

A new methodology for monitoring *P. oceanica* meadows in Tavolara Punta Coda Cavallo MPA using GIS

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Marine Protected Areas (MPAs) are acknowledged globally as effective tools for the protection and management of the marine environment; however, to get effective results it is necessary to set up a proper and continuous mapping of the marine territory, in order to gain detailed knowledge of its different aspects. Therefore, the implementation and maintenance of a modern GIS (Geographic Information System) has become an indispensable task for the MPA of *Tavolara - Punta Coda Cavallo* to collect, aggregate, classify, and track the conducted mapping activities.

Between 2011 and 2012 the sea bottom of the MPA was surveyed using different methods: by means of a multi-beam echo sounder and of a side scan sonar, as well as conducting fast scientific scuba divers with re-breathers and underwater position system technologies. High resolution geodatasets, characterized by a significantly high quality in representing and describing the sea bottom and its habitats, were produced in both feature (scale up to 1:1.250) and raster formats (up to 30cm/pixel for sonar images and 1m/pixel for bathymetry) and they currently constitute the basis of the MPA's GIS, including its 3D applications and its web map services for desktop and mobile devices (iPhone & Android).

To update the above described geodatasets during time, acquiring new data on the conservation targets considered in monitoring activities, among which the status of *P. oceanica* meadows is of the most important ones, a long term mapping plan was realized on the basis of an innovative methodology elaborated by the MPA considering both the wideness of the area and the limited funds available at present. The whole MPA was divided in territorial units by means of a regular grid of square cells having a 100m side with the logic of starting the mapping activities from the mainly important areas and then to spread the surveys up to fill the whole mosaic. All the new data acquired with this methodology could then be mixed, compared and indexed within the same cell and/or in the many already available geodatasets, starting from those dated 2006 having a regular grid with square cells of 500m *per* side.

KEY WORDS: Marine Protected Areas, management, Geographic Information System (GIS), mapping, 3D, *Posidonia oceanica*, habitats, biocenosis, geomorphology, gridding.