



# Duxbury Beach Crossover 1 & 2 Dune Restoration

**Project Summary:** Duxbury Beach Reservation, Inc. has a long and successful history of maintaining Duxbury Beach, including extensive dune restoration. Working with the Woods Hole Group, the Reservation identified the area between the first and second crossovers of Duxbury Beach as very vulnerable due to its narrow width and the high wave energy. The living shoreline approach provides erosion control, buffers storm surge, and protects critical habitat for wildlife. The Reservation received a \$500,000 Coastal Resilience Grant through the MA Office of Coastal Zone Management to contribute to the \$1.4 million project. This project represents a portion of the resilience work needed and is a step towards implementing a larger-scale dune nourishment project that will provide longer term health and resilience to the beach. This work bolsters the ability of the beach to protect the communities behind it, particularly in the face of sea level rise and increased storm impacts.

## Project Basics

Location:

East and west sides of  
oceanside dune, including  
Crossovers 1 and 2

Start:

December 2018

Completion:

March 2019

Timing:

Weekdays, 7am-5pm  
(varied)



**Impacts & Updates:** The project required the cooperation of Marshfield, Duxbury and Plymouth residents as well as any visitors to Duxbury Beach and Gurnet and Saquish. It was vital that work crews were able to work quickly and efficiently as all construction needed to be completed by April 1st to ensure compliance with regulations protecting nesting shorebirds.

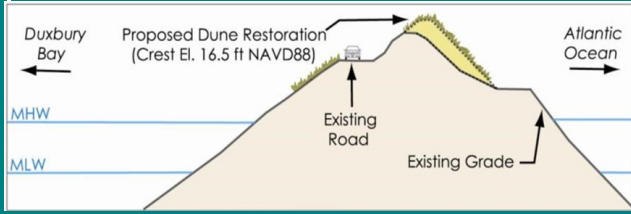
Duxbury Beach Reservation provided updates about the restrictions and restoration progress on social media, the Reservation website ([www.duxburybeach.com](http://www.duxburybeach.com)), and through bi-weekly emails for those signed up for the DBR email list. A pre-project public information reception was held in November 2018 to provide information and opportunity for questions. Associated information was made available at the Powder Point Guardhouse through a project handout.

Town officials were notified via phone and email prior to any work impacting access on the road or crossovers and received bi-weekly updates on the project progress. Weekly emails went out to MA Coastal Zone Management detailing project status and included monitoring reports from the Woods Hole Group who oversaw all aspects of construction.

## By the Numbers

- 76,633 tons of sand furnished and graded
- 3,500 feet of the dune was raised to 17ft and the top of the dune was built out to >45ft.
- 3,600 feet of sand fencing was replaced to protect the dune from foot and vehicle traffic and trap sand to help build the dune.
- 80,000 culms of American beach grass and 100 woody shrubs.
- 2 crossovers raised and realigned

# Why? Dune Restoration on Duxbury Beach



Proposed dune restoration shown in yellow

Impacts Expected from 50 Year Storm  
(solid line represents post-storm grade)



Erosion expected WITHOUT the proposed project.

- Dune is destroyed
- Beach is overwashed



Erosion expected WITH the proposed project.

- Dune provides increased protection
- Beach is not overwashed

## How We Got Here...

The restoration of the oceanside dune between the first and second crossovers is a product of extensive research and modeling work. The dune restoration represents the third step in the process of project conception, design, and implementation—created by Woods Hole Group and funded in part by CZM Coastal Resilience Grants.

2016 “Coastal Processes Study and Resiliency Recommendations for Duxbury Beach and Bay” report

2018 “Dune Restoration Final Design and Performance Modelling”

2019 “Duxbury Beach Dune Restoration Project”

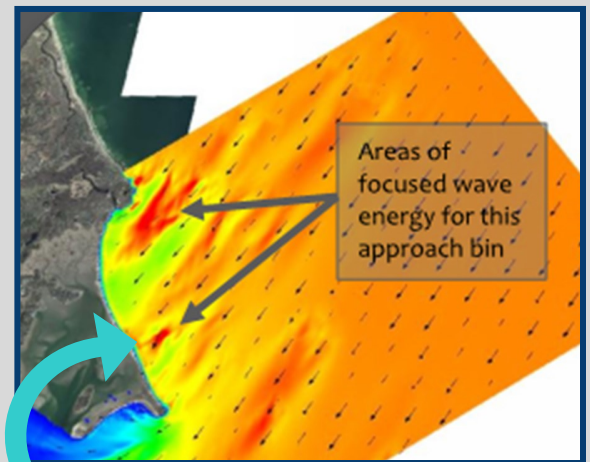
### Dune Restoration through Nourishment:

#### Benefits to the Barrier Beach

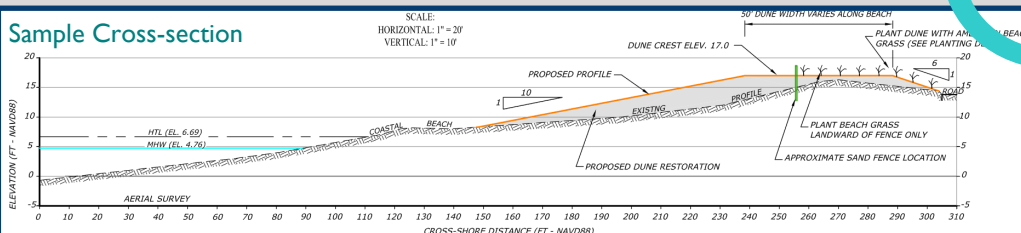
- ⇒ Beach nourishment does not stop erosion, but it does strengthen this sand-starved system by adding compatible material
- ⇒ Assist in strengthening the barrier beach structure
- ⇒ The damage to landward areas is postponed by extending the shoreline toward the ocean.
- ⇒ Nourished area will weather storms much better than non-restored sites. If some sand is eroded and moves it is doing its job!
- ⇒ Some sand will move to new parts of the beach. This adds critical protection to the overall system and builds the health of the barrier beach system!

## Additional Project Details

- Preparatory work: Graded back road, removed sand fence and permanent symbolic fence, removed RFID system wires at crossovers
- Furnished and graded sand: Raised dune to 17 ft, widen dune >45 ft, and create slopes appropriate for wildlife and coastal resilience
- Replaced sand fence and permanent symbolic fence to strengthen and protect the dune. Permanent fence will be erected during the fall 2019.
- Planted beach grass, woody shrubs to trap sand to hold the dune in place
- Site clean-up: Fixed post and cable along the road, grade the back road



## Sample Cross-section



Wave energy modeling by the Woods Hole Group shows that the area between First and Second Crossovers suffers higher wave energy than other areas of the beach.