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Understanding social knowledge, attitudes and perceptions towards marine biodiversity: The case of tegrù in Italy



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ABSTRACT

The global decline of marine ecosystems may be partially ascribed to poor governance and to the lack of sustainable use and marine biodiversity conservation policy. Conservation success is strongly related to how people perceive marine biodiversity and those perceptions can change as a result of the accumulation of knowledge, the quality of the environment, and the appropriate and sustainable management of these areas. Engaging the targeted community in the process of promoting and planning safeguarding activities may also contribute to the acceptability and the dissemination of a shared culture of sustainability and a positive change in behavior.

This study investigates people's knowledge, perceptions and feelings toward the protection and improvement of marine biodiversity of coralligenous areas in the North Adriatic Sea in Italy. Several focus groups were conducted in the major towns of the targeted area (N = 107) to explore people's familiarity with marine biodiversity and ecosystem services, and to reveal their opinions and behaviours for certain protection strategies, such as the marine protected area (MPA).

We found that coralligenous habitats are not very well known among the general people; in fact, only 42% of respondents had previously heard about biodiversity in these habitats. However, participants agreed that they provide important environmental services that benefit human wellbeing. Moreover, we found that 80% of respondents had heard before of MPA, and the majority of them were in favor of supporting interventions and policies to protect these areas.

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1. Introduction

Coastal and marine ecosystems provide goods and services that are essential for our well-being (Beaumont et al., 2008). However, they are strongly dependent on biodiversity (Schwartz et al., 2000), which makes them extremely vulnerable to environmental change (Nunes and van den Bergh, 2001). Human activities are degrading the quality of marine biodiversity and thus diminishing the ability of marine ecosystems to provide goods and services (Worm et al., 2006; Petrosillo et al., 2007). The observed global deterioration of marine biodiversity has resulted in a worldwide demand for changing the way the resources of oceans and seas are managed and conserved. Scholars agree that the governmental strategies implemented until now have failed to deliver sustainable use of these resources and to ensure marine biodiversity conservation in many regions of the world (Beaumont et al., 2008; Brooks et al., 2006).

Recent studies have found that biodiversity conservation success is often grounded in local population support, which in turn is strongly influenced by the perception of these resources and the effects that are experienced by local communities (Schultz, 2011; Jefferson et al., 2014). The challenge is to understand how to engage society and stakeholders in supporting biodiversity conservation strategies and sustainable behavior. This new approach to informing society on the importance of marine biodiversity conservation implies a strengthening of the positive connections between society and the sea (Jefferson et al., 2014). Empirical studies demonstrate that policies and activities are necessary to improve the relationship between public managers and communities and between socioeconomic and conservation outcomes (Abecasis et al., 2013; Atkins et al., 2011).

Individual's attitudes are here defined as "psychological tendency expressed by evaluating the natural environment with some degree of favor or disfavor." (Milfont and Duckitt, 2010). How the local community and users perceive marine biodiversity is fundamental for the social acceptance of any conservation policy and for monitoring and evaluating the effects of these policies (Paterson et al., 2011).

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Since perceptions and attitudes towards marine ecosystem management play an important role in any conservation actions, it is fundamental to figure out how this ecosystem works. However, the functioning of marine ecosystems may be more difficult to understand than terrestrial ones due in part to what has been described as the “spatial and cognitive disconnection between society and the sea” (Jefferson et al., 2014). The marine environment is perceived by people living in cities or inland areas as being far away and thus its benefits, services, and impacts appear distant. On the contrary, Ahtiainen et al., 2012 demonstrated that citizens of coastal countries have positive attitude and perception towards improving the state of the resource and biodiversity conservation. In particular Newig and Fritsch (2009) underline the spatial relevance regarding stakeholders' perceptions, meaning that people living in proximity to a natural resource tend to favor its economic use, whereas those living at a greater distance tend to favor resource conservation. Finally, coastal residents reveal a deep connection to the marine environment in terms of different values such as aesthetics, lifestyle, and cultural identity.

Marine environment is strictly connected with human activities, and the close interaction with man determines a variety of negative impacts in a range of temporal and spatial scales (Halpern et al., 2008). For all these reasons, we think that studies on the attitudes and perceptions of local communities are necessary to improve understanding of people's needs and aspirations and to reveal their ideas, opinions, and suggestions on how to protect the marine ecosystem.

To our knowledge, there are few studies in the literature that consider people's perceptions and attitudes toward marine biodiversity and ecosystem quality, even if it is possible to find some papers related to marine environment (Hynes et al., 2014; Jefferson et al., 2014; Jacobs et al., 2015), fisheries (Alexander et al., 2013; Barley Kincaid et al., 2014; Barley Kincaid and Rose, 2014) and marine management options (Gelcich et al., 2009; Pita et al., 2013; McAuliffe et al., 2014; Masud et al., 2014; Engel et al., 2014; Giglio et al., 2015). Jefferson et al. (2014) highlights that the majority of these studies regard coastal or littoral marine ecosystems, where the high levels of biodiversity are strongly threatened by human presence and the effects of economic activities. In these areas, marine resource management assumes greater significance both for local stakeholders and government (Foster et al., 2011); consequently, we have closely examined and identified factors that may facilitate an effective marine resource management.

This paper aims to address the research gap mentioned before by investigating the role of people's knowledge, perceptions and feelings toward the protection and/or improvement of biodiversity in a particular marine ecosystem, i.e., a coralligenous area locally named *tegnù* in the North Adriatic sea in Italy. This marine ecosystem is also the case study analyzed in a wider EU project (<http://www.life-ghost.eu>) whose aim is to assess the impact of the so-called “abandoned, lost, or discarded fishing gears” (ALDFG) on biodiversity and to promote concrete measures for the restoration of an optimal environmental quality.

The objectives of this current study were (i) to understand people's knowledge about coralligenous habitat and its biodiversity; (ii) to gather information on the attitudes of general people toward marine biodiversity; (iii) to identify the perceived impacts and ecosystems services associated with coralligenous habitat; and (iv) to investigate people's perception toward marine protected area as a strategy tool for its conservation. Focus groups were organized among citizens of four different Italian cities (Venice, Bari, Rome, and Livorno).

In what follows, Section 2 will briefly review previous studies on people's perceptions toward marine biodiversity. Section 3 will introduce the case study and the methodology adopted. Section 4

will explain and discuss the results, and Section 5 will end the paper with some conclusions.

2. Previous studies that have examined perceptions and attitudes toward marine ecosystems and marine biodiversity

Studies about attitudes and perception toward marine ecosystem and marine biodiversity are valuable due to their ability to increase awareness and to understand the existing beliefs regarding conservation efforts. The analysis of the existing scientific literature has the additional objectives of understanding which factors may influence marine biodiversity perception and how to increase society's knowledge and people's involvement in this issue. Moreover, through the review of the literature it is possible to understand which aspects of marine biodiversity have been previously examined and those still missing or underestimated, which methodological approaches have been utilized by researches and how to organize our own work on this field. To our knowledge, the first study that specifically considers the perception of marine biodiversity is a research project supported by Cobham Resource Consultants in 1996 regarding the attitudes and perceptions of Scottish people toward their marine environment. The study, based on literature review and an original survey, found that stakeholders appear to have a restricted understanding of biodiversity and of the importance of marine biodiversity but had a better knowledge of some negative environmental externalities related to the marine environment, such as pollution, waste disposal, and overfishing damage.

Later, Suman et al. (1999), within a broader survey regarding the management plan of the Florida Keys National Marine Sanctuary, introduced the concept that different stakeholders hold different positions and perceptions toward biodiversity conservation activities and underlined the relevance of taking into account all the decisive groups in society for an effective management of biodiversity resources. In particular, the authors found that the main differences in stakeholder perceptions were principally attributed to the diverse ecosystem services they enjoyed in a consumptive or non-consumptive way; that is, in a way that determined whether or not there was a physical reduction of natural capital. A correct stakeholder analysis provides significant information on what the stakeholders want, who they interact with and how, and what problems they are experiencing related to marine biodiversity.

Spash (2002) published a very seminal work in the economic valuation field in which he highlights how cognitive and social psychology provides potential insight into the information and preference formation process in the economic valuation of coral reef biodiversity. In a previous paper (1997), the author had already recognized that environmental attitudes and ethical beliefs were found to affect people's willingness to pay for. Later, Spash (2009) reaffirmed that perceptions and attitudes offer a better understanding of value formation, especially for policy purposes. The paper extended the standard contingent valuation method to the theory of planned behavior, using measures of attitudes and perceptions to assess the validity and reliability of willingness to pay a bid.

Knowledge is another important element to consider in explaining people's perceptions and attitudes. For example, Steel et al. (2005) administered a national survey on public literacy about ocean and revealed that the people in the state of Oregon in the US felt they were not well informed about environmental issues and had very little knowledge of oceans and coastal areas. One might expect higher levels of knowledge concerning oceans and coastal management issues among those citizens who frequently visit or live in coastal areas for either recreational or commercial purposes and among those who have strong attitudes about ocean

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