JOSH STEIN
Governor
D. REID WILSON
Secretary
TANCRED MILLER
Director

NORTH CAROLINA
Environmental Quality

CRC-26-71

August 5, 2026

MEMORANDUM

TO: Coastal Resources Commission
FROM: Daniel Govoni
SUBJECT: Oceanfront Erosion Discussion

North Carolina's coastline encompasses more than 320 miles of oceanfront beaches. Due to chronic erosion and repeated storm events, oceanfront houses and related infrastructure have increasingly encroached onto beaches subject to public trust. A 2020 assessment conducted by the Division of Coastal Management (DCM) identified more than 750 oceanfront structures, out of approximately 8,777 analyzed, as at risk due to the absence of dunes or vegetative buffers between the structures and the ocean. Continued sea-level rise and increased coastal storm frequency are expected to continue these conditions.

Under the Coastal Area Management Act (CAMA) and the associated rules in 15A NCAC Chapter 7, North Carolina limits hard erosion control structures along the oceanfront. Structures such as groins, breakwaters, seawalls, bulkheads, and revetments are generally prohibited due to their adverse impacts on public access, public trust beaches, adjacent properties, and natural shoreline processes. The State relies primarily on beach nourishment as the preferred method for mitigating erosion and reducing risk to oceanfront development. Temporary protective measures, such as sandbags, may be authorized under limited circumstances for imminently threatened structures or shorelines experiencing accelerated erosion; however, these measures are subject to stringent criteria and are not intended to serve as permanent solutions. The General Assembly has authorized a limited number of terminal groins, providing exceptions to the broader limitation on hardened erosion control structures.

There will be an oceanfront erosion discussion at your upcoming meeting with an update on the Science Panel draft report, other coastal states' policies on hard structures, and a history of North Carolina's laws and rules governing hardened structures.

Science Panel Report

At your June 18, 2026, meeting, Dr. Laura Moore presented the Science Panel's draft report titled "Effects of Hard Structures on Sandy and Open-Ocean Coastlines." The draft report addressed the Science Panel's charge, considerations specific to North Carolina, categories of coastal management approaches, and the approaches currently permitted on North Carolina's oceanfront. It also summarized the tradeoffs associated with hardened structures and outlined lessons learned from past projects.

The draft report included several key recommendations: maintaining a cautious approach to any expansion of hardened structures; requiring comprehensive evaluations for all proposed hardened structures; avoiding projects where evaluations indicate adverse impacts that cannot be mitigated; and ensuring that any ocean shoreline modification includes long-term monitoring, maintenance, and mitigation plan.

The Commission had several questions and requests for Dr. Moore at and following the June meeting, including a closer look at other states' policies, a review of Reef Balls as offshore breakwaters, and adding known erosion hotspots along the oceanfront into the report.

Since your June meeting the Science Panel's draft report has been available on DCM's website for public review and comment. Several public comments were received, including comments submitted by the North Carolina Coastal Federation (attached).

Dr. Moore will give an update on the final report at your upcoming meeting.

Inlet Hazard Update

Since their adoption in 1979, North Carolina's Inlet Hazard Area (IHA) boundaries have remained largely unchanged, despite the Coastal Resources Commission's (CRC) initial expectation that updates would be completed by the late 1980s. The existing boundaries were developed using statistical analyses of historical shoreline movement conducted in the late 1970s and were incorporated by reference into the CRC's rules. Beginning in the late 1990s, the CRC's Science Panel recommended revising the IHA boundaries, initiating years of data collection, methodology development, stakeholder engagement, and multiple briefings to the CRC. Previous attempts to update the boundaries were delayed due primarily to concerns regarding the size and regulatory implications of proposed revisions.

In 2023, anticipating the next scheduled update of the State's oceanfront erosion rates, the CRC directed the Science Panel to re-evaluate the IHA boundaries using the most recently available data and methodologies. The resulting 2025 studies produced updated IHA boundaries and oceanfront and inlet erosion rates that more accurately reflect inlet shoreline change over time, with some hazard areas expanding and others contracting relative to the original 1979 designations.

At your May 2026 meeting, the CRC approved the updated IHA boundaries, oceanfront and inlet erosion rates, and the associated rule amendments, formally initiating the rulemaking process. Division of Coastal Management staff are currently completing the required fiscal analysis, which must be reviewed and

approved by the North Carolina Department of Environmental Quality (NCDEQ), the Office of State Budget and Management (OSBM), and the CRC before the proposed rules can proceed to public hearings. At this time, the earliest anticipated effective date for the updated IHA boundaries, erosion rates, and associated rule amendments is spring 2027.

Coastal States Hardened Structures

At your June 18, 2026, meeting, the Science Panel presented its "Report on the Effects of Hard Structures on Sandy, Open-Ocean Coastlines." The report included a brief description of coastal armoring policies in other coastal states. The Commission requested staff to expand upon this topic. In response, DCM staff contacted numerous coastal states, reviewed their policies, and compiled the following summary of regulatory frameworks related to oceanfront hardening.

Maine
Maine generally prohibits construction of new seawalls and similar structures under the Coastal Sand Dune Rules (06-096 C.M.R. ch. 355). Alterations or replacements may be allowed under statutory emergency provisions (38 M.R.S. 480-W) or through Permit by Rule authorizations (06-096 C.M.R. ch. 305, Sections 8 and 16). Under ch. 355, Section 5(E), DEP may permit replacement of an existing structure with a differently sized or differently located structure positioned farther landward, provided the replacement results in reduced impacts to dunes, wildlife habitat, and adjacent properties. In 2025, the legislature amended 38 M.R.S. 480-E, Section 19, to allow a one-time height increase to existing seawalls.

Massachusetts
Massachusetts regulates construction on coastal beaches, dunes, and barrier beaches under 310 CMR 10.27–10.29. The state strongly restricts hardened structures and favors non-structural approaches such as beach nourishment and dune restoration. Construction may not increase erosion or alter beach morphology. Dune-adjacent construction must avoid harming vegetation or impairing dune resilience. Barrier beaches are presumed environmentally significant, and engineering structures are limited under Executive Order 181.

Rhode Island
Rhode Island prohibits new hardened structures on barrier beaches, headlands, coastal wetlands, and areas classified as Type 1 Waters, which include exposed open-ocean shores. This prohibition applies to more than 75 percent of the state's coastline. Applicants must demonstrate that all non-structural alternatives, including relocation or nourishment, have been evaluated before any permit may be approved.

Connecticut
Under the Connecticut Coastal Management Act, non-structural erosion control measures are prioritized. Structural armoring is allowed only when unavoidable and necessary to protect pre-1995 homes, critical infrastructure, or water-dependent uses. Applicants must demonstrate the lack of feasible alternatives. Most projects require an individual permit from the Department of Energy and Environmental Protection.

New York
New York closely regulates hardened structures within Coastal Erosion Hazard Areas (CEHA), including dunes, bluffs, and beaches. Armoring is generally discouraged unless it is necessary to prevent erosion and impacts can be minimized. A CEHA permit, and often a Tidal Wetlands Permit, is required. Replacement structures must remain landward of the existing footprint. Specific design standards apply to groins and revetments.

New Jersey
New Jersey's Resilient Environments and Landscapes (REAL) rules, effective 2026, strengthen coastal resilience standards. New hard armoring is generally discouraged due to downdrift erosion concerns. Preferred methods include nourishment, dune restoration, and living shorelines. Repairs to authorized pre-1981 structures are allowed under strict conditions.

Delaware
Under the Beach Preservation Act, Delaware imposes strong restrictions on hardened oceanfront structures. New seawalls, bulkheads, and riprap are generally prohibited. State policy prioritizes managed retreat, renourishment, and living shorelines. Construction seaward of the DNREC building line requires a Coastal Construction Permit.

Maryland
Maryland regulates hardened structures within Beach Erosion Control Districts, where permanent structures are generally prohibited on dunes and ocean beaches. Exceptions exist for approved storm-control projects and repairs to existing public structures in Ocean City, provided there is no expansion of footprint.

Virginia
Virginia's Coastal Primary Sand Dunes and Beaches Act largely prohibits hardened structures on dunes and beaches. Alterations require approval from the Virginia Marine Resources Commission or local wetlands boards. Hard structures may be permitted only when ecological harm will not occur, and the project serves a clear public interest. The state prefers living shorelines and nourishment.

South Carolina
South Carolina prohibits new hardened structures seaward of the statewide setback line. Limited exceptions exist for protecting public roads predating the Beachfront Management Act. Groins may be approved on nourished beaches with required monitoring.

Georgia
Georgia's Shore Protection Act generally discourages hardened structures on beaches and dunes. Exceptions may be granted for public works needs. The state encourages soft stabilization and living shoreline projects.

Florida
Florida regulates coastal armoring under the Beach and Shore Preservation Act. Rigid armoring is allowed when vulnerable structures or infrastructure require protection and when alternatives have been

evaluated. Applicants must minimize impacts to dunes, wildlife, and public access, and structures must be placed landward to the maximum extent practicable.

Alabama
Under the Alabama Coastal Area Management Program, applicants must first evaluate retreat or soft alternatives. Hardened structures are permitted only when soft options are infeasible and impacts can be minimized. Local governments administer permits in coordination with state agencies.

Louisiana
Louisiana evaluates shoreline armoring on a case-by-case basis under the Coastal Use Permit process. There is no statewide prohibition on hardened structures. Permitting focuses on environmental impacts, alternatives analysis, and consistency with the Louisiana Coastal Resources Program.

Texas
Texas prohibits beachfront armoring seaward of, or within 200 feet landward of, the vegetation line under 31 TAC §15.7. Hard structures may be placed only on private upland property outside public beach areas.

California
California regulates hardened shoreline structures under the California Coastal Act and California Coastal Commission policies. Under Section 30235 of the Act, hard protection is allowed only for coastal-dependent uses or existing development demonstrably endangered by erosion. Projects must be designed to avoid or mitigate adverse impacts to sand supply and shoreline processes. Coastal Development Permit applications require detailed technical reports, including geologic studies, wave run-up analyses, and beach profile evaluations.

Oregon
Oregon's Land Use Planning Goal 18 governs shoreline armoring. The state prohibits new armoring for development built after January 1, 1977. Structures may be permitted only to protect development predating this threshold. The state and local governments prioritize soft alternatives such as vegetation, sandbagging, and managed retreat. Exceptions are rare and closely scrutinized.

North Carolina Coastal Federation
Working Together for a Healthy Coast

June 17, 2026

Tancred Miller
N.C. Division of Coastal Management
400 Commerce Av.
Morehead City, NC 28570

Re: CRC Science Panel's Report on the Effects of Hard Structures on Sandy, Open-Ocean Coastlines

Dear Mr. Miller:

The North Carolina Coastal Federation supports the findings and recommendations of the Coastal Resources Commission Science Panel's report, *Effects of Hard Structures on Sandy, Open-Ocean Coastlines*, and urges the Commission to formally adopt the report and its recommendations. The report provides a thorough, balanced, and science-based assessment of the benefits, limitations, and adverse impacts associated with hardened shoreline structures and should serve as an important guide for future coastal management decisions.

The report reinforces what decades of coastal science and management experience have shown: hard structures may provide localized short-term benefits, but those benefits come with significant and often unavoidable costs. Structures designed to trap sand reduce erosion in one location by depriving other areas of that same sand. The result is increased erosion on neighboring beaches. Likewise, structures designed to hold the shoreline in place prevent beaches and dunes from naturally migrating landward as sea level rises, leading to narrower beaches, loss of habitat, diminished public access, and ultimately the loss of the very beach these structures are intended to protect.

Importantly, these impacts do not occur in isolation. Sand-trapping structures and shoreline hardening often create compounding effects. One structure can trigger erosion problems elsewhere, leading to pressure for additional structures, additional maintenance, and additional public costs. Over time, this can create a cycle in which more and more shoreline becomes dependent on engineered solutions while the natural resilience of the coastal system continues to decline.

The report clearly documents a broad range of adverse impacts associated with hard structures, including downdrift erosion, beach narrowing, loss of dunes and habitat, reduced recreational value, diminished ecosystem services, increased maintenance obligations, and decreased ability of barrier islands to adapt to rising seas and stronger storms. While these structures may provide localized protection for a few specific properties or infrastructure, the report demonstrates that the broader costs and

Northeast Regional Office
637 Harbor Road, P.O. Box 276
Wanchese, NC 27981
252-473-1607

Headquarters & Central Regional Office
3609 N.C. 24 • Newport, NC 28570
252-393-8185
www.nccoast.org

Southeast Regional Office
309 W. Salisbury Street
Wrightsville Beach, NC 28480
910-509-2838

consequences often extend well beyond the project area and are borne by actors outside of the impact zone.

The experience at Ocean Isle Beach illustrates many of the concerns identified in the report. While the terminal groin was constructed with the goal of reducing erosion and stabilizing the shoreline, erosion challenges have persisted and shifted within and around the project area, requiring continued intervention and management. The project demonstrates that hardened structures are not one-time solutions. Instead, they can create an ongoing dependence on engineering, monitoring, maintenance, and beach nourishment while fostering the perception that erosion has been solved when, in reality, the underlying coastal processes remain unchanged. As the Science Panel notes, structures that trap sand in one location inevitably affect sediment movement elsewhere, creating consequences that may extend beyond the immediate project area and persist for decades.

We particularly support the Science Panel's recommendation that North Carolina maintain a cautious approach toward any expansion of hard structures on the oceanfront. The report makes clear that decisions regarding these projects require rigorous technical evaluation, long-term monitoring, and a thorough assessment of both benefits and adverse impacts including cumulative and compounding effects over time and across neighboring shorelines. Such reviews demand substantial scientific and engineering expertise. Without sufficient technical capacity, agencies may face increasing difficulty evaluating proposals, enforcing permit conditions, and defending decisions when challenged.

North Carolina's longstanding restrictions on hardened oceanfront structures did not emerge by accident. They were adopted after careful consideration of the impacts observed both within our state and elsewhere. For more than three decades, North Carolina has been recognized as a national leader in protecting public beaches and preserving the natural function of barrier islands. Many coastal states that historically relied heavily on shoreline armoring have since experienced the unintended consequences of those decisions and have increasingly shifted toward approaches that work with natural coastal processes rather than against them.

The findings of this report strongly validate the approach North Carolina has taken for decades and support the concerns that the Coastal Federation and many coastal scientists have raised for years. The report does not suggest that hardened structures are a solution without consequence. Rather, it demonstrates that these approaches involve significant tradeoffs that must be carefully weighed against their limited and localized benefits.

At a time when sea-level rise, stronger storms, and increasing coastal development are creating unprecedented challenges, North Carolina should continue to lead rather than retreat from the principles that have guided coastal management for decades. The Science Panel's report provides a strong scientific foundation for maintaining that leadership and exercising caution before expanding the use of hard structures along our oceanfront.

The Federation supports the Commission's adoption of this report and respectfully urges the Commission to continue protecting North Carolina's beaches, dunes, and barrier islands by maintaining the state's longstanding restrictions on hardened oceanfront structures. North Carolina's coast is one of the state's greatest public assets. Protecting its natural function, public access, and long-term resilience is more important today than ever before.

Sincerely,

Ana Zivanovic-Nenadovic
Chief Program Officer