

SHORELINES – June 2009

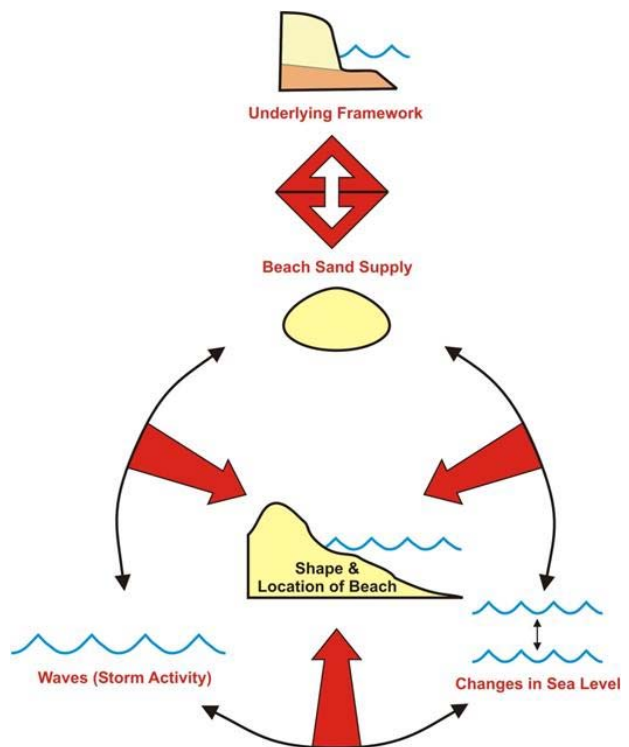
As presented to the *Island Review* Magazine

Sand Supply

As neatly presented in the accompanying diagram and in a classic textbook sense, there are really three macroscopic factors affecting the shape and location of our beaches - **(1) sand supply**, **(2) sea level**, and **(3) storms** (both intensity and frequency). The interplay between these factors is really neat to think about - if there is enough sand entering the system, then a particular beach may be able to withstand storms and/or a gradual rise in sea level = almost no erosion or even accretion. If not enough sand enters that same exact system, then we could have chronic erosion problems, and so on for scenario A, B, C, etc. If we superimpose the inherited geologic framework upon these factors (sand supply, sea level, and storms), we can get low topography overwhelm dominated barrier islands, high topography sand-rich beaches, or even beaches with exposed rock on their surface.

Coincidentally in the last edition of the *Island Review* we discussed some of the latest developments concerning sea level, and in the next *Island Review* we usher in June 1st and the start of the hurricane season with a summary of the various “pre-season” predictions for 2009. The take home message here is sea level is rising and we’re in a heightened period of cyclone activity. So with two of the three aforementioned beach factors in check (sea level and storms), there’s no reason not to sandwich the topic of sand supply for this month’s *Island Review*.

First of all, it’s important to get a baseline understanding of what sand really is, whether from a purely aesthetic vantage point (what characteristics make a “beautiful” beach) or in a technical sense. Actually **sand** is a scientific term for a particle measuring between 1/16 and 2 mm in diameter, regardless of color, shape, or composition. For instance, a handful of black, angular volcanic particles measuring between 1/16 and 2 mm from Hawaii and the white, rounded quartz particles from the panhandle region of Florida also measuring between 1/16 and 2 mm are both sand. Anything finer/smaller than sand (< 1/16 mm) is termed mud and anything coarser/larger than sand (>2 mm) is called gravel.



Modified from Pilkey et al. (1998)

But perhaps more interesting and a fundamental part of modern coastal processes today, is that there is essentially no “new” beach sand being introduced into the N.C.

coastal system. Unlike much of the west coast, the mountains in N.C. have not delivered sand to the beach for thousands of years because the gradient between the mountains and sea are simply too gentle to transport any new sediment. Therefore, our sand budget is fixed and for the most part, the beaches we enjoy is comprised of "recycled" sand from adjacent inlets, capes, and eroding beaches. Poorly designed coastal defense structures such as jetties and groynes, and/or dredging projects that either permanently remove or impound sand accentuates the impacts of living on a sand starvation diet.

However, properly designed coastal defense structures and good dredged material management practices can help conserve our sandy resources by prudently keeping sand in various places along the coastal (beach and inlet) system. But alas, there's a fine line between "helping" or "hurting" the coastal system, and that debate has been going on for centuries and continues to this today in hindsight and foresight as economical, social, and science concerns are weaved into the evaluation processes.