

SAND DUNE RESTORATION ON A LOGGERHEAD NESTING BEACH IN GREECE

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INTRODUCTION

The coastline of the Evrotas Delta and the nearby beaches comprise a significant nesting rookery in Greece for the Loggerhead sea turtle (*Caretta caretta*), hosting an average of 200 nests annually. The area of the Evrotas Delta is also an important stopover site for thousands of migrating birds having flown over the Sahara desert and the Mediterranean without resting or feeding. The sand dune system that once extended between the beach and the low-lying wetlands are now greatly reduced in area due to agricultural conversion, and degraded by numerous damaging activities. Main problems are sand extraction, vehicle use on the dunes and illegal use of public land.

THE STUDY SITE

Lakonikos Bay is located in the southern part of the Peloponnese, Greece. The nesting beaches in the area have been monitored by ARCHELON since 1985. Sand dunes exist behind most of the 15 km of the Evrotas nesting beach. In 1996 a road was constructed by the local forestry department along the nesting beach, effectively cutting the sand dune system in half and introducing foreign plant species brought with the road material. The construction of the road made it possible for the same department to plant a number of thousands of non-naturally occurring plants in the sand dune area. Furthermore vehicular access through the sand dune system let visitors access the beach at any point creating considerable erosion of the sand dunes. The River of Evrotas reaches the sea in the middle of the beach and the whole Evrotas Delta has been proposed for the NATURA 2000 network, which is a network within the European Union of sites containing priority habitats and species. The actions presented take place on three different locations along the Evrotas nesting beach.

THE PROJECT

After an experimental period, the action was developed according to a Management Plan for the area prepared by ARCHELON under the LIFE-Nature project with the title «Implementation of Management Plans for Pylos Lagoon and Evrotas Delta» which was produced in collaboration with the Hellenic Ornithological Society. LIFE-Nature is a financial instrument for actions aiming at the conservation of natural habitats and of wild fauna and flora of EU interest.

Three locations, one blowout and two wash-overs, were selected for sand dune restoration. Sand trapping fences were constructed from wooden poles and a double layer of degradable plastic netting (Table 1). The first location, Kiani Akti, was monitored from February 1999. The other two locations, Pougka 1 and Pougka 2,

were monitored, respectively, from September 1999 and March 2000. Monitoring lasted until the end of September 2000. Measurements took place approximately every 2-3 weeks at all the 30 fences (Table 1). All measurements were taken in the same day. The measurements were taken from a centimeter scale written on the wooden poles of the fence. Experimental planting of marram grass was effected on certain sites. Furthermore a wooden path was constructed from local sawmill off cuts to facilitate access to the beach and reduce erosion due to trampling by visitors.

RESULTS

Accumulation of sand at the fences over the monitoring period for each location is presented in Figure 1. Monitoring showed significant accumulation of sand during the windy season with an almost completely restored sand dune profile in certain places. The best results of sand accumulation were observed in the beginning of the spring and by fences with an orientation perpendicular to South-South West, the direction of the prevailing wind of the season.

It was seen throughout the monitoring period that fences with a height of about 30 cm were to be preferred. They were covered in a rather short time and additional fences could be put to expand the action or to further adjust the dune profile. If new fences are put before the existing ones are covered the sand supply might be cut off for some fences. In some cases the sand trapped by a fence might be transported away when new fences change the wind flow. This means that continuous monitoring and adjustments of the action is usually necessary to achieve best results.

CONCLUSIONS

For the effective protection of sea turtle nesting beaches of Lakonikos Bay, ARCHELON is focusing its attention on the protection and restoration of the coastal zone. In close collaboration with the local community and for the first time in Greece a successful sand dune restoration action was implemented according to the management plan produced for the coastal zone of the Evrotas Delta. After the successful results of the three pilot actions presented here ARCHELON went on, implementing the restoration action on a bigger scale. With good organization and a small team of volunteers five hundred meters of sand trapping fence and 2500 m of wooden path (including a "Nature Trail") was put in 16 different locations along the Evrotas beach during the autumn of 2000. The local authorities understanding the problem of the sand dune destruction and recognizing the success of the pilot action participated actively

in the expansion of the action.

The Environmental Scientific Center of Evrotas, constructed with the assistance of the Municipality of Skala (February 2000), and the construction of the Nature Trail in the sand dunes of Evrotas with the help of the Municipality of Elos (December 2000), contributed to making known the results and the importance of the action, achieving the support of the local society.

As a result the majority of the local people stopped considering the sand dune zone as a place for sand extraction, vehicle use, garbage dumping, and an area for recreational housing and agricultural use. It is worth to mention that, despite the big scale of the action area none of the sand trapping fences or wooden paths was destroyed intentionally.

The proven results of scientific work in addition to public awareness

activities focusing mainly on children, will provide a foundation for the acceptance of a future protected area and local participation in the management of the Evrotas Delta.

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Table 1. Main data of fencing used to restore sand dunes in Evrotas nesting beach, southern Peloponnese, Greece.

TOTAL LENGTH OF FENCES (m.)	165.5
TOTAL NUMBER OF MEASURING POINTS	168
AVERAGE NUMBER OF MEASURING POINTS PER METER	1
TOTAL NUMBER OF FENCES	30