

# Sand Dune Nourishment (Sand Fill/Placement)

## Overview

- Sand dunes provide protection from storm surge flooding during coastal storms.
- Storms, high tides, storm surge and high winds can cause erosion of sand dunes. Erosion is the gradual loss of sand on the sand dune. An eroded sand dune will be less effective in providing flood protection from storm surge during coastal storms for structures along the shoreline.
- In order to protect property from coastal flooding, nourish eroding sand dunes. Sand dune nourishment is the application of sand to the existing eroded dune.
- Sand dune nourishment fortifies the dune and helps protect any structures behind it from coastal flooding.
- A contractor and design engineer are highly recommended for nourishing a private dune.
- After nourishing the dune, plant native plants on the dune such as Cape American beach grass (*Ammophila breviligulata*) to re-vegetate the frontal and back dune zones. This will further fortify the dune, make the dune more aesthetically pleasing, and provide habitat for wildlife.
- It may be necessary to speak with neighbors about the project in order to maximize beneficial outcomes. For example, it may be more effective to nourish the entire dune in front of a row of homes rather than just nourishing the portion of the dune directly in front of your structure.
- Do not walk, drive, or store boats on the dune before or after nourishment as these actions will lead to more erosion.
- Check to see if the dune is in a rare, threatened, or endangered shorebird habitat before altering the dune in any way. Action may be limited in areas within a protected shorebird habitat.



Photo credit: DNREC

## Key Takeaways

During coastal storms, high-energy waves can destroy protective sand dunes by washing away the dune base. Additionally, the high-velocity winds of coastal storms can cause sand erosion. Dune erosion can lead to receding and the eventual loss of dunes.

If the dune is destroyed, it no longer offers flood protection for the structures behind it.

Nourishing sand dunes (sand fill/placement) makes dunes more likely to withstand flooding events and reduces costs associated with coastal storm damage.

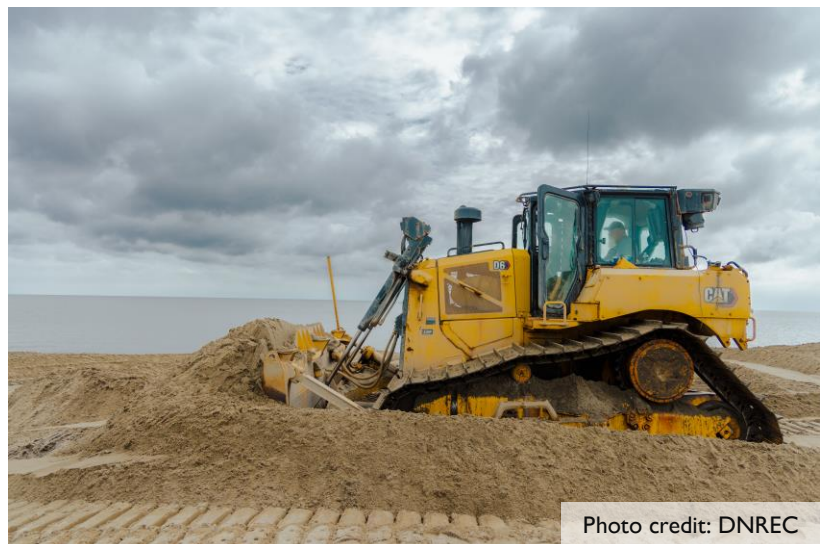
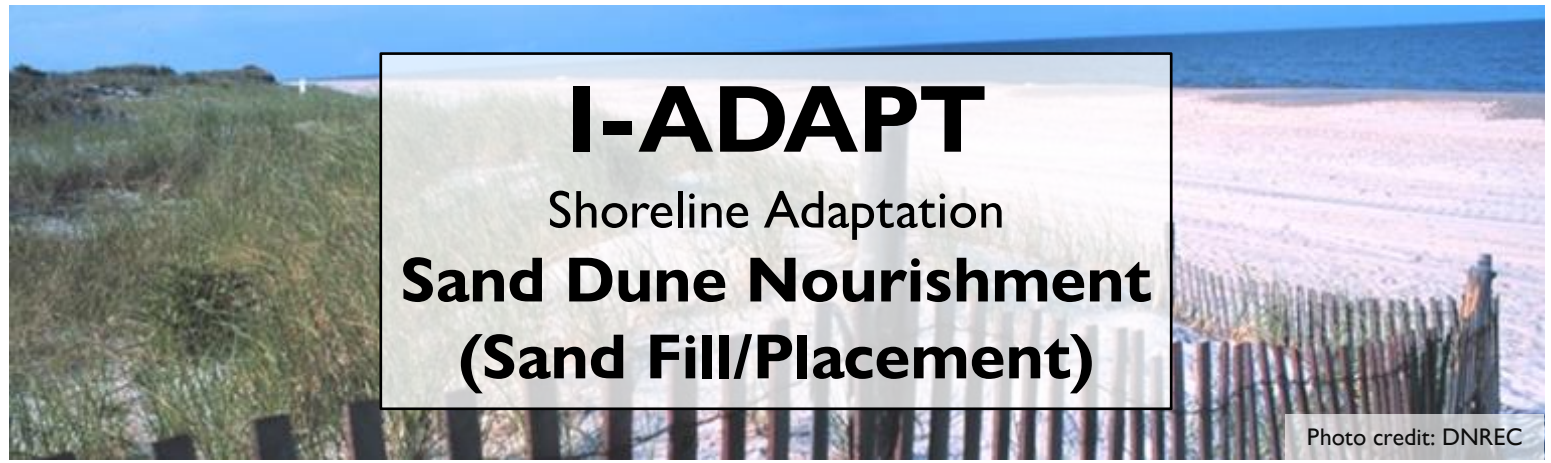


Photo credit: DNREC



# I-ADAPT

## Shoreline Adaptation

### Sand Dune Nourishment (Sand Fill/Placement)

Photo credit: DNREC

### Estimated Costs/Benefits

\*U.S. dollars (2022), estimates are subject to change

Potential Costs (100ft x 10ft x 3ft dune)		Potential Benefits (100ft x 10ft x 3ft dune and a 1,000 sq ft structure)		
Item	Estimate	Post-Flooding Recovery Action	Estimate	
Sand (75-90 tons)	\$20-\$21 per ton when purchased in mass quantities	Complete dune reconstruction due to flood erosion damage (about 210 tons)	\$20-\$21 per ton	
		Labor for sand dune reconstruction	\$1,000-\$1,500	
Labor	\$750-\$1,200	Flood damaged structure recovery (professional clean-up, mold removal, replacement/repair of flood damaged items)	1 inch water ↓ 4 feet water	\$10,800-\$53,500+
			\$203,300+	
<b>ESTIMATED TOTAL COST</b> (add 1ft to dune)	<b>\$2,250-\$3,100</b>	<b>ESTIMATED TOTAL SAVINGS</b>	<b>\$16,000-\$209,200+</b>	

### Expected Maintenance

- Depending on the location of the sand dune and the structure, the sand dune may need to be re-nourished every few years.

### Additional Actions

- Encourage your neighbors and community members to nourish their dunes as well.
- Plant native plants after nourishment.

### Permitting Agencies

Contacts for permitting requirements include but are not limited to the following:

- Your city and/or county government for local flood ordinances or regulations
- Your city and/or county government for building permits
- [DNREC Coastal Construction Permit](#)
- [DNREC Wetlands and Subaqueous Lands Permit](#)

### Who to Contact

- Marine contractor and design professional
- [DNREC's Shoreline and Waterway Management Section](#)
- [811 Call Before You Dig](#)
- Native plant nursery

### Potential Funding Sources

- [Building Resilient Infrastructure and Communities Grant](#)

### Additional Resources

- [DNREC Beaches and Shorelines](#)
- [DNREC Coastal Construction](#)
- [Sea Grant Building and Planting Coastal Sand Dunes](#)
- [Sea Grant Coastal Dune Protection & Restoration](#)

Resources can also be found at <https://de.gov/iadapt>

Technical definitions and more information are located on the I-ADAPT website: <https://de.gov/iadapt>.



This information is intended to be used for planning purposes. It is not intended to substitute or take precedence over the guidance of design engineers, contractors, utility companies or regulatory agencies.

For more information, contact DNREC's Division of Climate, Coastal and Energy at [DNREC\\_IADAPT@Delaware.gov](mailto:DNREC_IADAPT@Delaware.gov)

