

THE IMPORTANCE OF CORALLIGENOUS HABITAT TO THE LOCAL ECONOMY OF ISOLE TREMITI MPA (ADRIATIC SEA): THE CASE OF RECREATIONAL DIVING

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Abstract

Coralligenous represents a key habitat of the Mediterranean continental shelf in terms of biodiversity and aesthetic value. An annual economic benefit of €0.88 M (2014 €) generated by SCUBA diving on coralligenous habitat in the Isole Tremiti MPA (South Italy) was estimated through a survey questionnaire administered to diving centres. Notwithstanding the results represent only one among many other ecosystem services generated by coralligenous, they highlight the importance of cultural ecosystem service related benefits in the marine ecosystems and of coralligenous in particular.

Keywords: Coastal systems, Ecosystem services, Economic valuation, Marine parks, Mediterranean Sea

The assessment of Ecosystem Services (ES) provides a useful analytical and communication tool to support spatial planning and management of marine systems by connecting ecosystem processes to human welfare [1]. Among Cultural Ecosystem Services (CES [2], recreation and aesthetic benefits have long been recognized as important features in land use planning and management, as it should also be in the marine environment. In the present study we assessed part of the economic value generated by coralligenous outcrops, one of the most important Mediterranean habitats in terms of structural complexity and species richness [3], considering the diving industry in the Isole Tremiti Marine Protected Area (MPA; South Adriatic Sea, Italy). A survey questionnaire was distributed to the Diving Centres (DCs) working within the MPA to: a) produce a systematic mapping of the most visited diving sites and understand their spatial distribution within the MPA and their main habitat; b) assess which are the habitats that divers prefer to visit and explore the role of coralligenous in the diving frequentation; c) estimate the economic importance of coralligenous in the recreational SCUBA diving industry considering the gross revenue generated by the number of dives carried out, the number of diving licences released, the gears rented and the number of tanks rented/refilled by each DC during 2014. According to the respondent DCs (4 of the 5 DCs working within the MPA), 34 main diving sites were identified, all featured by the presence of coralligenous. Eight of them were also featured by marine caves. Coralligenous resulted the favourite habitat for divers, along with marine caves, stressing the valuable aesthetic significance of coralligenous as a seascape (CES). The cost of a single recreational SCUBA dive in 2014 ranged from €5 to €40, with a mean cost of €37.00±2.45. Considering the number of dives, the number of divers and the number of days of each season in 2014 (table 1), it was estimated that 4,175 individual dives/year (considering each single diver in the water as one dive) were carried out in the MPA by each of the respondent DCs. An indication of the economic flow yielded from SCUBA dives on coralligenous in Isole Tremiti MPA, based on the mean cost of a single dive, was estimated to be on average €154,468/year per DC. Considering all the active DCs censused (N=5), a total of €772,340 of gross revenue from SCUBA dives was estimated. In addition, an annual economic gross revenue of €20,809 per DC was assessed considering the diving licences (table 2). As DCs do not offer tanks rental/refills and gear rental services to divers not diving with them, no additional revenue was considered from these activities.

Tab. 1. Mean number and standard deviation (SD) of the number of dives per day and divers per dive in 2014, according to the respondent DCs, and their estimated gross revenue.

Season	Dives per day		Divers per dive		N days	Individual dives per season	Gross revenue (€)
	Mean	SD	Mean	SD			
Spring	0.70	0.16	7.25	2.06	93	472	17463
Summer	3.75	0.50	10.00	2.16	93	3488	129038
Autumn	0.33	0.13	7.25	2.99	90	215	7967
Winter	0.00	0.00	0.00	0.00	89	0	0
Total						4175	154468

Tab. 2. Mean number and standard deviation (SD) of diving licences issued during 2014 and their costs, according to the respondent DCs. OWD: Open Water Diver, AD: Advanced Diver, DM: Dive Master, TD: Tech Dive.

Diving licence	Licences issued		Cost (€)		Gross revenue (€)
	Mean	SD	Mean	SD	
OWD	27.50	9.88	387.5	47.87	10656
AD	19.00	5.48	347.5	41.13	6603
DM	3.67	1.53	600	173.21	2200
TD	5.0	4.24	270	14.14	1350
Total					20809

Summing up the average gross revenue per DC for each of the activities considered, an annual gross revenue of €0.88 million was estimated (€76,385; average annual gross revenue per DC of €175,277). This gross revenue can be considered entirely related to coralligenous habitat since all the main diving sites in the MPA resulted characterized by this habitat. Despite the limitations, the present study represents an exploration of the economic role of recreational SCUBA diving to approximate part of the CES benefits provided by coralligenous, considering that recreational practices are closely related to benefits such as identities, spiritual and aesthetic experiences [2]. The estimated gross annual revenue is indicative of a portion of the economic role that a single MPA can obtain from the diving frequentation on coralligenous. This must be intended as a minimum estimate of its CES since other important sources of income (e.g., boat rental, meals, travel and accommodation) were not included in the analysis. Moreover, the total economic value of coralligenous outcrops could strongly increase also taking into account the other ES provided by this habitat, presented as the direct and indirect benefits that contribute to human welfare (e.g. habitat for species of commercial interest, hot-spot of biodiversity, coastal erosion, climate regulation) [3]. However, the present study provides an insight to the potential economic value of coralligenous considering the market impact of diving to capture the magnitude of the importance that recreational diving and tourism related to the coralligenous habitat have in the local economy of an MPA. These results are critical to address the challenges of including economic assessments to complement management measures in the refinement of better informed environmental policies.

References

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