

Land Erosion and Coastal Home Values

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Presented by Eli Beracha at the SLSC All hands meeting – February 2016

Outline of the Research

- ▶ Measure the extent to which coastal land erosion, which is continuous and well documented, is capitalized into waterfront housing values.
- ▶ Employ 33,790 residential real estate transactions spanning 1996 through 2012 – Dare County Tax Office.
 - Transaction date, price, parcel number, physical characteristics, distance from sound or ocean.

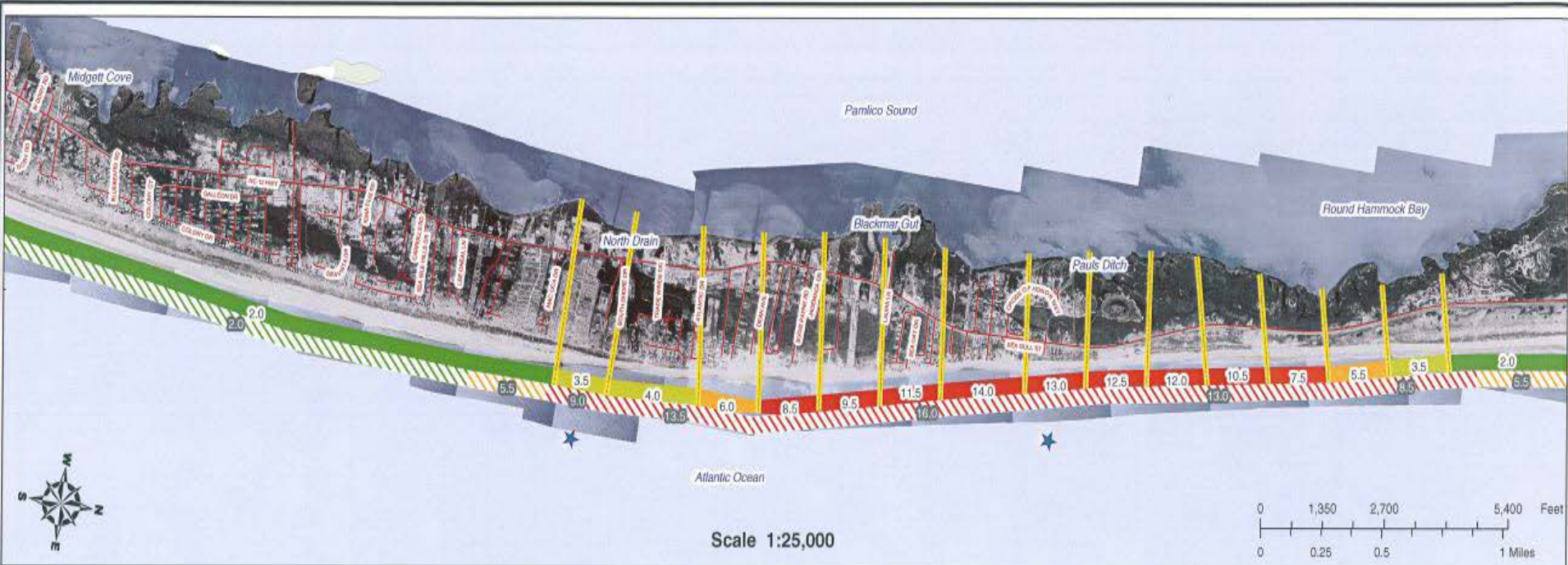
Motivation

- ▶ Coastal shorelines are vulnerable to a variety of environmental hazards.
- ▶ Some communities struggle to decide whether to rebuild severely damaged areas.
- ▶ Beach Nourishment programs are increasingly becoming prohibitively expensive and are unsustainable long-term solution.



Erosion and Erosion Rate

- ▶ Using maps from the North Carolina Division of Coastal Management identify the long-term average annual shoreline erosion rate associated with each property.



Hatteras Island at Rodanthe

Long-Term Average Annual Shoreline Study & Erosion Factors

Updated Through 1998



North Carolina Division of Coastal Management

This map is for general information only. The map illustrates average rates of shoreline change over approximately 50 years. The information presented here is not predictive nor does it reflect the short-term erosion that occurs during storms. This map may not be suitable for property-specific determination of erosion rate factors due to its small scale. For a site-specific determination contact your CAMA Local Permit Officer or the regional field office of the North Carolina Division of Coastal Management.

Funding for this project was provided by:
National Oceanic and Atmospheric Administration, Federal Emergency Management Administration, and North Carolina Division of Emergency Management

1998 Long-term average annual shoreline change rate developed by:
NC State University's Kenan Natural Hazards Mapping Program and North Carolina Division of Coastal Management

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Or visit:
www.nccoastalmanagement.net

How to read Erosion Factors

→ "2.0" Indicates a 1998 Erosion Factor of 2.0 Feet / Year
 → "2.0" Indicates a 1992 Erosion Factor of 2.0 Feet / Year

Legend

| 1998 Erosion Factor | 1992 Erosion Factor | Symbol |
|---------------------|---------------------|--------|
| 2.0 Ft. / Yr. | 2.0 Ft. / Yr. | |
| 2.5 - 3.0 Ft. / Yr. | 3.0 Ft. / Yr. | |
| 3.5 - 4.0 Ft. / Yr. | 3.5 - 4.0 Ft. / Yr. | |
| 4.5 - 5.0 Ft. / Yr. | 4.5 - 5.0 Ft. / Yr. | |
| 5.5 - 6.0 Ft. / Yr. | 5.5 - 6.0 Ft. / Yr. | |
| 6.5 - 7.0 Ft. / Yr. | 6.5 - 7.0 Ft. / Yr. | |
| 7.5 - 8.0 Ft. / Yr. | 7.5 - 8.0 Ft. / Yr. | |
| > 8.0 Ft. / Yr. | > 8.0 Ft. / Yr. | |

Erosion Factor Boundary
 Inlet Hazard Area Boundary
 Roads
 This general area has been influenced by beach nourishment either for beach protection or dredge disposal. This action artificially lowers the erosion rate in these areas.

NC Division of Coastal Management GIS - Printed: April - 2003

Regression Equations

$$\ln Price_{it} = \alpha_0 + \sum_{j=1}^k \beta_j X_{jit} + \theta \ln Dist_{it} + \rho Erosion_{it} + \sum_{t=1996}^{2012} \delta_t D_{it} + e_{it}$$

$$\ln Price_{it} = \alpha_0 + \sum_{j=1}^k \beta_j X_{jit} + \omega ErosionRatio_{it} + \sum_{t=1996}^{2012} \delta_t D_{it} + e_{it}$$

Findings

- ▶ Oceanfront properties command a higher premium compared with inland homes.
- ▶ Rate of erosion is negatively related to home value.
- ▶ Risk of land erosion is only capitalized when the property is located very close to the ocean and/or at rapidly eroding area.

Selected results, table 3

| | By distance | | | By ratio | | | 2.5 ft./year | |
|--------------|-------------|-----------|---------|----------|---------|---------|--------------|--------|
| | Close | Middle | Far | Low | Middle | High | Above | Below |
| LnDist | 0.072 | -0.219 | -0.015 | | | | -0.161*** | 0.061 |
| | [0.67] | [-0.64] | [-0.14] | | | | [-3.47] | [0.84] |
| Erosion | -0.049*** | -0.044*** | -0.016 | | | | | |
| | [-5.93] | [-3.30] | [-1.02] | | | | | |
| ErosionRatio | | | | 0.155*** | -0.201 | -0.106 | | |
| | | | | [3.77] | [-0.91] | [-1.04] | | |



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