

PADRE ISLAND NATIONAL SEASHORE
RESEARCH OUTLINE

Title of Research: Sand Movement, Speed and Direction

Resource Study Proposal Number: PAIS-N-3

Purpose: To determine the speed at which active dunes move across the grassland areas of the island and to determine the rate at which the island might be enlarging on the west side adjacent to the Laguna Madre.

Value to the U. S. Government and the National Park Service: During road construction in the FY 1967-68, some dunes had inundated routes of construction before the work had commenced. Blowing sand became a major concern. Future planning should take this moving sand into consideration, and this research project will provide basic data in regard to sanddune movement and buildup on the inner island areas. Sand blowing toward the Laguna Madre is apparently widening the island at a very slow rate. This same material tends to help silt in channels that are dredged for the passage of boats. Future NPS developments may possibly involve the construction and maintenance of small boat channels from the Intracoastal Waterway to the island, and the rate of sand movement in these areas may possibly become a budgetary factor.

Procedure: This project will be accomplished by area personnel under the direction of the incumbent Park Naturalist and should require a period of no less than five years to gain the necessary information.

Six locations will be selected initially. Others may be added if the need arises. Three of these study areas will be at the leading points of active dunes showing a decided movement through the middle of the island in an east-west direction. Three other areas will be selected along the shores of the Laguna Madre on the west side of the island between the shell loading docks and oil storage tank on the north and Green Hill on the south.

Initially, three stakes will be driven at each site selected. In the moving dune areas, the first stake will be located ten yards east of the dune's point, The second will be five yards east of the dune's point, and the third will be at the point of the dune. These will be arranged in a straight line and new stakes will be added if the sands drift more than five yards beyond the point stake. The stakes located on the edge of the Laguna Madre will be aligned in much the same way with the third stake located at the waters edge and new stakes added as the shoreline exceeds five feet of growth past the shoreline stake. Each stake will be set so that thirty-six (36) inches remains above the sand, and each stake will be flagged with surveyors tape to make it easier to locate.

At least once a month, measurements will be taken using the stakes as base points. To determine the rate of growth of the sand in depth, the height of the exposed stake will be measured. To determine distance of travel, the distance between the point stake and the edge of the dune (or edge of the water) will be recorded. Other pertinent data such as the average velocity and direction of the wind, the amount of precipitation, and unusual weather phenomenon will be noted. Additional measurements will be taken at each site immediately after violent storms such as those resulting from hurricanes and northers.

A sheet for recording measurements has been prepared and is kept in the desk of the Park Naturalist. It provides spaces for recording depth of sand and rate of lateral movement. If, after five years, it is felt that enough information has been gathered to make specific conclusions, the resident naturalist will compile the material for submission to the superintendent and the regional office.

SAND MOVEMENT RESEARCH PROJECT

General

Six study sites have been selected initially. More should be added if the need arises. Three stakes are placed at the site in an east-west direction. These stakes are five (5) yards apart and thirty-six (36) inches above the surface. If sand movement exceeds five yards past the last stake (Stake No. 3), another stake should be added.

Measurements

A form has been devised for this activity. Measurements should be taken at least once a month or more often in the event of unusual conditions such as hurricanes.

Post No. - Take depth (d) and width (d). Depth is the distance from the top of the post to the sand surface. Width is the distance the sand has traveled past the last post. Again, a new post should be added if the width exceeds five yards.

Precipitation - Amount of rainfall between measurements.

Average Wind Conditions - Record the average velocity (v) and wind direction (d) for the month between measurements and at times of special measurements.

If most measurements are taken near the end of the month, the average above will be easier to gather from the monthly weather report.

Study Areas

Set No. 1 - Approximately 200 yards south of the Standard of Texas storage tank on the Laguna Madre side of the island. The last stake is set at the water's edge and the study plot is designed to indicate westward expansion of the island.

Set No. 2 - Approximately half way between the above area and Green Hill. Designed to serve the same purpose as set no. 1.

Set No. 3 - At Green Hill. Designed to serve the same purpose as set no. 1.

Set No. 4 - Approximately 3/10 mile north of the junction between the Park Road and Spur Road #1. To show rate of sand movement across island.

Set No. 5 - Approximately 3/10 mile south of the temporary access road near the North Development Area. Same purpose as set no. 4.

Set No. 6 - Approximately 1/4 mile south of Twin Tanks. Same purpose as set no. 4.