SIASCONSET BEACH PRESERVATION FUND
JULY 1, 2005

PAST AND PROJECTED EROSION ALONG THE SIASCONSET SHORELINE

Beach scarp and cliff-top erosion at Siasconset is graphically displayed on the attached set of photo-maps. Present and past scarp and cliff-top positions determined from aerial photographs or field surveys are shown for December 1957, November 1977, April 1990, and April, 2005. Future erosion scenarios projected from existing data are drawn for 2015, 2025, and 2035. The area covered by the photo-map set extends from the southern end of Sesachacha Pond to approximately 1800 feet south of the southern end of Codfish Park. Cliff-top and beach scarp positions, both past and projected, are shown with solid and dotted lines respectively. A Cliff-top line is defined for this report as the top edge of an actively eroding bluff as seen in the vicinity of Sankaty Light and north to Sesachacha Pond. A Beach Scarp position is defined as the landward edge of the sandy, non-vegetated beach. Examples are the base of an eroding bluff face or the seaward limit of the grassy "low beach" dune areas.

Data used for the placement of the erosion lines are tabulated following this narrative report. Aerial photos taken in 1957, 1977, and 1990 supplied the data for those years. The 2005 position was determined from both aerial photos and field data supplied as part of a continuing erosion monitoring survey performed for the Siasconset Beach Preservation Fund. No 1957 photos were available for the areas covered by photo-maps 1 and 2. The Nantucket Shoreline Survey, Gutman et al, MIT Sea Grant Study, August, 1979 provided erosion estimates for the time period 1961-70.for transects 96 and 97 as 3.1 and 2.5 feet per year respectively.. These two stations are situated in the areas covered by photo-maps 1 and 2. The rates of 3.1 and 2.5 feet per year were then extended to the period 1957 to 1977 and are so tabulated on the previously mentioned data sheet.

The 10, 20, and 30 year projections were calculated by extrapolating the average annual rates of erosion from 1990 - 2005 as determined from the aerial photos and other sources described above. This method simply assumes that the annual rate of erosion for the next 30 years will be the same as the average annual rate for the past 15 years. However, the fact that erosion takes place measurably faster at dune and low beach stations than at cliff top stations must e considered. The average 1990-2005 erosion rate for transects 87 through 90, which were dunes or lower vegetated bank face during that period, was 10.3 feet per year. In contrast, the average 1990-2005 erosion rate for transects 92 through 95, full height un-vegetated cliff-top stations, was 3.6 feet per year or 35% of the dune erosion rate. Whenever the projected erosion figures showed a change from fast erosion low beach area to slower erosion at cliff stations, the more realistic adjustment rate of 35% was applied to the cliff top reading. For example, for transect 89, the cliff top is 200 feet from the current scarp, the average dune erosion rate is 11.1 feet per year and the corresponding bank erosion rate is .35 x 11.1 or 3.9 feet per year. So the 10 year projected dune erosion of 111 feet is fine, but the 20 year projection of 223 feet runs beyond the cliff top by 23 feet. Reducing the 23 feet by multiplying by.35 yields 8 feet, or total 20 year projected erosion of 208 feet. Adding 10 x 3.9 = 39 feet yields 30 year projected erosion of 247 feet.

The erosion configurations seen on the photo-maps, past and projected, are subject to the limitations of distortion imposed by aerial photography and the graphic processes of reproduction, enlargement, map overlap, reduction of multiple scales and estimates of line positions between data stations.