

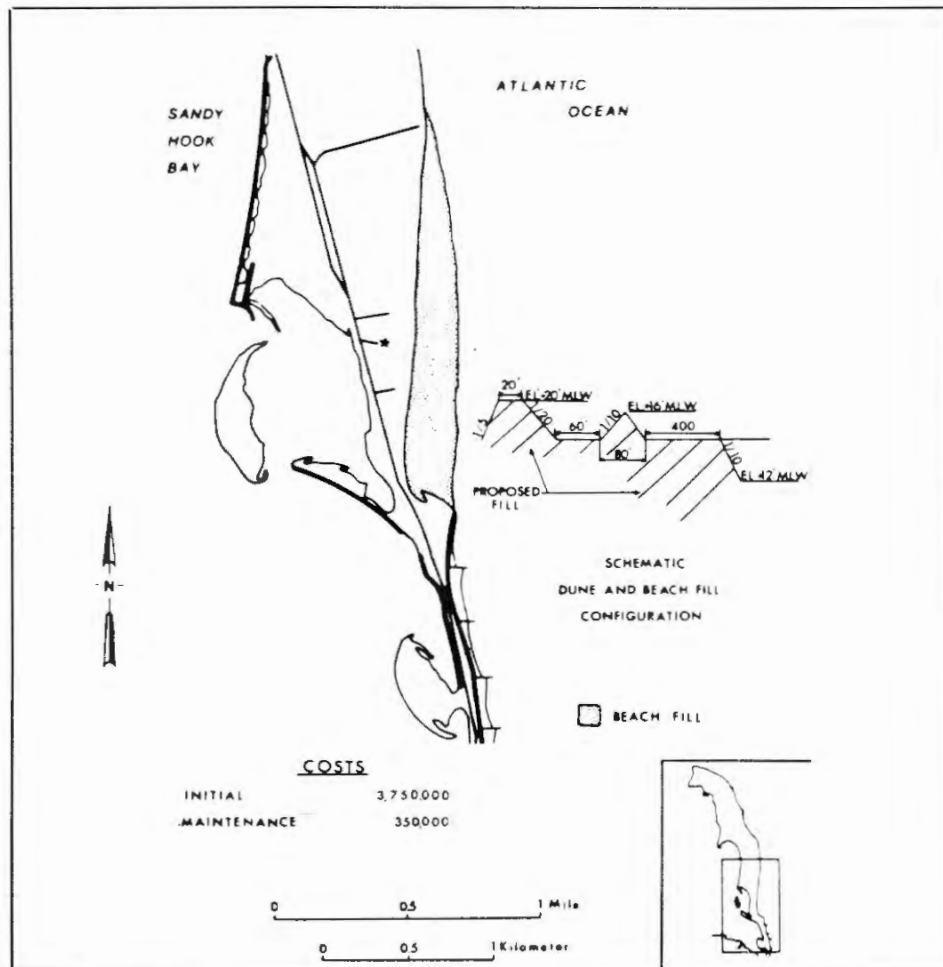
Mimicking Nature Through Dune Building

By John T. Tanacredi and Al Farrugio

Figure 5 PLANTING



Figure 2 BEACH NOURISHMENT



The dynamic geomorphological processes that shape our coastline are testimony to nature's landscaping abilities. Erosion and accretion of our coastal barriers has both plagued and nurtured man's desire to settle closer and closer to our rising seas. At the Sandy Hook Unit of Gateway National Recreation Area, a natural sand spit exists where the shoreline dynamics have separated the tip area (a spit in geological definition) from the mainland time after time over the last several hundred years.

Considerable effort on the part of many federal and state agencies has gone into evaluating alternatives for solving the potential breaching of the "critical zone." (Figs. 1 and 3) Erosion was leading to the separation of the spit from the mainland. A single access route to the tip is the only way facilities such as the U.S. Coast Guard, the National Oceanographic and Atmospheric Administration, New Jersey Marine Science Consortium, and American Littoral Society continued to operate, as well as being the only access for over 2 million beach users annually. A special Congressional appropriation of \$12 million, to be reimbursed to the Federal Government by charging beach user fees, was allotted to help restore the original 1954 Sandy Hook shoreline profile.

The plan called for some 4 million cubic yards of sand material dredged from Sandy Hook and Ambrose Channels to be placed by hydraulic pumps up into the critical zone, beginning in March 1983. In addition to the sand material, an attempt at dune construction and stabilization would be made along a 1.5 mile strip of beach once the sand had been placed establishing the original shoreline. (Fig. 2) Three hundred thousand culms of dune grass, *Ammophila breviligulata* (Fig. 4) would be purchased, planted and fertilized over a two month period beginning in November 1983. Aerial photographs of the entire planted area are being made, coupled with an on-site ground evaluation of the survivorship of the culms.

The process is surprisingly simple. The plant species is dependent upon the location along the coastline. Only a handful of species is tolerant of the stresses associated with the beach environment. The plants must be able to survive sand blasting, burial by sand, salt spray, saltwater flooding, drought, heat and low nutrient supply. A perennial grass such as *Ammophila breviligulata* (American beachgrass) fits the Sandy Hook bill. This species is a cool-season dune grass, vigorous, and grows in dense clumps spreading laterally by rhizomes; it is easy to propagate, harvest, and store, and is readily available from commercial nurseries. The grass is extremely easy to transplant: (Fig. 5) it establishes and grows rapidly to begin trapping sand by the middle of the first growing season. The rhizomes may spread as much as 10 to 12 feet per year while accumulating as much as four feet of sand in the one growing season.

The work force for this project consisted of the Sandy Hook maintenance staff equipped with a tractor and an agricultural transplanter, and 50 volunteers. The volunteers included representatives of the NPS, NOAA, USCG, local Sierra, Audubon and Garden Clubs, Boy Scouts, Camping Clubs, and others. The planting went quickly to total approximately 150 rows, each with somewhere in the neighborhood of 1200 plants. To encourage rapid establishment of the beach grass, a complete fertilizer was applied shortly after planting in the fall of 1983 and then re-applied in the Spring of 1984.

Figure 1 SANDY HOOK

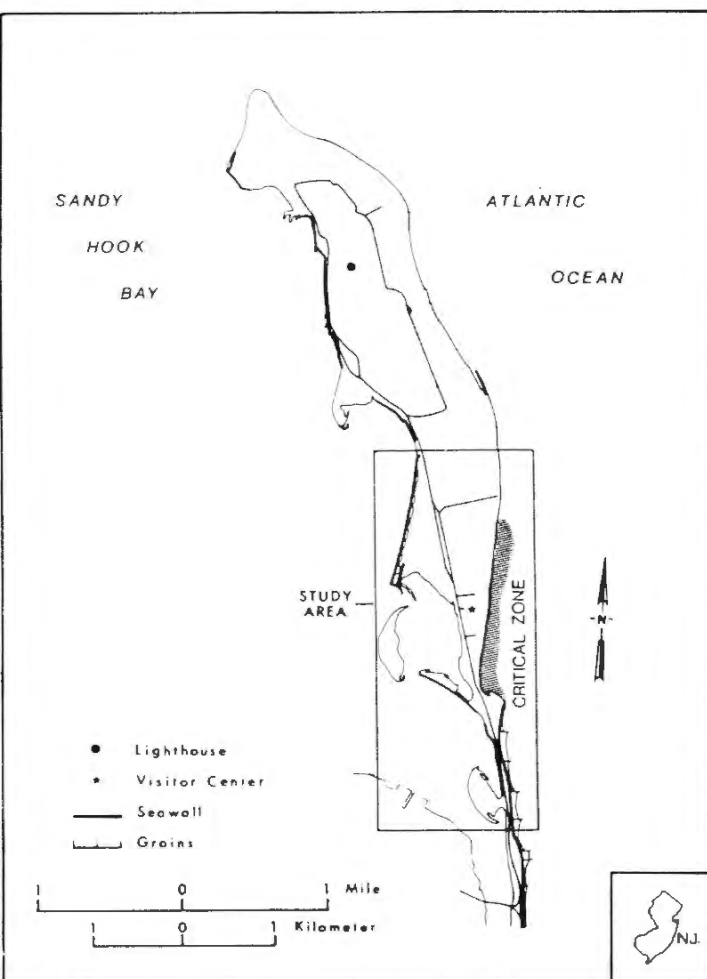


Figure 3 CRITICAL ZONE



Figure 4 BEACH GRASS



As the new dune system takes shape, powered by natural processes, other plant species will be introduced both naturally and with the help of the park. To do this, Gateway has begun a nursery system with the prime objective of growing coastal plant species that often are unavailable from commercial sources. A nursery site at Sandy Hook and one at Floyd Bennett Field in Brooklyn, along with a 24' x 36' free-standing greenhouse, will provide transplants of such plants as *Artemisia stelleria* (Dusty Miller), *Solidago sempervirens* (Seaside Goldenrod), *Myrica pensylvanica* (Northern Bayberry), *Coreopsis lanceolata* (Lance-leaved Coreopsis), *Opuntia compressa* (Prickly Pear), *Prunus maritima* (Beach Plum), and *Juniperus virginiana* (Eastern Red Cedar.)

The dune planting exercise at Sandy Hook is by no stretch of the imagination intended to stop erosional processes there. What is anticipated is that the grass will aid in stabilizing a new dune system, reduce the rate of erosion at the critical zone as the dunes become stabilized, increase coastal habitat diversity thereby providing for additional passive recreational opportunities, and continue to maintain the connection that provides access to Sandy Hook.

In the long term, other multi-purpose habitat development activities such as this one will be fostered at Gateway NRA, as well as at other coastal barrier parks. This habitat improvement, however, should not be achieved at the cost of elimination or substitution for "natural or virgin" habitat. A considerable period of time must elapse before any newly established habitat area can approach the level of diversity, complexity, and equilibrium a natural system develops over time.

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