

Conservation of coastal dunes is threatened by poorly designed infrastructure

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Conservation of coastal dunes is threatened by poorly designed infrastructure.
Credit: Sara Muñoz Vallés et al.

Although the dune ecosystem is unusual, fragile and is protected by the "habitats" directive of the network Natura 2000, its conservation is very vulnerable to the proliferation of car parks, nearby buildings and inadequate boardwalks installed for protection or beach access.

Researchers at the University of Seville (UoS) have published a study in the *Journal of Coastal Research* of [human impact](#) on the natural dunes at two sites in the Gulf of Cádiz, specifically in the protected areas of La Flecha Litoral in El Rompido and Enebrales in Punta Umbria, both in Huelva province. The experts show that both dune systems are exposed to human pressure.

"This work tried to identify which factors influence the vulnerability of the dunes. On the one hand, these ecosystems are exposed to natural perturbations like storms, but also, we observe that human impact may have negative consequences even in zones which are difficult to access", explains Sara Muñoz Vallés, lead author of the study and researcher at the UoS, speaking to SINC.

The scientists studied two dune systems, one at La Flecha Litoral in El Rompido, a "tongue of sand" almost entirely separated from the mainland, and which has very few tourists (only two kilometres can be accessed directly, the remaining ten kilometres can only be reached by boat), and at Enebrales in Punta Umbria, all of which can be accessed directly and which supports a considerable number of tourists.

"We assessed the weakness of the dune system and we divided it into three zones. The first of these (mostly in the isolated part of La Flecha) showed a low vulnerability. However, the level of the other two zones was intermediate, a relatively high score considering that these are natural dunes", adds Muñoz Vallés.

According to their assessment, some of the most affected areas, both in La Flecha and in Enebrales, owe this instability to human impact.

"Specifically, car parks constructed within the dune area, poorly designed accesses and the laxity of control of tourists, as well as boardwalks installed at ground level which permit access to the beach over the first (seaward) line of dunes, but which interfere with their natural dynamics, have contributed to this vulnerability", indicates the researcher.

This fact explains that zones of La Flecha where there are no boardwalks and tourists have free access to the dune system show the same degree of fragility and of poor conservation as zones in Enebrales, where there are six boardwalks intended to protect the dunes from trampling.

"Based on these results, a programme of dune regeneration in the most affected zones has been put in place, some improvements have been made to the existing boardwalks, and better-designed accesses have also been built. But there is still a lot to do", the scientist points out.

For Muñoz Vallés, certain characteristics of the dune system, such as the lie of the coast or the incidence of the sea, "cannot be modified with soft management techniques". Nevertheless, human impact can be avoided by giving better information to tourists and appropriate infrastructure.

Dunes and natural disasters

The vegetation of dunes is adapted to harsh conditions and has a high degree of unusual species. In the case of these dunes in the Gulf of Cádiz, in some 600 hectares there are 25 endemic species and 16 threatened ones. For this reason, the flora is protected just as the fauna is.

"Aside from their beauty and biodiversity, the dynamics of dune formation are unusual and highly plastic, and they play a very important role in the protection of the interior. Studies of the passage of Hurricane Katrina have explained how well-conserved mangrove swamps mitigated the destruction and erosion caused by Katrina, while those in a poor state of conservation did not have that capacity. The case of [dunes](#) is similar as far as pounding by the sea is concerned", concludes the expert.

More information: Sara Muñoz Vallés, Juan B Gallego Fernandez, Claudia M. Dellafiore, 'Dune Vulnerability in Relation to Tourism Pressure in Central Gulf of Cádiz (SW Spain), a Case study', JOURNAL OF COASTAL RESEARCH 27 (2): 243-251, March 2011.

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