



BREVARD COUNTY

BOARD OF COUNTY COMMISSIONERS

STAFF REPORT

NATURAL RESOURCES MANAGEMENT OFFICE

SUBJECT: Beach and Dune Erosion
DATE: October 31, 2007
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Brevard County manages approximately 40 miles of critically eroded shoreline between Port Canaveral and Sebastian Inlet (**see Attachment 1**). Of this, 13.8 miles is managed through a 50-year federal partnership for beach nourishment along the North and South Reaches. For the 7.6-mile Mid Reach, the U.S. Army Corps of Engineers is working to complete a General Re-evaluation Report in 2008, with the possibility of construction in November 2010, pending Congressional authorization and appropriations. Both the Mid Reach and the 14.5-mile South Beaches received extensive dune stabilization projects in 2005 after Hurricanes Frances and Jeanne. These projects were restored in 2006 after damage by Hurricane Wilma. An economic analysis of beach nourishment alternatives for the South Beaches was completed on October 15, 2007.



Figure 1: Surveying Mid Reach Erosion

Brevard County's beaches experienced varying degrees of erosion during tropical wave conditions that delivered relatively strong northeast winds the week of October 1, 2007. During the erosive event, staff conducted several surveys of erosion damage at vulnerable structures; and once sea conditions allowed, staff recorded erosion impacts along the entire Mid Reach and South Beaches for each shore segment bearing dissimilar damage.

The majority of erosion was on the natural beach rather than the engineered berm or dune. In most locations, the beach lost two to three feet of elevation. This beach deflation resulted in a narrowing of the remaining dry beach (**see Attachment 2**). Such deflation and narrowing is typical following periods of large waves and often recovers naturally after sea conditions



calm. However, deflation was significant enough along some shoreline segments to allow waves to reach and erode the engineered berm. These losses can take much longer to repair naturally and in some cases require placement of supplemental sand.

Figure 2: A small escarpment formed along much of the Mid Reach.

Damage Estimates for the Mid Reach are as follows:

- Erosion resulted in a small (1-3') escarpment along much of the shoreline.
- Along most of the shoreline, erosion of the engineered berm ranged from 10-20% of the original project volume.
- Losses greater than 20-80% occurred in discreet areas where berm construction was forced further seaward by privately placed sand or structures.
- Overall, approximately 15% of the engineered berm has been lost to erosion.
- Natural recovery is expected to heal the escarpment and restore most of the beach to its previous condition.



Figure 3: Erosion losses were greatest in front of seawalls and rock revetments.



Figure 4: Overall, Mid Reach losses amounted to 15% of the placed fill.

Damage Estimates for the South Beaches are as follows:

- Along 90% of the South Beaches (13 of 14.5 miles), losses from the engineered berm were less than 10%.
- Greater losses occurred in discreet areas where berm construction was forced further seaward by privately placed sand or protruding buildings, pools, or seawalls.
- Overall, approximately 8% of the South Beaches engineered berm has been lost to erosion of which most will recover naturally.
- Some of the structures that were most vulnerable after the 2004 hurricanes coincide with current areas of greatest loss.



Figure 5: Greatest losses occurred seaward of protruding structures.



Figure 6: Overall, only 8% of the South Beaches fill volume has been lost.

Using the 2007 “Economic Analysis of Beach Nourishment Alternatives South Beaches, Brevard County, FL,” staff has identified 13 properties in the South Beaches that have major habitable structures that may currently be vulnerable to a 15-year storm event. Assuming that detailed surveys and erosion modeling confirmed such vulnerability, these structures would be eligible for seawall permits issued by FDEP if the County ruled that armor was consistent with the Comprehensive Plan and Coastal Ordinance. Currently rigid coastal armor is prohibited without an emergency amendment to the Comprehensive Plan.

3435	Highway A1A
3455	Highway A1A
4215	Highway A1A
7035	Highway A1A
7205	Highway A1A
7845	Highway A1A
7855	Highway A1A
7865	Highway A1A
7875	Highway A1A
7915	Highway A1A
7925	Highway A1A
8055	Highway A1A
8065	Highway A1A

Table 1: Street addresses identify the most vulnerable habitable structures of the South Beaches.

Emergency amendments to the Comprehensive Plan require a unanimous approval of the Board and determination of “emergency” conditions. According to FS 163.3187 (1) (a):

"Emergency" means any occurrence or threat thereof whether accidental or natural, caused by humankind, in war or peace, which results or may result in substantial injury or harm to the population or substantial damage to or loss of property or public funds.

Neither the President nor the Governor have declared an emergency as a result of the recent tropical wave, therefore no emergency public assistance funds or programs are currently available. Damages also did not meet the thresholds for Small Business Association home and business disaster loans.

Currently, without a declared emergency or amendment to the Comprehensive Plan, private property owners in unincorporated Brevard County have several available options. All options require County and state permit review and some require federal involvement.

- For all developed and vacant properties, owners are permitted to repair and stabilize their dune by adding beach-quality sand obtained from upland sources.
- For vulnerable habitable structures owners can:
 - install engineered geo-textile sand bag systems,
 - repair minor damage to existing rigid coastal armor, or
 - retreat from the eroding bluff line.

In addition to these private actions, large-scale beach renourishment options may be considered by the Board.

NRMO staff submits the following options for BOCC consideration. These are not mutually exclusive and can include any or all actions based on Board direction:

- **ACTION 1** - Rely on FEMA and State Emergency funds to maintain the engineered berms of the Mid Reach (until a federal project takes over) and the South Beaches.
- **ACTION 2** - Request the U.S. Army Corps of Engineers to reexamine the feasibility of a federal shore protection project along any portion of the South Beaches.
- **ACTION 3** - Identify funds (ranging from \$105,000 - \$250,000 depending on project length chosen by the Board) and authorize staff to immediately pursue designing, permitting, and obtaining voluntary easements for an economically feasible beach renourishment project in the South Beaches. Pursue state cost-share for project construction to coincide with the next renourishment of the South Reach.
- **ACTION 4** - Direct staff to use market values assigned by the Property Appraiser to estimate the economic value of major habitable structures that appear to be currently vulnerable to damage from a 15-year storm event. This information may expedite the Board's ability to respond to property-owner requests for emergency amendments to the Comprehensive Plan that could allow seawalls.
- **ACTION 5** - Direct staff to examine managed retreat options and bring back funding needs for purchasing threatened properties at market value from willing sellers and converting those properties to public access.

Attachments:

1. Beach Management Overview Map
2. Typical Beach Cross Section (before and after beach deflation)+
3. Beach Condition and Management Report, 2007 Brevard County, FL
4. Economic Analysis of Beach Nourishment Alternatives, South Beaches, Brevard County, FL



