

SHORELINES – September 2005
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Beach Nourishment Sediment Guidelines Coming Your Way

“More than you ever thought you’d need to know about sand”

The N.C. Division of Coastal Management (NCDCCM) is currently evaluating proposed sediment criteria guidelines for beach nourishment and dredged material disposal projects that were developed by the State’s Science Panel on Coastal Hazards. The recommendations generated from this evaluation process are subsequently planned to be presented to the State’s coastal rule-making body, the Coastal Resources Commission (CRC) in the fall. In all likelihood, the CRC will approve the recommendation in the fall and the rule-making process will be initiated.

With an understanding of this timeline in check, let’s get to the nitty gritty of the proposed standards for beach nourishment & dredged material disposal projects.

This is a tough nut to crack – if the sediment criteria standards are too loose, then the possibility of placing sub par quality sand along the State’s beaches could increase. Conversely, if the standards are too confining, then the cost of beach nourishment could unnecessarily skyrocket and corner communities into pursuing “hard” solutions in unwise situations, i.e., seawalls, jetties, groynes, etc. Many of which actually result in the loss of public beach. Also, we could lose critical opportunities to take advantage of dredged sand from maintained navigation channels if the proposed regulations are too tight.

The Science Panel was requested to develop the criteria as an outgrowth of concerns raised during the construction of the Bogue Banks Restoration Project in Pine Knoll Shores/Indian Beach and the Oak Island Turtle Restoration Project, both completed in the 2001 – 2002 timeframe. The concerns that garnered the most attention were the biological and aesthetic impacts of placing coarse material along the oceanfront shoreline including shells for the Bogue Banks and sandy, limestone rocks for the Oak Island Projects, respectively. These concerns were coupled with a perceived lack of detail regarding the State’s present rules guiding sediment compatibility and the rules’ apparent inability to establish thresholds and triggers for when “poor” material is encountered during reconnaissance studies and to mandate mitigating measures during beach construction.

The purpose, proposed sampling and analytical protocols, and historical perspective of the sediment compatibility issue is available at NCDCCM’s new sediment criteria website at <http://www.nccoastalmanagement.net/sediment.htm>. Almost equally important, there is also a questionnaire available at the website that is tailored to facilitate public feedback regarding the proposed criteria.

The criteria is organized into 6 headings, briefly summarized below.

(Part 1) General Definitions. – This section provides succinct definitions to the terminology used in beach nourishment project development and implementation.

(Part II) Characterization of the Beach to be Nourished. - This section provides the sampling protocols the State would require to properly characterize the pre-nourished beach; i.e., minimum amount and spacing of beach samples.

(Part III) – Characterization of Borrow Site Material. The characterization of a potential borrow site has two distinctions and accordingly two different sets of parameters; (a) borrow sites confined to navigation channels, and (b) upland or submerged borrow sites.

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For upland or submerged borrow sites, appropriate remotely-sensed survey techniques shall be used to help delineate the framework of the sand source. Remotely-sensed surveys include fancy technologies such as seismic reflection, side-scan sonar, and ground penetrating radar that often provide an “x-ray” of the subsurface.

Also, sediment samples shall be obtained and analyzed utilizing three very important classifications; (a) the ***fine fraction*** (diameter of grains <0.0625 mm), (b) the ***sand fraction*** (diameter of grains between 0.0625 mm and 4.76 mm), and (c) the ***coarse fraction*** (diameter of grains >4.76 mm). These three classifications are also utilized for the pre-nourished beach analysis and therefore can be compared to one another. In general, characterization and sediment sampling shall not be required from a site that is confined to a maintained navigation channel.

(Part IV) – Compatibility of Borrow Site Material to the Pre-Nourished Beach. – The comparison for borrow site vs. pre-nourished beach sediments are evaluated by means of four different standards. This may seem a little cerebral for the average beach user but it's worth noting.

(1) Fine-grained fraction equals “native plus 5%”, thus the average percentage by weight of the fine-grained fraction in a borrow site shall not exceed the average percentage of the fine-grained fraction of the pre-nourished beach plus 5%. What does this mean? Let's say the pre-nourished, fine-grained fraction is 10% of the total sediment population; then the post-nourishment, fine-grained fraction shall not account for more than 15% of the post-nourishment, fine-grained fraction.

(2) Coarse-grained fraction equals “native plus 4%”, thus the average percentage by weight of the coarse-grained fraction in a borrow site shall not exceed the average percentage of the coarse-grained fraction of the pre-nourished beach plus 4%. That's right; if the pre-nourished, coarse-grained fraction is let's say 5% of the total sediment population, then post-nourishment, coarse-grained fraction shall not account for more than 9% of the post-nourishment, coarse-grained fraction.

(3) Sediment mineralogy thresholds are confined to a single parameter (calcium carbonate), whereby the percentage of calcium carbonate (often shell and limestone) characterized in a borrow site shall not exceed 40% of the pre-nourished beach.

(4) Shoal material from the direct maintenance of coastal navigation channels shall be deemed suitable for beach placement with up to 10% fine-grained material, provided that the excavation does not exceed authorized channel dimensions.

(Part V) – Execution of a Nourishment Project. - Many of the items included in this section have crossover to issues that should be reconciled in State and Federal scoping and permitting processes, e.g., “Material used for beach nourishment shall not contain foreign matter including...”

(Part VI) – Post-Nourishment Monitoring and Mitigation of Beach and Borrow Site.
- The first item in this section is mitigation-driven and may have been applied to the 2001-02 Bogue Banks Restoration Project. If exceedingly coarse material (>64mm in diameter) is present in material used for beach nourishment and is greater than the fraction of similar exceedingly coarse material (>64 mm) of pre-nourished beach values plus 1%, then the coarse material shall be removed from the beach. This essentially equates to a “native plus 1%” threshold, thus if the pre-nourished exceedingly coarse material accounts for 2% of the

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total population, then post-nourishment exceedingly coarse material cannot account for more than 3% of the total population.

Again, all of this may seem a bit philosophically and empirically “deep”, especially if this is your first time browsing the *Island Review*, but this is a big issue worth keeping an eye on. The trickle down effects of the recommendations, if adopted into law, could be huge.