

The proof is in the "putting"

Sand-nourished beaches hold strong, lessen the brunt of the 2004 hurricane season

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With the close of 2004 hurricane season, Florida has emerged from one of its busiest storm seasons on record. All in all, there were 14 named storms in 2004, of which eight made landfall along the coastal United States, with an unparalleled five of those hitting the Florida coast.

While this phenomenon was not anticipated by the professional forecasters, the performance of sand-nourished or restored beaches in the paths of these storms was, for the most part, precisely as predicted.

Of Florida's approximately 825 miles of sandy beaches, 331 miles are classified by the Florida Department of Environmental Protection as critically eroding. Though erosion and accretion are natural processes in coastal systems, wind and wave energy are significantly amplified during tropical storms and hurricanes. By adding human impact to the equation, in particular the net loss of sediment in near-shore coastal systems realized by navigational dredging, the results typically favor erosion for most areas.

In spite of the vast number of technologies available to restore eroding beaches, beach nourishment—a carefully engineered process for adding sand back into a coastal system—is the tried and true approach to address coastal erosion. Nourishment projects literally take sand from an appropriate borrow site and "put" it on the shore or in the water near the shore.

Nourished beaches do not hold strong against tropical storms and hurricanes just because of the increased amount of sand on the beach. Instead, properly engineered nourishment projects actually "build the beach" far into the water. This not only harbors additional sand in the system that prolongs the time intervals between required renourishment, but serves to dissipate wave energy (typical or storm-related) as waves travel over shallower depths near shore.

Even as Floridians were recoiling from the wind and rain from each of this season's storms, DEP's Bureau of Beaches and Coastal Systems was conducting damage assessments to identify impacts to the state's shorelines. The comprehensive efforts of the BBCS included the utilization of multiple damage assessment teams, continuous digital oblique aerial videography of the impacted coastal shorelines, coordination with the Federal Emergency Management Agency and the U.S. Army Corps of Engineers, and contact with local government sponsors and their consultants.

According to Mike Barnett, PE, chief of the BBCS, in reviewing the evidence left in the wake of the five major storms to impact Florida—Tropical Storm Bonnie and Hurricanes Charley, Frances, Ivan and Jeanne—the bureau found that, in most instances, nourished beaches experienced significantly less damage than adjacent non-nourished beaches.

Additionally, coastal properties buttressed by restored beaches suffered considerably less structural damage than was expected.

"Without exception," says Barnett, "shorelines on Florida's hurricane-impacted beaches which had realized the construction of beach restoration, nourishment, and inlet sand transfer projects provided a clear storm protection benefit to upland properties and infrastructure, when compared to those shoreline segments without such protective measures."

The unprecedented landfall of both Hurricane Frances and Hurricane Jeanne on Hutchinson Island in Martin County in September 2004 provided a ready example in Ambersand Beach (to the north, in Indian River County) for the protection offered from nourished beaches. Indian River County's proximity to the landfall of the eyes of these hurricanes left the

county's beaches exposed to the greatest wind and wave energy of these events.

According to the report *Hurricane Frances & Hurricane Jeanne: Post-storm Beach Conditions and Coastal Impact Report with Recommendations for Recovery and Modifications of Beach Management Strategies* (BBCS, October 2004), "...had there not been a beach fill for protection from these two back-to-back extreme events, Ambersand Beach would likely have been significantly destroyed."

Similarly successful and protective nourishment projects can be found scattered throughout the state, including projects completed in Pensacola Beach, Panama City Beach, Captiva Island, Bonita Beach and in Brevard County, to name just a few.

While beach nourishment projects typically come with a high price tag, the investment is merited both by loss avoidance and monetary return. Restored beaches buffer wave energy and reduce coastal

surge, thereby minimizing the number and value of insurance claims for coastal properties. This, in turn, maintains a pool of insurers in the state and slows the rise of insurance rates for all property owners.

Likewise, municipalities see less damage to coastal infrastructure—including piers and coastal roads—and, at the same time, realize the benefit of continued property tax revenue from higher-end coastal development that restored beaches help protect.

Directly offsetting the cost of beach nourishment are the revenues realized from tourism that draws people—and their wallets—to the shore. Beaches continually rank as the top destination for the 75+ million annual visitors to Florida, who inject in excess of \$15 billion dollars of revenue into the state's economy through direct spending and sales tax. And though no one can put a price tag on Mother Nature, habitat, too, is a benefactor of restored beaches facing tropical storms and hurricanes.

Stretches of sand and dune that remain post-storm rapidly emerge as suitable sites for a list of protected species of turtles and birds that nest soon after the end of hurricane season.

DEP plans and manages Florida's beach nourishment projects in conjunction with federal and local governments. Although the current administration in Washington has moved to discontinue funding for any planned or existing projects, DEP staff are coordinating with a number of sources to provide needed aid for affected beaches, including FEMA, the Florida Legislature, and the USACE, which has sponsored beach nourishment projects in Florida and around the nation for more than 50 years.

"The beach management program in Florida," says Barnett, "is a testament to comprehensive, responsible restoration and management of critically-eroded shorelines."

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