Critical review

Social and economic effects of marine protected areas in South Africa, with recommendations for future assessments

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Research on the socio-economic aspects of marine protected areas (MPAs) in South Africa is reviewed to guide evaluation and integration. After a brief international review, we used declaration notices and management plans to determine the extent to which social and economic objectives have been included in the purpose of MPAs. We then reviewed the current state of knowledge about the social and economic effects of South African MPAs. While many MPAs have purposes and objectives that include some social and economic objectives, these are limited in scope. Most of the MPAs that were declared before 2019 did not include objectives directly related to people or their needs. Social or economic research has been undertaken in fewer than half of the 23 coastal MPAs. Literature is largely limited to: (i) studies on negative impacts of MPAs on adjacent rural communities; (ii) selected aspects of tourism; and (iii) various aspects related to resource use. A wide range of other tangible and intangible effects, including those experienced by a broader set of stakeholders and over differing scales of time and space, have seldom been addressed. A case study on the Tsitsikamma MPA exemplifies challenges associated with understanding the full scope of social and economic aspects of MPAs. We conclude with recommendations to address the challenges of building a better understanding of the social and economic effects of MPAs, ensuring that these are addressed in establishing or revising objectives for each MPA, and assessing the extent to which the objectives meet both human and environmental needs.

Keywords: community needs, conservation, effectiveness, international context, objectives, review, stakeholder perceptions, Tsitsikamma MPA

Introduction

Marine protected areas (MPAs) are not simply conservation tools: they have the potential to contribute to local community needs, to address wider societal issues and to provide opportunities for future generations. However, for this to be realised, far greater attention needs to be paid to the human aspects of MPAs because—like all tools for environmental management—MPAs are social constructs. Internationally and locally, there is a need to understand the complex interplay between the effects experienced by people as a result of the presence of an MPA, and the influence of those effects on peoples’ attitudes, support and ultimately behaviour (McNeill et al. 2018). To improve our ability to manage MPAs we need to assess and measure the effects of MPAs against the multiple objectives of MPAs, including ecological, socio-economic and governance aspects. A better understanding of the objectives for which MPAs are established, the multifaceted social and economic effects of MPAs and the measurement of these effects thus remain essential pieces of the complicated MPA puzzle.

MPAs are widely considered to be one of the most effective tools to conserve biodiversity and address the challenges of habitat destruction and unsustainable resource extraction, and to provide resilience against climate change in marine and coastal environments (Roberts et al. 2005; Gaines et al. 2010; Wilhelm et al. 2014; Lubchenco and Grorud-Colvert 2015; Sala and Giakoumi 2017; Jones et al. 2018; Roberts et al. 2020). It is for this reason that Goal 14.5 of the 2015 United Nations Sustainable Development Goals called for the protection of a minimum of 10% of ocean ecosystems and habitats by 2020 (UN General Assembly 2015). There is increasing evidence of the beneficial ecological effects of MPAs (particularly fully protected areas) around the world (Lester et al. 2009; Edgar et al. 2014). However, in most cases the social and economic effects of MPAs are still largely under-researched (Gaines et al.
In South Africa, calls to better understand the social and economic effects of MPAs have been made since the mid-1990s (Attwood et al. 1997; Beaumont 1997). Despite this awareness of the importance of understanding the social aspects of MPAs, it is only relatively recently that concrete steps have been taken to address socio-economic issues formally in the planning and management of MPAs (Sowman et al. 2014a). Several initiatives have focused on the social and economic aspects of MPAs in South Africa (Sowman et al. 2014a), including university-based research projects (Kruger et al. 2012), initiatives by the national Department of Forestry, Fisheries and the Environment (DFFE), and projects initiated by conservation-orientated, nongovernmental organisations (NGOs) (Harris et al. 2003). To achieve a better understanding of the effectiveness of MPAs, a current collaborative project headed by DFFE and the World Wildlife Fund – South Africa (WWF-SA) is developing an overarching set of objectives against which South Africa’s MPAs can individually and collectively be assessed. The project commenced in 2017 with a workshop comprising multiple stakeholders. The outcome of the workshop was a draft guideline for objectives related to three broad categories pertaining to MPAs: (i) governance, (ii) ecological, and (iii) socio-economic, and a proposed methodology of how to assess the effectiveness of MPAs with respect to these objectives. However, prior to the development of this methodology into an implementable framework, it was necessary to review the current state of knowledge with respect to the three categories. Here, we review the socio-economic aspects of South Africa’s MPAs. An aligned publication in this issue addresses ecological aspects (Kirkman et al. 2021) and a review of governance aspects is in preparation (SL Petersen, WWF-International, pers. comm.).

This article examines the state of knowledge of the social and economic effects of South African MPAs. First, we provide a brief global contextualisation. Second, we review the gazetted purposes and objectives of existing MPAs in the marine territory of mainland South Africa, extending from the shore to the outer limit of the exclusive economic zone (excluding the Prince Edward Islands MPA) to determine the extent to which social and economic objectives have been included. Third, we examine the literature to understand efforts to assess social and economic effects of South Africa’s MPAs and we distil both negative and beneficial effects of MPAs at different spatial and temporal scales. Finally, we seek to draw from this work to make recommendations for future efforts in setting objectives and assessing socio-economic effects for MPAs in South Africa and elsewhere.

Methods

Review of the international context

A review of relevant international literature was undertaken to provide context for the examination of the South African situation. This review is intentionally brief, given the considerable body of research on the topic, but provides perspective for our detailed assessment of South African MPAs. Documents were first sourced from multiple Google Scholar searches using the terms ‘marine protected area/ marine reserve/sanctuary’ and ‘social and/or economic effects/or impacts.’ The titles and abstracts were then read to determine relevance. Thereafter, a ‘snowball’ method was used as relevant references from publications were sourced and added to the list of relevant documents. Several review papers were used to augment the literature review. In total, 34 published papers or book chapters and seven guideline documents were selected as relevant to this review.

Review of declarations of South African MPAs

South Africa currently has 41 MPAs around mainland South Africa, protecting a total of 5.4% of the ocean territory (Figure 1). Together, these MPAs provide protection to a large percentage of the marine ecosystem types found around South Africa (Sink et al. 2019). Historically, these MPAs were designated under a range of different legislation, from provincial ordinances to national environmental acts (Tunley 2009). Sourcing the declaration notices took considerable effort. To begin, those available electronically from the South African Government Printing Works (gpowline.co.za) were downloaded, and older print or electronic notices were obtained from various libraries and through personal contacts. Only 31 of the 41 original declaration notices could be found, and of these 20 were for the MPAs declared in 2019 as part of the Phakisa MPA expansion initiative (DPME 2015; Sink 2016). Each declaration notice was first analysed to determine the stated objectives (purposes). The relevant objectives were then listed and grouped into logical broad social and economic categories, agreed to by all authors. Examples for each category were extracted from the declaration notices to describe them more clearly. Thereafter, the declaration notice for each MPA was reanalysed to determine which categories of objectives were included for that specific MPA. It is important to note that, while various management plans include objectives, the aim of this review was to understand the declared purposes for which each MPA was established.

It is acknowledged that the terms ‘purpose,’ ‘goal’ and ‘objective’ have subtly different meanings and have been used differently over time. For clarity, the term objective has been primarily used in this document to refer to the ‘goals’ or ‘aims’ of an MPA, while the term purpose is primarily used when referring to government declarations. Many earlier MPA declarations refer to ‘objectives,’ while more-recent declarations refer to ‘purposes.’

Review of literature on the socio-economic effects of South African MPAs

Relevant socio-economic research undertaken in South African MPAs was obtained from an extensive review of academic literature published in English between 1985 and 2020. Given the relative scarcity of peer-reviewed literature in this field in South Africa, unpublished internal reports and student theses were included. Google, Google Scholar and university websites were searched using the key words...
To provide a broader South African context, papers that covered issues pertaining to ecotourism, and the social and economic effects of terrestrial protected areas, were also included where relevant. The above documents were augmented by a search of the Web of Science (WoS) database. The WoS database was used to search for publications authored or co-authored by researchers with a South African affiliation. As such, authors could either be locally based or visiting from other countries and conducting research in collaboration with a South African-based institution. Keywords together with Boolean operators were typed into the WoS search engine to extract publications specific to MPA-related publications, including any with a socio-economic theme. In addition, searches were conducted in WoS for 38 other marine science categories, and all socio-economic publications relevant to MPAs were manually extracted and added to the MPA-specific category. Finally, documents available in hard-copy form only were sourced from the library of the Oceanographic Research Institute in Durban, South Africa.

Figure 1: Map of South Africa’s mainland marine protected areas (MPAs). MPAs are numbered from west to east. In 1987 the Langebaan Lagoon and Sixteen Mile Beach MPAs were incorporated into the West Coast National Park but are still recognised as separate MPAs.
Each document was first screened for inclusion based on the title and the abstract (where available) and thereafter by reading the text. A document was considered relevant if it contained information on any social and/or economic effects of an MPA in South Africa. If selected as relevant, the document was analysed to identify the specific social and economic effects addressed (both positive and negative) in that particular MPA. In total, 62 published papers, chapters in books, theses and reports were included in the final summary. The Tsitsikamma National Park MPA is used to highlight the findings, as more research on the topic has been undertaken in this MPA than in any other in South Africa (16 published papers or theses).

Results

International context

Globally, a focus on the social and economic effects of MPAs is relatively recent (Christie et al. 2003; Mascia 2003; Gray et al. 2017). However, increasing evidence of the close correlation between the ecological performance of MPAs and local social factors highlights the critical importance of building social and economic considerations into the planning, design, implementation and monitoring of MPAs (Beaumont 1997; Christie 2004; Agardy et al. 2011; Bennett and Dearden 2014a; Giakoumi et al. 2018). Also important is the need to develop suitable methods to identify and measure the effects, and to ultimately assess the effectiveness of MPAs, particularly with respect to social and economic objectives (Voyer et al. 2014; Ferraro and Pressey 2015; Gurney et al. 2015; Ban et al. 2019). The current bias towards understanding the ecological effects of protected areas is not unique to the marine environment; terrestrial protected-area practitioners have and still are grappling with similar issues (Schreckenberg et al. 2010; Hicks et al. 2016; Corrigan et al. 2017; Kaplan-Hallam and Bennett 2018). Despite the availability of a plethora of guides and tools to assist with the measurement and monitoring of social and economic effects of MPAs (Pomeroy et al. 2004; Stauber and Hatziolos 2004; Wells and Mangubhai 2004; Commonwealth of Australia 2005; Alban et al. 2008; Rodriguez-Rodriguez et al. 2014; Russi et al. 2016), and many calls for a critical examination of social and economic indicators in evaluating protected areas (Christie et al. 2003; Corrigan et al. 2017; Pendleton et al. 2018), a full understanding of the complex and multiple effects of MPAs on people and communities remains elusive. This is, in part, because of a paucity of skills in the field of social and economic research among MPA practitioners (Ferraro and Hanauer 2015), as well as a shortage of baseline information against which change can be assessed. Furthermore, indicators to measure tangible benefits and losses are usually found only in difficult-to-obtain social data, such as those related to food security or income (Mascia et al. 2010). Clear indicators for intangible effects are even more elusive, and are therefore seldom assessed, let alone quantified. Gallacher et al. (2016) produced a useful framework of indicators of MPA success based on biophysical, socio-economic and governance indicators from a review of 105 papers. They noted that three socio-economic indicators were most frequently cited as indicators of MPA success: i) ‘Local marine resource use patterns’; ii) ‘Level of understanding of human impacts on resources’; and iii) ‘Local values and beliefs regarding the marine resources’ (Gallacher et al. 2016). Unfortunately, their framework has not been widely applied, in part because the latter two indicators are difficult to quantify and time-consuming to measure. This highlights some of the broader issues pertaining to marine social science. True interdisciplinary research and associated methodological innovations are needed to speed up progress in this field.

Internationally, many assessments of MPAs focus on positive social effects, thereby potentially biasing perspectives (Corrigan et al. 2017). Proponents of MPAs argue that protected areas contribute to local communities in a myriad of ways, both tangible and intangible, but also recognise that there are negative impacts. Sumaila and Charles (2002) and Blount and Pitchon (2007) have suggested that assessments of effects on people need to take into account: (i) consumptive activities (most commonly fishing, in the South African context, but also mineral extraction); (ii) non-consumptive uses (ecotourism, viewing nature—especially iconic species such as whales or sharks); (iii) existence value (the inherent value placed on the existence of a protected area); and (iv) option value (the value in terms of future uses).

Tangible benefits may include improved catches adjacent to protected areas that enhance food and financial security, employment opportunities in and around the MPA, alternative livelihoods derived from tourism activities or generated from different uses of resources, opportunities for research and education, mitigation of climate change threats, ecosystem services and higher property values (Pomeroy et al. 2004; Mascia et al. 2010; Bennett and Dearden 2014a; Russi et al. 2016; Ban et al. 2019; Cabral et al. 2020; Roberts et al. 2020).

Intangible benefits may involve decreased user conflict with more effective management, political empowerment, greater appreciation of cultural and spiritual heritage associated with an area, future opportunities from increased awareness and demand for ecotourism, enhanced opportunities for recreation, and associated health benefits (Bennett and Dearden 2014a). Emotional benefits such as a greater sense of community and pride have also been noted (Russi et al. 2016; McNeill et al. 2018). More elusive factors such as existence value, sense of place and future-option value have also been considered (Mascia et al. 2010; Voyer et al. 2012). Intangible values related to cultural and spiritual significance, and sense of place and belonging, have been considered by some as being as important as economic values (Masterson et al. 2019). Novel ways to account for these values will be needed to ensure their inclusion in assessments.

Social and economic costs are also associated with MPAs. Tangible costs include management expenses, decreased food security, loss of income from resource extraction (commercial fishing, subsistence fishing or fishing-related tourism), restricted access, and loss of social opportunities (Bennett and Dearden 2014a). Intangible costs may include increased conflict between fishers competing in smaller areas, restriction of choices (loss of access to preferred fishing grounds, loss of flexibility in selection of fishing areas), conflict between managers and communities, power alienation as a central authority takes
over management of an area, inequitable distribution of resources, and other opportunity costs, as well as the undermining of social and cultural practices (Bennett and Dearden 2014a; Voyer et al. 2014; Gollan and Barclay 2020). Changes in the ‘way of life’ and social identity, tradition and sense of place (Mascia et al. 2010; Voyer et al. 2012), and issues of justice and equity, are also often associated with MPA promulgation (De Santo 2013; Gustavsson et al. 2014).

Taken overall, the comprehensive review of 118 studies by Ban et al. (2019) on the social effects of MPAs suggests that protected areas in the marine environment generally provide more positive than negative social effects. They revealed that well-enforced, no-take, old MPAs generally have positive human wellbeing outcomes. However, in many case studies, the perceived effects of an MPA are mixed and related to individual experiences (Bennett and Dearden 2014b; McNeill et al. 2018). The uneven distribution of social effects results in differing attitudes to MPAs. Poorer communities closest to MPAs often experience the greatest negative impacts (direct loss of access to food), but as physical distance from an MPA increases the effects are likely to be more positive (tourism opportunities for national or international visitors). Addressing the concerns of those people directly and negatively affected by MPAs is critical, as their attitudes to MPAs can powerfully influence those responsible for MPA declaration and management (Voyer et al. 2012); and without the support of those affected, the MPA is unlikely to fully achieve its social, economic or ecological objectives.

Trading off the needs of local communities against matters of national interest is not simple, however, and requires a nuanced approach because it concerns issues of equity and justice. There is a risk that assessments of the effects of MPAs may prioritise the needs of tourists because their spending raises the monetary valuation of the MPA (and swells national coffers) at the expense of local communities that are often historically less socio-economically privileged and may be socially or culturally disadvantaged by the MPA. Monetary valuations need to be considered in relation to issues of inequality.

Social and economic objectives of South African MPAs
Nine categories of social and economic objectives were identified across South Africa’s MPA network (Table 1). Fisheries sustainability and resource recovery is considered a dual objective that contributes to both ecological and social goals, particularly considering the role of MPAs in supporting food and job security at a broader scale. Similarly, conflict management assists both social and governance goals. Research and monitoring were considered in their widest sense and thus were deemed to include socio-economic aspects.

Of the 31 South African declaration notices of MPAs examined, all included at least one social or economic objective. Six MPAs had only a single social objective (Table 2). The Aliwal Shoal MPA had the most diverse range and included eight out of nine identified categories of objectives. The most common objective was a provision of research and monitoring opportunities, with environmental education being second among the social objectives (Figure 2). Resource recovery and support in terms of fisheries sustainability was a common purpose of coastal MPAs across all time-periods examined, whereas eco-certification support and associated economic benefits were first reflected only in 2019 (Table 2). Only one MPA, Aliwal Shoal, explicitly included conflict management in the initial objectives in 2004; however, this objective was not incorporated into the revised purpose when this MPA was expanded in 2019. Contributions to cultural and archaeological heritage were included as early as 1979 (in Trafalgar MPA) (Mann et al. 1998) and were reflected in the Stilbaai MPA declared in 2008 and later in several of the new MPAs proclaimed in 2019. Some of the coastal MPAs proclaimed in 2019 included objectives to support the maintenance of spiritual assets and a ‘sense of place’. Protection of maritime heritage (shipwrecks) is formally listed only in the objectives of two MPAs, namely Aliwal Shoal and Amathole Offshore. Although the objectives of several recent MPAs refer to climate resilience, this is in a research context. No MPA notices explicitly mention objectives relating to ecosystem services.

Social and economic effects of South African MPAs
After an extensive literature search, less than 50 studies were found that report on the social and economic effects of South African MPAs (Table 3). This contrasts with the much larger body of evidence for the ecological effectiveness of well-managed MPAs in South Africa (more than 140) (e.g. Buxton and Smale 1989; Bennett and Attwood 1993; Cowley et al. 2002; Branch and Odendaal 2003; Floros et al. 2012; Kerwath et al. 2013; Mann et al. 2016; Kirkman et al. 2021). This suggests that, as has been noted internationally, evidence of the social and economic effects remains scant. Social science research in the South African marine environment has increased steadily since the mid-1990s (Sowman et al. 2013) but, in common with international norms, still lags behind natural science in terms of scientific output and practical implementation (McKinley et al. 2020).

In addition to the studies on various aspects of the social and economic effects of South African MPAs referred to in this review, an important over-arching contribution is that of Sowman et al. (2014a), which provides a comprehensive guide to including human dimensions into MPA planning and management, provides an understanding of which human dimensions relate to MPAs, and suggests steps to identify and integrate these into MPA management. This, together with other overviews concerning both African and other MPAs (Emerton 1999; Wells and Mangubhai 2004; Pomeroy et al. 2005; Malleret-King et al. 2006; Sowman et al. 2011, 2013, 2014a; Sowman and Sunde 2018) suggests that there is no shortage of information as to the social and economic factors associated with MPAs, or of how to include these in MPA planning and management. Despite this, it appears that writing about human dimensions of MPAs is easier than the incorporation of these aspects into the practice of MPA planning and management. Even recent efforts to establish MPAs were unable to incorporate all these factors in the design stage, although their application in management planning was deemed feasible. In a study on MPA management in South Africa, Sowman et al. (2011) concluded that ecologists, fisheries scientists and managers remain unconvinced of the importance...
of including social factors in MPA design, planning and management, regardless of the evidence that these factors are vital for the long-term success of any MPA. Ecologists were, however, among early advocates urging incorporation of socio-economic approaches for management of living resources and MPAs (Heydorn et al. 1992; Odendaal et al. 1994; Lemm and Attwood 2003). But even with calls for participatory consultation with users and local communities in management (Lemm and Attwood 2003) and criticism of the "narrow perspective of MPAs dominated by the natural science paradigm" (Sowman et al. 2011, p 579), research providing insight into the effects of South African MPAs on people and communities—and thus the overall value of these MPAs from a human perspective—remains limited.

Table 1: Nine categories of socio-economic objectives derived from 31 South African declaration notices of marine protected areas (MPAs), with specific examples of gazetted purposes. The locations of the MPAs are shown in Figure 1

| Category of objective                                      | Examples of gazetted purposes                                                                                                                                                                                                 |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recovery of resources and fisheries sustainability         | To allow for overexploited species of fish a sanctuary in which to recover and breed (Pondoland MPA: RSA 2004a)                                                                                                               |
|                                                            | To facilitate fisheries management by protecting spawning stock, allowing stock recovery, enhancing stock abundance in adjacent areas, whilst accommodating appropriate small-scale fisher and recreational access to marine resources within certain zones in the MPA (Dwesa-Cwebe MPA revision: RSA 2015) |
|                                                            | To support the recovery of linefish, rays and sharks by protecting spawning, nursery, foraging, aggregation and refuge areas for threatened and overexploited species (uThukela MPA: RSA 2019) |
|                                                            | To facilitate fisheries management by protecting spawning stock, allowing stock recovery, and enhancing stock abundance in adjacent areas (iSimangaliso MPA: RSA 2019).                                                               |
| Eco-certification and associated economic benefits          | To facilitate seabed and species management including the protection of part of an area of life history importance for kingklip, thereby supporting eco-certification and its associated economic benefits (Port Elizabeth Corals MPA: RSA 2019).         |
| Nature-based tourism and associated benefits               | To promote ecotourism within the MPA (Table Mountain MPA: RSA 2004b)                                                                                                                                                        |
|                                                            | To protect and regulate access to a scenic area which contributes to ecotourism (Tsitsikamma MPA revision: RSA 2016)                                                                                                          |
|                                                            | To support sustainable nature-based tourism opportunities in the area through the protection of marine wildlife (Addo MPA: RSA 2019).                                                                                     |
| Research and monitoring                                    | To provide benchmark areas for scientific research and monitoring aimed at the protection and conservation of biodiversity and ecosystems (Amathole MPA: RSA 2011)                                                                 |
|                                                            | To provide reference sites for research and monitoring, including areas in good ecological condition and areas which may show most clearly the impacts of climate change, and also to promote and contribute to environmental education (iSimangaliso MPA: RSA 2019). |
| Environmental education                                    | To provide reference sites for research and monitoring, and also to promote and contribute to environmental education (Protea Banks MPA: RSA 2019)                                                                             |
|                                                            | To provide undisturbed sites for field education, monitoring of resources and research into exploited species and their ecosystems (Stilbaai MPA: RSA 2008).                                                                   |
| Cultural heritage                                          | To preserve the vywers (traditional stone-walled fish traps), which have archaeological and cultural value (Stilbaai MPA: RSA 2008)                                                                                          |
|                                                            | To protect the cultural heritage of the coastline (Tsitsikamma MPA revision: RSA 2016)                                                                                                                                       |
|                                                            | To protect an area of significant cultural heritage, contributing to the tourism value of a South African National Heritage Site and a World Heritage Site (Robben Island MPA: RSA 2019).       |
| Maritime heritage                                          | To support sustainable nature-based tourism opportunities in the area through the protection of marine wildlife and maritime heritage (Aliwal Shoal MPA extension: RSA 2019)                                                    |
|                                                            | To support sustainable nature-based tourism opportunities in the area through the protection and management of marine wildlife, maritime heritage and cultural assets (Amathole MPA: RSA 2019).                                         |
| Sense of place, including protection of spiritual assets    | To protect and regulate a scenic area to support sustainable nature-based tourism, cultural and spiritual assets and a functionally connected coastal-marine system to retain a land-ocean ‘sense of place’ (iSimangaliso MPA: RSA 2019). |
| Conflict management                                       | To reduce user-conflicts over the use of the Aliwal Shoal (Aliwal Shoal MPA: RSA 2004c).                                                                                                                                  |
A comprehensive review of five South African MPAs, Sowman and Sunde (2018) noted significant negative effects among local communities living adjacent to the MPAs. These included:

- the weakening of local governance rights and processes (notably a lack of effective mechanisms for local community participation in decision-making and associated alienation of communities from conservation efforts);
- loss of tenure rights and access to resources among already marginalised communities;
- loss of livelihoods exacerbating the situation of already vulnerable communities, in some cases leading to decreased household income and increased food insecurity;
- impacts on culture, way of life and sense of place, as well as undermining community cohesion and causing identity fragmentation;
- increased conflict both within communities and between communities and authorities.

These negative effects are highlighted in several examples. In the Eastern Cape Province, local resistance to the closure of...
of harvesting in the Hluleka and Dwesa-Cwebe MPAs led to conflict as community members had been denied a traditional right (Emdon 2013), one that was upheld by the Supreme Court (Gongqose and Others v Minister of Agriculture, Forestry and Fisheries and Others 2018). In the Mkambathla MPA (now incorporated into the Pondoland MPA)—despite attempts by the responsible management agency to consult with the traditional leadership—the traditional authorities elected not to support co-management attempts (Sunde and Isaacs 2008), thus failing to establish lines of communication that might have resolved tensions. In the Maputaland MPA (now incorporated into the iSimangaliso Wetland Park [IWP]), notwithstanding extensive efforts at co-management and the development of community partnerships in local tourism initiatives, there remain many problems associated with tourism fund allocation, infrastructure developments and management, with many community members perceiving no benefits from either local tourism opportunities or co-management efforts (Sunde and Isaacs 2008). Illegal shore-fishing and collection of invertebrate resources in areas zoned for no-take within the IWP have continued unabated (BQM pers. obs.). The roll-out of the small-scale fishery policy (SSFP) has exacerbated this situation as long-term fishing rights were allocated to identified coastal communities, including those living adjacent to MPAs, without cognisance of the MPA regulations (BQM and SJ Lamberth, unpublished data). This has meant that local communities are harvesting with permits in terms of the SSFP, but illegally in terms of the MPA regulations.

Prohibition of all forms of fishing in the restricted (no-take) zones of Table Mountain National Park (TMNP) MPA in 2004 was undertaken with limited consultation with local fishers, and there remains ongoing conflict between different user groups (recreational, commercial and small-scale fishers) and between the fishers and law enforcement agencies (Sowman et al. 2011). Brill and Raemaekers (2013) used law enforcement data and interviews with illegal fishers to determine trends in poaching in the TMNP. The observed increase in poaching suggests that more innovative management interventions are required that integrate both social and biodiversity needs. Conflict also exists in the Langebaan MPA, where the exclusion of local communities from planning and management decisions has resulted in multiple negative impacts, as the management authorities attempt to balance access among different user groups (Sunde and Isaacs 2008) and the competing goals of conservation, utilisation and equitable access.

Positive effects
Despite limited research to examine the socio-economic effects of MPAs in South Africa, benefits have been reported for some of the MPAs that have been investigated (Table 3) (Dicken and Hosking 2009; Kenwath et al. 2013; Lewis 2014; Cele et al. 2017; Schleyer et al. 2018). These include:

- ecotourism opportunities and associated income to adjacent communities;
- opportunities for employment, usually in areas with few other prospects;
- capacity-building opportunities;
- the spillover of fish into adjacent exploited areas to enhance catches;
- existence and bequest values;
- recreational opportunities;
- ecosystem services;
- cultural and spiritual values.

![Figure 2: The number of marine protected areas (MPAs) that include each category of socio-economic objective in their gazetted purpose, out of a total of 31 MPA declaration notices examined](image-url)
| No. | MPA                                | Year established | Research on socio-economic effects | Illustrative references                                                                 |
|-----|------------------------------------|------------------|-----------------------------------|-----------------------------------------------------------------------------------------|
| 3   | Namaqua Coastal MPA                | 2019             | No                                |                                                                                         |
| 5   | Rocherpan                          | 1990, reproclaimed 1998 | No                                |                                                                                         |
| 8   | Malgas Island                      | 2000, incorporated into West Coast National Park | No                                |                                                                                         |
| 9   | Marcus Island                      | 2000, incorporated into West Coast National Park | No                                |                                                                                         |
| 10  | Jutten Island                      | 2000, incorporated into West Coast National Park | No                                |                                                                                         |
| 11  | West Coast National Park           | 1987, 1973, incorporated into West Coast National Park | Yes Schrijvers 2000; Sunde and Isaacs 2008; Sunde 2014; Sowman and Sunde 2018 |                                                                                         |
| 12  | Sixteen Mile Beach                 | 1985, incorporated into West Coast National Park | No                                |                                                                                         |
| 13  | Robben Island                      | 2019             | No                                |                                                                                         |
| 14  | Miller’s Point                     | 1981, incorporated into Table Mountain MPA in 2004 | No                                | Hauck 2009; Sowman et al. 2011; Brill and Raemaekers 2013; Lewis 2014; Saayman 2014; Sowman and Sunde 2018 |
| 15  | Helderberg                         | 1991             | No                                |                                                                                         |
| 16  | Betty’s Bay                        | 1981             | No                                |                                                                                         |
| 19  | Walker Bay Whale Sanctuary         | 2001             | Yes Findlay 1997                   |                                                                                         |
| 22  | De Hoop                            | 1985, revised 2000 | Yes Mnyani 2019                   |                                                                                         |
| 23  | Stilbaai                           | 2008             | Yes Norton 2020                   |                                                                                         |
| 25  | Goukamma                            | 1990             | Yes Pradrervand and Hiseman 2006; Kerwath et al. 2013; Smith et al. 2015; Attwood et al. 2016 |                                                                                         |
| 26  | Robberg                            | 1998             | No                                |                                                                                         |
| 27  | Tsitsikamma National Park          | 1964, reproclaimed 2000, 2016 | Yes Hanekom et al. 1997; Faasen and Watts 2007; Sunde and Isaacs 2008; Kruger and Saayman 2010; Kruger et al. 2010, 2012; Oberholzer et al. 2010; Scholtz et al. 2015; Smith et al. 2015; Ramukumba 2016; Ferreira and Harmse 2017; Saayman et al. 2017; Sowman and Sunde 2018; Lombard et al. 2020; Muhl and Sowman 2020; Muhl et al. 2020 |
| 30  | Sardinia Bay                       | Originally proclaimed in 1974 as Port Elizabeth Sea Reserve, revised 1990, and re-proclaimed 2000 | No                                |                                                                                         |
| 31  | Bird Island                        | 2004, incorporated into Addo Elephant MPA in 2019 | No                                |                                                                                         |
| 33  | Kei                                | 1989, incorporated into Amathole MPA in 2011 | No                                |                                                                                         |
| 34  | Dwesa-Cwebe                        | 2011, extended in 2019 | No                                |                                                                                         |

Table 3: Coastal marine protected areas (MPAs) established around South Africa with evidence of published research with a focus on socio-economic components. The numbers in the left-hand column link to the numbers shown in Figure 1. Several studies included reference to more than one MPA, for example Sunde and Isaacs (2008), Sowman et al. (2011, 2014a, 2014b), Sunde (2014), Sowman and Sunde (2018); these are also included in the table where appropriate. Studies that included protected areas in wider analyses of resource use, such as by Branch et al. (2002), Napier et al. (2005), Harris et al. (2007), and Dunlop and Mann (2012), are excluded from the table as they were not specifically focused on MPAs.
A study of an extremely popular ecotourism attraction in South Africa, the Boulders African penguin colony in the Table Mountain National Park, showed that it attracted over half a million visitors in 2009/10, generating R14.5 million ($1.7 million at R8.28 = US$1) in park revenues (Lewis 2014). With an estimated overall value of R26 million in 2011 ($3.8 million, at R6.77 = US$1), the penguin colony is very important for the local and regional economy (Lewis et al. 2012; Lewis 2014). Saayman (2014) highlighted the considerable non-consumptive value of iconic marine species (i.e. sharks, penguins and whales) in the Table Mountain MPA through a ‘willingness to pay’ study. Shark diving alone in the Aliwal Shoal MPA brings in over R12 million ($1.5 million, at R8.28 = US$1) to the town of Umkomaas and surrounding area (Dicken and Hosking 2009), and SCUBA diving in Sodwana Bay in the IWP generated a direct value of about R75.5 million ($9.3 million, at R8.13 = US$1) in 2012 (Dicken 2014), providing an important source of employment in an area characterised by low levels of employment (Mograbi and Rogerson 2007). Excluding associated job creation, Schleyer et al. (2018) suggest that diving in the IWP involves an estimated R57 million direct expenditure per year. Sport fishing, another popular pastime in the area, brings an estimated R11–20 million ($1.2–2.2 million, at R9.05 = US$1) to this impoverished region (Laing 2013). A study in the De Hoop MPA noted that public—private partnerships (PPP) benefit local communities economically through employment, local enterprise creation and collective income sources, with additional capacity-building and training opportunities; however, these PPPs were less effective in addressing other community needs (Mnyani 2019). In some cases the opportunities for ecotourism have not been achieved, as Dicken (2010) noted the unrealised potential of diving tourism related to the annual sardine run to contribute to communities adjacent to the Pondoland MPA. Likewise in the Sodwana Bay area of the IWP, opportunities for diving tourism to benefit local community members directly remain limited (Mograbi and Rogerson 2007).

The studies described above reinforce the assertion that MPAs are an important component of coastal and marine tourism (van der Merwe et al. 2011; Jonas et al. 2020). In addition to positive economic impacts, MPAs offer a range of recreational opportunities, meeting the needs of both local and international visitors. Despite the importance of this, limited research has been undertaken to better understand the motivations of visitors to South African MPAs, their experiences in MPAs, or the value they place on the existence of MPAs. There are, however, a few notable exceptions. Studies on divers at Sodwana Bay in the IWP, which focused on motivation for, and attitudes towards, diving and conservation, as well as the perceived value of the MPA, highlight the importance of better communication with this stakeholder group to build awareness and support for the objectives of the MPA (Lucrezi et al. 2013, 2017; Schoeman et al. 2016). Kepe (2001) noted that 47% of visitors to the Mkambathi MPA cited fishing as their primary recreational activity, highlighting the importance of fishing to tourism in some MPAs. (In 1999 shore fishing was allowed on 8 km of the 12-km stretch of coastline in the Mkambathi MPA.) A study on the south coast of KwaZulu-Natal Province noted that local community members were positive about the opportunities for tourism and local economic development provided by the Aliwal Shoal MPA, although opinions varied dependent on individual experiences (Cele et al. 2017). In a rare example of quantification of the benefits of spill-over from MPAs for local fishers, a 15-year catch-and-effort dataset provided empirical evidence that catches outside the boundaries of the Goukamma MPA in the Western Cape region increased after the proclamation of the MPA (Kerwath et al. 2013). The authors argue that any costs arising from loss of opportunity are more than

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**Table 3: (cont.)**

| No. | MPA                        | Year established       | Research on socio-economic effects | Illustrative references                                      |
|-----|---------------------------|------------------------|-----------------------------------|-------------------------------------------------------------|
| 35  | Hluuleka                  | 1991, re proclaimed 2000 | Yes                               | Timmermans 2004; Guyot and Dellier 2009; Emdon 2013; Thondhiana and Cundill 2017; Sowman and Sunde 2018 |
| 36  | Pondoland                 | 2004                   | No                                | Kepe 2001; Sunde and Isaacs 2008; Guyot and Dellier 2009; Dicken 2010 |
| 37  | Trafalgar                 | 1979                   | No                                | Sjursaether 2005                                            |
| 38  | Protea banks              | 2019                   | Yes                               | Dicken and Hosking 2009; Cele et al. 2017                   |
| 39  | Aliwal Shoal              | 2004, extended in 2019 | Yes                               |                                                            |
| 40  | uThukela                  | 2019                   | No                                | Holland 1993; Harris et al. 2003; Mograbi and Rogerson 2007; Sunde and Isaacs 2008; Laing 2013; Lucrezi et al. 2013, 2017; Dicken 2014; Sunde 2014; Schoeman et al. 2016 |
| 41  | iSimangaliso              | Declared world heritage site in 2000, extended in 2019 | Yes |                                                      |
|     | Maputaland marine reserve | 1986, incorporated into the iSimangaliso wetland park in 2000 | Yes |                                                          |
|     | St Lucia Marine Reserve   | 1979, incorporated into the iSimangaliso Wetland Park in 2000 | Yes |                                                          |

Illustrative references:
- Timmermans 2004; Guyot and Dellier 2009; Emdon 2013; Thondhiana and Cundill 2017; Sowman and Sunde 2018
- Kepe 2001; Sunde and Isaacs 2008; Guyot and Dellier 2009; Dicken 2010
- Sjursaether 2005
- Dicken and Hosking 2009; Cele et al. 2017
- Holland 1993; Harris et al. 2003; Mograbi and Rogerson 2007; Sunde and Isaacs 2008; Laing 2013; Lucrezi et al. 2013, 2017; Dicken 2014; Sunde 2014; Schoeman et al. 2016
offset by the benefits of improved catches in this area and, therefore, that there are no measurable disadvantages to local fishers (Kerwath et al. 2013). This study is also particularly important because it is one of only a few studies that are based on a before–after, control–impact (BACI) design that explores the biological benefits of MPAs and relates them to fisheries benefits. Interestingly, aerial surveys showed that shore-angler densities inside the Goukamma and Robberg MPAs were lower than those on sections of coastline outside the formal conservation areas, despite these areas being open to shore fishing (Smith et al. 2015). This highlights the multiple factors that influence angler effort distribution and the importance of data against which perceptions of loss or need can be assessed.

Despite their importance, almost no non-market valuations have been undertaken in South Africa’s MPAs. Holland (1993) argued that coastal areas such as Sodwana Bay (within the IWP) have high existence and bequest values, suggesting that visitors to the area valued it for its existence, as much as for what they could ‘extract’ from the area. Traditional healers in communities close to the Dwesa-Cwebe MPA value the sea and the beach as important cultural and spiritual sites (Timmermans 2004), highlighting the potential value of MPAs in protecting such sites. Similarly, intangible benefits such as emotional benefits, spiritual connection to nature or a ‘sense of place’ have not been studied, nor have ‘future potential’ issues been addressed. Despite a lack of research, intangible values such as a ‘sense of place’ were a critical issue advanced both by local communities and conservationists in advocating against mining in the iSimangaliso Wetland Park (IWP) on the east coast of South Africa and was pivotal in a legal decision to deny mining rights there (Hansen et al. 2014). Recent inclusion of more-diverse social and economic objectives in MPA purposes (Tables 1 and 2) calls for new innovative research to explore and assess the accomplishment of such goals.

Ecosystem services provided by MPAs have not been studied in detail, apart from the spill-over of adults and export of larvae from Goukamma, described above (Kerwath et al. 2013). A rare example is a study of sediment generation and entrapment by coral reefs in the IWP, showing that these services have a value between R74.4 and R89.4 million per year ($4.5 million at R16.47 = US$1) (Laing et al. 2020).

Co-management is increasingly advocated as a means of improving the acceptance of MPAs by local communities, and a pilot study of its efficacy was launched by WWF-SA to explore its feasibility for subsistence harvesting of mussels at Sokhulu, adjacent to Maphelane (now incorporated into the IWP) on the east coast of South Africa. Prior to this, poaching both inside the MPA and on the adjacent coast was recurrent, and clashes between harvesters and conservation officers were frequent, with claims of injustice on one hand and illegality on the other (Harris et al. 2003). The pilot study involved establishing co-management committees in which scientists, managers and community members participated, experiments engaging the local community in determining sustainable levels of harvesting, and extensive capacity-building (Harris et al. 2003, 2007). Encouraging outcomes included:

(i) jointly agreed limits to harvesting at sustainable levels;
(ii) preferential access by the local community to the resource outside the MPA; and
(iii) cooperation by the community in respecting the boundaries of the no-take zone. As a result, the protocol developed was spread to 18 other coastal communities undertaking subsistence fishing, including those harvesting resources inside other MPAs (Mann et al. 2014a, 2014b). A follow-up study in the area by Napier et al. (2005) identified key factors that contributed to the success of this co-management approach. These included: (i) community gains exceeding losses; (ii) improved stocks; (iii) training that empowered the community; and (iv) the existence of a ‘champion’ who drove and persisted with the process. Unfortunately, the initial successes of many of these initiatives have eroded since project funding and champions have left (BQM pers. obs.). This highlights the importance of long-term commitments on the part of both the management authority and the adjacent local community, and the potential pitfalls of initiatives driven by short-term projects.

Unlike South Africa’s previously established MPAs, the proclamation process of the 20 new or extended MPAs in 2019 followed iterative and comprehensive consultation with affected stakeholders, including the ocean industry, neighbouring communities, ocean users, scientists and responsible governmental agencies. Two other key principles were that the process integrated both ecological and socio-economic considerations and was based on systematic conservation planning that optimised protection and management objectives while minimising effects on other users (Sink 2008, 2016; Sink et al. 2011).

Case study: Tsitsikamma MPA
The Tsitsikamma National Park (TNP), South Africa’s oldest MPA, is explored as a case study that exemplifies many of the issues raised above, as it is the only MPA in South Africa that has been subject to extensive socio-economic research and incorporation of its application in management (Hanekom et al. 1997; Faasen and Watts 2007; Sunde and Isaacs 2008; Kruger and Saayman 2010; Kruger et al. 2010; Oberholzer et al. 2010; Scholtz et al. 2015; Smith et al. 2015; Ramukumba 2016; Ferreira and Harmse 2017; Saayman et al. 2017; Sowman and Sunde 2018; Lombard et al. 2020; Muhl and Sowman 2020; Muhl et al. 2020).

Surveys undertaken with visitors, local community members and businesses associated with the TNP revealed that the park has a positive economic impact on the local area (as indicated by direct tourist spending, job creation and other social indicators), and that the overall view of the park by the community was favourable (Oberholzer et al. 2010). The fact that 46.7% of employment opportunities in the area were attributed to the park, points to its importance in an area with few other employment opportunities (Oberholzer et al. 2010).

Although the value of the ecotourism opportunities in the TNP (diving, hiking, kayaking, etc.) have not been directly calculated, a study on the economic benefits of all the MPAs in the Garden Route MPA complex (a network of MPAs that includes the Tsitsikamma, Goukamma and Robberg MPAs) found the annual recreational value, fish ‘spill-over’ value and ‘existence’ value of the MPAs
to be substantially more than the cost of management and opportunity losses (Turpie et al. 2006). The financial benefits of the protected areas outweighed costs, even in the short term, and very obviously in the longer term. Using surveys among different stakeholders, Oberholzer et al. (2010) concluded that the park generated a direct income of R16 million to the local economy. Research, often directed at marketing the TNP, has characterised visitors as being primarily young, employed South Africans, who visit the park to relax in a beautiful environment (Ramukumba 2016) while spending considerable amounts of money in the park and surrounding area (Kruger et al. 2012).

Based on (i) the low fishing effort, consistent catch rates and species composition revealed by an analysis of catch-return cards completed by visitors and local people shore-fishing in the areas open for permissible fishing in the TNP between 1991 and 1995 (Hanekom et al. 1997), and (ii) the low economic benefit of this fishing to the local community (McGrath et al. 1997), shore fishing was completely prohibited in the TNP in 2001. This was not an abrupt change, as it followed increasingly restrictive closures after the promulgation of the MPA in 1964 (Lombard et al. 2020). Ever since the first restrictions were applied, local fishers have expressed the view that these regulations infringe on their traditional rights, and some have continued to fish illegally in the protected area (Faasen and Watts 2007). Although members of the local fishing community expressed an understanding of the need for conservation, they disagreed with the need to close the entire park to fishing. As local community members, they considered it their right to fish in the MPA for recreational and subsistence purposes, and 33% supported illegal fishing in the park (Faasen and Watts 2007). Despite this, 15 aerial surveys spanning 2008–2009 detected only 0.03 anglers km$^{-1}$ in the park, compared with 0.38 km$^{-1}$ on the adjacent coast (Smith et al. 2015), suggesting that the number of people fishing illegally in the park was very low. Research suggests that issues of identity and culture are closely linked to access to coastal resources in this area, that these resources do contribute to local incomes and help to supplement diets in the area (Muhl and Sowman 2020), and that these benefits are more important to the fishers than local job creation.

Based on ecological grounds, proposals to open the Tsitsikamma MPA to shore-fishing in response to local pressure were rejected on three occasions (in 1998, 2007 and 2010) by the various ministers responsible for managing the environment in those years (Lombard et al. 2020). However, in 2015 the national authorities again proposed the opening of selected areas of the MPA exclusively for local recreational fishers. During the ensuing stakeholder-engagement process, there was intense public pressure against opening the MPA to fishing; an online petition garnered over 7 600 signatures and more than 300 of the 330 individual written responses to the draft gazette were against the proposed opening of the MPA (Lombard et al. 2020). This response suggests that MPAs are viewed by many people as national assets. However, in 2016 the responsible government agency opened three selected areas of the MPA for recreational shore-angling by registered members of the local community. Although no data are yet published on the impact of this action, in terms of either benefits to the local community or impacts on the fish resources harvested, research on the decision-making process (Lombard et al. 2020) and the perceptions of the local community (Muhl and Sowman 2020) suggest that the final decisions have satisfied neither the fishing community’s desires for access nor the scientists’ conservation concerns.

The contradictions evident in the TNP case study highlight the critical interplay between social, cultural, political and economic issues prevalent in MPA management. The financial or subsistence value of fish removed from the MPA by fishing rights holders may be insignificant when compared with the economic opportunities created by the existence of the TNP, as only 2% of the local community depend on wild foods for survival (Sunde and Isaacs 2008). However, for the local community, access to the marine resources of the park clearly constitutes a social and cultural asset that is very significant. This suggests that intangible social, cultural and spiritual benefits or losses are critical considerations when determining the effects of protected areas and, although difficult to measure and quantify, their importance may outweigh more tangible benefits or losses.

This case study highlights the very different perceptions about the value of the TNP to people. Perceptions range from open hostility to enthusiastic support. The Tsitsikamma MPA thus provides a valuable case study (as detailed by Lombard et al. 2020), as many of the issues encountered in this MPA are reflected in other South African MPAs.

**Discussion**

**Integrative objectives for South African MPAs**

The issues surrounding establishing, communicating and assessing the objectives of MPAs in South Africa are not new. In an early document on problems encountered in South Africa’s coastal zone it was stated that the challenge was "First, to meet the needs and aspirations of all coastal dwelling South Africans, particularly those who are destitute and struggling to survive, while simultaneously preventing degradation of the coast. Second, and concomitantly, to protect vitally important coastal features and processes, thus ensuring that the benefits of the coastal zone can be enjoyed by present and future generations" (Heydom et al. 1992, p xvii). Nearly 30 years later, addressing these two goals remains a challenge.

As far back as 1994 the importance of setting clear objectives for MPAs was stressed in an inventory of South Africa’s MPAs (Robinson and de Graaf 1994). In a 1997 review of MPAs in South Africa it was noted that the objectives of many MPAs are not documented (Attwood et al. 1997). The role of clear objectives in encouraging public support was also stressed. All the more-recent reviews of the state of MPAs in South Africa have reiterated this need for clear objectives and for these objectives to be communicated effectively (Lemm and Attwood 2003; Tunley 2009; Chadwick et al. 2014). The absence of clearly articulated objectives results in many problems, including a mismatch in objectives perceived by managers and those of local community members (Thondhlana and Cundill 2017;
Sowman and Sunde 2018), and difficulties in assessing the value of the MPA.

It is clear from the current analysis of MPA objectives that the range of objectives of MPAs has broadened since the 1997 review, in which the only social objectives related to education and tourism, with fisheries objectives being better represented. In their development of criteria for MPA evaluation, Hockey and Branch (1997) suggested a suite of ‘utilisation’ objectives.

The present review shows that these important objectives are only now being considered, over 20 years later. However, despite this progress, many MPAs still have very narrowly conceptualised social and economic objectives, and many of the objectives that do exist are vague and difficult to measure.

The categories noted in the current suites of objectives are not exhaustive, and new objectives could emerge from future stakeholder-engagement processes. There are many opportunities to include a broader range of objectives for many of the existing MPAs, and these should be determined collaboratively with stakeholders.

**Effects of MPAs**

This review of the social and economic effects of South African MPAs highlights several issues. First, relatively few of South Africa’s MPAs have been evaluated in socio-economic terms and there is limited research to assess the effectiveness of MPAs in this context. This is unsurprising, given that it is a complex undertaking. This is particularly evident when it comes to evaluating less-tangible effects such as spiritual and cultural value or existence value, an example of which is the wellbeing derived from simply knowing that something exists, which is measured by public ‘willingness to pay’ to maintain something (Sowman and Sunde 2018). Nevertheless, such evaluations are essential to objectively assess the effects of MPAs in terms beyond those of their ecological values. The cultural, spiritual and personal values of nature expressed by local communities, as noted in the TNP case study and elsewhere (Masterson et al. 2019), provide a potential bridge of common values to link the needs of local communities with those of conservation officials. Other concepts such as community pride are emerging as additional ‘intangible’ factors in tourism research in South Africa (Scholtz and Slabbert 2016).

As noted, those living closest to an MPA are most likely to experience direct losses, while those at the wider local, provincial or national level are more likely to benefit, so there is a spatial element to the interplay between gains and losses. Because of this, there is a need to balance local, individual and community needs with those of the greater population (society) as well as future generations—namely bequest value. This raises the issue of differing time-scales. Whereas ecological effectiveness can usually be detected only years after implementation of an MPA and the benefits may take time to be experienced (Russ and Alcala 1996; Claudet et al. 2008), the negative social impacts caused by loss of access are experienced immediately. Nevertheless, the reality of biological limits to resource abundance must be considered when short-term human needs are addressed, especially in the context of long-term environmental losses and, ultimately, associated socio-economic debits.

Ensuring user rights while maintaining resource sustainability remains the crux of many discussions about the management of MPAs. Issues of equity—for instance, distributional (who has access rights vs costs), procedural (who makes decisions and how), recognition (acknowledgment of all role-players) and contextual (recognition of the broader political, social or governance context) all require urgent attention (Friedman et al. 2018). The historical context of protected area management is also an important factor that influences support for MPAs, particularly in South Africa, where apartheid resulted in the displacement of people from, or the denial of their access to, protected areas (Attwood et al. 1997; Sowman et al. 2011, 2014a; Dehens and Fanning 2018).

Complicating the challenges of assessing social and economic effects is the fact that the social factors that influence the effects of an MPA are often unrelated to the MPA itself, making it difficult to attribute effects. Such factors include adjacent community population size and growth rate, levels of employment and poverty, overall status of fish populations, opportunities for alternative income, decision-making within the community, input from external agencies (NGO and government), proximity to urban centres, knowledge about and attitudes towards MPAs, and tourism opportunities and capacity, and many of these are difficult to quantify (Pollnac et al. 2001; Pollnac and Seara 2011). Compounding these challenges is a lack of baseline data.

Assessments of the social effectiveness of MPAs are clouded by issues of perception (Bennett 2016). Research suggests that stakeholders experience fear, stress, uncertainty and injustice, even if the MPA has no substantial effect on, for example, their fishing activities (McNeill et al. 2018). While in many cases losses are real, in some cases simply the ‘idea’ of a protected area is enough to generate negative attitudes and a feeling of loss. In South Africa, this attitude is particularly prevalent because of past injustices, including forced removal of people from coastal areas, compounded by the weak development of participatory processes, which breeds mistrust. The lack of participation in the design of MPAs has thus had an overall negative impact on perceptions held by local communities and associated management of MPAs (Sunde and Isaacs 2008; Sowman and Sunde 2018). Pre-existing attitudes towards rules in general may predispose stakeholders negatively towards MPAs, regardless of the actual losses associated with that MPA (Bennett and Dearden 2014a). Perceptions of economic or social loss are therefore critical, as they may mask actual losses or gains, depending on the situation. Research on perceptions can also help to identify latent social effects which can then be addressed (Thondhlana and Cundill 2017).

Beliefs about the ecological effectiveness of MPAs also influence attitudes and support (McNeill et al. 2018). Where evidence of the ecological effectiveness of an MPA is lacking, support decreases (Caveen et al. 2015). The importance of scientific monitoring to provide this evidence or address this perception is critical because, in
the absence of robust evidence, the ecological value of the MPA will always be questioned. Studies investigating compliance with MPA regulations have found that both an understanding of the role and functioning of MPAs and positive perceptions of MPAs and their governance are vital for local support and compliance (Pollnac et al. 2010; Arias 2015; Lancaster et al. 2015; Bergseth 2018; Bennett et al. 2019). Similarly, without evidence of social and economic effects, scientists, stakeholders and managers may continue to rely on perceptions, thereby missing opportunities to recognise and address such effects and to optimise MPA design and management for social and economic development.

This analysis suggests a disconnect between the outcomes of the research that has been undertaken and the current processes to identify social and economic objectives for MPAs. Where effects have been noted, such as cultural value of an area or a particular ecotourism or educational prospect, these should be investigated as opportunities in setting objectives particular to that MPA. In addition to better communication with stakeholders there is a need for closer collaboration between MPA planners, managers, natural scientists, legal teams, social scientists and representatives from local communities.

Ultimately, the effectiveness of any conservation endeavour, including the establishment of MPAs, is largely determined by human behaviour (Mascia 2004; St John et al. 2013; Bennett et al. 2017; Aswani et al. 2018). Therefore, a better understanding of human psychology and behaviour, including the knowledge, perceptions, attitudes, beliefs, values and actions of multiple stakeholders, should become an essential feature of future research in MPAs (Martin et al. 2017). Without a better understanding of people, why they do what they do and how to better support pro-environmental behaviour, many of the challenges facing MPA management will remain unsolved. Fundamentally, the effectiveness of MPAs in the future is likely to depend as much on environmental social scientists’ understanding of people as on natural scientists’ understanding of ecology.

The discrepancies in findings about the social aspects of the TNP highlight differences in sampling and underlying research paradigms (Lombard et al. 2020). The largely qualitative nature of many social studies undertaken to date mean that while rich, detailed information is gathered from representatives of communities, the broader scale of the effects is largely unknown and the results can seldom be generalised (Thondhlana and Cundill 2017). In addition, since much of the focus of available research comes from work undertaken with local communities, the other effect experienced by a wider range of stakeholders have not received adequate research attention. There is a need to widen the research agenda to include a focus on other effects, including tourism and educational opportunities, and to add empirical studies. Recent advances in impact evaluation, including the development of comparative metrics, should be considered to expand our current research paradigms (Ahmadia et al. 2015; Brockington and Wilkie 2015; Baylis et al. 2016; Zafra-Calvo et al. 2020). There is clearly a need to build support for a more inclusive research agenda that will ensure that the social aspects of MPAs receive the same research attention as their ecological counterparts. Traditional knowledge and scientific research do differ, but both have a role to play in building an understanding of the complex reality of ecological systems (see Figure 13.14 in Branch and Branch 2018). In the same way, different research paradigms can be explored to enhance social and economic research within MPAs (Blount and Pitchon 2007). Widening research approaches would contribute to building a better understanding of the multiple effects of MPAs on different stakeholders and at different spatial and temporal scales. The future of MPAs in South Africa requires more multidisciplinary research, with an understanding and acceptance of multiple paradigms (Pflafl et al. 2019). This echoes international calls to mainstream and integrate social sciences more effectively in conservation practice (Bennett et al. 2016, 2017; Aswani et al. 2018; Cochrane et al. 2019).

Understanding of, and engagement with, the structure, needs and priorities of people’s livelihoods and their impact on the environment is an essential component of MPA management. MPAs do not exist in isolation and can only be effectively managed by considering the wider social, cultural, economic, political and environmental contexts. It is often difficult to separate the effects of an MPA from this broader framework. In the South African context, issues of colonisation, racism, politics, history and ownership are compounded with allegations of corruption (Sundstro 2015), lack of management capacity, blurred lines of responsibility within government agencies (Chadwick et al. 2014), poverty, inequality and very low levels of trust or respect between communities and government agencies (with associated lack of respect for legislation), which exacerbate already complex situations. Opportunities for marine-based tourism in South African MPAs have yet to be fully realised, even though tourism, and in particular nature-based tourism, is one of the world’s fastest growth industries (Ardoin et al. 2015). A wide range of social and economic effects therefore need to be identified, studied and relevant lessons applied.

An example of this type of approach emerges from the work of Butler et al. (2020), who analysed the potential benefits of recreational tourist fishing versus artisanal fishing, using the catches of the giant African threadfin Polydactylus quadrifilis in the Kwanza Estuary, Angola, as a case study. This revealed that, based on total revenue, fish caught by the recreational tourist sector were worth anything between 3.6- and 32.6-times more than those caught by the artisanal fishery. However, because of economic leakages between the initial revenues generated and the amounts that accrue to local communities (86.1% of total revenue), the contribution of the tourism fishery to the local economy was reduced to less than that of the artisanal fishery. There are important principles to be learnt from this that are applicable to MPAs. The most critical is that if local communities are to benefit, mechanisms must be sought to reduce the leakages that diminish local benefits.

The successes and failures of MPAs are likely to be influenced as much by the willingness of authorities to invest in the necessary staffing, infrastructure and funding for them to operate efficiently (Findlay 2020) as by the way in
which they operate in relation to neighbouring communities. The theory about what should be done is well developed (Sowman et al. 2014a), but the capacity to implement this wisdom lags behind the knowledge. It is hoped that the following recommendations, based on international and local information, will help to build a more collaborative approach to the research, planning and management of South African MPAs and will help all involved to implement innovative practices to set objectives, identify and measure effects, and thereby track the effectiveness of each MPA, to the benefit of both people and nature.

Recommendations

(i) It is recommended that a clear methodology be developed to enable stakeholders to collaboratively identify current and possible future social and economic effects. This approach to a more impact-orientated evaluation is in line with international trends that seek to promote equity in governance and management (Ahmadia et al. 2015; Ferraro and Pressey 2015; Maxwell et al. 2020; Zafra-Calvo et al. 2020). Once effects have been identified, useful objectives and meaningful indicators can be formulated. These need to be tailored for the circumstances of each MPA, and we advocate that pilot studies be used to refine the procedure. All objectives and indicators should consider local indigenous knowledge as well as scientific information and be based on the specific needs of the various communities associated with the MPA and should be developed in consultation with all stakeholders.

(ii) Where absent, there is an urgent need to develop clear, carefully considered, and assessable ecological, socio-economic and governance objectives for each of South Africa’s MPAs. These should be developed collaboratively by authorities and a wide range of stakeholders, with the assistance of natural and social scientists and facilitators skilled in conflict resolution, as the first step in developing true partnerships between local communities, broader stakeholders and authorities. When considering objectives, it is critical that both adjacent and more-distant stakeholders are considered, as well as current and future generations.

(iii) There is a need to identify and implement innovative opportunities to enhance tangible benefits associated with MPAs to build support for the MPA. Once identified, it is important to follow through with initiatives and to track and report evidence of progress (as can be done through the Management Effectiveness Tracking Tool [METT]; Agardy et al. 2016; Giakoumi et al. 2018). In the absence of visible changes on the ground and regular reporting of progress, the credibility of the stakeholder-engagement process will be questioned and ultimately management may fail. For this reason, local participation in monitoring and evaluation is recommended, such as appropriate citizen-science projects (Potts et al. 2021). This can provide opportunities to build capacity and support, generate mutual understanding and help to ensure long-term commitment.

(iv) Particular attention needs to be paid to resolving historical issues (Harris and Lombard 2018). The development of the methodology discussed in (i) above will require the active involvement and support of both local and national management agencies, and the inclusion of biological, economic and social scientists and communities to develop creative solutions. In some cases, changes may be required to facilitate effective and collaborative management.

(v) Baseline data from which to track management effectiveness in a socio-economic context and the achievement of objectives should be identified and sourced. This should be undertaken in a transparent manner with the participation of stakeholders.

(vi) There is clearly a need for more social science research that builds an understanding of the extent of the effects of each MPA on multiple stakeholders at multiple scales (local, national and global) and different time-scales, and the extent of these effects. Research should help to identify key stakeholders and ensure that planning processes are inclusive and the decisions made are based on scientific evidence. It is recommended that multiple methods be used to build an understanding of the many social and economic effects of each South African MPA.

(vii) Training curricula for MPA managers should be expanded to build a greater awareness of the socio-economic effects of MPAs. It is not recommended that MPA managers become experts in social science, but rather that they understand how social science can benefit their work, support efforts to build the social science knowledge base for MPAs and develop relationships to access assistance from specialists in this field.

(viii) Improved communication is critically needed for future MPA success. Communication efforts should focus on multiple target audiences, including local communities, wider stakeholder groups and local authorities, as well as the broader public. Communication should be tailored for each group and should be an ongoing two-way process.

The findings and recommendations of this study should prove beneficial, not only in South Africa, but across Africa and the wider international contexts of MPA development and implementation.

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