



PROVIDUNE Project

Preservation and recovery of coastal dune habitats in the sites of the Cagliari, Matera and Caserta provinces



forests

Habitat Directive

eradication of invasive
alien species

water habitats

improving biodiversity

management tools

PROJECT DESCRIPTION

Recovery and rehabilitation of degraded coastal dune habitats. These are the goals of the **PROVIDUNE** project which aimed, in particular, at safeguarding the priority habitat 2250* "Coastal dunes with Junipers and other coastal dune habitats connected to it", among the most threatened of the EU and present in Italy, Portugal, Spain, Denmark, France and Greece. Coastal areas are strategically important for the European Union (**Recommendation 2002/413/EC** on the Integrated Coastal Zone Management in Europe), because they are particularly exposed to several risks, which are likely to increase as a result of climate change: the rising sea levels in the Mediterranean areas increase the risk of coastal erosion and flood, and the likely intrusion of brackish waters inland. However, the major threats related to coastal erosions are still those deriving from not respectful human actions.



OBJECTIVES

The general objective set by the project was to enhance knowledge about the conservation status of the habitats in the project sites, and to put in place a number of urgent protection measures for the 2250* habitat (Coastal dunes with *Juniperus* spp) in five Natura 2000 sites located in the provinces of **Cagliari** (SCI ITB042230 Porto Campana, SCI ITB042218 Stagno di Piscinni, and SCI TB040020 Isola dei Cavoli Serpentara - Punta Molentis - Campulongu) **Matera** (SCI IT8010019 Pineta della Foce del Garigliano) and **Caserta** (SCI IT92220055 Bosco Pantano di Policoro - Costa Ionica Foce Sinni), which were subject to serious damages, mainly of anthropic origin, related to:

- **uncontrolled access** of vehicles and pedestrians walking on the dunes, and the very negative seasonal practice of beach cleaning with mechanical devices;
- **incorrect perception** of the dune as an element only linked to the land, whereas its physiology is directly connected to the active morphosedimentary processes of the entire beach system, especially to those generated underwater within 10 meters of depth;
- **improper beach management**, including the stable physical human occupation of vulnerable, dynamic spaces;
- **low awareness**, among the beachgoers, of the importance of the dune habitat for the conservation of the whole beach area;
- presence and propagation of **alien plant species**.

PROVIDUNE was aimed to develop and implement a common approach among the provinces (Cagliari, Matera and Caserta) with the same habitats and characterized by similar problems, as well as to increase the level of awareness of local populations and tourists both on the objectives of the project and the importance of these habitats.



PROJECT PHASES

The project included a range of diverse actions, such as preparation, practical conservation actions, awareness raising and monitoring. In the preparatory phase a **multidisciplinary study** was carried out on the interested sites aimed at acquiring botanical and sedimentological data concerning the coastal erosion and dune processes that provided the basis for the implementation of habitat recovery and conservation actions, as well as to identify reliable indicators on the basis of which to verify the effectiveness of the undertaken actions. The remote control system enabled a detailed analysis of the ordinary marine weather events and the impact of the extreme ones.

Geobotanical studies have allowed to learn about the biotic characteristics (flora and vegetation) and conservation status. The preliminary studies were instrumental for designing the preparatory and executive actions to mitigate risks, regenerate and safeguard the habitats. Conservation actions consisted in the following series of interventions:

- **Recovery and rehabilitation of the degraded coastal dune habitats** with naturalistic engineering techniques and by planting indigenous psammophilous species fostering the restoration of the geomorphological-vegetational balance of the areas of intervention. The interventions consisted of:
 - *collection of germplasm* (seeds and fruits) of more than 50 taxa originating from the SCIs and their conservation at the Germplasm Bank of Sardinia;
 - *realization of sand capture and trapping systems* by the installation of "grafting units" and "windbreak barriers with chessboard screens" with the aim of favoring the formation and consolidation of the embryo dunes;
 - *realization of a protection system for the stabilized dunes* by covering them with mats in coconut fiber;
 - *renaturation of the degraded coastal dune sectors* by planting psammophilous species;
 - *eradication of invasive alien species and renaturation* through the removal of invasive species such as the *Carpobrotus* spp. and subsequent planting of native species.
- **Reduction of human impact** through the creation of pedestrian pathways, light delimitations to contain the degradation effects caused by pedestrian traffic, and sanitary services to prevent habitat degradation caused by use in general;
- **Creation of a floristic-vegetational and biotic database** for the long-term management of the dune complex.

As regards communication, special attention was paid to tourists who were involved in awareness raising actions during the summer season directly on the beaches and areas of congregation, as well as to schools for whom educational modules, workshops and field trips have been activated.

PROJECT RESULTS

All the habitats included in the project area, of great environmental value and importance for the landscape, have made **evident improvements** thanks to the drastic reduction of pedestrian traffic, to the eradication of invasive alien species and to naturalistic engineering works aimed at dunes recovery. The experimented planting interventions have instead contributed to the **renaturation** as well as **mitigation** of the impacts determined by the infrastructures. The **Post LIFE conservation plan** (2015-2019) of the PROVIDUNE project represents the commitment of the project partners to continue the protection activities of the 2250* habitat and of all the closely linked habitats. Moreover, in the frame of the project, **Management Plans** have been elaborated **for the two Natura 2000 sites in the Provinces of Matera and Caserta**. Among the results achieved following the environmental recovery measures, it is necessary to highlight the following:

- realization of about **1 km of removable and hanging walkways** to guide the flow of tourists;
- positioning of about **10 km of barriers** to discourage access to the dunes;
- *ex situ* collection and conservation of the **taxonomic units** present in the area through the development of germination protocols useful for the reproduction in nurseries of the structural species of the dune habitats. A total of **139 accessions** were collected corresponding to 52 taxa sent then for storage to the **Germplasm Bank** of Sardinia; on 12 taxa experimental germination tests were carried out;
- a **pilot project for the reintroduction of the structural species of the priority habitat 2250*** (*Pancratium maritimum*, *Pistacia lentiscus*, *Juniperus macrocarpa*) was carried out in all the intervention areas to contribute to the reinforcement of the structural species' populations, to contain the fragmentation of the habitats and to ensure its ecological functionality;
- **renaturation** of degraded coastal dune habitats by planting a total of 59 thousand seeds, composed of *Juniperus macrocarpa* (6 thousands), *Pistacia lentiscus* (6 thousands) and *Pancratium maritimum* (47 thousands);
- creation of a **database for the management of information and data of both floristic-vegetational** (autoecology and synecology of the concerned species) **and of abiotic type** (geomorphology of beaches, currents, winds and climate data) for an adequate long-term management of the dune complex;



- **development** of an educational module on the sustainable use of beaches, customized version for the sites of the Province of Caserta of the **Teachers' book "Providune School"** and an **educational project, "Providune School" for Cagliari**, for the approximately **3 thousand pupils**, from kindergartens to superiors, involved in the project;
- **production** of the brochure **"Dune, a treasure in the light of the sun"** to raise awareness of the approximate yearly average of **30 thousand tourists** coming during the summer season.

The project led to greater knowledge of the mechanisms through which beach systems function, with particular reference to the sedimentary exchange processes between the dunes and the submerged beach. The practical conservation actions of the **PROVIDUNE** project were carried out in the final phase of the project, and therefore their results will be evaluated over the next few years. However, it can already be said that the implemented measures acted like a brake on the threatening factors, and in particular on the impact of human presence in the summer months, moreover the efficiency of the grafting units and of the biomats laid down on the dunes are directly observable.



Acronym
PROVIDUNE

Number of reference
LIFE07 NAT/IT/000519

Reference Programme
[LIFE](#)

Beneficiary Coordinator
Provincia di Cagliari (ora Città
Metropolitana di Cagliari)

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EU contribution
2.396.010,00

Call Year
2007

Start Year
2009

End Year
2014

Beneficiary headquarters

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Region
Sardegna

Description

Province of Cagliari (now Città
Metropolitana di Cagliari), (SIC
ITBO42230, SIC ITB042218, SIC
ITBO40020), Provincia of Caserta, (SIC
IT8010019), Provincia of Matera, (SIC
IT92220055), habitat 2250, 2270, 2230,
2240, 2110, 2120, 2210



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