

Science for Environment Policy

Vegetation of coast dunes not changing due to climate change

Scientists did not observe changes in plant communities in the coastal dunes of Scotland due to climate change in the past several decades. The region's proximity to the ocean and its patchy make-up may prevent it from experiencing rapid changes in species distribution.

As [global temperatures rise](#), many ecosystems across the globe are affected. The usual trend is for species to begin to migrate farther toward the poles because of changes in temperatures. A majority of the studies on dune habitats and climate change have dealt with erosion or storm patterns, but rarely with plant species. A key method for studying the impact of climate change upon [vegetation](#) is a revisitation survey, where a study area is assessed again years or even decades later.

To look at the impact of climate change on the sand dune habitats of Scotland, scientists carried out a revisitation survey in (mainly) 2010, following an initial survey in (mainly) 1976 by other researchers. The study used similar methods from the 1976 survey to compare a total of 89 coastal sites in Scotland. During that 34-year period, the area experienced an increase in annual rainfall from 1059.8 millimetres to 1109.9 millimetres. It also saw an increase in the average summer temperature from 12.60 °C to 13.39 °C and an average winter temperature change from 4.48 °C to 5.06 °C. Both surveys documented what species were present in the areas. The revisitation survey also utilised one general dataset of climate data and another dataset of climate data for individual plant species, in order to identify the climatic requirements of the individual species.

If climate change had an effect on this ecosystem, the species would have moved farther north and the plant communities would more closely reflect those associated with warmer climates. However, the overall findings supported neither of these hypotheses and even showed some species had moved slightly farther south. Any small changes observed were not substantial enough to be solely the result of climate change, and were likely caused by other processes that occur in these coastal habitats, such as land management or succession — the process where vegetation is evolving towards taller species — in this case trees and shrubs.

Because the ocean warms more slowly than the land, these habitats may not be experiencing the rapid temperature changes other systems, such as alpine regions, are. The scattered distributions of these smaller areas inside this larger system may also make them more static, as their distribution impedes seed dispersal by wind, birds, or other animals.

Overall, these coastal systems appear to be affected differently by climate change when compared to other areas, such as alpine regions, which can facilitate much quicker species movement. The unique properties of coastal dune vegetation — such as the patchy distribution and long life history of the plants — have allowed them to show resistance to climate change for over a third of a century. The question however is whether this resistance is rather an incapability to adapt to climate change, which could be detrimental in the longer term.



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