

Fiscal Analysis

2019 Update of Inlet Hazard Area Boundaries, Setback Factors, & Rule Amendments

**15A NCAC 07H .0304, 15A NCAC 07H .0306, 15A NCAC 07H .0308, 15A NCAC 07H .0309,
15A NCAC 07H .0310**

Prepared by
Ken Richardson
Shoreline Management Specialist
Policy & Planning Section
&
Mike Lopazanski
Deputy Director
NC Division of Coastal Management
(252) 808-2808

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Basic Information

Agency	DEQ, Division of Coastal Management (DCM) Coastal Resources Commission
TITLE	AREAS OF ENVIRONMENTAL CONCERN (AECS) WITHIN OCEAN HAZARD AREAS, GENERAL USE STANDARDS FOR OCEAN HAZARD AREAS, & USE STANDARDS FOR INLET HAZARD AREAS
Citation	15A NCAC 7H .0304(2), 15A NCAC 07H .0306(A)(4), 15A NCAC 7H .0308, NCAC 7H .0309(C) AND 15A NCAC 07H .0310(A)
Description of the Proposed Rule	7H.0304 defines and establishes Areas of Environmental Concern (AECs) within the Ocean Hazard Areas along the State's Atlantic Ocean shoreline. Ocean Hazard Area AECs include the Ocean Erodible Area, Inlet Hazard Area and the Unvegetated Beach Area; 7H. 0306 defines use standards with AECs; 7H.0309 defines use standards for OHA and exceptions, and; 07H.0310 defines use standards within Inlet Hazard Areas (IHAs).
Agency Contact	Ken Richardson Shoreline Management Specialist ken.richardson@ncdenr.gov (252) 808-2808 ext. 225
Authority	G.S. 113A-107; 113A-113; 113A-124
Necessity	The Coastal Resources Commission proposed amendments to 15A NCAC 7H .0304(2), 15A NCAC 7H .0306(a)(4), 15A NCAC 7H .0309(c) and 15A NCAC 7H .0310(a) to reference proposed update of Inlet Hazard Area boundaries and associated development setback factors. The proposed rule change is in the public interest as it is intended to minimize the loss of property and human life by establishing development setbacks between structures and the Atlantic shoreline.
Impact Summary	State government: No Local government: Uncertain Private Property Owners: Yes Substantial impact: No Federal government: No

Summary

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 inlet hazard area (IHA) AEC is defined in 15A NCAC 07H.0301(3) 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."

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.

IHA boundaries in use today are 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 Commission 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.

The Coastal Resources Commission (CRC) seeks to amend Inlet Hazard Area (IHA) boundaries and its administrative rules governing structure size, development density, and siting of new construction within these areas more prone to erosion caused by inlet related processes.

Introduction and Purpose

Developed in 1978 and estimated to be applicable for approximately ten years, the State's existing Inlet Hazard Area boundaries were intended to be updated before 1990. However, completing an update did not occur due to limited staff resources, insufficient data and mapping tools, and the lack of a defined method that could incorporate modern data and knowledge related to inlet geology and geomorphology.

Geographically, the ends of barrier islands adjacent to inlets are constantly being reshaped by both natural (wind, currents, tides, waves) and manmade (dredging, beach nourishment, and erosion control structures) forces. In the event of a severe storm, these changes can occur very rapidly, and in time, many structures have been destroyed, with more than 347 platted parcels submerged (Brunswick, Pender and Onslow Counties), and erosion control structures (sandbags, terminal groins) installed in order to slow erosion or protect structures. Currently, several existing IHA boundaries are spatially inaccurate as the inlet has migrated outside of the mapped boundary, and

no longer accurately reflect the potential erosion hazards for actual developed portions of barrier islands that are adjacent to those inlets. In an effort to update IHA boundaries, the Coastal Resources Commission's Science Panel and DCM Staff have collaborated on identifying appropriate data and best methods for calculating inlet shoreline erosion rates and defining new defined IHA boundaries.

In addition to updating IHA boundaries, the CRC is proposing amendments to their rules. One of the CRC's management objectives is to ensure that development is compatible with natural characteristics of coastal areas while also minimizing the likelihood of significant loss of private property and public resources (NCAC 07H.0203). At most inlets, the proposed IHA boundaries expand farther from the inlet along the oceanfront-inlet shoreline, and farther landward compared to existing IHA boundaries. Under the current rules, construction setback factors, which are based on erosion rates and used for siting new development, are calculated for the oceanfront (but not inside IHAs) approximately every five years. Instead, setback factors that are applied within the IHA are those of adjacent Ocean Erodible Areas (OEA) and do not reflect the actual erosion rates with the IHAs. This practice was necessary due to technological and methodological limitations in calculating erosion rates along inlet shorelines. By Applying this same practice to expanded IHA would misrepresent the erosion hazards associated with inlet areas. Now that the technology exists to calculate erosion rates along inlet shorelines, the CRC is proposing to amend their rules and allow the use of setback factors based on inlet erosion rates instead of using adjacent OEA oceanfront setback factors.

The Coastal Resources Commission originally approved the updated Inlet Hazard Area (IHA) boundaries as recommended in the CRC's Science Panel's report, "*Inlet Hazard Area Boundary, 2019 Update: Science Panel Recommendations to the North Carolina Coastal Resources Commission*," and the IHA erosion rate setback factors presented in the report "*2019 Inlet Setback Factors*." in February 2019. The Commission sent the updated boundaries and use standards to public hearing via draft amendments to 15A NCAC 7H .0304, 07H .0306, 07H .0308, 07H. 0309 and 07H .0310.

Staff presented the proposed rule amendments at public hearings in the seven affected counties (Brunswick, New Hanover, Pender, Onslow, Carteret, Hyde, and Dare Counties), followed by five workshops (Ocean Isle Beach, Holden Beach, Carolina Beach, Topsail Beach, and North Topsail Beach) to allow for additional public discussion. The rulemaking process was deliberately extended in order to give the Commission, the public, and Staff, the opportunity to work through all issues raised by local governments and the public. Staff has incorporated all input into revised draft amendments.

Description of Rule Update

15A NCAC 7H .0304

15A NCAC 7H .0304 describes Areas of Environmental Concern (AEC) within Ocean Hazard Areas (OEA). In section 15A NCAC 7H .0304(2) the proposed amendment references the updated Inlet Hazard Area boundary report and maps titled "*Inlet Hazard Area Boundary, 2019 Update*:"

Science Panel Recommendations to the North Carolina Coastal Resources Commission.”¹ The methods used to calculate the inlet shoreline erosion rate setback factors² and for mapping the IHA boundaries can be found in the reports. Similar to how the Ocean Erodible Area is calculated on the oceanfront, landward IHA boundaries are heavily based on erosion rates multiplied by 90; however, expert (CRC’s Science Panel) consideration was also given to inlet-specific geomorphology and underlying geology. It is important to note that factors of 30 have been used and accepted since 1980’s for the purpose of calculating construction setback and landward boundary of the Ocean Erodible Areas and was initially based on the length of a typical mortgage (30 years).

In section 15A NCAC 7H .0304(2)(a) of this Rule, the Inlet Hazard Area width cannot be less than the adjacent Ocean Erodible Area. However, these two AECs are mapped differently, and given that the IHA has remained static since 1979, while the OEA is updated approximately every five years, the resulting OEA boundary does not always conform to this requirement. In addition, there may be an erosion control structure (sandbag, terminal groin, navigational jetty) or unique geologic or geomorphologic barrier island feature that prevents the ability to meet this existing requirement. Therefore, the CRC is proposing that this requirement be removed.

As mentioned above, the adjacent OEA setback factor is currently applied throughout the IHA. The CRC is proposing to utilize inlet setback factors that are based on actual inlet erosion rates instead of adjacent oceanfront rates. The report, “2019 Inlet Setback Factors”³ is referenced in 15A NCAC 7H .0304(2)(a) that includes the methodology and maps. As in Rule 15A NCAC 7H .0304(1) where the minimum setback factor of two is established, this section establishes the minimum setback factor of two within the IHA.

15A NCAC 07H .0306

Under a separate action, the Commission has proposed repealing provision for the development line. Deletion of 15A NCAC 7H .0306(a)(2) and 7 H .0306(a)(3) is intended to ensure consistency between the rules.

15A NCAC 07H .0308

Existing Rule 15A NCAC 07H .0308 describes the use standards that include provisions for dune establishment and stabilization. In 15A NCAC 7H .0308(b), the Commission is clarifying that while new dunes may not be created, dune restoration may be undertaken within Inlet Hazard Areas.

¹ Accessible at:
https://files.nc.gov/ncdeq/Coastal%20Management/GIS/2019_Inlet_Hazard_Area_Boundary_Update_20190212.pdf
² https://files.nc.gov/ncdeq/Coastal%20Management/GIS/2019_Inlet_Hazard_Area_Setback_Factors_20190212.pdf
³ https://files.nc.gov/ncdeq/Coastal%20Management/GIS/2019_Inlet_Hazard_Area_Setback_Factors_20190212.pdf

15A NCAC 07H .0309

Existing Rule 15A NCAC 07H .0309 describes the use standards and exemptions within Ocean Hazard Areas. Section 15A NCAC 07H .0309(b) of this rule prescribes conditions on the potential development of lots that were platted prior to June 1, 1979. The intent of this rule is to allow development of size-limited structures that would not be permissible due to oceanfront setback taking effect after these lots were platted. The provision was not extended into Inlet Hazard Area. With the expansion in some locations of the new Inlet Hazard Area boundaries, the Commission is proposing to allow use of the size-limit provisions due to these areas previously afforded this opportunity.

15A NCAC 07H .0310

Rule 15A NCAC 07H .0310 describes use standards for Inlet Hazard Areas. The intent of this existing rule is to limit the structure size and development density within the Ocean Hazard Areas that are more strongly influenced by inlet-related erosion than oceanfront processes.

The existing rule in Section 15A NCAC 07H .0310(a)(1) requires the use of the adjacent Ocean Erodible Area (oceanfront) setback factor to be applied within the Inlet Hazard Area. Because the CRC is proposing the use of newly calculated inlet setback factors based on inlet erosion rates (referenced in proposed amendments to 15A NCAC 07H .0304), and not the adjacent oceanfront shoreline, the Commission is amending the rule to remove reference the adjacent ocean hazard area. The CRC is also proposing that inlet erosion rates and setback factors are to be updated once every five years, and to coincide with oceanfront erosion updates.

The intent of the existing section 15A NCAC 07H .0310(a)(4) is to limit development density of commercial and residential structures to one unit on lots less than 15,000 square feet of land area. The proposed amendment would change this to section 15A NCAC 07H .0310(a)(3) and remove the reference to “commercial or residential” since this rule applies to all structures regardless of use.

Existing section 15A NCAC 07H .0310(a)(5) limits development density inside an IHA to four units or less for residential and commercial to less than 5,000 square feet. The proposed amendment would remove the distinction between residential and commercial, treating all structures equally, and limiting them to 5,000 square feet.

The proposed addition of the new section 15A NCAC 07H .0310(a)(8) is included to reference existing rules pertaining to construction setback requirements in 15A NCAC 07H .0306(5). Additionally, this section references grandfathering provision for structures built prior to August 11, 2009 and no greater than 10,000 square feet in size.

The remaining amendments to 15A NCAC 07H .0310 are minor edits to existing rule language and do not change how the rule is currently applied.

The draft amendment is located in Appendix A.

Description of Boundary and Construction Setback Factor Update

In addition to the proposed rule amendments, the CRC is proposing to update the Inlet Hazard Area boundaries at the State’s developed inlets: Tubbs, Shallotte, Lockwoods Folly, Carolina Beach, Masonboro, Mason, Rich, New Topsail, New River and Bogue Inlets. Because the CRC’s rules are intended to primarily manage development, the CRC is proposing to remove IHA status for public lands that are managed by state or federal government, as these public areas are protected and unlikely to be developed for the purpose of establishing habitable structures. These inlet areas include: 1) Little River Inlet at Bird Island (State of NC); 2) New River Inlet at Onslow Beach (US Marine Corps); 3) Brown’s Inlet at Onslow Beach and Brown Island (US Marine Corps); 4) Bear Inlet and Brown (US Marine Corps) and Bear Islands (State of NC); 5) Barden Inlet at Shackelford Banks and Core Banks (US Dept. of Interior); 6) Ocracoke Inlet at Ocracoke Island (US Dept. of Interior), and 7) Hatteras Inlet at Ocracoke and Hatteras (US Dept. of Interior).

While the size of the proposed IHA boundaries are reduced at some locations, overall they do encompass more land area compared to existing IHAs (Table 1). Collectively, IHAs are reduced by approximately 470 acres at Tubbs, Mason and New Topsail Inlets; and increased by approximately 1,800 acres for all others combined. Although the land area (~4,728 acres) inside the proposed IHAs does increase to some degree at most inlets, only 3% (~152 acres) of the total area is not already within the existing Ocean Hazard Area (IHAs, OEAs and Unvegetated Beach AECs). In other words, approximately 97% of the land area inside the proposed IHAs is already part of one of three existing AECs that make up the current Ocean Hazard Area, and already within the CRC’s jurisdiction.

Table 1. Comparison of land area, not area over marsh or water, inside the existing and proposed IHAs. Positive land area difference values represent increases, and negative values represent decrease in size of the IHA. Approximately 152 acres is currently not within an Ocean Hazard AEC.

Inlet - Location	Land Area Inside Existing IHA (acres)	Land Area Inside Proposed IHA (acres)	Land Area Difference (acres)	Land Area Currently Not inside an AEC (acres)
Tubbs Inlet - Sunset Beach	182	96.8	-85.2	0
Tubbs Inlet - Ocean Isle	123.5	84.3	-39.2	0
Shallotte Inlet - Ocean Isle	64.6	216.6	152	3.4
Shallotte Inlet - Holden Beach	290.5	569.3	278.8	76.4
Lockwood Folly Inlet - Holden Beach	64.1	189.5	125.4	2.3
Lockwood Folly Inlet - Oak Island	126.7	229.7	103	6.2
Carolina Beach Inlet - Carolina Beach	177.5	346	168.5	5.7

Masonboro Island - CB & Masonboro Inlets	75.6	535.5	459.9	0
Masonboro Inlet - Wrightsville Beach	0	90.8	90.8	9.4
Mason Inlet - Wrightsville Beach	267.6	125.5	-142.1	0.2
Mason Inlet - Figure Eight	267.6	165.6	-102	2.2
Rich Inlet - Figure Eight	156.2	253.6	97.4	21.3
Rich Inlet - Lea-Hutaff Island	117.7	409	291.3	0
New Topsail Inlet - Lea-Hutaff Island	517.1	414.4	-102.7	0
New Topsail Inlet - Topsail Beach	256.9	427.4	170.5	2.3
New River Inlet - N. Topsail Beach	85.2	144.8	59.6	5.3
Bogue Inlet - Emerald Isle	136.1	429.5	293.4	17.3
TOTAL:	2908.9	4728.3	1819.4	152

At many locations, the proposed IHA boundaries include areas that have historically been part of one of the Ocean Hazard AECs. Approximately 648 acres at developed inlets would be removed from an IHA. At undeveloped inlets where land is publicly owned and IHA boundaries are proposed to be removed, the total area that will not be included as an IHA is approximately 3,300 acres.

For purposes of this analysis, “structures” are counted as one structure when they are physically connected; this includes multi-family and commercial. There are approximately 750 existing structures inside current IHAs, and a total of 945 within the proposed IHAs. Of the 750 structures inside the current IHAs, approximately 40% (307 structures) of those would not be included in the updated IHAs, nor would they be included within the OEA. This means that those 307 structures will no longer be in within an Ocean Hazard Area. Of the total 945 structures within the proposed IHAs, 443 (59%) of them are already located within an existing IHA, and 726 (77%) are currently located within one of three Ocean Hazard AECs. Because the proposed IHAs do expand and include approximately 152 acres of land, there will be approximately 217 structures that are not currently located within an Ocean Hazard AEC that will be included within the updated IHAs.

Table 2. Comparison of the number of structures inside the existing and proposed IHAs; summary of the number of structures (219) that will be included in the updated IHA that are not currently within an Ocean Hazard Area (OHA), and; number of structures (307) that will be removed from the OHA as a result of the IHA update.

Inlet - Location	Structures inside IHA- Existing	Structures inside IHA- Update	Structures inside IHA- Update not Currently Inside OHA	Structures Removed from OHA
Tubbs Inlet - Sunset Beach	203	16	0	187
Tubbs Inlet - Ocean Isle	56	31	0	20

Shalotte Inlet - Ocean Isle	0	110	8	0
Shalotte Inlet - Holden Beach	51	208	107	0
Lockwood Folly Inlet - Holden Beach	4	38	0	0
Lockwood Folly Inlet - Oak Island	31	69	13	0
Carolina Beach Inlet - Carolina Beach	0	19	4	0
Masonboro Island	0	0	0	0
Masonboro Inlet - Wrightsville Beach	N/A	2	0	0
Mason Inlet - Wrightsville Beach	1	1	0	0
Mason Inlet - Figure Eight	36	20	0	31
Rich Inlet - Figure Eight	34	66	25	9
Rich Inlet - Lea-Hutaff Island	0	0	0	0
New Topsail Inlet - Lea-Hutaff Island	0	0	0	0
New Topsail Inlet - Topsail Beach	164	178	12	0
New River Inlet - N. Topsail Beach	68	95	10	5
Bogue Inlet - Emerald Isle	102	78	40	55
TOTAL:	750	931	219	307

Since 1980, the Division of Coastal Management has updated its oceanfront shoreline change rates approximately once every five years for calculating both oceanfront development setbacks and the landward boundary of the Ocean Erodible Area of Environmental Concern. The Commission is now proposing to utilize calculated erosion rates within IHAs to determine development setbacks.

Due to technological and methodological limitations, the CRC has calculated development setbacks within existing IHA boundaries utilizing the erosion rate setback factors of the adjacent Ocean Erodible Area (NCAC 07H. 0310); which may not always be representative of the actual erosion associated with inlet-related processes.

By applying the adjacent oceanfront shoreline setback factor inside the IHAs, and not using factors based on actual erosion rates at the inlet, the potential risk associated with inlet-induced erosion may not always be reflected in the setback factors applied in determining construction setback.

Table 3, Column (A) shows the range of calculated setback factors without applying the adjacent OEA factor as required by current rules; and Column (B) shows the range for the same area when the adjacent OEA factor is applied inside the existing IHA. The same comparison was made using proposed inlet setback factors with proposed rule amendments (Table 3, Column (C)), and; application of current rules with proposed inlet setback factors and boundary (Table 3, Column (D)). At specific inlets (Tubbs and Mason) the use of the adjacent OEA's setback factor results in no change; while at others (Lockwoods Folly, New River, and Bogue Inlets), the use of the adjacent OEA's setback factor applied within the IHA does significantly change the setback factor applied throughout the entire IHA.

Table 3. The geographical extent of setback factor (SBF) ranges in this table is the same area of land within the proposed IHAs. (A) represents the range of existing setback factors within the area of the proposed

IHA boundary before applying the adjacent OEA setback factors within the current IHAs as required by existing Rules (15A NCAC 07H .0310); **(B)** illustrates the range of existing setback factors after applying the adjacent OEA setback factors within existing IHAs, and represents current requirements; **(C)** represents the proposed IHA setback factors and application of proposed rule amendments – and once adopted, would become the setback factors within the updated boundaries; **(D)** represents range of setback factors when existing rules are applied to the updated IHA and inlet setback factors. Both (A) and (D) illustrate how existing rules (15A NCAC 07H .0310) can influence setback factors.

Inlet - Location	<i>(A)</i>	(B) (current IHAs & SBFs)	(C) (proposed IHAs & SBFs)	<i>(D)</i>
Tubbs Inlet - Sunset Beach	2	2	2	2
Tubbs Inlet - Ocean Isle	2	2	2	2
Shallotte Inlet - Ocean Isle	2 to 6.5	2 to 6.5	2 to 18	2
Shallotte Inlet - Holden Beach	2	2	2 to 5	2
Lockwood Folly Inlet - Holden Beach	2 to 8.5	3.5 to 7	2 to 5	3.5
Lockwood Folly Inlet - Oak Island	2	2	2	2
Carolina Beach Inlet - Carolina Beach	2 to 11.5	3 to 6.5	2	3
Masonboro Island (CB & Masonboro Inlets)	2 to 28	2 to 12.5	2 to 18	2 to 18
Masonboro Inlet - Wrightsville Beach	2	2	2	2
Mason Inlet - Wrightsville Beach	2	2	2	2
Mason Inlet - Figure Eight	2	2	2	2
Rich Inlet - Figure Eight	2	2	2	2
Lea-Hutaff Island (Rich and New Topsail Inlets)	2 to 10	2 to 10	2 to 37	2 to 37
New Topsail Inlet - Topsail Beach	2	2	2	2
New River Inlet - N. Topsail Beach	2 to 14	2	2 to 8	2
Bogue Inlet - Emerald Isle	2 to 12.5	2	2 to 4.5	2

Cost or Neutral Impacts

Private Property Owners:

The IHA rules only apply when property owners are seeking a Coastal Area Management Act (CAMA) permit for construction of new a structure, or replacement of an existing structure (requiring more than fifty percent (50%) repair) within the Inlet Hazard Area. The proposed rule amendments will remove existing distinctions between commercial and residential and require all structures: 1) to be limited to 5,000 square feet, and; 2) utilize IHA calculated setback factors, and not its adjacent oceanfront shoreline factor. It is important to note that current rules limiting development to no more than one unit per 15,000 square feet of land area, and grandfathering of structures that meet conditions in existing rules (15A NCAC 07H .0306(a)(5)(L)) will still apply within the updated IHAs.

New construction:

The two most notable influences that the updated IHA boundaries and rule amendments will have on new construction are: 1) the required use of erosion rate setback factors calculated for inlet areas and not that of the adjacent OEA, and; 2) both residential and commercial structures would be treated equally and limited to 5,000 square feet, and no more than one unit per 15,000 square feet of land area. Although both current and amended IHA rules have potential to limit size and density of new development, they do not specifically restrict a property owner’s ability to develop when higher rates of beach erosion are not measured or experienced.

Currently there are approximately 425 platted lots adjacent to inlets that are completely submerged in the ocean or inlet or on the wet-sand beach. This alone demonstrates that geomorphology around inlets is very dynamic and have potential to change rapidly. For this reason, the CRC has traditionally taken the position that large-scale and dense development should be limited in areas adjacent to inlets. The 5,000 square feet size regulation has always applied to commercial development within IHAs because they have typically been thought of as being the largest structures when compared to single-family residential; especially during the early development of NC’s coast. Today, NC’s coast is experiencing the construction of large 24-bedroom “single-family” homes, which is an example of why the CRC treats all structures the same, regardless of its use.

With regards to redevelopment of existing structures, it is not feasible to speculate on level of damages that might be caused by future storms, or speculate on the collective plans of property owners who might want to redevelop existing structures. Therefore, this section will focus only on how these rule amendments might affect existing vacant lots as a whole, regardless of ownership, or current use (public vs. private). Based on a random sampling of existing structures that are adjacent to vacant lots and within the updated IHAs, the average size of single-family residential structures is approximately 3,000 square feet (Table 4). The CRC is confident that the 5,000 square feet limit is sufficient for the development of vacant lots if they can meet the construction setback requirement.

For the purpose of this analysis, a “vacant lot” simply means that there are no existing residential or commercial structures on the existing platted lot. Within existing IHAs, there are an estimated 113 vacant lots. Approximately 46% (52) of these lots currently do not have enough land area to allow for a structure to meet the minimum setback requirement based on current rules and erosion rate setback factors. Within the proposed updated IHA boundaries, the number of vacant lots increases by 60, making the total number of vacant lots estimated to be 173. Of 173 vacant lots, approximately 62 (36%) cannot meet the minimum construction setback; therefore, 111 (64%) of the vacant lots have potential to be developed to some degree should the owner chose to do so. Although this analysis does not examine why these lots are vacant, it should be noted that a portion of the 111 lots are owned by local government for the preservation of open space and public beach access, parking, and neighborhood common areas; while several have simply remained undeveloped.

Table 4. Average square footage of residential structures basef on a random sampling of structures adjacent to vacat lots and within the updated IHA. Although individual units within multi-family structures ranged from 640 to 1380 heated square feet, these averages do not consider multi-family structures as a whole. (*) indicates average based on structure physical footprint as determined using county tax data.

Inlet Location	Heated Square Feet (Average)
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Tubbs Inlet	3,600
Shallotte Inlet	3,700
Lockwood Folly Inlet	2,700
Carolina Beach Inlet	2,000*
Masonboro Inlet	NA
Mason Inlet	3,400
Rich Inlet	3,500
New Topsail Inlet	2,000
New River Inlet	3,300
Bogue Inlet	3,200
AVERAGE	3,000

Repair of existing structures:

Since 1979, the DCM oceanfront erosion rates have been used to calculate setback factors, and where there is accretion or rates are less than two feet per year, the default setback factor is two. Based on the 2019 inlet study and compared to existing setback requirements, 737 (79.2%) existing structures within the proposed Inlet Hazard Areas will experience no change in their development setback factor, 137 (14.7%) structures will experience an increase in construction setback factors, while 57 (6.1%) will have decreased setback factors (Table 5). It is important to note that where proposed inlet erosion rates will increase setback factors, all parcels and structures (100% of the 137) are in areas with known historically high erosion rates; however, because existing rules require the adjacent oceanfront shoreline setback factor to be applied inside the IHA, the setbacks for these locations have historically been lower than the proposed.

Currently, 188 (20.2%) structures within the proposed IHA cannot meet the current minimum setback (60 feet, or SBF x 30). Using the proposed inlet setback factors, an additional 21 structures would not meet the minimum setback.

Table 5. Structure count summaries include all structures within the proposed IHAs, and they are counted as one structure when they are physically connected: (A) number of structures inside the proposed IHAs; (B) number of structures with no change in setback factors as a result of using inlet factors; (C) number of structures with increased setback factors; (D) number of structures with decreased setback factors; (E) number of structures that cannot meet the current minimum setback requirement, and (D) number of additional structures that could not meet the minimum setback using inlet calculated setback factors.

Inlet - Location	(A)	(B)	(C)	(D)	(E)	(D)
Tubbs Inlet - Sunset Beach	16	16	0	0	0	0
Tubbs Inlet - Ocean Isle	31	31	0	0	4	0
Shallotte Inlet - Ocean Isle	110	72	38	0	79	7
Shallotte Inlet - Holden Beach	208	208	0	0	0	0

Lockwood Folly Inlet - Holden Beach	38	0	0	38	35	-26
Lockwood Folly Inlet - Oak Island	69	69	0	0	0	0
Carolina Beach Inlet - Carolina Beach	19	0	0	19	1	0
Masonboro Island (CB & Masonboro Inlets)	0	0	0	0	0	0
Masonboro Inlet - Wrightsville Beach	2	2	0	0	0	0
Mason Inlet - Wrightsville Beach	1	1	0	0	0	0
Mason Inlet - Figure Eight	20	20	0	0	12	0
Rich Inlet - Figure Eight	66	66	0	0	13	0
Lea-Hutaff Island (Rich and New Topsail Inlets)	0	0	0	0	0	0
New Topsail Inlet - Topsail Beach	178	178	0	0	0	0
New River Inlet - N. Topsail Beach	95	21	74	0	36	9
Bogue Inlet - Emerald Isle	78	53	25	0	8	5
Total:	931	737	137	57	188	21
Percentage:		79.2%	14.7%	6.1%	20.2%	2.3%

Not meeting construction setback requirements based on existing or proposed setback factors and rules does not necessarily mean those same structures can never be rebuilt in the event they are destroyed or damaged beyond fifty percent. The reference feature from which development setbacks are measured, the first line of stable and natural vegetation (FLSNV), is determined in the field since it is dynamic and can change with the frequency and severity of storms and other factors common with inlet shorelines. The location of the first line of stable and natural vegetation can also be influenced by a community's decision to construct a beach nourishment project. In time, the vegetation may respond and grow seaward with the beach, thus changing the point of reference from which the construction setback is measured. As previously mentioned, in a situation where a structure was destroyed and could not meet the construction setback, they still could potentially rebuild a structure on its original footprint and size if the structure was built before August 2009 and meets certain grandfathering conditions in existing rules (15A NCAC 07H .0306(a)(5)(L)). This grandfathering rule does not permit structures to be rebuilt in the original footprint and size if it was constructed after August 2009, and it cannot meet the required minimum setback.

Isolating or predicting the impact of state setback requirements on inlet and oceanfront property is difficult, if not impossible, since there are many statistically independent criteria that affect structure values. To examine these types of changes, economists use hedonic price models to decompose the total structure value into measurements for individual aspects of the structure such as size, age, number of bathrooms, location, and nearby amenities. Existing research indicates that erosion risks may decrease the value of oceanfront property but that this effect is overshadowed by the much larger positive value homebuyers place on being located directly next to the ocean.⁴ Our ability to analyze this change is also complicated by different local construction ordinances which typically have additional structure setback distances that are measured from points of reference not presented in this document, but can potentially limit size or placement of a proposed structure on a lot. It is true that as the erosion rate increases, construction setback increases; however, depending on size of lot and structure, local government construction requirements (lot-

⁴Bin, O. and Kruse J.B. "Real Estate Market Response to Coastal Flood Hazards" *Natural Hazards Review*, 7:4. 2006.; Hindsley, P. "Applying Hedonic Property Models in the Planning and Evaluation of Shoreline Management" Presented at the Coastal Society's 22nd International Conference in Wilmington North Carolina June 13, 2010.

side and street setback) in instances of home damage exceeding 50 percent of the structure value, the property owner may still be able to repair the structure to its original size.

NC Department of Transportation (DOT):

Pursuant to G.S. 150B-21.4, DCM DOT permitting staff reported that the proposed amendment to 7H.0304 will not affect environmental permitting for the NC Department of Transportation. Development such as roads, parking lots, and other public infrastructure such as utilities continue to have a minimum setback factor of sixty feet (60) or thirty (30) times the shoreline setback factor (whichever is greater) as defined by 07H.0306(a)(2)(I). In the event NC DOT needs to build or replace a road located within an Inlet Hazard AEC, DOT actions regarding the roadbed would likely be considered maintenance and repair and not affected by changes in the oceanfront setback factors.

Local Government:

Public infrastructure (roads, parking lots, & utilities) have a minimum setback factor of sixty feet (60) or thirty (30) times the shoreline erosion rate (whichever is greater) as defined by 07H.0306(a)(2)(I). In the event that local governments need to replace or rebuild public infrastructure within an Inlet Hazard AEC, the proposed amendments will not change the CRC's approach to permitting that activity.

With regards to local property and tax values, the CRC is confident that trying to quantify these values would be difficult if not impossible since there are statistically independent criteria that affect structure values along the coast. Existing research indicates that erosion risk may decrease the value of oceanfront property but that this affect is overshadowed by the much larger value homebuyers place on being located next to the ocean.^{3 and 5}

Division of Coastal Management:

There will be a net increase of 181 structures within the IHAs (Table 2). However, because these changes will only apply to new development or replacement of an existing structure requiring more than fifty percent (50%) repair or re-construction, the Division of Coastal Management's permit review process will not be changed by these amendments, and DCM does not anticipate changes in permitting receipts due to the proposed action.

In terms of staff time required to do future updates of the IHA boundaries and erosion rate setback factors every five years, this process will be included as part of the existing practice of analyzing the oceanfront erosion rates and Ocean Erodible Areas. The same automated Geographical Information System (GIS) analysis already includes the option to analyze both the oceanfront and inlet erosion rates at the same time.

⁵ Below, S., Beracha, E. and Skiba H. "Land Erosion and Coastal Home Values" Journal of Real Estate Research, Vol. 37, No. 4-2015

Benefits

Private Property Owners:

One of the CRC's management objectives is to ensure that development is compatible with natural characteristics of coastal areas while also minimizing the likelihood of significant loss of private property and public resources. IHA rules are intended to allow development to occur within areas adjacent to inlets while considering rates of erosion when siting the placement of new structures. Since these areas are very dynamic and can change rapidly, the CRC's objective is to require the siting of new development to be in a more landward position when erosion rates are higher than average (approximately 2 feet/year.)

Although there are two hundred and nineteen (219) structures that are currently not within an Ocean Hazard Area that will now be within the updated Inlet Hazard Areas, there will be three hundred and nine (307) structures that will be removed from the updated IHAs. With regards to proposed inlet setback requirements, approximately 794 (85.3%) of existing structures within the proposed IHAs will see no change, or either a setback factor reduction.

Although purely speculative, properties within the existing or proposed IHAs could potentially be permitted and allowed re-development or expansion of the existing structure if new setback requirements can be met, and the total conditioned square footage does not exceed 5,000 square feet. It is not possible to estimate the exact value of this benefit without knowing how many property owners would choose to undertake expansion or redevelopment, or knowing specifics related to construction plans; however, where structures are removed from the IHA, or setback factors are reduced, it is estimated that this is potentially a positive net influence for those property owners if compared to existing more restrictive setback requirements.

Although the erosion rates are often higher near inlets, it is important to note that National Flood Insurance Program (NFIP) does not consider the actual erosion rate when flood insurance rates are evaluated. NFIP only considers that fact that the State of North Carolina did, or did not, update its erosion rates utilizing current data. NFIP requires this update to occur approximately once every five years. If the state does not, NFIP can then discredit fifty Community Rating System (CRS) points from all NC oceanfront communities with property inside a Special Flood Hazard area. Along the Atlantic shoreline (oceanfront and inlets), these areas are defined by the Velocity Zone, or V-Zone, and vary in size based on coastal region. In some areas this zone may extend across an entire barrier island, while in others it may only contain first or second row property.

The NFIP does not consider the methodology for calculating setback factors, or the differences between the OEA and IHA; just that the fact that the State updates its setback factors once every five years. Updating inlet setback factors will coincide with the update of oceanfront setback factors. Regardless of the calculation methodology, the State will continue to update erosion rates in part to assure that communities do not lose CRS points. The loss of fifty CRS points would not have an immediate negative impact on those communities listed below in Table 6. However, several communities are scheduled to be reevaluated by NFIP in 2019 and 2020, and at that time could potentially benefit by having fifty points awarded and saving five percent in premiums as a direct result of NC updating erosion rates. Although this update alone does not guarantee a

community will save five percent in premiums, the 50-points awarded could mean the difference between higher and lower NFIP Classes.

Table 6. List of oceanfront communities participating in the Community Rating System (CRS). This table illustrates their current CRS Class, Special Flood Hazard Area (SFHA) Premium discount percentages, CRS points, and point score scenario subtracting 50 points. Based on current points, none of the listed communities would be impacted by the loss of fifty points. It should be noted that those communities identified with an asterisk (*) have an assigned CRS Class that does not correspond to their CRS Points because they did not meet FEMA’s prerequisites during their last evaluation; therefore, could not be placed in the Class tier based on scored points.

	Community	Current CRS Class	% Discount for SFHA(1)	% Discount for Non-SFHA	CRS Points	CRS Points (-50)	CRS Class Change if Points Lost
1	Carolina Beach	6	20	10	2058	2008	No
2	Emerald Isle	7	15	5	1906	1856	No
3	Holden Beach	8	10	5	1181	1131	No
4	North Topsail Beach*	5*	25	10	3600	3550	No*
5	Oak Island*	7*	15	5	2258	2208	No*
6	Ocean Isle Beach*	8*	10	5	2088	2038	No*
7	Sunset Beach*	7*	15	5	2109	2059	No*
8	Topsail Beach	5	25	10	2597	2547	No
9	Wrightsville Beach	7	15	5	1768	1718	No

Cost/Benefit Summary

One of the CRC’s management objectives is to ensure that development is compatible with natural characteristics of coastal areas while also minimizing the likelihood of significant loss of private property and public resources. Given the rapid changes that can occur in areas adjacent to inlets, there is future potential for loss of property or development limitations as a direct result of beach erosion and the application of both current and amended rules. On the other hand, natural beach growth (accretion), or the installation of terminal groins (erosion control structure) coupled with regular beach nourishment and maintenance, can potentially slow or temporarily mitigate the negative effects caused by erosion. In either scenario, the application of both amended and current rules can influence development limitations (construction setback, structure size and/or density); when property is lost or significantly threatened by erosion.

The proposed amendments will result in a net of 307 structures that will be removed from Inlet Hazard Area boundaries which could allow for greater level of property development or redevelopment than under existing rules. In some locations, additional area will now be included within this AEC. Overall, there will be 57 structures with reduced construction setback requirements. Collectively, this has an un-quantified, but positive, option value for those property owners.

With regards to flood insurance, amending Rules 15A NCAC 7H .0304 and 15A NCAC 7H .0310 and updating Inlet Hazard Areas do not have an immediate negative or positive impact to community NFIP CRS points and Class ranking. However, the CRC will continue to update setback factors for both the oceanfront and inlets areas once every five years in an effort to contribute to an annual cost savings for property owners living in oceanfront communities by the avoidance of a five percent (5%) increase in flood insurance rates should the Coastal Resources Commission not update its construction setback factors.

There will be approximately 219 structures that are currently not within an Ocean Hazard Area that will now be included within the updated IHA. Additionally, there will be approximately 137 structures that will experience an increased construction setback factor when compared to existing requirements. In contrast to current practice, both commercial and residential structures will be treated equally in the proposed amendments, and all new construction will be limited to 5,000 heated square feet, and with a density limit of no more than one unit per 15,000 square feet of land area.

In a situation where a structure was destroyed or damaged beyond 50% and could not meet the construction setback, they still could potentially rebuild a structure on its original footprint and size if the structure was built before August 11, 2009 and meets certain grandfathering conditions in existing rules (15A NCAC 07H .0306(a)(5)(L)). Grandfathering applies single-family of all sizes and multi-family 10,000 square feet or less. These proposed rule amendments will not affect the application of these existing rules.

Within the context of these rule amendments, it is not anticipated that the \$1M impact threshold would be exceeded primarily because these amendments do not prevent development from occurring within the IHA. These rules only apply to new construction or redevelopment of an existing structure in the event that it is damaged beyond 50% of its appraised value. Existing structures can be rebuilt if they meet required setbacks, or if they do not meet setback requirements but can meet specified grandfathering conditions outlined in Rule 15A NCAC 07H .0306(a)(5)(L). Although there will be 21 additional structures that cannot meet these IHA setback requirements, there will be 26 structures that can now meet setback compared to existing requirements (Table 5, Column D); thus resulting in an overall benefit. Furthermore, not meeting setback requirements does not necessarily mean the structure would be damaged fifty-percent or more during a storm, or need a CAMA permit to do repairs. If an existing structure cannot meet setback requirements, and also does not qualify for grandfathering, it is theoretically possible that future setback requirements could be met if erosion rates are reduced as a result of natural accretion, beach nourishment, or construction of a terminal groin.

With regards to the existing vacant lots within the proposed IHA (approximately 111 lots), these rule amendments do not prohibit development, but they do limit structure size to 5,000 heated square feet and development density to no more than one unit per 15,000 square feet of land area. As illustrated in Table 4, the average size of structures adjacent to those 111 vacant lots is approximately 3,000 square feet, and the CRC believes that the size limit is sufficient in meeting the management objectives. In a scenario where an existing vacant lot could not meet the setback requirements defined in this amendment, property owners could still potentially develop their property utilizing an existing rule (15A NCAC 07H .0104) which allows for a structure up to 2,000 square feet to be constructed with minimal conditions.

There are unknowns and uncertainties associated with forecasting property owner's intentions, storm magnitude and frequency, or barrier island responses to inlet and ocean forces. For this reason, it is impossible to estimate a monetary cost or benefit that can be directly attributed to these

rule amendments, especially when they do not prohibit development. It is certain that barrier islands can and do change, and when structures are more appropriately sited, they are better protected from the forces of the ocean and can potentially save property owners and government agencies the cost associated with rebuilding, storm damage clean up, and erosion mitigation.

References

Below, S., Beracha, E., Skiba, H. (2015). *Land Erosion and Coastal Home Values*. Journal of Real Estate Research, 37(4), 499-536.

Federal Emergency Management Agency (FEMA), 2019, *Calculation of Flood Insurance*, <https://www.fema.gov/faq-details/Calculation-of-Flood-Insurance>