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CRC-26-57

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**MEMORANDUM**

**TO:** Coastal Resources Commission  
**FROM:** Ken Richardson, *Shoreline Management Specialist*  
**SUBJECT:** Updated Ocean Hazard Areas Erosion Rates & Setbacks, Boundaries (OEA & IHA), and Rule Amendments in 15A NCAC 07H .0304 and 07H .0310:

At your August 2025 meeting, updated Ocean Hazard Areas of Environmental Concern (AEC) boundaries, specifically the Inlet Hazard Areas (IHA) and Ocean Erodible Areas (OEA), and their corresponding erosion rate setback factors were presented to the Commission by Dr. Laura Moore, Chair of the CRC Science Panel on Coastal Hazards, and Division of Coastal Management (DCM) staff. As part of the discussion on rule changes, the CRC Chair appointed a sub-committee to evaluate potential rule changes, including consideration of the hybrid-vegetation line (HVL) as a method for measuring setbacks as recommended by the Science Panel. As you may recall from your February meeting, the Subcommittee's proposals were presented and discussed at the last Coastal Resources Advisory Council (CRAC) meeting, and subsequently supported and then recommended to the Commission. Proposed draft rule amendments being presented at this meeting were developed based on recommendations made by the CRC's Subcommittee. The CRC's action items for this topic are to consider approval of the following:

1. Rule amendments - which reflect the Subcommittee's findings and recommendations and supported by the CRAC.
2. Updated IHA boundaries.
3. Updated OEA and IHA erosion rate setbacks, to include OEA landward boundaries.



## Background:

The establishment of Areas of Environmental Concern (AEC) is authorized under the NC Coastal Area Management Act (CAMA) of 1974 (NCGS 113A-100 et seq.) and forms the foundation of the North Carolina Coastal Resources Commission's (CRC) permitting program for regulating coastal development. Rules defining three specific ocean hazard AECs appear in 15A NCAC 07H.0300: 1) Ocean Erodible, 2) Inlet Hazard, and 3) Unvegetated Beach AECs. The Ocean Erodible Area is defined in 15A NCAC 07H .0304(1) as the "area where there exists a substantial possibility of excessive erosion and significant shoreline fluctuation," and the Inlet Hazard Area is defined in 15A NCAC 07H.0304(2) as locations that "are especially vulnerable to erosion, flooding and other adverse effects of sand, wind, and water because of their proximity to dynamic ocean inlets."

Since 1979, the DCM has used long-term erosion data to determine construction setbacks in Ocean Hazard Areas (IHAs and OEAs) and to also establish the landward boundaries of Ocean Erodible Areas of Environmental Concern. However, due to limited data and resources, erosion rate setback factors within Inlet Hazard Areas (IHA) have traditionally been based on the rates of adjacent Ocean Erodible Areas, as specified in Rule 15A NCAC 07H.0310. Given the rapid changes that can occur at inlets, this method has often resulted in setback factors that underestimate the true erosion dynamics of these areas.

The Coastal Resources Commission's (CRC) setback rules are used to site oceanfront development based on the size of the structure according to the graduated setback provisions in 15A NCAC 7H .0306(a). In areas where there is a high rate of erosion, buildings must be located farther from the shoreline than in areas where there is less erosion. The construction setback equation depicted in Table 1 is used to site oceanfront development and determine the extent of the CRC's jurisdictional area for the Ocean Erodible Area of Environmental Concern (OEA) - the area where there is a substantial possibility of shoreline erosion. A minimum setback factor of two (2) is applied if the erosion rate is less than two feet per year or where there is accretion. This method of siting oceanfront development was initially established by the CRC in 1979.

Structure Size (square feet)	Construction Setback Equation	Minimum Setback (calculated using Setback Factor = 2 ft./yr.)
Less than 5,000	30 x Setback Factor	60
=>5,000 and < 10,000	60 x Setback Factor	120
=>10,000 and < 20,000	65 x Setback Factor	130
=>20,000 and < 40,000	70 x Setback Factor	140
=>40,000 and < 60,000	75 x Setback Factor	150
=>60,000 and < 80,000	80 x Setback Factor	160
=>80,000 and < 100,000	85 x Setback Factor	170
Greater than 100,000	90 x Setback Factor	180

**Table 1.** This table demonstrates an example of minimum construction setbacks based on structure size and the minimum setback factor of 2.



In addition, since 2013, shoreline change rates must be updated every five years to maintain North Carolina's compliance with Federal Emergency Management Administration (FEMA) guidelines for the Community Rating System (CRS). This requirement helps ensure that property owners in coastal communities participating in the National Flood Insurance Program can earn an additional 50 CRS points, potentially lowering insurance rates.

These reports provide details and maps for the updated IHA boundaries and Erosion rates for OEAs (oceanfront) and IHAs:

- *Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission ([download](#)).*
- *North Carolina 2025 Inlet Hazard Area (IHA) Erosion Rate & Setback Factors: Update Study ([download](#))*
- *North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report ([download](#))*



## Proposed Rule Amendments:

Updating Ocean Hazard Area boundaries (IHAs and OEAs), along with the associated erosion rate setback factors, requires rule amendments to, at a minimum, reference the updated report and maps. Historically, because IHA boundaries have remained static and adjacent OEA erosion rates were applied within IHAs, the primary amendment has been to 15A NCAC 07H .0304(1) to simply reference the updated oceanfront erosion rate report. However, this update includes revised IHA boundaries and inlet-specific erosion rates within IHAs, necessitating additional rule amendments to reference the applicable reports, maps, and use standards.

As you may recall from the November 2025 meeting, the CRC tasked a Subcommittee with considering rule amendments that include the CRC Science Panel's recommendation to measure setbacks from the hybrid-vegetation line (HVL). This review included consideration of grandfathering provisions, with the outcome intended to inform and guide the Commission's rule-making deliberations at its February 2026 meeting.

While the subcommittee recognized the logical basis for using the HVL to measure setbacks, they identified challenges in implementing this approach without rendering existing structures nonconforming. After thorough discussion, including the pros and cons of various grandfathering options, the subcommittee chose not to recommend the HVL for regulatory purposes, instead adopting an approach that still limits seaward encroachment of new development inside IHAs and pulls from existing CRC rule language.

Under this approach, setbacks within IHAs would continue to be measured from the actual vegetation line or pre-project line, but could not extend farther oceanward than the footprint of an existing structure, or, for vacant lots, the landward-most adjacent neighboring structure. In practice, this would reflect the seaward extent of existing development and function as a de facto development line without requiring the mapping and management of an additional regulatory boundary. This approach reduces the creation of nonconforming structures while preventing new development from advancing seaward in response to temporary natural accretion within an IHA, and is consistent with what is currently allowed under pre-project vegetation line and beach management plan rules.

Rules with amendments are included in Attachment A. The following highlights proposed rule amendments in 15A NCAC 07H .0304, AECs within Ocean Hazard Areas, and summarizes the purpose:

1. **15A NCAC 07H .0304(1)** – Ocean Erodible Areas (OEA):
  - Amendments reference updated long-term average annual erosion rate report and maps. Erosion rates are used for determining new construction setbacks and identifying the landward boundary of the OEA. Traditionally, this has been the only rule amendment needed when the CRC approves an erosion rate update.



- The current long-term average erosion ~~rate data~~ rates for each segment of the North Carolina coast is depicted on maps in the report entitled "North Carolina 2019 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study" "North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report" and approved by the Coastal Resources Commission on February 28, 2019 ~~(except as such rates may be varied in individual contested cases or in declaratory or interpretive rulings)~~ April 16, 2026.

2. **15A NCAC 07H .0304(2)** – Inlet Hazard Areas (IHA):

- Amendments reference two reports: 1) the CRC Science Panel’s updated IHA boundary report and maps, and 2) the IHA erosion rate report and maps. The current rule refers to the 1978 report. Including inlet erosion rates is new for IHAs since current rules require the adjacent OEA rate to be applied inside IHA.
  - The areas on the maps identified as Inlet Hazard Areas included in the report entitled ~~INLET HAZARD AREAS, The Final Report and Recommendations to the Coastal Resources Commission, 1978, as amended in 1981, by Loie J. Priddy and Riek Carraway~~ "Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission" and approved by the Coastal Resources Commission on April 16, 2026
  - The current long-term average erosion rate data for each Inlet Hazard Area is depicted on maps entitled “North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report” and approved by the Coastal Resources Commission on April 16, 2026. In all cases, the rate of shoreline change shall be no less than two feet of erosion per year.

3. **15A NCAC 07H .0304(3)** – Unvegetated Beach Areas:

- Amendments remove the temporary AEC designations at Oak Island, Surf City, and North Topsail Beach. As you may recall, these CRC designations are applied when vegetation is lost due to erosion caused by a major storm event, thus requiring a Measurement Line to be established for setback determinations until vegetation recovers, which has now occurred at all of these locations.
  - ~~The Commission designates as temporary unvegetated beach areas those oceanfront areas of:~~
    - ~~Surf City and North Topsail Beach in which the vegetation line as shown on the United States National Oceanic and Atmospheric Administration imagery dated September 17, 2018 was destroyed as a result of Hurricane Florence in September 2018; and~~
    - ~~Oak Island in which the vegetation line as shown on the United States National Oceanic and Atmospheric Administration and Geological Survey imagery dated August 4, 2020 was destroyed as a result of Hurricane Isaias in August 2020.~~



Rules with amendments are included in Attachment A. The following highlights proposed rule amendments in 15A NCAC 07H .0310, Use Standards for Inlet Hazard Areas, and summarizes the purpose:

1. **15A NCAC 07H .0310** (Use Standards for Inlet Hazard Areas):

- Amendments require setbacks to be based on inlet erosion rates and not the adjacent OEA rate.
  - All development in the inlet hazard area shall be set back from the vegetation line a distance equal to the setback required in the adjacent ocean hazard area; The Inlet Hazard Area setback for development shall be determined by the long-term erosion rate as defined in Rule 15A NCAC 07H .0304(2) and measured in a landward direction from the vegetation line as defined in 15A NCAC 07H .0305(5), the pre-project vegetation line as defined in 15A NCAC 07H .0305(6), or the measurement line as defined in 15A NCAC 07H .0305(9), whichever is applicable;
  - Amendments remove the commercial and residential distinction but retains the current density limitation.
  - Permanent structures shall be permitted at a density of no more than one ~~commercial or residential~~ unit per 15,000 square feet of land area on lots subdivided or created after July 23, 1981;
- Amendments remove structure type distinction but retains the current size limit on new development.
  - Only ~~residential structures of four units or less or non-residential~~ structures of less than 5,000 square feet total floor area as defined in Rule 15A NCAC 07H .0306(a)(2) shall be allowed within the ~~inlet hazard area~~ Inlet Hazard Area, except that access roads to those areas and maintenance and replacement of existing bridges shall be allowed.
- Amendments limit new development within IHAs to no farther seaward than the landward-most adjacent neighbor. This approach mirrors the CRC's beach management plan use standards defined in Rule 15A NCAC 07H .0306(a)(9) and Ocean Hazard Area setback exceptions defined in Rule 15A NCAC 07H .0309(b). While it does not require a formally mapped development line, it effectively functions as one by preventing seaward encroachment of new development. As you may recall, the Science Panel recommended using the hybrid vegetation line (HVL) for setback measurements out of concern that new development could move seaward in areas of recent accretion that are nonetheless expected to erode. The CRC's Subcommittee and the CRAC concluded after careful consideration that this approach provides a reasonable alternative to Science Panel's recommendation while still preserving the underlying intent of using the HVL.



(4) On a lot where new development is proposed, the development shall be set landward in accordance with the following criteria:

(A) No portion of a building or structure, including roof overhangs and elevated portions that are cantilevered, knee braced, or otherwise extended beyond the support of pilings or footings, extends oceanward of the landward-most adjacent habitable building or structure;

(B) The alignment shall be measured from the most oceanward point of the adjacent building or structure's roof line, including roofed decks, if applicable. An "adjacent" property is one that shares a boundary line with the site of the proposed development;

(C) When no adjacent buildings or structures exist, or the configuration of a lot, street, or shoreline precludes the placement of a building or structure in line with the landward-most adjacent building or structure, an average line of construction shall be determined by the Director of the Division of Coastal Management based on an approximation of the average seaward-most positions of the rooflines of adjacent structures along the same shoreline, extending 500 feet in either direction;

(D) If no structures exist within this distance, the proposed structure must meet the applicable setback from the vegetation line, pre-project vegetation line, or measurement line, which ever is applicable, and will not be held to the landward-most adjacent structure or an average line of structures, and;

(E) The structure is located as far landward on the lot as feasible.

- Amendments limit replacement of an existing structure inside an IHA to existing footprint and size, and requires replacement structures to also be as far landward on lot as feasible. This serves to prevent seaward encroachment of development, and the language is consistent with grandfathering provisions defined in Rule 15A NCAC 07H .0306(a)(3)(L).

(5) Replacement of a structure shall be allowed provided the structure meets the following criteria:

(A) the structure as replaced does not exceed the original footprint or square footage;

(B) the structure meets the required setback defined in this Rule; and

(C) the structure is rebuilt as far landward on the lot as feasible.



These amendments meet the minimum requirements necessary to update erosion rates for both the OEA and IHA and to revise IHA boundaries. In addition, the proposed IHA use standard amendments limit the seaward encroachment of new development in areas where natural accretion is expected to be lost to erosion. While this approach differs from the CRC Science Panel's recommendation to use the HVL for setback measurements, it achieves the same underlying intent.

The remaining amendments to 15A NCAC 07H .0304 and .0310 are minor and are intended for rule housekeeping purposes and do not change the intent of the rule.



## Updated Inlet Hazard Area Boundaries:

Unlike other CRC jurisdictional areas, IHA boundaries are defined in a report referenced in the CRC's rules at 7H.0304(2). The current IHA boundaries correspond to maps originally developed by Priddy and Carraway (1978) for all of the State's then-active inlets. The report designating the IHA boundaries was adopted by the CRC in 1979, with minor amendments since that time.

The original IHA boundaries were based on statistical analysis (and to a lesser extent previous inlet location) of historical shoreline movement identified on multiple aerial photosets. In most cases, the statistical methods used in the 1978 study identified the landward-most shoreline position (99% confidence interval) projected to occur between 1978 and 1988. Originally, the CRC anticipated that these boundaries were to be updated at the end of the 1980s. However, due to a combination of factors, that update did not occur.

It was not until the late 1990s, after the CRC's Science Panel on Coastal Hazards was formed, that the need to update IHAs became more of a focal point of discussion. The following is a summarized timeline from 1998 to 2025:

- **1998-1999:** The newly-formed Science Panel recommended to the CRC that the IHAs were outdated and should be updated. The Science Panel recommended that DCM hire staff to work on inlet hazards data collection and analysis.
- **November 2002:** DCM hired a Coastal Hazards GIS Specialist to support all oceanfront and inlet data collection, mapping, and analysis efforts.
- **2004-2008:** Data collection and mapping in preparation for updating IHAs. DCM worked extensively with the Science Panel to develop inlet delineation methodologies.
- **2009:** DCM synthesized data and study results into a report.
- **May & July 2010:** DCM presented a proposed IHA boundary update to the CRC.
- **2010-2012:** Due to concerns about the increased size of the proposed Inlet Hazard Areas (IHAs), there were numerous questions regarding the applicable IHA rules, and particularly whether "risk" was consistent across all areas within the proposed boundaries. With several of these questions about IHA development standards remaining unresolved, and with other major issues demanding the attention of both the CRC and the Science Panel, such as



studies on terminal groins and updates to oceanfront erosion rates, the IHA boundary update was temporarily paused.

- **2012:** The General Assembly directed the CRC to study the feasibility of creating a new AEC for the lands adjacent to the mouth of the Cape Fear River. Session Law 2012-202 required the CRC to consider the unique coastal morphologies and hydrographic conditions of the Cape Fear River region, and to determine if action is necessary to preserve, protect, and balance the economic and natural resources of this region through the elimination of current overlapping AECs by incorporating appropriate development standards into one single AEC unique to this location. During this study, the CRC found that while the Cape Fear River inlet did present a unique set of challenges, other inlets may have similar issues. The CRC therefore decided to undertake a comprehensive review of inlet-related issues, with the expectation of developing additional management tools that would allow the CRC to more proactively address the issues confronted by local governments in these dynamic areas.
- **February 2014:** The CRC asked the Science Panel to review a recommendation to remove IHA status from Mad Inlet, which had been naturally closed for some time. From this effort, the Panel made two recommendations that were presented to the CRC: 1) Mad Inlet was not at risk of reopening so IHA status should be removed; and 2) current IHAs were severely out of date and needed to be updated.
- **September 2014:** DCM presented a report to the CRC that was prepared following a series of stakeholder meetings, entitled, “NC Coastal Resources Commission Inlet Management Study Findings and Policy Options.” Stakeholders made several recommendations to the CRC that pertained specifically to IHAs: 1) The CRC should task the Science Panel to complete the development of methods to define revised IHAs and potential inlet and near-inlet setback lines for CRC review; and, 2) The IHAs should be eliminated and incorporated into the Ocean Erodible Area (OEA) while applying the same development standards currently utilized in the OEA.
- **May 2016:** Staff proposed to the CRC to continue discussing the IHAs, and to update inlet shoreline change rates that were presented in 2010 – CRC unanimously approved.
- **July 2016:** At the CRC meeting in Beaufort, the Commission issued the following scope of work to the Science Panel:
  - Develop a methodology for calculating inlet shoreline change rates.  
*The Science Panel chose the linear regression method to measure shoreline change at inlets. This method incorporates multiple shorelines, versus the end-point method currently used on the oceanfront which only uses two shorelines*



*(early and current). Inlet shoreline changes rates have not historically been used for determining construction setbacks at inlets.*

- Re-evaluate points along the oceanfront shoreline where inlet processes no longer influence shoreline position.

*When the Science Panel first started working on updating IHA boundaries in 2005, the Panel evaluated changes in shoreline position over time to determine the location along the shoreline where inlet-related processes no longer have a dominant influence on the shoreline's position.*

- Present results at a CRC Meeting.
- **November 2018:** At the CRC meeting in Ocean Isle, the Science Panel Co-Chair, Mr. Bill Birkemeier, presented the Panel's updated proposed IHA boundaries, and described the methods utilized by the Panel to map them.
  - **February 2019:** The Science Panel's IHA report titled, "Inlet Hazard Area Boundary 2019 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission" was approved by the CRC, in addition to rule amendments 07H.0304, and 07H.0310. This started the rule making process.
    - **September 2019:** The CRC approved the fiscal analysis
    - **December 2019- January 2019:** Seven Public Hearings held in each of the affected counties (Brunswick, New Hanover, Onslow, Pender, Carteret, Hyde and Dare)
    - **December 2019- January 2019:** Five public workshops held in North Topsail, Ocean Isle, Holden Beach, Carolina Beach and Topsail Beach
    - **January 2020:** Public comment period closed, but then was later extended to March 2020 to allow more time for submitting comments
    - **COVID-19:** delayed rule making until the CRC was able to meet in-person.
  - **April 2023:** One of the recommendations in the Science Panel's 2019 report was to re-evaluate Inlet Hazard Area (IHA) boundaries and associated erosion rates in coordination with future oceanfront erosion rate update studies. However, delays in rulemaking, caused by an extended public comment period and the onset of COVID-19, meant that the next scheduled oceanfront erosion rate update (2025) was approaching. In response, and at the request of both stakeholders and Division staff, the Coastal Resources Commission (CRC) re-issued a scope of work to its Science Panel.
    - Perform 5-year re-evaluation of IHA methods and boundaries incorporating data collected since the 2019 study.
    - Evaluate end-point and linear regression methods, and consider alternative methods for calculating oceanfront shoreline change rates.
    - Present draft report(s), including proposed IHA boundaries and erosion rates.



- **August 2025:** The CRC’s Science Panel on Coastal Hazards and DCM Staff presented results for the updated IHA boundaries and OEA & IHA erosion rate studies detailed in the following reports:

At the August 2025 CRC meeting, Dr. Laura Moore, Chair of the CRC’s Science Panel, presented the updated Inlet Hazard Area (IHA) boundaries and the methodologies used to define them. Specific details for each IHA boundary can be found in Chapter 3 (starting on page 30) of the report entitled *“Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission.”*<sup>1</sup>

As Dr. Moore demonstrated then, the spatial extent of the updated IHAs varies by inlet, with some areas decreasing in size compared to the current (1979) boundaries, while others have expanded. Table 2 provides a general comparison of the number of structures located within the current and proposed updated IHAs. Based on recent imagery and county tax data, 783 structures are located within the current IHAs, compared to 866 within the proposed IHAs, a net increase of 83 structures that would be included within IHA boundaries.

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<sup>1</sup> *Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission* ([download](#))

**Table 2.** This table illustrates the number of structures inside the current IHAs and the updated IHAs. The last column illustrates the difference in number of structures transitioning from the current IHA to the updated IHA. (-) Indicates decrease.

Location	Total Structures (Current IHA)	Total Structures (2025 IHA)	Total Structures (Increase/Decrease)
Tubbs Inlet - Sunset Beach	206	17	-189
Tubbs Inlet - Ocean Isle	41	30	-11
Shallotte Inlet - Ocean Isle	0	200	200
Shallotte Inlet - Holden Beach	59	144	85
Lockwood Folly Inlet - Holden Beach	4	42	38
Lockwood Folly Inlet - Oak Island	43	105	62
Carolina Beach Inlet – Carolina Bch.	0	18	18
Masonboro Inlet - Wrightsville Beach	0	3	3
Mason Inlet - Wrightsville Beach	1	16	15
Mason Inlet - Figure Eight	36	10	-26
Rich Inlet - Figure Eight	36	62	26
New Topsail Inlet – Topsail Beach	177	17	-160
New River Inlet - N. Topsail Beach	84	125	41
Bogue Inlet - Emerald Isle	96	77	-19
<b>Total:</b>	<b>783</b>	<b>866</b>	<b>83</b>

Consistent with previous update studies, IHA boundaries at undeveloped inlets were not analyzed. DCM staff will recommend removing IHA designations from the following inlet locations: Little River Inlet (SC/NC), New River and Brown’s Inlets (Camp Lejeune), Bogue Inlet (Hammocks Beach State Park), Barden Inlet, Ocracoke Inlet, and Hatteras Inlet. It is important to note that while inlet hazards are present at these sites, these areas are not being developed.



## OEA and IHA Erosion Rates & Setback Factors:

### **Ocean Erodeable Areas (OEA) Erosion Rates:** *North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report*

Based on this study, the statewide long-term average annual erosion rate is -1.9 feet per year (median is -1.3 feet per year). Erosion rates below -2.0 feet per year were recorded at 4,343 transects, covering 134.9 miles (42.4% of the analyzed shoreline), while rates exceeding -2.0 feet per year were measured at 4,485 transects, spanning 139.3 miles (43.8%). Accretion was observed at 3,193 transects across 99.2 miles (31% of the analyzed shoreline). Despite using least squares regression, the results align closely with previous studies that employed the end-point method (Tables 3 and 4).

Relative to the current setback requirements established in 2020, the updated setback requirements within the Ocean Erodeable Area (OEA) will remain unchanged along 201.4 miles of shoreline. In total, 70.3 miles will reflect a reduction in setback factors, with rates of change ranging from 0.5 to 14.0 feet per year (mean: 1.5 feet per year), while 12.6 miles will reflect an increase ranging from 0.5 to 32.0 feet per year (mean: 3.0 feet per year).

Focusing on segments of developed shorelines only (144.6 miles), within the OEA, and excluding areas within the proposed 2025 IHA updated boundaries:

- 124.9 miles (86%) will see no change in setback factors
- 17.7 miles (12%) will experience a decrease between 0.5 and 3.5 feet per year (average: 1.0 foot), and
- 2.0 miles (2%) will see an increase between 0.5 and 3.5 feet per year (average: 1.0 foot per year)



Parameter	Lengths of shoreline for each parameter	
	End-Point Method Miles of Shoreline (%)	Least Squares Regression Method Miles of Shoreline (%)
<b>Miles of Shoreline Mapped &amp; Analyzed</b>	317.8	317.8
<b>Measured Accretion</b>	109 (34.3%)	99.2 (31.2%)
<b>Measured Erosion</b>	208.5 (65.6%)	218 (68.6%)
<b>No Change or No Output (no data)</b>	0.3 (<1%)	0.6 (<1%)
<b>Setback Factor = 2.0</b>	196.8 (61.9%)	193.7 (61%)
<b>Setback Factor = 2.5 to 5.0</b>	63.8 (20.1%)	66.5 (20.9%)
<b>Setback Factor = 5.5 to 8.0</b>	34.1 (10.7%)	33.7 (10.6%)
<b>Setback Factor &gt; 8.0</b>	23.1 (7.2%)	23.8 (7.5%)

**Table 3.** This table presents the length and percentage of the total shoreline, comparing the calculated erosion rate setback factors determined by both the least squares and end-point methods. It is important to note that the minimum setback factor is 2, as defined in Rule 15A NCAC 07H.0306. A setback factor of 2 indicates that erosion is either less than -2.4 feet per year or that accretion was measured. Setback factors greater than 2 correspond to calculated erosion rates.

Statewide Summary	2025 Miles (% of total)	2020 Miles (% of total)	2013 Miles (% of total)	2004 Miles (% of total)	1997 Miles (% of total)	1986* Miles (% of total)	1980* Miles (% of total)
<b>Miles of Shoreline Mapped/Analyzed</b>	<b>317.8</b>	<b>304.5</b>	<b>307.4</b>	<b>312</b>	<b>300</b>	<b>237*</b>	<b>245*</b>
<b>Setback Factor (2 ft/yr.)</b>	193.7 (61%)	174.6 (57.3%)	190.2 (61.9%)	193 (62%)	165 (55%)	144 (61%)	149 (61%)
<b>Setback Factor (2.5 to 5.0 ft/yr.)</b>	66.5 (20.9%)	67.1 (22.1%)	62.1 (20.2%)	64 (21%)	54 (18%)	43 (18%)	52 (21%)
<b>Setback Factor (5.5 to 8.0 ft/yr.)</b>	33.7 (10.6%)	38.7 (12.7%)	31.5 (10.2%)	28 (9%)	30 (10%)	20 (8%)	22 (9%)
<b>Setback Factor (&gt;8.0 ft/yr.)</b>	23.8 (7.5%)	22.7 (7.4%)	20.8 (6.8%)	27 (8%)	32 (10.7%)	22 (9%)	22 (9%)
<b>No Data</b>	0.0	1.4 (<0.5%)	2.8 (<1%)	0	19 (6%)	8 (4%)	0

**Table 4.** This table presents a summary of length of analyzed shoreline and blocked shoreline change rates (Setback Factors) relative to previous studies dating back to 1980. Where the study year is marked with an asterisk (\*), the total shoreline length is lower because either some or all the National Seashore was not mapped and analyzed (e.g., Shackleford Banks, Core Banks).



**Inlet Hazard Areas (IHA) Erosion Rates: North Carolina 2025 Inlet Hazard Area (IHA) Erosion Rate & Setback Factors: Update Study**

As anticipated, the analysis of inlet shoreline change rates along the study area reveals a fluctuating trend of shoreline retreat (erosion) and accretion, with a collective average erosion rate of less than -2 feet per year within the 2025 IHAs. However, this average should not be misinterpreted as indicative of minimal risk at each inlet, as this average is heavily influenced by the balance between very high erosion rates exceeding -20 feet per year and significant accretion rates resulting in construction setback factors ranging between 2 and 18. These findings underscore the substantial impact of natural inlet processes, such as tides, wave action, storm events, and sea-level rise, compounded by anthropogenic influences like coastal development and engineering practices, including dredging, beach nourishment, and erosion control structures.

As noted, erosion rate setback factors within IHAs have historically been adopted from adjacent OEAs. While this approach has aligned with past setback requirements in some inlets, others will see increased setback requirements as they are now based on inlet-specific erosion rates rather than oceanfront-derived values.

For each proposed updated Inlet Hazard Area (IHA) boundary, the tables below illustrate the blocked setback factor sections within the 2025 IHAs and compares the calculated results to those from previous erosion rate studies for the same geographic areas. For example, in the **Shalotte Inlet–Ocean Isle** table, the row corresponding to the section of beach with a 2025 erosion setback factor of **SBF=4** also summarizes the setback factors measured for that same section of beach in each prior study (2020=2 to 4, 2013=4, 2004=2, 1997=2, 1986=2, 1983=3, & 1980=2).

**Tubbs Inlet - Sunset Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	2	2

**Tubbs Inlet - Ocean Isle:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 10</b>	2	2	2	2	2	2	2
<b>SBF = 2</b>	2	2	2	2	2	2	2



**Shalotte Inlet - Ocean Isle:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2 to 4	2	2	2	2 to 3	2
<b>SBF = 4</b>	2 to 4	4	2	2	2	3	2
<b>SBF = 7</b>	4	4 to 6.5	2 to 4.5	2	2	3	2
<b>SBF = 10</b>	5	6.5	4.5	2	2	3	2
<b>SBF = 14</b>	5	6.5	4.5	2	2	3	2
<b>SBF = 17.5</b>	5	6.5	4.5	2	2	3	2
<b>SBF = 17</b>	5	6.5	4.5	2	2	3	2
<b>SBF = 9</b>	5	6.5	4.5	2	2	3	2

**Shalotte Inlet - Holden Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	2	2
<b>SBF = 9</b>	2	2	2	2	2	2	2
<b>SBF = 16</b>	2	2	2	2	2	2	2

**Lockwood Folly Inlet - Holden Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	4 to 6	3.5 to 7	6.5 to 7.5	4	3	4	2
<b>SBF = 5</b>	6	7	7.5	4	3	4	2



**Lockwood Folly Inlet - Oak Island:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	2 to 4	2

**Carolina Beach Inlet - Carolina Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	3 to 7	3 to 6.5	2 to 8	2 to 5	7 to 10	5 to 10	2 to 10

**Masonboro Island:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2 to 29	2 to 12.5	2 to 12	4 to 7	5 to 7	4 to 12.5	2.4

**Masonboro Inlet - Wrightsville Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	2	2

**Mason Inlet - Wrightsville Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	2	2

**Mason Inlet - Figure Eight Island:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
<b>SBF = 2</b>	2	2	2	2	2	5	2.3



**Rich Inlet - Figure Eight Island:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
SBF = 2	2	2	2	2	2	2	2.3
SBF = 3.5	2	2	2	2	2	2	2.3
SBF = 5	2	2	2	2	2	2	2.3
SBF = 2	2	2	2	2	2	2	2.3

**Lea-Hutaff Island:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
SBF = 3 to 12.5	4 to 10	2 to 10	2 to 7	2 to 6	5 to 6	2 to 5	2 to 5.7

**New Topsail Inlet - Topsail Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
SBF = 2	2	2	2	2	2	2	2

**New River Inlet - North Topsail Beach:**

Area Inside 2025 IHA	2020	2013	2004	1997	1986	1983	1980
SBF = 2	2	2	2	2	2	2	2.5
SBF = 2.5	2	2	2	2	2	2	2.5
SBF = 5	2	2	2	2	2	2	2.5
SBF = 7	2	2	2	2	2	2	2.5
SBF = 6	2	2	2	2	2	2	2.5
SBF = 10	2	2	2	2	2	2	2.5



**Bogue Inlet - Emerald Isle:**

<b>Area Inside 2025 IHA</b>	<b>2020</b>	<b>2013</b>	<b>2004</b>	<b>1997</b>	<b>1986</b>	<b>1983</b>	<b>1980</b>
<b>SBF = 2</b>	2	2	2	3	5	3	NA



## **Staff's Recommendation to the Commission**

DCM Staff are asking the Commission to consider approval of the proposed amendments to 15A NCAC 07H .0304 and 07H .0310, the CRC Science Panel's recommended Inlet Hazard Area boundary updates, and erosion rates and setback reports and maps for IHAs and OEAs in order to move forward with rulemaking.

**Attachment A:** *Proposed rule amendments in 15A NCAC 07H .0304 and 07H .0310*

**Attachment B:** *Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission ([download](#)).*

**Attachment C:** *North Carolina 2025 Inlet Hazard Area (IHA) Erosion Rate & Setback Factors: Update Study ([download](#))*

**Attachment D:** *North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report ([download](#))*



## Attachment A: Proposed rule amendments in 15A NCAC 07H .0304 and 07H .0310

### 15A NCAC 07H .0304 AECS WITHIN OCEAN HAZARD AREAS

The ocean hazard AECs contain all of the following areas:

- (1) Ocean Erodible Area. This is the area where there exists a substantial possibility of excessive erosion and significant shoreline fluctuation. The oceanward boundary of this area is the mean low water line. The landward extent of this area is the distance landward from the vegetation line as defined in 15A NCAC 07H .0305(a)(5) to the recession line established by multiplying the long-term annual erosion rate times 90; provided that, where there has been no long-term erosion or the rate is less than two feet per year, this distance shall be set at 180 feet landward from the vegetation line. For the purposes of this Rule, the erosion rates are the long-term average based on available historical data. The current long-term average erosion rate data rates for each segment of the North Carolina coast is depicted on maps in the report entitled "North Carolina 2019 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study" "North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report" and approved by the Coastal Resources Commission on February 28, 2019 (except as such rates may be varied in individual contested cases or in declaratory or interpretive rulings) April 16, 2026. In all cases, the rate of shoreline change shall be no less than two feet of erosion per year. The report and maps are available without cost from any Local Permit Officer or from the Division of Coastal Management on the internet at <http://www.nccoastalmanagement.net>, online at <https://www.deq.nc.gov/coastal-management/north-carolina-2025-oceanfront-setback-factors-long-term-average-annual-erosion-rate-update-study/open>.
- (2) Inlet Hazard Area. The inlet hazard areas are natural hazard These are areas that are subject to inlet migration, rapid and severe erosion, and flooding especially vulnerable to erosion, flooding, and other adverse effects of sand, wind, and water because of their proximity to dynamic ocean inlets. This area extends landward from the mean low water line a distance encompassing that area within which the inlet migrates, based on statistical analysis, and shall consider such factors as previous inlet territory, structurally weak areas near the inlet, and external influences such as jetties, terminal groins, and channelization. The areas on the maps identified as Inlet Hazard Areas included in the report entitled INLET HAZARD AREAS, The Final Report and Recommendations to the Coastal Resources Commission, 1978, as amended in 1981, by Loie J. Priddy and Riek Carraway "Inlet Hazard Area Boundaries, 2025 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission" and approved by the Coastal Resources Commission on April 16, 2026 are incorporated by reference and are hereby designated as Inlet Hazard Areas, except for: for inlets defined as State Port Inlet Management Areas in Item (4) of this Rule. The report and maps are available from the Division of Coastal Management online at <https://www.deq.nc.gov/coastal-management/documents/north-carolina-2025-inlet-hazard-area-ih-a-boundary-update/open>.
  - (a) the location of a former inlet which has been closed for at least 15 years;
  - (b) inlets that due to shoreline migration, no longer include the current location of the inlet; and
  - (c) inlets providing access to a State Port via a channel maintained by the United States Army Corps of Engineers.

In all cases, the Inlet Hazard Area shall be an extension of the adjacent ocean erodible areas and in no case shall the width of the inlet hazard area be less than the width of the adjacent ocean erodible area. The current long-term average erosion rate data for each Inlet Hazard Area is depicted on maps entitled "North Carolina 2025 Oceanfront Setback Factors & Long-Term Average Annual Erosion Rate Update Study: Methods Report" and approved by the Coastal Resources Commission on April 16, 2026. In all cases, the rate of shoreline change shall be no less than two feet of erosion per year. This report is available for inspection at the Department of Environmental Quality, Division of Coastal Management, 400 Commerce Avenue, Morehead City, North Carolina or at the website referenced in Item (1) of this Rule. The report and maps are available from the Division of Coastal Management online at <https://www.deq.nc.gov/coastal-management/north-carolina-2025-inlet-hazard-area-ih-a-erosion-rate-setback-factors-update-study/open>.
- (3) Unvegetated Beach Area. Beach areas within the Ocean Hazard Area where no stable and natural vegetation is present may be designated as Unvegetated Beach Areas on either a permanent or temporary basis as follows:



- (a) An area appropriate for permanent designation as an Unvegetated Beach Area is a dynamic area that is subject to rapid unpredictable landform change due to wind and wave action. The areas in this category shall be designated following studies by the Division of Coastal Management. These areas shall be designated on maps approved by the Coastal Resources Commission and available without cost from any Local Permit Officer or the Division of Coastal Management on the internet at the website referenced in Item (1) of this Rule.
- (b) An area that is unvegetated as a result of a hurricane or other major storm event may be designated by the Coastal Resources Commission as an Unvegetated Beach Area for a specific period of time, or until the vegetation has re-established in accordance with 15A NCAC 07H .0305(a)(5). At the expiration of the time specified or the re-establishment of the vegetation, the area shall return to its pre-storm designation.
- ~~(c) The Commission designates as temporary unvegetated beach areas those oceanfront areas of:
 
  - ~~(i) Surf City and North Topsail Beach in which the vegetation line as shown on the United States National Oceanic and Atmospheric Administration imagery dated September 17, 2018 was destroyed as a result of Hurricane Florence in September 2018; and~~
  - ~~(ii) Oak Island in which the vegetation line as shown on the United States National Oceanic and Atmospheric Administration and Geological Survey imagery dated August 4, 2020 was destroyed as a result of Hurricane Isaias in August 2020.~~
 The designation AEC boundaries can be found on the Division's website at [https://files.nc.gov/ncdeq/Coastal%20Management/GIS/unvegetated\\_beach\\_aec.pdf](https://files.nc.gov/ncdeq/Coastal%20Management/GIS/unvegetated_beach_aec.pdf) and [https://files.nc.gov/ncdeq/Coastal%20Management/GIS/unveg\\_beachAEC\\_Oak\\_Island.zip](https://files.nc.gov/ncdeq/Coastal%20Management/GIS/unveg_beachAEC_Oak_Island.zip). This designation shall continue until such time as the stable and natural vegetation has reestablished, or until the area is permanently designated as an unvegetated beach area pursuant to Sub-Item (3)(a) of this Rule.~~
- (4) State Ports Inlet Management Area. These are areas adjacent to and within Beaufort Inlet and the mouth of the Cape Fear River, providing access to a State Port via a channel maintained by the United States Army Corps of Engineers. These areas are unique due to the influence of federally-maintained channels, and the critical nature of maintaining shipping access to North Carolina's State Ports. These areas may require specific management strategies not warranted at other inlets to address erosion and shoreline stabilization. State Ports Inlet Management Areas shall extend from the mean low water line landward as designated on maps approved by the Coastal Resources Commission and available without cost from the Division of Coastal Management, and on the internet at the website at [https://files.nc.gov/ncdeq/Coastal%20Management/GIS/state\\_port\\_aec.pdf](https://files.nc.gov/ncdeq/Coastal%20Management/GIS/state_port_aec.pdf).

*History Note:* Authority G.S. 113A-107; 113A-107.1; 113A-113; 113A-124;  
 Eff. September 9, 1977;  
 Amended Eff. December 1, 1993; November 1, 1988; September 1, 1986; December 1, 1985;  
 Temporary Amendment Eff. October 10, 1996;  
 Amended Eff. April 1, 1997;  
 Temporary Amendment Eff. October 10, 1996 Expired on July 29, 1997;  
 Temporary Amendment Eff. October 22, 1997;  
 Amended Eff. April 1, 2020; July 1, 2016; September 1, 2015; May 1, 2014; February 1, 2013;  
 January 1, 2010; February 1, 2006; October 1, 2004; April 1, 2004; August 1, 1998;  
 Readopted Eff. December 1, 2020;  
 Amended Eff. August 1, 2022; September 1, 2021.



## 15A NCAC 07H .0310 USE STANDARDS FOR INLET HAZARD AREAS

(a) Inlet Hazard Areas of Environmental Concern ~~as are~~ defined by Rule ~~.0304~~ 15A NCAC 07H .0304 (2) of this Section are subject to inlet migration, rapid and severe changes in watercourses, flooding and strong tides. Due to the extremely hazardous nature of the Inlet Hazard Areas, all development within these areas shall be permitted in accordance with 15A NCAC 07H .0306 and the following standards:

- (1) All development in the inlet hazard area shall be set back from the vegetation line a distance equal to the setback required in the adjacent ocean hazard area; The Inlet Hazard Area setback for development shall be determined by the long-term erosion rate as defined in Rule 15A NCAC 07H .0304(2) and measured in a landward direction from the vegetation line as defined in 15A NCAC 07H .0305(5), the pre-project vegetation line as defined in 15A NCAC 07H .0305(6), or the measurement line as defined in 15A NCAC 07H .0305(9), whichever is applicable;
- (2) Permanent structures shall be permitted at a density of no more than one commercial or residential unit per 15,000 square feet of land area on lots subdivided or created after July 23, 1981;
- (3) Only residential structures of four units or less or non-residential structures of less than 5,000 square feet total floor area as defined in Rule 15A NCAC 07H .0306(a)(2) shall be allowed within the ~~inlet hazard area~~ Inlet Hazard Area, except that access roads to those areas and maintenance and replacement of existing bridges shall be allowed;
- (4) On a lot where new development is proposed, the development shall be set landward in accordance with the following criteria:
  - (A) No portion of a building or structure, including roof overhangs and elevated portions that are cantilevered, knee braced, or otherwise extended beyond the support of pilings or footings, extends oceanward of the landward-most adjacent habitable building or structure;
  - (B) The alignment shall be measured from the most oceanward point of the adjacent building or structure's roof line, including roofed decks, if applicable. An "adjacent" property is one that shares a boundary line with the site of the proposed development;
  - (C) When no adjacent buildings or structures exist, or the configuration of a lot, street, or shoreline precludes the placement of a building or structure in line with the landward-most adjacent building or structure, an average line of construction shall be determined by the Director of the Division of Coastal Management based on an approximation of the average seaward-most positions of the rooflines of adjacent structures along the same shoreline, extending 500 feet in either direction;
  - (D) If no structures exist within this distance, the proposed structure must meet the applicable setback from the vegetation line, pre-project vegetation line, or measurement line, which ever is applicable, and will not be held to the landward-most adjacent structure or an average line of structures, and;
  - (E) The structure is located as far landward on the lot as feasible.
- (5) Replacement of a structure shall be allowed provided the structure meets the following criteria:
  - (A) the structure as replaced does not exceed the original footprint or square footage;
  - (B) the structure meets the required setback defined in this Rule; and
  - (C) the structure is rebuilt as far landward on the lot as feasible.
- ~~(4)~~(6) Established common-law and statutory public rights of access to the public trust lands and waters in Inlet Hazard Areas shall not be eliminated or restricted. Development shall not encroach upon public accessways nor shall it limit the intended use of the accessways; and
- ~~(5)~~(7) All other rules in this Subchapter pertaining to development in the ~~ocean hazard areas~~ Ocean Hazard Areas shall be applied to development within the Inlet Hazard Areas.

(b) The ~~inlet hazard area~~ Inlet Hazard Area setback requirements shall not apply to the types of development exempted from the ocean setback rules in 15A NCAC 07H .0309(a), or to the types of development listed in 15A NCAC 07H .0309(c).

(c) In addition to the types of development excepted under Rule .0309 of this Section, ~~small-scale~~ small-scale development that does not induce further growth in the Inlet Hazard Area, such as the construction of single-family piers and small scale erosion control measures that do not interfere with natural inlet movement, may be permitted on those portions of shoreline within a designated Inlet Hazard Area that exhibit features characteristic of Estuarine Shoreline. Such features include the presence of wetland vegetation, lower wave energy, and lower erosion rates than in the adjoining Ocean Erodible Area. Such development shall be permitted under the standards set out in Rule .0208 of this Subchapter. For the purpose of this Rule, small scale is defined as those projects which are eligible for authorization under 15A NCAC 07H .1100, .1200, and 07K .0203.



*History Note: Authority G.S. 113A-107; 113A-113(b); 113A-124;  
Eff. December 1, 1981;  
Emergency Rule Eff. September 11, 1981, for a period of 120 days to expire on January 8, 1982;  
Temporary Amendment Eff. October 30, 1981, for a period of 70 days to expire on January 8, 1982;  
Amended Eff. April 1, 1999; April 1, 1996; December 1, 1992; December 1, 1991; March 1, 1988;  
Readopted Eff. December 1, 2020;  
Amended Eff. August 1, 2022.*

