

THE STUDY OF DIVING TOURISM TO SUPPORT THE ADAPTIVE MANAGEMENT IN AN ITALIAN MARINE PROTECTED AREA (USTICA ISLAND)

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Abstract

The conservation of natural resources present in a marine protected area (MPA) can provide a high element of natural attractiveness for diving-activities. The present contribution is an approach to the study of scuba-diving tourism in the Italian MPA of Ustica Island and considers some influencing factors of the dive sites such as the biologic aspects, depth, distance from the main harbour and spatial distribution of the divers presence through the application of a GIS technology. The applied approach seems to be useful in yielding a concise vision on the phenomenon and in identifying the main polarising aspects for diving tourism in support of management activities.

Key words : Marine parks, GIS, Coastal management.

Introduction

The Marine Protected Areas' (MPAs) objectives are centred on marine biodiversity conservation, the maintaining of productivity and the contribution to economic and social welfare (1, 2). To obtain and maintain the integration between the environmental protection and the development of local economies, MPAs need clearly articulated management plans and these should be adaptive (i.e. the management should be set up as a verifiable scientific experiment) (3).

Scuba-diving is one of the most important tourism activities in MPAs and represents one of the major ways to directly appreciate the effects of the protection on marine environments but this activity should be regulated so as to be really compatible with the conservation of natural resources (4- 7).

This aspect is very important in Italy where 15 MPAs are established and national legislation foresees the establishment of 50 MPAs.

To approach the adaptive management of scuba-diving activities, a preliminary study was started in the Ustica MPA (Italy) which currently represents one of the major national destinations for recreational diving tourism. Established in 1986, this MPA is characterized by three different protection zones and diving activities are forbidden only in Zone A. This scenario justifies the need to investigate the degree of tourism distribution (8), with particular attention to its underwater component so as to obtain management indications (4).

Materials and methods

The study on scuba-diving tourism was carried out with the aim of characterizing the scuba-diving industry, to identify the tourist attractiveness of dive sites and to analyse the divers' spatial distribution in Ustica. Data concerning the diving-centres (organisation, equipment, staff, kind of activities, number of divers and their temporal distribution, localization and characteristics of dive-sites) was collected through data-forms completed by the operators of scuba-diving centres.

The tourist attractiveness of the more important dive sites located in Zones B and C, were identified through interviews with the relative stakeholders and an analysis of specialized reviews on scuba-diving tourism. The dive sites were characterised identifying "environmental" priorities affecting the tourist demand such as: the range of depth where the dive is more interesting, fish species with high density of specimens or with high frequency of sighting, species that are present with large individual and benthic species of tourist relevance for recreational dive. The latter information was obtained through data-forms for each dive site completed by a panel of scuba-diving experts present in the MPA (field guides of the area and representatives of scuba-diving centres).

Data on spatial distribution was collected during 25 day-time surveys, conducted between July 1st and August 30th 2000 by the MPA personnel, who recorded the number of boats, the estimated number of scuba-divers and the geographical location of each site on specifically formulated questionnaires. Basic cartographic information was obtained by digitising the nautical map of Ustica island (9), and information on benthic assemblages' distribution was extracted from previous studies (10).

Location of the scuba-diving sites was implemented in the GIS and appropriately repositioned with respect to their average depth. All the above data was elaborated and integrated with GIS software packages ESRI Arc/Info and Arc View.

Results and discussion

The diving centres working in Ustica are six and the spatial distribution of divers shows that 63.6% of the dive sites are in Zone C and

36.4% in Zone B. The characterisation of dive sites resulting from the analysed environmental parameters indicates that in general, the percentage of site-use increases with their richness, as shown by the fact that 65.8% of the divers' presence is concentrated in only 3 sites that are characterized by high values for all of the considered parameters. Nevertheless, other aspects, as the distance from the main harbour and marketing strategies are also important as suggested by the recorded low diver presence (3%) in one area, which is potentially very interesting but which is distant from the main harbour and is thus not very publicised to the divers.

The combination of information related to the dive-sites and the benthic assemblages indicates that an approximate 48.3% of dive-sites are deemed of interest due to the presence of photophylic assemblages while 21.1% is characterised by sciaphilous assemblages, and approximately 30.5% is characterized by the presence of *Posidonia oceanica* meadows.

The present study suggests and applies a method that includes environmental and tourist aspects. The implemented GIS is particularly useful in this regard to integrate and analyse different kinds of information. The utility of GIS should be stressed with the increasing number of variables considered affecting diving demand for each site such as: distribution of detailed benthic assemblage, fish populations, presence of endemic species, sea-currents, exposure to marine meteorological conditions, sea-geomorphology, and the presence of wrecks or historical vestiges.

The applied approach appears useful in order to yield a concise vision of the phenomenon and to identify the main polarising aspects for diving tourism. The approach should be applied to support management activities devoted to increase the valorisation of dive sites that are currently less exploited and to suggest new sites, thus reducing the tourist pressure on those most visited and in order to allow an effective conservative management of this important activity.

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