



Dune Die-Off



In New England, **beachgrass** (*Ammophila breviligulata*) is the most common plant found in sand dunes. Beachgrass and other native plant species play important roles in providing habitat, trapping sand to build dunes and nourish beaches, and stabilizing dunes to provide storm protection.

A phenomenon known as **die-off** can occur where large areas of vegetation loss are observed that do not appear to have other causes. Die-off largely affects beachgrass, but can affect other dune species too. Given the critical role these plants play in sustaining dune systems, researchers have been exploring the causes of die-off and solutions for mitigating it.

Suspected Causes of Die-Off

Research in the 1990s out of Delaware indicated that parasitic nematodes were the likely cause of beachgrass die-off.¹ Nematodes are unsegmented worms, most of which are microscopic, that are an important part of soil food webs. Nematodes generally play beneficial roles, such as in nutrient cycling, although some of them are harmful. In Delaware die-off areas, researchers found high densities of nematodes that were known to cause root damage and limit growth in other grassland habitats. They concluded that parasitic nematodes were the likely cause of dune vegetation die-off. Recent research out of the University of New Hampshire used genetic tools to examine die-off in New England dunes.² Results suggested that die-off is due to a combination of infections by both **nematodes and fungi**.

How to Spot Die-Off

The aboveground growth of beachgrass and other dune species dies each year and this is a typical and expected process. Die-off events can often be distinguished by **rapid vegetation loss** without any other obvious cause. The vegetation loss tends to spread out in a circular pattern and it is typically, although not exclusively, found on the dune crest or back side of the seaward dune. A quick test is to tug the plants and if they come out of the ground very easily because they have no root system, it may be a clue of die-off.

Replanting Die-Off Areas

Recent research out of the **University of New Hampshire** suggests that applying lime and slow-release fertilizer when planting may help restore die-off areas.³ Soil in die-off areas can be acidic, so the addition of lime can raise the pH of the soil, resulting in more favorable growing conditions. The addition of fertilizer can increase the productivity and vigor of plants, stimulate growth, and make them more resistant to infection. UNH researchers found that the addition of pulverized dolomitic limestone (21.6% Calcium and 10% Magnesium) at a rate of 2.35 pounds per 100 square feet and slow release fertilizer (N14:P14:K14) at a rate of 1 pound per 100 square feet replanted in die-off areas resulted in more live plants, greater relative abundance of beachgrass, and higher plant cover than areas that did not receive the combined **lime-fertilizer treatment**. The combination of lime and fertilizer treatment when planting dune vegetation may help in the restoration of dune die-off areas. If you are considering using this approach, please consult state and municipal wetlands rules to determine if these amendments are allowed prior to implementation.



For questions about dune die-off, contact:

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References

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3. Moore, G.E., Burdick, D.M., and A.R. Payne. 2020. Determining how soil amendments enhance the recovery of *Ammophila breviligulata* following dune die-off events in coastal New England. *Journal of Coastal Research* 36(1):88-93.

