Ocean & Coastal Management 120 (2016) 29–38

Contents lists available at ScienceDirect

Ocean & Coastal Management

journal homepage: www.elsevier.com/locate/ocecoaman

Social networks and information flow: Building the ground for collaborative marine conservation planning in Portofino Marine Protected Area (MPA)

Vasiliki Markantonatou [a, *], Pedro Noguera-Méndez [b], María Semitiel-García [b], Katie Hogg [b], Marcello Sano [c, d]

[a] Department of Life and Environmental Science, Polytechnic University of Marche, Ancona, Italy
[b] Department of Applied Economics, University of Murcia, Spain
[c] UBICA s.r.l., Genoa, Italy
[d] Griffith Centre for Coastal Management, Griffith University, Gold Coast, Australia

ARTICLE INFO

Article history:
Received 26 July 2015
Received in revised form
14 November 2015
Accepted 26 November 2015
Available online xxx

Keywords:
Marine Protected Area
Social Network Analysis
Stakeholder engagement
Information flow
Adaptive resource management

1. Introduction

There is an increasing understanding that the complexity of most ecosystems is matched by equally complex social settings; hence governance aspects, social and ecological systems should be considered together (Ostrom, 1990). Stakeholder engagement is a continuous learning process that increases social capital, deepens mutual understanding and promotes the exploration of possible solutions, facilitating cooperation in decision-making (Hogg et al., 2013; Pomeroy and Douvere, 2008). Particularly in Marine Protected Areas (MPAs) participation is essential for the generation of information, the compliance with common rules and the mitigation of conflicts on the use of marine resources (Folke et al., 2005). Although widely acknowledged by several EU Directives, stakeholder participation is a complicated process that involves expensive and time-consuming procedures, which often results in a limited audience and engagement potential (Pomeroy and Douvere, 2008). Furthermore, the heterogeneity of groups and the emergence of personal interests may pose conflicts or power inequalities capable of influencing perceptions and decreasing the efficiency of policy interventions (Prell et al., 2009). To achieve successful stakeholder participation and adaptive co-management of resources two fundamental components should be considered: the participation of representatives of all actors' perspectives and interests influencing or being influenced by decisions, and the provision of adequate information and tools that will support communication and mutual understanding among stakeholders (Bodin et al., 2006; Markantonatou et al., 2013a).

Information and Communication Technologies (ICTs), ranging from simple dissemination tools such as Social Media and multimedia environments to virtual communication, or sophisticated participatory cartographic platforms, have made significant contributions towards stakeholder engagement, enabling information production and knowledge spillovers (Markantonatou et al., 2013a). These tools integrate multi-disciplinary participatory techniques that advance in cost, time and effort compared to typical approaches, due to their ability to instantaneously transfer information disabling distance obstacles (Merrifield et al., 2012). If used properly, ICTs can make relationships appear remarkably robust and may improve the transparency and efficiency of decision-making processes by integrating accurate information from a wide variety of users (Folke et al., 2005).

Successful stakeholder engagement is not always straightforward but depends on building reliable social networks that will assure horizontal and vertical communication between resource users and government authorities (Prell et al., 2008). The nature and characteristics of these links may vary by different factors. For instance, relationships between actors differ in their interpersonal strength depending on the frequency and quality of communication (Valente, 2012). Strength of ties may affect social processes in

* Corresponding author.
E-mail addresses: v.markantonatou@univpm.it (V. Markantonatou), pedrono@um.es (P. Noguera-Méndez), mariase@um.es (M. Semitiel-García), katie.hogg@um.es (K. Hogg), m.sano@griffith.edu.au (M. Sano).

http://dx.doi.org/10.1016/j.ocecoaman.2015.11.023

resource management such as power relations, information sharing and consensus building (Prell et al., 2009). Stakeholder engagement and information flow may also be influenced by the position of actors in the social network, which can be measured using centrality measures (Borgatti et al., 2009). In communication networks, an actor is considered central if he can quickly interact with other stakeholders of the network; hence he has a strategic position through his contacts for receiving or disseminating information that flows within the network in a short time (Borgatti and Everett, 2006; Wasserman and Faust, 1994). Finally, the communication efficiency and access to resources can be influenced by the network's structure. A disproportionate distribution of ties between actors forming a core-periphery structure is commonly noticed in social networks, having distinct risks and benefits for building collaborate management. In a core-periphery network a small number of central agents or 'hubs' is more densely connected while others maintain fewer connections (Borgatti and Everett, 1999).

Stakeholder Analysis (SA) and Social Network Analysis (SNA) are complementary methodologies that have been used to provide information and guidance for fostering communication, trust and collective learning in natural resource management (de Nooy, 2013; Prell et al., 2009). SA focuses on the identification and prioritization of stakeholders and their characteristics that may hamper the engagement in order to minimize the effort and risks of success (Reed, 2008). SNA moves one step forward and elucidates relationships among actors developed within a social network. It allows a better understanding of how the position of actors and the structure of the network may promote or hinder collaboration in natural resource governance (Crona and Hubacek, 2010).

This study aims to provide an insight into the social networks' characteristics directly involved in supporting stakeholder engagement for sound governance performance and co-management of resources. Conducted at a time when Portofino MPA considers initiating negotiating plans to expand the reserve that is expected to stimulate oppositions, this case study is of particular interest and relevance as it adds value and recommendations that can support participation and information flow between stakeholders. The study was guided by the following research questions:

1. Has the Portofino MPA's social network the ability to support adequate information flow between actors?
2. Who are the stakeholders with the capacity to act as communication hubs and foster social capital in Portofino MPA's social network?
3. How can stakeholder participation be improved, taking advantage of the benefits of ICTs and the position of actors in the Portofino MPA's social network?

The present study highlights the importance of embedding weak ties, which may augment plurality and equal opportunities for the participation of all actors into the engagement process. This is one of the few attempts to examine the benefits perceived through creating interventions geared towards a combination of different participation strategies for sound governance processes and adaptive management of marine resources. Finally, the fact that Portofino represents a typical case of an MPA where decisions usually stimulate opposition from users makes the methodology and results applicable to MPAs of similar context.

2. Materials and methods

2.1. Case study: Portofino MPA and past experience in stakeholder engagement

Since the early 60s several environmental associations and agencies have promoted the protection of the marine area surrounding the Promontory of Portofino's regional terrestrial park. Portofino MPA (Fig. 1) was established in 1999 and is one of the smallest MPAs in Italy (total surface 374 ha). It hosts a significant number of activities such as yachting, scuba diving, small-scale and sport fishing that were practiced intensively long before the MPA establishment. Salmona and Verardi (2001) described the establishment of Portofino MPA as a long and difficult process that took several years to reach a common consensus. The initial Decree of 6 June 1998 for the establishment of Portofino MPA stimulated strong conflicts and opposition from the local community. One year later, a new Ministerial Decree of 26 April 1999 was established that reduced the boundaries of the designated area and amended some regulations for human activities. Public opposition to the MPA establishment were attributed to the lack of updated information available, limited awareness within the local community regarding the future benefits from the MPA and poor stakeholder participation (Salmona and Verardi, 2001). Inadequate cross-jurisdictional coordination between different administrations (MPA authority and Portofino Regional Park) regarding terrestrial and marine regulation has hampered communication and has resulted in legislation inconsistencies.

One of the future targets of the MPA's management Consortium, consisted of the Municipalities of Camogli, Portofino and Santa Margherita Ligure, the Province of Genova and the University of Genova, is to expand its current area in order to improve its conservation capacity. Past experiences and the current inadequate communication between stakeholders in Portofino MPA suggest that the future conservation initiative is expected to raise conflicts and opposition from the local community, bringing forward new challenges in MPA management (Markantonatou et al., 2013b). Consequently, to increase stakeholder participation and support the planning process, a more effective stakeholder engagement process needs to be carefully designed.

2.2. Survey design and data collection

Semi-structured interviews with key stakeholders in 2013 resulted in the compilation of a preliminary stakeholder list. An online survey was designed to identify stakeholders in Portofino MPA and characterize their relationships. The list was updated using the snowballing technique applied through the survey (Appendix A). In snowballing sampling participants were shown the stakeholder list and were asked to nominate other actors who, from their perspective, should be involved in the management of Portofino MPA. The newly suggested stakeholders were added to the list and were invited via e-mail to participate in the survey. The survey was finalized after four rounds, when snowballing elicited no more new names (Areizaga et al., 2012). The complete stakeholder list includes 56, of which 49 actors were initially identified through the interviews and 7 from the snowballing sampling. Stakeholders were then grouped in 10 categories based on the activities taking place in the MPA (Appendix B).

Participants were subsequently asked based on their perception to characterize the strength of their relationship (strong, weak or no tie) with each member in the stakeholder list. To define the boundaries for stakeholder involvement, participants were asked