SHORELINES – October 2011

As presented to the *Island Review* magazine

Hurricane *Irene*

August had a windy and wet ending with Hurricane *Irene* making landfall at Cape Lookout as a Category 1 hurricane at 7:30 am on 8/27/2011 (Fig. 1). The Cedar Island Ferry Terminal measured sustained winds of 90 mph, gusting to 110 miles per hour (mph) at about the time of landfall and sustained winds of 85 mph, gusting to 101 mph was measured at Atlantic Beach later that morning.

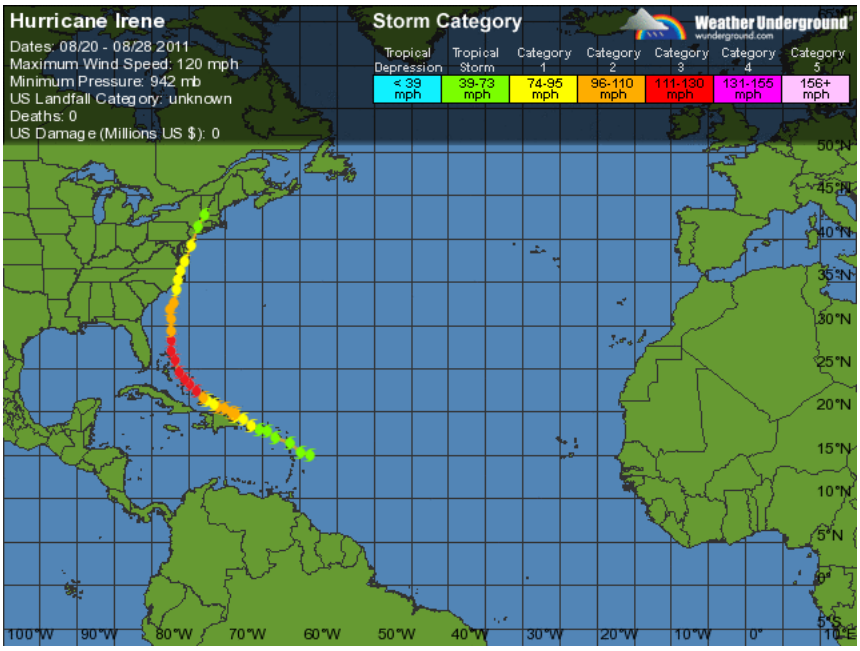

Fig. 1 – Track, intensity, and general U.S. landfall location of *Irene*.

For Bogue Banks the back side (return flow) of *Irene* produced much higher winds than the front side and prolonged the impacts of *Irene*. There was soundside flooding along Bogue Banks and pier/dock damage resulted that was likely the cause of the initial build up/push of water from generally easterly flow (east to west). That water was quickly blown in the other direction as west winds took command after *Irene* passed north of Cape Lookout and also caused debris to crash into soundside docks and piers. The westerly flow was also predominantly responsible for much of the debris found along island roads and yards. Fortunately, there was no catastrophic damage to homes or buildings on the island, but it was not uncommon to see areas of vinyl siding and roof shingles missing.

Beach Erosion

Erosion was not catastrophic but there was dune erosion along most of Bogue Banks, and figure 2 is a representative example of the type of dune erosion that occurred. The "old" existing high dunes (or emplaced foredune in east Emerald Isle) incurred no or very

little damage. However, the incipient dune field that has been created in the past several years with the aid of public/private sand fencing and planting did suffer noteworthy erosion.

Fig. 2 – "Before" (left panel) and "after" (right panel) from Memorial Park, Pine Knoll Shores. Notice the remaining sand fence posts and absence of sand and fencing slats between the posts on 8/27/11.

Importantly, the incipient dune field has acted as a line of defense for that large foredune fronting most of Bogue Banks and often exceeds an elevation of 20 feet. The geographic extent of incipient dune erosion and was very "zonal" across Bogue Banks and figure 3 loosely depicts the different areas of severity along the island. Please keep in mind this is a very subjective exercise, but provides a sense (order of magnitude) of the erosion. Figure 4 is an example of "worse case" erosion.

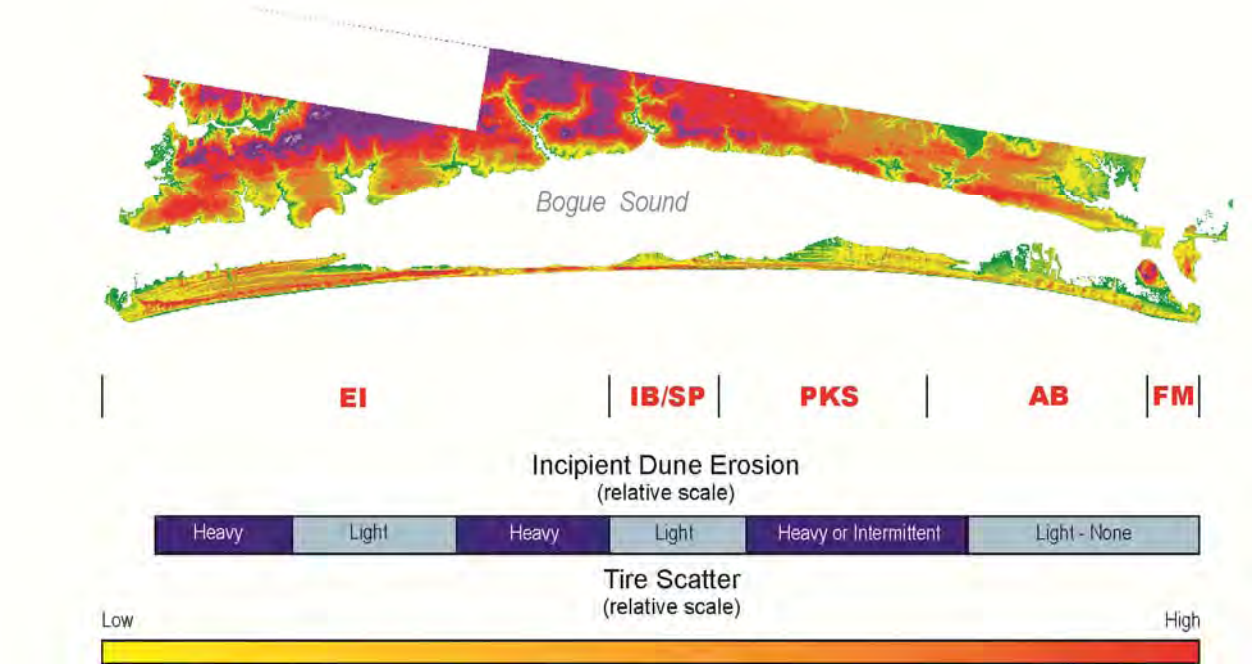

Fig. 3 – Map depicting the relative scale of incipient dune damage and tire scatter along Bogue Banks. EI – Emerald Isle, IB/SP – Indian Beach/Salter Path, PKS – Pine Knoll Shores, AB – Atlantic Beach, and FM – Fort Macon.

Fig. 4 – Before (8/26/11) and after (8/28/11) incipient dune impacts of *Irene* at Ocean Oaks, Emerald Isle.

Making any precise assessments concerning berm erosion (the flat part of the beach) will be difficult until our post-storm beach survey is completed and processed into a final report. In general however; much of the sand that was removed from the upper part of the beach tends to be translated offshore in bar configurations, which creates a very "flat" looking beach immediately after the storm. Some of this sand will accrete back onto the beach – some will not, and our repetitive surveys will help us catalogue the volume and location of sand along the beach profile (see surveying note below).

Tire Scatter – As also depicted on Figure 3, tires and to a much, much lesser extent concrete pipes from offshore artificial reefs were brought to the beach compliments of *Irene*. The tire scatter was "heavy" in Atlantic Beach, but quickly subsided to "light" in Pine Knoll Shores, "very light" in Indian Beach, to "almost nonexistent" in Emerald Isle. The N.C. Division of Marine Fisheries collected the debris from the beach within days of *Irene's* departure.

Shackleford Banks and Core Banks – Although outside our purview, a series of aerial photographs obtained two days after *Irene* passed do allow us to make some casual observations concerning the Cape Lookout Seashore and moving north to south; (a) South Core Banks – there was a high degree of overwash along this region with what appears to be heavy damage sustained by some of the cabins, RVs, and other structures (Fig. 5). No new inlets formed. (b) Cape Lookout – the lighthouse is still standing and damages to the ancillary structures in this area appeared to minor and wind related. (c) Shackleford Banks – no overwash occurred that crossed the entire island. There is a narrow spot located along the eastern edge of this island (almost due north of the Lookout spit) that would be prone to this.

Fig. 5 – Aerial photograph depicting overwash sand impacting cabins and RVs at south Core Banks, Cape Lookout National Seashore.

Archives – If you're interested in reviewing any of the updates the Shore Protection Office produced or perhaps the hundreds of photos that were obtained before and after *Irene*, then please visit our archive website now available at http://www.protectthebeach.com/temp/irene.html.