Attitudes to a marine protected area are associated with perceived social impacts

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A B S T R A C T

Marine protected areas (MPAs) conserve marine biodiversity and ecosystems by limiting or prohibiting resource use in specific areas. Reduced access to a marine resource will invariably impact local communities which reside nearby and utilise those resources. Social dimensions are recognised as crucial to the success of MPAs in meeting environmental goals, however, these dimensions are poorly understood. While much research is focused on developing countries, the majority of recent growth in MPA coverage is occurring in more economically developed settings. This research aims to address this gap by exploring the diversity of social impacts associated with an established MPA on the mid-coast of Western Australia. A range of extractive and non-extractive stakeholders were interviewed to identify the type of impacts experienced and how these are associated with attitudes towards the MPA. The results demonstrate there is a strong association between the nature of the impacts experienced by stakeholders and their attitudes. The social impacts are not distributed uniformly among stakeholders, with some groups of extractive users suffering the majority of the negative impacts and holding highly critical attitudes. The most common adverse impacts affect individual users' well-being including feelings of fear, stress, uncertainty and inequity, while impacts on fishing activities are limited. Those who reported broader scale community or environmental benefits held largely positive assessments of the MPA. Together these results illustrate the importance of identifying and mitigating the full spectrum of social impacts experienced, as opposed to a narrow focus on the disruption of fishing activities or socio-economic impacts alone.

1. Introduction

To combat declining marine ecosystem health and biodiversity worldwide [1,2], the Convention on Biological Diversity has set a global target to conserve 10% of coastal and marine ecosystems through effective and equitably managed systems of Marine Protected Areas (MPAs) by 2020 [3]. Despite significant progress towards this target [currently 6.35% of the global ocean, 4], research suggests MPAs often fail to deliver ecological benefits due to design and management challenges. These may include inadequate regulations or poor enforcement [5], lack of representativeness [6] and capacity shortfalls [7]. In addition, substantial evidence supports that correlations exist between social and ecological performance [8–14], highlighting the central role social factors play in achieving successful ecological outcomes. Given that MPAs are used to manage people's access to natural resources [15], a balanced social-ecological management approach is advocated to improve both ecological and social outcomes [16–18].

Social impacts are all of the social consequences experienced by

humans as a result of a proposed decision or action. They may be felt by an individual, household, organisational or societal level, and include positive and negative impacts [19]. Therefore, considering MPA outcomes in terms of social impacts can provide a useful framework through which potential social issues and successes can be identified [20]. To date, the majority of published social impacts research has occurred in developing nations [see reviews in 11,21,22,23]. This is despite the stronger growth of MPA establishment in developed country settings, with over 70% of the global coverage occurring in the combined territorial waters of the U.S.A, France, United Kingdom, Australia and New Zealand [4]. Previous research on the human aspects of MPAs in developed countries commonly focuses on the socio-economic aspects of establishment [e.g. 24,25–27]. These analyses exclude other potential impacts on equally significant aspects such as mental and physical well-being, the living environment, culture, human relationships, governance and equity [28]. Other studies have focused on selected stakeholder groups, e.g. commercial fishers [e.g. 29,30] or changes in fishing effort [e.g. 31,32]. Although examination of the full

spectrum of social impacts from MPAs has increased in recent years [e.g. 33], it remains an under-represented area of research [34,35].

This difference can be in part explained by Jones, McGinlay and Dimitrakopoulos [21] who found the most common themes of social impacts from protected areas include poverty, health, displacement, power redistribution and human rights. These issues will naturally be more acute in developing countries where there are high levels of dependency on marine resources for livelihoods [36] and governance processes are weaker [37]. However, previous attempts to explore the full spectrum of social impacts from MPAs in developed countries reveal that significant negative impacts do exist. These include tension and conflict, reduced well-being, equity concerns, decreased enjoyment and cultural restrictions [33,38–40]. Some of the positive impacts have been reported include increased respect for the environment, greater recognition as a tourism destination and improved recreational experiences [33,38]. Additionally, social impacts are context specific and are consequently dependent on the social, cultural, political, economic, and historical milieu of the community and project of focus [28]. This is evident within research across multiple countries, which show differing responses to MPAs [13,41]. As a result, the research insights from developing country settings may not be transferable to more economically developed countries.

Social impacts are also significant for MPA management because the formation or change in attitudes as a result of a policy implementation are themselves social impacts [28], and social impacts may influence attitudes towards an MPA via an individuals experiences. Attitudes can be defined as an expression of an evaluative judgement of an object [42]. The multicomponent model of attitude formation, proposes *cognitive*, *affective* and *behavioural* components shape an individual's attitudes towards an object [43,44]. *Cognitive* elements are the beliefs, thoughts and attributes associated with an object. *Affective* elements are the feelings or emotions felt in response to an object. *Behavioural* elements are past behaviours and experiences regarding an object [42]. An individual's experiences of a proposed or established MPA subsequently contribute to the cognitive, affective and behavioural information which shapes their attitudes towards the policy.

Attitudes can also be conceptualised in hierarchy with the other psychological constructs of beliefs and values [45]. Social psychology theories attempt to conceptualise the connections between these constructs to understand their influences on human behaviour. Widely used theories such as Ajzen's Theory of Planned Behaviour [46] and Stern's Value-Belief-Norm theory of environmentalism [47] have successfully shown attitudes flow from values and beliefs, and are influenced by other factors such as personal and social norms. Despite this, specific attitudes are harder to predict from fundamental values and beliefs due to the complexity of unique contextual and situational aspects which can interact and affect attitudes in a variety of ways [46,48–51]. Considering stakeholders' perceived social impacts alongside attitudes allows the role of personal experience to be considered and increase our understanding of the situational drivers of attitudes towards MPAs across contexts. This perspective is also particularly useful to managers as the social impacts of policy implementation are variable through policy design and management, whereas the underlying values of stakeholders are relatively stable across situations [52] and time [53], and therefore difficult to change.

Attitudes towards MPAs are a critical area of concern for managers for a multitude of reasons. Specific attitudes are recognised as a useful predictor of behaviour and behavioural intentions [54,55], which is considered critical for conservation [56,57]. Attitudes also influence the amount of attention paid by individuals to a particular topic, and how well information is remembered [42], supporting recent research which shows that simply providing information or education is not enough to change behaviour [58]. Positive attitudes towards a policy can be a useful indicator of the level of social acceptability of MPA policy. Favourable opinions are considered a position of acceptance and unfavourable opinions a position of rejection [59]. Expressions of support, or a reduction or lack of vocal opposition are considered indicators of communities granting a "social licence to operate" to a project [60]. Following Kelly et al. [61], social licence is an unwritten contract of community acceptance [62] reflecting expectations and opinions about the costs and benefits resulting from a practice or project [63]. Stakeholder support for policy interventions is also critical if 'soft' or voluntary compliance methods are going to succeed in complementing traditional formal regulation [64]. Finally, understanding the drivers of stakeholder support including the role of social impacts has been identified as a critical research need by MPA researchers and managers alike [65].

This paper explores the nature of the social impacts experienced in response to the establishment of an MPA in a developed country setting using a case study on the west coast of Australia. It examines the views of a broad range of extractive and non-extractive stakeholders to investigate how perceived impacts vary between and within stakeholder groups. Stakeholder attitudes towards the MPA are explored to assess the relationship between an individual's direction of attitudes and the impacts they have experienced. This study will contribute to an improved understanding of the drivers of support and opposition to MPAs and provide valuable lessons to inform future MPA decisions in similar settings.

2. Methods

2.1. Case study site

This research focused on a case study MPA, the Jurien Bay Marine Park (JBMP) which is located on the mid-north coast of Western Australia (WA) about 200 km north of the state capital Perth. The region is a biogeographic tropical and temperate convergence zone with high biodiversity and includes a complex seabed topography comprised of islands, sub-tidal and intertidal limestone reefs [66]. The commercial western rock lobster fishery (*Panulirus cygnus*) operates out of the coastal settlements and is the mainstay of the local economies in the region [66]. The fishery was declared limited entry in 1963 and was the first globally to receive independent ecological sustainability certification from the Marine Stewardship Council in 1999 [67]. Depending on quota levels, the fishery has grown to be worth $200–400 million annually, representing the largest single species fishery in Australia [68].

The JBMP is a Category II multiple-use MPA declared in 2003 covering an area of 82,375 ha in state waters out to three nautical miles offshore (Fig. 1). The park is managed by the State Department of Biodiversity, Conservation and Attractions (DBCA, previously known as the Department of Parks and Wildlife, the Department of Environment and Conservation and the Department for Conservation and Land Management). Commercial and recreational fishing in state waters is managed by the State Department of Fisheries, including within the marine park. The park is comprised of six zone types (Table 1) which were developed using an iterative consultative process with a community advisory committee and key stakeholder groups. The DBCA finalised the management plan after consideration of practicality, public submissions and further consultation with key stakeholders [66]. Marine parks gazetted in Western Australia require signing off by the current Minister for Fisheries [69], who provided support after the Central West Coast Professional Fishermen's Association accepted the proposed management plan. Conservation and recreational fishing representatives voiced significant opposition concerning the balance of zoning being too generous to commercial rock lobster interests [69,70]. However, the Government established the marine park in 2003 with no significant amendments and the management plan zoning came into effect in 2005 [69].

The management plan also details the long-term vision and strategic objectives of the marine park, alongside the operational objectives, targets and strategies employed within the life of the management plan. The strategic objectives of the park are: to maintain the marine