

Deer Island and Marsh Point Erosion – 50 year extrapolations

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The theoretical shoreline configurations (Figures 1 and 2) are based on historic data, and should be treated as one of many likely scenarios, depending on future conditions. It should not be used to design structures; it is primarily intended to outline the potential magnitude of shoreline change. This being said, the modeled outcome appears to be in line with the present evolution of each area.

Placement of structures or new marsh will likely change the predicted outcomes. The theoretical shorelines may help, however, to outline areas where shoreline loss can and should be modified.

Method

Fourteen profiles were drawn across the shoreline at specific locations on Deer Island and six at marsh point; less were needed at Marsh Point because of the straight shoreline. The average rate of erosion was measured from 1950 to 1999 for both Deer Island and Marsh Point, from 1993 to 1999 for Deer Island, and from 1986 to 1999 for Marsh Point to get both long- (1950 to 1999) and short-term (86 to 99 or 93 to 99) values. These values were then averaged to get a “corrected” average. The reason for doing this is so that localized geology and storm data are factored into the long term rates. For example, the 1950 shoreline may have been composed of different shoreline morphology than at present and would have evolved at different rates. While the 1950 shoreline has this type of problem, it also provides a long-term rate that is necessary to extrapolate into the future. In short, the averaged values are part long-term and part short-term estimates.

Results

Deer Island

Placement of the potential 26-acre marsh (Figure 1) is based on my understanding of the project and where I would tend to place the footprint. The seaward limit of the structure coincides with the 1850 shoreline, but this may not be the actual case. Given this assumption, the theoretical 2050 shoreline may pull away from the structure. In 50 years, it is reasonable to assume that much of the eastern point will be gone. This should be accounted for when planning hardened structures; however, the shoreline evolution will change with placement of marsh and structures themselves.

Marsh Point

The same size marsh as Deer Island was placed arbitrarily along this stretch of shoreline (Figure 2) and is located on the west end of the bulkheaded beach section. It too is constructed to correspond with the 1850 shoreline. The bulkheaded area was assumed to be stable (no further erosion). Like at Deer Island, the shoreline will probably pull away from the structure and should be accounted for on the ends. In the Marsh Point case, there could also be a change in the longshore drift process. Any structure placed on the shoreline will interrupt the east to west sand movement that is presently feeding the western spit. The theoretical shoreline does not consider the longshore drift changes; this added variable makes changes associated with the marsh and hardened structures more difficult to predict. Also, note the change in the shoreline location in Davis Bayou since 1850.

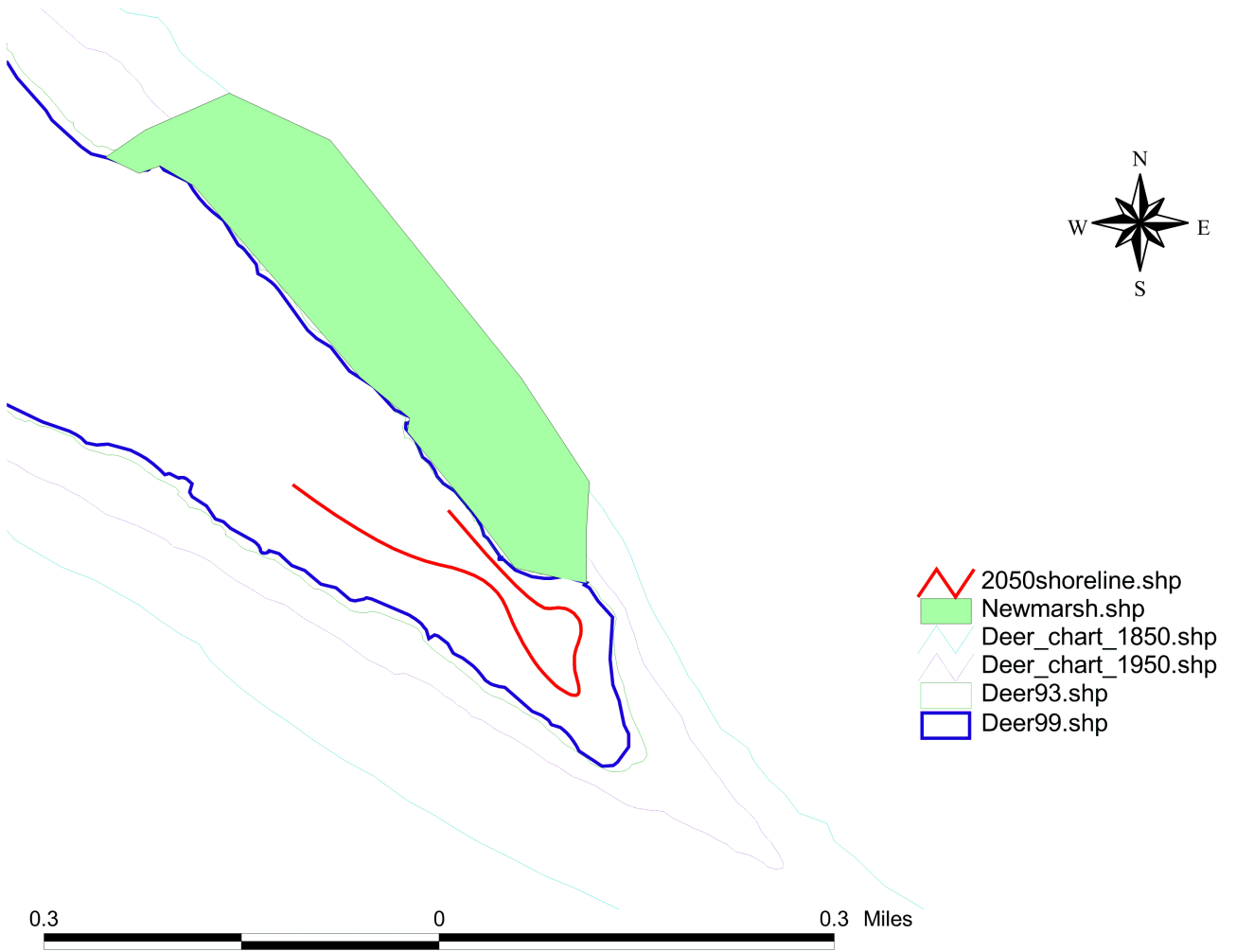


Figure 1. Deer Island with theoretical 2050 shoreline in red.

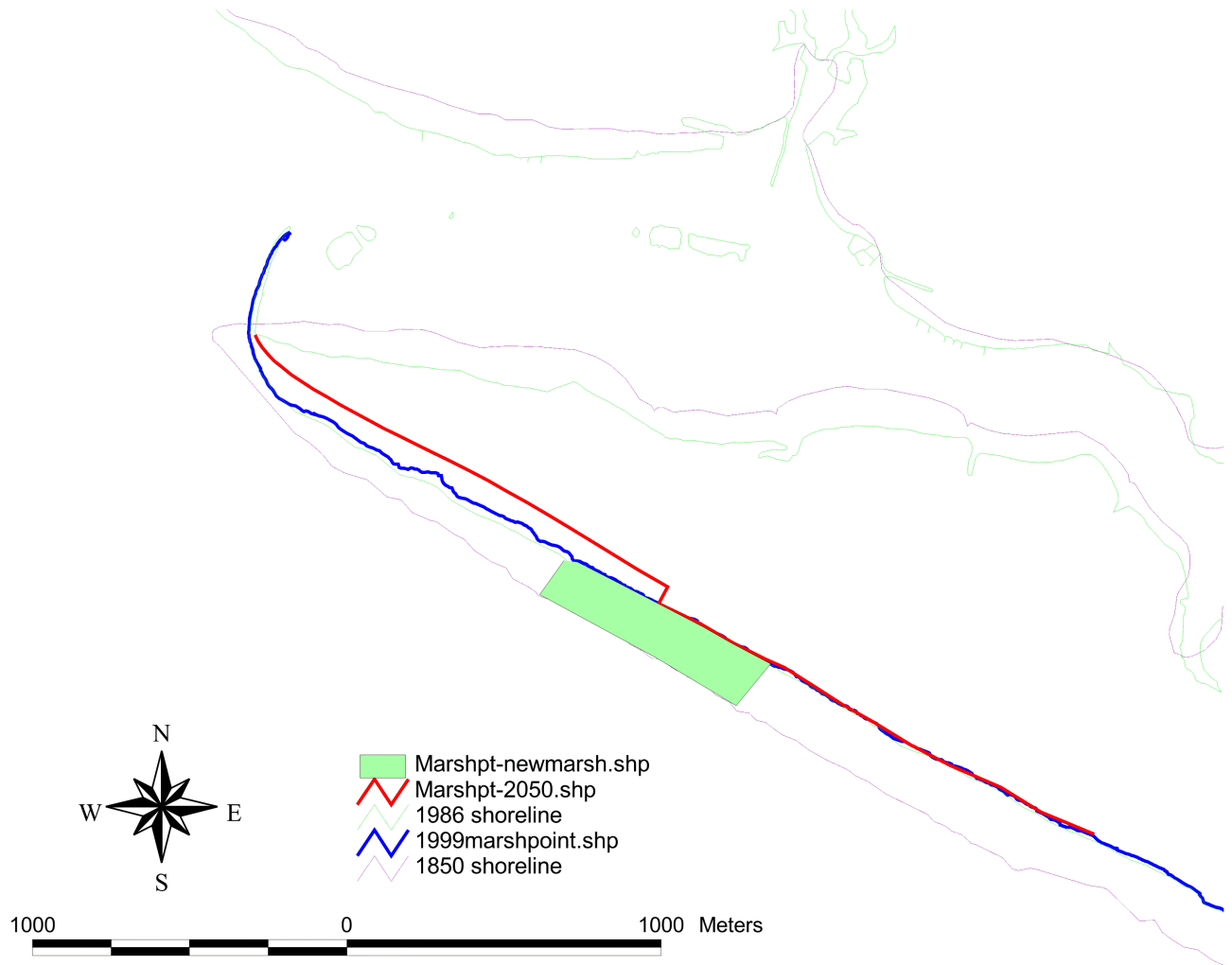


Figure 2. Marsh point with theoretical 2050 shoreline in red.