



## **SHORELINES – September 2007**

As presented to the *Island Review* magazine

### **The 2007 Hurricane Season (part III)**

This edition of *Shorelines* constitutes our last of a three part series regarding the 2007 Hurricanes Season --- just in time for the climatological peak of hurricane activity (September 10<sup>th</sup>). Part I summarized tropical cyclones in general (storms and hurricanes) and the often media-hyped predictions for 2007. Part II described five variables we often pay close attention to if a cyclone does happen to migrate into the southeast Atlantic Ocean (intensity, duration, approach direction, storm surge, and lunar tide). For this last segment, we're going to briefly describe our damage assessment procedures if we have the unfortunate experience of sustaining a hurricane strike, which we essentially conduct in three phases; (1) ground reconnaissance, (2) aerial reconnaissance, and (3) beach surveying.

**(1) Ground Reconnaissance** – Ideally, we try to drive the entire length of Bogue Banks the day after a hurricane impacts the area, paying special attention to areas of concern such as erosion hotspots, low elevation portions of the barrier island, inlet shorelines, and any other interesting geomorphic features. This exploratory assessment gives us a quick indication to whether there has been significant dune erosion and structural damage. As one might expect, we take digital pictures to document the general condition of the beach/dune system in the post-hurricane setting, and record any significant dune and/or property damage. Depending upon the hurricane's characteristics and the sand volume residing in the pre-storm beach, dune erosion and property damages do not always occur.

However we do always observe "profile deflation", which simply describes the process whereby waves take sand from the upper part of the beach (near the dune base) and deposits the sand along the lower part of the beach (near the swash zone). The end product is a very flat-looking beach the day after the storm. Fortunately, the deflation process serves a useful purpose by forcing waves to dissipate their energy over a broader beach surface. This shock absorbing function often prevents turbulent water from eroding dunes. The flat nature of the post-storm beach usually rebounds rather quickly as fair-weather waves and winds re-configure sand, and "inflate" the beach to near pre-storm elevations.

**(2) Aerial Reconnaissance** – To gain a broader vantage of hurricane impacts and to determine relative damage from one area to the next, we often go to the skies in a charter plane and perform an aerial reconnaissance once the winds subside. The bird's eye view provides a great perspective and while not quantitative, the pictures obtained during this phase of the post-storm assessment are often worth a thousand words and corroborate what we see on the ground.

**(3) Beach Surveying** – Approximately 120 survey profile locations have been established along Bogue Banks to help determine the overall health the beach and the fate of sand placed along the shorelines via beach nourishment. A profile is simply a shore perpendicular line where elevations are measured on a routine basis (usually once a year in the early summer). The annual surveys can be utilized to provide a snap shot of the pre-

storm beach, and if a hurricane strike is imminent, we trigger a rapid response deployment of a survey crew to measure beach conditions once the hurricane passes.

Besides gathering geospatial information concerning the position of major beach features such as the dune toe and mean high water line; the survey also helps us quantify the volume of sand lost during the hurricane. This verifies or dismisses our visual observations and provides an objective dataset that has several uses. In some instances, the Federal Emergency Management Agency's Public Assistance Program and the N.C. Division of Emergency Management will reimburse communities for the replacement of sand lost during a Federally-declared disaster event (such as a hurricane). The rapid response, post-storm survey helps communities determine exactly how much sand was lost to file a reimbursement claim. The post-storm survey, when coupled with subsequent repetitive surveys also provides a benchmark to observe how the beach recovers months and even years after the hurricane(s).

From a purely chronological standpoint, we're roughly halfway through the hurricane season (June 1 – November 30); however the period from August 20<sup>th</sup> until October 14<sup>th</sup> produces the greatest number of storms. Let's hope this and many following years provide some reprieve on the implementation side of the damage assessment coin!