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A governance analysis of three MPAs in Belize: Conservation objectives compromised by tourism development priorities?

Ruth Murray

Department of Geography, UCL, London E1W 3HZ, United Kingdom

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ABSTRACT

This comparative governance analysis of three MPAs in northern Belize identified two different approaches to governance and some significant challenges undermining effectiveness. Across Hol Chan Marine Reserve (HCMR), Bacalar Chico Marine Reserve (BCMR: a World Heritage Site) and Caye Caulker Marine Reserve (CCMR), the challenges stem from a lack of political will for conservation, high levels of tourism for short-term economic gain, a significant lack of community involvement and inadequate focus on evaluating ecosystem health. There were indications of all these challenges at each site, but to differing degrees. At the time the fieldwork supporting this paper was undertaken (2014), Bacalar Chico Marine Reserve, a World Heritage Site, was listed as 'In Danger'. In 2018 this status was removed by The World Heritage Committee, due to steps taken by the government of Belize to introduce 'a moratorium on oil exploration in the entire maritime zone of Belize' [1] as well as improved mangrove protection. Whilst this is positive progress to offer some protection, it could be argued that this move has been made too soon. The majority of challenges highlighted in this paper still remain, and those elements in combination are severely undermining the effective achievement of the conservation objectives of all three MPAs. Focus is needed to address tourism volumes, illegal/over fishing and continued coastal development, to improve governance for the future and ultimately improve effectiveness across the MPAs.

1. Introduction

The Mesoamerican Reef is the largest barrier reef in the Western Hemisphere, stretching nearly 700 miles from the northern tip of the Yucatan Peninsula in Mexico down through the Honduran Bay Islands, touching the coastlines of Mexico, Belize, Guatemala and Honduras [2]. The area has long been known as a biodiversity hotspot and the reefs were once considered to be amongst the most flourishing reefs of the Caribbean [3]. However, due to a combination of natural disturbance events, such as hurricanes, chronic stressors from human activity and climate change, there has been a significant decline in coral cover to just 14%–17% in some areas and increases in macro-algae, impacting the resilience of the reefs and affecting the total ecosystem [3–6].

Belize designated its first MPA, Hol Chan Marine Reserve, in 1987 in the north of the country, at the southern tip of the island Ambergris Caye (Fig. 1), with further designations over the next few years forming a stream of protected areas along the coastline. This paper focuses on three MPAs in northern Belize: Hol Chan Marine Reserve (HCMR), Bacalar Chico Marine Reserve (BCMR: a World Heritage Site) and Caye Caulker Marine Reserve (CCMR) (Fig. 1), as part of a special section of papers analysing 26 MPAs through the MPA governance analysis framework. It draws on fieldwork undertaken in 2014, approved under University College London Research Ethics Committee requirements, which combined participant observation and 33 interviews across Belize City, Sarteneja, Ambergris Caye and Caye Caulker. Those interviewed included government officials, independent representatives and users of the MPAs. Whereas the same government officials covered all three MPAs, the users and independent representatives were split between the three MPAs, to provide specific insight and a balanced view for each MPA. It is important to note that the term 'Marine Reserve' is widely known as an area with no extractions, a no-take MPA. However, in Belize this term is used across all MPAs, despite consisting of multiple-use areas with extraction allowed in certain zones. In this document, the term MPA will be used as standard and 'marine reserve' will only be used if referring to a study area by name, for example, Hol Chan Marine Reserve. To provide further context, the IUCN Protected Area classifications of each MPA are as follows:

E-mail address: Ruth.murray.13@alumni.ucl.ac.uk.

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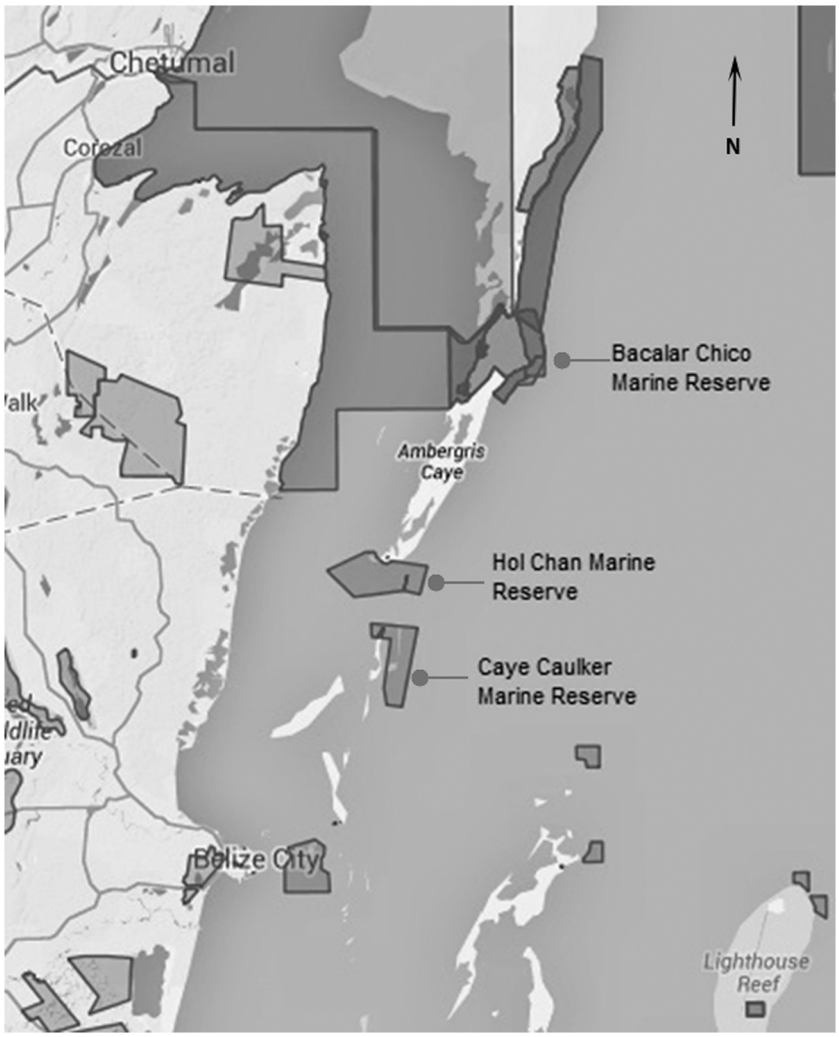

Fig. 1. Map of the MPAs under analysis in Belize: BCMR, HCMR, and CCMR. *Source:* [7]. Scale: approx. 1 cm:10 km.

- Hol Chan Marine Reserve – II National Park: Protected area managed mainly for ecosystem protection and recreation.
- Bacalar Chico Marine Reserve – IV Habitat/Species Management Area: Protected area managed mainly for conservation through management intervention
- Caye Caulker Marine Reserve – VI Managed Resource Protected Area: Protected area managed mainly for the sustainable use of natural ecosystems.

2. Context

The country of Belize was once part of the British Empire but gained independence in 1981. It has increasingly attracted tourists, especially to SCUBA dive or snorkel amongst the rich marine life. Since becoming independent, tourism has boosted economic development, but the country remains a developing country, positioned in the lower rankings of economic statistics, along with neighbouring countries Honduras, Guatemala and Nicaragua [8]. The country suffered a down turn in the economy in 2008 but started to grow again, with 2.5% GDP growth for 2013 [9]. The country is heavily dependent on tourism, fish export and agriculture, with services contributing 64% to GDP (est. for 2012) [9]. Although the GDP per capita is significantly higher than neighbouring countries at $8,800, indicating that the people of Belize have a higher economic wealth, there is a disparity between the wealthy and the poor. A significant proportion (41%) of the population live below the poverty line, a lower percentage than neighbouring countries, yet experiencing higher levels of unemployment at 15.5% in comparison to Honduras (4.5%); Guatemala (4.1%) and Nicaragua (7.2%) [9]. The state capacity is as expected for a developing country at − 0.26 (rank 40.8%) [10] and the Human Development Index (HDI) supports that position with the relative health of society indicating medium development at 0.709, a ranking of 106 in the world in 2016 [11].

3. Objectives

The primary objectives of the three MPAs include both conservation and operational objectives. They focus on four key components: protection of natural resources; protection of fisheries (conservation objectives); recreation and tourism; education and research (operational objectives) (Table 1). There are slight variations regarding key habitats across the three areas, dependent on their location and associated ecosystem under protection, providing additional associated objectives detailed in each management plan [12–14]. BCMR is also one of seven UNESCO World Heritage Sites in Belize, that make up the Belize Barrier Reef Reserve System. Specific outstanding universal values (OUVs) must be conserved to maintain the World Heritage status of the site.

Each MPA is designated as multiple-use with a zoning scheme consisting of a preservation zone, conservation Zone and general use areas (Fig. 2). Each zone has a specific purpose associated with the objectives.

Table 1
Objectives of the three MPAs.

MPA	Objectives
Hol Chan Marine Reserve (HCMR)	To maintain a sample coral reef ecosystem in its natural state. To provide recreation and tourism services and preserve the value of the area for fisheries. To provide an area for education and research. To conserve genetic resources.
Bacalar Chico Marine Reserve (BCMR)	To provide protection to the physical and biological resources of north Ambergris Caye in a region targeted for extensive further development. To provide an area for education and research. To preserve the value of the area for fisheries and other important genetic resources. To develop recreational and tourism services
Caye Caulker Marine Reserve (CCMR)	To preserve and maintain in optimal working condition, representative samples of the ecological systems (including coral reef, littoral forest, caye mangroves, and seagrass) in its natural state on and around Caye Caulker for all people, for all time. To provide natural areas for the promotion of education and research. To preserve the value of the area for fisheries and tourism, including export of larval and adult marine and terrestrial life in addition to other important marine and terrestrial genetic resources and resource-based activities. To develop sustainable and ecologically balanced recreational and tourism services that enhance the economic and social benefits of the area.

Source: [12–14].

4. Drivers/conflicts

Tourism is the primary economic contributor to the economy and its development is the main focus of the Government of Belize. Whilst this was once marketed as an eco-tourism destination it has been replaced by more high volume mass tourism, placing extreme pressures on marine ecosystems. Fish exports remain a significant economic contributor, putting continued pressure on overexploited fisheries, along with high levels of illegal fishing in the region. Increased coastal populations and numbers of tourists have steadily encouraged expansion over the past 25 years, contributing to coastal development, pollution, reef degradation, increased seafood demand and increasing loss and deterioration of ecosystem resources.

4.1. Tourism

Overnight tourism has almost tripled in the past 20 years, from 131,000 tourist night stays in 1995 to 341,125 in 2015 [16,17]. Cruise ship tourism has rapidly increased with numbers totalling 957,975 visitors in 2015 [17], with no carrying capacity restrictions. An estimated 60% of all tourists arriving in Belize go to Ambergris Caye (Fig. 1), as HCMR is the most visited site in Belize, with CCMR also a regular stopping point as a close neighbour and only 30 min away by boat. The volume of visitors arriving at these two small islands every year is over double the total population of Belize. An estimated 50% of people visiting will SCUBA dive and 72% will snorkel [18] resulting in damage to and destruction of corals from touching, breaks, sedimentation disturbances, etc. [4], exacerbated by poor tour guide practices and increased boat traffic. Damage has especially been noted at CCMR, due to high volumes of cruise ship passengers snorkeling a single area in very shallow waters, bringing people closer to the reef and anchors being dropped on the reef due to a lack of mooring buoys. Disturbed sediment settling on corals is significant enough to show a path where snorkelers have been in CCMR. The increased volume of cruise ships emptying liquid waste and polluting the water is inevitably influencing the levels of nutrients and impacting the reefs [19], noted as a major issue of concern in the Fourth Report to the Convention on Biological Diversity (CBD) [20].

4.2. Coastal development

The rise in tourism has also generated an increase in coastal development to meet demands from overnight visitors and to house increased numbers of locals moving to coastal areas for jobs in tourist services. An estimated 75–80% of all coastal land in Belize has been purchased by foreigners to develop into condos, resorts or residential property [19], not only increasing development but also reducing the sharing of benefits for local communities and limiting capacity for growth of small local business. With this level of international investment, the Government of Belize is eager for it to continue.

To support sustainable development, legislation stipulates completion of an environmental impact assessment (EIA) prior to building commencing, but due to weaknesses in state regulation, this is often overlooked and developments proceed regardless. This includes poor construction management, with sediments and pollutants washing into the oceans and concerns of future dredging plans expected as developments move further north towards BCMR [21]. The fragile infrastructure of the small islands is unable to cope with the rate of development, with insufficient or none existent sewage treatment facilities adding to pollution issues [19,22,23]. San Pedro in Ambergris Caye only has sewage treatment in the core of town with nothing further north and there are no treatment facilities on Caye Caulker. High levels of fleshy macro-algae have been reported across all three MPAs, which are likely to be an indication of high levels of nutrients caused by pollution. These concerns have been noted by the UNESCO World Heritage Committee, contributing to the Belize Barrier Reef System (BBRS) being listed as 'World Heritage in danger' in 2009. Additional concerns noted include 'ongoing development affecting the Outstanding Universal Value (OUV)', the inability of the Coastal Zone Management Authority and Institute (CZMAI) to carry out its mandate, and related poor coordination between government agencies [24,25]. Many of these issues were evident during field research discussions.

4.3. Global and national seafood demand

Fish exports, especially the Caribbean spiny lobster (*Panulirus argus*) and queen conch (*Strombus gigas*), are still significant contributors to the total fish export of US$29 m in 2012 [26] and local demand is increasing due to tourism. Numbers of lobster and conch are considered stable, but the number of fishers is increasing [26]. The number of fishing licences issued over 2000 and 2009 increased by approximately 1,000, reaching nearly 3,000 licences [27,28]. With a licence at only $35bz (approximately £12) and no limits to the number of licenses that can be issued, there is little to deter applications, leading to increased effort. Weak enforcement of fisheries regulations, including illegal fishing by locals and incoming fishers from neighbouring countries, is a widespread concern, ranging from undersized catches and fishing out of season to fishing in no-take zones (NTZ) within MPAs. There are also discrepancies in catch records due to a lack of visibility of lobster and conch supplied directly to hotels and restaurants. Only landings processed through the fisheries cooperatives are recorded with the Food and Agriculture Organisation (FAO) and it is anticipated that total extractions are much higher [18]. A reconstruction of catch data in Belize (1950–2008), which incorporated estimated landings for catch supplied directly to hotels/restaurants, estimated total catch at over 3.5 times that officially recorded by the FAO [29]. It is common practice for one

cooler to be filled for the cooperative and another for direct sale. Undersized product that is rejected from cooperatives is not confiscated and often sold on to customers directly [30]. It is believed that over the years this practice and increases in price of product have masked the effects of declining catches and sizes [18] and inaccurate recording could be masking major declines in fish stocks. A 'Managed Access' programme has been introduced to support fisheries and encourage responsibility for resource management, as is discussed later.

5. Governance framework/approach

Two governance approaches were identified across the three MPAs: HCMR is an example of 'decentralised' governance and BCMR and CCMR are both 'Government-led', as defined by the MPA governance analysis framework [31].

5.1. Hol Chan Marine Reserve – HCMR

In 1987, the Government of Belize designated HCMR with finance from the World Wildlife Fund (WWF). The area was created with the participation of the local community and businesses to better manage decreasing fish stocks. Collaborative meetings and discussions between these groups resulted in 70% of those involved agreeing to the designation. It was important to have the involvement of different stakeholders, due to the number of users of the area, and it was the first MPA designated in Belize. A later expansion occurred (Shark Ray Alley) to control conflicts between fishermen and tour guides, using the area to show tourists the marine life attracted by fishermen cleaning their catch. A further expansion took place in 2008 with a further much bigger expansion planned. The MPA is controlled by the Government of Belize under the Ministry of Agriculture and Fisheries (MAF), with shared authority and responsibility via a Board of Trustees (BoTs), 'responsible for management of finance, allocation of funds and re-investment of funds to the site'. Due to structuring of tourist fees and the BoTs, HCMR has become self-sustainable. The relatively large personnel of 16 employees, all Belize Fisheries Department (BFD) officers, include a dedicated education coordinator and a public awareness manager, additional to a biologist who conducts monitoring, a manager and rangers. This decentralised approach and transfer of responsibility, funded directly via tourism through user fees, is the only one of its kind in Belize as the tourist fees from other MPAs are allocated to MAF rather than the individual MPA in question, and this is not a preferred approach by the Ministry of Finance, preventing the model being used elsewhere. Tourism funds are re-invested into the community via education, awareness and outreach programmes, encouraging local participation.

5.2. Bacalar Chico Marine Reserve – BCMR

In the late 1990′s, the area to the north of Ambergris Caye bordering Mexico was identified by environmentalists as a biodiversity hotspot, though local fishermen had already noted a decline in fish stocks. Successful lobbying from both parties led to the designation of BCMR in 1996, though the NTZ was not legally implemented until 2001 [32]. The site was included as one of seven locations in Belize declared a UNESCO World Heritage Site in 1996. The MPA is under full control of the Government of Belize under the MAF, with management conducted by BFD. An advisory board was established, consisting of various private, non-governmental, and other ministerial bodies to represent participation in decision-making, though these appear to be relatively inactive [33]. There are eight staff: a manager, a biologist to conduct monitoring, five rangers and a caretaker.

5.3. Caye Caulker Marine Reserve – CCMR

After lobbying by local fishermen and the community, a poll across community and government determined whether to establish an MPA to protect fish stocks in the bay of Caye Caulker island. With 90% agreement amongst those involved, CCMR was designated in 1998. However, it remained as a 'paper park', allowing fishermen to continue harvesting all marine life until 2008 when rules and regulations were defined and on-site management and enforcement measures were implemented. The MPA is under full control of the Government of Belize under the MAF, with management conducted by BFD. An advisory board was established but this ceases to be active [33]. The personnel consist of just a manager, a biologist to conduct monitoring, two rangers and a caretaker. There are mixed views regarding the involvement of the Forest and Marine Reserves Association of Caye Caulker (FAMRACC), a non-government organization (NGO), who are sometimes referred to as a 'co-manager', but this is not a formal agreement and the relationship with BFD has broken down resulting in no current management activities within the MPA.

5.4. . MPA legislation

All three MPAs are legislated under the Fisheries Act 1981 with specific fishing regulations including: methods, gear type and restricted areas using zoning within the MPA. Each MPA consists of a Preservation Zone, Conservation Zone and General Use areas, with Preservation Zones being strictly no-take (Fig. 2). The complexities of associated legislation and policy across government are vast, with a variety of ministries, agencies and international conventions involved [18]. All MPA personnel have the powers of arrest under fisheries legislation. In 1990, the CZMAI was established to aid sustainable coastal development and to protect MPAs from siltation and land-based sources of pollution with a long-term plan [4]. However, after external funding for this department ran out, the organisation depleted to a skeleton staff of four with no capacity for field work and a diminished lack of influence.

6. Effectiveness

HCMR is the more effective of the three MPAs with an effectiveness score of two (some impacts partly addressed but some impacts not yet addressed), due to the decentralised model, financial sustainability, and autonomy to include local communities and thereby promote their cooperation. CCMR and BCMR both score an effectiveness rating of one (some impacts beginning to be slightly addressed). With regards to effectiveness in achieving core conservation objectives, all three MPAs suffer from similar challenges resulting from inadequate state capacity, lack of political will and a disproportionate political influence in favour of development undermining conservation objectives. The lack of will to control tourism, coastal development and illegal fishing and a distinct lack of focus on enforcement and protecting natural resources, with 'ministerial discretion' in decision making [34], is not sustainable for the long term and is removing focus from delivering the MPA objectives, with concerns regarding the future functioning of ecosystems [24]. There is a belief that if the MPAs had not been designated, fish stocks would be even more depleted [30] and that the additional and increased volumes of tourism and associated impacts could have led to irreversible damage to the marine ecosystem, though this risk remains [24]. The loss of independent and cross-jurisdictional influence from the CZMAI has also weakened decision-making capacity to influence and support sustainable development. CCMR is the least effective and is severely compromised by extremely weak management, low community participation, lack of enforcement and continued illegal fishing. In the light of these concerns, the recent removal of the 'In Danger' status relating to The World Heritage Site of BCMR, is considered to be premature. The steps taken that resulted in the de-listing do show some will to make improvements, but they are not addressing the core challenges impacting these MPAs. This scenario reflects similar concerns that were raised regarding the Galapagos Marine Reserve in 2013 [35].

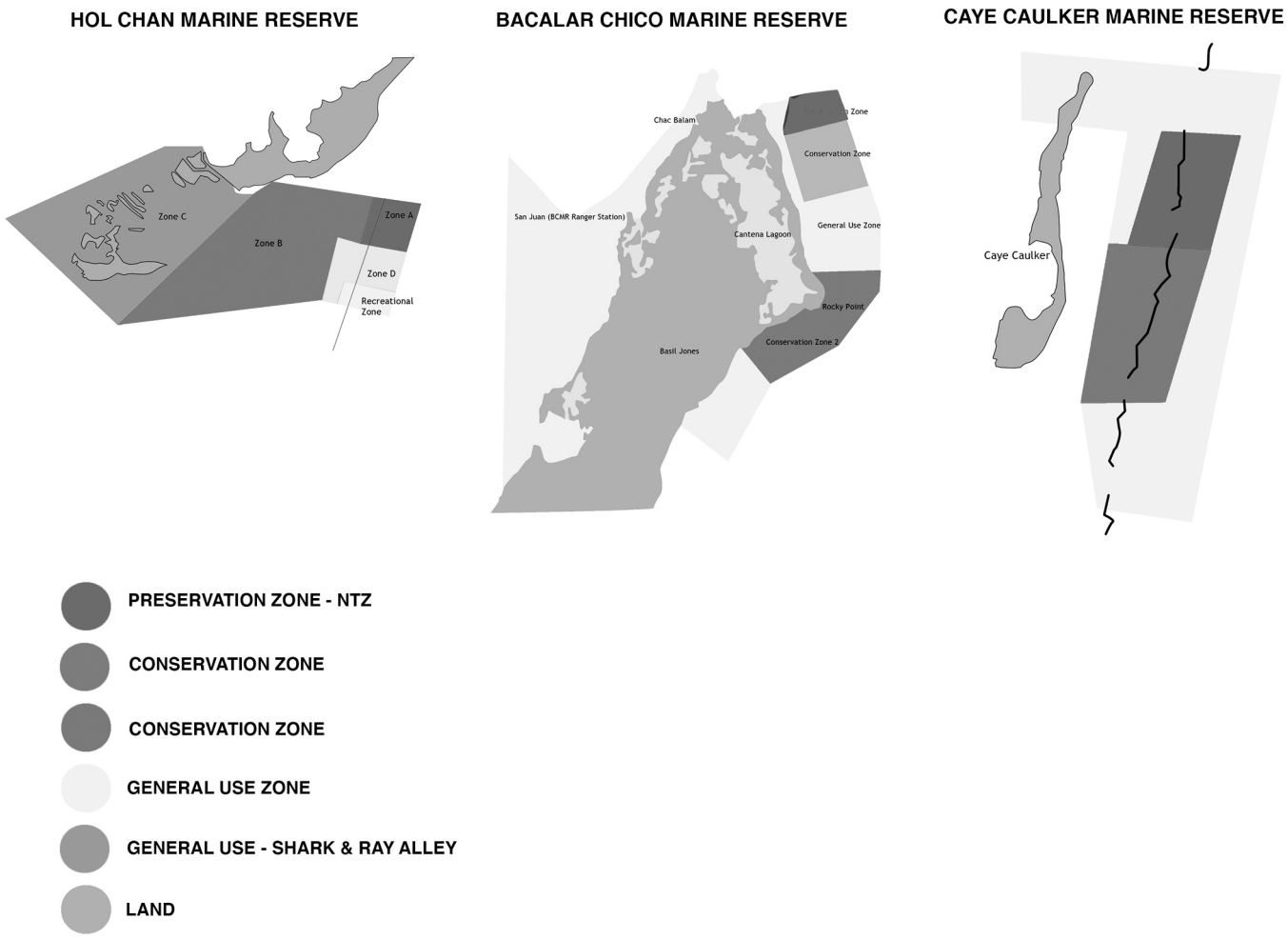

Fig. 2. Images of MPA zoning schemes - HCMR, BCMR, CCMR.
Source: [15].

7. Incentives

Despite differences in governance approaches, there are relatively minor differences in incentives utilised across all three MPAs. Table 2 compares the incentives used and those that are particularly important priorities for strengthening or introducing to improve effectiveness. Further details on the how the incentives were actually used for each MPA and why some need strengthening or introducing can be found in the Supplementary Materials to this paper. The strong use of economic incentives and a lack of legal incentives is a pattern shared across all, although HCMR demonstrates the use of more participation incentives due to the involvement of the BoTs and involvement of the local community. Communication incentives are supported across all three zones by HCMR and the joint activities that the BoTs fund.

7.1. Economic

The growth of tourism has provided alternative livelihoods (I-6) for some who may have been displaced from fishing by the designation of the MPAs. Many fishermen have moved into hotel/restaurant ownership or tour guiding, either full-time or combined with fishing at the opening of a season. There are limited local growth opportunities however, as international businesses flood into the area reducing the benefits available to locals (I-3). A small community based organization, Sarteneja Alliance for Conservation and Development (SACD), based in a remote fishing village, has supported fishermen who cannot benefit from tourism, using grant funding for a livestock production programme, with approximately 50% of fishermen in that area involved, though this is not suitable for all and this has created some hostility.

HCMR benefits directly from tourism for financial stability through the collection of user fees that are allocated to this MPA, the lack of this opportunity being a critical issue for BCMR and CCMR as they have to rely on government funding that is insufficient to provide enough resource (human and financial) [22,36]. The already restrictive BFD budget was reduced again by US$250,000 for 2014, worsening the situation (I-9). CCMR is particularly suffering from insufficient funds with absent demarcation buoys for over three years and a lack of moorings for tourist boats, which often drop their anchor on the reef instead. Illegal fishing here is widespread, including from fishermen outside of the community (I-3) and insufficient fuel for patrols is preventing adequate enforcement. BCMR also suffers from lack of fuel for patrols and illegal fishing from the Mexican border. CCMR and BCMR could benefit from private sector funding or the involvement of an NGO to build stronger foundations for the management of the MPA (I-10).

Attempts have been made to introduce sustainable fishing by introducing gear restrictions, closed seasons and bans on fishing methods, which has reduced impacts on habitats to some degree. A planned expansion to HCMR will also introduce further bans on gill nets. However, neighbouring countries are undermining the benefits available to local fishermen, through illegal fishing by their incoming fishers to HCMR. In some instances, Guatemalan fishermen have been granted fishing licences in return for political support, i.e. patronage. Without measures to reduce the loss of benefits, those who have given up rights for the MPA are at a disadvantage due to unfair usage rights. A ‘Managed

Access' programme, piloted in the south of Belize to provide location-based fishing rights for specific fishers (I-2), could increase benefits and provide some form of ownership and responsibility for the fishermen, with potential to reduce illegal fishing and the related leakage of income (I-3), as well as reducing the limitations of open access [28]. Early pilots proved successful, but these can only be sustainably successful if there is transparency, trust and wide-scale involvement.

Where Belize was once promoted as an eco-tourism destination, this can no longer be claimed, as large-scale cruise ship tourism dominates tourism numbers [16,17], negatively impacting the marine ecosystems and reducing economic benefits to locals through the dominance of short-stay visitors from cruise ships.

7.2. Communication

Most awareness-raising and communication comes from the HCMR management team, covering all three MPAs, mainly focused on education through schools and other children's activities. The local community around CCMR benefits from the resources of HCMR. Every year, for the past nine years, HCMR hosts 'Reef Week', bringing together all three MPA staff to present to the community and run competitions and trivia with local children. There are other school projects run throughout the year at both Ambergris Caye and Caye Caulker. Tour guides receive annual 1:1 training to get updates on the MPA, including rules and regulations, but resource is limited at CCMR, negatively impacting effectiveness and often resulting in rules being ignored. Minimal tourism guidance at BCMR is provided by tour guides from the other two locations. Aside from these specific activities, there is little else to provide information on the MPAs. The BFD rely on pamphlets, although none were seen during the field study and this is a recognised limitation. Interpretative incentives could be utilised more effectively with fishermen as there is still a lot of confusion. Where one understands benefits to the MPAs are to "Save for a better tomorrow", the next four will believe that BFD is trying to end fishing altogether and feel that they are being marginalised, receiving no benefits from the MPAs. A lack of comprehension coupled with significant self-interest is leading to a lack of cooperation and more effort is needed to engage these stakeholders.

7.3. Knowledge

There is little use of local knowledge (I-14) across all three MPAs, instead relying on expertise from external sources, often attached to funding programmes, which supports arguments against top-down governance approaches involving strategies built without knowledge of local conditions [37]. Valuable expert knowledge from the CZMAI is overlooked and local knowledge was only used in early stages prior to MPA designations, when local fishermen were consulted regarding the fishing grounds. More recently, fishermen have been called upon again regarding the Managed Access programme to help build a workable strategy, but there is not a regular platform to utilise knowledge. To reinstate the CZMAI to its full potential would be a great advantage to all to provide an independent and holistic expert perspective (I-16).

7.4. Legal

There is a clear lack of legal incentives being employed within these MPAs, especially at BCMR and CCMR. Although a legislative framework exists, lack of political will and cross-jurisdictional coordination (I-22), and a disproportionate political influence is undermining enforcement (I-18) and the application of sufficient deterrents (I-19). Vanzella-Khouri [38] identified a lack of political will as the core of many challenges that MPAs face across the Caribbean. Corruption was discussed openly throughout the field research and has previously been identified as a significant issue in Belize, especially with regards to 'environmental and tourism legislation' [39]. The legal framework applies penalties for deterrence (I-19), but they are so inadequate that often infractions continue, as people are happy to pay the minimal fine, or political connections and bribery are regular alternatives. Poor enforcement (I-18), due to insufficient resources to conduct patrols or respond to infractions, allows illegal activity to go unchecked. In some cases, deals are alleged to have been made between enforcement officers and tour guides or fishermen to 'look the other way' for a price. Enforcement is marginally more effective at HCMR as there are more regular patrols available due to the better financial status. A lack of transparency (I-26) between government and the public does little to build confidence that actions are in the best interest of the community and the future of the MPAs. Even at HCMR, local community support for the MPA is waning as perceptions grow that funds from the MPA are going to the staff and not to the community, due to poor communication and transparency. It has been recognised that the management of these MPAs 'has not been run that well up to now' (anonymous interviewee).

There is a great need for a thorough legislative review and some increased influence of the hierarchical obligations (I-17) through legal adjudication (I-25), as without an enforceable legal framework there cannot be effective governance [31]. It has been stated that there is a fundamental lack of understanding of sustainability and all that it implies from top-level decision making, through to the average citizen [34] which could be impacting decisions surrounding environmental protection. A long-term project with the Global Environment Fund (GEF) for development in financial and governance strategies may force collaboration between ministries to seek appropriate long-term goals. Political pressure from the UNESCO World Heritage Committee and the CBD may also provide some influence for improvement of future development plans and re-instating the CZMAI, to help balance the current prioritisation of tourism development, though the delisting of BCMR as 'at risk' could undermine this.

7.5. Participation

There are few options for participation by people from local communities. Advisory boards (I-28) were established at BCMR and CCMR to incorporate broader stakeholder involvement in discussions and decision-making, but these have ceased to be active [33]. The BoTs for HCMR is the exception and they meet regularly every two months to actively collaborate and progress in a more dynamic manner. The decentralisation of responsibilities (I-31) at HCMR has enabled this more flexible approach, although community participation could be improved in decision-making. There are indications that BFD are reluctant to delegate or accept community support, as previous attempts of peer enforcement (I-32) at CCMR were stopped by BFD due to them not having the 'relevant authority'. In addition, reports of illegal activity are regularly ignored, or cases are not progressed, due to political intervention. The involvement of an NGO would greatly benefit CCMR to assist the local community with participation and to establish a collaborative platform (I-28) within the local community and the BFD. Decentralisation or shared responsibility (I-31) with an NGO has been successful with many other MPAs in Belize, which have evidence of greater success than government-led MPAs [33].

Table 2
Incentives identified as used or needed in governance of the three MPAs.

Marine Protected Area	*Hol Chan Marine Reserve*	*Caye Caulker Marine Reserve*	*Bacalar Chico Marine Reserve*
Incentive (I)	*Used or needed*		
Economic			
2. Assigning Property Rights	N*	N*	N*
3. Reducing the leakage of benefits	N*	N*	N*
4. Promoting profitable and sustainable fishing and tourism	Y*	Y*	Y*
6. Promoting diversified and supplementary livelihoods	Y	Y	Y
8. Investing PA Income/funding in facilities for local communities	Y	N*	
9. Provision of state funding	Y*	Y*	Y*
10. Provision of NGO, private sector and user fee funding	Y	N*	N*
Communication			
11. Raising awareness	Y	Y	Y
12. Promoting recognition of benefits	Y	Y	Y*
13. Promoting recognition of regulations and restrictions	Y	Y*	Y*
Knowledge			
14. Promoting collective learning		N*	N*
16. Independent advice and arbitration	Y	N*	N*
Legal			
17. Hierarchical obligations	Y	Y	Y
18. Capacity for enforcement	Y*	N*	N*
19. Penalties for deterrence	N*	N*	N*
20. Protection from incoming users		N*	N*
22. Cross-jurisdictional coordination	N*	N*	N*
23. Clear and consistent legal definitions	Y	Y	
25. Legal adjudication platforms	N*	N*	Y*
26. Transparency, accountability and fairness	N*	N*	N*
Participation			
27. Rules for Participation	N*		
28. Establishing collaborative platforms	Y*	N*	N*
29. Neutral facilitation	Y*		
31. Decentralising responsibilities	Y	N*	
32. Peer enforcement		Y*	
33. Building trust and the capacity for cooperation	N*	N*	
34. Building linkages between relevant authorities and user representatives		N*	
36. Potential to influence higher institutional levels	Y*		

Incentives applied (Y), including those that are particularly important priorities for strengthening (Y*) and introducing (N*), blank field indicates incentive not discussed as a particular priority in interviews (Detailed versions – Supplementary Material)

8. Cross cutting issues/factors

8.1. Role of NGO's

There is very little NGO involvement across these three MPAs, with some support for educational activities at HCMR and for independent scientific reef research at BCMR. The success of NGO involvement in the south of Belize is evident, as with many other MPAs around the world where state capacity is limited. The involvement of an NGO to influence decisions on behalf of the community and to provide some transparency would be greatly beneficial, especially at CCMR where the community is increasingly frustrated by the lack of action, transparency and accountability.

8.2. Equity issues

There is inconsistency and irregularity regarding the distribution of access to fishing areas, which is far from equal or fair. Some fishermen from CCMR gave up their 'rights' to fishing grounds that had been passed down through generations, in favour of the MPA. Consequently, some of those grounds were given to fishermen from a neighbouring island and remaining areas are often invaded by fishermen from other areas of Belize, who steal lobsters caught in traps before the owning fisherman can retrieve them. Similarly, restrictions on fishing type were enforced across all MPAs, though at HCMR one fisherman is still allowed to use restricted methods because 'he's been doing it for years'. There are also issues between local tour operators and those connected to cruise ships, with inconsistencies over regulations on boat size, duration at snorkelling spots and numbers of visitors.

9. Conclusion

It is increasingly important for MPAs to have effective governance to achieve their objectives and mitigate the impacts from anthropogenic and climate change stressors [31]. There are significant challenges with these three MPAs fundamentally stemming from a lack of political will, poor community inclusion and a disproportionate focus on economic development through tourism and fish exports. Resource is a major challenge in the form of finance and skilled people who can be trusted to carry out vital roles within the management system of the MPAs, particularly enforcement. HCMR is the most effective of the three due to its decentralised responsibilities and financial sustainability, which has enabled a team of trained and capable staff and community involvement, producing a more effective governance structure. The lack of effective monitoring and ecosystem condition monitoring in all areas needs to be addressed to fully understand the rate and extent of decline in habitats and marine populations within and around the MPAs. The importance of these designations needs to be recognized by the Government of Belize as the long-term outlook is not looking very positive, with the rate that reef health is declining and pressures continue to rise. There must be improved collaboration, more focus on enforcement and overall management to encourage sustainable use. At a time when these areas should be getting more focus from the Government of Belize, it is questionable whether this was the time right for removal from the 'World Heritage in Danger' list, as it could be argued that the moratorium on oil exploration distracted from a lack of attention to address the other challenges facing these MPAs. Certainly, there remains a need to address the impacts of tourism and fishing if these three marine 'reserves' are to better achieve their conservation objectives and the role of the World Heritage Committee to 'encourage' political will to do this remains an important potential opportunity.

Declaration of Competing Interest

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The only affiliations are previously with the Department of Geography at UCL, as a MSc student.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2020.104243.

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