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Research Projects
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Facilitating Natural Dune Building R/6410-0013

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Bulldozed dune at Brick Township following Hurricane Sandy 2013

Assessments of damage along the New Jersey shore after Tropical Storm Sandy indicate that the condition of the dunes had a pronounced effect on susceptibility to flood and wave damage. Not all dunes were alike; some dunes evolved by natural processes; some were created by direct deposit of fill; some were created using sand-trapping fences; some were bulldozed using local beach sand or storm-wave deposits. Some dunes had surfaces stabilized by planted vegetation; some had vegetation growing throughout; and some were unvegetated. The size, shape, and resistance to erosion of dunes are related to the method of construction, but when and how the different methods can be optimized to provide a better protective dune is poorly understood.

Naturally evolving dune at Avalon 2009

This project focuses on the quantification of the resistance of different dune types to wave erosion and of sand supplied to the dune by winds, accounting for the constraints to wind-blown sand transport across narrow beaches of developed shorelines. Field investigations will provide data on the ability of human-modified dunes to withstand wave impact, the rates of delivery of sediment to dunes from nourished and unnourished beaches, and the ability of dunes to resist erosion and maintain their effectiveness as a barrier against flooding, especially during the critical period when they are rebuilding after storms. Maintaining healthy dunes on developed coasts like New Jersey is challenging because dunes require space to accommodate growth and time to evolve, which are frequently unavailable.

The results of this project will provide better criteria for creating protective dunes where human development has introduced spatial and temporal constraints. Local managers can use results of this project to design management activities that enhance dune resilience based on site-specific constraints.