

Bald Head Island



- Located in Southeast North Carolina at the mouth of the Cape Fear River, immediately adjacent to the shipping channel for the Wilmington Port.
- Approximately 300 permanent residents; Over 300,000 visitors each year.
- Approximately 13 miles of beaches, over 10,000 acres of nature preserve.
- Home to “Old Baldy” the oldest lighthouse in NC, originally commissioned by Thomas Jefferson.

- Wilmington Harbor Project (WHP) deepened and widened the Wilmington Port shipping channel in 2000, realigning it closer to Bald Head.
- Environmental review process required Sand Management Plan between Village of BHI, other area beaches and US Army Corps of Engineers. The Sand Management Plan requires maintenance dredging every two years, with sand placement on BHI and area beaches.
- Maintenance dredging plans challenging because of USACE District receiving of Congressional funding.
- Island erosion nearest the channel a long-standing issue for BHI due to accelerated erosion threatening public & private infrastructure, beach integrity and habitat for endangered sea turtles.



“This sand is not only important for tourism, recreation and the economy of the Cape Fear Region, it provides vital protections to these communities through storm management to prevent further erosion and waterfront deterioration” Rep. Mike McIntyre, February 2012.



- To save Bald Head Island and its rare coastal habitat, the beaches need timely nourishment.
- The Sand Management Plan must be consistently funded through the USACE.
- Future plans for the Wilmington Harbor need to take into consideration how channel changes impact erosion processes and provide adequate funding for mitigation.



Timeline of Shoreline Protection Activities

Village of Bald Head Island

- 1999 - 2000 Negotiations over beaches among Village of BHI, USACE and State of North Carolina result in written Sand Management Plan (SMP), incorporated into federal and state environmental approvals of WHP.
- 2000 - 2001 WHP deepens and widens shipping channel, realigning it closer to Bald Head.
- 2003 No Federal funding available to implement Sand Management Plan. Erosion causes permanent loss of portions of South Bald Head Wynd – a major road serving homes and businesses.
- 2003 – 2004 USACE commences emergency dredging and deposits beach quality sand off-shore prompting the Village of BHI to file a restraining order and lawsuit.
- 2004 Erosion is occurring at faster rates than before WHP changes to channel. Private placement of sandbags to mitigate damage, homes are relocated away from shoreline.
- 2004 - 2005 Sand Management Plan dredging occurs and beaches are nourished.
- 2007 Supplemental funding by Village of BHI and State required to fund Sand Management Plan, dredging and sand placement.
- 2009 SMP dredging occurs; sand distributed to Caswell Beach and Oak Island Beach. No nourishment to Bald Head results in devastating erosion to Island beaches and Bald Head Shoals.
- 2010 Village of BHI self-funded engineered beach project costing Bald Head taxpayers approximately \$17M. Village files lawsuit against USACE for failure to comply with Sand Management Plan obligations including sand placement, impact studies and WHP mitigation.
- 2011 No federal funding for SMP dredging. Hurricane Irene damages engineered beach and five sand-filled groins. Village, at its cost, must install 350' sand bag revetment and repair groin field.
- 2012 To date, Village required to expend approximately \$25M to study and mitigate WHP erosion impacts. Bald Head Creek Dredging project of 140,000 cubic yards – funded through IRENE Disaster Funds.
- 2012 Channel shoaling causes USACE to move buoy 12 and to complete “emergency” dredging to remove “speed bumps” depositing beach quality sand off-shore similar to actions in 2003-2004.
- 2012 -2013 TENTATIVE PLANS for USACE dredging (combination of FY 12 Supplemental Funds, Hurricane Irene Disaster Funds & FY 13 Funds).

OLD BALDY
Lighthouse
1817



Timeline of Shoreline Protection Activities

Village of Bald Head Island

2015 - 2016

Terminal Groin structure constructed by BHI property owners at a cost of \$6M during summer 2015 in conjunction with WHP channel maintenance dredging. MOU between Village & Corps for sand placement of fillet in excess of 100kcy paid by BHI is placed just east of the Point.

2018

WHP channel maintenance per SMP performed during the Summer of 2018 due to budget shortfall/contractor bids exceeding engineering estimates. Per SMP sand placement on Caswell Beach/Oak Island completed late 2018.

2018 - 2019

Village funded private beach nourishment project at a cost of \$10.9M contracted for 1.0Mcy dredged from Jay Bird Shoals with placement along south beach. Replacement of 13 geotextile soft-filled groin tubes completed in conjunction with nourishment at a cost of \$1.0M.

2020 – 2021

WHP channel maintenance per SMP during winter of 2020-2021 with sand placement along south beach. Dredge quantities of shoaled material estimated well over 1.4Mcy (w/ 2' foot over-dredge depth an additional 300-400kcy for estimated total of 1.8Mcy). Village requests for sand placement to extend to the eastern terminus of South Beach.

2023

WHP channel maintenance per SMP during winter of 2022-2023 with sand placement along south beach. Dredged quantities of shoaled material estimated over 1.0Mcy.

PRESENT

Village is working on a locally funded project for 2025 (in the SMP gap year) for sand placement along south beach in two sections. Section A to maintain Terminal Groin fillet extending through the soft-tube groinfield. Section B at the east end of south beach to mitigate ongoing chronic erosion. Jay Bird Shoals is the planned borrow site for this project. Frying Pan Shoals borrow site permitting has gone unsuccessful to date but will be a priority for future Village projects beyond the 2025 project.

For more information, please contact Jae Kim, Shoreline Protection Manager

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Historical Shoaling impacts to channel MAY 2012...

- Container vessel YM Portland passes BHI.
- Marker 12 relocated toward center of channel because of shoaling.
- Channel is open for one-way traffic only.
- Depth restrictions put in place.





Historical Chronic Erosion at The Point adjacent to the WHNC





History of Cape Fear River Channel

Table 1: Cape Fear River Channel Improvements (1925 to present).
Adapted from USACE (2014).

Year Constructed	Depth (ft below MLW)	Width (ft)
1925-26	30	400
1949	32	400
1956	35	400
1968	40	500
2000	44	500

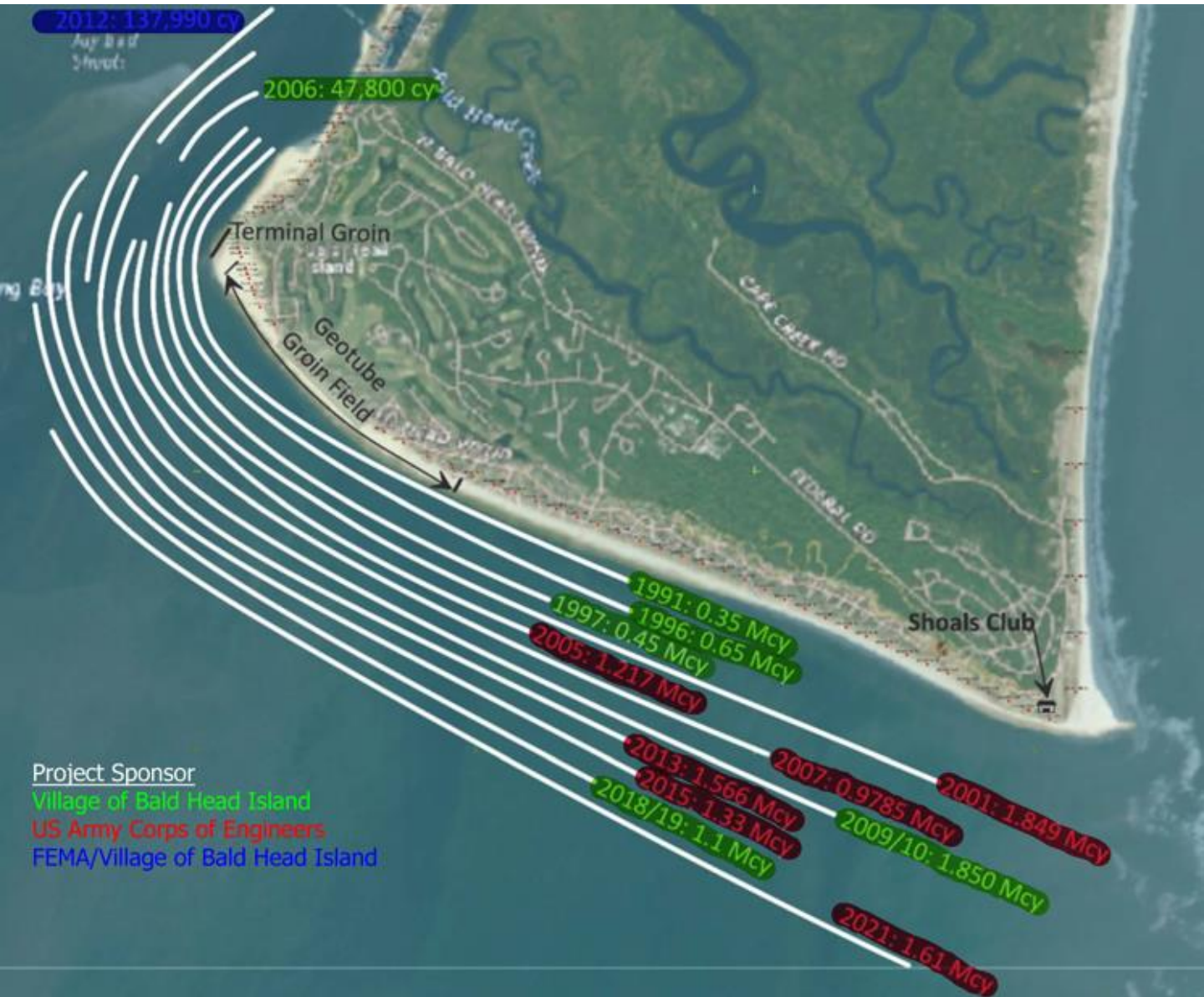
Table 1.2: Beach disposal or sand placement activities at Bald Head Island since 1991.

Year	Volume	Sponsor	Location
1991	0.35 ± Mcy	VBHI	(Sta. 24+00 to 138+00)
1996	0.65 ± Mcy	VBHI	(Sta. 24+00 to 142+00)
1997	0.45 ± Mcy	VBHI	(Sta. 24+00 to 128+00)
2001	1.849 ± Mcy	USACE*	South Beach (Sta. 41+60 to 205+50)
2005	1.217 ± Mcy	USACE*	South Beach (Sta. 46+00 to 126+00)
2006	47,800 cy	VBHI	West Beach (Sta. 16+00 to 34+00)
2007	0.9785 ± Mcy	USACE*	South Beach (Sta. 46+00 to 174+00)
2009/10	1.850 ± Mcy	VBHI	West Beach (Sta. 8+00 to 32+00) South Beach (Sta. 40+00 to 190+00)
2012	137,990 cy	FEMA/VBHI	West Beach & Western South Beach
2013	1.566 ± Mcy	USACE*	South Beach (Sta. 44+00 to 150+00)
	92,500 cy		West Beach (Sta. 8+00 to 27+00)
2015	1.33 ± Mcy	USACE*	South Beach (Sta. 41+50 to 154+00)
2016/17	50,000 cy	VBHI	West Beach and Row Boat Row
2018/19	1.1 Mcy	VBHI	South Beach (Sta. 49+00 to Sta. 146+00)
2021	1.61 Mcy	USACE	South Beach (Sta. 60+00 to Sta. 212+00)
2023	1.3 Mcy	USACE	South Beach (Sta. 60+00 to Sta. 165+00)

* Disposal pursuant to the WHSMP. Dredge volume estimate (pre-losses).

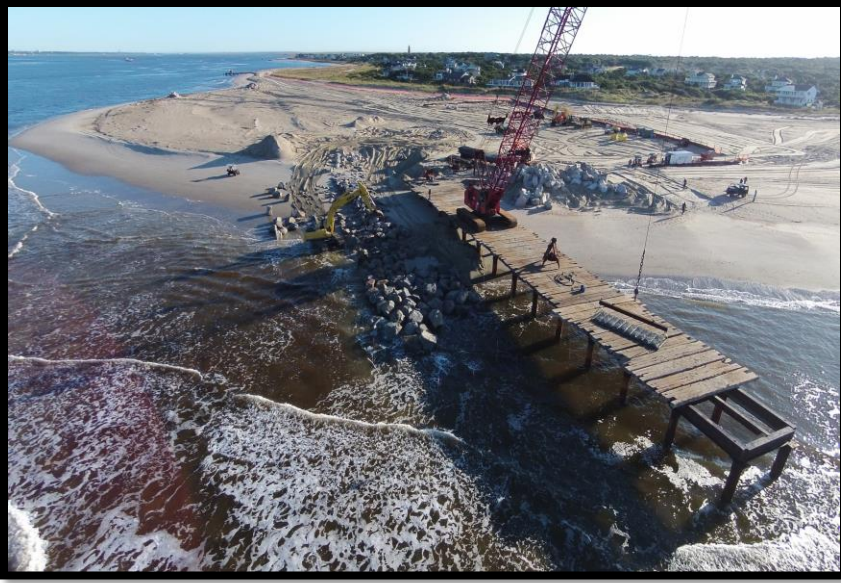


History of Channel Maintenance Dredging (SMP)..., and Village Privately Funded Beach Nourishment Projects





Terminal Groin Construction 1,300 ft long (22 OCT 2015)



Post-Hurricane Florence (4 OCT 2018)





Village “Groin Field”

Sand-filled geo-textile groins

13ea. tubes extending seaward

**Support Terminal Groin in slowing
sand transport/shoaling rates towards
navigation channel**

(9 MAY 2018)

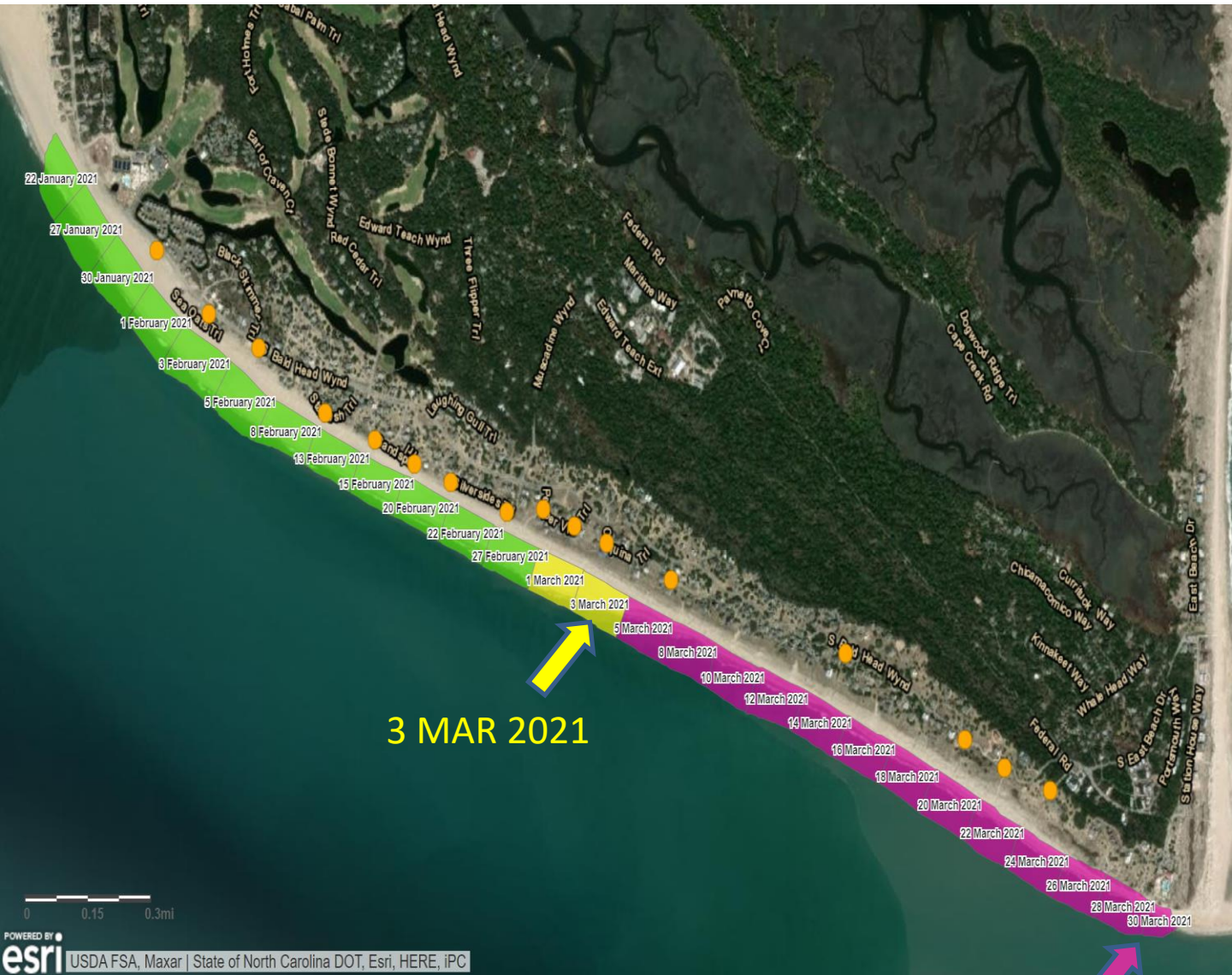


Corps Maintenance Dredging/SMP Beach Fill
Shoreline Aerial Drone Imagery
(Flight date: 2 MAR 2021)





Wilmington Harbor – Inner Ocean Bar Contract Corps Sand Placement Viewer Website (update as of 3 MAR 2021)



*Approximately 7,500' feet remaining to 30 MAR 2021 endpoint

East End of South Beach Erosion



Drone Flight Date: 23 OCT 2020



Drone Flight Date: 18 FEB 2021





Drone Flight Date: 17 JUN 2022



Shoals Club
Sandbag
Revetment

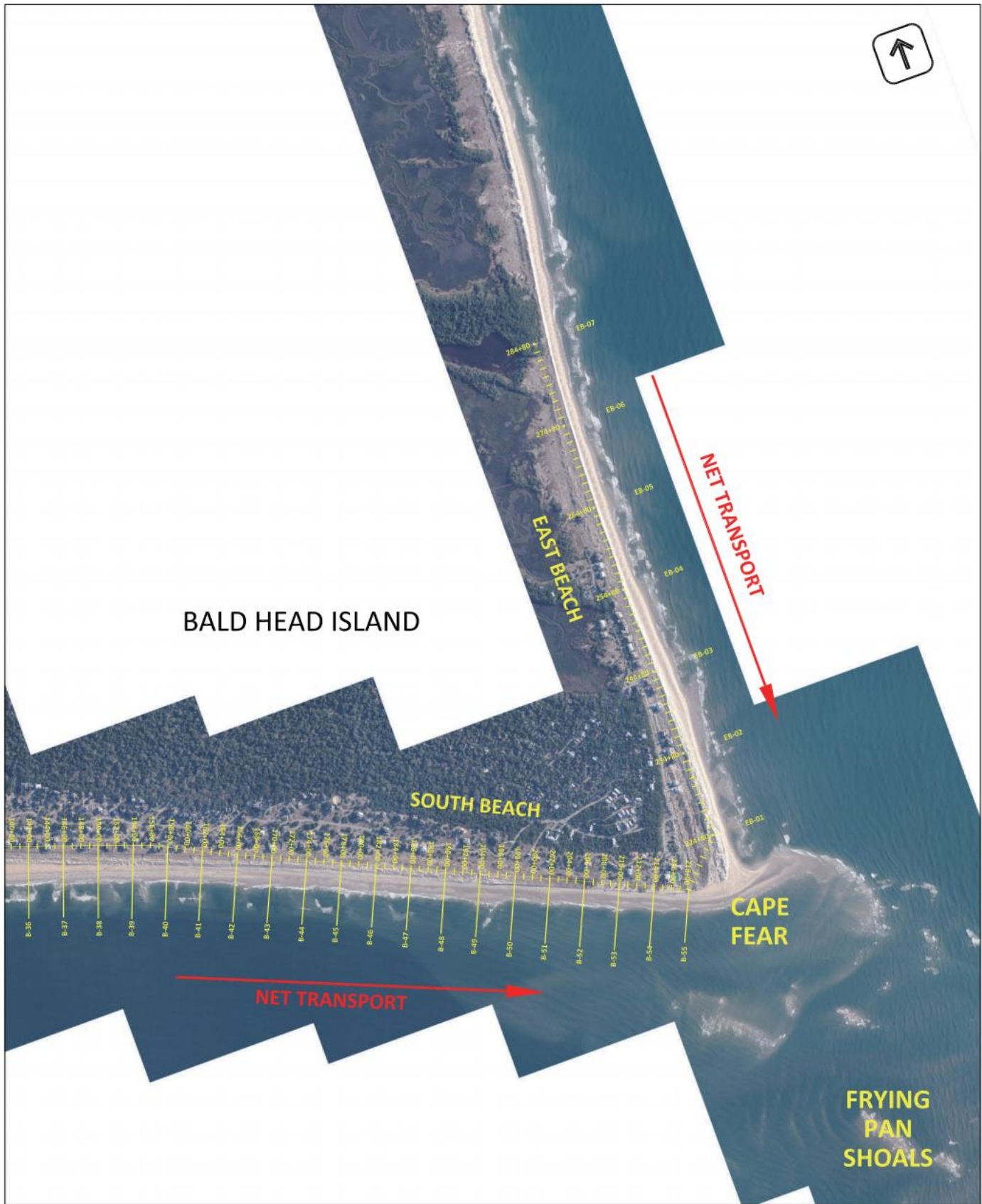
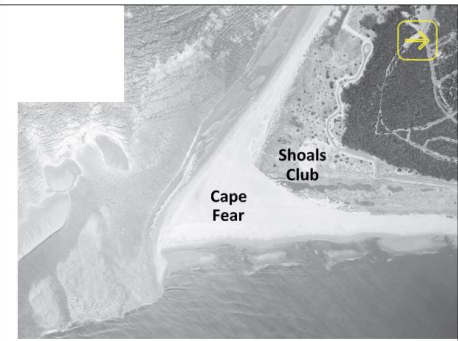


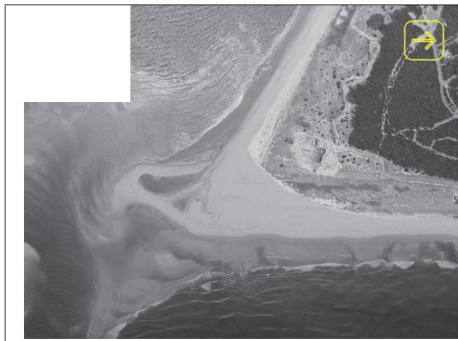
Figure 3
 Directionality of Littoral Transport at Cape Fear



Cape Fear Shoreline Conditions (2003-2008)



April 2003 Photo



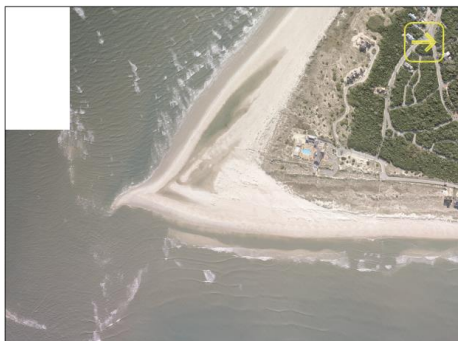
May 2004 Photo



May 2005 Photo



April 2006 Photo



May 2007 Photo



May 2008 Photo

Figure 4:
Cape Fear shoreline conditions
(2003-2008)



Cape Fear Shoreline Conditions (2003-2020)

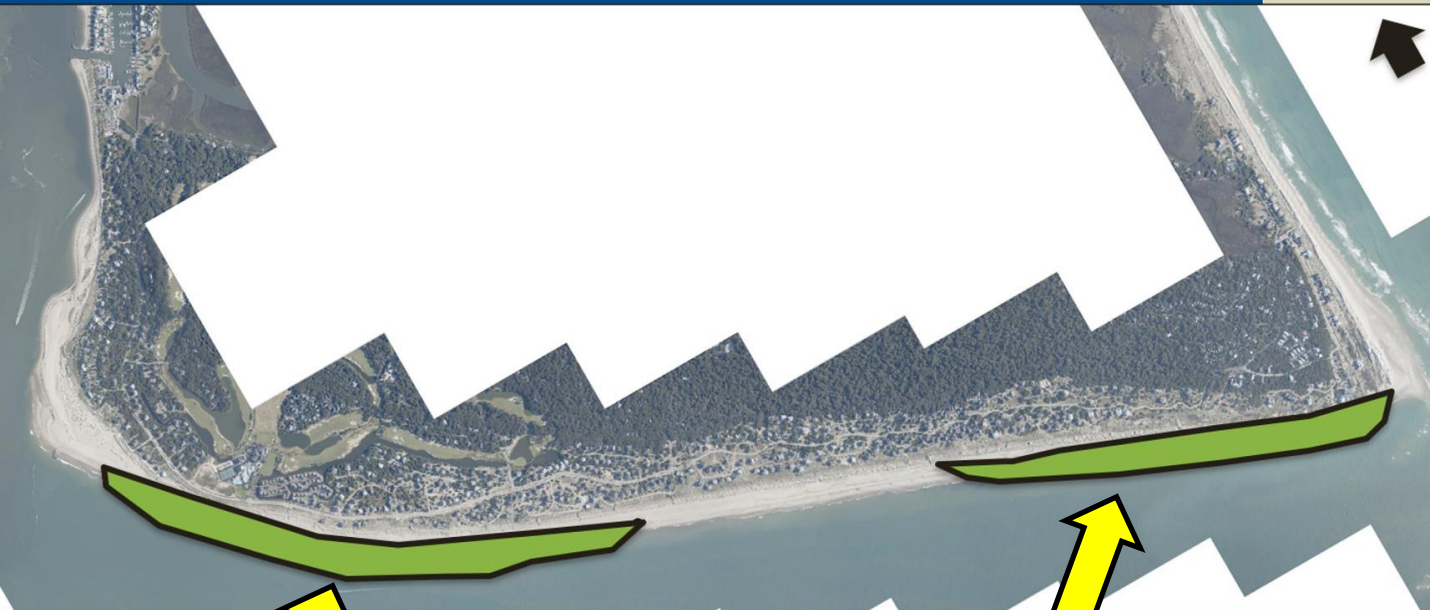


Figure 5:
Cape Fear shoreline conditions
(2008-2020)



2025 Coastal Storm Damage Reduction Project ("CSDR") (a.k.a. "Beach Nourishment Project")

Proposed Beach Fill Locations



Part "A" Fill

Part "B" Fill





2025 Coastal Storm Damage Reduction Project (“CSDR”) Jay Bird Shoals Borrow Site

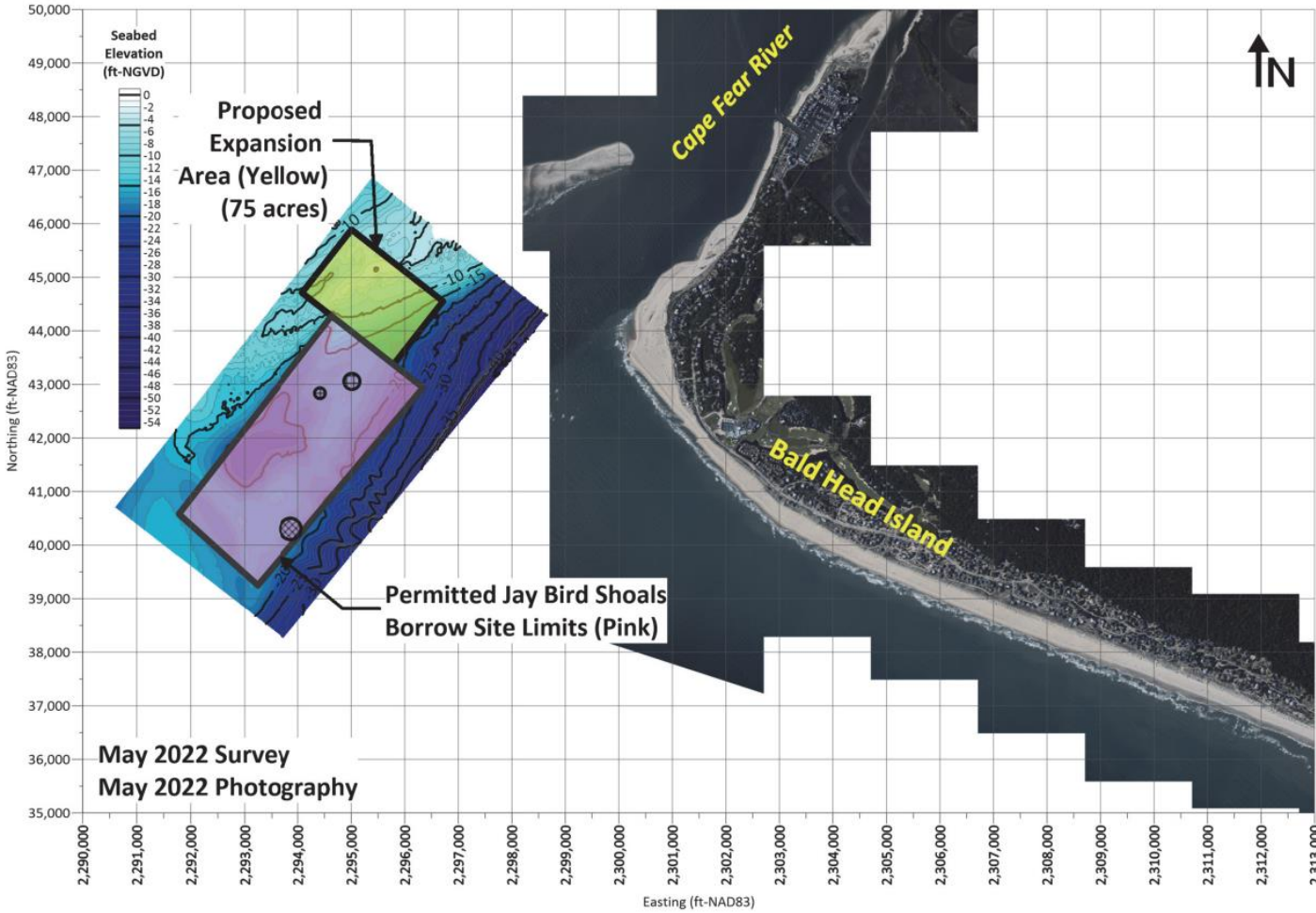
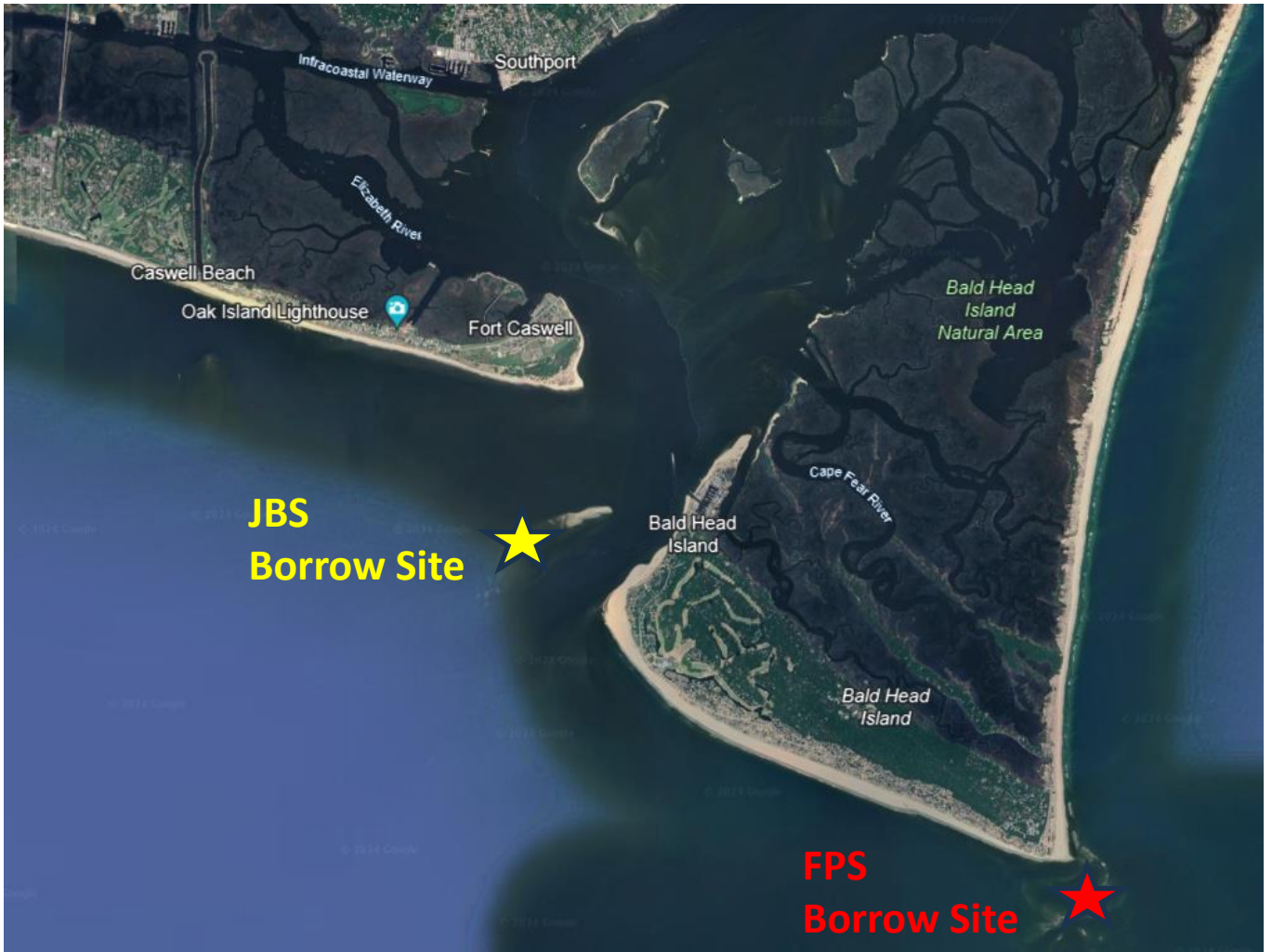
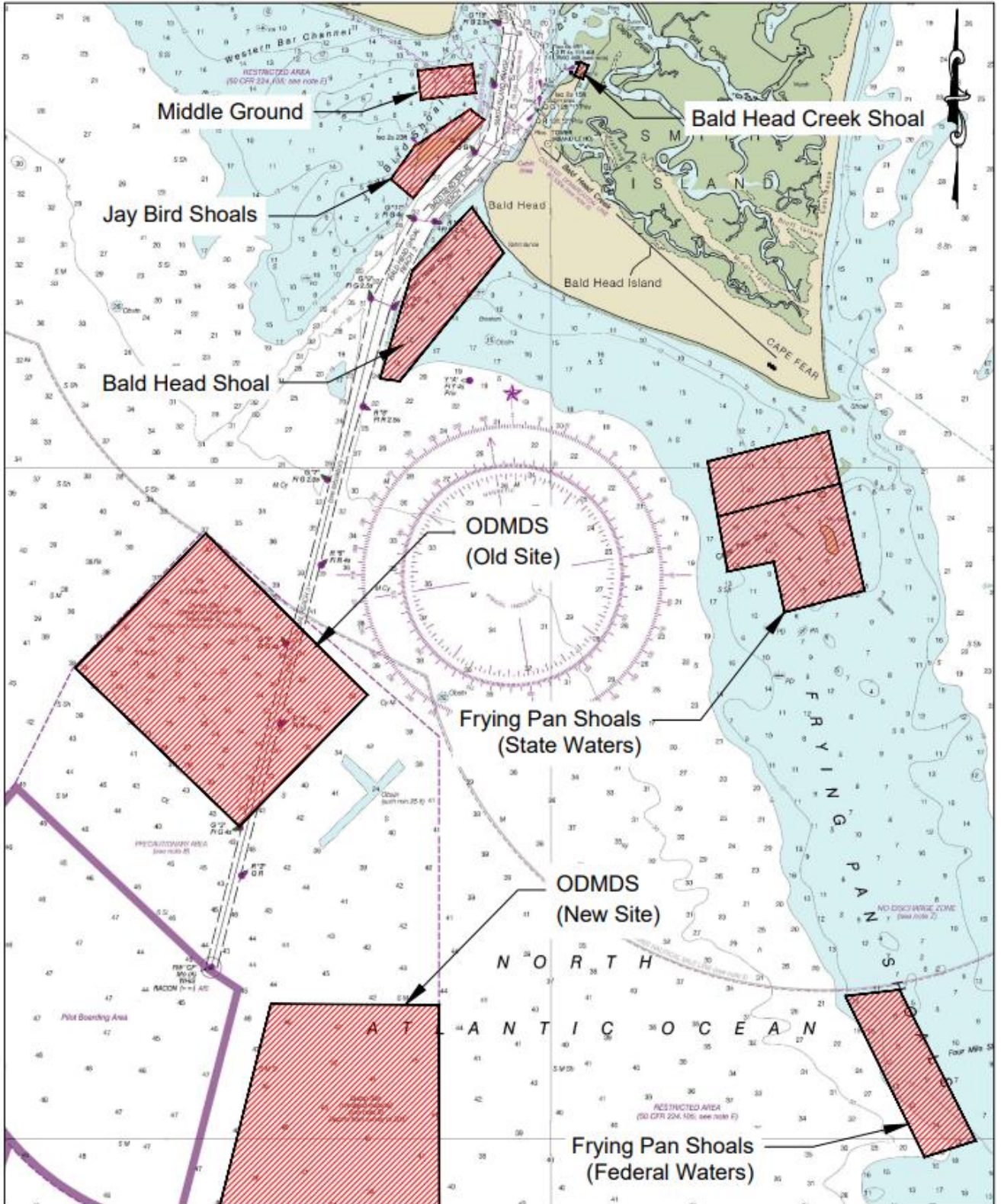


Figure 8: Proposed borrow area expansion.



Jay Bird Shoals & Frying Pan Shoals Borrow Site Locations (Both in State Waters)





Note – This is not an engineered or surveyed drawing. This drawing is intended to show the approximate locations of potential sand source areas and is not intended to depict specific borrow area limits.



FUTURE GOALS

- “Conversion” of sand tube groin field,



FUTURE GOALS

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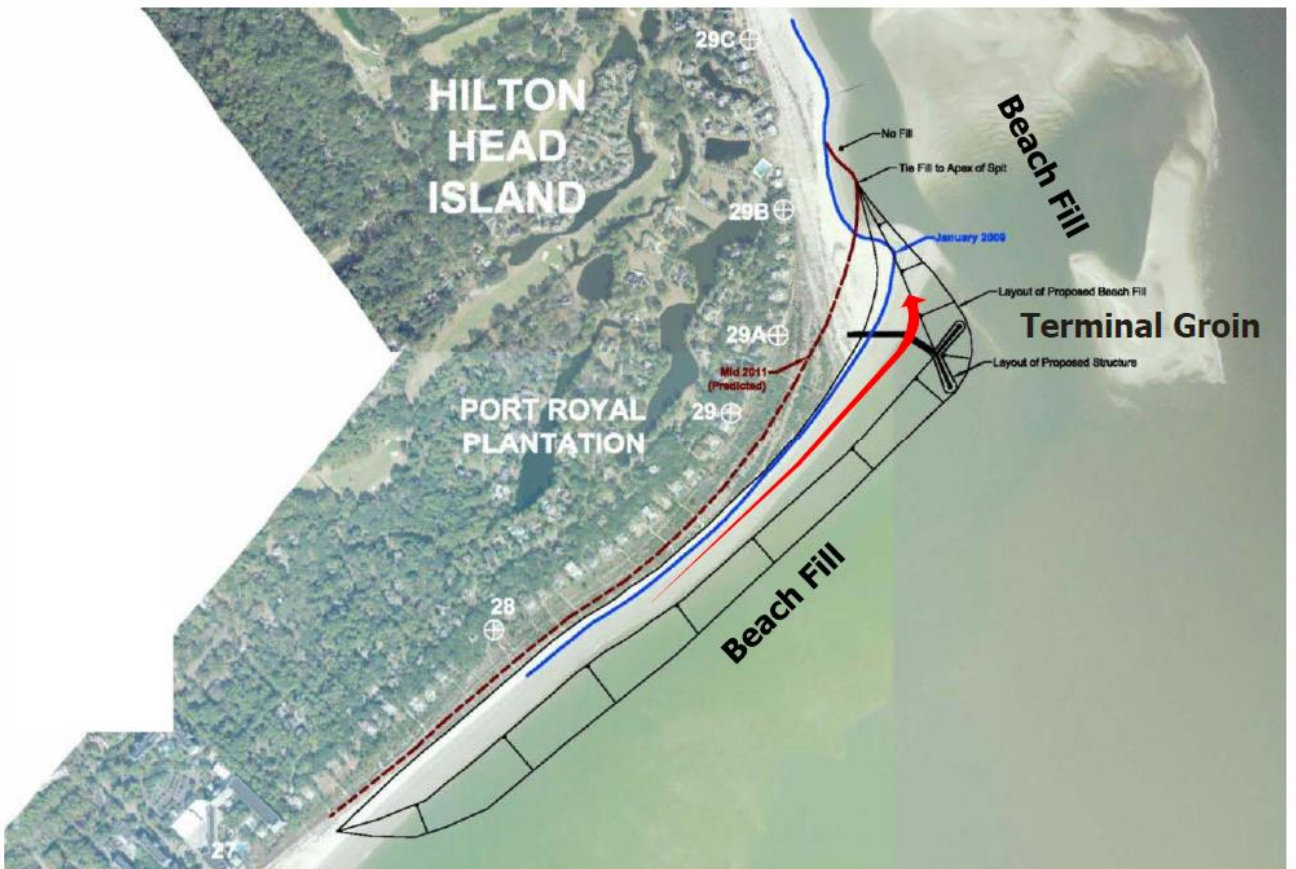


A BILL TO BE ENTITLED

AN ACT TO CLARIFY THAT A PERMANENT EROSION CONTROL STRUCTURE ORIGINALLY PERMITTED PURSUANT TO A VARIANCE GRANTED BY THE COMMISSION PRIOR TO JULY 1, 1995, IS NOT A TERMINAL GROIN AND THEREFORE IS NOT SUBJECT TO LIMITATIONS ON TERMINAL GROIN STRUCTURES AND TO PERMIT TERMINAL GROIN WHERE TWO SHORELINES CONVERGE AT A CAPE.



East End Erosion Mitigation Alternative w/ Hardened Structure (Hilton Head Island Terminal Groin Example)



Hilton Head Island, SC



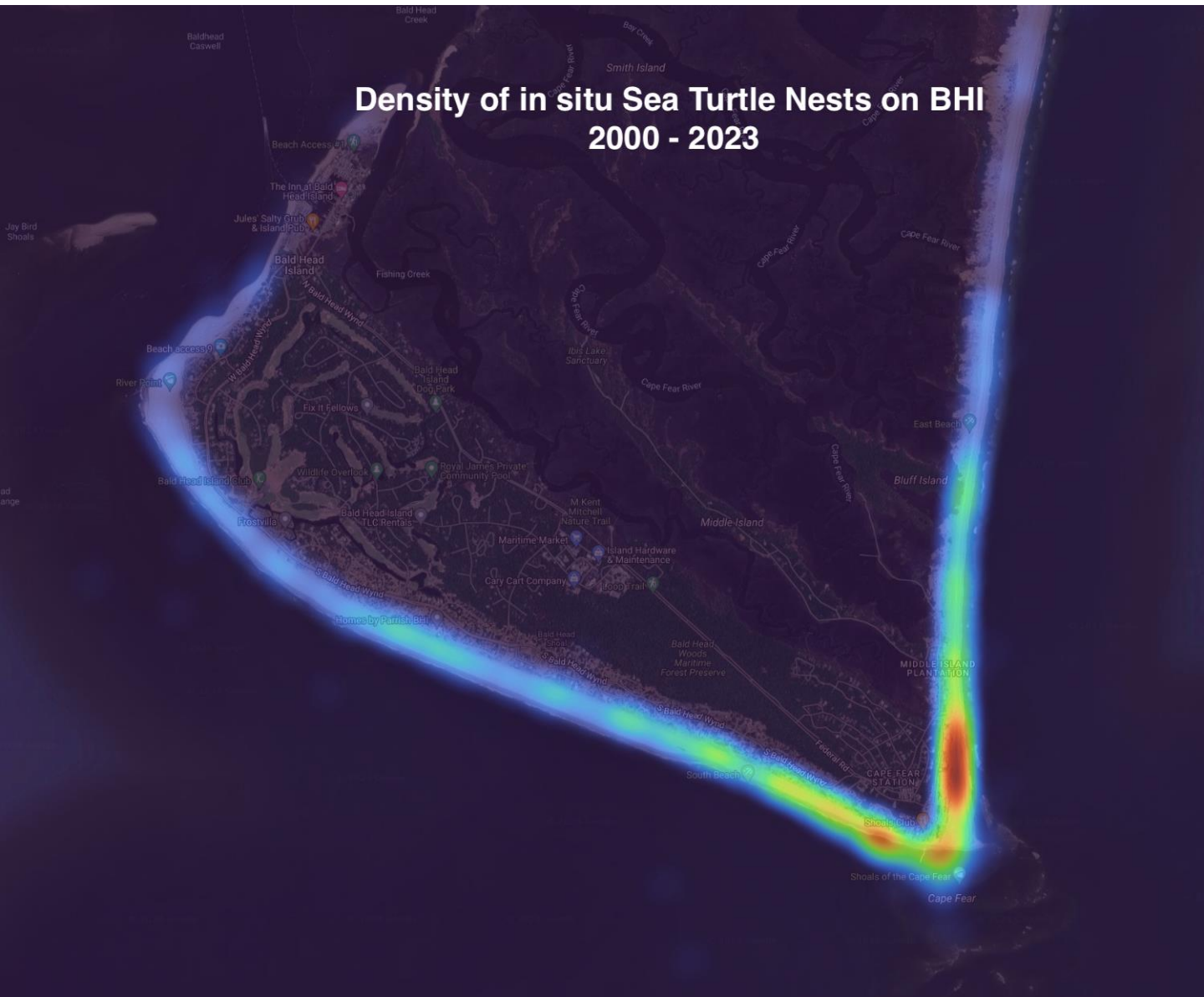
Density of Sea Turtle Nesting Activity on BHI 2000 - 2023



Data Source: BHI Conservancy



Density of in situ Sea Turtle Nests on BHI 2000 - 2023



Data Source: BHI Conservancy

Draft Hardened Structures Language



*Brooks Pierce Draft
April 18, 2024*

§ 113A-~~115.1~~-115.1. Limitations on erosion control structures.

- (a) As used in this section:
- (1) "Erosion control structure" means a breakwater, bulkhead, groin, jetty, revetment, seawall, or any similar structure.
 - (1a) "Estuarine shoreline" means all shorelines that are not ocean shorelines that border estuarine waters as defined in G.S. 113A-~~113~~-113(b)(2).
 - (2) ~~(2)~~ "Ocean shoreline" means the Atlantic Ocean, the oceanfront beaches, and frontal dunes. The term "ocean shoreline" includes an ocean inlet and lands adjacent to an ocean inlet but does not include that portion of any inlet and lands adjacent to the inlet that exhibits characteristics of estuarine shorelines.
 - (3) ~~(3)~~ "Terminal groin" means one or more structures constructed at the terminus of an island or ~~on~~ the side of an inlet or where the ocean shoreline converges with Frying Pan Shoals, with a main stem generally perpendicular to the beach shoreline, ~~that is primarily intended to protect the terminus of the island from shoreline erosion and/or inlet migration.~~ A "terminal groin" shall be ~~pre-filled~~ pre-filled with beach quality sand and allow sand moving in the littoral zone to flow ~~past~~ around, over, or through the structure. A "terminal groin" may include other design features, such as a number of smaller supporting structures, that are consistent with sound engineering practices and as recommended by a professional engineer licensed to practice pursuant to Chapter 89C of the General Statutes. A "terminal groin" is not a jetty.

(b) No person shall construct a permanent erosion control structure in an ocean shoreline. The Commission shall not permit the construction of a temporary erosion control structure that consists of anything other than sandbags in an ocean shoreline. This subsection shall not apply to any of the following:

- (1) Any permanent erosion control structure that is approved pursuant to an exception set out in a rule adopted by the Commission prior to July 1, 2003.
- (2) ~~(2)~~ Any permanent erosion control structure that was originally constructed prior to July 1, 1974, and that has since been in continuous use to protect an inlet that is maintained for navigation.
- (3) ~~(3)~~ Any terminal groin permitted pursuant to this section.

(b1) This section shall not be construed to limit the authority of the Commission to adopt rules to designate or protect areas of environmental concern, to govern the use of sandbags, or to govern the use of erosion control structures in estuarine shorelines.

(c) The Commission may renew a permit for a permanent erosion control structure originally permitted pursuant to a variance granted by the Commission prior to July 1, 1995, if the Commission finds that: (i) the structure will not be enlarged beyond the dimensions set out in the original permit; (ii) there is no practical alternative to replacing the structure that will provide the same or similar benefits; and (iii) the replacement structure will comply with all applicable laws and with all rules, other than the rule or rules with respect to which the Commission granted the variance, that are in effect at the time the structure is replaced, except as set forth in this subsection (c). Such permanent erosion control structure is not a terminal



groin and shall not be subject to the provisions herein applicable to a terminal groin, including the requirements of subsections (e)(1) – (6) hereof. If such existing permanent erosion control structure consists of a field of geotextile sand tubes, it may be redesigned and engineered by a licensed coastal engineer, consistent with sound engineering practices and as recommended by a professional engineer licensed to practice pursuant to Chapter 89C of the General Statutes, for the fabric sand tubes to be replaced with a field of rock erosion control structures. The plans for the work shall be sealed by the coastal engineer. The number of rock structures shall not exceed the original permitted number of sand tubes nor any individual structure exceed the as-installed length of the longest existing sand tube. The structure(s) or field of structures may consist of groins. The structure field shall not be enlarged beyond the alongshore dimensions set out in the original permit. The aggregate overall length of the rock structures shall not exceed the aggregate overall length of the sand tubes set out in the original permit. The work shall be deemed to be maintenance of the existing erosion control structures, which the Commission shall permit.

(e) The Commission may authorize the repair or replacement of a temporary erosion control structure that was originally permitted prior to July 1, 1995, if the Commission finds that (i) the structure is located adjacent to an intertidal marine rock outcropping designated by the State as a Natural Heritage Area pursuant to Part 42 of Article 2 of Chapter 143B of the General Statutes and (ii) the replacement structure will comply with all applicable laws and with all rules, other than the rule or rules with respect to which the Commission granted the variance, that are in effect at the time the structure is replaced.

(d) Any rule that prohibits permanent erosion control structures shall not apply to terminal groins permitted pursuant to this section.

(e) In addition to the requirements of Part 4 of Article 7 of Chapter 113A of the General Statutes, an applicant for a permit for the construction of a terminal groin shall submit all of the following to the Commission:

- (1) Information to demonstrate that structures or infrastructure are threatened by erosion.
- (2) An environmental impact statement that satisfies the requirements of G.S. 113A-~~4~~-4. An environmental impact statement prepared pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321, et seq., for the construction of the terminal groin shall satisfy the requirements of this subdivision.
- (3) A list of property owners and local governments that may be affected by the construction of the proposed terminal groin and its accompanying beach fill project and proof that the property owners and local governments have been notified of the application for construction of the terminal groin and its accompanying beach fill project.
- (4) A plan for the construction and maintenance of the terminal groin and its accompanying beach fill project prepared by a professional engineer licensed to practice pursuant to Chapter 89C of the General Statutes.
- (5) A plan for the management of the inlet and the estuarine and ocean shorelines immediately adjacent to and under the influence of the inlet. The inlet management plan monitoring and mitigation requirements must be



reasonable and not impose requirements whose costs outweigh the benefits. The inlet management plan is not required to address sea level rise. The inlet management plan shall do all of the following relative to the terminal groin and its accompanying beach fill project:

- ~~a.~~ ~~a.~~ Describe the ~~post-construction~~post-construction activities that the applicant will undertake to monitor the impacts on coastal resources.
- ~~b.~~ ~~b.~~ Define the baseline for assessing any adverse impacts and the thresholds for when the adverse impacts must be mitigated.
- ~~c.~~ ~~c.~~ Provide for mitigation measures to be implemented if adverse impacts reach the thresholds defined in the plan.
- ~~d.~~ ~~d.~~ Provide for modification or removal of the terminal groin if the adverse impacts cannot be mitigated.

- (6) Proof of financial assurance verified by the Commission or the Secretary of Environmental Quality in the form of a bond, insurance policy, escrow account, guaranty, local government taxing or assessment authority, a property owner association's approved assessment, or other financial instrument or combination of financial instruments that is adequate to cover the cost of implementing all of the following components of the inlet management plan:

- ~~a.~~ ~~a.~~ ~~Long-term~~Long-term maintenance and monitoring of the terminal groin.
- ~~b.~~ ~~b.~~ Implementation of mitigation measures.
- ~~c.~~ ~~c.~~ Modification or removal of the terminal groin.
- ~~d.~~ ~~d.~~ Repealed by Session Laws ~~2013-384~~2013-384, s. 3(a), effective August 23, 2013, and applicable to permit applications submitted on or after that date.

(f) The Commission shall issue a permit for the construction of a terminal groin if the Commission finds no grounds for denying the permit under G.S. 113A-~~120~~120 and the Commission finds all of the following:

- ~~(1)~~ ~~(1)~~ The applicant has complied with all of the requirements of subsection (e) of this section.
- ~~(2)~~ ~~(2)~~ Repealed by Session Laws ~~2013-384~~2013-384, s. 3(a), effective August 23, 2013, and applicable to permit applications submitted on or after that date.
- ~~(3)~~ ~~(3)~~ The terminal groin will be accompanied by a concurrent beach fill project to prefill the groin.
- ~~(4)~~ ~~(4)~~ Construction and maintenance of the terminal groin will not result in significant adverse impacts to private property or to the public recreational beach. In making this finding, the Commission shall take into account the potential benefits of the project, including protection of the terminus of the island from shoreline erosion and inlet migration, beaches, protective dunes, wildlife habitats, roads, homes, and infrastructure, and mitigation measures, including the accompanying beach fill project, that will be incorporated into the project design and construction and the inlet management plan.



Brooks Pierce Draft
April 18, 2024

- (5) ~~(5)~~—The inlet management plan is adequate for purposes of monitoring the impacts of the proposed terminal groin and mitigating any adverse impacts identified as a result of the monitoring.
- (6) ~~(6)~~—Except to the extent expressly modified by this section, the project complies with State guidelines for coastal development adopted by the Commission pursuant to G.S. 113A-~~107-107~~.

(g) The Commission may issue no more than ~~six~~seven permits for the construction of a terminal groin pursuant to this section, provided that two of the ~~six~~seven permits may be issued only for the construction of terminal groins on the sides of New River Inlet in Onslow County and Bogue Inlet between Carteret and Onslow Counties.

(h) A local government may not use funds generated from any of the following financing mechanisms for any activity related to the terminal groin or its accompanying beach fill project:

- (1) ~~(1)~~—Special obligation bonds issued pursuant to Article 7A of Chapter 159 of the General Statutes.
- (2) ~~(2)~~—Nonvoted general obligation bonds issued pursuant to G.S. ~~159-48~~159-48(b)(4).
- (3) ~~(3)~~—Financing contracts entered into under G.S. 160A-~~20-20~~ or G.S. ~~159-148~~159-148.

(i) No later than January 1, 2019, and every five years thereafter, the Coastal Resources Commission shall report to the Environmental Review Commission on the implementation of this section. The report shall provide a detailed description of each proposed and permitted terminal groin and its accompanying beach fill project, including the information required to be submitted pursuant to subsection (e) of this section. For each permitted terminal groin and its accompanying beach fill project, the report shall also provide all of the following:

- (1) ~~(1)~~—The findings of the Commission required pursuant to subsection (f) of this section.
- (2) ~~(2)~~—The status of construction and maintenance of the terminal groin and its accompanying beach fill project, including the status of the implementation of the plan for construction and maintenance and the inlet management plan.
- (3) ~~(3)~~—A description and assessment of the benefits of the terminal groin and its accompanying beach fill project, if any.
- (4) ~~(4)~~—A description and assessment of the adverse impacts of the terminal groin and its accompanying beach fill project, if any, including a description and assessment of any mitigation measures implemented to address adverse impacts. (~~2003-427~~2003-427, s. 3; ~~2004-195~~2004-195, s. 1.2; ~~2004-203~~2004-203, s. 43; ~~2011-387~~2011-387, s. 1; ~~2012-201~~2012-201, s. 2(a); ~~2013-384~~2013-384, s. 3(a); ~~2015-241~~2015-241, ss. 14.6(r), 14.30(v); ~~2017-10~~2017-10, s. 4.19; ~~2018-114~~2018-114, s. 15; ~~2020-3~~2020-3, s. 4.30(b).)