



## Why people matter in ocean governance: Incorporating human dimensions into large-scale marine protected areas



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### ABSTRACT

Large-scale marine protected areas (LSMPAs) are rapidly increasing. Due to their sheer size, complex socio-political realities, and distinct local cultural perspectives and economic needs, implementing and managing LSMPAs successfully creates a number of human dimensions challenges. It is timely and important to explore the human dimensions of LSMPAs. This paper draws on the results of a global “Think Tank on the Human Dimensions of Large Scale Marine Protected Areas” involving 125 people from 17 countries, including representatives from government agencies, non-governmental organizations, academia, professionals, industry, cultural/indigenous leaders and LSMPA site managers. The overarching goal of this effort was to be proactive in understanding the issues and developing best management practices and a research agenda that address the human dimensions of LSMPAs. Identified best management practices for the human dimensions of LSMPAs included: integration of culture and traditions, effective public and stakeholder engagement, maintenance of livelihoods and wellbeing, promotion of economic sustainability, conflict management and resolution, transparency and matching institutions, legitimate and appropriate governance, and social justice and empowerment. A shared human dimensions research agenda was developed that included priority topics under the themes of scoping human dimensions, governance, politics, social and economic outcomes, and culture and tradition. The authors discuss future directions in researching and incorporating human dimensions into LSMPAs design and management, reflect on this global effort to co-produce knowledge and re-orient practice on the human dimensions of LSMPAs, and invite others to join a nascent community of practice on the human dimensions of large-scale marine conservation.

### 1. Introduction

A new era in marine conservation has emerged. Within the international conservation arena, there has long been a sustained effort to

promote marine protected areas (MPAs) as a preferred marine conservation policy tool [1]. Through conventions and other efforts (e.g., Resolution of 17th Assembly of IUCN in 1987; the United Nations (UN) Earth Summit in 1992; the World Parks Congress in 2003; the Aichi

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Targets from the tenth meeting of the UN Convention of Biological Diversity Conference of Parties (COP 10); the World Parks Congress in 2014), the international community has agreed on several conservation targets, most notably aspiring to set-aside between 10–30% of the world's oceans in MPAs [2,3]. While setting such targets has not been without its critics [4–7], there has been rapid and increasing growth in the number and spatial extent of MPAs globally. Yet large-scale marine protected areas (LSMPAs) are a relatively new phenomenon.

Similarly to Toonen et al. [8] and as employed by the Big Ocean network of LSMPAs managers, LSMPAs are defined as areas nearly 100,000 miles<sup>2</sup> or more in size (i.e., roughly 250,000 km<sup>2</sup> or more). This definition is significantly larger than the median size of 3.3 km<sup>2</sup> of more than 6000 MPAs established globally by 2013 [9]. Others have defined LSMPAs in different ways – e.g., as larger than 30,000 km<sup>2</sup> [3] or 100,000 km<sup>2</sup> [10,11]. The results presented in this article are relevant to all large scale conservation efforts. In recent years, LSMPAs have offered the largest spatial contributions to meeting international ocean protection targets [8,9]. While Wood et al. [2] projected that the 10% target would not be achieved until 2067, more recent establishment of LSMPAs suggest that the 10% global MPA target may be attainable by c.2035 [9].

Large-scale MPAs originated in 1975, when the *Great Barrier Reef Marine Park Act* established the Great Barrier Reef Marine Park (GBRMP), measuring 344,400 km<sup>2</sup>. The multiple-use GBRMP remained the largest MPA on the planet for 23 years and has continued to serve as an example of the potential of large-scale marine conservation for many subsequent MPA efforts worldwide [12–14]. Then in 1998, the Galapagos Marine Reserve was created by Ecuador and in 2000 United States President Clinton created the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve and in 2001 initiated the process to designate a National Marine Sanctuary (Executive Orders 13178 and 13196). In March 2006 Kiribati declared the Phoenix Islands Protected Area (PIPA) and expanded it in 2008 to 408,250 km<sup>2</sup> in its full legal gazette. In June 2006, using the U.S. Antiquities Act, U.S. President George W. Bush designated the Northwestern Hawaiian Islands as the Papahānaumokuākea Marine National Monument (PMNM). Both PIPA and PMNM were later recognized as UN World Heritage sites in 2010 [15]. At the time, PMNM and PIPA were two of the largest MPAs in the world, and their establishment sparked a new era of large-scale ocean and island conservation, significantly remote and different from the coastal nature of GBRMPA. As the world's largest MPA (at the time) created by a small island developing nation, PIPA inspired the Pacific Island Forum Leaders' Framework for a Pacific Oceanscape and subsequent large scale Pacific Island designations. Together PMNM and PIPA as sister sites convened the first learning network for LSMPAs—the Big Ocean network.

Since just 2009, many new LSMPAs larger than 250,000 km<sup>2</sup> have been declared or existing MPAs have been expanded to this scale [see Table 1 and Fig. 1]. Additional sites have been proposed or declared and are in various stages of development including Marae Moana (Cook Islands, 1,900,000 km<sup>2</sup>), Coral Sea Commonwealth Marine Reserve (Australia, 989,842 km<sup>2</sup>), Te Tau Nui a Hau MPA (French Polynesia, 700,000 km<sup>2</sup>), Kermadec Ocean Sanctuary (New Zealand, 620,000 km<sup>2</sup>), Ascension Island MPA (United Kingdom, 445,390 km<sup>2</sup>) and Tristan da Cunha MPA (United Kingdom, 750,510 km<sup>2</sup>). At the time of this writing, more LSMPAs have been proposed by governments and non-governmental organizations (NGOs).

One reason for the emphasis on MPAs as a conservation tool, including in international targets, is because of their demonstrated effectiveness in achieving ecological benefits. MPAs have been shown to increase target species inside their boundaries, enhance fisheries in adjacent waters via adult spillover and increased reproductive output, while also protecting critical habitats [16,17]. LSMPAs have the potential to provide added fisheries and ecological value relative to smaller MPAs by protecting entire ecosystems, particularly habitats not typically part of nearshore MPAs, such as the deep sea, seamounts, and

pelagic realms [18–20]. In addition, LSMPAs directly protect highly mobile species such as tunas, billfish, sharks and other targeted fisheries species, as well as sea turtles, marine mammals, seabirds and other pelagic species, which are taken as by-catch in pelagic fisheries [8].

Despite the proliferation of LSMPAs, they come with unique social, political, cultural, and economic opportunities and challenges that are poorly understood. First, past research has suggested that management of LSMPAs might be more cost efficient than smaller areas [21]. Yet, there is a very real danger that these LSMPAs will simply be “paper parks” due to lack of resources or capacity to take management actions, monitor or enforce regulations [3,22]. While recent years have seen significant advances and enthusiasm about the potential for technology to aid with monitoring—including drones and satellite data—the will and ability to subsequently enforce restrictions is hampered by costs, operational limitations, policy loopholes, and pressure from the fishing and mining industries [23,24]. Second, Gruby et al. [10] identify a number of important political and governance considerations, including questions about which groups (e.g., NGOs, philanthropic organizations, the private sector, foreign states, national governments, political elites, local people) and what underlying interests (e.g., conservation, fisheries, geopolitics, sovereignty) are driving the process of creating and managing LSMPAs [3,25]. Finally, ensuring equitable distribution of the costs and benefits of LSMPAs to local people and national economies presents both challenges and opportunities [26]. There is the potential for lost economic benefits or opportunities for the fishing and mining sectors, which may form a significant portion of the economy of some countries [10]. LSMPAs may displace or reduce fishing effort, and their contribution to alleviating global issues of overfishing and impacts on associated species is yet to be fully understood [27]. Having received significant attention in the literature on smaller MPAs, the socio-economic impacts of conservation and the displacement of small-scale fishers and indigenous communities from LSMPAs is an additional important ethical and socio-economic consideration [28–30]. On the other hand, LSMPAs also provide unique opportunities to protect cultural heritage and the resources upon which livelihoods are based [31,32].

In 2010, in recognition of the unique management challenges and significant opportunities of LSMPAs, Big Ocean, a peer-to-peer network of managers of LSMPAs, was created with the purpose of developing and enhancing the professional standards of practice, and long-term, effective management of LSMPAs through peer-learning (see <http://bigoceanmanagers.org>). As one of its inaugural efforts, the Big Ocean network of managers and scientists gathered at a three-day think tank in 2011 [8] to develop a bio-physical research agenda for LSMPAs [33]. Three main research themes emerged from this effort: (1) biological and ecological characterization, (2) connectivity, and (3) monitoring of temporal trends. The intention was to provide a framework to help facilitate future joint research efforts between Big Ocean sites, and thereby improve marine management practices worldwide as additional LSMPAs are proposed and established.

Given the rapid and recent growth in designation of LSMPAs and the potential challenges and opportunities associated with their creation and ongoing management, it is both timely and important to explore the human dimensions (HD) of LSMPAs. While interest in the HD of conservation has grown, there remains a surprising lack of full engagement with HD recommendations in conservation practice in general [34,35] and in LSMPAs in particular [10]. Three reasons emerge to explain this oversight. First, the leading paradigm of conservation practice still privileges scientific ecological knowledge and priorities over human dimensions [34]. Yet, research on conservation, MPAs and fisheries management effectiveness consistently highlight that HD considerations are central to the success of conservation [28–30,36–39]. Furthermore, as Richmond & Kotowicz [26] show, not incorporating social, economic and cultural considerations into LSMPAs can lead to significant conflict and resistance. Second, the inclusion of both relevant (natural and social) scientific and non-scientific knowledge into the planning process is challenging [40,41]. Third, the

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