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How important is the coast? A survey of coastal objectives in an Australian regional city

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ABSTRACT

Defining goals and objectives is a critical component of adaptive management of natural resources because they provide the basis on which management strategies can be designed and evaluated. The aims of this study are: (i) to apply and test a collaborative method to elicit goals and objectives for inshore fisheries and biodiversity in the coastal zone of a regional city in Australia; (ii) to understand the relative importance of management objectives for different community members and stakeholders; and (iii) to understand how diverse perceptions about the importance of management objectives can be used to support multiple-use management in Australia's iconic Great Barrier Reef. Management goals and objectives were elicited and weighted using the following steps: (i) literature review of management objectives, (ii) development of a hierarchy tree of objectives, and (iii) ranking of management objectives using survey methods. The overarching goals identified by the community group were to: (1) protect and restore inshore environmental assets; (2) improve governance systems; and (3) improve regional (socio-economic) well-being. Interestingly, these goals differ slightly from the usual triple-bottom line objectives (environmental, social and economic) often found in the literature. The objectives were ranked using the Analytical Hierarchical Process, where a total of 141 respondents from industry, government agencies, and community from across Queensland State undertook the survey. The environment goal received the highest scores, followed by governance and lastly well-being. The approach to elicit and rank goals and objectives developed in this study can be used to effectively support coastal resource management by providing opportunities for local communities to participate in the setting of regional objectives.

1. Introduction

Clearly defining and prioritising management goals and objectives is a critical part of what constitutes adaptive natural resource management (NRM). Clear goals and objectives help managers and stakeholders evaluate the effectiveness of management interventions by comparing outcomes of these interventions with

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management objectives, which also helps identify data and information gaps [35,38]. Defining and prioritising management goals and objectives is difficult as it may involve intense stakeholder negotiations [2] to make the trade-offs required to manage natural resources [15,28]. To complicate matters, goals and objectives are sometimes implicit rather than explicit in management procedures, or they are not well articulated [5,6]. As a result, conflicts between stakeholders can (and often do) occur in NRM [38,39]. Conflicts and challenging negotiation processes happen because individuals and groups rate environmental, social, economic and cultural objectives differently based on their worldviews, values and assumptions about the current state of the resource and their expectations for its future state [3,22]. As a result, the process of defining and prioritising management objectives to support decision-making and policy implementation is strongly influenced by powerful groups and leaders, especially in multiple-use areas, such as the coastal zone [10].

The articulation and prioritisation of management objectives for NRM is essential to develop a broad vision about how natural resources are to be used and managed. Targets, which can be explicit or implicit in management plans, give a clear purpose for decisions, also providing accountability and defensibility for the decisions made [26]. Goals and objectives' targets are necessary to evaluate progress and effectiveness of management actions/strategies. A process to clearly define and prioritise management objectives strongly supports NRM because it facilitates the negotiation process between managers and stakeholders. Such process helps stakeholders appreciate the trade-offs involved with decisions [25,26].

This paper describes the outcomes of a collaborative project between researchers, a community group and coastal managers from Mackay (Queensland, Australia) to elicit and prioritise management objectives related to inshore fisheries and biodiversity in the coastal zone of the Great Barrier Reef (GBR). The aims of the research were to: (i) apply and test a collaborative method to elicit management objectives from a community group, (ii) understand the relative importance of management objectives to different stakeholders, and (iii) understand how diverse perceptions about the importance of management goals and objectives can be used to support multiple-use management in Australia's iconic GBR. This is important because Australia attempts to manage coastal resources (e.g. fisheries) using ecologically sustainable development (ESD) principles, which require integrated objectives (social, economic and ecological) to support decision-making [36].

The lack of data on what communities want for their future (goals and objectives) can challenge the effective implementation of ESD in coastal Australia because policies that do not consider local needs and aspirations can be ineffective without public support and participation. As a result the research team submitted the results of the project to management agencies, such as the Great Barrier Reef Marine Park Authority, Queensland Department of Science, Information Technology and Innovation, Queensland Department of Environment and Heritage Protection, and Queensland Department of Agriculture, Fisheries and Forestry. As such, this research is expected to contribute to ESD by providing a methodology that helps elucidate what local communities value and propose how this information can be used to support coastal management decisions following ESD principles.

1.1. Study site

The extent of the Mackay coastal zone is Midge Point in the north to Broadsound in the south, and the tidal region to 12 nautical miles offshore (Fig. 1). Mackay has a population of approximately 75,000 people [1] with a large "Fly in and Fly out" (an employment arrangement characterised by temporarily flying in and out employees to/from the workplace) community associated with the mining industry. Coal mining and agriculture (sugar cane) are the largest economic sectors in the Mackay region [1]. Mackay has two active ports (Fig. 1): the Port of Mackay, which handles sugar and sugar products, grain and petroleum; and the Port of Hay Point, which is one of the largest coal terminals in the world with two coal export terminals (Dalrymple Bay Coal Terminal, and Hay Point Coal Terminal) [18].

Recreational fishing is important to Mackay residents. With approximately 19,200 recreational boats registered it has one of the highest ratios of boats per resident in Australia, featuring one boat registered for every four residents [7]. Fishers in the Mackay region mostly fish where they live because they have access to excellent marine fishing environments, which is reflected in their catches (e.g. coral trout, yellowfin bream, mud crab, pike bream, cod, and barramundi) [9].

Commercial fishing is also important in the Mackay region, where the largest constituent of active commercial fishing licences utilise pot and net apparatus in combination to fish for crab and inshore fin fish species [9]. There are extensive commercial fisheries closures in the region imposed by GBR and Queensland marine parks zoning (Marine National Park and Conservation Park zones) and Dugong Protection Areas declared under the Fisheries Act 1994. Trawling is further restricted to General Use zones in the region while recreational fishers are only restricted by Marine National Park zones. The inshore waters of the Mackay region support both beam and otter trawling. In 2010, 42 otter trawlers caught 252.7 t of fish. In 2011 and 2012, 112.2 and 133.9 t of fin fish were recorded through logbook returns; the downturn in catch was directly proportional to the decrease in active commercial licences during the same period. An increase to 247.4 t was recorded in 2013.

Among the key habitats in the region are coral reefs, mangroves and seagrass. There are also important populations of threatened, endangered and protected (TEP) species groups such as dugongs and turtles [14,29]. Inshore and offshore coral reefs in the Mackay region are extensive and part of the GBR.

The community group selected for the project in Mackay was the Local Marine Advisory Committee (LMAC) (http://www.gbrmpa.gov.au/about-us/local-marine-advisory-committees). The Mackay LMAC boundaries also define the boundary for the Mackay case study. Members of the LMAC include a representative of the Great Barrier Reef Marine Park Authority (GBRMPA), a local councillor, members of the community (including indigenous groups) and major industry stakeholders such as North Queensland Bulk Ports Corporation [8].

2. Material and methods

2.1. Selecting a community group in Mackay

The LMAC meets five times a year, but for this project a more intense engagement process was required for more effective communication about the project with stakeholders and to more thoroughly include their inputs to the project. As a result the project team approached the LMAC to create a volunteer group called the LMAC Reference Group (RG) to meet with the project team more frequently to provide in-depth input and guidance to the project. Given that not all members of the LMAC volunteered for this group, the RG membership was bolstered by names provided by the Mackay LMAC who subsequently volunteered for RG membership through a GBRMPA staff member.

The engagement process pursued throughout the project was mostly with the LMAC RG, with updates and occasional input or endorsement of finalised products from the LMAC. The