HOW THE BEACH WORKS

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Wave breaks: Wave Height = Depth

\[ H = 78\% \ d \]
EROSION “TYPES”

- Seasonal
- Severe Storm
- Long-Term
- Inlet
SEASONAL FLUCTUATIONS

WORST WINTER EROSION

SUMMER BERM

VEGETATION LINE
Dune Myth #1

- **MYTH:** The roots of dune plants stop erosion
- **FACT:** The stems of dune plants protect from wind erosion
STORM-INDUCED DUNE SCARP

- DUNE SCARP
- PRE-STORM DUNE
- STORM SURGE
- OFFSHORE BAR
Dune Fact

Dunes provide erosion protection from infrequent but severe storms such as hurricanes.
POST-STORM RECOVERY

BERM REBUILDS

BAR MOVES LANDWARD
STEEP EROSION SCARP
SCARP DRIES & COLLAPSES
SCARP DRIES & COLLAPSES
INITIAL
REVEGETATION
LONG-TERM EROSION

DUNE RECOVERY
MYTH: Dunes provide protection from chronic erosion
FACT: Dunes provide little or no protection from chronic erosion
Dune Myth #3

- **MYTH:** To build a big dune start close to the ocean
- **FACT:** Dunes build from landward to seaward
- **FACT:** To build a big dune start as far landward as possible
DUNE GROWTH WITH TIME

YEAR 1
YEAR 2
YEAR 3
YEAR 4

SEASONAL BEACH

VEGETATION LINE LIMIT
Dune Fact

To build the best storm protection, start the dune as close to what you want to protect as feasible
Dune Myth #4

- **MYTH:** A big dune is always more protection than a small dune
- **FACT:** Location, location, location
- **FACT:** Smaller, more landward dunes can provide more protection for storm-induced and long-term erosion
SAND FENCES

- Invest in plants rather than fence
  - Low maintenance
  - No debris
- Best use for pedestrian control
- Can trap sand too far seaward
  - Consider rope fences as low cost alternative
OUTER BANKS
SHORELINE & BEACHFILL
EXPECTATIONS

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CENTER FOR MARINE SCIENCE
UNC-Wilmington
CIVIL ENGINEERING
NC State University
Top 10 things you need to know about your beach & beach nourishment

10. OBX has a long-term erosion problem
9. OBX has a hurricane & NE’er problem
8. Beachfill: treatment, not a cure
7. Only effective on longer shorelines
6. Effective for moderate erosion rates
Top 10 things you need to know about your beach & beach nourishment

5. NOT cost-effective in high erosion rates
   Beware erosion hotspots like Inlets

4. Small projects effective for long-term erosion

3. Larger projects provide hurricane protection (with dune)

2. Beach nourishment is expensive

1. Inaction may be more expensive

For the oceanfront owners & the town
Buildings DESTROYED or THREATENED by Erosion
OBSERVATIONS

- Prior damage
- Erosion hot spots
Beach nourishment: Corps of Engineers Hurricane protection projects
THE SCORE:

OUTSIDE NOURISHMENT PROJECT DUNES

968

Threatened or Destroyed

INSIDE PROJECT DUNES

0
Wrightsville Beach Renourishment

Masonboro Inlet Borrow Site – Dredge Is to the Left

Project Begins Here and Moves To Top of Picture
STORM SURGE ELEVATIONS
Behind Masonboro Island

FEET

RETURN FREQUENCY
(YEARS)
WRIGHTSVILLE BEACH

CENTRAL AREA, POST-DENNIS & FLOYD
1995, PRE-HURRICANES
OBSERVATIONS

- Smaller nourishment projects
- Long-term erosion protection
- Poor storm protection
QUESTIONS?

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