

South Dakota—Department of Game, Fish, and Parks, Pierre, S. Dak. 57501.

Publicity Department, Department of Highways, Pierre, S. Dak. 57501.

Tennessee—Division of State Parks, Department of Conservation, 203 Cordell Hull Building, Nashville, Tenn. 37219.

Texas—Travel and Information Division, State Highway Department, Highway Building, Austin, Tex. 78701.

Utah—The State Park and Recreation Commission, 19 West South Temple, Salt Lake City, Utah 84101.

Vermont—Department of Forests and Parks, Montpelier, Vt. 05601.

Virginia—Virginia Travel Council, The Robert E. Lee House, 707 East Franklin Street, Richmond, Va. 23219.

Division of Parks, State Department of Conservation and Economic Development, Suite 403, Southern States Building, Seventh and Main Streets, Richmond, Va. 23219.

Washington—Washington State Parks and Recreation Commission, 522 South Franklin, Olympia, Wash. 98501.

West Virginia—Division of Parks and Recreation, Department of Natural Resources, State Office Building, Charleston, W. Va. 25305.

Wisconsin—Recreational Publicity Section, Conservation Department, State Office Building, Madison, Wis. 53701.

Wyoming—Wyoming Travel Commission, Room 60, Capitol Building, Cheyenne, Wyo. 82001.

Sand Fortresses Tame Atlantic Surf

WILMER W. STEINER



FOR 3 DAYS during March 1962 a coastal storm raked Atlantic beaches and shore communities from the Carolinas to New England. Maryland, Delaware, and New Jersey bore the brunt of tides topped by pulverizing 25-foot waves. Rampaging waters took precious human lives, and property losses were staggering.

As the wind and waves subsided, town officials and property owners began to assess the scene. Debris was strewn up and down the coast as far as one could see. Skeletons of beachfront homes filled the horizon. Yet, one contrast stood out: Where properties had been nestled behind protective sand dunes there was little or no damage. But on the stretches of shore where bulldozers had leveled dunes to create more house lots or play areas, destruction was often complete. Similarly,

little protection was provided by low dunes which had been eroded by wind after the heavy foot traffic of summer vacationers destroyed the vegetation. The crashing surf had overwhelmed the low, irregular dunes and had swept through a number of communities.

Two days after the storm, a USDA Soil Conservation Service team of specialists drove along New Jersey's Long Beach Island toward the seaside community of Loveladies. After clearing police checkpoints, they picked their way through the shambles of what had been the beautiful town of Harvey Cedars.



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They had a special interest in what had taken place. Since 1956, they had been working with local groups in the testing of plants and techniques on Loveladies' dunes. Dr. E. E. Evaul, SCS technical leader in New Jersey, selected a stretch of beach and encouraged the owners to help the SCS team conduct the tests. Entering the Loveladies community, the specialist team had some anxious moments until they spotted the test area and found its houses still intact.

Six years of sand fencing, planting, and fertilizing on the test plots built and held the dunes high and wide in front of the houses. The churning seas had not breached the test dunes. Granted, waves chewed into the seaward side for 30 feet or more. They left a vertical wall of sand festooned with hanging beachgrass roots where gentle, grassed slopes once existed. But the houses were intact.

Neighboring properties fronted by low or narrow dunes were not so fortunate. There was damage and loss from waves and flooding as sea water poured through many a living room. A Philadelphian who "summered" in Loveladies declared, "My place is wiped out. I planned to retire here, and I still want to. But something has to be done to make sure this doesn't happen again. The future—that's what's important now."

The Great Storm of March 1962 set in motion a host of new preventive activities. Immediately, the U.S. Army Corps of Engineers marshaled bulldozers and dredges to build a protective sand dike from Maryland northward through Delaware into New Jersey. This dike was designed for the normal storm tides; sand fences were erected, and plantings made here and there to fortify it.

There remained a need to build and stabilize a massive frontal dune system.

Using the guidelines from their early studies on the dunes of Long Beach Island, Soil Conservation Service specialists intensified their search for better plants and planting techniques. Marshall T. Augustine, field plant materials specialist working in four coastal States, established cooperative test plantings at New Jersey's Island Beach State Park and on a scoured area of former dunes near Lewes,

Del., controlled by the Delaware State Highway Department. Elsewhere, SCS cooperated with State research workers assigned to dune work in North Carolina, Massachusetts, and Rhode Island.

A wealth of information soon began to accumulate. American beachgrass (*Ammophila breviligulata*) proved to be the best species for building and holding frontal dunes from Maine to North Carolina. In North Carolina, American beachgrass and sea-oats (*Uniola paniculata*) solved the problem; and, farther south, sea-oats proved the dominant frontal dune species.

Fence "Backbones"

Armed with new knowledge of what to do and aided by fresh memories of the Great Storm, SCS technicians set forth to encourage and aid seafront communities. Working through soil conservation districts and cooperating State and Federal agencies, they recommended erection of sand fences to build dunes higher and wider. Under certain conditions, sand nearly 4 feet deep can be trapped during a single windstorm. Another set of fences, set on top of the new sand, causes the process to be repeated.

In this way, sand fences become the "backbones" of new dunes.

Seaside workers drove posts in parallel lines 40 to 60 feet apart, running along and above the sea's edge. To these, they fastened lines of snow fencing or pickets or brush to form the sand-trapping fences. Where the edge of the surf was not at a right angle to the prevailing winds, a single line of fence was constructed parallel to the sea and perpendicular spurs of fencing 30 feet long were attached, spaced 40 feet apart. In other more critical areas, dunes were built rapidly by bulldozing or through dredging.

Next came the job of "tying down" the newly formed dunes. The SCS specialists showed the community groups how and when to dig American beachgrass plants from nearby sandy flats and how to prepare planting stock for use on the dunes.

As SCS men worked with groups and agencies, interest in dune building and in stabilization mounted. Planting "bees" were organized by community leaders,

with old and young alike pitching in. Such popular terms as "Operation Greendike" promoted an atmosphere of importance and urgency. Typical of community action, more than 1,000 "greendikers" swarmed onto New Jersey's Long Beach Island to make plantings at Barnegat Light, Harvey Cedars, and Shipbottom on a single weekend.

The U.S. Navy began dune building and planting in Virginia and Delaware.

The Delaware State Highway Department and State Parks Commission joined private citizens in a massive sand trapping and planting program.

Various agencies of the U.S. Department of the Interior planted some 14 miles of dunes along the beaches of the Chincoteague (Va.) National Wildlife Refuge, and they were active elsewhere along the Atlantic with their beachwork.

100 Miles of Barriers

The result was more than 100 miles of renewed, vegetated protective barriers—sand fortresses standing guard against the sea. Much remains to be done. But where the dune grasses have been established, they will continue to trap sand and reach ever higher and wider if they are properly protected and managed.

Soon after this flurry of dune planting started, it became evident that better sources of American beachgrass were needed. Grass on the sandy flats was being exhausted. "It's folly to rob any of the barrier dunes of their mantle, and hand-digging good planting stock from the old beachgrass stands is laborious," observed Robert B. Thornton, manager of SCS's National Plant Materials Center, which is in Beltsville, Md.

After studying various beachgrass production methods at the center, Thornton developed practical methods of producing nursery-grown seedlings.

The vigorous young plants responded to the improved cultural methods. Stems multiplied nearly a hundredfold the first year, ample quantities for propagating material. The next logical step was to use these methods and materials to encourage commercial nurseries to take over plant production.

The SCS plant material specialists approached soil conservation district leaders. The latter found a number of cooperators interested in trying out commercial beachgrass as an enterprise. Beltsville's American beachgrass planting stock was then shipped to the district supervisors who, in turn, shipped to the cooperating growers.

SCS also followed up with technical advice upon planting and growing techniques. By 1965, several million stems of the nursery-grown beachgrass were being produced commercially. Following suit, some State and Federal agencies secured stock for nurseries that now produce stock for their own lands. Prior to 1965, there had been no nursery production of American beachgrass along the entire Eastern United States.

In the spring of 1966, a new dunes-related project was established. It was at least partly stimulated by the "Great Storm of '62" and its aftermath. With funds from Congress, and land provided by the State, SCS built and put into operation the Cape May Plant Materials Center at Cape May Court House, N.J. One of the center's main objectives is to develop better plants and techniques for Atlantic coastal dunes from Cape Cod to North Carolina. The center's men gather and test suitable grasses for the ever-changing pioneer zone of the frontal dunes; and better herbaceous and woody plants for the more stable climax zone of the back dunes.

Also of concern to Plant Materials Center specialists are plants to add beauty and wildlife food and cover around dune-based homes.

Thus the 3 devastating days in March 1962 may well have been the prolog to a new era of secure shoreline beauty backed by plant science that the seas inspired.

For further reading:

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