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Innovative Recycling of Major Sand Surplus Volumes Instead of Using Virgin Material i.e. (Backpassing) in New Jersey

"This is a re-examination of classifying chronic areas of sand surplus as recycling borrow zones for erosional hot spots within multiple large-scale beach nourishment regions. Recycling sand supplies is a concept, while sand backpassing is a technique that has been employed at a smaller scope and scale on New Jersey coastal reaches. Chronic erosion and oversupply form a series of problematic reaches along the entire shoreline. Few worry over chronic oversupply to an area, but this excess supply becomes a potentially valuable resource to an adjacent beach area where loss dominates.

Hydraulic dredging inlet or offshore borrow zones comes with a $2.5 million dollar price tag for mobilization costs. These costs have greatly escalated over the past decade, pushing the maintenance of projects ever higher. The recycling of sand supplies will vary depending on the desired final volume involved with each operation.

1) Six projects below 100,000 cubic yards have utilized high capacity trucks loaded with an excavator and graded in place with a bulldozer. Mobilization costs about $80,000 with a $5-$7/cubic yard hauling rate.

2) Fixed assets in the form of a pumping station, pipeline and an eductor dredge and crane have been in service since 1988 at Indian River, Delaware with operational output of 61,000 cy/year (2013-5 data since Hurricane Sandy with less surplus sand available). Original goal was 100,000 cy/year.

3) Inlet dredging using hopper dredges with sand placement along nearby shorelines is an established process, done as far back as 1978 at Barnegat Inlet.

4) Thinking on a bigger scale, since the NY Army District commenced the Monmouth County beach restoration project, over 3 million cubic yards of new sand has been added to Sandy Hook just between the park entrance and Gunnison Beach (CRC, 2011). Design a fixed asset installation to extract sand from the tip of Sandy Hook and pump it back at least as far as Sea Bright's municipal beach. Major components would be an eductor dredge on a crane, buried supply pipeline and multiple booster pumping stations along the way. Winter operations limit wildlife impacts.

Backpassing does require more frequent deployment since most zones of sand loss are reduced by 100,000 to 150,000 cubic yards per year and the most cost effective means of resource allocation is to use the high capacity trucks driven on the beach offseason. The borrow zone becomes the accretional berm and beachface with between 1 and 3 foot deep cuts pushed into a linear ridge where the excavator sits and loads trucks that haul 20 to 25 yards of sand per trip to the zone of chronic loss. This prospect appears to work best on NJ barrier islands where each island has a zone of accretion and usually a zone of chronic loss. The best data on actual projects competed comes from Avalon and North Wildwood in Cape May County. Avalon has 4 projects since 2005 moving 221,119 cubic yards at a cost of $1,359,125 ($6.18/cu. yd.), and North Wildwood has 3 projects since 2012 moving 221,486 cy at a cost of $1.74 million ($7.85/cu. yd.)."

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