



High Pines Dune Restoration

Project Overview

As landowners of Duxbury Beach, the Duxbury Beach Reservation, Inc. has implemented numerous restoration projects ranging from cobble berm creation to dune re-nourishment. This successful history has been reliant on undertaking projects both in response to storm impacts and proactively in vulnerable areas. High Pines, best known as the forested area midway down Duxbury Beach, is a critical geologic anchor point for the barrier beach. It connects the ribbons of sand to the north and south, forming a continuous barrier. The dunes on the Atlantic facing side of High Pines are experiencing ongoing erosion and must be actively maintained to ensure stability of this key anchor point. This work will strengthen the barrier beach and allow it to continue to protect the resources and communities behind it, particularly in the face of sea level rise and increased storm impacts.

Project Benefits

- **Maintain & Enhance** the High Pines anchor point by restoring the dune toe
- **Reinforce** the dune by planting beach grass and woody shrubs
- **Strengthen** the barrier beach by adding sand to the system
- **Shield** unique forested habitat for native wildlife and plants from flooding and storm impacts
- **Protect** the barrier beach in front of the High Pines salt marsh



The Duxbury Beach back road is sheltered behind High Pines—here we see the back road today and the path that was traveled a century and more ago.



Project Costs

Permitting and Construction Oversight	\$10,000
Finalize Survey and Plans	\$12,000
Equipment Mobilization & Demobilization	\$5,000
Sand Import	\$420,000*
Remove/Reset Fencing	\$8,400
Planting of Beach Grass and Shrubs	\$10,000
Estimated Total Project Cost	\$465,400

*(based on \$21.80 per ton delivered and installed)

Project Specs

- ⇒ 870 linear feet
- ⇒ Elevation 16.5ft NAVD88
- ⇒ >15,000 culms American Beach Grass
- ⇒ Exact sand volume to be determined through updated survey



Duxbury Beach has an extensive history. One hundred years ago the beach was purchased by a group of families to protect it from development. Four thousand years ago the barrier beach as we know it began to form. But to find the true beginning of Duxbury Beach we must look back 20,000 years.

This was the final stage of the last Ice Age, known as the Wisconsin glaciation. As the glacier retreated north it left behind the three headlands that anchor Duxbury Beach, including High Pines.

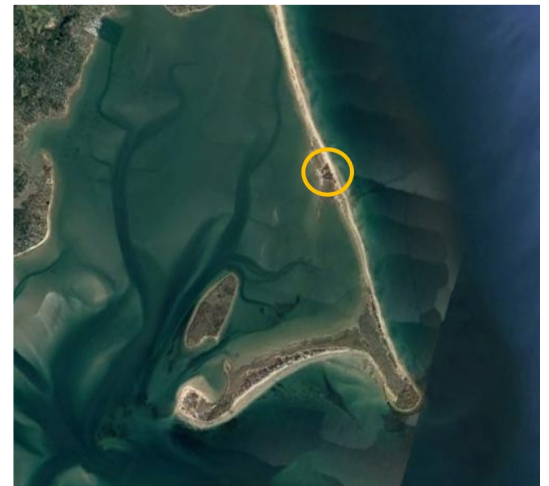
Today High Pines is covered in trees and wind-blown sand dunes. However, the underlying layers are glacial till deposited 20,000 years ago. About 4,000 years ago, large deposits of glacial sediment began moving landward and sand spits protruded from the three headlands, eventually joining to form Duxbury Beach.

The beach has continued to change and migrate landward, but High Pines remains an important anchor point for the barrier beach.

A Look Back

Restoration Steps

- 1) Survey the project area
- 2) Design dune to regulations and to increase coastal resilience
- 3) Permit construction through appropriate agencies
- 4) Import & Grade compatible material
- 5) Install sand fencing and permanent symbolic fencing
- 6) Plant beach grass and woody shrubs
- 7) Monitor changes to the dune, vegetation, and sediment color



Circled area indicates project location

Design Cross Section

In order to maintain and enhance the High Pines dunes, the Woods Hole Group, an environmental engineering firm, recommended placing sand on the east side of the dune. This will widen the dune and enable it to better withstand future erosion and storm impacts.

(Figure created by Woods Hole Group)

