THREATENED HABITATS AS A CRITERION FOR SELECTING COASTAL PROTECTED AREAS IN THE MALTESE ISLANDS

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Recognising that the sea is one of the Maltese Islands' main resources, recent environmental protection legislation pays particular attention to the coastal zone and shallow seas off the islands. Under this legislation, the terrestrial areas of three islands, and a number of coastal sites, have been declared nature reserves. However, at present there are no marine protected areas within Maltese territory. Marine activities are restricted in certain sea areas round the Maltese Islands, but this is for reasons of security. One factor hindering the establishment of marine protected areas is lack of knowledge as to which ecosystems are in need of protection. In order to address this deficiency, a survey was carried out to identify coastal and shallow water habitats which are threatened. The results of the survey are summarised below. For each habitat type recognised as in need of protection, status, exploitation and threats are reported upon in that order.

Mediolittoral bioconstructions

Status: Platforms formed by the alga *Neogoniolithon notarisii* and the vermetid *Dendropoma petraeum* are common on all gently sloping rocky shores. *Lithophyllum* cushions are only known from a few shores (for example, Xlendi, Gozo and Ghar Lapsi, Malta). These rocky shore bioconstructions are considered vulnerable on a Mediterranean scale (UNEP/IUCN/GIS POSIDONIE, 1990).

Exploitation: No direct exploitation.

Threats: The same as all local rocky shores, mainly from development.

Sea-grass (*Cymodocea nodosa* and *Posidonia oceanica*) meadows

Status: Although common and widespread round the Maltese Islands, in some areas, especially in enclosed or semi-enclosed bays receiving a variety of effluents and subject to certain activities, these meadows have regressed and eroded away, leaving in their place much impoverished thanatocoenoses.

Exploitation: Not exploited directly, except for certain types of fishing, but their high productivity makes them one of the most important local sublittoral community types, as in the rest of the Mediterranean (ROS *et al.*, 1985).

Threats: The main threats are: dredging, which causes both mechanical damage and also increases water turbidity and the rate of sedimentation; terrestrial run-off in enclosed bays, particularly that containing sediment and agricultural run-off; cooling water from the local power stations; the hypersaline discharge from reverse osmosis plants; nutrient-rich effluent from sewage; waste from fish-farms; bottom trawling; the use of heavy anchors, which physically damage the meadows; and the illegal use of explosives for fishing. Coastal developments have changed the current and sedimentary regimes in some areas (for example, Marsaxlokk Bay, Malta) and have caused regression of sea-grass meadows.

***Posidonia* "barrier reefs"**

Status: Only very few such formations are known locally. The best documented are those in Mellieha Bay (BORG and SCHEMBRI, 1993) and in Salina Bay, both in Malta.

Exploitation: Not exploited directly, however, these "reefs" are very important in protecting the shore from wave action by absorbing the energy of waves.

Threats: The same as sea-grass meadows in general, but particularly susceptible to mechanical damage, as for example, from boat anchors and moorings.

***Halophila stipulacea* meadows**

Status: Meadows of this Lessepsian immigrant are only known from two Maltese localities, the inner reaches of Marsaxlokk Bay, Malta (LANFRANCO, 1970) and Mgarr Harbour in Gozo. The populations at Marsaxlokk have regressed in recent years.

Exploitation: Not exploited.

Threats: Dredging works in connection with the new power station at Delimara, together with pollution resulting from the fishing harbour at Marsaxlokk, have caused a severe decline in the Halophila meadows growing in Marsaxlokk Bay.

Deep-water Cystoseira communities

Status: Deep-water Cystoseira communities based on *C.spinosa*, *C.dubia* and *C.zozteriodes*, are rare and poorly known in the Maltese Islands, however, it is suspected that they may be threatened, as in other parts of the Mediterranean (UNEP/IUCN/GIS POSIDONIE, 1990).

Exploitation: Not exploited directly, except for some types of fishing.

Threats: Most species of Cystoseira are sensitive to pollution, particularly to high phosphate levels and upper infralittoral communities are disappearing from some areas receiving organic pollution; deep-water communities may be similarly affected Other threats include changes in sedimentary and current regimes due to coastal developments, dumping, and fishing with explosives.

***Cladocora cespitosa* banks**

Status: In Malta this coral forms banks some 20 cm across. These were previously common but are now rare. Large and well-developed banks are particularly rare.

Exploitation: Collected for their curiosity value and for use as decorations in aquaria.

Threats: Overcollecting and mechanical damage from the use of heavy anchors and fishing gear; also, illegal fishing with explosives.

Maërl communities

Status: Apparently rare in the Maltese Islands, although this could be because these communities occur mainly in deep water. It is suspected that those occurring close to the transition zone between the lower infralittoral and the upper circalittoral may be threatened.

Exploitation: Not exploited directly, except for some types of fishing.

Threats: The main threat seems to be from bottom trawling although changes in the sedimentary regime due to coastal development may pose an additional threat in some areas.

Corallegene communities

Status: Occur in deep water (circalittoral) and poorly known locally. It is suspected that those occurring close to the transition zone between the lower infralittoral and the upper circalittoral may be threatened.

Exploitation and threats: The same as for maërl communities.

Caves

Status: Common in Maltese waters and different types exist, ranging from those close to the surface and open to the air, to deep grottoes and tunnels.

Exploitation: Not exploited directly, except for "sight-seeing" by tourist divers.

Threats: The main threat is from divers who enter the caves. These cause both mechanical damage to erect sessile forms, and death of the biota on the ceiling due to air bubbles from diving cylinders becoming trapped there.

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