

## **AN OVERVIEW OF BALD HEAD ISLAND'S SHORELINE PROTECTION PROGRAM IN ADVANCE OF THE VILLAGE'S 2025 PROJECT**

Shoreline protection is a comprehensive approach to coastal management that is designed to mitigate the effects of ocean currents, waves, and storms. The Village of Bald Head Island monitors the island's various coastal interfaces through a "best practice" approach and seeks to enhance dunes and promote a robust shoreline. There have been several peer-reviewed publications that describe how wide beaches with established vegetated dunes have protected property during significant storm events.

The Village's stewardship of this resource has enabled it to maintain a FEMA-qualified engineered beach over the last several years. This means that if the Village keeps up with its shoreline maintenance and there is a presidentially declared disaster due to a hurricane causing significant erosion and loss of sand, the Village qualifies for FEMA reimbursement to restore (or replace sand) the beach to its pre-storm condition. In addition to private property protection, shoreline management protects important public infrastructure such as roads and utilities, preserves habitat for endangered species like sea turtles and shore birds, and holds recreational benefits that contribute to the area's tourist economy and make BHI one of the most sought-after places to purchase property on the North Carolina coast.

The Village of Bald Head Island regularly monitors through an annual shoreline monitoring program dating back to the early 2000s the shoreline and implements erosion control measures (such as groins and beach nourishment). The Village monitors all beaches along the 14 miles of shoreline, which includes East Beach, South Beach, West Beach, and Row Boat Row. On a regular basis, and prior to significant storms, the Village performs assessments to document the condition of the beach and shoreline stabilization structures (geotextile groins, breakwaters & jetties). After the storm passes, the Village compares pre- and post-storm conditions to determine if external validation is warranted. If there is a significant change, the Village contacts engineering, and surveying contractors to quantify changes. FEMA reimbursement requires quantifying sand loss or percentage of damage (in the case of a structure). Currently, the Village utilizes Olsen and Associates for its coastal engineering needs. Erik Olsen, President, and Owner has been instrumental over the years dating back to their initial beach erosion study in 1989 in developing the Village's long-term Beach Management Program.

Olsen and Associates, a firm out of Jacksonville, Florida, has worked on several beach projects (groins, beach nourishment, and jetties) along the East Coast and has many years of coastal design experience. Along with the structural design, coastal engineers play an integral role in the permitting and compliance phases of beach projects. Permitting is perhaps the most challenging component of coastal construction. Permitting often requires approval from the North Carolina Division of Coastal Management, NC Marine Fisheries, US Army Corps of Engineers, US Fish & Wildlife, and National Marine Fisheries in addition to a host of other external stakeholders.

Olsen and Associates utilize 3D modeling to determine the future profile of Bald Head's beaches. This information allows the Village to plan and budget for upcoming projects. The firm provides an annual monitoring report which highlights changes in the Island's shoreline. The firm

also makes a presentation at each annual Village Council retreat to give an update on the island's shoreline conditions and makes recommendations for what actions should be taken as part of the Village's shoreline protection program. Olsen's last two retreat presentations are available on the Village of Bald Head Island YouTube channel and the Village's Shoreline Protection webpage (<https://villagebhi.org/departments-services/shoreline-protection/>) under Resources, Shoreline Protection Presentations. Olsen's monitoring reports going back to 2015 are also on the Village's Shoreline Protection webpage.

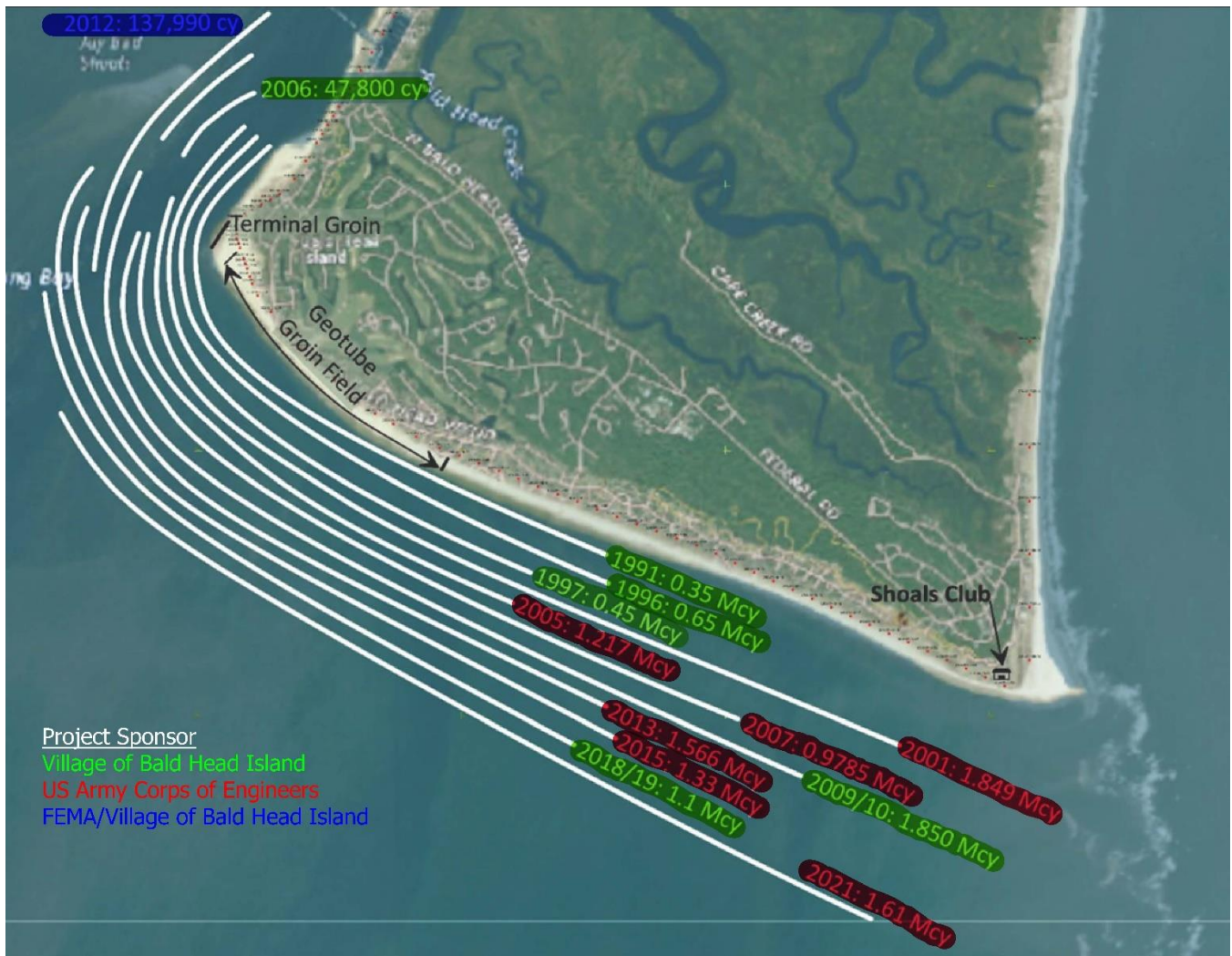
Since 1991, Bald Head Island has had thirteen (13) separate beach nourishment projects along its shoreline. Of those nourishments, eight (8) were performed and fully funded by the US Army Corps of Engineers (USACE) as part of the Wilmington Harbor Sand Management Plan (WHSMMP). These nourishments deposit beach-quality sand that is removed from the Wilmington harbor navigational channel on Bald Head Island and Oak Island at pre-determined intervals. Bald Head Island is scheduled to get sand every two out of three nourishments. The nourishments typically take place every two years but are contingent upon Federal appropriations made to the USACE via Congress. The Village has no authority to determine the location or engineering aspect of the sand disposal for these projects. Historically the sand is placed on the west end of South Beach until the material and/or funds are exhausted.

**TABLE 1  
BEACH DISPOSAL OR SAND REPLACEMENT ACTIVITIES  
ON 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)
2013	92,500 cy	USACE*	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)
<u>2021</u>	1.61 Mcy	USACE*	South Beach (Sta. 60+00 to Sta. 212+00)
<u>2023</u>	1.3 Mcy	USACE*	South Beach (Sta. 60+00 to Sta. 165+00)

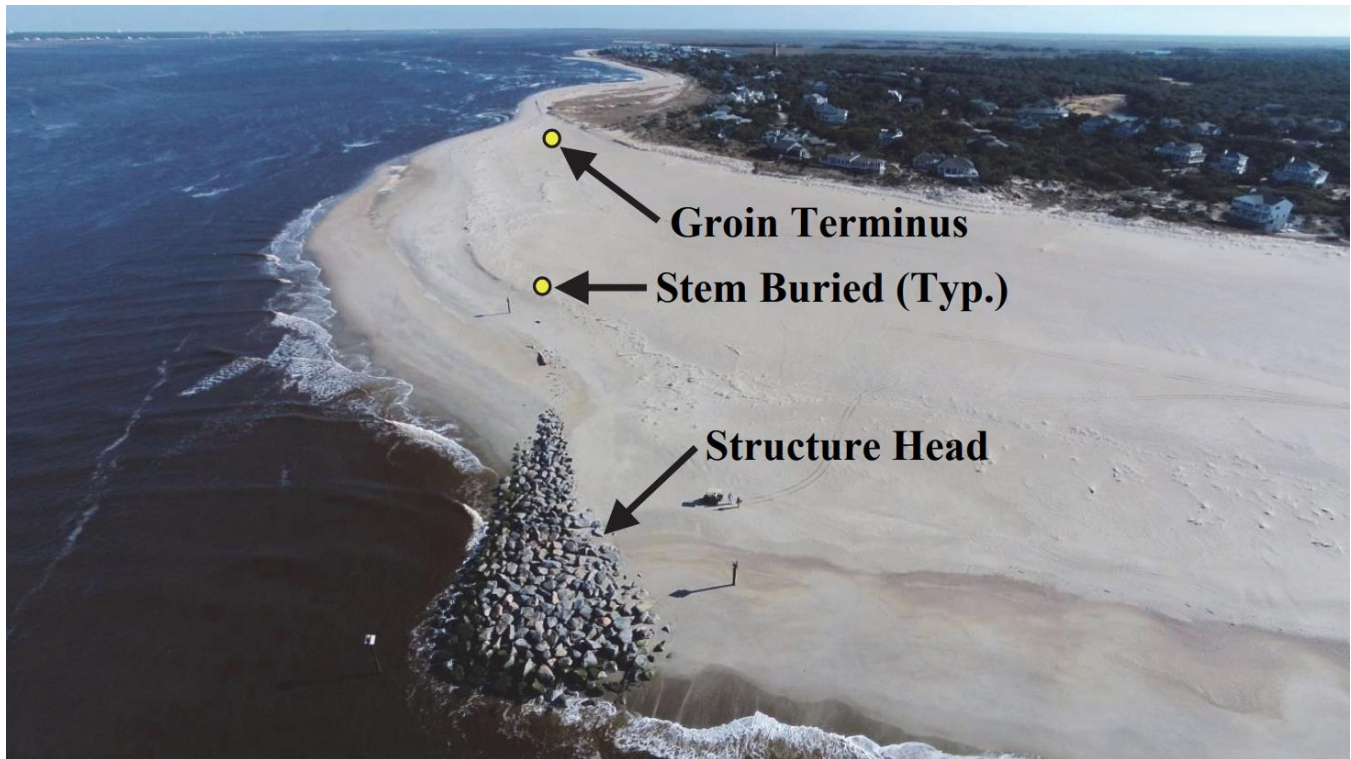
\* Disposal pursuant to the Wilmington Harbor Sand Management Plan.

VBHI = Village of Bald Head Island  
 USACE = US Army Corps of Engineers  
 FEMA = Federal Emergency Management Agency



Location of beach disposal or sand replacement projects on BHI. Adapted from Table 1 by Coastal Protection Engineering of NC, Inc. and color-coded by the Village to indicate the project sponsor.

Since 1994, Bald Head Island has installed a variety of erosion control structures to manage erosion along its shoreline. This includes sandbag revetments, geotextile groin tubes, a 1,300-foot-long terminal groin, marina channel entrance structure extensions, and detached breakwaters. These structures supplement the beach nourishments and, in many cases, prolong the need for nourishment by keeping sand on the shoreline for an extended period. Maintenance for these structures is a part of Olsen’s annual assessment and recommendation to the Village so that maintenance events can be planned and performed concurrently with nourishment events if it is more cost-effective. For a list of all erosion control structure activities go to <https://villagebhi.org/departments-services/shoreline-protection/past-project-information/>.



*Bald Head Island's Terminal Groin - After successfully lobbying with other NC municipalities and coastal organizations for a state law to allow a limited number of terminal groins (now up to 6) in the state of North Carolina, BHI was the first to construct one in 2015/2016. (Photo from Olsen & Associates Monitoring Report No.14)*

Based on Olsen's findings, Olsen has recommended that the Village prepare to do a Village-funded beach nourishment project in the "off" years or the years that the USACE is placing channel maintenance sand on Oak Island. Since the Village was the recipient of the last two WHSMP nourishments from the USACE, the Village is planning the next Village-funded project in 2025, named the 2025 Coastal Storm Damage Reduction (CDSR) Project. As of the publication of this article, the project has been estimated to cost \$18 million and the Village has applied for the permits necessary to perform the following actions as recommended by Olsen:

1. Dredge beach quality sand from the Jay Bird Shoals borrow area.
2. Place the sand from the west end of the terminal groin down through the soft-tube groin field, then restart the sand fill east of Muscadine Wynd through the east end of the Shoals Club.
3. With the dry sand beach nourishment in place in the soft-tube groin field area, removal, and replacement of all groin tubes.



*Borrow site and sand placement areas for the 2025 CDSR Project  
(Photo from Project Plans submitted to USACE)*

The Village has been proactive in setting up a mechanism for funding nourishment projects on Bald Head Island. After seeking the advice of a beach funding consultant (PAR – Peter A. Ravella Consulting) and through the consultant’s thorough public engagement process, in 2008-2009, the Village developed a funding plan for the Village-funded portion of the island’s shoreline protection program. This resulted in the formation of two municipal service districts. The property owners in these districts pay an additional ad valorem tax each year which goes into the Village’s BRRAT (Beach Renourishment, Recreation and Tourism) fund.

When a beach nourishment project is imminent like the upcoming one planned for 2025, the Village voters decide whether more debt is to be obligated to the Village through a general obligation (GO) bond referendum. Past referendums have successfully passed and resulted in successful Village-funded projects in 2010, and 2016 (specific to the installation of the Terminal Groin, additional sand placement of the “fillet”, jetty extensions w/ spurs at the Marina Channel entrance, and installation of the two breakwaters along Row Boat Row shoreline) and 2018 which included removal and replacement of the geotextile groins. The Village will be finished paying off the GO bond debt from the Village’s 2018 shoreline project (which was \$13.2 million) in October 2025. All previous shoreline projects are paid in full.

The Village is in contact with financial consultants and bond attorneys who will be working with the Village to secure financing and assist the Village with its Local Government Commission (LGC) application. The Village must apply to the LGC to borrow money for the project and has submitted a letter of intent to apply.

The Village Council will have issued its bond order, adopted a preliminary resolution, and set a public hearing at its November 17, 2023, regular meeting. The bond order and notice of public hearing will be published by December 8, 2023, and the public hearing and adoption of the bond order, along with the setting of the referendum date will take place at the Council's December 15, 2023, meeting. The bond referendum will take place on March 5, 2024, coinciding with the 2024 presidential primary for North Carolina.

Below are some important dates regarding voting in the referendum:

<b>January 15, 2024</b>	Absentee ballots for the bond referendum will be available.
<b>February 9, 2024</b>	Last day to register for the referendum.
<b>March 5, 2024</b>	The referendum will take place.
<b>By March 15, 2024</b>	Canvass of returns by Board of Elections.

*The referendum results will be certified and declared by resolution at the first meeting after the canvass. A statement of result of referendum will be published as soon as convenient after election results are certified.*

The Village will be providing additional information as we go through the bond referendum process. A webpage has been created to post updates on the 2025 CSDR Project (here: <https://villagebhi.org/departments-services/shoreline-protection/2025-csdr-project/>).

We hope the background supplied in this article and the materials provided on the Village's shoreline protection webpage, including the past presentations provided by our coastal engineering firm give you a firm understanding of the Village's shoreline protection program. If you have any questions, please contact the Village's Public Information Officer, Ms. Carin Faulkner, at [public.information@villagebhi.org](mailto:public.information@villagebhi.org) or (910) 457-9700 ext. 1025.