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Restoration of White Tower Bay sand dune

The sand dune at White Tower Bay is severely threatened by illegal camping activities

Picturesque though they are, coastal sand dunes serve a more important purpose than beauty. Dunes act as flexible barriers to ocean storm surges and waves and protect low-lying backshore areas. In addition, they provide a habitat for fauna adapted to this harsh environment, some of which are endemic to the Maltese Islands.

According to Schembri (1991), only 13 out of a total of 27 sandy beaches still support some form of dune ecosystem, and just five of them support dunes with a relatively intact characteristic dune vegetation community.

These are Ramal l-Hamra in Gozo, Santa Marija on Comino, Ghadira, Ramla tat-Torri (White Tower Bay) and Ramla tal-Mixquqa (Golden Bay) in Malta.

Stevens (2001, unpublished) says that a total of 29 floral species were found to live exclusively on sand dunes. Seven are extinct or almost extinct, while 18 species are vulnerable or endangered.

Also, sandy beaches comprise only 2.4 per cent of the 190-km long Maltese coastline, and the figure for sand dunes is even lower. Ramla is the only well-preserved sand dune in our islands. In addition, recreational activities, both of a local (as testified by boathouses, offroad vehicles and camping) origin and of a touristic (as testified by catering outlets and hotels) origin, have a huge impact on sand dunes due to their proximity to popular sandy beaches.

As a result, dune floral and faunal species are among the most endangered of the Maltese Islands - a case in point is the dunal genus Ammophila (beach grass) which is widespread in European dunes but completely eradicated from the Maltese Islands.

Description

White Tower Bay is the northernmost sandy beach in Malta, lying about 400 metres from Ahrax Point, the island's northernmost tip. The beach owes its name to one of the De Redin towers, the White Tower, which is perched on high ground at 100 m away from the ground.

The dune covers about 4,000 m2, reaching a maximum height of three metres above the sand. It gives way to a 6,000 m2 sandy beach, which receives a significant input of shed Posidonia leaves from mid-October to mid-March.

The foredune (i.e. the part of the dune closest to the sea) is dominated by the aggressive pioneer plant Eryngium maritimum (sea holly), while further up the dune the sea daffodil (Pancratium maritimum), easily distinguishable from its star-like white flower) and Cakile maritima are also common. A small number of Tamarix africana shrubs form the climax community on the upper reaches of the dune at the mouth of the valley system leading to the beach.

This valley system, which forms the catchment area for the dune system, has largely been reclaimed for agriculture. A narrow road meanders around the dune. The fauna of the dune is dominated by various beetle orders, namely the darkling beetles (tenebrionids), by crustacea such as amphipods and by various forms of spiders.

Needless to say, all animals inhabiting the dune are able to burrow into the sand during the day and to emerge at night to allay excessive heat and dessication.

Major threats to the White Tower Bay sand dune include:

¤ excessive erosion of the dune itself due to exacerbated flooding problems after heavy rainfall. This is due to the fact that illegal boathouses and agriculture have reclaimed the dune's catchment area; consequently, the former watercourse leading to the dune has been eroded into a fully-fledged gulley fragmenting the dune into two.

¤ illegal camping activities right in the middle of the dune

¤ rampant human trampling

¤ the removal of the Posidonia (seagrass) shed leaves from the sandy beach as this mitigates sand erosion, helping in the accretion of sand and is a valuable nutrient source to the dune's flora.

The high level of degradation experienced by the White Tower Bay sand dune is evident from the widespread presence of alien plant species characteristic of highly disturbed grounds.

Restoration measures

In view of the dire state in which the White Tower Bay sand dune lies, Nature Trust (Malta) has presented a series of proposals (in conjunction with Mellieha council and Nixxiegha Kulturali of Mellieha) to the Malta Environment and Planning Authority (MEPA), the essence of which include:

(a) legislative/enforcement measures

1. The scheduling of the entire dune since this currently falls only within a site of scientific importance. In addition, a 50-metre buffer zone should be declared all around the dune to mirror the protection offered to historical remains in the area dating back to the Knights, such as entrenchments and batteries.

All illegal boathouses lying within such a buffer zone should be demolished - the "front gardens" of boathouses are dominated by a degraded genre of dune flora, thus indicating that they are occupying part of the former extent of the dune.

2. The enforcement of the site's scheduling should be undertaken (by sending a warden once a week during winter and three times a week during summer during peak occupancy times) or by MEPA by sending enforcement officers.

(b) ecological measures

3. Abandoning the practice of beach cleaning (i.e. removal of Posidonia banquettes) on at least part of the beach. Besides enriching the dune sediment with organic material, the Posidonia banquettes also constitute an important habitat themselves, harbouring unique fauna, as well as helping to reduce sediment loss, while meadows of Posidonia below the shoreline act as sediment traps.

The banquettes could be raked 20 metres from the seaside towards the dune so as to allow public use of the beach, while not dispensing with the banquette. Public exploitation of banquettes suspended within coastal waters to collect isopods for fishing purposes should be permitted as long as pre-accepted carrying capacity is not surpassed (see photo).

4. Strict control of land use in terms of agriculture in the water catchment area of the dune. Although the level of the water table of dune systems varies seasonally, it is also drastically affected by human activities adjacent to the dune.

Extraction of water through boreholes, for example, and the consequent depressing of the water table increases infiltration and sand deposition which may help to fight beach erosion. However, such a practice may also draw in salt water and so severely affect the dune vegetation, while leading to the virtual disappearance of plants dependent on a high water table (Boerboom 1960, Voo 1964).

Besides, land should not be cultivated right up to the boundary of the dunefield, but allow an intermediate buffer zone of natural vegetation so as to protect the dune from pollution by pesticides or topsoil and from nutrient enrichment by fertilisers.

At White Tower Bay, this is especially important since landward cultivated areas are high-lying when compared to the dune and so drainage must be controlled. In the Netherlands, it was found that significant changes occurred in dune plant communities due to enrichment by fertiliser residues from agricultural land.

Grazing by farm animals will be strictly prohibited.

Planting of Ammophila muticaria (marram grass - qasbet-ir ramel), a stabilising and pioneer species characteristic of foredunes, around the seaward margins of the dune. Such a species, due to its extensive root rhizome system, act as a sand-binder.

Sand is progressively trapped among the interstices of the grass and so the mound grows, even up to several metres high, and can be then colonized by other floral species.

Such planting should be done manually along a zone about five metres wide. Prior to this, however, the species will be planted in other areas which formerly harboured a sand dune, such as Armier or Gnejna, so as to monitor the extent of its colonisation and so avoid unpleasant surprises.

Such a species has been completely wiped out from the Maltese Islands, but Haslam (1977) reports that it was previously present at the sand dune at White Tower Bay. Specimens introduced would be taken from stocks coming from Sicily so as to maintain the highest degree of genetic homogeneity possible.

The manual removal of any species which is alien to the characteristic dune vegetation. Again, this should be done manually so as to avoid unnecessary damage being wrought to the dune. Such species may include opportunistic species, such as Oxalis pes-caprae (Haxixa ngliza) and Soncus oleraceus (Tfief Komuni).

(c) physical measures

Demolition of the shanty kiosk projecting out on the beach at the westward limit of the dune. Dune systems are affected by structures built directly upon or immediately in front of them. Resulting changes in sand movement and dune profiles may only become apparent after some time. The dune area behind the kiosk is visibly floristically impoverished when compared to the rest of the dune.

Closure of the road which meanders around the dune and the subsequent removal of the asphalt surface to allow for re-colonisation of dunal vegetation. Access roads modify the supply of sand to the dune system.

Installation of metal bollards at both extremities of the beach and at the accessible ends of the dune to mitigate vehicular trampling. In fact, indefinite road margins provide easy vehicular access to the dune and beach, and tyre markings bear witness to the frequent trespassing of the beach-dune system. Additional measures would include

The stretching of netting over flattened areas of the dune, especially on its fringes once the road is removed, to encourage the colonisation by dunal vegetation.

The limitation of light pollution in the area so as not to affect adversely the dune's flora and fauna by using non-dispersive, energy-saving lightning systems

(d) follow-up measures

Promoting the educational value of the site. This could be done by installing a wooden walkway all around the dune over which visitors can participate along short guided tours of the dune once this is established. Such walkways do not trample underlying vegetation and the benefits to the system greatly exceed the costs of construction (Brown & Mclachlan, 1990).

In addition, educational signs and leaflets, depicting characteristic fauna and flora to be found at each site, may be installed.

The start of a monitoring programme, during which floral and faunal species will be monitored by using different sampling techniques every six months so as to assess the dune's biodiversity. The site is already being studied as part of a seasonal study for an M.Phil. thesis.

(e) Other possibilities

Nature Trust (Malta) is also considering the placing of large stones (easy to blend with the surroundings) immediately behind the metal bollards as a further deterrent, a technique which has already been successfully utilised in the Maghluq nature reserve at Marsaxlokk and the installation of a very flimsy fence whose sole function is to demarcate the physical boundaries of the dune, rather than to act as a deterrent.

So as not to interfere with the Aeolian transport of sand, such a fence would be composed of very thin wooden posts, placed some 10 metres apart, and connected by three very thin iron wires. The introduction of such measures will be decided upon after adequate consultation.

A document with all these proposals has been presented to MEPA which is showing the will to conserve the dune. While waiting for the full proposal to be endorsed, emergency conservation measures will be implemented before the summer season gets fully underway.

Other threatened dunes

Various conservation measures have been attempted at our most important (both in terms of biodiversity and physical extent) sand dune (i.e. Ramla), most of which have had no avail. The sand dune is being managed by the NGO Gaia Foundation as part of the LIFE programme by the EU.

Some years ago, a type of fence was constructed around the dune by the Environment Protection Department to deter bathers from venturing inside the dune - the fence was dismantled literally overnight by some unscrupulous characters.

Yet another threat to this dune is agricultural land reclamation which has already claimed at least two-thirds of the former dune. The allure for offroading enthusiasts has luckily been mostly assuaged while the educational signs in place are largely inadequate and slipshod.

One recent threat to the dune has been the use of a spotlight by one of the in situ makeshift kiosks which is literally lighting up most of the dune. Highly commendable is the action taken last winter to close part of the former car park next to the Roman remains and plant the area with littoral vegetation.

The dune at Golden Bay, or its remnants, run the gauntlet of overt popularity with bathers who seek it for shade and barbecues, thus peppering it with all forms of waste. An Internet Café lies right in the middle of the dune while the catchment area of the dune is smothered by another catering outlet.

Highly commendable is the manual removal of the illegal concrete steps passing over the dune at Golden Bay embarked upon by MEPA employees last winter. It may sound like wishful thinking but Nature Trust (Malta) aspires to embark too on the conservation and replenishment of the Golden Bay sand dune in the future.

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