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Stakeholder involvement in Marine Spatial Planning

Lydia Koehler[(1)], Leyla Knittweis[(2)], Joseph A. Borg[(2,3)]

[(1)] Faculty of Laws, University of Malta, Msida MSD 2080
Email: lydia4blue@gmail.com
[(2)] Department of Biology, University of Malta, Msida MSD 2080
Email: leyla.knittweis@um.edu.mt
[(3)] Email: joseph.a.borg@um.edu.mt

Abstract

The importance of stakeholder involvement in marine spatial planning was assessed in a Maltese Marine Protected Area (MPA) through a questionnaire survey of six main stakeholder groups, namely governmental authorities, non-governmental organizations (NGOs), bus and boat trip operators, dive centres and small business owners. The questionnaires revealed the different views of the stakeholder groups based on their interest in the Dwejra MPA, conflicts among users, environmental concerns, and also helped identification of potential management measures. Interests differed among stakeholders, but response rates were highest for questions related to economic and environmental concerns. Two additional existing data sets, one on marine habitat distribution and one on fishing activities in the MPA were included in a spatial analysis of conflicts identified through the questionnaire. A major conflict exists between stakeholders engaged in fishing and diving activities, due to overlap of activity ranges in the relatively small MPA. The number of ongoing activities was highest during the months April to October, which results from the high influx of tourists during the summer months, favourable weather conditions, and the fact that fishers are more active during this period. Environmental NGOs considered the number of tourists visiting the MPA to be too high, and a similar perception was expressed by most stakeholders with regards to the number of divers. Fifteen management measures which may be used to improve regulation of human activities in the area were identified, including the

introduction of a visitor fee. This suggestion was favoured by NGOs, government authorities, and most dive centres interviewed, but opposed by bus and boat trip operators, as well as by small business owners. A zonation plan was considered beneficial by most interviewees, with the results of the statistical analyses indicating no significant difference among the responses given by the different stakeholder groups. A comparison between a zonation scheme developed by the Maltese national government, the San Lawrence local council, and the NGO Nature Trust in 2005, and a second draft scheme prepared by the Professional Diving Schools Association, which was presented during the stakeholder interviews carried out as part of the present study in 2014, showed partial overlap of conservation measures. However, the 2005 zonation plan is more comprehensive since it takes into account available data on benthic habitats and includes measures to protect sensitive habitats and species.

Introduction

Increased human demand for resources and ecosystem services leads to growing pressures on the marine environment (Reid et al., 2005); consequently improved management and regulation of human activities are required. Marine Spatial Planning (MSP) can lead to an adaptive and comprehensive approach to face the challenges of marine resource management (Crowder and Norse, 2008). Pomeroy and Douvere (2008) note that an essential part of the MSP process is understanding the views of different stakeholders by identifying their interests and expectations regarding a specific marine area. Moreover, existing or potential conflicts need to be considered, which can be achieved by identifying overlapping activity areas, mapping natural habitats that are being impacted (Ehler and Douvere, 2009), and investigating the perceptions of users within a marine area (Johnson and Pollnac, 1989).

In August 2010, the Maltese Government issued Legal Notice 851, which declares the "Marine Area in the Limits of Dwejra (Gozo) a "Special Area of Conservation of International Importance" in accordance with the Maltese Flora, Fauna and Natural Habitats Protection Regulations (Malta Legal Notice 311 of 2006), and in part fulfilment of Malta's obligations under the EU Habitats Directive (EU Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora). The area is a "multipurpose area" in which various activities take place, as is often the case for Mediterranean Marine Protected Areas (MPAs) (Baude et al., 2012). Marine habitats present at the Dwejra/Qawra MPA (hereafter referred to as the "Dwejra MPA") include several which are listed in Annex I of the EU Habitats Directive, namely semi- and fully-submerged marine caves, rocky reefs and patches with *Posidonia oceanica* seagrass. This site is one of the major tourist attractions of the Maltese Islands and has been attracting a growing number of visitors, as many MPAs do according to Badalamenti et al. (2000). In 2013 the site had 1,291,036 visitors (MTA, 2014).

The present study uses MSP principles to identify management measures which could be used to achieve a more ecosystem-based approach for managing the Dwejra MPA. Existing datasets on the distribution of marine habitats and fishing activities at the MPA were analysed, and the perceptions and views of different stakeholder groups investigated. The viability of management measures suggested by stakeholders was

subsequently evaluated. The approach aims to demonstrate the applicability of key MSP principles, such as stakeholder engagement, conflict identification, and effective space allocation, to improve the management of a Mediterranean "multipurpose" MPA.

Material and Methods

The focus of the present study was on primary stakeholders, who directly depend on the Dwejra MPA (Fig. 1) economically, have a cultural or environmental interest, and/or are staff of the relevant regulatory authorities. The stakeholder analysis involved the assessment of MPA users and governmental authorities with an interest in the area, and a review of an existing Action Plan (MEPA, 2005). The MEPA (2005) Action Plan resulted from the EU-funded "Dwejra/Qwara Heritage Park Project", which aimed to set up a protected area in Dwejra, and to propose management measures following consultations held with dive centres, boat trip operators, the environmental NGO Nature Trust Malta, the Ministry for Gozo, and the San Lawrenz local council. These stakeholders were thus considered primary stakeholders during the present study. In addition, the then Malta Environmental and Planning Authority (MEPA) (now the Environment and Resources Authority; ERA), the Department of Fisheries and Aquaculture (DFA), and the Malta Tourism Authority (MTA) were interviewed. Small business owners, commercial bus trip operators and fishers were identified as primary stakeholders with commercial interests, while the Din l-Art Helwa organisation, as well as the Gozo Tourism Association were identified as primary stakeholders with a cultural interest in the area.

Stakeholders were questioned using a questionnaire template adapted from a survey carried out in a Caribbean Marine Park (CERMES, 2005). Both multiple choice and open-ended questions were asked; the former to facilitate reporting and the latter to give stakeholders the opportunity to freely express their opinions. Fishers were not interviewed since the DFA provided information on commercial fishing activities in and around the Dwejra area based on interviews conducted with full- and part-time professional fishers in 2012. The study included all fishers having vessels registered at the two fishing ports closest to the study area: Dwejra (n = 17) and Xlendi (n = 17).

A comprehensive literature review was undertaken, which focussed on (i) existing information of direct relevance to the Dwejra MPA, and (ii) best practice approaches to MPA management. In addition, published data on the presence and distribution of marine habitat types in the Dwejra MPA were taken into consideration. Survey techniques included direct observation along transects laid on the bottom by SCUBA divers, and collection of video footage of marine benthic assemblages and benthic habitats (Borg et al., 2004).

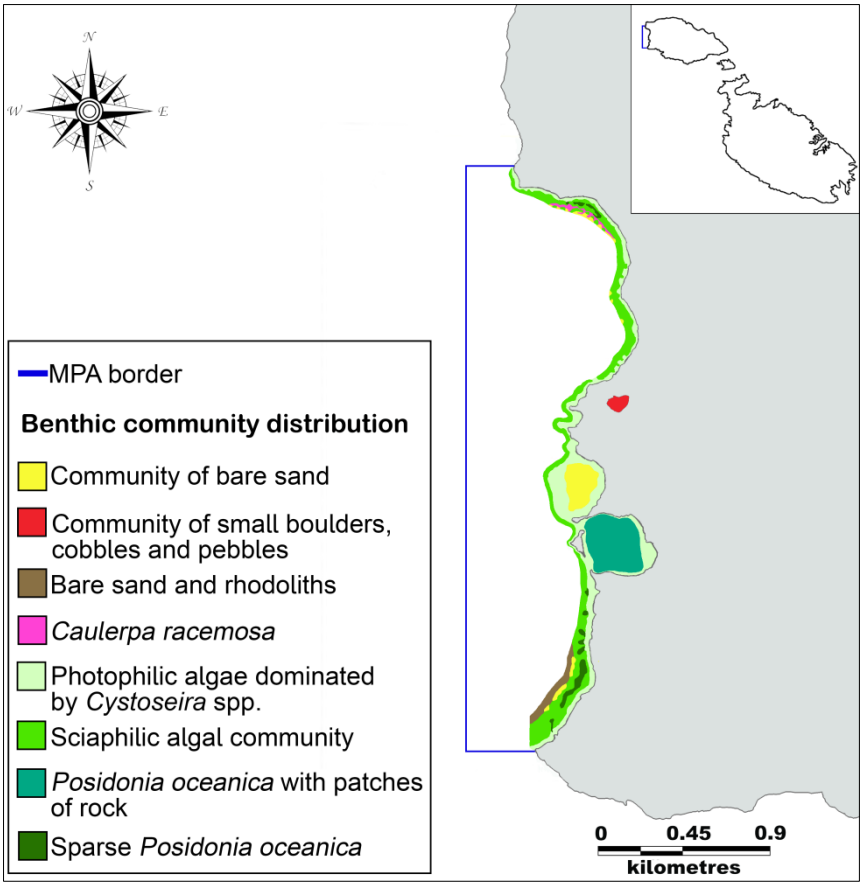

Fig. 1: Map of part of the western coast of Gozo (see insert for location in Maltese Islands), showing the border of the Dwejra Marine Protected Area and the distribution of marine benthic assemblages adapted from Borg et al. (2004).

For the purpose of statistical evaluation, interviewed stakeholders were divided into 6 groups: authorities, dive centres, NGOs, bus trip operators, boat trip operators and small business owners. A Chi-Square Test of Independence was used to analyse the collected data sets and test for statistically significant differences between the questionnaire responses given by the various stakeholder groups. Since the number of interviewed stakeholders varied between the different stakeholder groups, relative response rates were compared. Spatial data was evaluated by demonstrating the range of different activities, considering the overlap between anthropogenic activities and marine habitats, and by identifying key potential conflict areas using ArcGIS.

Results and Discussion

Response rates among stakeholder groups varied from 100% of the interviewed authorities and NGOs, 63% of small business owners and boat trip operators, 50% of bus trip operators and 40% of dive centres. An overview of the Chi-Square Test results is given in Table 1. A total of thirty nine primary stakeholders agreed to participate in the questionnaire survey. A limitation of the present study is the relatively low number of interviewed stakeholders in each interest group, which affected the significance levels of the statistical analyses. Nevertheless, the data reflect the direct responses of

individual primary actors who have a direct stake in the area. The exclusion of fishermen and secondary stakeholders was partly mitigated by including the results of the DFA questionnaire.

Table 1: Table showing the results of the statistical analyses, including interview questions for which stakeholder responses were analysed statistically, question types, sample size (n) and Chi-Square Test results (x^2).

No.	Interview Question	Question Type	n	x^2
1	Opinion on purpose of an MPA	Open-ended	38	$x^2(20) = 21.910$; $p=0.345$
2	Opinion on conflicting activities	Open-ended	31	$x^2(50)=73.046$; $p=0.018$
3	Amount of diving too much	Dichotomous	33	$x^2(10)=30.479$; $p=0.001$
4	Number of tourists too much	Dichotomous	32	$x^2(10)=24.725$; $p=0.006$
5	Zonation plan beneficial	Dichotomous	36	$x^2(5)= 4.098$; $p=0.535$
6	Support for introduction of visitor fee	Dichotomous	34	$x^2(5)=15.269$; $p=0.009$

Stakeholder interests in the Dwejra MPA

When asked about the nature of their interest, dive centres, boat trip operators, bus trip operators, as well as other small business owners confirmed that they have an economic interest in the Dwejra MPA. A specific interest in the environmental features of the area was expressed by 80% of all stakeholders representing dive centres, NGOs and government authorities. A cultural interest was stated by 67% of the authorities, 60% boat trip owners, 50% NGOs and bus trip operators, 26 % of the dive centres and 20% of the small business owners. Use of the area for recreation was indicated by 100% small business owners, 60% boat trip operators, 58% dive centres, 50% NGOs and bus trip operators and 33% of the authorities questioned. When asked about the perceived general purpose of the establishment of a MPA, stakeholders gave replies which did not differ significantly between groups (Table 1; test 1). The most frequently cited purpose was environmental protection (75% of boat trip operators, 80% small businesses, 83% authorities, 95% of dive centres and all NGOs and bus trip operators interviewed), with some stakeholders specifying that the declaration of no-take zones and establishment of management and control measures would be expected in a MPA. Another perceived MPA purpose stated by the interviewed stakeholders (50% of the NGOs, 25% boat trip operators and 10% of the dive centres) is the provision of support for tourism-related economic activities by increasing the number of tourists visiting the area.

Conflicts

A number of conflicts were identified, which were primarily related to ongoing activities in the MPA and the resulting environmental impacts. Stakeholders however statistically differed in their perception on the most concerning conflicting activities (Table 1; test 2). Authorities identified a conflict between fishing activities and SCUBA diving operations, which was confirmed by 84% of the dive centres. About half of the

boat trip operators and more than one quarter of all dive centres stated a conflict between each other in the area around the Inland Sea, where activities overlap spatially (Fig. 2). Littering was the most significant environmental impact of tourism mentioned by dive centres and small business owners.

NGOs, and one of the government authorities, stated that anchoring is having negative impacts on *Posidonia oceanica* meadows in the area, confirming the concerns previously highlighted by Borg et al. (2004). Other potential threats to sensitive marine habitats included the impacts of diving on underwater cave habitats and reef habitats (Borg et al., 2004). The results of the spatial analysis comparing the range of boat trip and SCUBA diving operations (Fig. 2) with the presence of sensitive habitats- *Posidonia oceanica*, reefs and marine caves (Fig. 1) - confirmed these impacts.

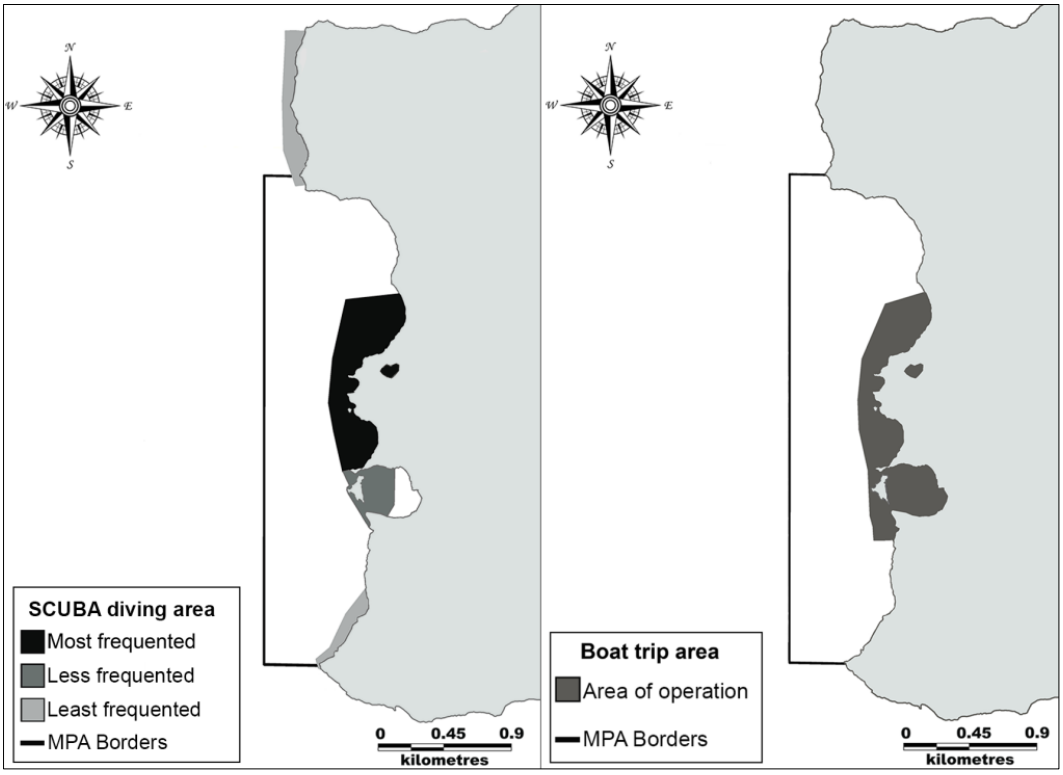

Fig. 2: Map showing the spatial range of boat trip operations and areas used for diving identified by the questionnaire survey.

Conflicts present in the Dwejra MPA vary considerably between seasons, and the economic use of the area is concentrated over a few months of the year. Primary stakeholders stated that the period of most frequent use of the Dwejra area is between April and October (Fig. 3), when the Maltese Islands receive an influx of tourists. In the opinion of most stakeholders questioned, the number of divers visiting the Dwejra MPA is too high. Similarly the perception of the all NGOs and bus trip operators as well as 76% of the authorities is that too many tourists visit the area. There was no statistical difference between the responses given by stakeholders for these questions (Table 1; tests 3 and 4).

Fishing effort data provided by the DFA showed that fishing mostly takes place between March and October, coinciding with the high season of tourist-based activities (Fig. 3). The results of interviews conducted by the DFA with fishers revealed seasonality in use of different gear types: drift nets targeting small pelagic species are used between January and May, pots and traps are mainly used between March and September, various types of bottom set nets including gill and trammel nets are deployed between March and October, and bottom long-lines are set all year around. Although nets are usually deployed offshore, they can drift towards the shore. The results of the spatial analysis showed that all gear types are deployed along the entire coastline (Fig. 1).

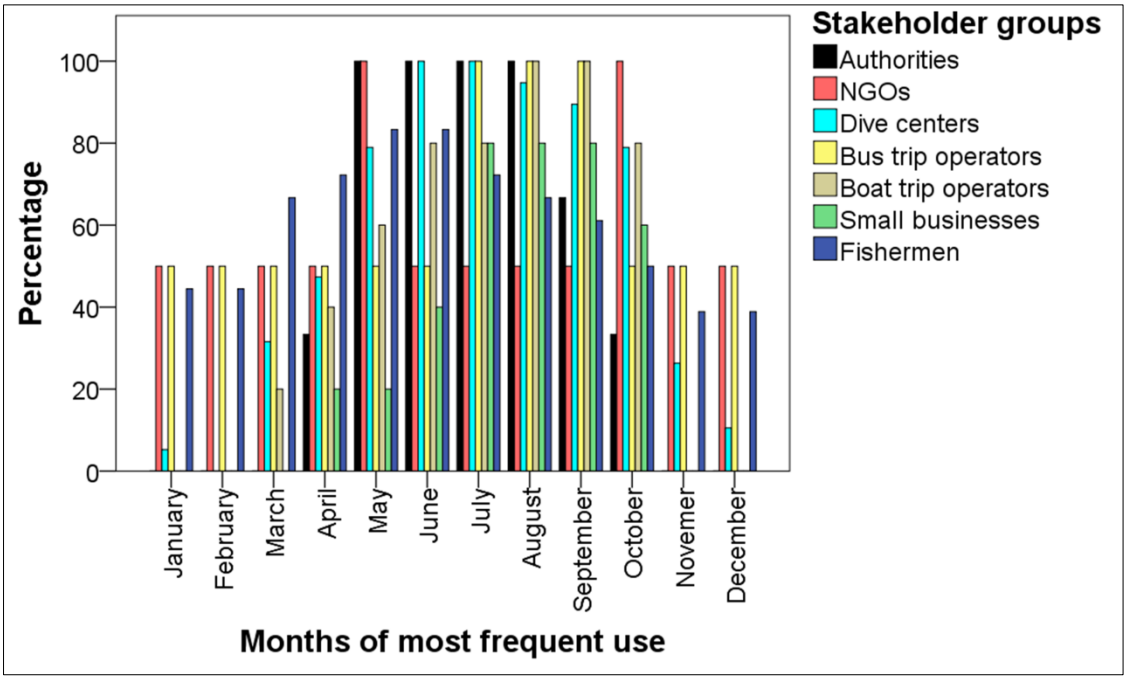

Fig. 3: Months when the Marine Protected Area is most frequently used by the different stakeholder groups including fishing activities, the latter based on data provided by Department of Fisheries and Aquaculture. Percentages and totals are based on total numbers of respondents.

Management approaches

Stakeholders were asked open-ended questions on possibilities to reduce conflicts among activities and improve environmental protection. Proposals made by stakeholders were similar among stakeholder groups. All NGOs and bus trip operators, 66% of dive centres and 50% small business owners suggested stronger control and enforcement measures, including the use of park rangers and camera surveillance; 67% of authorities proposed regular stakeholder meetings. The general idea of introducing a zonation plan was considered beneficial by the majority of stakeholders (no statistical difference between stakeholder groups - Table 1; test 5). The consideration of establishing “no take” zones to ban fishing as part of such a zonation plan was supported by 41% of the dive centres, 50% NGOs, 17 % of authorities, and 13% of small business owners.

When stakeholders were asked about their opinion on the zonation plan included in the existing Dwejra Action Plan (MEPA, 2005), the Professional Diving Schools Association of Malta (PDSA), explained that they have in fact developed a new, alternative, zonation scheme. The PDSA zonation plan excludes all types of fishing within a wider Area (Zone A) compared to the scheme proposed in the 2005 MEPA Action Plan, where only commercial but not recreational fishing is excluded from the MPA Core zone (Fig. 4).

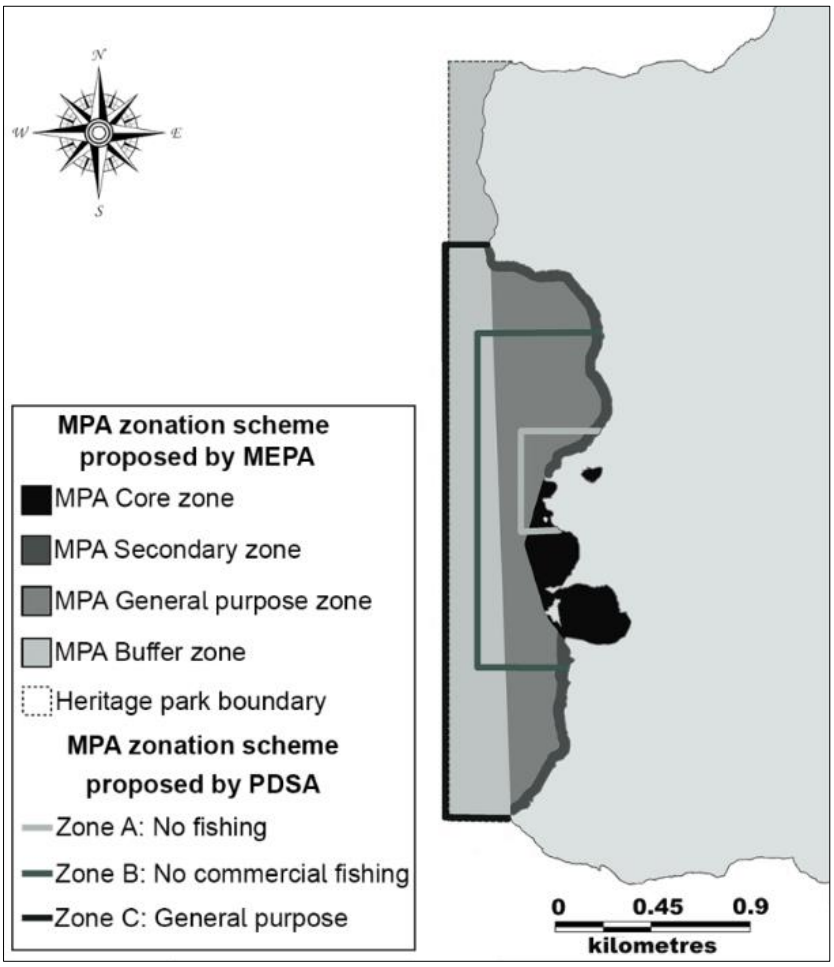

Fig. 4: Comparison between the zonation schemes indicated in the 2005 Malta Environment Planning Authority (MEPA) Action Plan, and proposed by the Professional Diving Schools Association (PDSA) of Malta during the interviews.

Based on the results of the literature review on best practice approaches to MPA management and the results of the stakeholder questionnaires, fifteen management approaches were identified (Table 2) to complement those listed in the existing 2005 MEPA Action Plan. The introduction of a visitor fee to generate money to implement management measures was supported by NGOs, 67% of government authorities, and 67% dive centres. All boat trip operators and small business owners however voiced a strong objection to such a fee, which resulted in a significant difference among stakeholder groups (Table 1; test 6).

Table 2: Management approaches to complement those listed in the existing Action Plan (MEPA, 2005).

Proposed Management Measure	Purpose	Reference
Recruitment of a MPA Manager	Required for an effective implementation of management measures	Gabrie et al. (2012)
Setting up a management board and holding frequent stakeholder meetings	Exchange ideas and achieve consensus	This study*
Ongoing habitat monitoring studies and fish population assessments	To monitor impacts of human activities in the area	This study*
Recruitment of park rangers	Improve current levels of enforcement	This study*
Introduction of camera surveillance		
Establishment of no-take zones	Limit environmental impacts of certain activities like fishing	This study*
	No-take zone can support fish stock recovery	Claudet et al. (2006)
	No-take zones can protect sensitive areas	Costello (2014)
Introduction of a visitor fee	Fund implementation of management measures	This study*
Instalment of an underwater Trail for Snorkelers	Can be used to divert SCUBA divers from sensitive habitats, and create additional underwater attractions	Baude et al. (2012)
Prohibition of unguided diving and respective training for dive guides	Can reduce impacts on sensitive marine habitats	Di Franco et al. (2009)
Restriction of areas for inexperienced divers	Can reduce impacts on sensitive marine habitats	Luna et al. (2009)
Closure of sensitive dive sites (e.g. ecologically sensitive caves)	Can reduce impacts on sensitive marine habitats	Guarnieri et al. (2012)
Installation of “Do Not Litter” signs	Reduction of environmental impacts created by high numbers of visiting tourists	This study*
Increased regulation of recreational fishing activities	Address the fact that Malta is “most notably deficient” in terms of regulations on recreational fishing	Font et al. (2012)
Use of MSP to create an adaptive spatial plan	Zonation plan considered beneficial by stakeholders	This study*
	Known benefits of MSP	Crowder and Norse (2008)
Extension of the MPA	Large MPAs more likely to achieve desired conservation value	Edgar et al. (2014)

* Proposed by stakeholders

Conclusions

Marine Spatial Planning (MSP) through stakeholder involvement can support the application of an ecosystem-based approach to management and help to implement existing legislation (Gilliland and Laffoley, 2008). In particular, the use of MSP to support ecosystem-based strategies has been recognised as a necessity for the successful implementation of marine management regimes for MPAs in Europe (Douvere, 2008). The present results lay the foundations for the successful implementation of MSP in a Maltese MPA. The study highlights the importance of stakeholder involvement throughout the planning process by identifying potential conflicts and by highlighting the different views and interests concerning the use of a marine space.

For management measures to be effectively implemented through appropriate control and enforcement measures, the recruitment of a MPA manager is an important prerequisite (Gabrie et al., 2012). Given the high number of visitors to the Dwejra MPA on an annual basis, the salary of such a manager could at least in part be funded through the introduction of a visitor fee, which was favoured by three of the six stakeholder groups interviewed. However it is important that the general legal framework is supportive and reflects the most important management concerns. Given that recreational fishing is one of the activities that generates conflicts in the Dwejra MPA, the lack of regulations on recreational fisheries in particular remains a matter of concern.

The introduction of a zonation plan was considered beneficial by most interviewees. A zonation plan has the potential to reduce conflicts in the area, such as those between stakeholders engaged in fishing and diving activities in the relatively small MPA. However, the results of this study reveal that the desired distribution of activity zones and associated activity restrictions remain contentious. A comparison of the zonation scheme initially developed by the Maltese government, the San Lawrence local council, and Nature Trust in 2005 (MEPA, 2005), with an alternative scheme proposed by the PDSA shows that the former is more comprehensive since it includes measures to protect sensitive habitats and species. Consideration of existing ecosystems can be considered crucial for reaching the objectives of a MPA (Claudet et al., 2011). No-take zones in particular can be a valuable tool to preserve fish stocks within a MPA; it has been shown that such zones can have positive effects on the replenishment of fish populations (e.g. Claudet et al., 2006). Such measures are particularly effective if they are implemented in critical habitats, as long as they are appropriately enforced, additional fisheries management measures that prevent increasing fishing effort along MPA boundaries are in place (Kellner et al., 2007; Costello, 2014), and the relevant MPA is of a sufficient size (Edgar et al., 2014).

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