

Geologic Site of the Month
August, 2009

Dune Recovery at Ferry Beach, Saco: A Helping Hand



43° 27' 59.70" N, 70° 22' 54.48" W

Text by
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Introduction

The Maine Geological Survey has documented historic shoreline changes along the Saco shoreline using historical aerial photographs from the late 1970s through 2003 (Figure 1). Based on this data, the shoreline changes along the Saco Beaches reflect a general lack (and loss) of sand at the southern end of the beach, with a point where patterns of erosion turn to accretion (i.e., nodal point) occurring approximately 6,000 feet north of the jetty where the shoreline movement reflects a more stable to growing shoreline at the northern end of the beach.

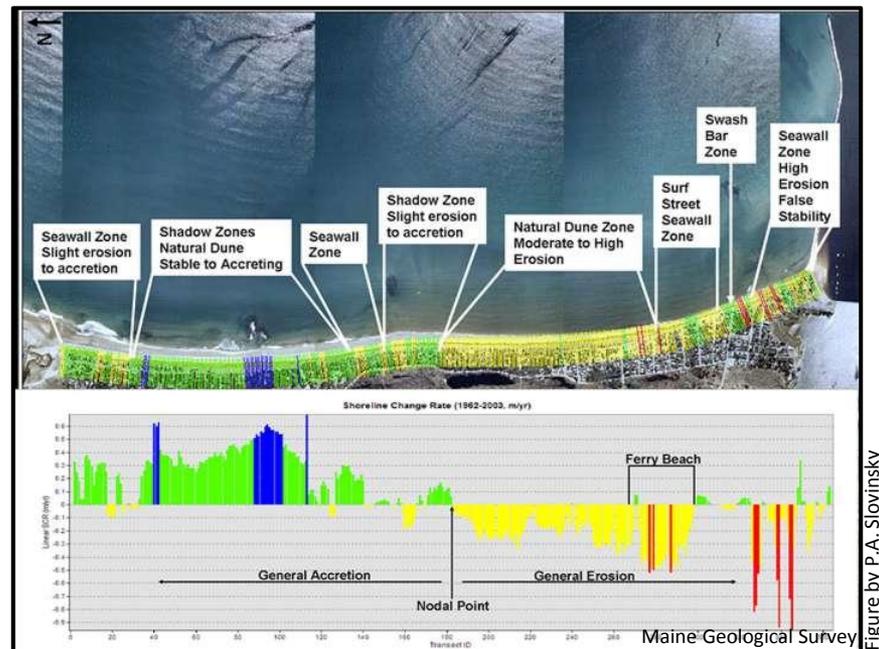


Figure by P.A. Slovinsky

Figure 1. Historic shoreline changes along Saco beaches. Note the nodal point where the pattern changes from erosion to accretion. Ferry Beach is located between transects 275-300.

Introduction and Background

Over the past few years, we have specifically been concerned about erosion of the natural dune system located just north of the northern end of the seawalls that front Surf Street in the vicinity of Ferry Beach (Figure 2). This area of Saco has seen continual damage to Surf Street, especially during winter months, and subsequent dune erosion. A large section of Surf Street was damaged in the Patriots' Day Storm of 2007, and several homes were destroyed.

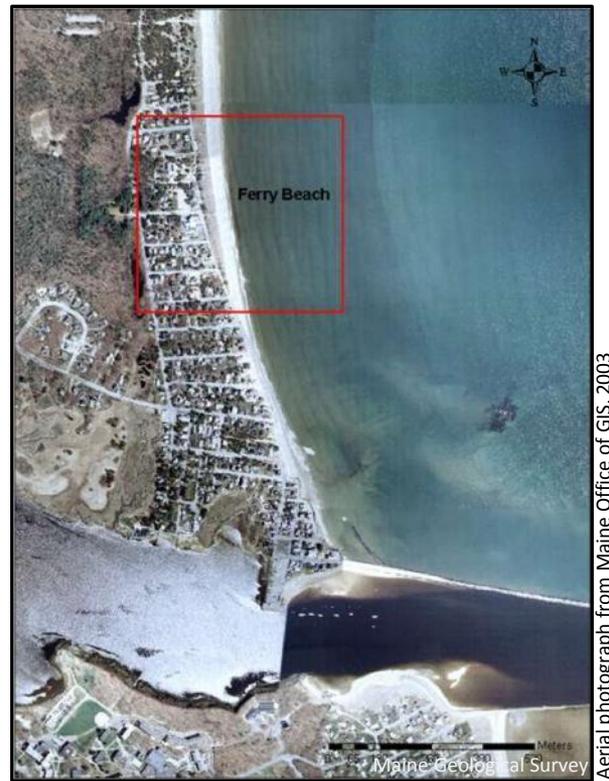


Figure 2. Location of Ferry Beach just north of the northern end of the seawalls that front Surf Street.



Introduction and Background

Since 2003, we have conducted GPS surveys of the natural shoreline within a portion of this area. From 2003-2008, the seaward edge of the natural dunes has retreated dramatically (Figure 3), between 1 and 2 m/yr of dune loss - which represents up to almost 40 feet of dune loss over the 5 year period!



Figure 3. Short-term shoreline change rate (SCR) calculated using GPS measurements of the seaward edge of dune vegetation along Ferry Beach from May of 2003 through July of 2008.

Coastal Resiliency and Dune Management

In response to the significant damage to Surf Street during the Patriots' Day Storm of 2007, the City of Saco received a permit to bury a ProTec Tube (sand-filled geotextile tube) in the sand within the existing footprint of Surf Street and reestablish dune grass along a portion of the beach in front of Surf Street to aid in protection of landward property during future storms.



Photo by P.A. Slovinsky

Figure 4. View south of geotube within Surf Street planted with dune grass.

Coastal Resiliency and Dune Management

Photographs taken in July, 2009 show how the tube has been successfully planted with dune grass (Figure 4 and Figure 5).



Figure 5. View north of geotube and dune grass plantings. The Ferry Beach Park Association's artificial dune construction begins at the tree and extends northwards (Figure 7).



Coastal Resiliency and Dune Management

As a condition of the issued permit, the geotube must be covered with sediment at all times; however, undermining of the tube remains a problem due to the combined effects of storm events and accelerated erosion at the northern end of the seawall (Figure 6).



Figure 6. Undermining of the geotube remains a problem due to the combined effects of storm events and increased ("end effect") erosion at the northern end of the seawall.

Coastal Resiliency and Dune Management

In addition, the Ferry Beach Park Association received a permit to enhance the existing contiguous dune north of the geotube project by constructing a secondary artificial dune ridge and planting it with native dune species (i.e., American beach grass) (Figure 7).



Figure 7. View north of secondary dune ridge constructed just north of the geotube project.

Coastal Resiliency and Dune Management

Largely as a result of these dune management practices, the seaward edge of the dune along Ferry Beach has extended seaward since the post-Patriots' Day Storm position in 2007 through July of 2009. MGS compared the position of the seaward edge of the dune in 2007, 2008, and 2009, and determined that the net shoreline movement was up to almost 5 meters (Figure 8 and Figure 9).



Figure 8. Net shoreline movement, in meters, for transects 1-35 (north to south) calculated from measurements of the edge of dune vegetation along Ferry Beach since the Patriots' Day Storm position in 2007 through July of 2009. See Figure 9 for a graph showing net shoreline movement at each transect.

Coastal Resiliency and Dune Management

North of these dune management projects, the shoreline has not extended seaward, but has remained in the same location with no further erosion. This data suggests a successful dune management strategy thus far. The artificially constructed dune north of the geotube has performed admirably, and represents a dramatic shift in the overall shoreline changes observed since 2003. We will be closely monitoring the fate of the dune over the coming winter months.

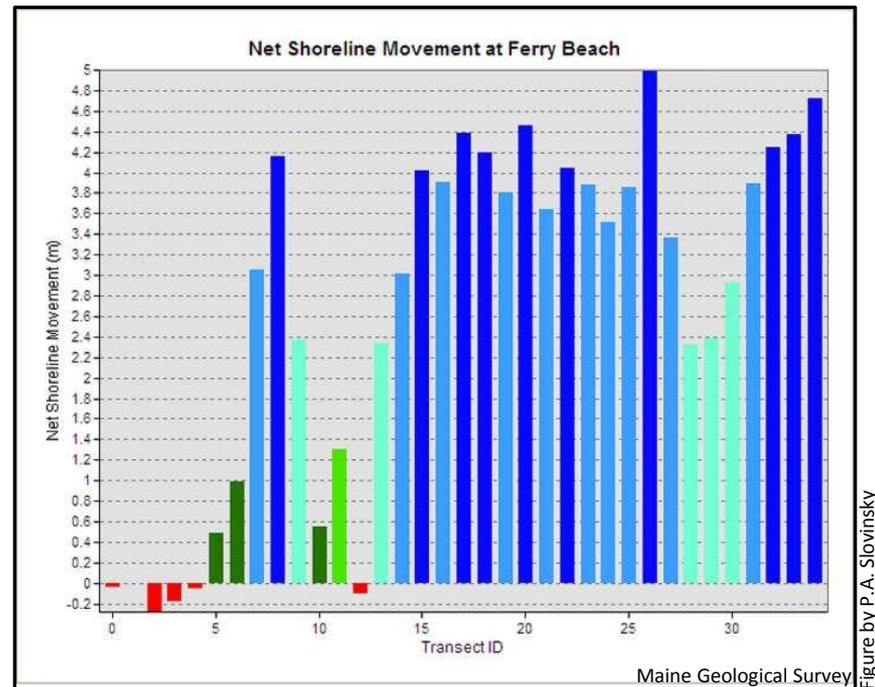


Figure by P. A. Slovinsky

Figure 9. Graph showing net shoreline movement (of edge of dune vegetation) at each transect shown in Figure 8 along Ferry Beach since the Patriots' Day Storm in 2007 through July of 2009. This positive trend reflects dune management - including restoration and plantings - by the Ferry Beach Park Association.



References and Additional Information

[Ferry Beach Park Association \(FBPA\) website](#)

[Building a Resilient Coast: Maine Confronts Climate Change](#) - DVD available on the [Maine Sea Grant](#) website

