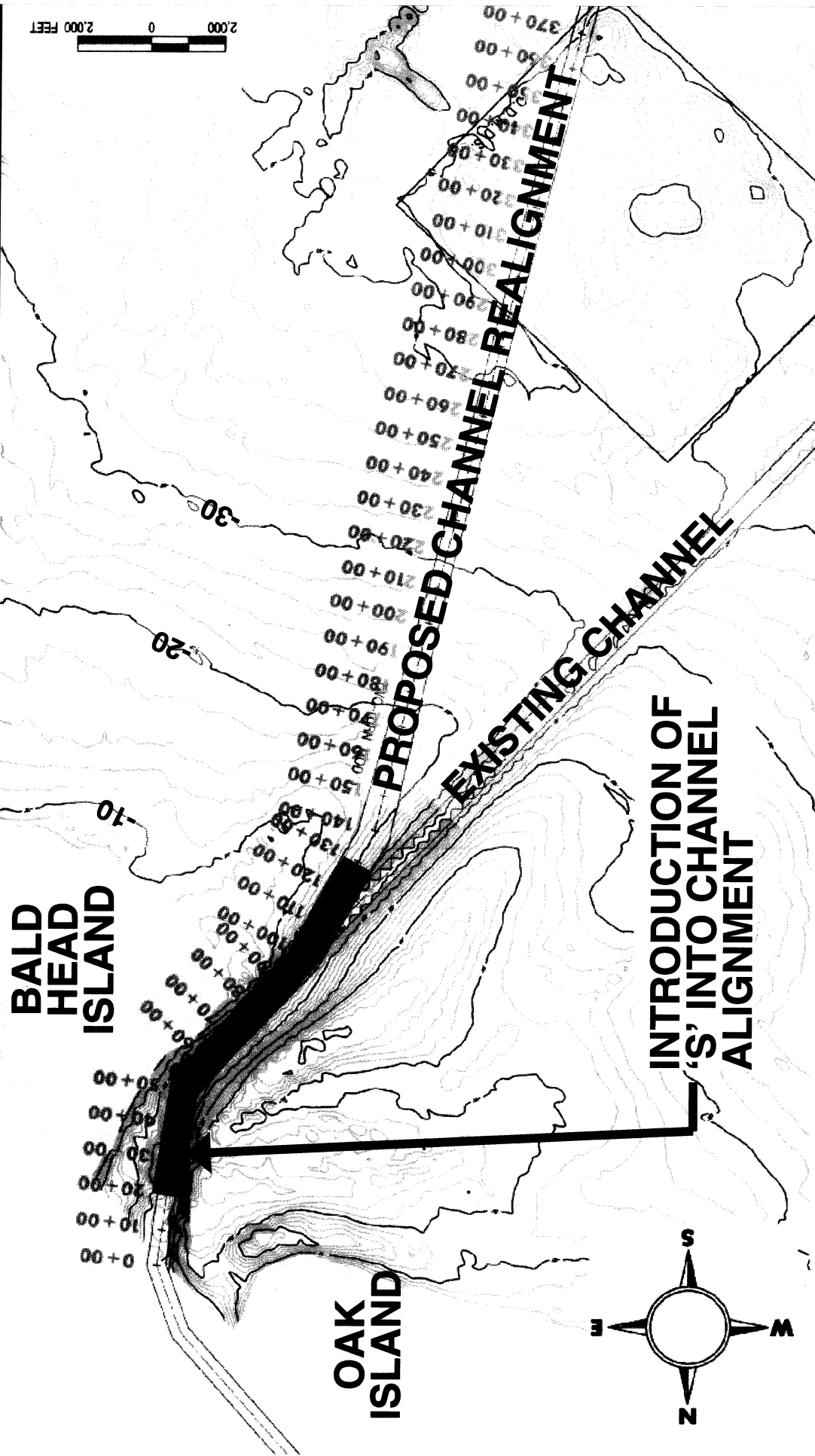
Thank you for your time and consideration. Please contact me if any additional information would be helpful.

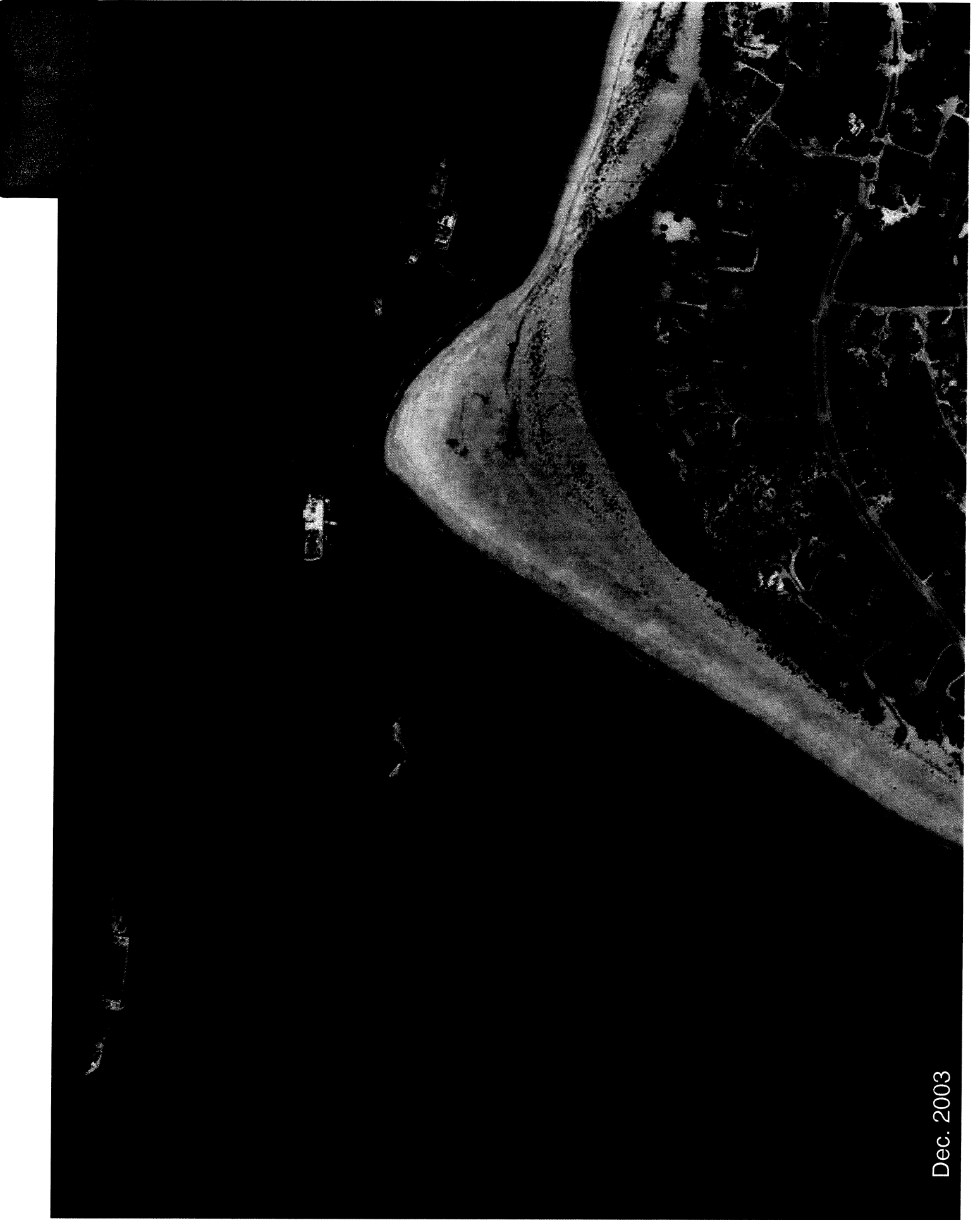
Sincerely yours,

  
J. Andrew Sayre,  
Mayor

Attachments

pc: Jeffrey D. Warren, Ph.D., Coastal Engineer  
Calvin R. Peck, Jr., Village Manager  
John L. Fisher, Mayor Pro Tem  
Charles S. Baldwin, IV, Esquire





Dec. 2003

# Dipper dredge Tauracavor excavating channel at "The Point"

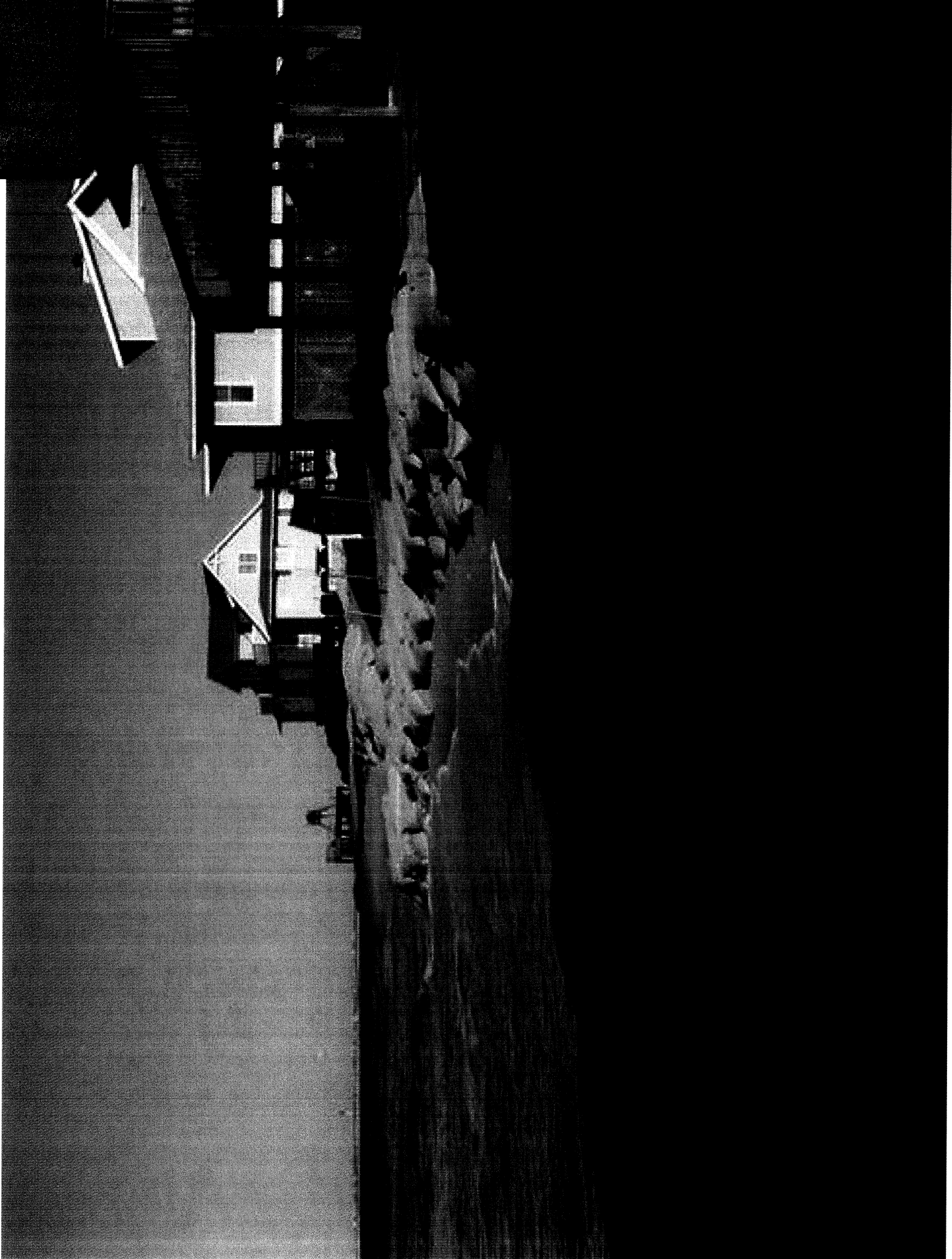




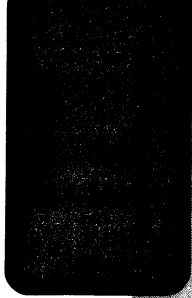


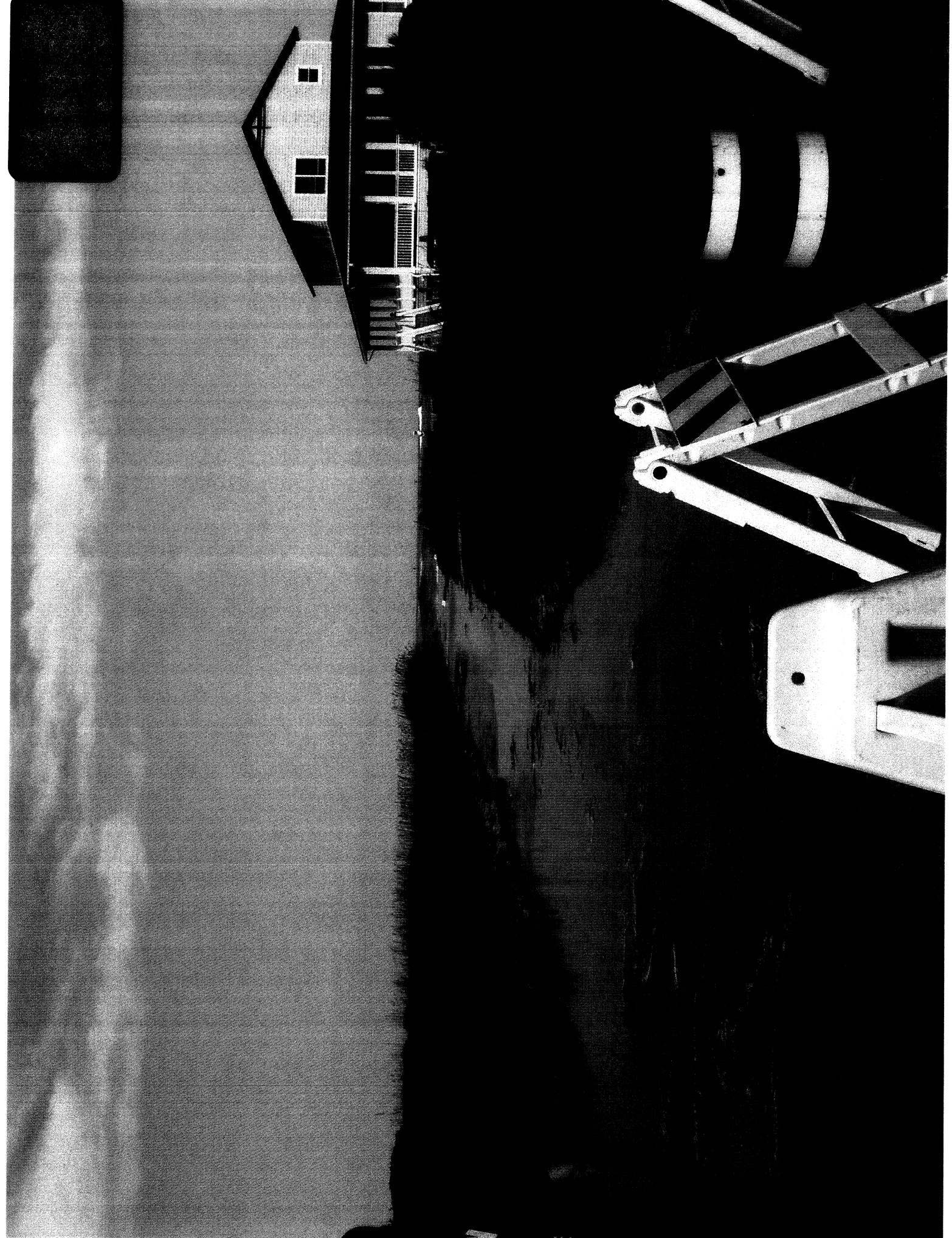


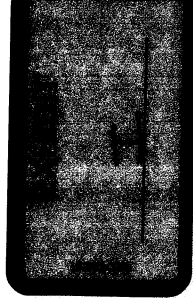














ENDANGERED AND THREATENED SPECIES HABITAT  
ON “THE POINT”, BALD HEAD ISLAND

16 April, 2009

By: Suzanne E. Dorsey, Ph.D. Executive Director BHI Conservancy and Maureen Dewire,  
Senior Naturalist, Director of Education BHI Conservancy

The “Point” of land at the juncture of West Beach and South Beach, BHI is of significant and unique ecological importance. The Point is used by many different species of plants and animals in the dune/beach ecosystem and is particularly valuable habitat because of the extensive dune crest habitat – the area above the high-tide line and below the major vegetation. This wide sandy area on BHI is unique, in part, because humans rarely trespass. The dune crest habitat at the Point has been most impacted by the semiannual dredging off the coast of BHI. This year, when dredging has not been complemented by renourishment to replace eroded sand from the Point, essential habitat has disappeared—either eroded away or washed over. There is no longer any sea turtle, shorebird, or endangered plant habitat in the area known as the Point as well as adjacent beaches along West and South Beaches. According to the Endangered Species Act, any listed species are protected from take, and take includes destruction of habitat. Loss of nesting and foraging habitat would certainly fall under the definition of take. Restoration and preservation of habitat is essential for the long term survival of federally endangered or threatened species.

Affected state and federally listed flora/fauna by loss of beach at the South/West “Point”:

**SEA TURTLE:**

Loggerhead Sea Turtle: Federally listed as Threatened

Green Sea Turtle: Federally listed as Endangered

**PLANT:**

Seabeach Amaranth: Federally listed as Endangered

**BIRD:**

Least Tern: Species of Special Concern

Piping Plover: Federally listed as Threatened

Wilson’s Plover: Listed in North Carolina as a Species of Special Concern

American Oystercatcher: Species of Special Concern

Common Tern: Species of Special Concern

Caspian Tern: Species of Special Concern

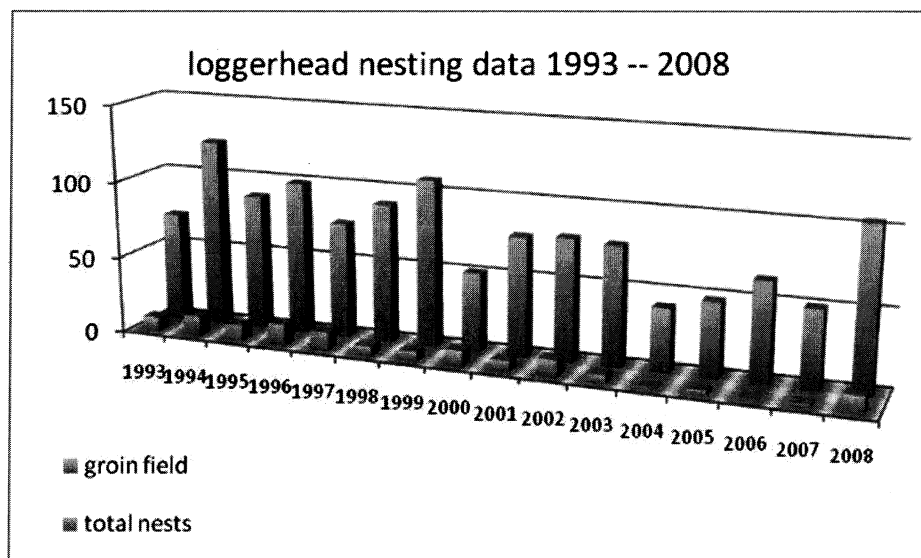
Brown Pelican: Significantly Rare



Sandwich Tern: Watch List  
Forster's Tern: Watch List

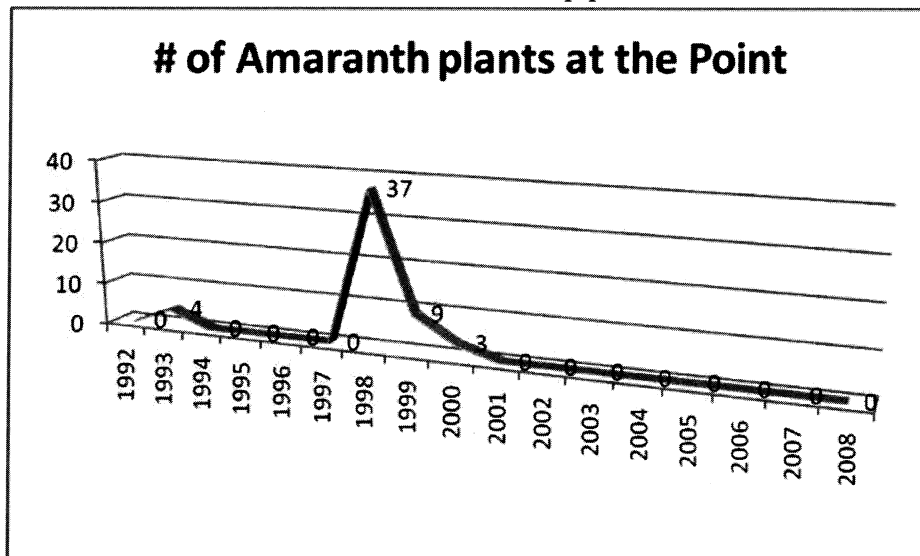
## SEA TURTLES

- Loggerhead and green sea turtles have both been documented nesting on Bald Head Island's beaches, including those that run east, south and west. The great majority of nests are laid by the federally threatened loggerhead sea turtle, with a handful of nests laid by the federally endangered green sea turtle. Ocean beaches in the Cape Fear region have the highest density of nesting sea turtles in North Carolina; so maintaining the integrity of their nesting habitat is key to successfully managing sea turtles in the state. These species require a sufficient amount of sand between the high tide line and dune line in order to nest successfully. The more narrow the area between the high tide line and the dune line, the more likely their nests will become inundated with water during a storm event or a simple extreme high tide caused by a full moon or strong onshore winds. Nesting beaches appropriate for sea turtles are becoming more infrequent as development encroaches on what was once suitable habitat.
  - Preliminary analysis of sea turtle nesting data show an increased variance and decreased overall number of sea turtle nests throughout the island and along the groin field from 2000 to 2008 when compared to 1993 to 1999. T-test show significant differences in nesting in both categories between these dates  $P < 0.05$ . Although sea turtles have an internal 2-3 year nesting cycle, the data below seem to demonstrate that nesting improves after nourishment—although further analysis will be needed to support this contention. Additional analysis of nesting trends on the Point will be forthcoming.



## PLANTS:

- Seabeach amaranth, a federally endangered plant occurring on barrier island beaches, has been documented on the beaches of BHI in scattered locations. This plant is sporadic in its appearance but has been documented by Conservancy staff annually for the past 5 years. Seabeach amaranth's primary habitat "consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of noneroding beaches. This species appears to need extensive areas of barrier island beaches and inlets functioning in a relatively natural and dynamic manner." (FWS: <http://www.fws.gov/nc-es/plant/seabamaranth.html>). It will often times occur with other mixed vegetation including sea rocket and dune spurge. Seabeach amaranth is also considered to be an effective sand binder, helping to build dunes (USFWS website, same as above).
  - Data collected by the Corps of Engineers indicates that Seabeach Amaranth was found on the "Point" until 2000. After the realignment no examples were noted. The survey was conducted in "Reach C from the area NW of the lighthouse around West Beach and South Beach to Sandpiper Trail."



- Seabeach Amaranth occurs in open sands where there is little or no competition from perennials. It is definitely much more prevalent as a colonizer of the upper beach and unvegetated sand flats above the high tide. Thus it has almost exactly the same habitat as sea rocket, piping plover nesting areas, and loggerhead turtle nesting areas. Intact dunes are highly beneficial in maintaining suitable habitat on a more constant and consistent manner for all these organisms.
  - Alan Weakley, Curator and Adjunct Asst. Professor, University NC Herbarium, NC Botanical Garden Department of Biology UNC-Chapel Hill.
- The erosion of at least 100' on the Point has likely removed a significant portion of the seed bank for this endangered species. The seed bank, seeds stored and protected underground, would have provided a source for new plants when and if conditions



improved on the Point. The level of erosion on the Point has made recolonization Seabeach amaranth unlikely without a restoration program.

## **BIRDS**

- **NESTING HABITATS**

- Least terns, piping plovers and Wilson's plovers all use similar beach habitat to lay their eggs. Nesting occurs above the high tide line but below the dune line in fairly open and un-vegetated habitat. Too much vegetation will actually deter the birds from nesting, as that vegetation will hide potential predators and the birds prefer to be in more exposed, open beach habitat. A sand/shell substrate is preferable for successful nesting. The birds lay their eggs in a small depression in the sand with the egg shell closely matching the color of the surrounding sand. This affords the birds protection against predators but also leaves them susceptible to being crushed by unknowing humans or dogs. As beach habitat is quickly being swallowed up by development and a rapid increase in human populations along the coast (53% of the United States' population lives in coastal counties), protection of essential nesting habitat for shorebirds is critical to their continued survival.

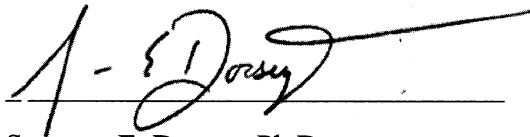
- **FORAGING HABITATS**

- Habitat such as that found on the Point are ideal for foraging and resting for dozens of species of birds. During low tide, large sand flats are exposed which provide excellent areas for foraging for a number of shorebird species. Worms, crustaceans and other invertebrates are all present below the sand and birds take advantage of this habitat, feeding for hours each day. Areas from the high tide line to the vegetation line are equally important, providing a resting spot for birds, whether they are year-round residents or migratory species in desperate need of an area to rest and re-fuel. Some of the species forage in the water just offshore (all of the tern species and brown pelican), searching for small bait fish. In between foraging trips, they will most often rest on the beach. The tern species use the sandy beach area for mating purposes as well during the months of April and May. Many of the species documented using the south/west point of the beach are here for the majority of the year (April-October) and in some cases, are year-round residents. Several are also colonial birds, preferring to be in large flocks, therefore requiring large expanses of beach to accommodate the birds.
- The Point on Bald Head Island is important foraging and resting habitat for several bird species listed in the state of North Carolina as Threatened, Species of Special Concern, Significantly Rare or Watch List. One of these species is also listed as Federally Threatened.
  - Threatened in NC:

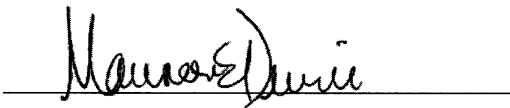
- Piping Plover (Federally Threatened as well)
- Species of Special Concern in NC:
  - American Oystercatcher – upgraded from Significantly Rare in 2006 to Species of Special Concern in 2008
  - Wilson’s Plover – upgraded from Significantly Rare in 2006 to Species of Special Concern in 2008
  - Common Tern
  - Least Tern
- Significantly Rare in NC:
  - Caspian Tern
  - Brown Pelican
- Watch List:
  - Sandwich Tern (W2 & W5)
  - Forster’s Tern (W2)

W2= Species rare to uncommon

W5 = Species with increasing amount of threats to its habitat



Suzanne E. Dorsey, Ph.D.  
Executive Director, BHI Conservancy

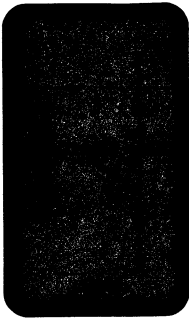


Maureen Dewire  
Senior Naturalist/Director of Education, BHI Conservancy



# Village of Bald Head Island

## CAMA Inlet Hazard Area Analysis



- DCM Staff Proposed IHA
- Existing IHA
- CAMA Static Line
- Ocean Hazard AEC Setback Boundary Lines
- Current Setback Lines (1998 Erosion Rates)





## **WILMINGTON HARBOR NAVIGATION PROJECT ENTRANCE CHANNEL MAINTENANCE DREDGING (2009)**

### **SHORELINE ASSESSMENT AT BALD HEAD ISLAND, NC**

#### **PURPOSE**

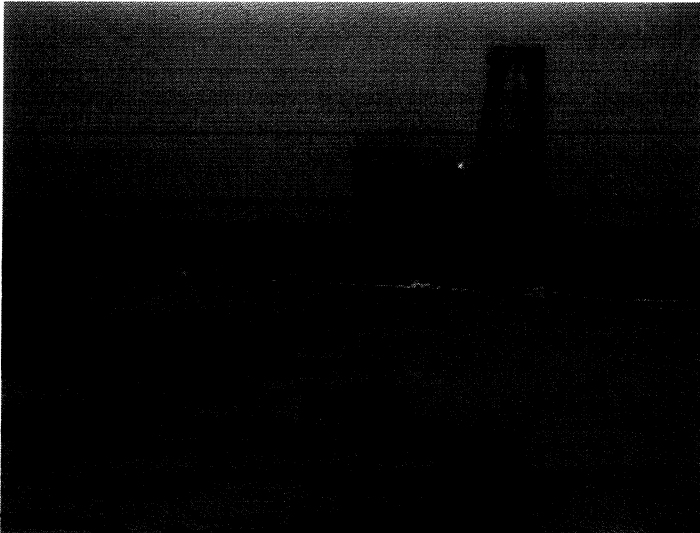
At the request of the Village of Bald Head Island Council, the coastal engineering firm of Olsen Associates, Inc. was directed to review ongoing (2009) maintenance dredging activities within the Bald Head Shoal Channel segment of work, assess associated shoreline changes and analyze potential impacts to the island shorefront over the next 6-12 months.

Recent visual daily beach erosion monitoring and reporting by Paul Hearty, Ph.D. of the Bald Head Island Conservancy during the second week of March documented rapid and direct shoreline changes at the juncture of South Beach and West Beach (the “Point”) due to the dredging of the toe. Of particular concern to the Council is the fact that all beach fill material excavated is being placed at Oak Island in lieu of the Bald Head Island shoreline. As anticipated, changes to the western limits of the South Beach shoreline, including the Point, have been rapid and easily visualized – even without the benefit of survey. This assessment is therefore in response to the Village’s concerns relating to the potential ultimate extent of shorefront impact in 2009 and possible ensuing endangerment of habitat homes, and infrastructure prior to remedial action by the Village, or the USACOE. *Figure 1* depicts the relative proximity of the dredge Illinois to the Point shoreline during Dr. Hearty’s field observations.

#### **BACKGROUND**

Since near-island federal Wilmington Harbor Navigation Deepening Project in 2000-2001, (the “Deepening Project”) we have opined on the apparent direct cause and effect relationship between excavation of the toe of the Point and rapid reshoring of that depositional

Wilmington Harbor Navigation Project  
Entrance Channel Maintenance Dredging (2009)  
Shoreline Assessment of Bald Head Island, NC

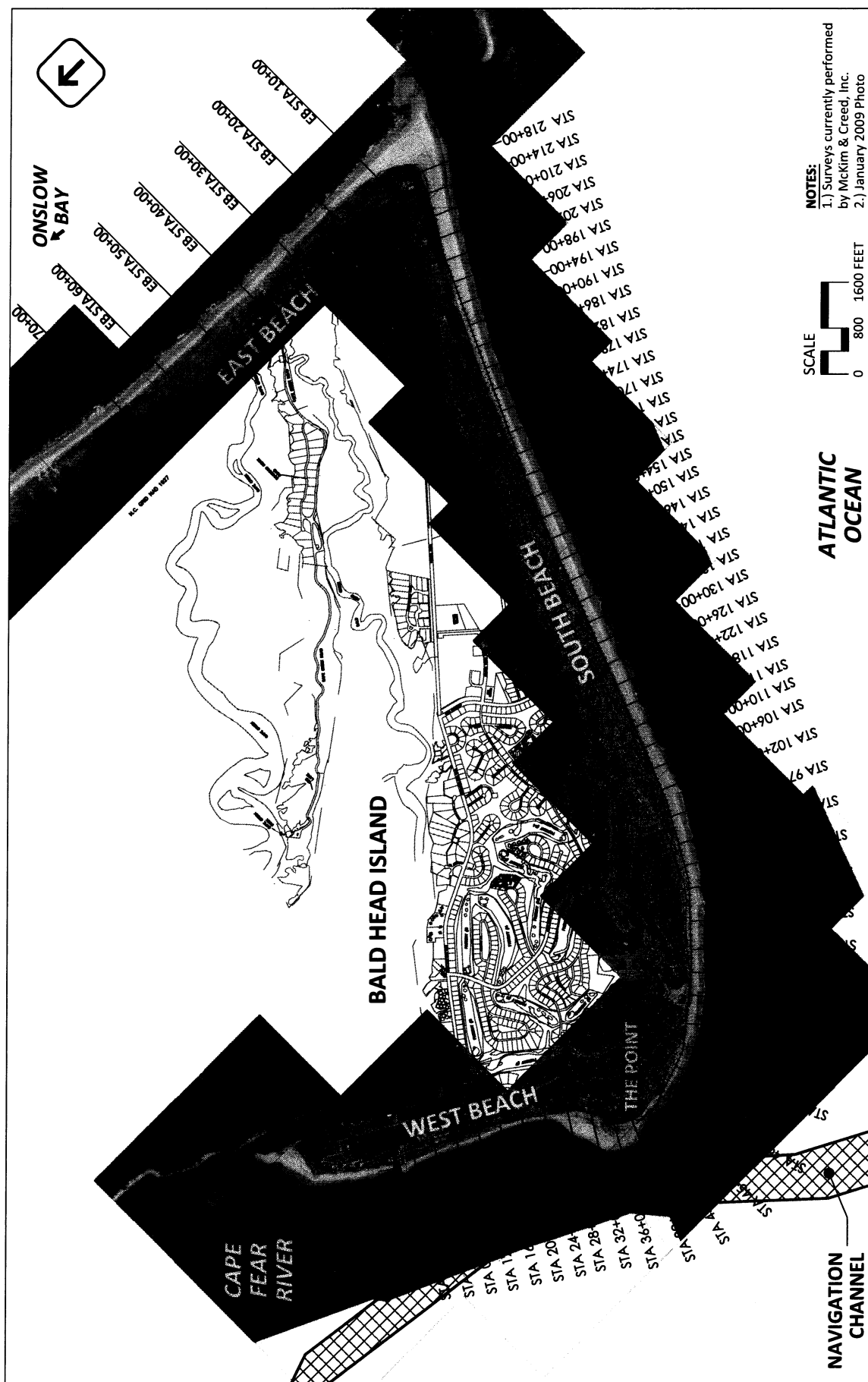


**Figure 1:** Photos of dredge operations at the Point by Dr. Paul Hearty (March 2009)

feature. It has been our continuing observation and opinion, supported by survey that the sediment constituting the reshoring at the Point derives principally from the western end of South Beach. The Wilmington District USACOE has failed to comment directly on the relationship or its implications, citing the need for completion of a federally sponsored monitoring study which was intended to cover a “6-year” (three dredging projects) maintenance cycle. Based upon the schedule of report preparation distributed by the USACOE, the study will not be available until at least April 2010. However, data and analyses associated with published federal monitoring studies to date (through September 2007), as well as those performed by the Village, can be used at this time to quantify an area of potential direct impact at South Beach associated with the original Deepening Project and subsequent biennial maintenance dredging operations in 2005 and 2007. The survey baseline for Village beach monitoring performed since 1999 is presented by *Figure 2*.

As background, the present schedule for navigation project entrance channel operation and maintenance is performed in accordance with the negotiated terms of the Deepening Project specific Sand Management Plan. Pursuant to this Plan, the strategic beneficial disposal of approximately 1,000,000 cubic yards of beach compatible sediment is to occur on the adjacent barrier island beaches every two years. The division of sand to be derived from future channel maintenance was based upon pre-project computed alongshore littoral transport rates and *not* predicted impacts to the abutting shorefronts of either Oak or Bald Head Island. As such, the Plan addressed an initial 6-year maintenance cycle premised on a 2:1 ratio, with two-thirds of the sand going to Bald Head Island and the remaining one-third to Oak Island/Caswell Beach. Correspondingly, the Plan called for the first two maintenance dredging operations (*i.e.*, at year 2 and year 4) to be placed on Bald Head Island with the last disposal event at Oak Island. The ongoing 2009 disposal operation at Oak Island/Caswell Beach completes the first “6-year” cycle.

The first official post-construction entrance channel “maintenance” event was accomplished between November 2004 and January 2005. At that time, Bald Head Island received approximately 1.217M cubic yards of beach quality sediment which was placed along the South Beach shorefront. Similarly, between February and April 2007 (*i.e.*, the second



scheduled maintenance operation), Bald Head Island received approximately .98M cubic yards again along South Beach. Presently, it is anticipated that up to 1.12M cubic yards will have been placed at Caswell Beach between February and April 2009. This work is ongoing with the channel dredging and beach disposal being performed by the Corps' contractor Great Lakes Dredge and Dock Co.

It is important to note that in early 2005, the Village of Bald Head Island repaired a 16-structure sand tube groinfield along the western end of South Beach. The repaired structure groinfield was designed to reduce beach fill losses and associated rate of re-entrainment of sand by the federal navigation project. Monitoring programs implemented by the Wilmington District, USACOE and the Village of Bald Head Island have both documented the beneficial effects of the groinfield with respect to the global erosion of the western half after the last two (2) maintenance disposal projects – particularly in comparison to losses experienced after the 1.85M cubic yard fill which resulted from navigation channel deepening, widening and realignment. The latter large scale sand placement operation occurred in 2001 – *prior* to groinfield repair by the Village.

Although the sand tube groinfield has provided significant net benefit to the overall South Beach “average” erosion condition, it has *not* been sufficient to offset certain *recurring* localized effects which in all probability result from the biennial destabilization by dredging and subsequent equilibration at the base of the Point. Sand necessary for the Point feature to re-establish itself tends to derive principally from the active beach profile along the westernmost segment of South Beach. At the Point, the slopes of the depositional terminus of the island overlap with the authorized limits of the federal navigation project. While some “conflict” may have existed since the 1970's, it has been greatly exacerbated by the Deepening Project. At the critical juncture between island and channel, the navigation fairway was both widened and deepened. Hence, the magnitude of erosional response after each dredging event since 2000 is larger than those of the past and therefore more easily quantifiable.

Monitoring studies by Olsen Associates, Inc. for the Village of Bald Head Island have observed a direct cause and effect relationship between the dredging of the toe of the Point,



relatively rapid reshoring of that depositional feature and the source of sediment constituting a large portion of the shoal material. During the last two (2) maintenance dredging projects (*i.e.*, 2005 and 2007), the reshoring at the base of the Point has occurred quickly *but* much of the adverse effect on the directly abutting section of South Beach shoreline has been “masked” by the sand placement operation. Hence, *critically* eroded shoreline conditions failed to appear between disposal events on South Beach in 2005 and 2007. As of November 2008, Village monitoring surveys have documented a highly stressed section of shoreline which is beginning to evolve immediately eastward of Sta 43+00, mol. (see *Figure 2* and *Appendix A*).

This year (2009), the Bald Head Island shorefront is not designated for sand placement to mitigate accelerated sand losses from both its beach and nearshore zone after, or concurrent with the scheduled dredging event. For this reason, it has been hypothesized that annualized net sediment losses in this “out year” for sand disposal will be so great and spatially impactful to the western end of South Beach that a compensating large scale beach restoration project must be performed to both re-establish a base project and mitigate problematic erosional conditions. The area of pending worst impact will be the segment of shorefront synonymous with the westernmost eight (8) to ten (10) groins, mol. In addition, the Point itself will experience a change in configuration (*i.e.*, retraction in effective length and width). At this location, it is also expected that beach deflation will cause a sand tube revetment to become exposed and that numerous sand tube groins will fail due to both significant exposure and destabilization during storms. The Village is therefore concerned that upland damages may occur during periods of elevated wave energy associated with tropical storms, hurricanes, or the 2009 nor’easter season.

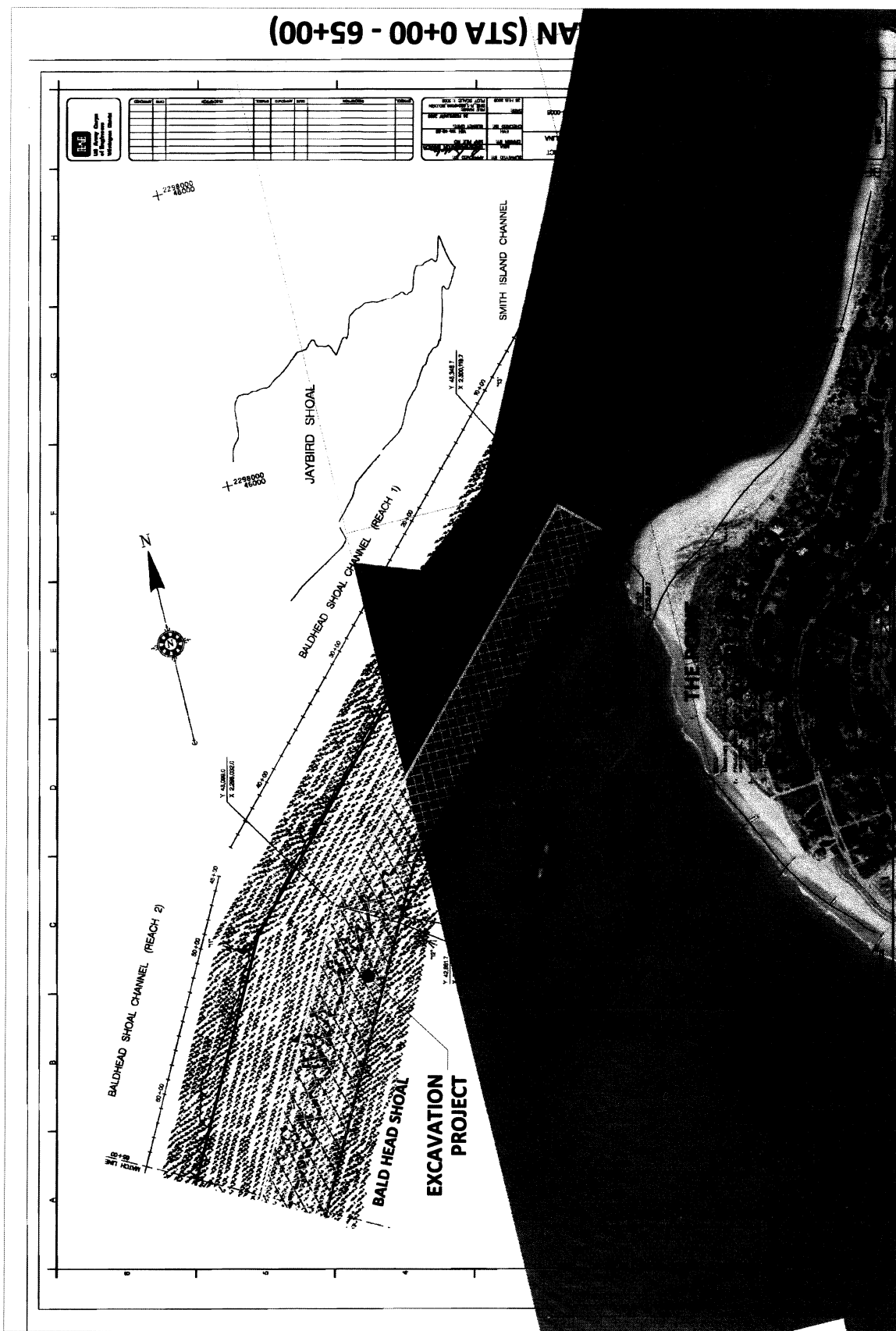
Reviewing the data collected and surveys since 1999, the Village anticipated that some form of additional sand re-nourishment would be needed to prevent catastrophic upland losses. Because the USACOE continued to refuse to take a position on the cause of the impacts to South Beach until completion of the 6-year study, the Village applied for a 404 permit to supplement the beach nourishment by borrowing sand from Jay Bird Shoals. The ideal construction window for a supplementary beach fill project at Bald Head Island would have been the winter of 08/09. The permitting of that private project has unfortunately experienced a major delay. Should

permits not be issued before mid-2009, project construction may not be feasible during the winter of 09/10. Under this scenario, significant irreparable damage is predicted to occur along portions of the westernmost segment of South Beach.

As a result, the Village Council has requested a description of the pending problem, an assessment of impact probability and the identification of quantifiable alternative actions (near- and long-term) suitable for immediate discussion with the Wilmington District USACOE. The WHSMP specifically addresses the obligation of the federal and state government to mitigate navigation project damages to Bald Head Island.

## IMPACT SOURCE ASSESSMENT

**Overview** – Prior to this year’s biennial maintenance dredging, condition surveys performed by the Wilmington District indicated that, the “toe” of the Point (*i.e.*, the intersection of the island’s riverfront beach slope at that location and the navigation channel floor) overlapped by approximately 500-ft, mol (see *Figure 3*). This phenomenon reoccurs in the same relative manner and location every 24 months at which time a dredge excavates the “conflict”. In so doing, the dredger is required to box-cut the island toe outside the channel fairway at some location within the intersecting slope. This type cut is necessary in order for the contractor to meet the District’s design requirements which address *both* channel fairway width and side slopes (after equilibration) – estimated to extend outward at a ratio of 1:5 (vertical to horizontal). This requirement necessitates a substantial vertical cut some 100-ft or more outside the channel fairway within the base or toe of the island. Experience with infilling at this location indicates that in order to maintain a dredged configuration sufficient to allow after-dredging (AD) surveys to be performed documenting compliance with the design documents, the contractor must operate (*i.e.*, swing the dredge cutterhead) beyond the limits of theoretical box-cut. That is to say, the contractor’s box-cut must be sufficiently wide to assure documentation of compliance with the contract design documents in an environment of rapid reshoring. Hence, the width of dredging must generally be *conservative*, otherwise redredging is necessary. As expected, there is no contractual limit in the design documents limiting the amount of over dredging required to meet grade – for acceptance and payment. Short term post-excavation effects at this location



**January 2009 Photo**

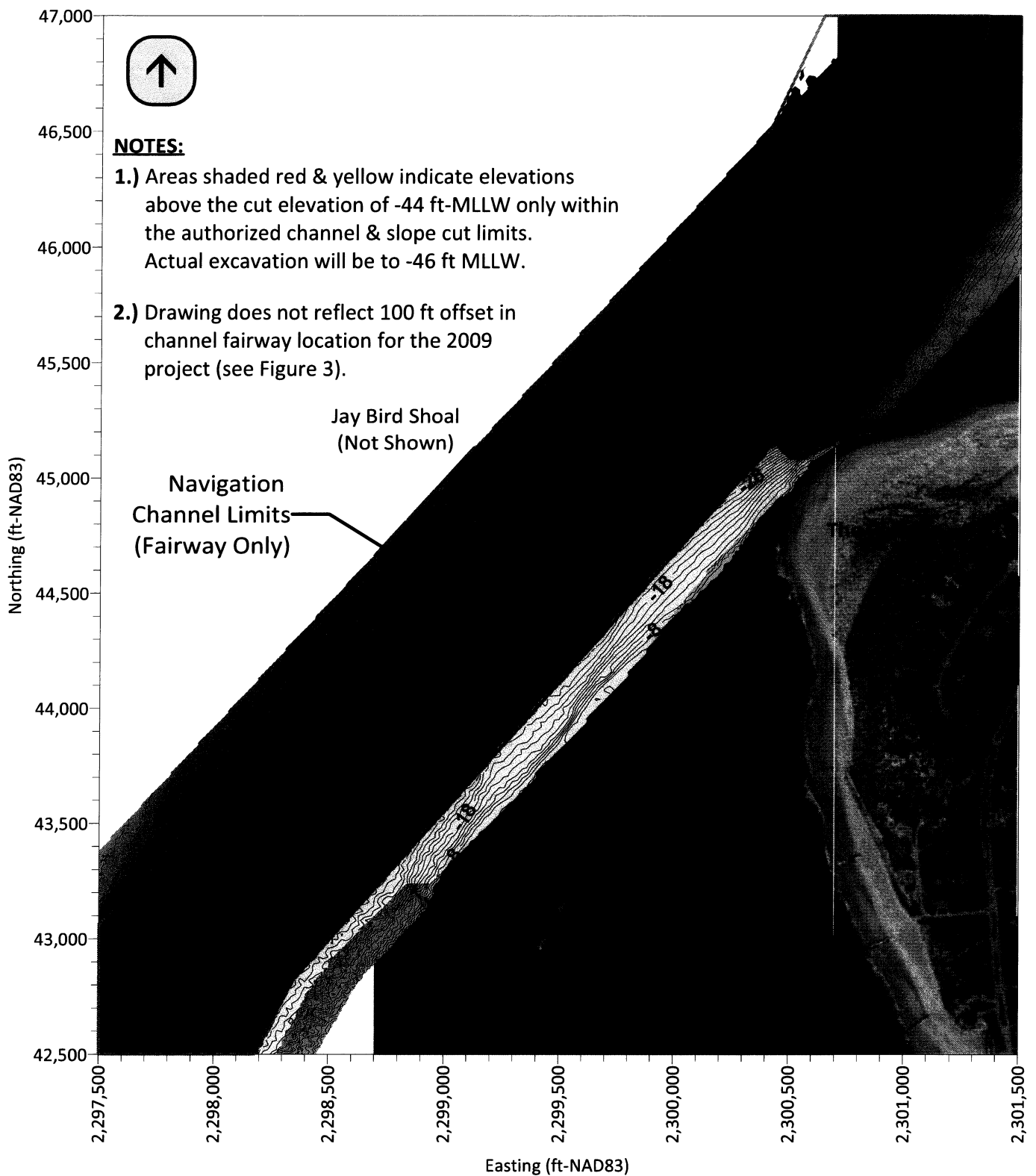


**FIGURE 3**

manifest themselves in an immediate visible response of the Point shoreline, as was photographically documented by Dr. Hearty at the inception of dredging earlier this month. Longer term (months to a year) effects are generally documented in the response of the South Beach shorefront and nearshore beach profile which must recede and erode to provide the *sacrificial* sand necessary for reconstitution of the excavated slope of the Point.

**Locations of Channel Shoaling** – The principal destabilizing segment of the entrance channel maintenance dredging operation under consideration is shown by *Figure 4*. Although the portion of channel to be excavated where existing water depths are less than authorized for commercial navigation (at -44 ft) are denoted in red, the actual *minimum* extent of work which includes the requisite channel side slopes is denoted by yellow. As discussed above, this limit is both theoretical *and* somewhat conservative due to the contractor's requirement to sufficiently box-cut this channel segment in order to meet post-dredging survey acceptance requirements. With this said, it is acknowledged that for the past two dredging contracts, the Wilmington District has set back the design channel limits (by 100-ft) from its maximum authorized extent in order to attempt to reduce the destabilization effect (see *Figure 3*). Apparent limitations of the depth of cut in the actual slope itself are also evident in a contractor's Cut Chart for the dates March 3-7. Although such minor modifications to the work limits are being pursued in good faith by the Wilmington District, in all probability they will result in little overall net benefit to the updrift South Beach shorefront where sediment is lost in the process of supplementing the requisite sand supply to the Point during its period of recovery. Re-establishment of the excavated channel slopes essentially begins immediately upon excavation. Pragmatically, there is therefore little near-term *operational* relief from this predictable direct impact other than the cessation of maintenance dredging at this location in the future, or a movement of the navigation channel limits westward away from Bald Head Island. However, an obvious *management* alternative is the placement of sand at Bald Head Island during *every* maintenance dredging cycle in the future.

For the 2009 maintenance dredging project, there are two relatively distinct zones of beach quality sediment deposition to be addressed by the contractor within the Bald Head Shoal



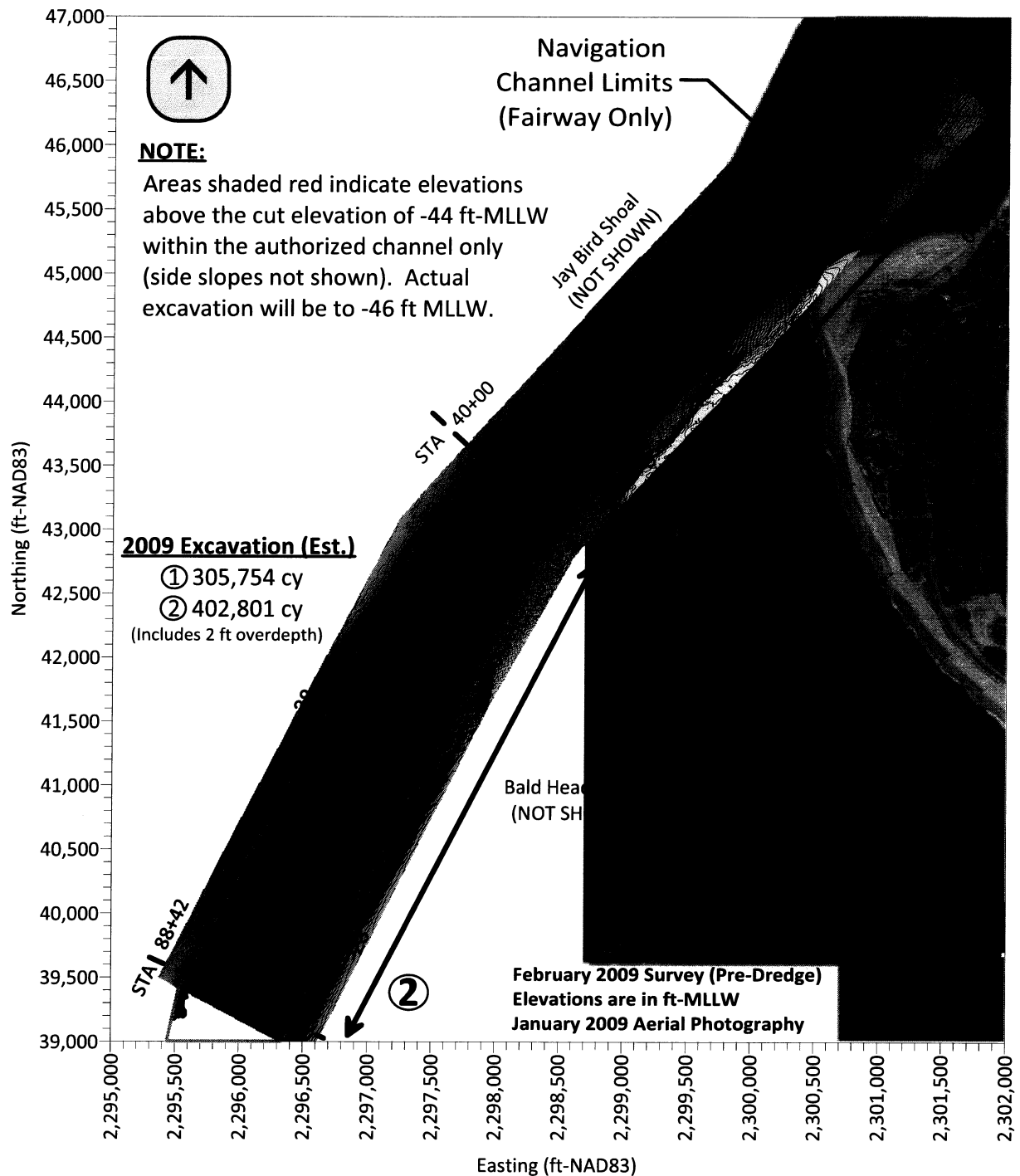
**Figure 4:** Location of 2009 authorized channel fairway and side slope excavation near the Point at Bald Head Island.

segment of the work (*i.e.*, Channel Sta 14+00 and Sta 88+00, mol). For that segment, it is estimated that the maximum contract pay volume at that location is approximately 708,000 cubic yards (including over-depth). Of this amount some 306,000 cubic yards of material is associated with shoaling near the Point, mol (see *Figure 5*). The remainder, 408,000 cubic yards is material transported from Bald Head Shoal directly into the eastern side of the channel fairway (ref. *Figure 5*). To the north of Bald Head Island within the Smith Island Channel Range (*i.e.*, Sta 0+00 – Sta 51+88, mol) lies the remainder of the tentative 2009 dredge contract volume, *i.e.*, slightly over 400,000 cubic yards. That material derives from sediment principally driven into the section of the channel from the shallow environs of Middle Ground. The latter shoal lies northward of Jay Bird Shoal and extends almost to Oak Island. Bald Head Shoal, Jay Bird Shoal and Middle Ground essentially comprise the ebb tidal platform of the Cape Fear River – as it exists today (post-navigation project).

**Location of Impact** – An examination of both federal and Village sponsored monitoring program data depict a segment of South Beach shoreline which is presently *more eroded* today than it was prior to the placement of the 1.85M cubic yards of sand from the widening/deepening project in 2001. This is in addition to subsequent 2005 – 1.217M cubic yard and 2007 – .98M cubic yard sand placements along South Beach.

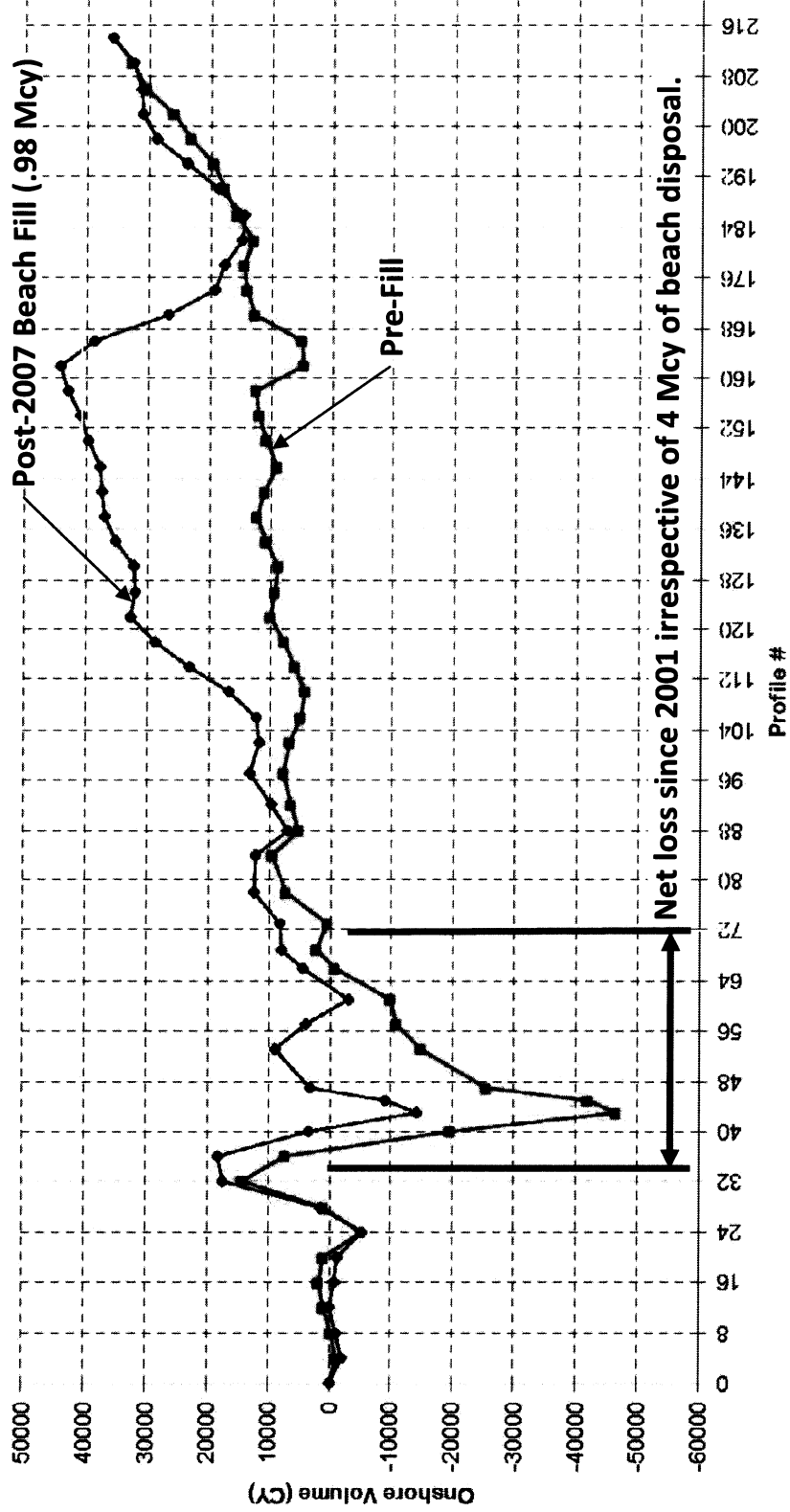
For example, *Figure 6*, is excerpted from the last published federal monitoring report (USACOE, April 2008). The data represented therein address beach changes only through September 2007. The January depicted 2007 volume change curve represents an area of *net* erosion (greater than documented *prior to* the original 1.85M cubic yards fill in 2001) extending from monitoring Sta. 38+00 to Sta. 65+00, mol. on South Beach. This presentation portrays beach profile volume above -2 ft NGVD, *i.e.*, approximately MLW. This overly eroded “hot spot” was delineated by this monitoring report immediately *prior* to the 2007 biennial beach disposal project.

Similarly, Village shoreline monitoring data (through November 2008), document upper beach *net* erosional conditions (beyond that existing prior to the 2001, 1.85M cubic yard fill) between Sta.s 043+47 and 065+50. The supporting data is presented in *Appendix A* and includes



**Figure 5:** 2009 Shoaling (to -44 ft-MLLW) and maintenance dredging locations, Bald Head Shoal Channel Sta 0+00 to Sta 88+42.

**Wilmington Harbor Monitoring - Bald Head Island**  
**Beach Profile Volume Change since the Start of Monitoring (August/September 2000)**  
**Onshore Volumes above -2-ft NGVD**



USACE Monitoring Report No. 5

January 2007 — July 2007

**Figure 6: Zone of net loss since 2001 Beach Disposal Activities by USACE.**



the most recent surveys reflecting beach conditions 17-months subsequent to the 2007 beach disposal project. Survey data scheduled to be acquired for the Village monitoring program in May of 2009 (after the ongoing channel maintenance dredging program) is expected to show an expansion of this erosional “hot spot” – predominantly in an easterly direction. It is this predicted loss of protective beach width which will again re-expose the presently buried sand tube revetment which extends approximately from baseline Sta. 60+51 to Sta. 71+00. Immediately upland of the tube revetment lies the roadway and subgrade utilities. In November of 2003 the USACOE was unable to proceed with the scheduled first maintenance cycle of the SMP because of the lack of funding. Without this re-nourishment of South Beach, December and January storms caused destruction of both the road and other buried infrastructure in the road right of way, thereby necessitating emergency sand tube placement in an attempt to limit upland damages. It should be noted that several residences lie westward of the terminus of the revetment and are vulnerable to upland erosion and particularly if the sand tube groinfield becomes compromised over the next few months as the beach continues to recede and deflate – without the benefit of biennial sand placement.

## **SUMMARY AND CONCLUSIONS**

- 1) Critically eroded conditions along the western end of South Beach between 2005 and the present have been largely “masked” by two (2) beach disposal operations at that location totaling over 2.2M cubic yard (*i.e.*, 1.217M cy in 2005 and .98M cy in 2007). In February – April 2009, approximately 1.12M cubic yard of sand is being removed from the navigation project and placed on Oak Island/Caswell Beach. The next tentatively scheduled similar beach disposal event at Bald Head Island will not occur prior to 2011.
- 2) The ongoing channel maintenance dredging operation will excavate some 300,000 cy from the base of the Point and the area immediately southward thereof. Re-establishment of the “shoal” dredged from the channel limits at that location will begin immediately thereafter. Observations of Dr. Paul Hearty in the second week of March documented losses along portions of the Point shoreline occurring simultaneously with the dredging operation by the Corps’ contractor Great Lakes Dredge and Dock Co.

- 3) It is relatively well documented (by survey) that the source of sediment for the rapid reshoring of the Point will occur from the beach and nearshore environs of the westernmost segment of South Beach. At that location, the *currently* stressed shorefront extending from baseline Sta. 42+00 to approximately Sta. 65+00, mol. will continue to be heavily impacted by erosion. This phenomenon will expand principally in an easterly direction as available sand is diminished in that erosion zone. As the MHWL recedes to the limits of a buried sand tube revetment and as the overall beach innertidal platform deflates, numerous sand tube groins will eventually fail – thereby exacerbating the problem. As a result, both residential structures and infrastructure will be threatened. The occurrence of elevated periods of wave energy concurrent with tropical storms, hurricanes, or nor'easter's will in all probability result in property damage.
- 4) The Village of Bald Head Island recognized several years ago that an interim sand placement project may be inevitable during the “out” years where sand is placed at Oak Island/Caswell Beach pursuant to the terms of the existing Wilmington Harbor Sand Management Plan. Accordingly, studies and investigations were initiated in 2006 for such a purpose. The anticipated interim effort was estimated as a 1 to 2M cubic yard designed beach fill. Unfortunately, permitting of the requisite project has been delayed by a year during the regulatory review process. Unless the permits for the subject improvements are granted by June 2009, it may not be possible to construct an interim project over the winter of 09/10. Under such a scenario it is highly probable that the westernmost segment of South Beach and the adjoining upland amenities will suffer irreparable damage.
- 5) Barring an immediate modification of the ongoing COE channel maintenance contract with some level of interim sand placement on South Beach from the Bald Head Shoal portion of the remaining work, there are no large scale sources of sediment available to offset sediment losses this year originating with the excavation of the Point. Re-establishment of this federally designated “shoal” is estimated to require some 200 – 300,000 cubic yard of immediate direct mitigation along the westernmost segment of South Beach to protect upland

properties – even without the probable occurrence of the sources of elevated storm erosion noted above.

- 6) At this juncture in the implementation of the WHSMP it would appear imperative that future changes to either the navigation project design, or the Plan, or both must be considered by the USACOE, the State and the local government Stakeholders. The tenets of sand division addressed by the original Plan were not derived on the basis of estimated or documented “damage” – for obvious reasons. Rather, the 2:1 ratio of biennial sand placement operations over a 6-year maintenance cycle were predicated upon theoretical estimates of alongshore sediment transport at Oak Island and Bald Head Island.
- 7) It can be reliably concluded that there is little near-term project related *operational* relief from both historically documented (and pending) direct impacts to Bald Head Island other than the cessation of maintenance dredging at and near the Point in the future, or the movement of the channel fairway away from the Point. An obvious *management* alternative is the recognition of impact associated with channel maintenance and the requisite placement of suitable volumes of sand at Bald Head Island during every channel maintenance dredging cycle in the future as mitigation.
- 8) The final 6-year cycle monitoring analysis of project impacts by the USACOE will not be completed until at least April of 2010. On the basis of 5-years of comprehensive monitoring data and the pending documentation of accentuated erosional stress and shoreline damages along South Beach over the next 6-months, mol. – by both the Village and the Federal government – there is no apparent reason to delay a critical analysis of the operational and sand management actions noted above. It would appear that time is of the essence in this regard.

  
Erik J. Olsen, P.E.  
N.C. #15626

  
Olsen Associates, Inc.  
C.O.A. #00001468

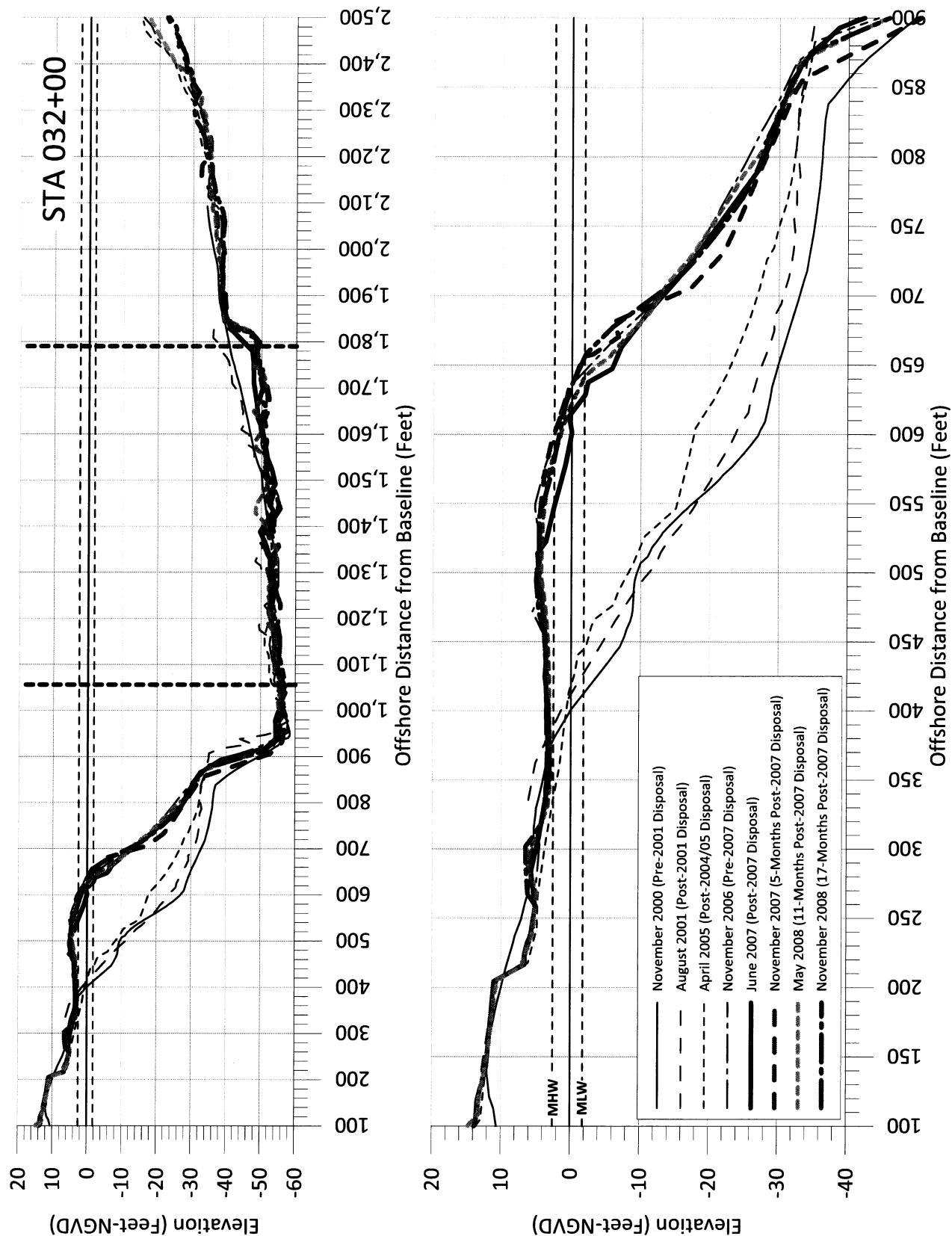
**APPENDIX A – VILLAGE MONITORING PROGRAM SURVEY PROFILES  
STA. 032+00 – STA. 65+50 (INCLUDING NOVEMBER 2008)**

## APPENDIX A

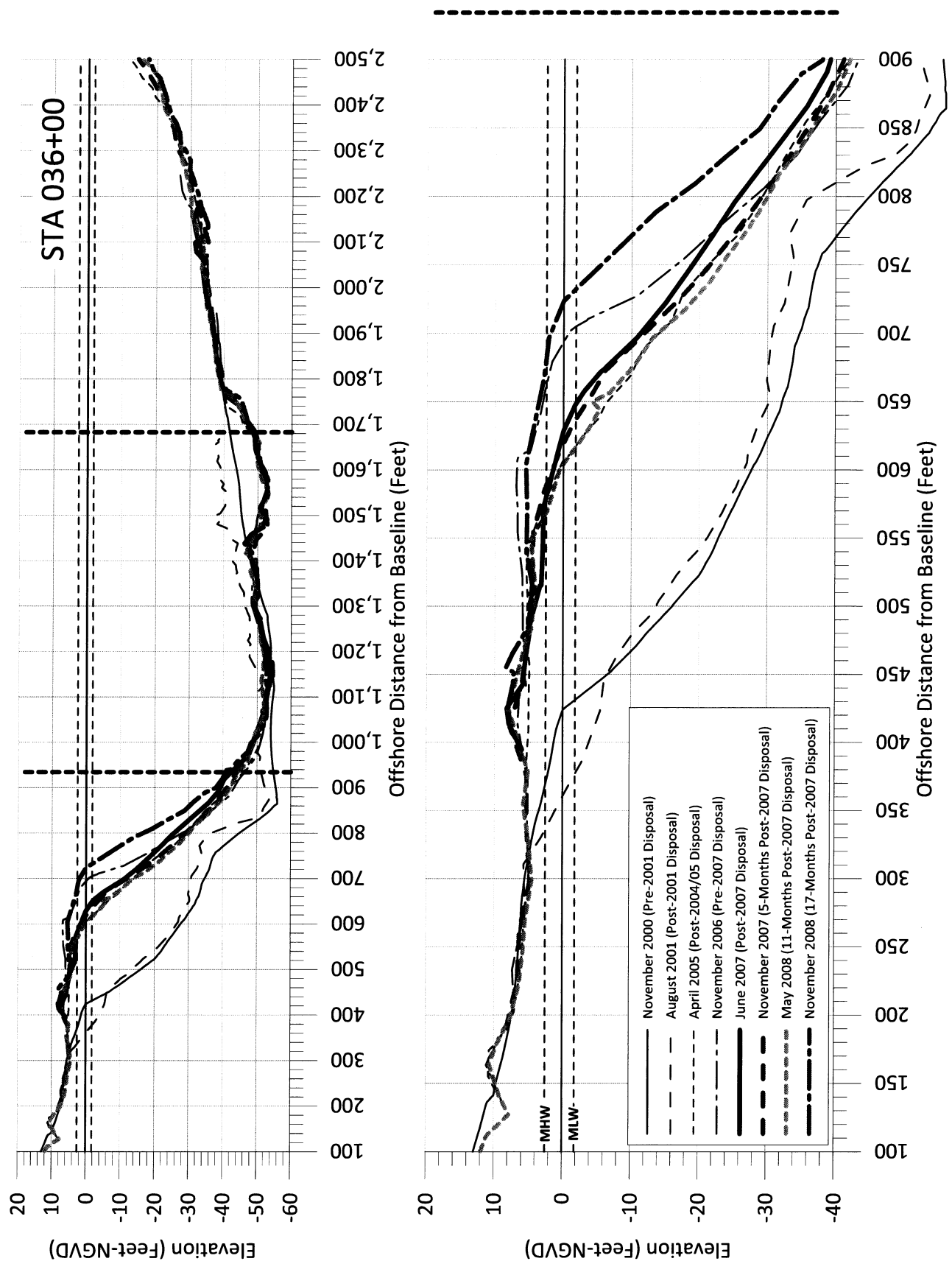
### NOTES FOR INTERPRETING SURVEY DATA

- 1) The navigation channel fairway (*i.e.*, bottom width without side slopes) is delineated on those profiles where intersection occurs. Many intersections are oblique.
- 2) The Village survey profiles are relative to a NGVD 29 datum. The COE design is relative to MLLW.
- 3) The minimum authorized depth of excavation is -44 ft MLLW (or -46 ft NGVD). The maximum contract depth of excavation for pay is -46 ft MLLW (-48 ft NGVD). Note – to achieve the pay volume associated with the -46 MLLW elevation, the contractor must typically dredge lower than that elevation to assure compliance by check survey.
- 4) The COE contract necessitates the creation of a channel side slope from the base of fairway at -48 ft NGVD westward at a ratio of 5:1 (horizontal to vertical). The contract dredge must therefore box-cut the existing Point slope in such a manner that the 5:1 slope exists – after equilibration. The excavation must be verified by after-dredge survey. Hence, the cut must be conservative – otherwise re-dredging is typically required to meet the design grade.
- 5) A definitional sketch of the required dredging methodology follows as “Example A”.
- 6) For purposes of presentation, all horizontal and vertical graphic scales are “distorted”, *i.e.*, they are different.



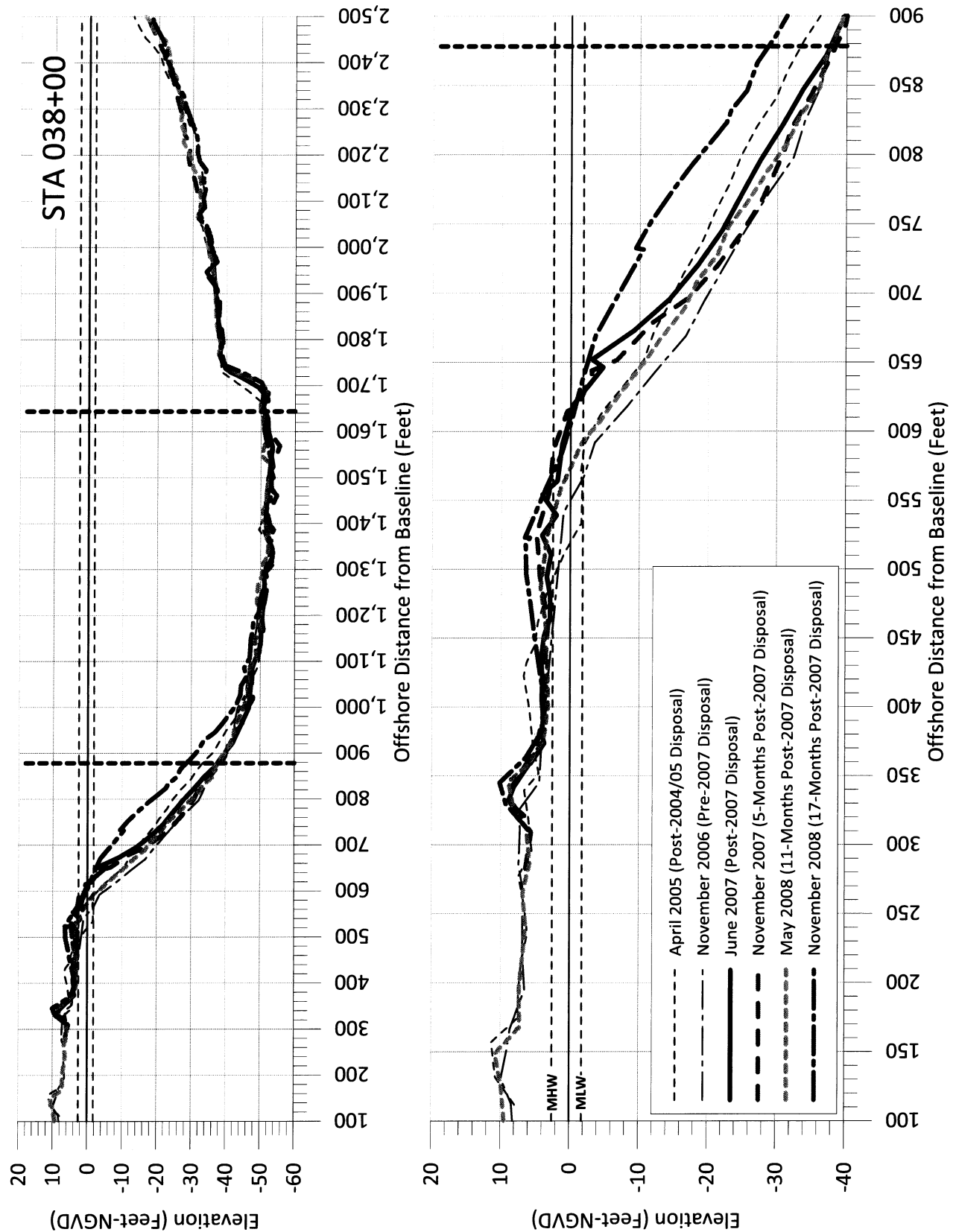


**Figure A-1:** Measured beach profiles at baseline station 032+00, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)

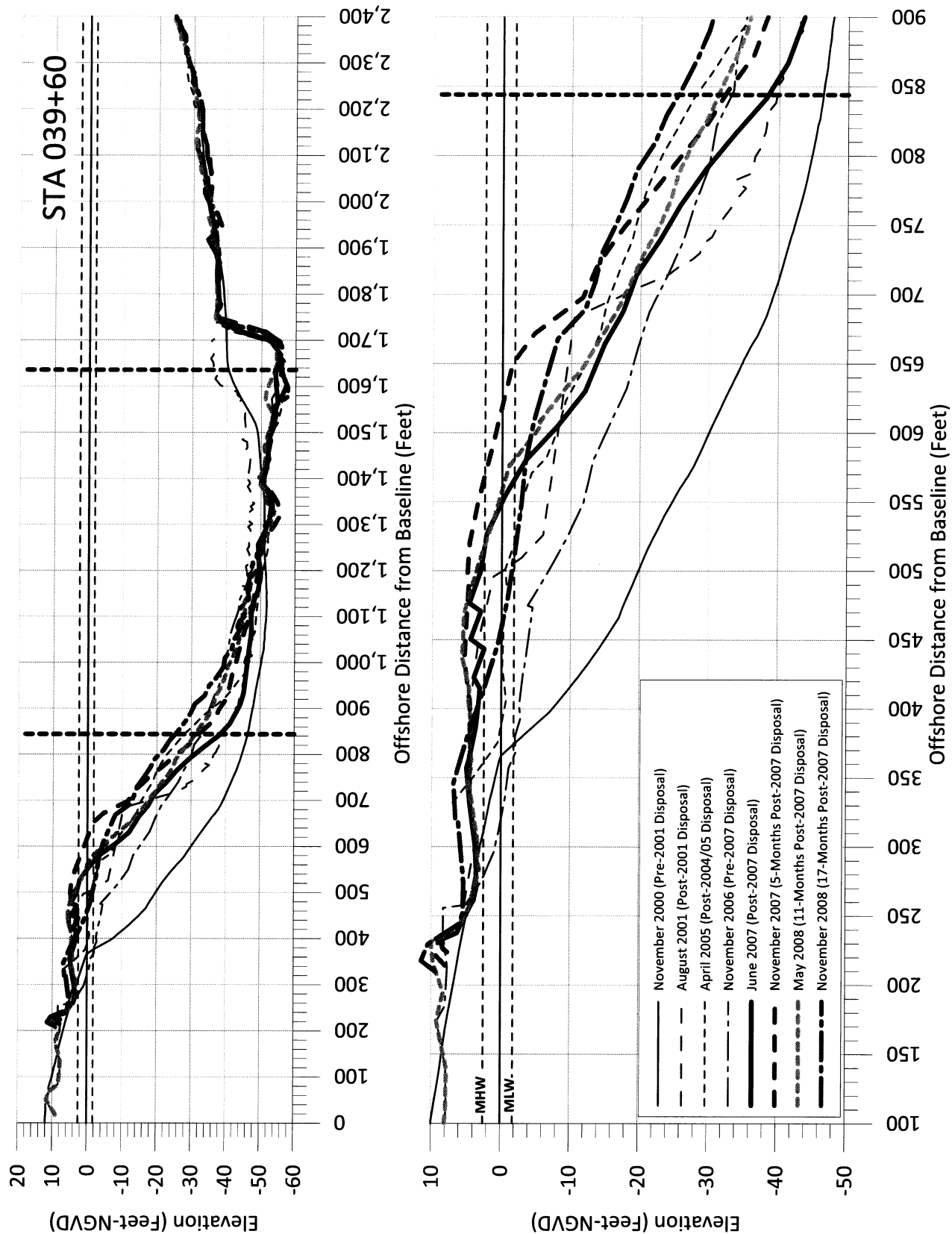


**Figure A-2:** Measured beach profiles at baseline station 036+00, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)

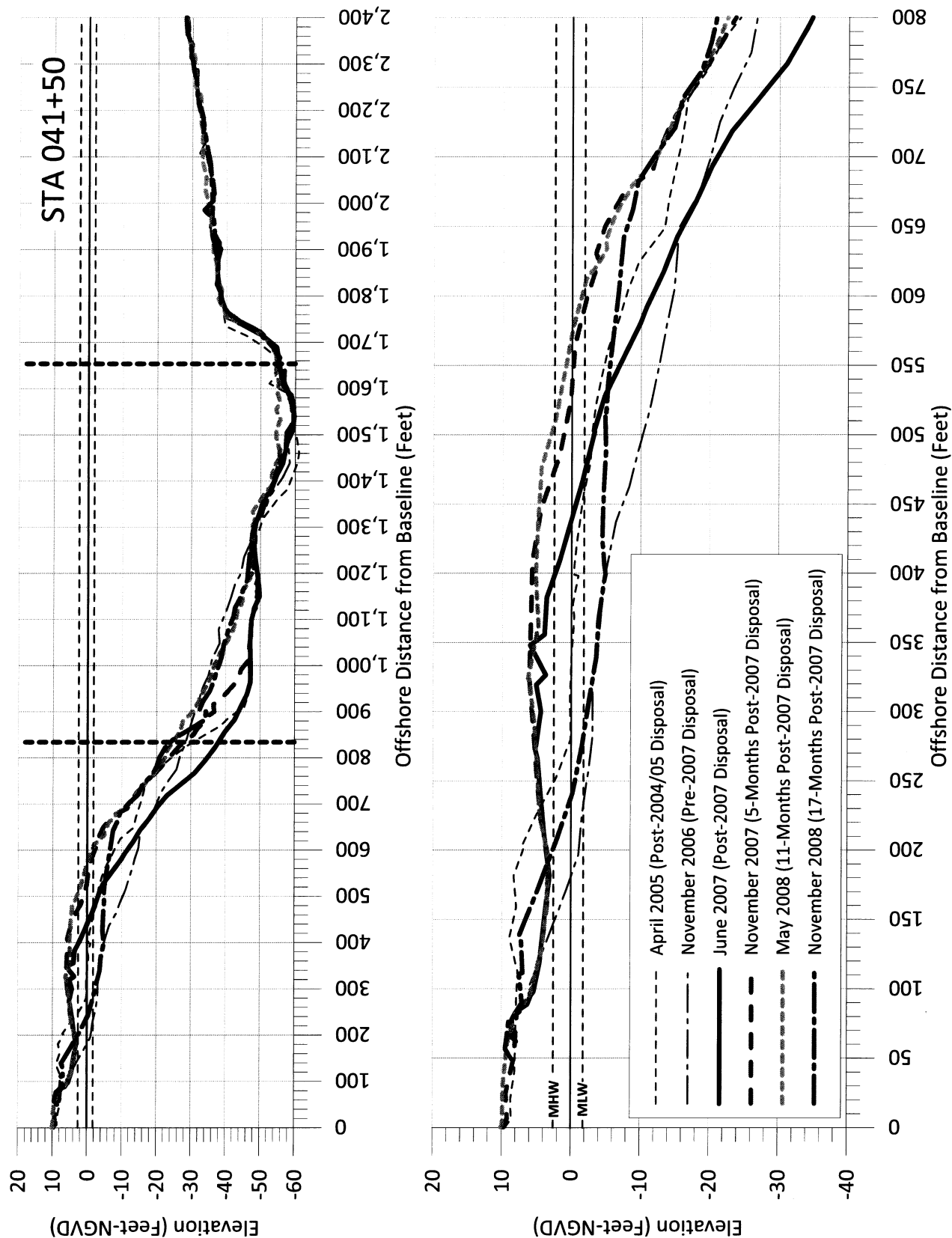




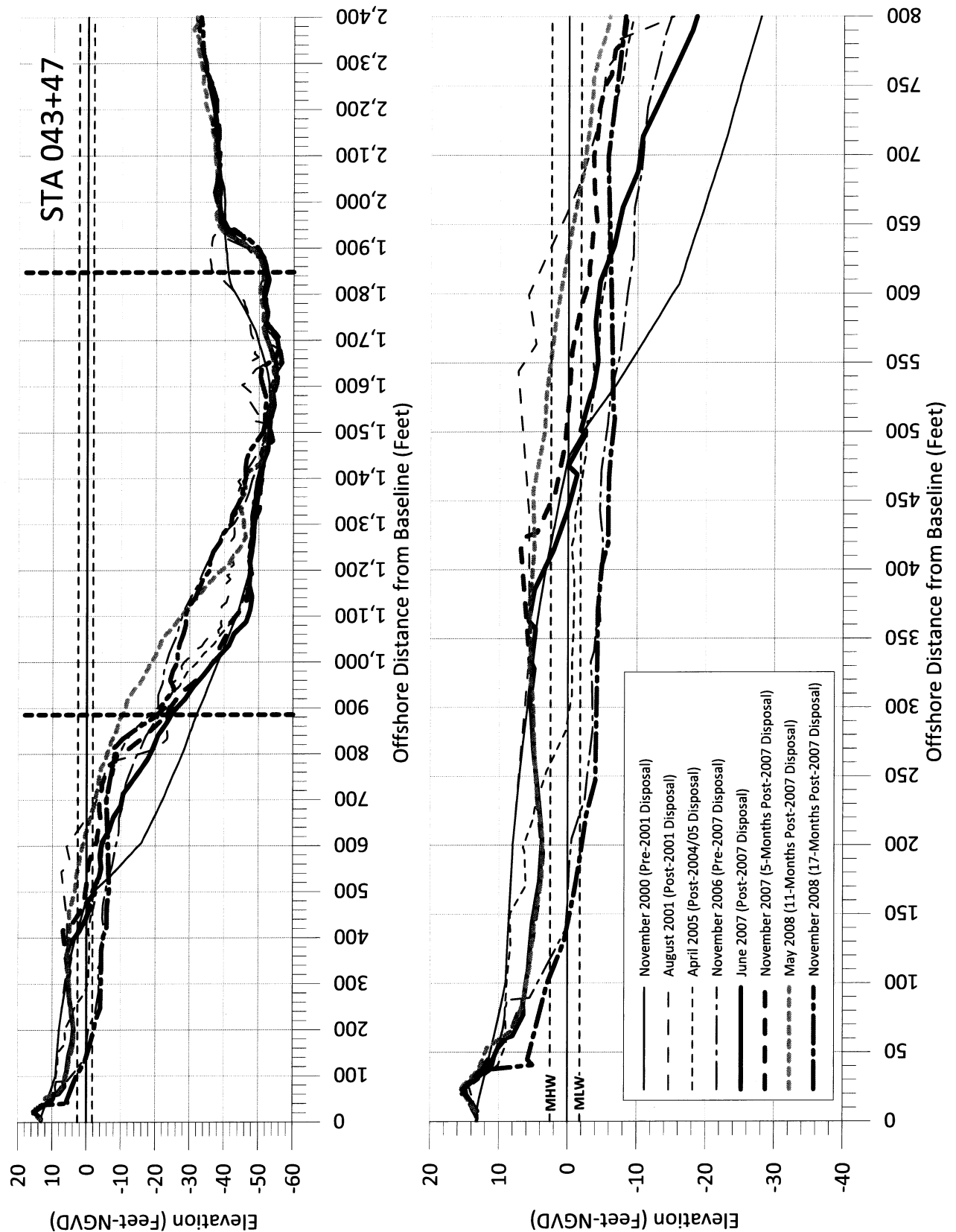
**Figure A-3:** Measured beach profiles at baseline station 038+00, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)



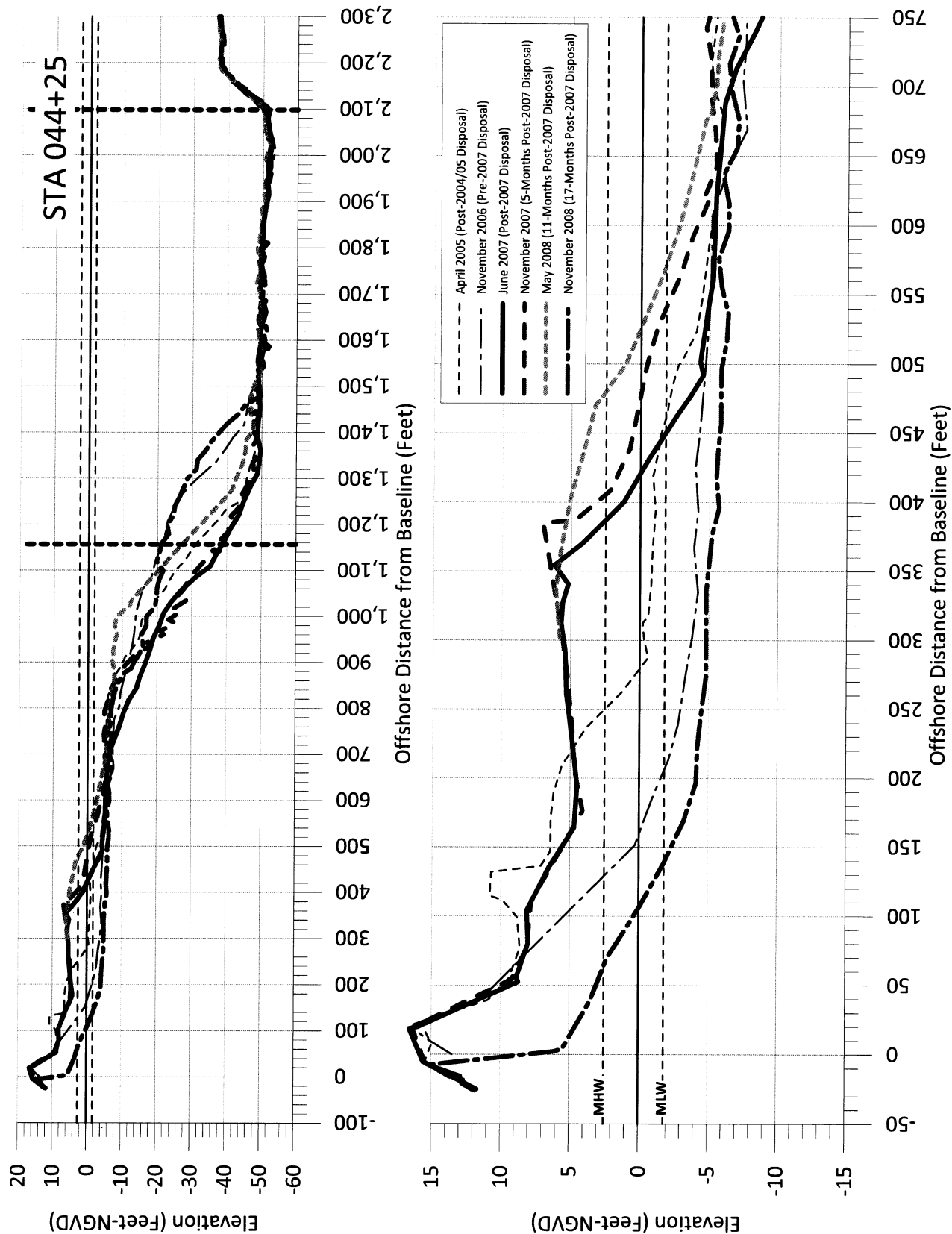
**Figure A-4:** Measured beach profiles at baseline station 039+60, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)



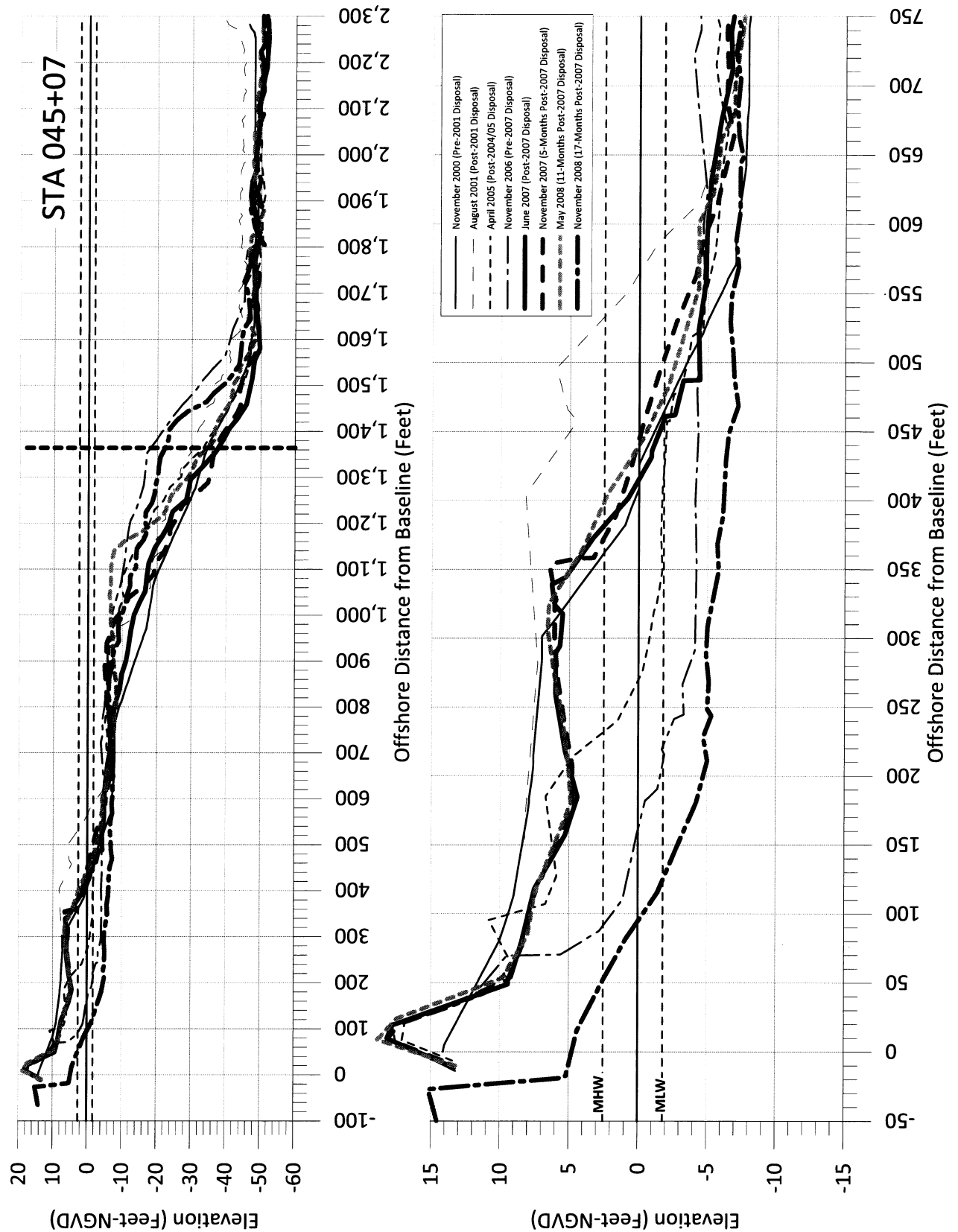
**Figure A-5:** Measured beach profiles at baseline station 041+50, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)



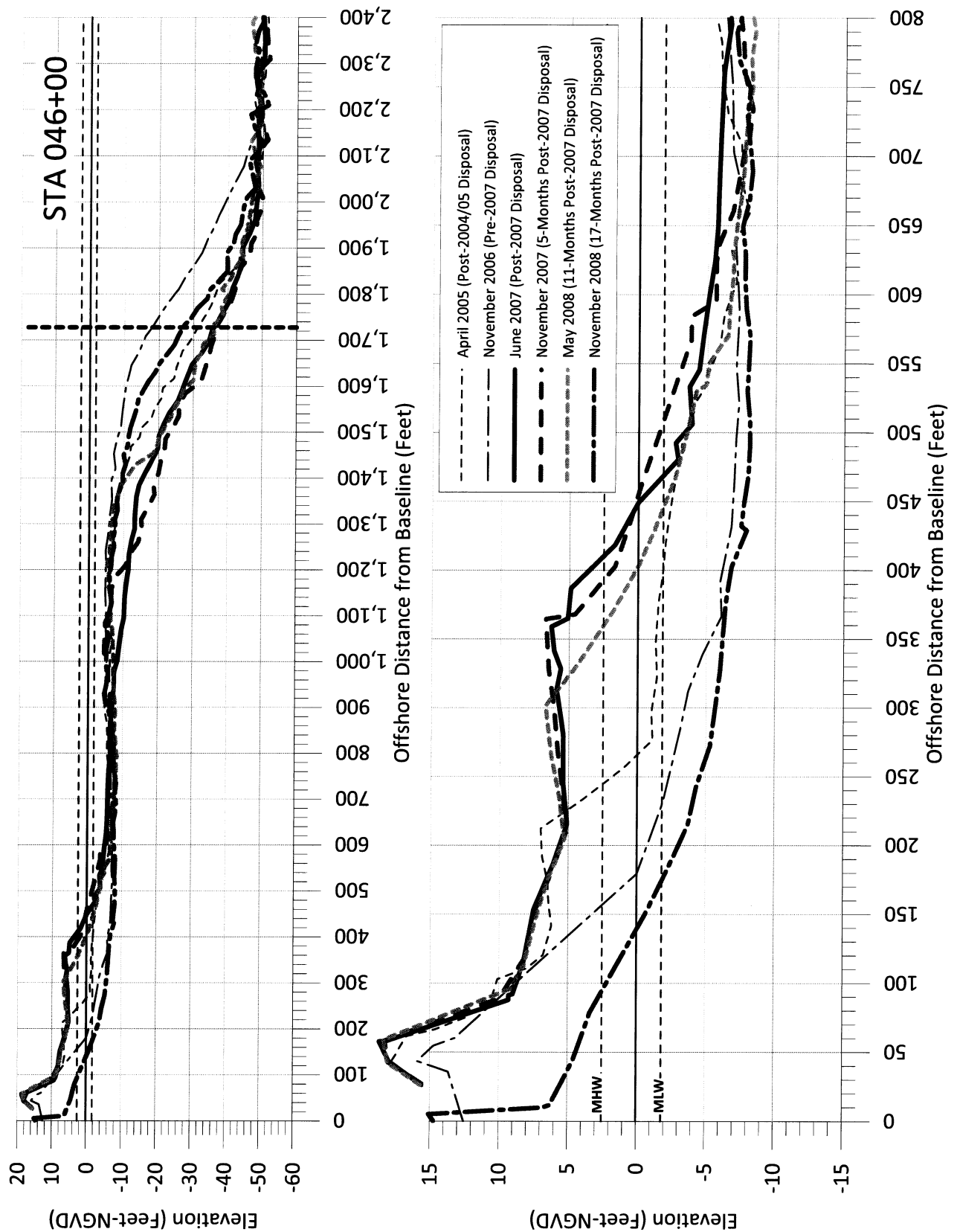
**Figure A-6: Measured beach profiles at baseline station 043+47, Bald Head Island, N.C.**  
(Vertical dashed lines indicate physical limits of authorized navigation channel)



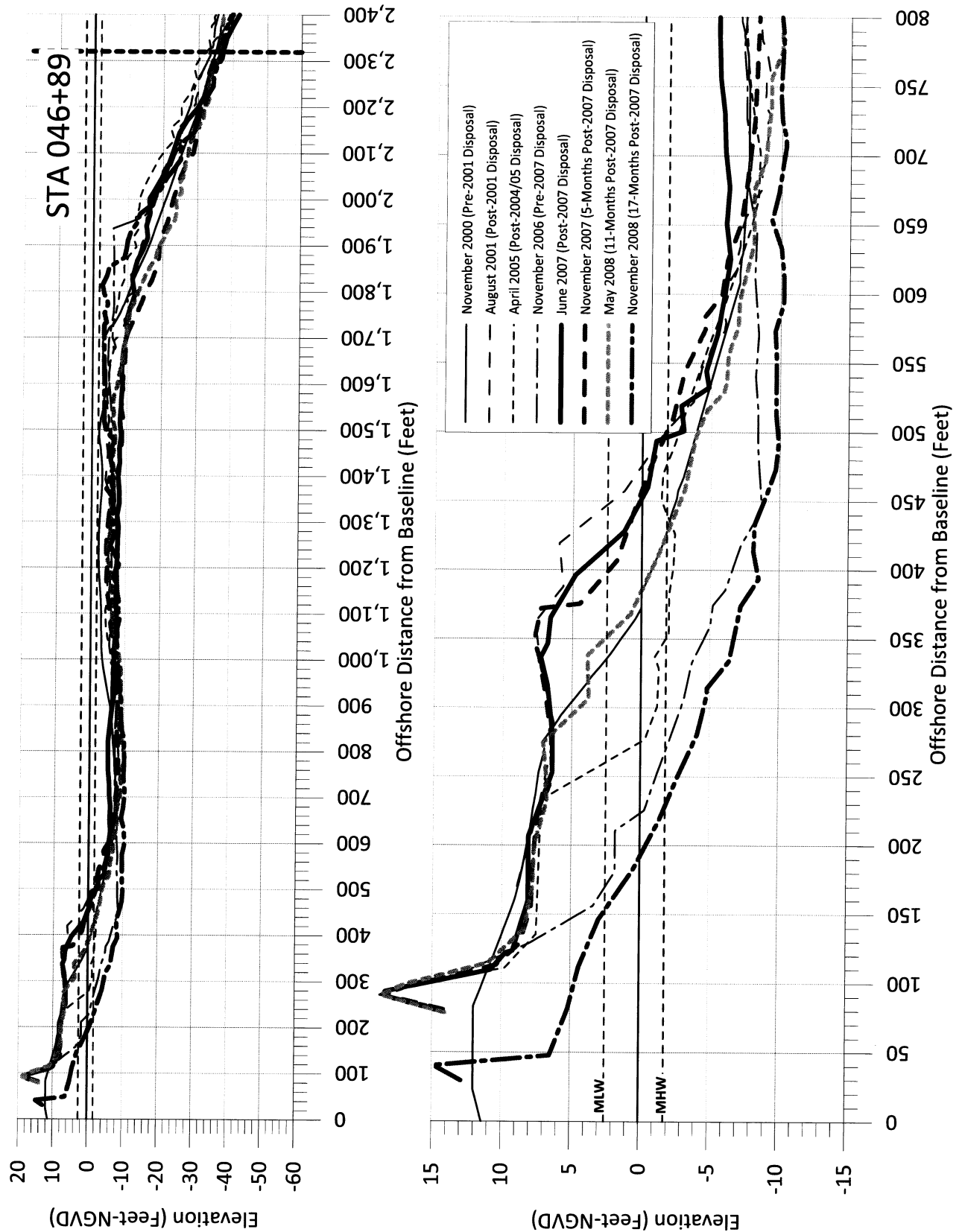
**Figure A-7:** Measured beach profiles at baseline station 044+25, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)



**Figure A-8:** Measured beach profiles at baseline station 045+07, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of authorized navigation channel)

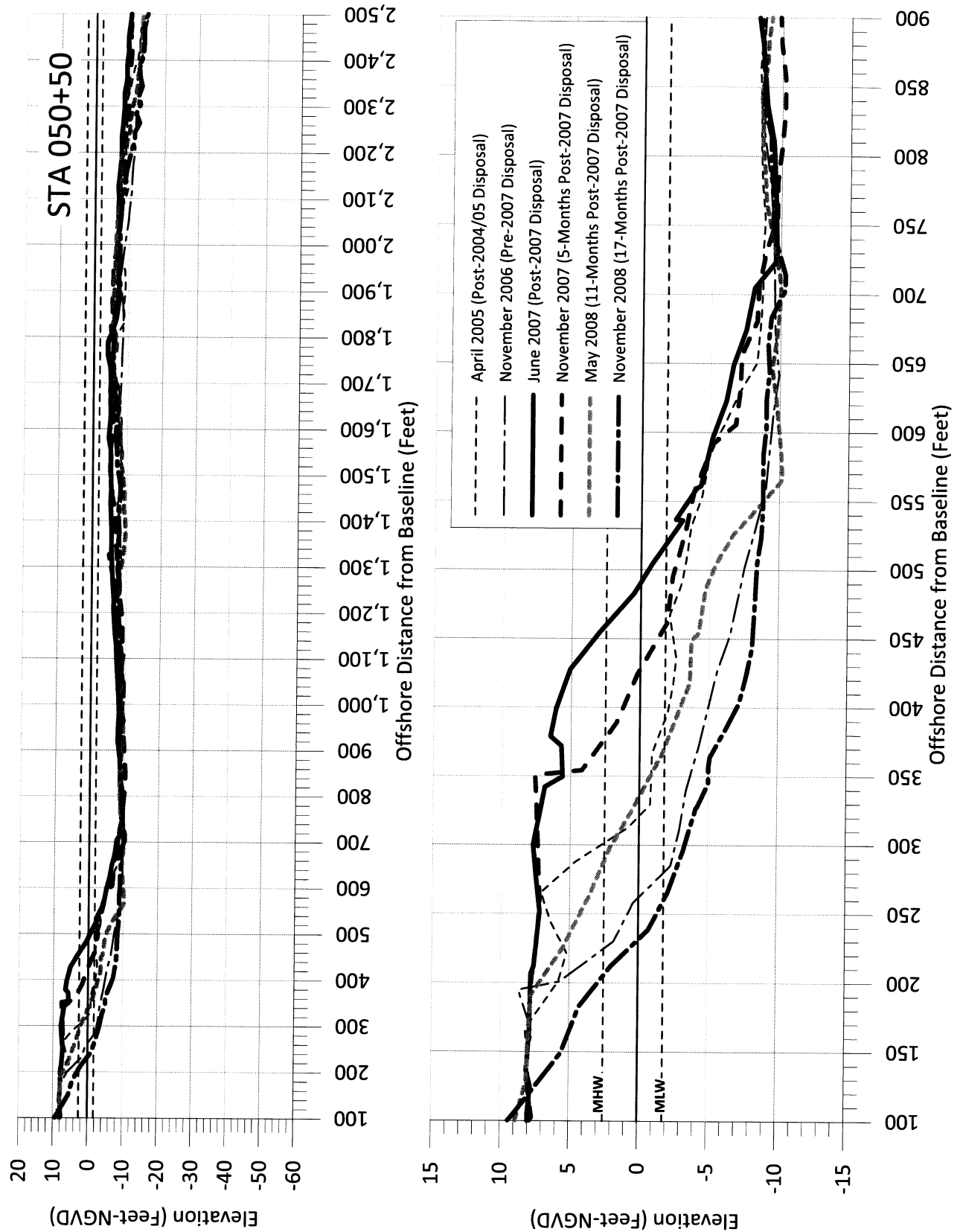


**Figure A-9:** Measured beach profiles at baseline station 046+00, Bald Head Island, N.C.  
(Vertical dashed line indicates physical limit of authorized navigation channel)

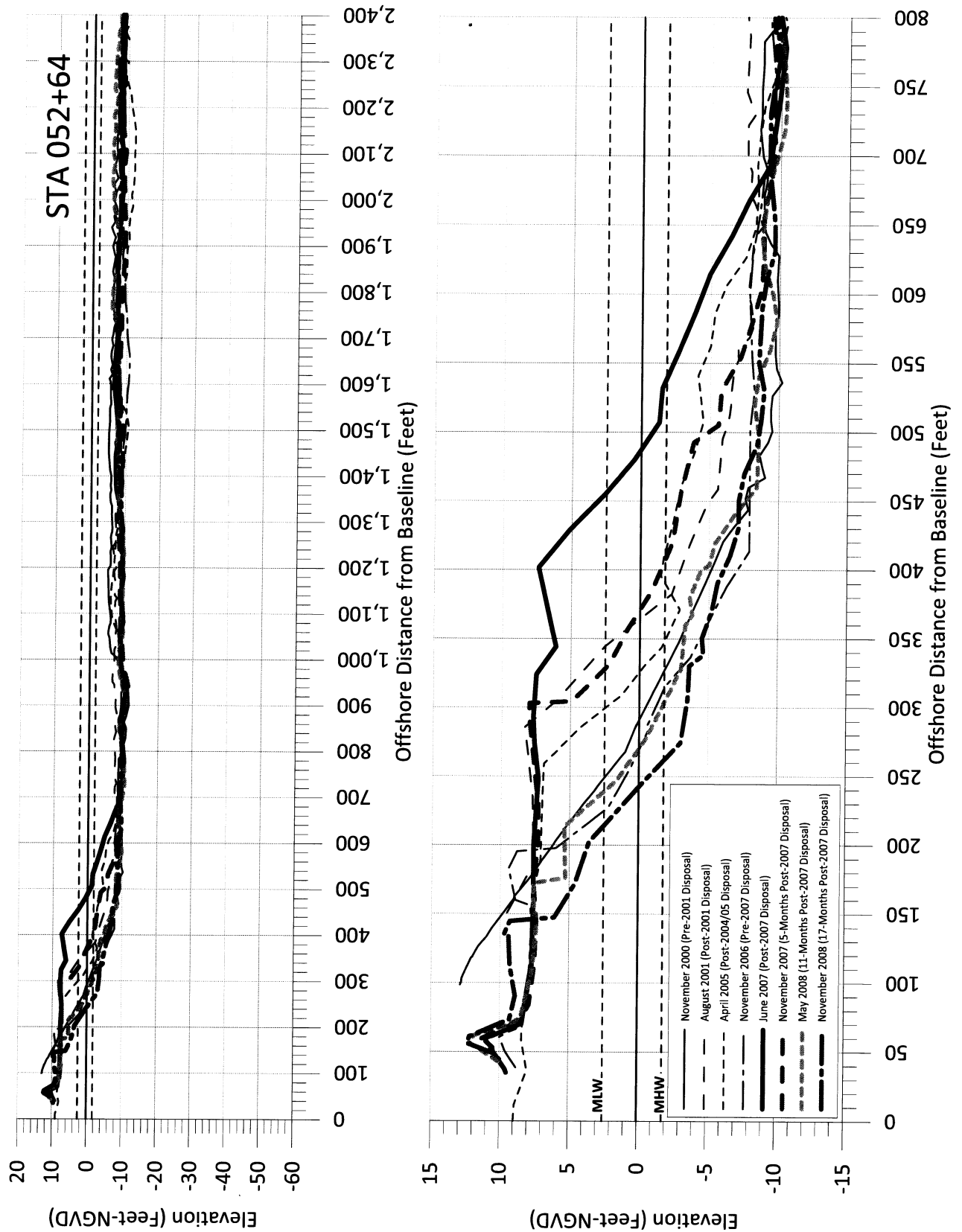


**Figure A-10: Measured beach profiles at baseline station 046+89, Bald Head Island, N.C.**  
 (Vertical dashed line indicates physical limit of authorized navigation channel)

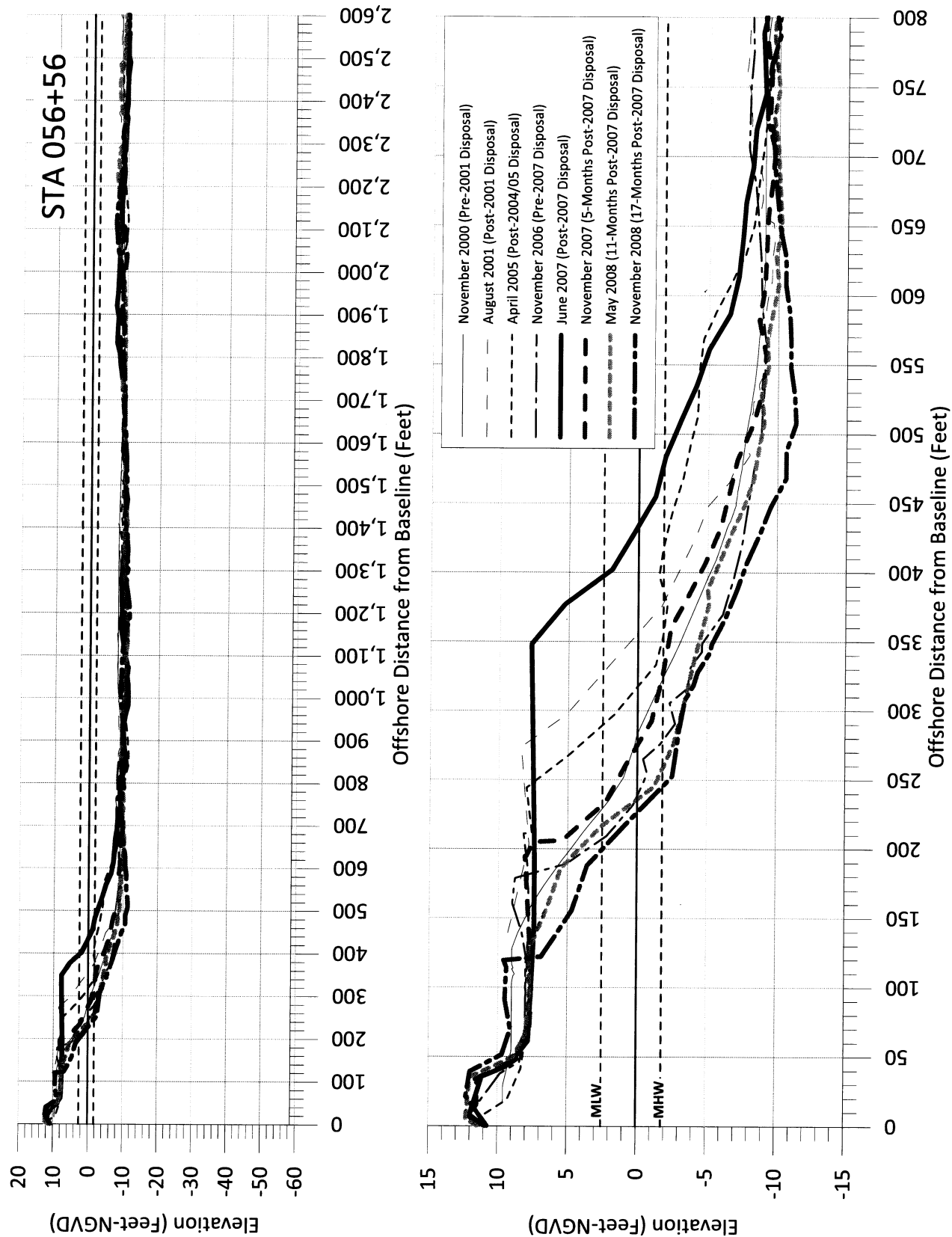




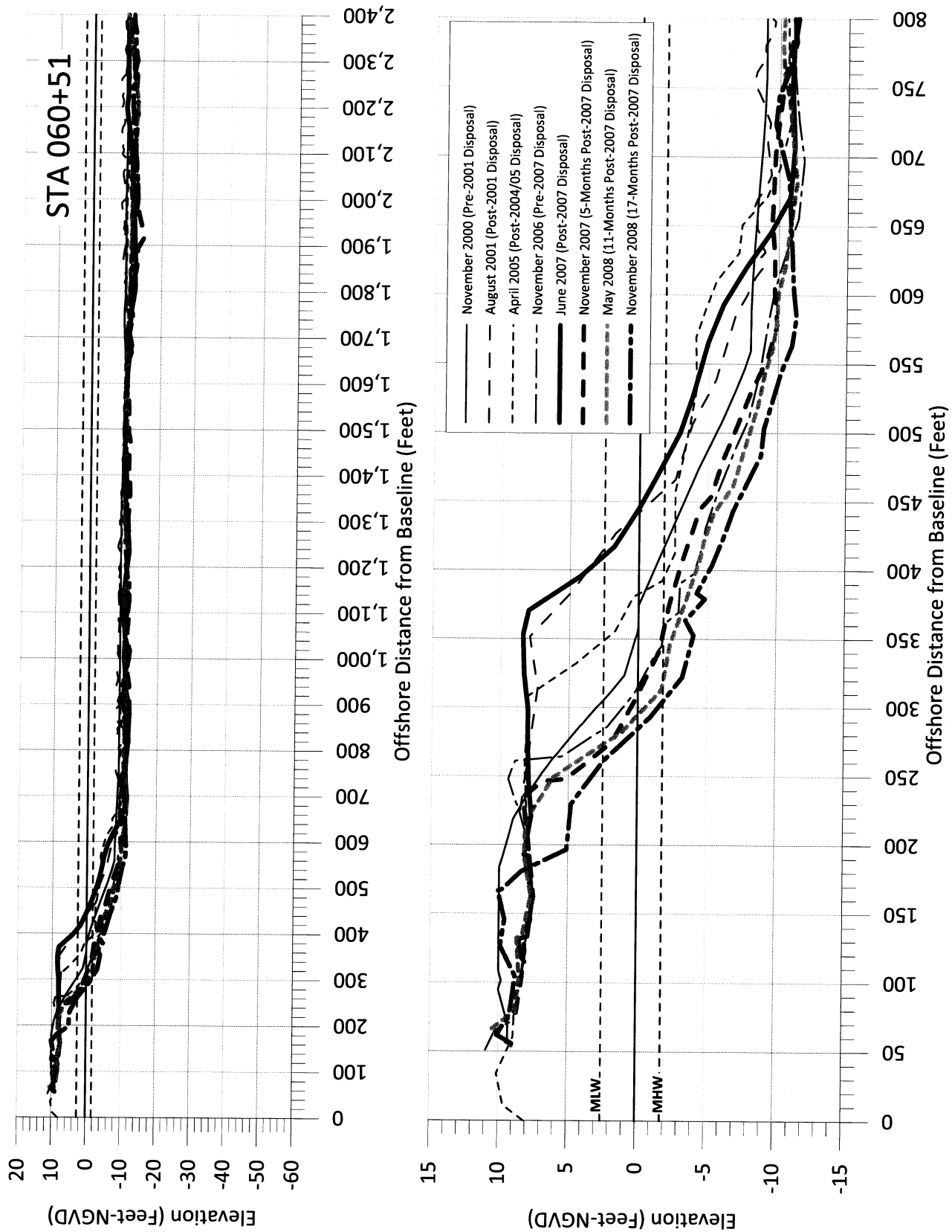
**Figure A-11:** Measured beach profiles at baseline station 050+50, Bald Head Island, N.C.



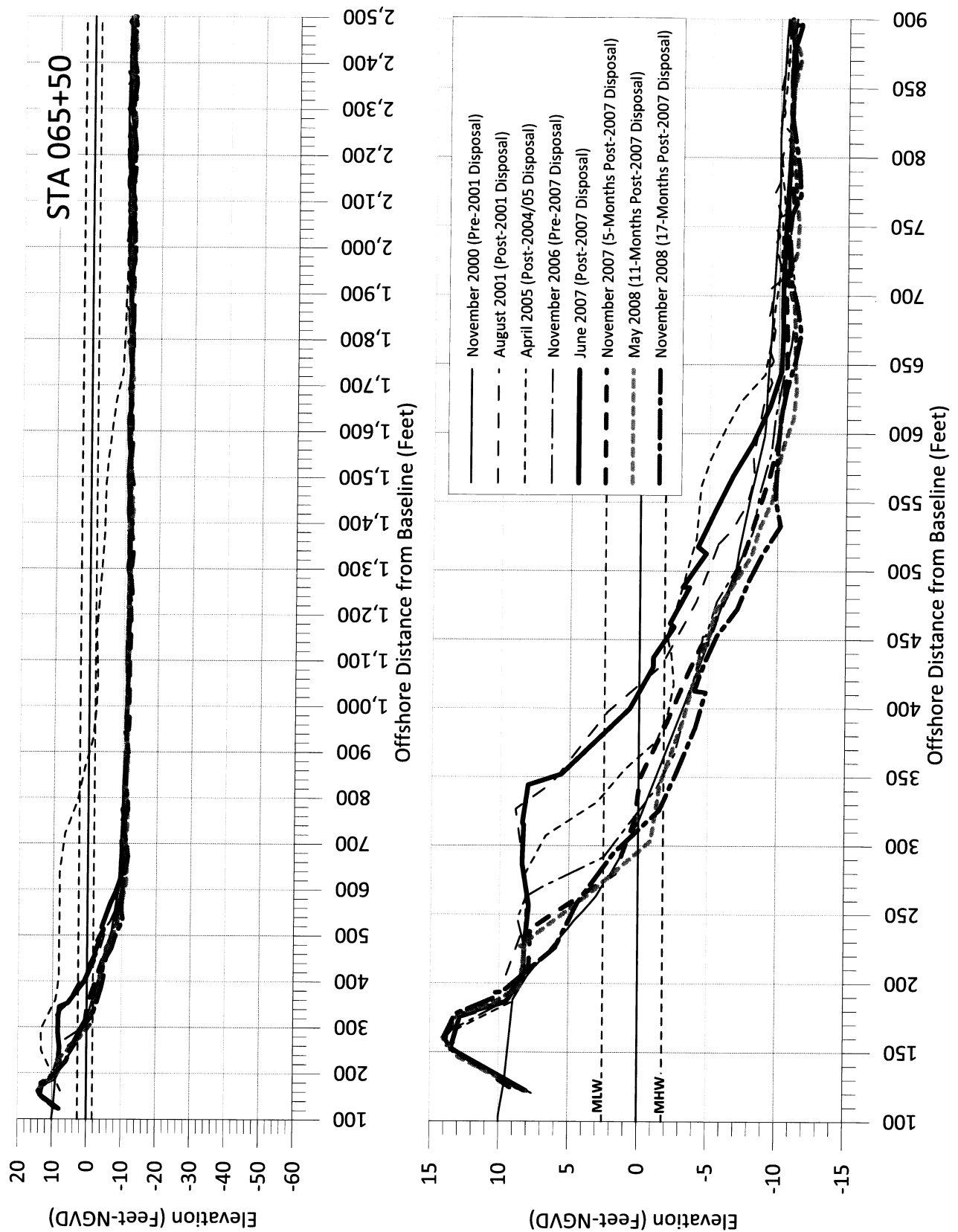
**Figure A-12:** Measured beach profiles at baseline station 052+64, Bald Head Island, N.C.



**Figure A-13:** Measured beach profiles at baseline station 056+56, Bald Head Island, N.C.



**Figure A-14:** Measured beach profiles at baseline station 060+51, Bald Head Island, N.C.



**Figure A-15:** Measured beach profiles at baseline station 065+50, Bald Head Island, N.C.  
(Vertical dashed lines indicate physical limits of volume change computations)

**PUBLIC HEARING #4**  
**New Hanover County Government Complex**  
**Wilmington, NC**  
**February 17, 2010**

**CRC Study of the Feasibility and Advisability of the Use of Terminal Groins**

Paul Tschirky stated this presentation would be similar to the others given at the three previous public hearings. House Bill 709 was the trigger for this process. It had two sections in the Bill and the second section of the Bill directed the Coastal Resources Commission to study the feasibility and advisability of the use of a terminal groin as an erosion control device. The legislation specifically had six points that should be considered. The study follows those six points. The first was to look at scientific data regarding the effectiveness of terminal groins. The second was to look at the terminal groin's impact on the environment. The third was to look at engineering techniques used to construct terminal groins and if anything could be done with the techniques to minimize any impacts that they may have. The fourth point was to look at the economic impact to North Carolina from shifting inlets. The fifth point was to look at the cost of construction and maintenance of terminal groin structures. The sixth point specifically addressed the question of location and whether terminal groins should be limited to navigable and dredged inlet channels. The other parts of the legislation addressed the need for public input. Three public hearings were required in the legislation. Today is the fourth public hearing that has been held on this study and a fifth is scheduled during the next Coastal Resources Commission meeting. The final report by the CRC to the ERC and General Assembly is due April 1, 2010. The study team that put together the draft report is Moffatt & Nichol which looked at the coastal engineering and physical aspects. Dial Cordy and Associates looked at the environmental aspects. Dr. Duncan Fitzgerald of Boston University provided advice with respect to the coastal geology. Dr. Chris Dumas from UNCW worked on the economic section. The overall work plan for the contractor portion of the study had seven main tasks. The first six tasks mirror that of the legislation. The seventh task is the public input. The eighth part is the reporting function. The CRC and CRAC have provided guidance to Moffatt & Nichol during the study and are ultimately responsible for developing policy and recommendations. The Science Panel was involved in the project scoping, approval of the study methodologies, and in an advisory capacity providing comments to those methodologies and to the report. The five sites that were selected to look at in detail in the study were two in North Carolina, Oregon Inlet and Fort Macon, and three in Florida, Amelia Island, Captiva Island and John's Pass. All information on this study (reports, presentations, comments, and meeting schedules) can be found on the DCM website [www.nccoastalmanagement.net](http://www.nccoastalmanagement.net) under the "What's New" section. Comments can be made to Jim Gregson at [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov) in his role as the Executive Secretary to the CRC. The working draft of the report came out on February 1, 2010 and it is available on the website. The final draft of the contractor portion of the study is due March 1, 2010.

John Fisher, Village of Bald Head Island, stated I would like to start by saying that the Village of Bald Head Island appreciates the hard work that the Coastal Resources Commission, Steering Committee, Science Panel, Advisory Council, Division of Coastal Management, Staff and their consultants have put into this terminal groin report as well as Moffatt & Nichol. It is a very inclusive product. Often we don't recognize those that do a lot of public service work. You are

appreciated. We may not always agree with the results of some of these things, but the effort is there and it is appreciated. This is how we reach conclusions and move forward. The report is consistent with Bald Head Island's experience and belief that terminal groins can be helpful at inlets if properly designed and constructed as part of a comprehensive management plan which does include beach nourishment. That was alluded to by the Science Panel and not necessarily all added in this report but it is certainly a key component. The Bald Head Island sand tube groin field was alluded to earlier. I want to state for the record that it has been very helpful. It is not robust enough for the serious shipping channel induced erosion that we experience on Bald Head Island, however the sand tubes also do not meet the report preferred design criteria of structure permeability, longevity, low-elevation, wave absorption characteristics and so forth. But do they do the job? Yes they do. The Bald Head Island cloth tubes fail approximately every four to five years and that is relative to major storms or not. This costs about 1.1 million to replace each time we go back into that. You have personally observed the Corps' dredging and erosion which results immediately thereafter at Bald Head Island. You have also observed the loss of public beaches, habitat and accesses. The Village had to fund a 17 million dollar beach nourishment project this past year. That was to protect the island's habitats, homes, and infrastructure as the existing sand management plan is inadequate and leaves a four year gap between the placement of sand from the Corps. A terminal groin should be studied for Bald Head Island and maybe helpful along with continued sand placement under the sand management plan as part of a comprehensive management plan at Bald Head Island's inlet and other NC inlets. All of the inlets are unique and different. It is very difficult. We have heard that today reiterated numerous times to have a scientific study that says each is the same. As legislation is necessary to build a terminal groin, the CRC should propose legislation to the General Assembly. The legislation should require proper oversight and compliance with good engineering practices. We do feel that today's engineering practices are much better than they have been in the past. Science is science and we are moving forward. Engineering is moving ahead. The legislation should allow terminal structure permit decisions to be made by the CRC or the DCM Staff rather than being made at the legislative level. Bald Head Island will again have a four year sand gap in 2016-2017. We do need some action and quickly because the process is timely overall. Bald Head Island's beaches, turtles and birds belong to the State and the people of North Carolina. They are worthy of protection. Terminal groins that are properly designed and constructed as part of a comprehensive management plan, including beach nourishment, can be helpful at Bald Head Island's inlets as well as other N.C. inlets. The alternative to no terminal groin may be no beaches at all. I didn't hear that talked about too much in the reports. I did hear about habitat, preservation for the critters as well as the people, and the birds, fish and wildlife. But the environmental impact of allowing unmitigated erosion doesn't seem to be present in the report. That needs to be thought about. What if we do nothing and the beach continues to fall away and is gone? The Village of Bald Head Island has delivered a letter in support of terminal groins to the Coastal Resources Commission as well as the N.C. Division of Coastal Management. We would like to see our suggestions, the study of this report considered and the legislation move forward as we have heard today.

Alderman Deborah Lanci stated she represents the Citizens of the Town of North Topsail Beach, the Board of Alderman and the Mayor. I have been authorized by the aforementioned leadership to make a statement at today's CRC public hearing with regard to hardened structures in the form of terminal groins. North Topsail Beach would like to go on the record as proponents of

legalization of terminal groins solely for the purpose of inlet stabilization. With the textile and furniture industries having been relocated out of North Carolina and sent overseas, tourism now remains one of our main leading industries. Towns like North Topsail Beach that are located adjacent to turbulent, dynamic inlets face severe erosion challenges. Some might see inlet stabilization as a means of protecting private properties, however in order to continue to compel tourists to continue to visit our beaches we need to demonstrate our commitment to maintaining those beaches with erosion control. It is a well known fact that wide, white sandy beaches are the preference of tourists. No tourist wants to arrive at their vacation destination to find the home that they rented is next to a condemned structure falling into the ocean. Residents of our town and towns of similar geography find themselves having to foot the bill for very expensive beach renourishment events. Inlets tend to act as enormous black holes sucking in sand from neighboring beaches and requiring very expensive navigation channel maintenance dredging operations. The ability to stabilize the inlet by means of a terminal groin would lessen the need to perform such operations as frequently. When the maintenance is required, the sand could be placed in a means sensitive to mitigating any downstream beach erosion. In conclusion, on behalf of North Topsail Beach, I implore the CRC to make the recommendation to legalize the use of terminal groins as a means of inlet stabilization on North Carolina's beautiful yet fragile coastline. Thank you for your time and anticipated support of our concerns.

Ray Webb, attorney with Bald Head Island Limited, stated I delivered a letter of comment from our CEO and President and ask that this be made a part of the record on this matter. I was searching for a way to segway into this and it struck me that I am 6'4" and well north of 200 pounds so I might have particular credibility in suggesting that one size does not fit all. I respectfully submit to you that for quite some time the one size fits all premise has been an underpinning of much of North Carolina's coastal policies. As a consequence we are grateful to the legislature for giving us this opportunity to consider certain options. I would like to suggest that the justification for the prohibitive policy which has been a policy for years is largely the idea that littoral movement of sand will give us islands and coastal landforms that seek their own equilibrium. Certainly, to a large extent, in many circumstances this is true. I would like to submit that it is equally true that the justification for that policy drops out in the case of managed or dredged inlets where the natural process is no longer controlling. Bald Head Island is in certain respects, especially the sensitive West and South beach area, is a poster child for managed or dredged inlets. This inlet has been dredged, gouged, engineered, moved and monkeyed with for 150 years or more. As a consequence I don't know that anyone can absolutely say what it would or should look like as a consequence of the natural processes. I think we can say without fear of contradiction that as a consequence of man's most recent intervention, in the form of the aggressive channel maintenance dredging that took place this past summer, we have had an unprecedented loss approximately four times the customary or usual rate of loss of sand than would have otherwise occurred during the natural erosive process. I would like to suggest that if we as a society through our government are going to mandate a critical interest, open and navigable channels, it is only fair that we equally mandate that those areas in those communities that suffer the consequences of that policy should be entitled to mediate or mitigate in some fashion. The opportunity for careful studied use of the terminal groin may present that opportunity or that technology. I want to emphasize that we want to add our voices to the entirety of coastal communities in supporting the opportunity to study this type of intervention through the use of the terminal groin wherever it is justified on the basis of sound



science and sound policy. It strikes me personally that we currently have a fundamental anomaly in that when wildfires or perhaps flood waters threaten homes and lives we not only tolerate, but we demand a response. I would like to suggest that it should be no different in the case of the negative effects of uncontrolled erosion. Certainly we can expect that the response be safe and that it pose no collateral damage to other properties, but I think we would be reasonable in demanding or at least expecting that that opportunity be made available. I believe that in some respects many coastal property owners are perhaps in the grips of an illness at a time when the economy, politics, and the pressures that are being brought to bear on them demand that they be especially fit and well and vital. I would like to suggest that the careful, intelligent use of a terminal groin might well provide for that cure. It would prove to be good medicine and an instrument to be added to the doctor's bag. Or as someone else has said very well previously, it would be another tool to place in the box.

John Kluttz stated I would like to thank the CRC for the service that this Commission is providing to the public and carrying out your responsibilities in the interest of North Carolina and its citizens. I am a small business owner and an avid water sportsman. I speak only as a concerned citizen. I have had some opportunities to work with the North Carolina Coastal Federation and understand some of the things that they are doing in view of this current project. I think it is significant to note that North Carolina is one of only two states that have regulations on the books forbidding the construction of terminal groins. In our state we only have two of these structures. I am not sure what that means because I think what you have heard here today and what the Commission is going to be going through is very complex, emotionally driven conversation. I don't know if the fact that we are only one of two states that forbid these whether in time will prove to be a sign of great wisdom from our community leaders and law makers. I think when I looked at what was going on with this recently there has been a review of the Moffatt & Nichol proposal by some folks with the NCCF. Even as complete and complex as that document is there are already some areas that have been identified as not clearly being addressed. I am sure you will have an opportunity to do so as this process moves forward. There is scientific data and good science supporting these structures as well as good science and data supporting that they shouldn't be there. We have a lot to go through. I am not here supporting either way. I am asking this Commission to approach this process with a well thought out and prudent review process regarding this proposal to change the law. The CRC should also ensure that the due diligence process fairly and equitably represents all of the interested parties.

Dave Dawson of Buxton stated I have the Cape Hatteras Motel and Croatoan Inn. I have been fighting the Atlantic Ocean for 38 years at the Cape Hatteras Motel. Back in the late 1970's and early 1980's I used to be a thorn in the CRC's side because I came to all of these hearings and ran my mouth. We had a meeting one time at the Ramada Inn in Nags Head, which at that time was the tallest structure on Hatteras Island or Bodie Island. They were trying to justify the existence of the CRC at the time. They showed a slide show. The slide show was my motel and two next door to it. They went on to say that they were trying to protect the cottage court atmosphere that had long been a mainstay on Carolina beaches. I was quick to point out that we were standing in the very type of building that they wouldn't let us build anymore while the cottage courts that they alluded to were washing away and that was 35 years ago and nothing has changed. We are still washing away. I have heard a lot about stabilizing the inlet area with these

groin fields. The groins work. All you have to do is go to Google Earth, type in Bald Head Island, and take a gander at beautiful beach. I don't begrudge anybody from protecting their beach, but don't leave the rest of the coast hanging out to dry. What is good for the goose is good for the gander. Thank you.

Robert McFeeters stated I am a citizen of New Hanover County and here to represent myself and my family. I am against any relaxation in the law not permitting terminal groins. I think at best the science is mixed. The animals, birds and critters that were aforementioned to don't need terminal groins to be protected. With the science mixed, that means that they may do just as much harm as they may do good. If somebody hands you a pistol and told you that they thought it wasn't loaded, I don't think you would put it to your head and pull the trigger. I think terminal groins are the same thing. Thank you.

Michael Rice stated I live in Southport. I am afraid that I cannot enlighten you any on the technical aspect of terminal groins. But I do know a little bit about reports. I do know a little bit about laws. I look at the law that you are facing and the report that you are facing and I don't see a match. You have been directed by the legislature to conduct a study of the feasibility and advisability of the use of terminal groins. You have a report that doesn't tell you that. It doesn't even try. It says on page one that this report is a fact gathering effort. It does not advocate any policy. Where are you going to get it if not from this report and from these experts that you have paid? We look through the report and we hope there are some conclusions in there that you might find as guidance. At the end of the report in the conclusion section there is nothing. They are leaving that to you. When you go down each of the six points, each one of those has a place for conclusions. Sometimes there are conclusions, but they are very timid. We can either conclude from that that your consultants are just shy people and unwilling to say what they think or there is not enough in the science that they have looked at to draw conclusions. They are leaving that to you and your staff in the next six weeks. That is a very difficult job. This is an important policy issue. What you are considering is changing a policy that has been long standing in this state. This is not something to be done lightly. There is one area here that did emerge in some of the conclusions. There is an agreement that beach erosion in the vicinity of navigation channels is due to the sediment traps caused by dredging. That clearly is the problem at Bald Head Island and several other places. This tells us that there is a larger issue here. By the way, item six in your list doesn't appear to have been addressed to any extent in the report. It is also larger in other ways. There is a Beach and Inlet Management Plan that has been held captive somewhere. That speaks to the very same issues. This report and that cannot be considered separately. Ladies and gentleman I believe what you have got here is a situation where in the next six weeks there is very little you can do to reach any kind of conclusion that would change the current legislative situation. I believe the legislature deserves more of a study than this if they are going to be asked to change that policy. Thank you.

Todd Miller stated I would like to thank the Commission for the job that you are doing. It is not an easy task and you are dealing with a public policy issue that is of critical importance not only to the people sitting in this room but to many future generations. This Commission since the early 1980's has had as its basic policy when it comes to ocean beaches that it is the top priority to protect the beaches. In situations where you can protect private property and protect the beach, you have made allowances for that. But never have you sacrificed the beach to protect

private property. I hope as you go forward in making these considerations over the next six weeks that you will not abandon this basic policy. There has been a lot of discussion about the input from the Science Panel in this process and I hope everybody will go to the website and read the draft report and the comments that have come in both from the public and from the science panel. I looked at the five sets of comments that did come in from the Science Panel. The comments came in from two engineers, two geologists, and one biologist. Quite frankly, I found it amazing the amount of agreement in the comments. I think the Science Panel has struggled with this over its last four meetings. They are trying to talk about this in a scientific and technical manner and not in a political manner. There has been a lot of discussion about the economics of this issue and I would just like to speak on behalf of someone who spends a lot of time playing and recreating in an inlet. If you go there any day in the summer there are thousands of people enjoying these inlets, these natural inlets. Those inlet shoals which are critical wildlife habitat and are a major economic engine for the State when you think about the boating activity, the fishing activity, and all the things that go on around these inlets. Anything that would interfere with that type of activity is going to have a negative economic impact on our state. So it is good to think about the positive economic impacts that come from shifting inlets as well as being concerned about the negative concerns with erosion. There has been some comments made about who will pay for these structures if they are allowed. I want to point out in the Bogue Inlet project that it was built originally as a local project. The costs escalated over the course of doing that project and the state of North Carolina was asked to step in and help fund that effort as well and became a major payer even though the original intent was that it would be locally funded. There have been recommendations that we think about going back to the variance process and I think there has been some discussion about why that process was taken away by the legislature. Let's not kid ourselves; there was a lot of politics in that process. The decisions that came out of it were not strictly made based on the science in front of us. The question is who should be playing politics here, the Commission or the legislature? If it is going to be a political decision then let's leave that in the legislature's hands. This option as we have all learned today is not a simple solution to the problems. Beach renourishment will have to continue. The annual maintenance costs based on figures I have seen in the Beach and Inlet Management Plan actually exceed what many communities are currently spending on beach renourishment. You are going to have those costs in addition to the cost of building these structures and the continued cost of nourishment. If anybody thinks this option is going to save money, I am afraid they have been sorely misled. At the beginning of this effort there was a notion that there were terminal groins everywhere and that they had a proven track record and we knew what they would do. Obviously through this study we have found that there aren't that many examples of these structures in existence that meet the criteria of what we are talking about in North Carolina and that the track record is very unproven. Even looking intensely at five case studies we have not found definitive answers in terms of what the impacts have been. In your permitting process if you face uncertainty in terms of what the actual impacts of a proposal are going to be, the way the Coastal Area Management Act is written, you are under the obligation to issue those permits. If you are uncertain that something is going to work or not work, the burden is on you to show that it will not work or you will be issuing the permits. If you are comfortable being wrong ten percent or twenty percent or fifty percent of the time then take on that burden. I would ask that you think about the consequence for beaches and the rest of the citizens of North Carolina if you make wrong permit decisions. As we have seen with sandbags it is not easy to undo these actions once you set a policy and go forward with it. It would be nice

to be naïve enough to think that we would pull out mistakes, but that is not the history anywhere. The history is that we keep adapting, expanding and multiplying when the first initial attempts do not work and the efforts just continue to escalate. Long-term people are going to need answers and alternatives. I am just sorry that this isn't an easy, simple solution to the problems that people are facing. We are in a period of rising sea level and storm activities. These issues are not going to go away and the problems in dealing with them are going to increase no matter what policy course you decide to take. Thank you.

Carolyn Pryor stated I am here representing Coastal Water Watch, an environmental group that is concerned with the water sheds of Brunswick County. We are very concerned about any change in the law that would effect our beaches and our wildlife here in North Carolina. My husband and I run a sailboat charter business and we sail in and out of the inlet over 100 times per year between Oak Island and Bald Head Island. We think that the tourism business that comes here doesn't come just to have a house on the beach. They come here to see the natural beautiful beaches that we do have and the wildlife that we have. We think that the laws here in North Carolina that have protected the beaches against hard structures have been very wise. We do not believe that there has been any new information to show that hard structures would be better than they were back when that decision was made in 1984. Our recommendation is that we try to consider the loss in tourism dollars if we effectively put in these groins that may save some inlets but it's also going to change the shifting dynamics that could cause new inlets to develop as more rapid inflow comes in to the dredged inlets. It could cause more damage to other property because of increased storm surge coming in these specified inlets. We hope that the laws will stay as they are. We think that the beach nourishment and the sandbags isn't a way to effectively deal with the problem. It could be just as cost effective as the other groins that allows flexibility if we do get sea level rise and other storms that could make the terminal groins in fact become obsolete or ineffective or possibly doing even more damage than we would like. Thank you for considering. I hope that we will leave the rules as is and add to the report the economic effects of a decrease in tourism that could come from putting in terminal groins. Thank you.

Frank Iler, District 17 Representative, stated this is the fourth time we have met like this. You all have met five times but I missed one of those. Next time the report will have been completed. I wanted to come today to wrap up a few things that I have mentioned before. Hopefully it will help in the process. I am here to help. I asked you last time to keep an open mind about this. It is obvious that confusion still exists in the public about what a terminal groin is from the descriptions I have been hearing. Let's look at what we have got here. We have a bill in the legislature which is in a House committee, the Environmental Committee. It passed the Senate 30-20. It crossed over so it is eligible to be taken up this year. It is in the Environmental Committee and based on the CRC's recommendations, Speaker Hackney and Chairman Allen will probably act on it favorably or unfavorably based on what you recommend. Again, as I have said before, this is another tool in the toolbox for coastal management. If we need an amendment to the bill to avoid you being forced to permit them that can happen. I am sure Chairman Allen would love to amend it to that affect in the Committee or on the House floor. We are asking for a chance to vote. The people's representatives in the Senate thought it was a good idea. The people's representatives in the House probably think it is a good idea, but we don't know that until we debate it and vote on the floor. Then the Governor has a chance to sign

or not sign it. That is the basis of what we are talking about. Based on your recommendations something could happen this year. I want to thank everybody. I know from coming to your meetings how much effort you have put into it. I apologize for being late today. I came from the Department of Natural Resources in Raleigh from a meeting and we may have resolved something at Oak Island and the sewer system there today. Thanks for your efforts and I will repeat one thing that I said before, if not this then what? If not now, then when?

*Tripp Murphy and Dave Pryor signed up to speak but did not make oral comments.*

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Thursday, March 04, 2010 9:44 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Terminal groin

James H. Gregson, Director  
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**From:** Doug Turner  
**To:** Gregson, Jim  
**Cc:** dtur2232@aol.com  
**Sent:** Thu Mar 04 19:45:31 2010  
**Subject:** Terminal groin

Mr. Gregson,

I hope this finds you well.

As a home owner on the East end of Ocean Isle Beach, I write to you not only to suggest how successful the groins have been in other areas and how successful they could be here and without collateral damage. But, I write to you also on a more personal level for myself and so many others like me.

It seems that most people on the outside looking in, have the mis-conception that all of the property owners in these fragile areas of the Island, are part of the rich and famous. The thought is, that these homes are just a small part of most owners portfolio. So, who cares if they get washed away, they are rich anyway.

Nothing could be farther from the truth. In my case I have worked extremely hard for many years to have this home as a major part of my retirement. At 62 years old this is coming up quickly and without this home it would be devastating. I have worked all of my life, and like most, have played by the rules, trying to do the right things, paid more than my share of taxes, and tried to achieve the American dream of family, ownership, faith, and a vision of a comfortable retirement.

I only ask you too, also do the right thing in pushing all you can, in any way possible to allow the terminal groins. It seems to be the logical answer not only for tax revenue, but to save so many homes, lives, and dreams.

Thank you so much for taking the time out of your busy schedule to read this for your careful and important consideration.

Sincerely,  
Douglas Turner  
[dtur2232@aol.com](mailto:dtur2232@aol.com)  
336 918-2062 cell

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Monday, March 08, 2010 6:45 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: CRC terminal Groin Study Final Report

James H. Gregson, Director  
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**From:** Frances Kelly  
**To:** Gregson, Jim  
**Sent:** Mon Mar 08 18:28:36 2010  
**Subject:** CRC terminal Groin Study Final Report

I read this with great interest. The report was well thought out and easy to read. I am very appreciative of the effort put into this report.

The data reflects that a properly engineered, site specific groin would be an excellent tool for coastal communities. The coastal communities, visitors, and wildlife will be positively impacted. We may once again be able to walk to the end of our beautiful island.

I would like to point out one concern. The study notes:

Anchoring the end of an island may curtail an inlet's natural migration patterns thereby minimizing the formation of sand flats;

Ocean Isle Beach has lost a significant amount of beach flats which continues to occur with erosion. I would think the opposite would occur with a groin in place since it would allow accretion to the far end to finally occur.

Fran Kelly  
OIB

**March 9, 2010**  
**Comments on the Final Terminal Groin Report**  
**By**  
**Tom Jarrett, P.E.**

My comments will be limited to the findings and conclusions provided in the Executive Summary (ES) since this is the new portion of the report that was not included in the working draft.

My general comment is the Findings and Conclusion contained in the ES should be limited to what can be supported by the information included in the report. If the supporting information for a finding or a conclusion is not in the report, that finding or conclusion should be removed as it represents nothing more than speculation.

**Executive Summary**

**Physical Assessment**

- A consequence when the structure is built on the downdrift side of the inlet is the stabilization of the inlet by preventing migration of the inlet channel. The groin inhibits erosion of the side of the channel by tidal currents and thus the inlet is not allowed to migrate.

Construction of a terminal groin may not necessarily prevent the inlet channel from migrating but should prevent the inlet itself from migrating. For example, in the case of Oregon Inlet, the channel has continued to change position, particularly in the area where it crosses the distal lobe of the ebb tide delta.

**Environmental Assessment**

- The construction of a terminal groin, beach nourishment and dune construction prevents overwash and inlet migration thereby contributing to a loss of habitat for breeding and non-breeding shorebirds and waterbirds, including the piping plover.

Beach nourishment and dune construction can prevent or lessen overwash. However, there is no information in the report to conclude the combination of beach fill, dune construction, and a terminal groin will result in the loss of habitat.

There appears to be more emphasis on the possible reduction in sand flats in the final report compared to the working draft. I hope this was not in response to the letter received from the SELC.



- Based upon the historical nature of the terminal groins at Fort Macon, John's Pass (northern groin), and Redfish Pass; discernible trends of the effects of these terminal groins on the natural resources is somewhat limited. Lacking pre-construction data makes an empirical determination of post-construction effects at these sites difficult if not impossible.

Lacking data makes empirical determinations "impossible" not difficult.

- The current development and use of some of the selected sites precludes unrestricted utilization by the site's natural resources. Sea turtles, avian species, and marine species, however, continue to make use of these managed sites, albeit sometimes on a limited basis.

Point to the information in the report that supports the statement the species utilize the sites on a "limited basis."

- Anchoring the end of an island may curtail an inlet's natural migration patterns thereby minimizing the formation of sand flats;

Information supporting this conclusion is not presented in the report. Simply stopping an inlet from migrating does not necessarily prevent the formation of sand flats within the inlet/sound complex.

- Resources continue to use locations where terminal groins exist, however, if habitat succession occurs, species suitability may be affected.

On the north end of Pea Island prior to the construction of the terminal groin, the area was characterized by robust dune fields as well as a fresh water pond on the back side of the island. Inlet migration that occurred between 1983 and 1989 completely changed the habitat. All of this change cannot be attributed to natural causes as the channel maintenance operations that occurred between 1983 and 1989, which involved the disposal of the maintenance material outside the normal area of littoral sand transport, has been listed as one of the probable causes of the accelerated inlet migration.

### **Engineering Construction Techniques**

- Ideally, the groin height should be limited to just above beach level. Adjustable heights to nourishment volumes and design berm heights are also beneficial. The design groin height should also account for wave overtopping and the desired amount of sediment transmission over the structure.

While this may be true, none of the cases considered included adjustable groins.

- Rock is generally the most widely used building material since it is readily available and highly durable. Concrete and steel are suitable building materials for shorter, mid to shallow-water groins; however, these materials tend to be cost-prohibitive. Timber and geotextile groins are less expensive alternatives and can be adapted to a variety of beach conditions, but also have limited applicability to shorter, shallow-water conditions.

Rock is not that readily available in North Carolina. Most of the rock for the Masonboro Inlet jetties came from a quarry near Rock Mount. It was transported by rail to Wilmington, offloaded to barges, transported over water to the inlet. For the landward portions of the south jetty, the rock had to be offloaded to shore. In the case of the Oregon inlet terminal groin, I believe most of the rock came from a quarry located in New Jersey.

The rock for the Fort Macon terminal groin was a light weight marine limestone which was obtained from quarries located in eastern NC.

- There also seems to be a threshold that appears with both length and height to be crossed where adjacent impacts become more pronounced. While it is possible that dredging impacts may be responsible for this threshold crossing, it underlies the importance to considering the overall length of the structure in relation to the exterior man-made and natural processes that also drive sediment transport so that the structure's relative effects are minimized or eliminated.

First, not sure what the reference to "adjacent impacts" is referring to. The entire statement reads like gobbledygook and is completely incomprehensible and of no value and should be removed from the ES.

- The permeability of the structure has a significant impact on adjacent shorelines. The Amelia Island structure has allowed material to bypass the structures to limit effects on downdrift shorelines and volumes. However, the structure has also had a limited impact on the updrift shoreline (mainly within the first 0.5 miles). The other structures have impermeable cores and appear to hold more sand for a greater distance updrift of the structure.

Are the apparent updrift impacts due to the terminal groin or the offshore breakwater located north of the terminal groin?

### **Initial Construction and Maintenance Cost**

- Rubble-mound terminal groins could range from about \$1,230 per linear foot to \$5,180 per linear foot.

The cost range for rubble-mound structures seems too small. Note the updated cost of the Oregon Inlet terminal groin and revetment is equivalent to approximately \$7,700/lineal foot.

- Steel or Concrete Sheet Pile or Timber terminal groins could range from about \$4,000 per linear foot to \$4,800 per linear foot. (Timber only recommended for short groin scenarios)

Note sure about the basis of the cost for sheet pile structures. Based on cost information in RS Weeks, I can only come up with a cost of about \$2,000 to \$2,500/lineal foot, or about ½ of what the report has. Please provide more supporting information.

- Annual project costs including structure maintenance / repair, annual beach nourishment, and monitoring could be in the range of \$0.7 million to over \$2 million.

The estimated maintenance costs are excessive. To date, there has been no maintenance required for the Pea Island terminal groin (~ 19 years) or the Fort Macon terminal groin (~40+ years). Therefore, the assumptions made regarding maintenance cost should be revisited.

- The vast majority of the structures considered for this study were located at inlets with most of these adjacent to navigable, dredged channels.

I guess 5 of 5 or 100% is a “vast majority.”

- The most substantial (longer, higher and / or less permeable) terminal groins were typically found where the greatest amount of dredging activity occurs. While this may be obvious, it is worth stating that the more significant the dredging activities, the potentially greater the impacts on adjacent shorelines; the greater the potential need for more nourishment and / or more substantial stabilization structures. These dredging activities may greatly outweigh any potential long-term shoreline changes resulting from the construction of a terminal groin.

The length of a terminal groin does not depend on the amount of maintenance dredging. The length of the groin is dictated by the size of the inlet, the configuration of the end of the island, and the length of shoreline the groin is designed to stabilize. Oregon Inlet and Beaufort Inlet were largest of the 5 inlets included in the study thus the need for longer structures.

One of the major impacts of a terminal groin on sediment transport is the interception of flood tidal currents running close to a parallel to the shoreline. As sediment approaches the inlet under the direct influence of wave generated currents, the tide induced currents increase the sediment transport. The imbalance between the volume of sediment transported to the inlet by waves and the amount transported into the inlet by the combination of wave induced and tide induced currents results in the typically high rates of erosion immediately adjacent to the inlets. Other factors which can hide or overwhelm this impact are associated with the inlet channel position and alignment. When a channel

assumes an alignment toward one side of the inlet or the other, the side of the inlet in which the channel is directed may experience accretion while the other side could experience accelerated erosion.

- The relative impact of these structures on adjacent areas is likely increased when sited next to natural or minimally managed shallow-draft inlets. For these locations, additional care and study (geologic setting, sediment budgets, etc.) is warranted to be sure that the terminal groin's impacts are acceptable or can be mitigated through minimal human activities (dredging and nourishment).

What is the basis of this conclusion? There is nothing in the report to support this! Unless this can be supported by the existing data, it should be removed from the ES.

As I commented on the draft, the final report should contain information on previous attempts to place material next to inlets in NC. There are 5 good examples where antidotal information is available (and some survey info in the case of Figure 8 Island) that would provide some insight regarding the difficulty of placing sand near an inlet. These examples include the east end of Ocean Isle Beach (Shallotte Inlet), the east end of Holden Beach (Lockwood Folly Inlet), Bald Head Island – South Beach (Cape Fear River Entrance), the north end of Figure 8 Island (Rich Inlet), and the north end of North Topsail Beach (Rich Inlet). In the case of Fig 8 Island, the following table summarizes the previous attempts to place sand on the north end:

Beach Nourishment on North End of Figure 8 Island

Date	Volume (cubic yards)
June 1983	90,000
March 1988	267,000
1993-1994	328,000
January 1997	250,000
March 2001	350,000
November 2005	250,000
February-March 2009	299,000

Since 1993, beach nourishment has occurred about every 4 years on the north end of Figure 8, yet the homes along the northern 2,500 feet of the beach remained threatened with there continued existence depending on sandbags.

For North Topsail Beach, the USACE placed 154,000 cy of channel maintenance material along the northern 2,000 feet of beach in 2006 and 160,000 cubic yards in the same area in 2008. Both of these fills were completely gone in a matter of months and the buildings in this area remained threatened.

I don't have information for Ocean Isle, Holden Beach, or Bald Head Island but that information is readily available from the USACE and Bald Head Island.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, March 09, 2010 9:47 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: comments on draft of terminal groin study

James H. Gregson, Director  
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**From:** sam swanson  
**To:** Gregson, Jim  
**Sent:** Tue Mar 09 19:43:08 2010  
**Subject:** comments on draft of terminal groin study  
Hello--

I am a geologist with over 35 years of experience. I have also owned a home on the beach in North Carolina for over 20 years. Beaches are risky places. I knew that when I decided on a beach house. I love the uncluttered beaches in North Carolina, no sea walls groins, etc. like the states to the north and south. I fear the addition on groins to selected beaches in North Carolina is the first step in the destruction of our beaches. Please do not build any hardened structure on the beach.

The terminal groin study was flawed from the start. The lack of good pre-groin data makes evaluation of the post-construction effects impossible. Not just problematic, impossible. As a scientist I understand this and so do the scientists (not engineers) at dnr. The study is useless, worst than that because it gives some hope to those foolish enough to build in bad places. Trash the study. Do not build the groins. Let nature take its course with the foolish construction.

Sam Swanson

*Henry S. Zaytoun, D.D.S., M.S.O.  
5041 Six Forks Road, Suite 200  
Raleigh, NC 27609-4494*

*Phone: 919-782-6911 Fax: 919-782-6913*

March 16, 2010

Mr. James H. Gregson, Director  
NC Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557

Dear Mr. Gregson:

Those who advocate for the construction of terminal groins have yet to present a convincing argument that they will be effective in controlling beach erosion. The information is not sufficient evidence that groins will be effective, but cost will be in the millions of dollars, and beach re-nourishment will continue to be necessary at a cost of millions of dollars annually.

It is unfortunate that houses were constructed in dangerous areas, and one can only be sympathetic with the present homeowners. It may be to everyone's benefit to study how these houses may be relocated, even if it would be necessary to redefine set boundaries and street designs. There is also the question that the present location of these houses may also be a contributing cause to the erosion.

Whatever is decided should be a plan that will not require unending maintenance and financial burden to property owners and tax payers.

Sincerely,

Henry S. Zaytoun, D.D.S., M.S.O.

HSZ/sgl

p.s. Please include this letter as part of the public comments on the CRC Groin Study.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Friday, March 12, 2010 2:14 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** Fw: Against the Tide  
**Attachments:** Against the Tide.pdf

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**From:** Dave Eastburn  
**To:** Gregson, Jim  
**Cc:** Jimmy & Scott Trotter ; Lynne Eastburn  
**Sent:** Fri Mar 12 14:01:52 2010  
**Subject:** Against the Tide  
Dear Mr. Gregson,

I recently read the article in the Brunswick Beacon about the Terminal Groin Draft Report and the upcoming meeting in Sunset Beach on March 23-24. Unfortunately, I will be leaving the country and unable to attend. I am a homeowner on the island and am extremely concerned about the use of terminal groins, jetties, breakwaters and other artificial means that affect beach erosion on our barrier islands.

Attached is a cover page, copyright page and one sample illustration from a book that should be required reading material for anyone involved in the decision making process on this issue. Against the Tide: The Battle for America's Beaches, by Cornelia Dean (Science Editor for the New York Times), was written based on research conducted throughout the US by leading scientists, including several from our home state of North Carolina.

The illustration on page 79 shows with dramatic affect what has happened to Assateague Island, MD, after rock jetties were erected from the south end of adjacent Ocean City, MD. Nearly half of Assateague Island has disappeared since the construction of those jetties.

We would hate to see such a travesty occur on Sunset Beach because of actions taken to enable the construction of artificial barriers. As taxpayers, we grow weary seeing tax money that wasted on beach "renourishment". In one recent renourishment on Ocean Isle, we watched as a subsequent storm wiped out all of the sand and then some.

We feel sorry for the property owners in Ocean Isle and elsewhere whose property has disappeared due to erosion. However, there are many differences between Ocean Isle and Sunset Beach, including a conscious effort to protect our homes with rows of dunes and natural habit where no construction is allowed.

When purchasing our home more than 15 years ago, we specifically chose Sunset Beach because of its geographic orientation, good decisions by the original developers, ongoing enforcement by our town leaders and the resulting good

fortunes we have all experienced. We at Sunset Beach have been blessed with an island that is currently accreting sand. And, while there are no guarantees for the future, I would hate to see our leaders take overt actions what would guarantee a reversal of these good fortunes.

Please express our concerns at the upcoming meeting later this month.

Best regards,

Dave & Lynne Eastburn  
Sunset Beach, NC



AGAINST THE TIDE

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*The Battle for America's Beaches*

Cornelia Dean

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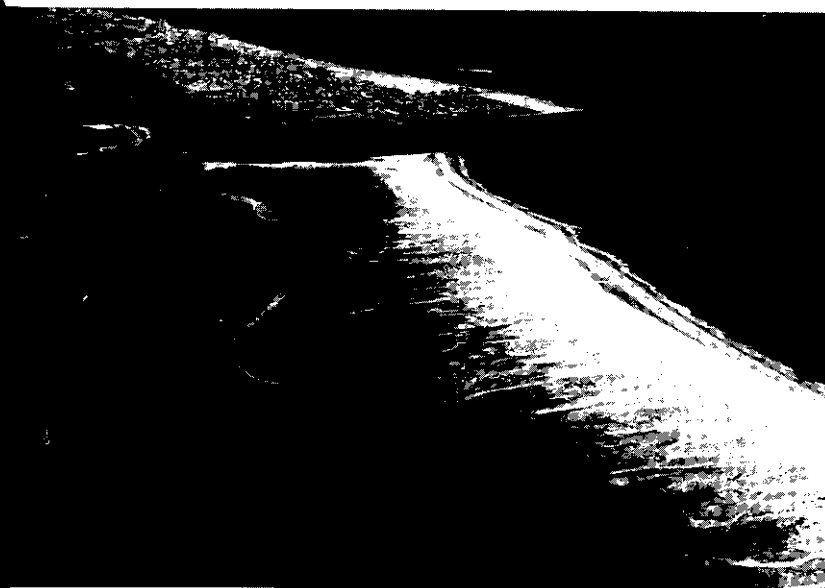
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storm in 1933 cut an inlet at Ocean City, Md. Today, erosion has left Assateague  
and a shadow of its former self. *(Stephen P. Leatherman)*

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, March 16, 2010 4:46 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: terminal groins

-----Original Message-----

**From:** wayne gray [mailto:[bmcmuscg@charter.net](mailto:bmcmuscg@charter.net)]  
**Sent:** Tuesday, January 26, 2010 9:26 PM  
**To:** Gregson, Jim  
**Subject:** terminal groins

I was the Officer In Charge at Oregon Inlet Coast Guard Station when the Terminal Groin was built at Oregon Inlet. Once they started laying the rock the beach started building out. When the last rock was laid the beach had built all the way out to the end of the groin. I have watched the beach south of the inlet and I can see very little effect as far as erosion. At the "S" Curves at Rodanthe, we had an erosion problem many years before the Terminal Groin at Oregon Inlet. I think a Terminal Groin would do much to help the situations around our inlets in North Carolina.

Wayne Gray  
Nags Head

**The following letter was received from many members of the Sierra Club. Following the text is a list of members (to date) who sent the letter to CRC Chair Bob Emory. Those letters that are substantially different than below are included separately in this file.**

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report assessing sea-level rise along North Carolina's coast for purposes of developing state policy. And, the Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. Those recommendations are expected next year.

What's more, an important multi-million federal study is underway to help North Carolina identify ways to reduce risk to built and living systems from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Their recommendations are also due next year.

It makes little sense to overturn or relax the ban on hardened structures to allow terminal groins or jetties today when in a short time, the Coastal Resources Commission could have the benefit of this additional insight and input as North Carolina makes tough decisions about a range of coastal adaptation policies. A reversal of public policy of this magnitude would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are; and ironically, in so doing, spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Weakening the ban would only serve to increase risk at great cost to the general public at a time when the emphasis should be on reducing fiscal and environmental risk.

Even a limited relaxation of the ban would likely serve to open the door to a floodgate of requests for further weakening. The political pressure to weaken public policy to protect private property is already intense. Relaxing the state's ban would only fuel expectations and increase political pressure on the Commission at a time when limited resources are better directed toward development of comprehensive adaptation strategies. Like all times of transition, this is a moment when leadership is sorely needed. I urge the Coastal Resources Commission to take the long view and protect the public's beaches for the future by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Michael Spradlin  
Margaret & Jay Jones  
Tom Henson  
Linda Mc Gowan  
John Bailey  
Joe Bearden  
Ned Martin  
Charles Cotter  
Carol Johnson  
Charlene Knop  
Jeffrey Collins  
Andrew & Jennifer Angyal  
Liliane Michniak  
Bob Ragland  
Judith Berry  
Tim Peppe  
Gil Hargett  
Scott Herman-Giddens  
Nancy Darling  
Carol Soroos  
Fred Strickhouser  
Kristen Moyer  
Thomas Harmon  
Eric Schwartz  
Carmel Zetts  
Kristin Keilt  
Mara Wooten  
Patricia Bright  
Nancy Kondracki  
Teresa Cronin  
Christine Tyburski  
Beth Winn  
Paula Stober  
Beth Brown  
Noelle Kehrberg  
Suzanne Lamport  
Elaine Stover  
Jeremy Sprinkle  
Paula McGrann  
Mark & Janet Benton  
Sara Felsen  
Cristina Vazquez  
Stuart & Carola Cohn  
Anita Hicks  
Billie Mann  
Cynthia Van Der Wiele  
Jackie & Bogdan Ewendt  
Elizabeth Aiken

Judy McClung  
Anne Broadwater  
Michael David Loven  
Tana Moseman  
Carol Thompson  
James Wilson  
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L M Pollander  
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Laurie Rohner  
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Karen Loughmiller  
Don Eads  
Elizabeth Holsten  
Chatham Olive  
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Chris Dowdle  
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Rhonda Bradshaw  
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John Franklin  
Cynthia Vondrasek  
Thomas Taylor  
Debbie Ryals  
Margaret Birk  
Rosanne & Richard Fortner  
Sadie Sondgerath  
Dirk Herr-Hoyman  
Myra Lighthart  
Jeffrey Leinicke

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Angela Vieth  
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Nathaniel Greenwood  
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Kate Nelson  
Jacqueline Sices  
Sarah Atwood  
Bill Kloepper  
Karin & David Griffiths  
Scott Fecho  
Cindy Gibson  
Javey Lowe  
Alyson Boyer  
Neil Infante  
Elisabeth Arriington  
Dwight Koeberl  
Dee Worley  
Linda Bach  
Robert Hoose  
Matthew Zedler  
Katherine Moore  
Eleanor & Peter Mockridge  
Dennis Rayfield  
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Richard Goldberg  
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Lynn Elliott

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R Keto  
Marsha Meyers  
Joann Nealis  
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Susan Johnson  
Melissa Rooney  
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Miriam Figueroa  
Steven Graham  
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Earl Walker  
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Holly Boudreau  
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Sarah Whitfield  
Betty Donaldson  
Megan Connolly  
Steve Copulsky  
Wayne Caldwell  
Anna Ploghoft  
paula forehand  
Ann Stewart  
Joan Keto  
Robin Runion  
Dolly Austin  
Whitney Martin  
Joe Burnham  
Heather Hensley  
Megan Shearin  
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Monika Coleman  
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Geitza Posada  
Charles Bachmann  
Melissa Whitmire  
Linda Peterson

Kenille Baumgardner  
Karyn Bigler  
Grant & Jenna Bailey  
Phyllis Pharr  
Bob Coleman  
Mary Bacon  
Lindsay Blackburn  
Joe Phillips  
Mr and Mrs Hal Trufan  
Richard Mearns  
Heather Payne  
Steven Rundle

**The following letter was also received from members of the NC Audubon Society. Following the text is a list of members (to date) who sent the letter to CRC Chair Bob Emory. Those letters that are substantially different than below are included separately in this file.**

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report assessing sea-level rise along North Carolina's coast for purposes of developing state policy. And, the Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. Those recommendations are expected next year.

What's more, an important multi-million federal study is underway to help North Carolina identify ways to reduce risk to built and living systems from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Their recommendations are also due next year.

It makes little sense to overturn or relax the ban on hardened structures to allow terminal groins or jetties today when in a short time, the Coastal Resources Commission could have the benefit of this additional insight and input as North Carolina makes tough decisions about a range of coastal adaptation policies. A reversal of public policy of this magnitude would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are; and ironically, in so doing, spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Weakening the ban would only serve to increase risk at great cost to the general public at a time when the emphasis should be on reducing fiscal and environmental risk.

Even a limited relaxation of the ban would likely serve to open the door to a floodgate of requests for further weakening. The political pressure to weaken public policy to protect private property is already intense. Relaxing the state's ban would only fuel expectations and increase political pressure on the Commission at a time when limited resources are better directed toward development of comprehensive adaptation strategies. Like all times of transition, this is a moment when leadership is sorely needed. I urge the Coastal Resources Commission to take the long view and protect the public's beaches for the future by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.  
cc: members, CRC

Wayne Irvin  
James Hardin  
Linda Gaines  
Timothy Kerr  
Judy McComb  
Richard Hicks  
Ron Duckworth  
James Zizzo  
Cassandra Wilson  
louis eubanks  
Matthew Rubino  
patricia carnrite  
Margaret Wolf  
Carolyn Cooke  
Joanne M. Fairhurst  
Mark Stanback  
Susan Brown  
Carol Hoke  
Paula Stober  
Catherine Barrett  
Pat Wang  
Alan Lenk  
Elizabeth L. Hanrahan  
Olivia Ferrelli  
Cindy Mooring  
Richard Yates  
Robert Taylor  
Robert Apperson  
Ariel Wynn  
James Potter  
Ruth Godsey  
Gareth Wynn  
Peggy Wynn  
Leslie Pruneau  
Albert Joyner  
Martha Brimm  
Shelby Salley  
Barbara Reynolds  
Elaine B Herring  
Allan Will  
Mary Pruneau  
Jack Jezorek  
James Hartsell  
Janette Ledford  
Russell James  
Robert Cherry  
Max Drake  
Suzanne Jones

Tamara Lesesne  
Frank Hartig  
Megan Crotty  
Nancy Goodridge  
Carol Soroos  
Tom Stilwell  
David Moon  
Susan White  
Philip Dickinson  
Barbara Hughes  
Cary Paynter  
Darwin Ferry  
Connie Raper  
Elizabeth Ijames  
Deborah Finn  
Coyla Barry  
Frances Armstrong  
Robert Workmon  
Nicolette Cagle  
Robert Dellinger  
arthur goodnight  
Jean Murdick  
Cecilia Leary  
Melissa Whitmire  
T Butler  
alan wolf  
Dolly Austin  
Deirdre Poe  
Wendy Elwell  
Gwendolyn Wauters  
Geoffrey Santoliquido  
Gregg Morris  
J. Chris Pruneau  
Nancy Goodwin  
Karen Snyder  
Gail Bagley  
Margaret Scott  
Janet Palmer  
Elizabeth Blumer  
Daniel Shields  
Ellen Colodney  
Virginia Brown  
Kenneth Coley Jr  
Ainslie Gilligan  
Maura High  
Amber Williams  
Jerome Carpenter  
Roberta Zenz

Ida Phillips  
Kelly Suttles  
Kari Wouk  
Jan Healy  
Mary Bridges  
Bonnie L Parker  
Jack Richardson  
Glenn A Temple  
Michael Ebner  
Robert Palsha  
Lisa Francia  
Bobby Wynn  
Robert Orchard, Jr  
Steven Tracy  
Sue Feldkamp  
Victoria Kaprielian  
Christine Abdelmonem  
Michael Morgan  
tina goff  
Pamela Phillips  
Melinda Bogardus  
Robert Zinn  
Jules Fraytet  
Harriette Frank  
Nancy Buckingham  
Pat Rittenmeyer  
Deb Brown  
trudi seely  
Lisa Nadler  
Michael Ouchakof  
Mary K. Ramm  
Michael Taeckens  
Ada Southerland  
Jen Yuson  
Larry Wohlers  
Susan Mock  
Deborah Rickenbach  
Joy Loyd  
Harrill Heath  
Kent Lupton  
Tim Leighton  
Lena Gallitano  
Doug Hill  
Rebecca Nussbaum  
Karen Hogarth  
Kim Davis  
Rebecca Currie  
Christy Howard

Hal Trufan  
Karen Newton  
Harry Mauney  
Ruth Miller  
Stanley Wolk  
Sue Cole  
Carla Smith  
Patricia Rusch  
Anne Brown  
Michael Logue  
fred shoemaker  
Chad Schoen  
Sarah Potter  
Ruth Stambaugh  
Phil Potter  
Don Jeffries  
Margo Raprager  
Cindy Yates  
Laura Harris  
Paul Kirchheimer  
James McKelvey  
Karen Bearden  
Marylee Davis  
Bonnie Reiter  
Jerry Weston  
Betty Gray Davis  
Joe Bearden  
Harrill Heath  
Joy Loyd  
Susan Mock  
Andy Wood  
Cynthia Tedore  
Peggy Nance Lyle

**Walker, Michele**

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Sterling & Barbara Whitener [shrln@bellsouth.net]  
**Sent:** Wednesday, March 17, 2010 6:17 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 17, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

My personal message to you, Mr. Emory, is to please uphold the ban on hardened structures on our shore line. These structures do not prevent erosion. They cause it. BBW

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.



## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Elizabeth Gullett [bgullett@triad.rr.com]  
**Sent:** Wednesday, March 17, 2010 8:47 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 17, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Take a look at Lake Tahoe, a dead zone around the lake that California regrets creating.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Elizabeth Gullett  
3644 Cash Dr  
Winston Salem, NC 27107-6305  
(336) 784-5693

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Timothy & Betty Chambers [tchambers4@bellsouth.net]  
**Sent:** Wednesday, March 17, 2010 5:16 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 17, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Our beaches are the property of the people of North Carolina for its people and guests. We are obligated to preserve and protect them for the use of all peoples.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr and Mrs Timothy & Betty Chambers  
3038 Morning Mist Ln  
Charlotte, NC 28273-7813  
(704) 588-6698

## Walker, Michele

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**From:** Site Administrator [audubonaction@audubon.org] on behalf of Elizabeth Pomper [liz\_pomper@yahoo.com]  
**Sent:** Friday, March 19, 2010 10:22 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 19, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

Although I live in Washington DC, I care about the coastal resources of nearby North Carolina. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Friday, March 19, 2010 11:51 AM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Please uphold our state's historic ban on hardened structures

-----Original Message-----

From: Sierra Club Membership Services [mailto:membership.services@sierraclub.org] On Behalf Of Mary White  
Sent: Friday, March 19, 2010 11:21 AM  
To: Gregson, Jim  
Subject: Please uphold our state's historic ban on hardened structures

Mar 19, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

As a long time NC resident and person who cares about perserving our beautiful NC coastline and animals who live there, I plead with you to thoughtfully read all that is in this letter. It's incredible our state was so smart so many years ago to have established the ban on hardened structures. Please please don't now make a very stupid decision by doing anything to this ban. It needs to be upheld as it is.

It's difficult in these hard economical times to make the right decision for the long term; instead of making the wrong short term decison because the powers that be are pressured by those who want this ban weakened for economical gains. But if the wrong decision is make it will only benefit a few and the loss to the citizens of NC and our coast and beaches will be great. Vote to keep the ban as it is!!!!

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Mary White  
2146 Sherwood Ave  
Charlotte, NC 28207-2120  
(704) 372-8836

## Comments in the Terminal Groin Study: Final Report

Submitted to the CRC

By Robert S. Young, PhD, PG.

Antonio Rodriguez, PhD

March 17, 2010

We have participated in all aspects of Science Panel evaluation of the study and would like to submit the following summary comments for consideration of the CRC

- 1) There was no formal process established for the Science Panel to review and comment on the document in a traditional peer review fashion. While we did have an opportunity to comment on the study as it progressed, no system was established for the Science Panel to reach consensus on recommendations, request changes from the consultant, and ensure that those changes were carried out. This was not the consultant's fault. We do believe that they listened to our input, but much of what to include and not include was left up to them. We did not have an opportunity to review the final document nor the overarching conclusions in the Executive Summary. Therefore, the CRC should not consider the final report to have been entirely reviewed or endorsed by the Science Panel.
- 2) We do not understand why the NCDENR and DCM logos appear on every page of the document. It is our understanding that DCM did not review or endorse the report, in fact, DCM has taken a very "hands off" approach to this study. The logo, used as it is, implies endorsement.
- 3) The report indicates clearly that there is uncertainty involved in the data collected, conversion to volume change, impacts of dredging, and processes not examined (storm impacts or geological control). This uncertainty is unquantified in the report and is probably unquantifiable. Yet, some fairly sweeping conclusions are drawn anyway. We understand the desire to produce a report that makes affirmative statements rather than equivocation, but we feel that many of the conclusions in the Executive Summary overreach.
- 4) Examining the data reported in the study, one sees that the incremental, alongshore response pre- and post-structure at each study site is complex and not given to generalization. Some sites have been so heavily impacted by dredging and beach nourishment that sorting out the impacts/benefits of the structure is impossible. We will agree that the report does not indicate a clearly definable negative impact from the structures studied. However, the report does not delineate a clearly defined benefit of any of the structures either. Certainly, a terminal groin can be used to hold the tip of the island in place, but this only benefits a small number of people. Large-scale beach nourishment is still required at all sites. The report does not demonstrate a linkage between building a structure and a reduced need for beach nourishment or any cost savings at the study locations.

- 5) The most important question is: “was maintaining the shoreline less expensive after building the structure than before?” The report does not address this directly, but based on the construction costs estimated and the demonstrated need for continued nourishment, the answer to the above question is probably no.
- 6) There are two potentially harmful impacts of any terminal groin that are not addressed by the report:
  - a. Does a large terminal groin on the downdrift side of an inlet block any sand from naturally bypassing that inlet? There is a legitimate assumption that dredging and offshore disposal deprives the downdrift island of sand. The geological community has always been concerned that a relatively large terminal groin on the downdrift side of an inlet could also prevent some sand from bypassing onto the downdrift island or change the nature of that bypassing in an unpredictable, and potentially harmful way. This concern is not addressed at all in the Final Report.
  - b. How does changing the configuration of the inlet and the location of the inlet channel impact erosion and accretion on nearby shorelines? The report clearly states that the configuration of the ebb-tidal delta and the inlet channel play a primary role in controlling sedimentary process (and thus erosion) near the inlet. The report also clearly documents that if you hold one side of a migrating inlet in place with a terminal groin, you will change the inlet morphology. Thus, a terminal groin in a location like Oregon Inlet must be having an impact on sedimentary processes, but this impact is not elucidated in the Final Report.
  - c. In truth, the consultant could not have addressed either of these concerns given the data available. Still, one must be aware that some potentially significant negative impacts of terminal structures were not addressed in the study.
- 7) The economic analysis in the Final Report may be interesting, but it provides no guidance at all regarding the potential economic harm/benefits of a terminal structure because the zones of impact cannot be clearly delineated.

Final Statement: It is our opinion that the report does not contain adequate scientific evidence to overturn current state policy. It would be terribly ironic for the Science Panel to be working on improved Inlet Hazard Areas to discourage irresponsible development in areas that we know are the most vulnerable to rapid change and to storms, while the CRC would recommend that we begin building structures in those vulnerable areas to increase the likelihood that development will continue there. There are many “tools in the toolkit” that the State of North Carolina has chosen not to use. Terminal groins should continue to be one of them.

Jim Gregson  
NC Division of Coastal Management  
Morehead City, NC 28557

March 17, 2010

Dear Mr. Gregson,

The CHPP Steering Committee met today in Pitt Co. and passed the attached resolution for consideration during the CRC's ongoing process of evaluating the terminal groin issue. Absent from today's meeting were CHPP Steering Committee members Bob Emory and Joan Weld of the CRC, and Anna Beckwith of the MFC. Consequently they were unable to participate in drafting and approving this resolution. The two CRC members may have chosen to recuse themselves if they had been present.

Sincerely,

Dr. Charles H. Peterson  
CHPP Steering Committee Chair



**Resolution from the CHPP Steering Committee to the Coastal Resource  
Commission**

17 March 2010

Whereas the CHPP Steering Committee, constituted by equal representation from the CRC, EMC, MFC, and WRC, is charged by the law with the protection and enhancement of fish habitat in NC;

Whereas the CRC was directed by the General Assembly to consider the feasibility and advisability of the use of terminal groins;

Whereas the state has had a three-decade-old prohibition of hard structures as erosion protection measures on ocean beaches;

Whereas terminal groins may impair habitat for fish and birds through obstruction of larval transport through inlets, prevention of inlet migration and formation and maintenance of shoals and habitats needed by fish and birds, and impacts on beach habitat from beach nourishment as discussed in the Moffitt and Nichol report (2010);

Therefore, be it resolved that the CHPP Steering Committee urges the CRC to consider the negative habitat consequences in their deliberation on the terminal groin issue and be cautious about changing the existing policy, which protects fish and wildlife habitat.

Dr. Charles H. Peterson  
CHPP Steering Committee Chair

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Heather Payne [helsimon@yahoo.com]  
**Sent:** Monday, March 22, 2010 6:58 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Hardened beach structures simply shift the problem - which also may lead to increased environmental or social justice issues just as we attempt to deal with shifting coastlines, changing more quickly due to larger and more powerful weather events. This does not make sense.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Roland Neal [birdmanneal2002@aol.com]  
**Sent:** Sunday, March 21, 2010 11:27 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

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I have lived on nearly every barrier Island area in the us. Even visited places like Nome. There are no beach areas that live long and permit structures to stay there and with climate change upon us the small rise that we have had in my lifetime will soon look like markings with a marks a lot. The UN already acknowledges that millions of refugees are being dislocated by climate change. Maybe just do like the casinos in Mississippi and just anchor along the beach.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Roland Neal  
4172 Craven Pines Rd  
Sophia, NC 27350-8058  
(336) 861-0579

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Barbara Stoudenmire [bstoudenmire@carolina.rr.com]  
**Sent:** Sunday, March 21, 2010 6:02 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

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We must protect these areas. Once lost they are gone. We can build buildings all day long but if we destroy our beaches and wildlife habitat they are gone for good. Who will come when the land has been destroyed? Do not reverse this ban just to satisfy a few. Do what will make the most happy and be for the greater good of all now and the future.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of David Grant [dagrant@davidson.edu]  
**Sent:** Sunday, March 21, 2010 1:28 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

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My personal perspective on this issue is driven by 56 years of work, study, research and teaching that has spanned the East Coast from Cape Cod Bay to the Dry Tortugas. From 1956 to 1972 I spent part or all of each year at the Marine Biological Laboratory in Woods Hole, MA. My doctoral degree in Biology from Yale University in 1965 as a student of G. Evelyn Hutchinson was based on research at Barnstable Harbor on the Cape. In alternate, odd-numbered years from 1979 to 2004 (as part of my 36 years of teaching Ecology, Invertebrate Zoology and Marine Biology at Davidson College) I led students on 13 semester programs that compared the shallow water marine invertebrate communities at 200 mile latitude intervals from the Duke Marine Lab in Beaufort, NC to Sapelo Island, GA (University of Georgia Marine Institute) the Tampa Bay area (working out of Hillsborough Community College's two labs) a few days in the 10,000 Islands Wilderness of the Everglades and ended at the Keys Marine Lab

in Layton, FL on Long Key a two night, three day snorkel and dive exploration of the Dry Tortugas based on a live aboard dive boat. I cannot adequately emphasize the importance of strengthening not weakening coastal protection globally and especially in the United States where our tendency is to feel that our knowledge and engineering prowess make us immune from natural laws and consequences.

Most of our experience has borne out the "Law of Unintended Consequences" when it comes to hard stabilization of coastal regions on our three coasts. In this period of increasing fragility of these environments, as we hope to put more demands on them for food and other resources for increasing national and global populations, it seem foolhardy to increase the risk of coastal disasters.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Dr David Grant  
PO Box 1598  
137 Morrison Hill Rd  
Davidson, NC 28036-0078  
(704) 892-6231

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Correne Anderson [cori@ceaphotography.com]  
**Sent:** Sunday, March 21, 2010 9:59 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Having grown up in Florida, I am very familiar with the negative and expensive effects of bad building decisions along beaches. Not only is the environment negatively impacted, but the amount of money and effort that hardened structure building along coastline requires is exhaustive and draining....once the damage is done, it means huge dollars are necessary to fight against the effects created by erosion and flooding inherent to artificial coastline changes.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

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leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Ms Correne Anderson  
111 Azalea Ave  
Swannanoa, NC 28778-2415

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Jeremy Todd Sturgell [esbyoda@yahoo.com]  
**Sent:** Monday, March 22, 2010 9:28 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

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Many of our wonderful coast towns are already overdeveloped, with condos and businesses sitting empty. Let's keep the ban in place and let developers focus on updating previously existing developments that were poorly planned in the first place! They've ruined enough of our coastal resources. Keeping (or strengthening) the ban would force the industry to look to their previous mistakes for further development, not the coast that makes North Carolina home to the most unique and amazing coastline in America.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward

development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Jeremy Todd Sturgell  
1509 Shackleford St  
Morehead City, NC 28557-4044

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Bill Mulvey [bmulvey@wcpss.net]  
**Sent:** Monday, March 22, 2010 8:28 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

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I work at Jockey's Ridge State Park during the summer and surf at Wrightsville Beach year-round. As a native North Carolinian I've seen the changes caused by development. The increased pressure on the beach environment has greatly reduced beach size and at several inlets greatly impacted large portions of the back dunes and destabilized the island. I urge you to uphold the ban on hardened structures as areas where I've seen them used erosion is greatly accelerated. I've seen this occur at the south end of Emerald Is., the north end of Figure Eight Is., along the area in front of the Comfort Inn in southern Nags Head, and the Shell Island Resort at Wrightsville beach. As a tax payer I see these as areas where we can better spend our money by limiting the use of hardened structures and educating the public to the dynamic nature of the beach. Beaches are moving constantly and trying to stop their movement with artificial structures is not possible and economically irresponsible.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Bill Mulvey  
4408 Surry Ridge Cir  
Apex, NC 27539-8906  
(919) 362-7569

**Walker, Michele**

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of George Santucci [george@ncnr.org]  
**Sent:** Monday, March 22, 2010 8:27 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

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As an appointee to the newly created Mountain Resource Commission, I can relate to the challenges and pressures that come with serving. It is hard to stand by unpopular decisions even when they are best for North Carolina's beautiful coast and beaches.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr George Santucci  
PO Box 1480  
National Committee For the New  
West Jefferson, NC 28694-1480  
(336) 982-6267

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Don Richardson [gaia@citcom.net]  
**Sent:** Sunday, March 21, 2010 8:01 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

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WHAT CAN SOME PEOPLE BE THINKING? ARE THEY THINKING AT ALL? IT WILL SOON BE TIME TO GET RID OF ALL THE MEDIEVAL THINKERS AND GET SOME LEADERSHIP WITH FUNCTIONING CENTRAL NERVOUS SYSTEMS. SURVIVAL IS WHAT WE WANT!

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Dr Don Richardson  
577 Windover Dr  
Brevard, NC 28712-9383  
(828) 884-3435



## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of John Csernecky [mrmustache@atmc.net]  
**Sent:** Sunday, March 21, 2010 8:01 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

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NC

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It is absolutely foolish to try and stop the movement of the seas. The Dutch have spent hundreds of millions of dollars keeping the sea from land they reclaimed. How many millions will be required to protect those dwellings which should never have built to begin with. We have a policy in place, leave it alone!

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr John Csernecky  
42 Sunfield Dr  
Carolina Shores, NC 28467-2321  
(973) 875-5435

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Alden Hanson [aldenhanson@embarqmail.com]  
**Sent:** Sunday, March 21, 2010 7:59 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

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Thirty years ago my husband and I heard a talk by then Duke geologist Orrin Pilkey at a meeting in Raleigh. He spoke convincingly and eloquently about North Carolina's need to ban hardened structures on the coast. With a vivid slide show of the destruction caused by seawalls and other efforts to control the natural movement of the coastal sands Mr. Pilkey's approach was certainly based on sound science.

This expert's advice then - to ban hardened structures on our coastline - still holds true now. Please support our current ban on hardened structures on our coast. As Orrin Pilkey titled his book, I admonish you to remember, "the beaches are moving!"

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Ms Alden Hanson  
7412 Rocky Ridge Rd  
Wake Forest, NC 27587-5973  
(919) 556-5039

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Becky Fields [bfields@ec.rr.com]  
**Sent:** Sunday, March 21, 2010 7:31 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

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Hardened structures have a negative impact even in less endangered areas. Our own home sits on a tidal creek in Carteret County, very near Bogue Sound. As our neighbors have added bulkheading to their property, we have seen the character of our creek change, the pollution increase, and our natural shoreline erode. We have to stop this trend and protect our coastal environment.

North Carolina's coast is one of our most valuable resources and it also attracts many visitors. We have to take action to assure that it is not DESTROYED by unwise development. Please vote to continue a very strict ban against hardened structures. NC's future depends upon your actions now.

Ironically, a policy shift on hardened structures would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Becky Fields  
511 Deer Creek Dr  
Cape Carteret, NC 28584-9702

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Michael Brown [cmbrown@mindspring.com]  
**Sent:** Sunday, March 21, 2010 6:59 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

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The beaches of North Carolina are among the most beautiful in our country if not the world because they have maintained their natural character. While it's true that they are threatened today due to sea level changes, we need to work to solve that problem rather than buttress our beaches in the hopes that we can 'out engineer' the ocean... the latter is a fool's game as has been demonstrated time and time again.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

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Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Michael Brown  
1104 Hemingway Dr  
Raleigh, NC 27609-6026

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Anne Guite [nicoleguite@hotmail.com]  
**Sent:** Sunday, March 21, 2010 6:31 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

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We have a very vulnerable coast and hardened structures will lead to more erosion in a unnatural way. Our beaches shift and move and this can not be controlled or stopped. Nothing positive comes from hardened structures and leads the state to have to spend more tax money.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mrs Anne Guite  
1314 Bar Harbor Dr  
Wilmington, NC 28403-3801  
(910) 509-0721

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Joan Williams [jowill1@bellsouth.net]  
**Sent:** Sunday, March 21, 2010 5:27 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

As a lifelong resident of North Carolina and growing up in Jacksonville, over my lifetime I have seen our beaches go from pristine and beautiful to ugly and unappealing. Once we as residents were able to go to the beach freely and did not have to worry about going to a public access area. I have seen hurricanes and n'oreasters come hit our coastline and the aftermath of these storms. These storms are an act of mother nature and they serve a purpose by cleaning the beaches as well as cutting new channels, widening or closing existing waterways. I have observed the futile attempts to stop the eventual affects of nature and these stop gap measure just do not work. When are our lawmakers going to realize that the money spent is just washing away with the waves. We cannot stop mother nature so these barriers will damage our coastline as well as be an eyesore. Once upon a time I was proud of our beaches but not now, ugly with structures everywhere because of the greed of tourism money. I am a realist but please consider keeping the ban on hardened structures and do not try to alter our coastline. Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?



Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mrs Joan Williams  
1400 Alderman Cir  
Raleigh, NC 27603-8953

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Margie Rhodes [rhodes\_m@bellsouth.net]  
**Sent:** Sunday, March 21, 2010 2:02 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Those who's home is here, in NC, know the damage that has been being done over the years due to our 'popularity'. The "old" NC is gone, as are many of the wild places that made it so unique. We will never have that beauty back.

While the beauty is simply gone in some areas, there is still some hope to limit the damage to our coast. The coasts are damaged, but not irreplaceably lost. Please help our coasts remain a place for our children to witness beauty.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mrs Margie Rhodes  
6917 Guy Johnson Ln  
Raleigh, NC 27603-8385  
(919) 772-8298

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of David Cook [dcook@dac-and.com]  
**Sent:** Sunday, March 21, 2010 2:01 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

It is well understood among educated people that hardened structures accelerate damage by the forces of the sea, and the result is more loss of resources and greater costs in future years. We cannot afford to do it that way just to assuage temporarily the fears of rich, greedy, influential people. The cost will be borne by the ordinary taxpayer, and that is one of the main things the government exists to prevent. Please work for us, instead of for the greedy and influential.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Dr David Cook  
411 E Cannon Ave  
Albemarle, NC 28001-4231

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Chloe Tuttle [info@bigmill.com]  
**Sent:** Sunday, March 21, 2010 1:31 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Please keep the ban on hardened structure for our beaches.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Ms Chloe Tuttle  
1607 Big Mill Rd  
Williamston, NC 27892-8032  
(252) 792-8787

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Dee Stenton-Litchford [deel1776@aol.com]  
**Sent:** Sunday, March 21, 2010 12:41 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Please! I have lived in NJ for the first 51 years of my life. DO NOT let the NC beaches have happen what happened to the NJ beaches! Even living 50 minutes from the Jersey shore, I would travel 10 hours to come to the NC beaches because they were MUCH less crowded, no homes overtaking the beaches and, because of this, much cleaner. PLEASE KEEP THE BAN ON HARDENED STRUCTURES!! Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Ms Dee Stenton-Litchford  
111 My Place Ln  
Franklin, NC 28734-1135  
(828) 349-9227

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Phillip Irwin [phlpirwin@gmail.com]  
**Sent:** Sunday, March 21, 2010 11:28 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

North Carolina has, thus far, managed to hold a stellar leadership roll in the matter of beach management. Just compare our beaches to those of other East-Coast states. Our winning strategy?? Denying the maternally incestuous developers that which they "absolutely must have, or our whole industry (industry???? buggery is more like it) will die and leave pestilence upon the land!!!) All said with much gnashing of teeth & rending of garments.

Keep and enforce the ban on hardened structures!

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

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Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward



development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Phillip Irwin  
230 Pecan Rd  
Raleigh, NC 27603-2804

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Janice Verhaeghe [janverhae@aol.com]  
**Sent:** Sunday, March 21, 2010 11:07 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

For years I have visited the North Carolina beaches and experienced the erosion and loss from development on these beautiful areas. They should be protected so that my grandchildren and generations to come can go there and experience one of the most extraordinary of nature's gifts to us.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Janice Verhaeghe  
43 Eller Ford Rd  
Weaverville, NC 28787-9579

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Oscar Barnhardt [obarnhardt@yahoo.com]  
**Sent:** Sunday, March 21, 2010 11:02 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

March 20, 2010  
Oakboro, NC

Dear Sirs:

Developers and owners of personal homes on the North Carolina oceanfront have long been given too much concession; nature and the the rest of our nation pays for their selfishness. There will likely never be an end to the relentless effort on their part. Match their relentlessness and do not give an inch on this matter.

Oscar Brooks Barnhardt  
Stanly County, NC

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Oscar Barnhardt  
PO Box 486  
Oakboro, NC 28129-0486  
(704) 485-8795

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Neil Stroud [nstroud@nc.rr.com]  
**Sent:** Sunday, March 21, 2010 10:31 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

But for my time in the Army overseas, I have spent my 56 years in North Carolina, and from my earliest memories with my parents, to visits with my young daughter when home on leave, to today, when Gayle and I, now empty nesters, head to the coast to enjoy our beautiful beaches. Through my university studies, I've learned of the fragile ecosystems of our outer banks, and fully understand the damage that hardened structures do to our beaches. Allowing developers to put in hardened groins and seawalls will destroy the adjacent beach. Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr and Mrs Neil Stroud  
1030 Bellenden Dr  
Durham, NC 27713-9282  
(919) 484-7328

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Chris Woolridge [chris\_woolridge@hotmail.com]  
**Sent:** Sunday, March 21, 2010 10:09 AM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 21, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

We do not need any more riprap on our beaches. This is not going to help anyone but a limited few "privileged" individuals who have taken an enormous, yet dubious risk of building on the sand.

To help with this important decision, a little reminder from the Bible (wisdom nearly 2000 years old, yet especially relevant in this case).

Luke chapter 7 verse 24-27:

"Therefore everyone who hears these words of mine and puts them into practice is like a wise man who built his house on the rock. The rain came down, the streams rose, and the winds blew and beat against that house; yet it did not fall, because it had its foundation on the rock. But everyone who hears these words of mine and does not put them into practice is like a foolish man who built his house on sand. The rain came down, the streams rose, and the winds blew and beat against that house, and it fell with a great crash."

Our policy should be to plan to move people away from the ocean, not as close to it as possible.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr Chris Woolridge

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Mark Stanback [mastanback@davidson.edu]  
**Sent:** Monday, March 22, 2010 4:59 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

Several members of my immediate and extended families own vacation homes at Figure 8 island, and we are all firmly in favoring of MAINTAINING THE BAN. Furthermore, as a professional ecologist (who also spent a semester at the Duke Marine Lab), I know plenty about coastal ecology. The data in favor of maintaining the ban on hardened structures is strong (and it is worth noting that those that oppose the ban have a huge monetary incentive for doing so. Those that oppose hardened structures have nothing to gain financially from their stance.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward



development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Dr. Mark Stanback  
515 Pine Rd  
Davidson, NC 28036-9045  
(704) 896-3570

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Pat Wang [patwangnc@yahoo.com]  
**Sent:** Monday, March 22, 2010 4:58 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

NC is known for its effective beach preservation program. The only reason to overturn the ban would be to develop the area, and that would be a disaster. There is too much beach development already.

Since hurricanes have been known to hit the NC coast, there is no decent reason to develop the area.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Ms Pat Wang  
4289 Perna Ln  
Iron Station, NC 28080-9560

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Richard Yates [ryates3@nc.rr.com]  
**Sent:** Tuesday, March 23, 2010 7:53 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

As a property owner in Corolla and having grown up on the southern New Jersey shore I am very aware of coastal shoreline dynamics. I have witnessed the effects of seawalls, jetties, groins, and piers on the beaches of NJ---not a pretty picture. I know much is at stake for some ocean front property owners and communities but trying to hold back the ocean is a very expensive and ultimately futile exercise. Those who chose to purchase property and reside on the oceanfront do so at their own risk! Allowing hardened structures at selected locations only delays the inevitable and shifts the effects to other property owners at other locations along the coast. The proper policy choice for NC is to continue the ban on placement of hardened structures.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mr. Richard Yates  
7828 Harbor Dr  
Raleigh, NC 27615-4515

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of R Keto [stutzdriver@gmail.com]  
**Sent:** Monday, March 22, 2010 10:22 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Barrier islands move. Sea levels rise. Concrete and sand bags won't change these facts. Just look at the mess New Jersey made of its beaches by building concrete retaining walls. Now they have NO BEACHES!!!

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mr R Keto  
3405 Wedgewood Dr  
Trent Woods, NC 28562-7723

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Melissa Rooney [mmr121570@yahoo.com]  
**Sent:** Monday, March 22, 2010 9:00 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

I AM BEGINNING TO LACK FAITH IN ALL DEVELOPMENT PRACTICES AND THOSE WHO PROFIT FROM THEM, AS A RESULT OF THE ABUSES I HAVE SEEN IN DURHAM COUNTY AND THROUGHOUT THE STATE OF NC. PLEASE HOLD THE DEVELOPMENT COMMUNITY ACCOUNTABLE FOR THE RESULTS OF THEIR ENVIRONMENTALLY AND FISCALLY (FOR LOCAL RESIDENTS) IRRESPONSIBLE DEVELOPMENT PRACTICES. AND PLEASE PREVENT THEM FROM CONTINUING DEVELOPMENT PRACTICES THAT CAUSE DAMAGE TO OUR COASTS, WATERWAYS AND OTHER NATURAL RESOURCES.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Dr Melissa Rooney  
301 Spring Garden Dr  
Durham, NC 27713-7535  
(919) 484-9737

## Walker, Michele

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**From:** Site Administrator [audubonaction@audubon.org] on behalf of Allan Will [allan@splitrock.com]  
**Sent:** Monday, March 22, 2010 9:00 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

I have enjoyed the beautiful North Carolina Beaches since I was a child. I now own a home on the coast of North Carolina's northern Outer Banks, across the street from the Pine Island Audubon Refuge.

The North Carolina beaches are true examples of some of our country's most spectacular natural beauty. My family and I volunteer with the Network for Endangered Sea Turtles and the NC Audubon Society.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban on hardened structures. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding policy. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Please preserve this natural wonder by maintaining the ban on hardened structures!

It makes little sense to overturn or relax the ban when in a short time the Coastal Resources Commission could have the benefit of insight from additional studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk? Your leadership is needed NOW to make wise, measured decisions.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

**Walker, Michele**

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Mary Pruneau [jlpmpcpx@aol.com]  
**Sent:** Monday, March 22, 2010 9:00 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

We have the most beautiful coast on the Atlantic . Please do not do away with the ban on hardened structures.

Why do humans always think they are better judges than nature!

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mrs. Mary Pruneau  
1201 Glendale Dr  
Raleigh, NC 27612-4772



## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Janette Ledford [jjledford602@att.net]  
**Sent:** Monday, March 22, 2010 8:30 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I realize the pressures that the public and private outcry for development on our beautiful beaches can create. The need for leadership to protect these fragile areas is most important now, when information is still being gathered, and the risk for damage is so great.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mrs. Janette Ledford  
225 Elm Ave  
Hudson, NC 28638-2435

## Walker, Michele

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**From:** Site Administrator [audubonaction@audubon.org] on behalf of Robert Cherry [cherryleigh@bellsouth.net]  
**Sent:** Monday, March 22, 2010 8:30 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

As a frequent visitor to our coastal areas I am concerned that the CRC might allow hardened structures that will create long-term damage to our beaches. There have been many studies along our nation's coasts that show that altering water flow and sand deposition benefits one area while harming others. In the long-term they do not work and merely delay the inevitable while causing more erosion at adjoining beaches.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mr. Robert Cherry  
301 Perkins St  
Boone, NC 28607-5313

## Walker, Michele

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**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Robbie Lane Jackson [robbielane@earthlink.net]  
**Sent:** Monday, March 22, 2010 8:29 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

I am an owner at both Emerald Isle, NC (ocean side), and in Wake County. Please keep our beaches intact, no hardened structures, no dredging, and most important to me, no destruction of the dunes and NO OFFSHORE DRILLING, DREDGING, or EXPLORATION. Our reef and undersea shore areas are still pretty pristine. Let's not let them die like so many places in the Caribbean, Tx, MX and others. Purdue is in favor of possible offshore drilling.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mrs Robbie Lane Jackson  
4805 Bentcreek Dr  
Fuquay Varina, NC 27526-7512  
(919) 552-3091

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Suzanne Jones [topgun2@citcom.net]  
**Sent:** Monday, March 22, 2010 8:00 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

Trying to "contain" the ocean results in consequences that cannot be controlled by man. It is the nature of the ocean to have a continuously altered coastline. Adding artificial structures prevents this natural occurrence, and just moves the natural change further along, exacerbating the problem.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Suzanne Jones  
1195 Stone Dr  
Brevard, NC 28712-7686



## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Cary Paynter [dmpaynter@earthlink.net]  
**Sent:** Monday, March 22, 2010 6:29 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

There is no good evidence to support the efficacy of hardened structures in preventing erosion without increasing damage to other sites. The NC coast is a dynamic system with complicated variables at work and as yet too little knowledge about how these variables interact. The most prudent policy for such a coast is flexibility. Keep future development away from beach edges and inlets and protect what is already there by preserving or creating natural buffers such as saltmarsh and oyster reefs.

North Carolina has been a leader in the protection of the coast through our ban on hardened structures. I am a NC resident, live on the coast and am on a tidal creek so I don't speak as a stranger to the problem.

We have already seen with Mason Inlet what happens when an inlet is developed supposedly at private cost with private risk. It is taxpayers who pick up the costs when the inlet moves as inlets always have and always will. This is not the time to burden the public with more costs so that the wealthy few who own unstable waterfront property can protect their investment with public money.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mrs. Cary Paynter  
6242 Head Rd  
Wilmington, NC 28409-2216

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Darwin Ferry [darspix@earthlink.net]  
**Sent:** Monday, March 22, 2010 5:59 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 22, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

North Carolina has a ban on hardened structures on the beach. This has been effective in limiting marked erosion of the beach. Recently there has been pressure to relax this ban. A drive up the coast to New Jersey will show the effects of hardened structures. Please do not reverse North Carolina's enlightened policy.

Sincerely  
Darwin Ferry MD  
609 Dock St.  
Wilmington, NC.  
28401

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for

development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Dr. Darwin Ferry  
609 Dock St  
Wilmington, NC 28401-4629

**Walker, Michele**

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of T Butler [butlerltnc@earthlink.net]  
**Sent:** Tuesday, March 23, 2010 9:53 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

As you well know, North Carolina's dynamic Outer Banks and other barrier islands have shaped our state's history and created a unique habitat for wildlife. They have become economic engines, as they draw huge and growing numbers of tourists to vacation on our wide, sandy beaches.

As experts on the nature of these narrow, rolling islands, the CRC members understand that human efforts to stabilize the islands and the inlets through them are a short-term solution at best. Such efforts come at massive cost to North Carolinians and jeopardize the very features that make the coast so attractive to visitors, both human and wild.

I urge the CRC to plan for the future and maintain the ban on hardened structures. Keeping our coastline as natural as possible and protecting the beaches for public use must take precedence over the interests of a few vocal opponents. As sea level rises, the notion of "finger in the dike" measures becomes ever more costly and dangerous.

At the very least, I urge you not to consider overturning or weakening the hardened structures ban until after the current federal study and the coastal adaptation strategies are completed and their recommendations have been received.

The citizens of North Carolina and the entire nation rely on your wisdom, foresight, and leadership.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mrs. T Butler  
628 Cedar Ln  
Reidsville, NC 27320-9350

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Chris Pruneau [jcpruneau@mactec.com]  
**Sent:** Tuesday, March 23, 2010 8:53 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

I am opposed to lifting the ban on hardened structures because the science and engineering studies prove that for the most part hardened structures cause enviromental damage and undesirable aesthetics to our beautiful coastline.

As a long-time surfer and coastal property owner I could be selfish in my opinion and say that hardened structures are good for me because they create good surfing and can protect certain properties. The problem is that while they may protect a certain property or cause accretion in one area, the natural sediment movement is altered, resulting in erosion at other locations. My gain is some other property owners loss or the environments loss, and when the environment looses all us humans and wildlife that use and enjoy our coastal resources loose.

Aside from the bad science and enineering, I know that in most peoples opinion a groin or other structure is aesthically out of place in this natural setting. North carolina has for the most part learned from the mistakes of other coastal states that have allowed hardened structures and ended up with a diminished environment that ends up costing the public much more in the long-term.

Sincerely,

J. Chris Pruneau  
225 Shorepoint Drive  
Wilmington, NC 28411

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mr. Chris Pruneau  
225 Shorepoint Dr  
Wilmington, NC 28411-9471

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Margaret Scott [mt\_scott@mindspring.com]  
**Sent:** Tuesday, March 23, 2010 10:53 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I grew up in North Carolina and have been visiting our beaches for over 40 years as well as areas outside NC where hardened structures exist. Allowing hardened structures will change forever the natural uniqueness of the NC coast for the financial benefit of a few who make unwise decisions.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Margaret Scott  
800 E Rosemary St  
Chapel Hill, NC 27514-3722

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Maura High [maurahigh@mindspring.com]  
**Sent:** Tuesday, March 23, 2010 1:24 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

There's no compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures.

The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Maura High  
307 Bluebridge Rd  
Carrboro, NC 27510-1223



## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Sarah Whitfield [sarah.whitfield@tengion.com]  
**Sent:** Tuesday, March 23, 2010 2:24 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 23, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Hardened structures are not only an eyesore to the visitors and locals alike, they make the shoreline unusable and created increased erosion by deferring wave impacts to areas that are not hardened. The ban on hardened structures in North Carolina has set us apart from other coastal communities which use the bad engineering practices. The continued absence of hardened structures makes North Carolina more appealing to tourism and upholds our value of our beautiful coastline.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

Mrs Sarah Whitfield  
2705 Midpines Dr  
Winston Salem, NC 27127-7213  
(252) 917-0585

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Ida Phillips [idawillsp@gmail.com]  
**Sent:** Tuesday, March 23, 2010 12:53 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

As a native North Carolinian, I believe that our beaches are some of the most beautiful in the world. Their beauty is due in great part to our forward-thinking policy prohibiting the construction of unsightly and ineffective jetties, groins and seawalls.

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Ida Phillips  
1586 Luther Rd  
Apex, NC 27523-7397

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Bonnie L Parker [bonnielparker@gmail.com]  
**Sent:** Tuesday, March 23, 2010 10:53 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

I was a 50-year resident of NJ and saw first hand the damage done to the NJ coastline due to hardstructures put up too halt the movement of sand. How ludicrous it proved, as anyone can observe. Poor NJ! Please - don't let NC's beaches go in the same direction!

A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, in so doing, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition, leadership is sorely needed.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Bonnie L Parker  
6 Ridgeway Ave  
Asheville, NC 28806-4665

## Walker, Michele

---

**From:** Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Barry Lentz [uncbrl@med.unc.edu]  
**Sent:** Monday, March 22, 2010 12:33 PM  
**To:** Gregson, Jim  
**Subject:** Please uphold our state's historic ban on hardened structures

Mar 22, 2010

Chairman Bob Emory  
NC

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. Just this month, a Coastal Resources Commission panel released a report estimating future sea-level rise. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to reduce risk from sea level rise. The National Oceanic Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas. Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Up to now, the ban on hardened structures has kept North Carolina's coast one of the most desirable on the east coast. People come from around the world to enjoy its beauty and gentle beaches. Ruining this natural resource would make a few developers and land speculators rich in the short run, but would have a very deleterious effect on our tourist industry in the long run. Ultimately, the citizens of North Carolina would bear a great long term loss in order to create these short term profits for a few.

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. The CRC's limited resources are better directed toward development of comprehensive adaptation strategies. As is true in all times of transition,

leadership is sorely needed. I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: members, CRC

Sincerely,

N/A Barry Lentz  
179 Tradescant Dr  
Chapel Hill, NC 27517-8942



North Carolina Department of Environment and Natural Resources  
Division of Marine Fisheries

Beverly Eaves Perdue  
Governor

Dr. Louis B. Daniel III  
Director

Dee Freeman  
Secretary

March 23, 2010

Bob Emory, Chairman  
N.C. Coastal Resources Commission  
C/o N.C. Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557

Dear Mr. Emory,

The N.C. Division of Marine Fisheries (DMF) has reviewed the Final Terminal Groin Study prepared by Moffitt and Nichol for the Coastal Resources Commission (CRC). After reviewing this information the DMF does not believe the scientific evidence and conclusions of this report support a change in North Carolina's policy on hardened structures on oceanfront shorelines. Our concerns include:

The General Assembly asked the CRC to assess the environmental effect of terminal groins. The effect of terminal groins on fish use was not assessed. The consultant found no fish or benthic invertebrate monitoring data associated with any of the five study groins. However, they draw the conclusion that the "marine resources" continued to use the sites. This statement is based on no data.

The report does mention some of the potential impacts to fish and fish habitat reported in the literature. For example, they include information on potential impacts to fish larval transport. Research in North Carolina has found that jetties adjacent to inlets block the natural passage for larvae into inlets, reducing recruitment success. It was estimated that the proposed Oregon Inlet jetties would reduce larval entry by 60-100% (Miller 1992; Blanton et. al. 1999). Although groins are shorter, there is no information currently available to know how those structures will affect currents and larval transport. Because the majority of North Carolina's important fishery species spawn offshore and must pass through inlets to reach their nursery grounds, any impact on nursery recruitment could have serious effects on fish populations.

The conclusions of the environmental section underplay the impact that anchoring a barrier island with a terminal groin will have on barrier island processes, which in turn will negatively affect fish, shorebirds, and the estuarine system overall. Barrier islands sustain themselves under rising sea level conditions through overwash processes and shifting inlets, which move sand to the back side of the island. Without the continuation of these processes, long term impacts will occur, including loss of sand flat habitat and back-barrier marsh. The former provides critical habitat for some bird species and the latter provides critical nursery areas for estuarine dependent fish such as red drum, Atlantic croaker, and shrimp. By preventing barrier island migration, an island is more vulnerable to inundation by rising sea level, which would greatly affect the estuarine environment.

Stabilizing the inlet will also result in a deterioration of ebb and flood tide deltas. However, the document fails to mention the effect that inlet stabilization will have on these shoals, and consequently, fish habitat. These shoals are important foraging areas for numerous fish, including summer and southern flounder, red drum, speckled trout, Spanish mackerel, and weakfish.

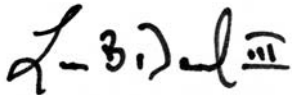


The study states that use of terminal groins does not eliminate the need for beach nourishment and that once a terminal groin is constructed, regular beach nourishment is conducted on a regular basis. Because nourishment projects were not done adjacent to inlets prior to groin construction, the amount of beach nourishment will actually increase after a groin is installed. Beach nourishment results in a temporary reduction in the abundance and diversity of the intertidal benthic community, which is the dominant food source for surf fish such as pompano, kingfish, spot, and croaker. Recovery time of the beach community varies from a few months to over two years, depending on sediment compatibility, length of beach filled, frequency of nourishment, and other factors. If there is no net reduction in beach nourishment with use of terminal groins, this hardened structure would result in increased environmental impacts and increased economic costs, and therefore does not appear to be advisable.

This study failed to demonstrate that the use of terminal groins alone would be an effective erosion control technique and therefore feasible. While beach width increased immediately next to the groin, erosion was observed on the updrift beach (on the opposite side of the terminal groin) for a limited distance, and also downdrift of the terminal groin after about the first mile, indicating use of terminal groins may cause impacts to adjacent beaches. In addition, all of the five terminal groins had additional hardened structures associated with them. For example, Oregon Inlet has a wrap around revetment, Amelia Island has a breakwater, and Captiva Island, following the terminal groin construction, had a rock revetment, seawall, and linear extension of the original terminal groin was added. If a terminal groin alone was effective, why were these additional structures needed? Is North Carolina prepared to allow these other hardened structures as well, after terminal groins are installed and found to be insufficient? The environmental impacts of seawalls, jetties, and breakwaters are well documented.

Because this study failed to adequately assess the feasibility and advisability of terminal groins with any certainty, particularly the environmental effects on fish and their habitat, DMF respectfully requests that the CRC recommend to the General Assembly that they maintain the current ban on all hardened structures on ocean shorelines, and rely on the existing exemptions authority to allow terminal groins where applicable. Providing an alternative option to allow terminal groins under certain conditions sends a confusing and misleading message that the scientific evidence supports use of terminal groins, which it does not.

Sincerely,

A handwritten signature in black ink, appearing to read "L-B-Daniel III".

Louis B. Daniel III, Director  
N.C. Division of Marine Fisheries

cc: Dee Lupton, DMF Deputy Director  
Anne Deaton, DMF Habitat Protection Section Chief  
DMF District Managers  
DMF Biological Supervisors

LBD/ad/cb

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Tuesday, March 23, 2010 3:41 PM  
**To:** Willis, Angela; Walker, Michele  
**Subject:** FW: Groin Report Comments  
**Attachments:** TerminalGroinReportComments.doc

-----Original Message-----

From: Rob Young [mailto:[ryoung@email.wcu.edu](mailto:ryoung@email.wcu.edu)]  
Sent: Sunday, March 21, 2010 1:02 PM  
To: Emory, Bob; Gregson, Jim  
Subject: Groin Report Comments

Hi Bob: FYI and for the full CRC meeting. Additional members of the Science Panel have signed onto the comments I circulated earlier.

Best  
Rob

Robert S. Young, PhD (Licensed Professional Geologist in NC, SC, FL) Director, Program for the Study of Developed Shorelines Professor, Coastal Geology Western Carolina University Belk 294 Cullowhee, NC 28723 828-227-3822, FAX 828-227-7163 [ryoung@email.wcu.edu](mailto:ryoung@email.wcu.edu) [psds.wcu.edu](http://psds.wcu.edu)

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## Comments in the Terminal Groin Study: Final Report

Submitted to the CRC

By Robert S. Young, PhD, PG.

Antonio Rodriguez, PhD

Stan Riggs, PhD

Pete Peterson, PhD

David Mallinson, PhD

Steven Benton

March 17, 2010

We have participated in all aspects of Science Panel evaluation of the study and would like to submit the following summary comments for consideration of the CRC

- 1) There was no formal process established for the Science Panel to review and comment on the document in a traditional peer review fashion. While we did have an opportunity to comment on the study as it progressed, no system was established for the Science Panel to reach consensus on recommendations, request changes from the consultant, and ensure that those changes were carried out. This was not the consultant's fault. We do believe that they listened to our input, but much of what to include and not include was left up to them. We did not have an opportunity to review the final document nor the overarching conclusions in the Executive Summary. Therefore, the CRC should not consider the final report to have been entirely reviewed or endorsed by the Science Panel.
- 2) We do not understand why the NCDENR and DCM logos appear on every page of the document. It is our understanding that DCM did not review or endorse the report, in fact, DCM has taken a very "hands off" approach to this study. The logo, used as it is, implies endorsement.
- 3) The report indicates clearly that there is uncertainty involved in the data collected, conversion to volume change, impacts of dredging, and processes not examined (storm impacts or geological control). This uncertainty is unquantified in the report and is probably unquantifiable. Yet, some fairly sweeping conclusions are drawn anyway. We understand the desire to produce a report that makes affirmative statements rather than equivocation, but we feel that many of the conclusions in the Executive Summary overreach.
- 4) Examining the data reported in the study, one sees that the incremental, alongshore response pre- and post-structure at each study site is complex and not given to generalization. Some sites have been so heavily impacted by dredging and beach nourishment that sorting out the impacts/benefits of the structure is impossible. We will agree that the report does not indicate a clearly definable negative impact from the structures studied. However, the report does not delineate a clearly defined benefit of any of the structures either. Certainly, a terminal groin can be used to hold the tip of the island in

- place, but this only benefits a small number of people. Large-scale beach nourishment is still required at all sites. The report does not demonstrate a linkage between building a structure and a reduced need for beach nourishment or any cost savings at the study locations.
- 5) The most important question is: “was maintaining the shoreline less expensive after building the structure than before?” The report does not address this directly, but based on the construction costs estimated and the demonstrated need for continued nourishment, the answer to the above question is probably no.
  - 6) There are two potentially harmful impacts of any terminal groin that are not addressed by the report:
    - a. Does a large terminal groin on the downdrift side of an inlet block any sand from naturally bypassing that inlet? There is a legitimate assumption that dredging and offshore disposal deprives the downdrift island of sand. The geological community has always been concerned that a relatively large terminal groin on the downdrift side of an inlet could also prevent some sand from bypassing onto the downdrift island or change the nature of that bypassing in an unpredictable, and potentially harmful way. This concern is not addressed at all in the Final Report.
    - b. How does changing the configuration of the inlet and the location of the inlet channel impact erosion and accretion on nearby shorelines? The report clearly states that the configuration of the ebb-tidal delta and the inlet channel play a primary role in controlling sedimentary process (and thus erosion) near the inlet. The report also clearly documents that if you hold one side of a migrating inlet in place with a terminal groin, you will change the inlet morphology. Thus, a terminal groin in a location like Oregon Inlet must be having an impact on sedimentary processes, but this impact is not elucidated in the Final Report.
    - c. In truth, the consultant could not have addressed either of these concerns given the data available. Still, one must be aware that some potentially significant negative impacts of terminal structures were not addressed in the study.
  - 7) The economic analysis in the Final Report may be interesting, but it provides no guidance at all regarding the potential economic harm/benefits of a terminal structure because the zones of impact cannot be clearly delineated.

**Final Statement:** It is our opinion that the report does not contain adequate scientific evidence to overturn current state policy. It would be terribly ironic for the Science Panel to be working on improved Inlet Hazard Areas to discourage irresponsible development in areas that we know are the most vulnerable to rapid change and to storms, while the CRC would recommend that we begin building structures in those vulnerable areas to increase the likelihood that development will continue there. There are many “tools in the toolkit” that the State of North Carolina has chosen not to use. Terminal groins should continue to be one of them.



## COUNTY OF DARE

PO Box 1000, MANTEO, NC

Mr. Bob Emory  
Chairman, North Carolina Coastal Resources Commission

Re: Terminal groins

Dear Chairman Emory:

I am unable to attend today's public hearing concerning the regulation of terminal groins along North Carolina's coastal areas. However I did want to express my views and am submitting this letter in lieu of my appearance at the public hearing.

The coastline and coastal communities that have developed along our coasts are integral parts of the economy of the State of North Carolina and provide tens of thousands of jobs to the people of Eastern North Carolina. As I am sure you are aware, the coastal infrastructure that supports these communities is in peril. Homes, business, streets, public beaches and other structures important to our state and local economies are being destroyed daily by shoreline erosion. In Dare County alone, there are miles of oceanfront shoreline where homes are in ruin, are in the surf zone or are about to become part of the surf zone. In parts of Dare County we have major highways and streets that are routinely closed after even winter storms. To date our only weapons to fight this danger to our infrastructure have been temporary sand bags and shoreline renourishment. Temporary sand bags are just that, temporary, and beach renourishment projects are very expensive. We, as local governments need additional tools to protect our shorelines. Terminal groins are one of those tools.

Some would say "you can't fight mother nature" and that we need to retreat. Retreat is not an option. There is nowhere to retreat to. Ocean front property owners cannot simply move their homes or business to a new location and local government cannot simply move a street. When the oceanfront homes or streets that are in danger now finally succumb, the next row of homes or streets immediately become endangered and the process continues. What those who advocate retreat are really saying is to abandon our homes, our business, and our communities. That is not a viable or reasonable alternative and only insures that our oceanfront beaches will always be in a state of disrepair.

I encourage you and your members to explore all new methods and ideas to include terminal groins, and off shore and near shore breakwaters, to consider including all coastal ocean and shore front and not limit their location to inlets and ends of islands and to support new and innovative methods to deal with coastal erosion and climate change. The easy answer is to say no. But if we are to have clean and safe beaches, as all have agreed that we must, to throw up our hands and do nothing solves nothing and exacerbates the problem further into the future. Now is the time to act. Please provide us with rules for terminal groins and allow us to protect our beaches.

Sincerely,

Warren C. Judge, III, Chairman  
Dare County Board of Commissioners

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Friday, March 26, 2010 6:18 AM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: (no subject)

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.ncccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** AuntLanaO@aol.com  
**To:** Gregson, Jim  
**Sent:** Thu Mar 25 18:58:38 2010  
**Subject:** (no subject)

Dear Mr. Gregson,

I am sending you this email because I am frequent visitor to Ocean Isle Beach, NC. I am asking you to request the committee's support for a positive recommendation for terminal groins.

We have seen the harm done to the eastern portion of the beach by the erosion from the inlet there.

The beaches and accesses are disappearing right before our eyes.

When we visited in December, we learned that houses which were once fourth row are now ocean front.

Streets and infrastructure are now exposed. The turtles that we love to watch are no longer nesting there.

We understand that a terminal groin is a possible solution to the continued erosion caused by the inlet and that it could help stabilize the area while not adversely affecting other nearby beaches.

We hope that the committee will recommend this solution to be used as an option to protect North Carolina's coast , especially Ocean Isle Beach.

Thank you,  
The O'Connell's

## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Thursday, March 25, 2010 6:17 AM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Ocean Isle, NC Terminal Groin Project

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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**From:** Gary Bosley  
**To:** Gregson, Jim  
**Sent:** Wed Mar 24 21:25:04 2010  
**Subject:** Ocean Isle, NC Terminal Groin Project  
Hello Mr. Gregson,

I would like to ask you for the committee's support of the terminal groin project for Ocean Isle Beach. My family and I frequently visit this beach and would like to see the beach remain intact for many years to come.

At the Eastern end of the island you can see houses that are literally part of the beach and it is very sad for the owners as well as the marine life that is being affected by the erosion when a viable solution such as a terminal groin could help prevent the erosion and not bring harm to other beaches close by.

Please consider this a viable solution to help stabilize the erosion and protect one of the great beaches along the North Carolina coastline.

Thank you very much for your time.

The Bosley Family

Waxhaw, NC



## Walker, Michele

---

**From:** Gregson, Jim  
**Sent:** Wednesday, March 24, 2010 2:15 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Terminal groin review

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

----- Original Message -----

From: Mike Keleher <mike@kelebox.com>  
To: Gregson, Jim  
Sent: Wed Mar 24 12:56:24 2010  
Subject: Terminal groin review

Dear Mr. Gregson,

I am writing to you as a resident of Ocean Isle, NC to request the committee's support for a positive recommendation for terminal groins.

I see that certain groups have taken to attacking such a recommendation with the old arguments about it being the first step toward a hardening of our beaches and an impediment to sand migration. The typical argument they seem to offer is that nature should be allowed to manage itself.

As you well know, the proposed terminal groin program would be limited to stabilizing inlet areas and would not condone or open the door to any beach hardening. Further, the proposed program is designed to stabilize areas which became destabilized through MAN-MADE activities such as inlet dredging. It is disingenuous for groups to claim that stabilizing beaches is a hopeless fight against "the ocean" or "the natural patterns" when in fact it is a corrective measure against prior human actions.

I have watched the wetlands areas of Ocean Isle disappear year by year - and it seems self-evident to me that preventing the end of the island from being absorbed into the Shallotte Inlet would actually enhance wildlife, increase turtle nesting area, and restore shore-bird habitats.

We hope that you will find that the science supports this corrective activity - and that carefully managed terminal groins will provide a tool that can enhance the Carolina coast when used with care and discretion.

My family and I ask that you step beyond the black and white emotional arguments of those opposed to a positive recommendation and entrust that the CRC will know when to utilize this valuable tool against inlet erosion.

Thank you for your consideration,  
Michael Keleher and family

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Wednesday, March 24, 2010 2:14 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Ocean Isle Beach - Support for terminal Groin

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: Monica Binger <[mbinger@nc.rr.com](mailto:mbinger@nc.rr.com)>  
To: Gregson, Jim  
Sent: Wed Mar 24 13:59:49 2010  
Subject: Ocean Isle Beach - Support for terminal Groin

Dear Mr. Gregson,

Our family visits Ocean Isle Beach, NC frequently. We love it there and it is the only beach we go to. We would like to request the committee's support for a positive recommendation for terminal groins.

We have seen the harm done to the eastern portion of the beach by the erosion from the inlet there. The beaches and accesses are disappearing. Houses which were once fourth row are threatened by the ocean. Streets and infrastructure stand exposed. The turtles no longer seem to nest there.

We understand that a terminal groin is a possible solution to the continued erosion caused by the inlet and that it could help stabilize the area while not adversely affecting other nearby beaches. We hope that the committee will see the merits of this valuable tool and recommend that it be available as an option to protect North Carolina's coastal resources such as Ocean Isle Beach.

Thank you,  
The Binger Family  
Raleigh, NC

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Wednesday, March 24, 2010 6:32 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Please save Ocean Isle Erosion of the beaches

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

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----- Original Message -----

From: Wolfgang Losken <[wolfdaisy@loskens.com](mailto:wolfdaisy@loskens.com)>  
To: Gregson, Jim  
Sent: Wed Mar 24 17:09:38 2010  
Subject: Please save Ocean Isle Erosion of the beaches

Dear Mr. Gregson,

Ocean Isle is a beautiful Island and the beaches are great. We visit Ocean Isle frequently and have been distraught by the erosion of the beaches. Homes have been lost and the beaches are eroding away on the Eastern part of the island. This is a tragic loss of a beautiful part of the island.

Please, Please support the proposal of Terminal Groins. We beg you.

You have it in your power to made such a great difference to the maintenance of this beautiful Ocean Island and we ask for your positive support for this great cause.

We admire the volunteer brigade that protect the turtles and are disturbed that it seems that the turtles no longer seem to nest on the Eastern part of the island. We need you to do everything you can do to protect the welfare of the turtles. We have loved watching the baby turtles hatch and lovingly directed into the ocean for their next feed.

The Terminal Groins are a solution to the problem and you and your committee have the power to be a positive influence for a wonderful cause. We plead with you to approve the Terminal Groins.

Thank you so much for your assistance.

Daisy and Wolfgang Losken  
Cary, North Carolina

## Walker, Michele

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**From:** Gregson, Jim  
**Sent:** Wednesday, March 24, 2010 2:18 PM  
**To:** Walker, Michele; Willis, Angela  
**Subject:** Fw: Save North Carolina's coastline from hardened structures

James H. Gregson, Director  
NC Division of Coastal Management <<http://www.nccoastalmanagement.net/>>  
NC Department of Environment and Natural Resources.  
400 Commerce Avenue  
Morehead City, NC 28557  
Phone: 252.808.2808  
FAX 252.247.3330  
Toll Free: 888.912.CAMA  
E-mail [Jim.Gregson@ncdenr.gov](mailto:Jim.Gregson@ncdenr.gov)

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

----- Original Message -----

From: Site Administrator <[audubonaction@audubon.org](mailto:audubonaction@audubon.org)>  
To: Gregson, Jim  
Sent: Wed Mar 24 10:26:52 2010  
Subject: Save North Carolina's coastline from hardened structures

Mar 24, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

Please, oh please! There is so much in life that is beautiful but we are pounded/blasted every day with scenes of distruction, pain, terror, etc., our lives need to have special places of beauty set aside to help renew a sense of peace and calm. These places are here in our world naturally and we humans seem to want to destroy them at any cost just to make a few people wealthy. These beautiful scenes remain in some ways for the wealthy who can buy homes in these natural areas and these few might be able to enjoy these sites for their lifetime. But building and taking up more and more of these beautiful sites will destroy the future. (No need to explain more.)

For peace and calm in a troubled world.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Ms. Karen Hogarth  
701 Kemp Rd W  
Greensboro, NC 27410-4511

**Walker, Michele**

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**From:** Parker Chesson [jpchesson@pineywoodsroad.com]  
**Sent:** Tuesday, March 23, 2010 9:22 PM  
**To:** bob.emory@weyerhaeuser.com  
**Cc:** jgweld@gmail.com; Gregson, Jim  
**Subject:** Oceanfront Hardening Rules

Dear Bob,

I am not sure we have ever met. I was fortunate enough to be a charter member of the Coastal Resources Commission, serving from 1974-1984. That was a long time ago, but yet it seems in the recent past. I served as chairman during my last seven years, being appointed to that position by Gov. Jim Hunt. We had some rough years during that span, when powerful forces in the General Assembly wanted to abolish the program. Gov. Hunt stood strong and we weathered those threats. That decade of public service has been the highlight of my life and career. We created a program that has been a model for other states. It certainly has not stopped coastal development, as its critics said it would. But, I believe it has made development more in harmony with the fragile coastal environment.

One of our hardest efforts was to propose and adopt rules to prevent hardening of the oceanfront. Oceanfront setbacks were also controversial and opposed by many local governments and developers.

I read with interest Jack Betts' column in today's News & Observer. I strongly support his analysis of your current situation and his recommendations for the future. Though I have purposely stayed out of CRC business since 1984, his column has prompted me to write this short email. I firmly believe the ban on hardening the oceanfront was the proper course of action in 1984 and that it is the proper course in 2010. I am realist enough to know that political pressures can be great on you and your colleagues and that they cannot be ignored. They must be addressed with reason and with unbiased presentation of the facts. With that said, my experience in the public arena has confirmed that it is very hard for politicians to take the long-term view. They see the immediate and the near-term. I believed then and believe now that the ban on hardening the oceanfront is a policy with long-range implications that are for the betterment of North Carolina - and that this is a proper role for the CRC. Weakening the ban on hardening the oceanfront is a slippery slope that once started down will be much harder to stop.

I have been in your chair and know the interests that must be addressed and balanced. Motives, pressures, and needs of 1984 were not, I suspect, that much different from those of today. I extend my thanks to you and your colleagues for your hard work and dedicated service to the State of North Carolina.

Sincerely,

Parker

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J. Parker Chesson, Jr.  
5 Falcon Nest Court  
Durham, NC 27713  
919.419.0674 Home  
919.418.4845 Mobile (best contact)



## Walker, Michele

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**From:** Site Administrator [audubonaction@audubon.org] on behalf of Cynthia Tedore [ctedore@gmail.com]  
**Sent:** Tuesday, March 23, 2010 5:24 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

The beauty of the Outer Banks is mostly due to the natural beaches and dunes and the habitats for shorebirds, turtles, and other wildlife.

Lifting the ban on hardened structures will destroy the unique natural beauty of North Carolina's outer banks. Besides being intrinsically important from a conservation standpoint, keeping the ban in place will also preserve the revenue generated by eco-tourism in North Carolina.

Furthermore, as sea levels continue to rise, hardened structures such as sea walls will only temporarily delay the inevitable creep of the ocean. Such walls are enormously expensive and will inevitably end up costing more to construct and maintain than the property value of the buildings on the outer banks. Why should state tax payers' money go towards building sea walls to preserve the vacation/retirement homes of the few who are wealthy enough to buy seafront property?

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mrs. Cynthia Tedore  
208 Hampton Lee Ct Apt 2D  
Cary, NC 27513-2449

## Walker, Michele

---

**From:** Skip Klapheke [sklapheke@mindspring.com]  
**Sent:** Sunday, March 28, 2010 10:17 AM  
**To:** Gregson, Jim  
**Subject:** Terminal groins

We have a beach house on the ocean at Holden Beach and **we are opposed to artificial barriers along the shore.** The barriers just rearrange the problem.

Nature will do what nature does.

**Skip Klapheke**

**704 365 6774**

**Walker, Michele**

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of Chad Schoen [schoen@math.duke.edu]  
**Sent:** Monday, March 29, 2010 5:29 AM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 29, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

The apparent benefits of the ban are numerous:

The dynamic North Carolina coast is the most hazardous places for development in the State. The barrier islands are moving and attempts to stabilize beaches involve enormous costs and high risks and will almost certainly be unsuccessful in the long term. The ban on hardened structures helps diminish the pressure on legislatures from lobbies which see the opportunity for personal profit at the expense of the public and the health of the environment.

Thus the ban on hardened structures serves to keep the coastline in a more natural state than would otherwise be possible. This helps attract tourists who seek an environment where nature is still a dominant force.

It helps to avoid further degradation of the natural environment, especially further declines in populations of threatened species which use the coast for nesting (terns, sea turtles,...).

According to the National Oceanic Administration North Carolina is one of three states with the most vulnerable coastlines. A major, multi-million dollar federal study is now in progress concerning the probable effects of sea level rise on the North Carolina coast. Furthermore the North Carolina Division of Coastal Management is working with the universities in our state and with neighboring states on how to deal with anticipated threats to the coastline. Of course with these studies ongoing and results expected next year, it is certainly an inappropriate time to make major policy changes such as modifying the ban on hardened structures on the coast.

Even a limited giving in to political pressure to relax the ban is inappropriate as it would simply make the pressure for further relaxation even more intense. As money plays a bigger and bigger role in who gets elected to the legislature, the leadership of the CRC is more needed now than ever in setting sustainable policies which will protect the natural state of the coast and benefit the state for generations to come.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mr. Chad Schoen  
1404 Carroll St  
Durham, NC 27707-1610

## Walker, Michele

---

**From:** Site Administrator [audubonaction@audubon.org] on behalf of James McKelvey [james@wineandwords.biz]  
**Sent:** Tuesday, March 23, 2010 6:55 PM  
**To:** Gregson, Jim  
**Subject:** Save North Carolina's coastline from hardened structures

Mar 23, 2010

Chairman Bob Emory

Dear Chairman Emory,

I am writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures.

As an "Inner Banks" small business, we see tourists from all over the world who come to our NC Outer Banks as one of the last refuges of barrier island ecology. Sacrificing the long view for the sake of short term profit for developers would be a shame.

I urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

cc: Members, Coastal Resources Commission

Sincerely,

Mr. James McKelvey  
413 Pamlico St  
Belhaven, NC 27810-1421

## Walker, Michele

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**From:** Kees, Diana  
**Sent:** Friday, March 26, 2010 9:16 AM  
**To:** Biser, Elizabeth; Freeman, Dee; Hardy, Cathy; Kees, Diana; Knight, David; Kritzer, Jamie; Smith, Robin; Taylor, Kenneth; Thompson, Mary; Wall, Steve; Wilder, Manly; Jim Gregson; Walker, Michele  
**Subject:** First do no harm - Lumina News

## First do no harm

by Marimar McNaughton  
Thursday, March 25, 2010

Terminal groins, banned in 1985 by the state's Coastal Resource Commission, Division of Coastal Management, have resurfaced as new studies, one completed, one in process, have attempted to collect fresh data for a softer look at the hardened structure that has been used around the country for decades to stabilize inlets and mitigate beach erosion.

When the CRC convened on March 24, it held a public hearing that raised questions about the feasibility and advisability of the use of terminal groins along the state's oceanfront.

A terminal groin is a long wall or hardened structure adjacent to an inlet or located at the end of a coastal land mass. Regardless of its shape—in the form of a capital I, a J or an L—the purpose of a terminal groin is to control down-drift sediment loss. It is one of several hardened structures: breakwaters, bulkheads, weirs and jetties studied by coastal engineers, geologists and biologists for the potential of both its damming effects on hydrogeology and sediment transport, and its arguable damning effects on the environment.

A terminal groin study commissioned by the North Carolina General Assembly and signed into law by Governor Bev Perdue last August was subcontracted to Moffat & Nichol, which produced a 400-page document. That document, available to the public on the CRC's Web site has been reviewed by the CRC's science panel, its advisory committee and now comes under the scrutiny of the full CRC at its third of six three-day annual meetings, this one held in Sunset Beach. The public hearing attracted final comments from those in favor of lifting of the ban versus those who advise against it.

Harry Simmons, Mayor of Caswell Beach spoke in favor of the ban's lift.

"We think there are literally a handful of places where a terminal groin might be appropriate in North Carolina."

He said the area in the greatest need of inlet stabilization is at the east end of Ocean Isle Beach nearest to Holden Beach.

"There are houses there, there are town streets, there are public access ways, there are in-ground water, sewer, electrical and cable television and all kinds of other utilities that are threatened," he said.

Right now, there are large piles of sandbags protecting those areas and not long ago Simmons said he saw a manhole on the beach.

Without a groin to stabilize the inlet, Simmons argued that beach nourishment efforts would fail.

"They can't put sand on the east end of it because it can't stay because of the way the inlet has shifted in the other direction," he said.

Simmons said all candidate locations for terminal groins in North Carolina had one thing in common. "They all have big piles of sandbags. A terminal groin is better than a big pile of sandbags," Simmons said.

Sandbags have also been spotted at the north end of Figure 8 Island, and though David Kellam, administrator, Figure 8 Beach Homeowners Association attended the public hearing, but did not speak, he is not silent on the subject of inlet stabilization tooled with terminal groins.

"A terminal groin is one of multiple items for consideration," Kellam said by telephone yesterday.

"We never found any indication that a terminal groin has created any significant problem. Nor has anyone ever asked the Corps of Engineers, which puts terminal groins in on a regular basis, to remove a terminal groin; because they have always worked."

About two years ago, Kellam said the Figure 8 Beach Homeowners Association initiated an Environmental Impact Study (EIS) that is presently being directed and administered by Mickey Suggs, U.S. Army Corps of Engineers (USACE). Such a study, Kellam speculated would cost roughly \$1 million.

A report published by *Lumina News* last week, suggesting that taxpayer money might be the primary source of funding for a 1,500 foot terminal groin to be located at the north end of Figure 8 Island Kellam said was, "False. We have looked at everything from approximately 400 up to approximately 1,500 feet in our environmental review," he said.

Since then, the EIS team has backed away from the 1,500 foot scenario, because the design projected less into the ocean more than it wrapped around the back side of the island. Estimated at a reported cost of \$10 million to construct and another \$2 million per year to maintain, Kellam said, "That is the worst case scenario of the Moffat & Nichol report. We're not asking anybody to approve one upfront, we're asking 'Let's look at it. Let's make educated informed decisions. Let's not just say, 'Let's not allow anything.'"

Relocating Rich's Inlet is another possibility being examined.

"It's much more expensive. It is also much more environmentally damaging," Kellam said.

He pointed a finger at construction of the Intracoastal Waterway as a mitigating factor in the Figure 8 dynamic.

"It altered the marshes, it altered the ecosystems and it wasn't that many years ago," Kellam said. "The water at Figure 8 Island bridge is more affected by Masonboro Inlet than it is by Mason's or Rich's. The water that used to go into Rich's Inlet on a rising tide ... had no way to go north and south. It had to go back out Rich's Inlet on a falling tide. When you had rains, storms, surges and floods it flushed water greater than what came in because you had water leaving the land. We are no longer dealing with a natural process."

--

**Diana Kees**  
Communications Director  
N.C. Dept. of Environment and Natural Resources  
1601 MSC, Raleigh, NC 27699-1601  
(919) 715-4112; fax (919) 715-3060

Connect with us:



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## Walker, Michele

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**From:** Emory, Bob [bob.emory@weyerhaeuser.com]  
**Sent:** Tuesday, March 23, 2010 4:58 PM  
**To:** Tracy Skrabal; Jim Gregson; Willis, Angela  
**Subject:** RE: Comments from USFWS, NCDMF, Conservation organizations letter

Tracy,

I suggest you be prepared to refer to these comments during the discussion. I don't want to forward them since, other than those of our sister agency DMF, I have not forwarded other comments.

Bob

---

**From:** Tracy Skrabal [mailto:tracys@nccoast.org]  
**Sent:** Tuesday, March 23, 2010 4:41 PM  
**To:** Emory, Bob; Jim Gregson; 'Willis, Angela'  
**Cc:** 'Todd Miller'; 'Katherine McGlade'  
**Subject:** Comments from USFWS, NCDMF, Conservation organizations letter

Bob and Jim- I received these three letters over the last two days, and I wondered if they were going to be forwarded or copied for each of the CRC members and CRAC sub-committee members in time for the discussion tomorrow and Thursday? I am happy to bring copies if needed, but wasn't sure how it would be handled. I understand from Molly Diggins (Sierra Club) that nearly 1,000 citizens had responded via email on this issue in the last several days, but I haven't verified that info. Tracy

Tracy E. Skrabal  
Coastal Scientist  
Southeast Regional Manager  
*We've moved! Please note our contact information:*  
North Carolina Coastal Federation  
The Landing  
530 Causeway Drive Suite F1  
Wrightsville Beach, NC 28480  
Ph: (910) 509-2838 Ext. 201 Fax: (910) 509-2840  
Website: [www.nccoast.org](http://www.nccoast.org)





Bob Emory  
Chair, Coastal Resources Commission  
112 Cameila Road  
New Bern, NC 28562

March 22, 2010

Dear Chairman Emory:

We are writing today to urge the Coastal Resources Commission (CRC) to recommend that the NC General Assembly uphold our state's historic ban on hardened structures. A recent consultant's study, conducted at the direction of the legislature, failed to provide any compelling evidence for overturning the ban while noting the considerable environmental damage that can accrue from the construction of groins. North Carolina's remarkable coastal heritage has been well-served by the state's longstanding ban on hardened structures, a stand we can be very proud of. The ban has kept our coastline natural and protected our beaches for public use, while at the same time providing important habitat for wildlife.

Though many have praised North Carolina for its leadership, few could have predicted just how pivotal the ban on hardened structures would become as North Carolina grapples with developing policies to address the potential impacts of rising sea levels on our coast. The National Oceanic and Atmospheric Administration has identified North Carolina as one of three states with the most vulnerable coastlines. Just this month, a Coastal Resources Commission panel released a report estimating the potential range of future sea-level rise, and urging the state to begin planning for at least one meter of elevation by 2100. The Division of Coastal Management is currently partnering with other state agencies and academia to develop coastal adaptation strategies. What's more, an important multimillion dollar federal study is underway to help North Carolina identify ways to respond to risk from sea level rise. Both sets of recommendations are due next year.

It makes little sense to overturn or relax the ban on hardened structures today when in a short time, the Coastal Resources Commission could have the benefit of additional insight from these studies as it makes tough decisions about a range of coastal adaptation policies. Hard structures like terminal groins seriously inhibit the capacity of coastal ecosystems to adapt to rising seas. Worse, overturning the ban would encourage investment of enormous resources into stabilizing the coast's most dynamic and unstable areas just as we are coming to fully appreciate how vulnerable these areas are. Ironically, such a policy shift would spur new development in the very areas identified as least suitable for development: high hazard inlet areas.

Why increase risk at great cost to the public at a time when the emphasis should be on reducing fiscal and environmental risk?

Even a limited relaxation of the ban would likely serve to open a floodgate of requests for further weakening. Political pressure is already intense to weaken public policy intended to protect the public's beaches. In our view, the CRC's limited resources are better directed toward development of comprehensive adaptation strategies.

As is true in all times of transition, leadership is sorely needed. We urge the Coastal Resources Commission to take the long view by recommending that the legislature uphold North Carolina's ban on hardened structures.

Thank you for your work on behalf of North Carolina's coast.

Sincerely yours,

Molly Diggins  
State Director  
Sierra Club, North Carolina Chapter

Chris Canfield  
Director  
Audubon North Carolina

Carrie Clark  
Executive Director  
Conservation Council of NC

Jane Preyer  
Director, Southeast Office  
Environmental Defense Fund

Brian Buzby  
Executive Director  
NC Conservation Network

cc: Members, Coastal Resources Commission  
The Honorable Bev Perdue  
The Honorable Dee Freeman



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Alligator River National Wildlife Refuge  
Pea Island National Wildlife Refuge  
Post Office Box 1969  
Manteo, North Carolina 27954  
(252) 473-1131 473-1668 (fax)

March 16, 2010

Mr. Jim Gregson, Director  
North Carolina Division of Coastal Management  
400 Commerce Ave.  
Morehead City, NC 28557

Dear Mr. Gregson:

The U. S. Fish and Wildlife Service reviewed the Working Draft Report – Terminal Groin Study dated February 1, 2010 and we would like to submit comments for consideration as the document is revised into a final report. Our review and comments focus on treatment of the Oregon Inlet Terminal Groin as that structure anchors the northern inlet shoreline of Pea Island National Wildlife Refuge.

It is evident from the 471 pages that the draft report assimilates a lot of information about terminal groins along the south Atlantic and Gulf coasts. Much of the report focuses on terminal groin design to “limit” impacts while focusing primarily upon shoreline erosion, economic analyses, and the effects they may have on shoreline erosion. Furthermore, the authors appear to conclude that terminal groins are probably acceptable if they are put in the right place with proper design and construction. This conclusion is quite contradictory to the best available science regarding ocean inlets, inlet dynamics, and coastal processes.

The report notes that global sea level rise is accelerating, but the document does not consider that natural coastal processes move barrier islands landward and allow them to exist as sea level rises. The overwash process contributes to the movement of sand from the beaches to the soundside marshes. As beach sand moves across the island, it raises the interior of the island and the estuarine salt marshes. Inlet migration and the incorporation of the flood tide delta to the back side of a barrier island contribute to the landward movement of the island. These processes ensure that barrier islands will remain and continue to support important resources as global sea level increases. Preventing sand from moving landward across barrier islands and blocking inlet migration create long-term threats to barrier island ecosystems.

The document falls short of a thorough presentation of current literature that would contribute to a far more comprehensive analysis of groin impacts on the overall dynamic inlet system. Oregon Inlet has been studied and observed extensively. The inlet, associated inlet channels, and refuge habitat on the down-drift side of the terminal groin have experienced erosion and changes since



the groin was constructed. Inlet narrowing, channel re-configuration, shoaling, island formation, and shoreline erosion are among the list of features and processes that must be thoroughly analyzed to fully understand the effects of a terminal groin.

From the information presented, it appears that the only way to ensure success of a terminal groin is to plan for beach nourishment on a recurring basis at regular intervals. This implies that after constructing a groin shoreline erosion will continue. This parallels the evidence after construction of the Oregon Inlet Terminal Groin. However, this type of analysis is dependent upon the assumptions used to create the model for evaluating impacts in this current analysis. If assumptions are not valid or if they are violated, then erroneous conclusions may be presented. This is the case with the Oregon Inlet Terminal Groin shoreline monitoring program. The model for this monitoring uses "historic" or "baseline" erosion rates that may not be appropriate for the period being monitored. Likewise, the model does not account for more than 10,000,000 yd<sup>3</sup> of sand dredged from the inlet and placing it on the beach since the groin was constructed. Yet, the model concludes that the agreed upon erosion "thresholds" have not been met for beach habitat replacement since the groin was constructed. This conclusion appears to be further extrapolated to imply that the terminal groin has no shoreline impact.

The document fails to recognize and fully address the value of landscape entities such as Pea Island National Wildlife Refuge. This is reflected in statements like the one found at the bottom of page VI-34:

*"Portions of the refuge would be at risk of loss should the existing terminal groin be removed."*

This statement very clearly demonstrates a lack of understanding of the natural processes that are constantly shaping and re-shaping these dynamic barrier island systems, especially when sea level is expected to rise for the foreseeable future. While it is true that shoreline erosion would occur and the inlet would continue to migrate southward, this is not necessarily a loss to the refuge or to the wildlife inhabiting the refuge. Shifting habitat is a feature of these systems. The habitat loss and subsequent loss to the refuge occurs because the terminal groin over-stabilized habitat in the fillet. With stability comes succession into a dune community and/or mud/sand flat; and the area continues to undergo succession into a vegetated dune community or marsh. The inlet overwash habitat no longer exists and cannot exist without human intervention because of the terminal groin. These are the types of impacts not addressed in the report. Furthermore, sensitivity to the mission of the National Wildlife Refuge System and purpose of the refuge is lacking as is an awareness of the laws, regulations, and policies governing refuge conservation practices and overall management.

The best "next step" for this draft document is to appoint a panel of experts from the relevant disciplines of coastal geology, coastal engineering, and coastal ecology to evaluate this document, define the deficiencies and make recommendations for finalizing it into a truly technical and objective report. As currently presented, it could possibly be finalized as a poorly defined technical document at best, and it certainly could not be presented as an objective document reflective of the best available science.

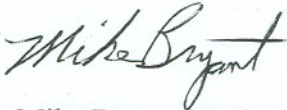
As presented, the document fails to fully analyze the overall effects of terminal groins in the coastal system at inlets and along ocean beaches. Similarly, there is no comprehensive acknowledgement of locations where terminal groins could be proposed. There is some indication of a few locations, but the document seems to be promoting the idea that groins are



appropriate on a wholesale basis. Refuge uses are governed by federal law, regulation, and policy that must be applied to all requested uses. Upon receiving a request for a use the Refuge Manager must decide if the use is appropriate and compatible before the use can be authorized through a permitting system. Because of the refuge's experience with the Oregon Inlet Terminal Groin, future requests for such a use will be found to be inappropriate or not compatible and there will be no permit authorization for such structures on the refuge.

We appreciate the opportunity to provide these comments. If you have questions or need additional information, please contact me at extension 222 or Dennis Stewart at extension 231.

Sincerely,

A handwritten signature in cursive script that reads "Mike Bryant".

Mike Bryant, Project Leader  
North Carolina Coastal Plains Refuge Complex

cc: Pete Benjamin, USFWS – Raleigh Field Office  
Mike Murray, NPS – Cape Hatteras National Seashore