GCSE Lesson 3

Coastal management: sand dune regeneration

Sand dune regeneration is a coastal management strategy that rebuilds and stabilises sand dunes.

1. Look at the photo below. It shows volunteers involved in sand dune regeneration at Mawgan Porth.

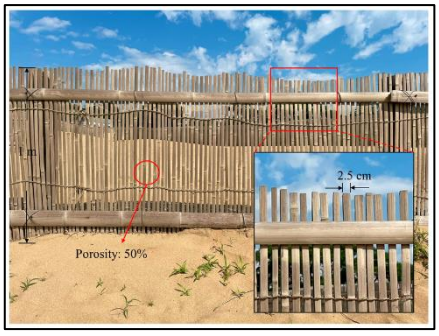


https://www.cornwallwildlifetrust.org.uk/what-we-do/our-conservation-work/on-land/making-space-sand

   (a) What is the evidence that these sand dunes are older, fixed sand dunes no longer actively being formed? There is little bare sand; the dunes are almost completely vegetated with grasses and shrubs.
   (b) Suggest what the volunteers might be doing to help regenerate the sand dunes. The volunteers might be removing invasive non-native species, or they might be planting native species. [Unlikely to be marram grass as there is none shown in the photo and marram grass is usually planted on new sand dunes.]
2. Marram grass is described as a sand dune miracle grass because it can stabilise sand dunes in hostile environmental conditions. On the photo below, use annotated labels to describe some of the main characteristics of marram grass. Labels should refer to the spiky, tall grass and to its tolerance of high winds, salt, and drought. Its ability to stabilise sand with its roots and how burial stimulates growth.



3. Once planted, marram grass needs to be protected to prevent being trampled by people.



(a) Look at the photo. Describe the fencing being used to protect the sand dunes. Fencing is made of natural materials, mostly wood and possibly bamboo (vertical posts). It has gaps between the vertical posts.

(b) Suggest why the fencing has gaps between the vertical stakes. The gaps allow for the transfer of sand to help further develop the sand dunes. Also allow migration of plant seeds, insects and small animals.

(c) Why is it important to install information boards to inform the public about sand dune regeneration. Information boards help to keep the public engaged and 'on side' with developments. Most people are interested in conservation and if they know why, for example, there are fences, they are more likely to behave appropriately.

4. The photos below show the creation of sand dune notches.





(a) On the left-hand photo, use a label to locate the sand dune notch.

(b) Using evidence from the photos, describe how sand dune notches are created. Diggers cut through the foredunes (front dunes) to connect the active beach (source of sand) with the older dunes behind. The diggers create a V-shaped notch in the foredunes.

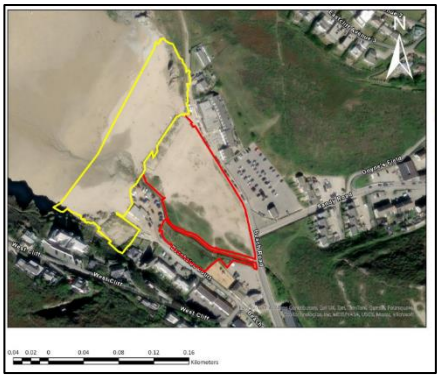
(c) Explain how sand dune notches support sand dune regeneration. Fresh sand, blown from the beach, can be blown further inland to help promote the development of the sand dune system. Not only does the sand build up the dunes but it creates and maintains important sandy habitats for wildlife.

5. Using the map, describe the location of Porthtowan. Porthtowan is located on the north coast of Cornwall to the NW of Redruth. [Students can refer to distances]



6. The photos below show the beach at Porthtowan.





Mobile dunes shown yellow. Fixed dunes shown red

(a) Were the photos taken at high tide or low tide? Low tide

Look at the photo on the left-hand side.

(b) In what direction is the photo looking? South
(c) Using located labels, identify the mobile dunes and the fixed dunes. Use the photo on the right-hand side to help you. [Student activity, could be a point or area]
(d) Apart from the sand dunes, are there any other coastal defences at Porthtowan? No
(e) The management approach at Porthtowan is 'managed retreat'. Explain how this approach will enable the sand dunes to develop naturally to provide protection from climate change and sea level rise. Managed retreat enables the sand dunes to be managed to evolve naturally without the interference of artificial structures, such as sea walls or groynes. Dune regeneration assists in helping to create a broad and stable buffer to the sea, protecting the community from the impacts of climate change and sea level rise.

7. The Porthtowan Dunes Community Group is a community-led project focusing on managing coastal change. The project aims to make the dunes more resilient to erosion and sea-level rise, and to improve the natural habitat for wildlife. The poster below has been used to advertise for volunteers.

(a) What activity is being advertised by the poster? Planting marram grass.
(b) Describe how the rope fencing is being used to protect the dunes. The rope fences are used to create a clear access path through the dunes, protecting the dunes either side.
(c) Suggest two advantages of using volunteers in projects such as this. Promotes community cohesion; awareness of issues; cheap (free labour); likely to be completed effectively by community stakeholders.



8. Describe how planting Christmas trees has been used to promote sand dune regeneration at Widemouth Bay. Following Christmas 2023, Christmas trees were planted in the sand dunes at Widemouth Bay to form a windbreak to trap sand blowing across the beach. They help to stabilise the sand and encourage the growth of plants such as marram grass.

