

# Managed Access: Moving Towards Collaborative Fisheries Sustainability in Belize

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**Abstract.** The Belize Fisheries Department (BFD) is leading a coalition with the Toledo Institute for Development and Environment (TIDE), Wildlife Conservation Society (WCS), Environmental Defense Fund (EDF) and Belizean fishers, to explore Managed Access as a fisheries management policy for Belize. This is in response to concern over increasing numbers of fishers, decreasing fish landings, and illegal fishing by Guatemalan and Honduran fishers, who sell Belizean marine products outside Belize, bringing no benefit to Belizean communities. Managed Access limits access to General Use Zones within reserves, restricted by a licensing system to “traditional fishermen”, as defined via community consultation with guidelines produced by BFD, and which establishes catch limits for commercial species that fishers depend on for their livelihoods. Program effectiveness is measured via collection and analysis of catch data from licensed fishers in the short term, and the biological response and economic outcomes in the long term. Two pilot sites have been selected; Port Honduras Marine Reserve (PHMR), co-managed by BFD and TIDE, and Glover's Reef Marine Reserve (GRMR) managed by BFD with support from WCS. The program, launched in July 2011 in both reserves, will run for two years, and if successful will be introduced in all MPAs in Belize. Pending continued success, a management system will be incorporated, using market-based incentives to align fishers' economic interests with conservation outcomes. However, concerns are already being raised over the process by which licenses are issued or denied, with some fearing that loopholes and weak enforcement will erode public confidence in the program. The coalition needs to be highly responsive to the emergence of weaknesses in the current design, to ensure continued buy-in, and ultimately, permanent transition towards Managed Access nationwide.

**Key words:** Managed Access, Catch Shares, Sustainable Fisheries, Conch, Lobster

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## Introduction

Belize Fisheries Department (BFD), in partnership with the Environmental Defense Fund (EDF), the Toledo Institute for Development and Environment (TIDE) and the Wildlife Conservation Society (WCS), under the Sustainable Fisheries Initiative (SFI) in Belize, is implementing Managed Access as a pilot program in Port Honduras Marine Reserve (PHMR) and Glover's Reef Marine Reserve (GRMR) as a first step towards the implementation of Catch Shares as a national fisheries management policy for Belize. After two years, if deemed successful, Managed Access will be implemented in other marine reserves in Belize, with a long term plan to apply this management approach to the entire territorial waters of the country, effectively ending open access fisheries in Belize.

The fishing industry is socially and economically crucial to Belize. Caribbean Spiny Lobster (*Panulirus argus*) is the most economically important commercially harvested species in the country, accounting for 60% of the total value Belize's capture fisheries sector: which totaled US\$10.8 million in 2010 (Wade et al. 2011). More than 2,400 registered fishermen are employed in the capture fisheries sector, with a further ~15,000 citizens indirectly employed by the sector in processing and exporting roles.

Recognising the importance of this industry, Belize is emerging as a regional leader in management of marine resources, taking a progressive approach by implementing a regionally unrivalled network of marine reserves (Fig. 1), protecting spawning aggregation sites, applying gear restrictions and species-specific seasonal closures, and placing

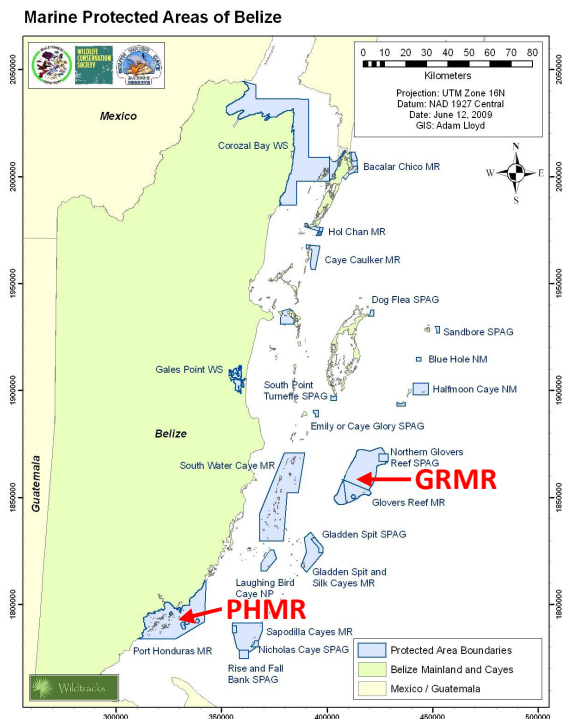


Figure 1: Location map: Belize's marine reserve network. PHMR and GRMR shown in red.

outright bans on extracting certain marine species. Consequently, Belize's fisheries have not yet experienced the same catastrophic collapse seen in neighboring countries.

Nevertheless, under open access management, whereby no regulations exist to restrict the number of people allowed to fish or the amount of fish that individual fishers are allowed to extract, Belize's fisheries are showing signs of overexploitation and decline. The number of licensed fishermen increased from 1,731 in 2004 to 2,267 in 2008, representing a cumulative increase of 30% and an increase of more than 7% in comparison to 2007 when 2,110 fishermen were licensed to fish. The number of boats also increased from 621 to 643 during the same period

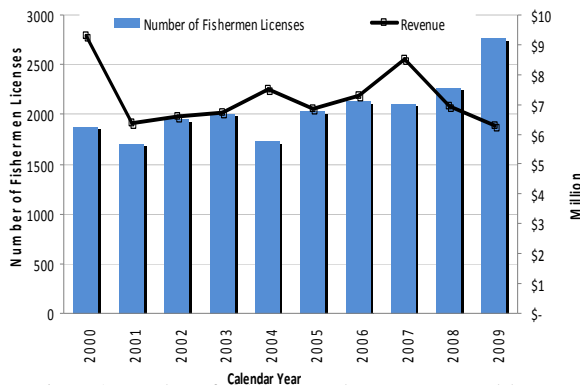


Figure 2: Number of fishermen and revenue reported by fishermen cooperatives, 2000-2009 (Wade et al. 2011)

showing an overall increase of over 8%. Despite the increase in fishing effort however, catches increased by only 2.42% when compared to 2007. Lobster landings declined 24% from 277 tons in 1999 to 211 tons in 2009 (Wade et al. 2011) (Fig. 2). Too many fishermen are chasing too few fish in fisheries that are mature, fully exploited or possibly in decline.

Open access encourages illegal fishing because there are no incentives for individuals to be good stewards and comply with marine reserve regulations. Legitimate fishers feel compelled to over-extract and disobey size limits and seasonal restrictions because if they do not, illegal transboundary fishers (fishers who travel from Guatemala and Honduras to fish illegally in Belizean territorial waters and return to their country of origin with their catch) will. In a classic case of the "tragedy of the commons" (Hardin 1968), local fishers are driven to race to catch as much as possible or risk losing out to illegal fishers.

The situation worsened when several years ago, certain members of a previous local government attempted to garner extra votes by issuing Belizean residency documents to dozens of Guatemalan fishermen, with which they were able to acquire fishing licenses enabling them to fish legally in Belizean waters. Foreign fishing vessels have been openly fishing in PHMR ever since, extracting marine product to sell in Guatemala, much to the consternation of Belizean fishers who consider themselves the traditional and rightful users of the reserve.

A significant number of legitimate fishermen see illegal fishing and overfishing as the two most important threats to their livelihoods and there is wide consensus that action must be taken to halt uncontrolled growth in the number of fishermen.

A lengthy process of community consultation began between the BFD, partnering NGOs and fishing communities across the country, and Managed Access was consequently proposed as a potential solution to these problems. Managed Access aims to end open access fishing in Belize's marine reserves, and ensure that persons considered to be 'Traditional Fishermen' (defined somewhat vaguely in the Managed Access Design and Framework of 2011, (Wade et al. 2011) as "someone that has fished in the area from 2009 and before") can continue to benefit from the marine resources in marine reserves that foster sustainable livelihoods. It is the first step in reducing fishing capacity, ending the uncontrolled growth in the number of fishermen, and protecting both the fishing industry and Belize's precious marine reserves, which are also crucial to the tourism sector. As a next step, the BFD and its partners will be working with fishermen, scientists, technical experts and other stakeholders to design a comprehensive Catch Shares

management system, which will allocate the rights to harvest a specific area or a percentage of a fishery's Total Allowable Catch (TAC) to individuals, communities or associations.

#### Catch Shares

As stated in Wade et al. (2011), "Catch Shares is a fishery management system that uses market-based incentives to align fishermen's economic interests with conservation outcomes. Typically, Catch Shares divides up and allocates quota percentages of a total allowable catch, or fishing areas, to individual fishermen or fishing groups. The most common forms of Catch Shares include individual transferable quota (ITQ) and spatial property rights, also called territorial user right fisheries (TURFs). A key part of Catch Shares is managing access to the fishery. Managing access provides fishermen with a secure, dedicated fishing area or quota. If properly implemented, Managed Access will create a climate where fishermen can commit to better management and responsibility for their fishery and cooperation with managers because they can expect to reap the benefits of their stewardship."

There is now widespread consensus that Catch Shares can be an effective management tool for large-scale commercial fisheries, such as in the Mediterranean Bluefin Tuna fishery, for which the International Commission for the Conservation of Atlantic Tuna (ICCAT) allocates strict quotas to individual vessels, which are a calculated percentage of the TAC determined by the European Union for that year based on CPUE data from the previous year. Mounting evidence suggests that use of Catch Shares can also maintain ecological and economic sustainability in small-scale low-governance fisheries, such as in Belize, provided they are designed to appropriate social and biological scales and there is good integration between Catch Shares, marine reserves and community-based management. As the pilot scheme is limited to two marine reserves, the scale is insufficient to be an effective management tool for highly mobile finfish species. Initially therefore, only Caribbean Spiny Lobster (*Panulirus argus*) and Queen Conch (*Strombus gigas*), are being targeted by the program.

#### Pilot Sites

PHMR and GRMR were selected for the initial project after months of consultation and analysis among government, NGOs and stakeholders:

#### Port Honduras Marine Reserve (PHMR)

PHMR (Fig. 3), established in 2000 and co-managed by the BFD and TIDE, lies adjacent to the coast of southern Belize covering an area of 414 Km<sup>2</sup>. The

reserve incorporates extensive coastline, 138 mangrove cayes, submerged banks, seagrass beds, patch reefs and several fringing reefs. Three major rivers flow directly into the reserve, seasonally changing water conditions. These ecosystems are of critical importance to the local communities of Monkey River, Punta Negra, the Cayes and Punta Gorda, and to Belize as a country. Fishers from these communities depend on PHMR for extraction of conch, lobster, finfish species and most recently sea cucumber species as a source of local protein and for family revenue, as well as export. There are three management zones within PHMR, a General Use Zone (95% of the reserve), where extraction is permitted in accordance with gear restrictions, size limits and season closures, a Conservation Zone (no extraction permitted – recreational activities only, including catch-and-release sport fishing), and a Preservation Zone (no public access, research only). Only 5% of the marine reserve is no-take.

PHMR is highly vulnerable to being fished by Guatemalan transboundary illegal fishers due to its close proximity to the Belize-Guatemala border. Reef systems are far more developed and far less impacted on the Belizean side, while human population and demand for marine products are far greater on the Guatemalan side, driving this activity.

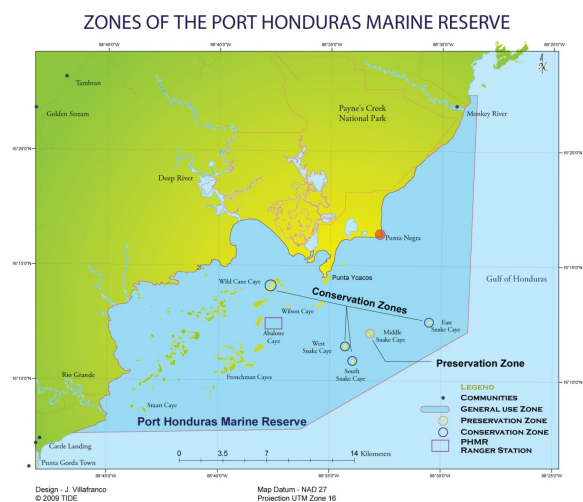


Figure 3: Map of PHMR showing General Use Zone, Conservation Zones and Preservation Zone.

#### Glover's Reef Marine Reserve (GRMR):

GRMR (Fig. 4), officially designated a Marine Reserve in 1993, is Belize's most southern offshore atoll, measuring 32km long and 12km wide, with an approximate area of 260km<sup>2</sup>. The reserve is managed by the BFD with support from WCS. The atoll is divided into four zones. The General Use Zone (extraction permitted in accordance with gear restrictions, size limits and season closures), a

Conservation Zone (non-extractive activities only), a Wilderness Zone (research only) and a Special Protected Zone (previously designated as “Seasonal Closure Zone”, now closed permanently to fishing) where the spawning aggregation site for Nassau grouper is monitored.

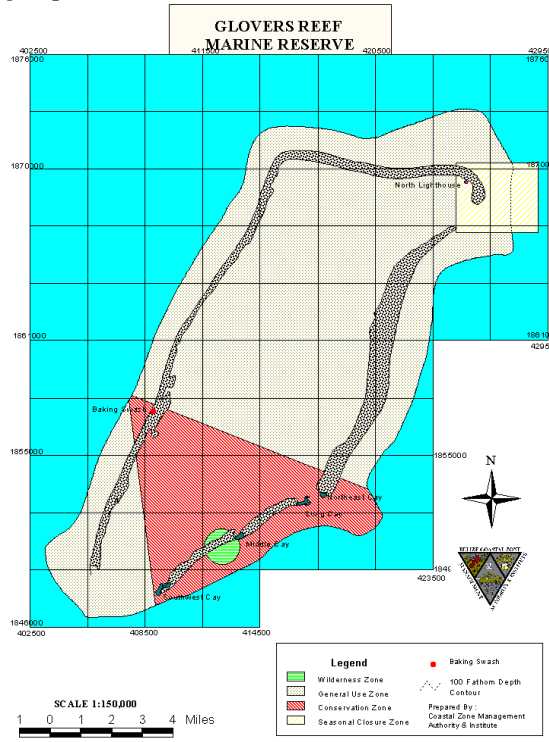


Figure 4: Map of GRMR showing General Use Zone, Wilderness Zone, Conservation Zone and Special Protected Zone (Grant 2004).

*Managed Access Design and Framework*

The framework and design for Managed Access are the result of an extensive series of community workshops with fishermen, cooperatives, the Belize Fisherman’s Cooperative Association (BFCA) and other stakeholders. Fishers generally support implementation of Managed Access and Catch Shares, provided they can form an integral part of the design process and are continuously consulted. Support for Managed Access has arisen from fishers understanding the anticipated benefits, including i) ending access to marine reserves for illegal transboundary fishers, ii) promoting long-term fisheries sustainability, iii) increasing security of livelihoods, iv) improving enforcement of existing regulations designed to increase sustainability.

*Managed Access Committees*

Managed Access Committees (MACs) for each marine reserve have been formed through a selection process, whereby groups of people with common interests (e.g. a fishing co-op or isolated community)

select candidates considered to be central figures in the community and able to represent their interests, to become members of the Committee. Each MAC evaluates applications for Managed Access licenses for each area and makes recommendations to Fisheries Department, which has ultimate authority for granting Managed Access licenses.

The functions of the MACs are to provide community leadership, scrutinize license applications, verify transparency in the license granting process, inform their community of program updates, assist in improving data reporting, support the Catch Shares Task Force and advise on reserve management.

**Materials and Methods**

Both fishery-dependent and fishery independent data will be collected and used to inform adaptive management of the Managed Access Pilot Program.

*Fishery Dependent Data*

Reporting is a requirement of the Managed Access license. Fishermen are required to stop at dedicated monitoring sites to provide managers their catch data log books. Managers have the authorization to conduct audits of catch at their discretion. Fishers have been provided with the necessary materials and training to fulfill these monitoring responsibilities including communications equipment, log books, writing tools, and measurement tool. Data is to be used to regularly inform stakeholders of the state of the fishery and to inform adaptive management of the program.

*Fishery-Independent Data*

Methods below are for PHMR. Fishery-independent data collection methods have yet to be established for GRMR.

**Lobster**

Caribbean Spiny Lobster (*Panulirus argus*) populations are surveyed by TIDE at 18 sites inside and outside PHMR twice a year, immediately before and after the Closed Season (February 15 to June 14). Sites are located in the No Take Zones (8 sites), The General Use Zone (7 sites), and outside the reserve (3 sites). At each site, where possible, either two 30 minute timed swims are conducted simultaneously by two diver pairs or a 60 minute timed swim is conducted by a single diver pair. For each lobster located, species, sex, maturity and carapace length are recorded.

**Conch**

Queen Conch (*Stombus gigas*) populations are surveyed by TIDE at 20 sites inside and outside PHMR twice a year, immediately before and after the Closed Season (July 1 to September 30). Sites are

located in the No Take Zones (5 sites), General Use Zone (11 sites), and outside the reserve (4 sites). At each site, where possible, five 50 x 2 metre belt transects are laid parallel to one another and at least five metres apart. Population density is estimated by counting the number of conch found and converting values into conch per hectare. Shell length is recorded to estimate size distribution of the population.

### Results

No results are yet available as the Program, which will be assessed annually using the data collected, has been in operation less than one year.

### Discussion

Concerns remain over the design of the Program. A central problem is that eligibility for a Managed Access license is reserved for those who can prove themselves to be "Traditional Fishermen". This term is subjective and there lacks any person sufficiently objective to decide if and who is not a Traditional Fisherman. The term likely arose out of a desire among local Belizean fishers who depend on PHMR for their livelihoods to eliminate Guatemalans from being eligible, as this was one of the central issues that catalyzed the implementation of the Program in the first place. Applicants must provide proof of residency in Belize by submitting utility bills, leading to the exclusion of some applicants that are considered among their communities as eligible, due to living in villages without electricity. Meanwhile, Jamaican businessmen who enjoy freedom of movement throughout CARICOM member states, have recently entered Belize and are rapidly monopolizing some fisheries, where daily catch was previously limited by what could be sold in a day due to lack of electricity and thus refrigeration. By having superior purchasing power, they offer guaranteed but low prices to local fishers for their product, which is then exported overseas. The result is that fishing behavior is changing towards catching as much as possible to make up for the reduced value they get for their product and not selling locally. Thus even though the fishers still consider themselves Traditional Fishermen, their fishing behavior and post-landing procedures are no longer traditional, instead depriving local people of food fish and selling their children's livelihoods from under their feet.

There is also concern among fishers that the Program will result in their children being denied access into fishing as a livelihood option. This is a legitimate concern because one of the primary objectives of the program is to limit the number of fishers having access to marine reserves. If each fisherman had more than one child (as most do), and every child born to a fisher was entitled to a Managed

Access license, the Program would fail. All fishers want the number of fishermen to be limited, but none of them want it to affect their own children. Ultimately, the program will have to be supported with some major developments in economic diversification in the region.

Many fishers have expressed their concern that it is too much effort to count their fish as required by the Program. Without this information it would be impossible to make estimates on the health of the fishery over time, and therefore incentives and infrastructure need to be developed to facilitate the counting of fish.

Confusion has occurred over the names of fish, which vary not just by region, but even by individual fisher. One name may be used to refer to two different species, or there may be multiple names for one species. This is further complicated due to some fishers speaking Spanish as their first language. Efforts are being made to determine the names used for fish by holding species identification sessions at community meetings.

There is also concern over the ability of reserve co-managers to enforce Managed Access rules when patrol staff are already struggling with limited resources to enforce existing laws. Fishers fear that the program will limit their rights to fish, while illegal fishers will continue benefitting at their expense due to weak enforcement. Considerable investment will be necessary to build enforcement capacity up to the required standard to effectively enforce Managed Access and maintain confidence in the Program among legitimate Managed Access license holders.

### Acknowledgement

The information here resulted from over one hundred meetings and workshops with fishermen, fishermen cooperatives and associations, University of Belize, research scientists, international fisheries management experts, marine protected areas (MPA) managers, MPA rangers, and government and non-governmental agencies. Valuable input was also made by the Ministry of Agriculture, BFD, Catch Shares Task Force, the Fisheries Advisory Board, and Belize Fisherman's Cooperatives Association. Major contributors include Beverly Wade, Janet Gibson, Celia Mahung, Larry Epstein, Adriel Castañeda, Julio Maaz and Nicanor Requena, with other contributions from Environmental Defense Fund, Toledo Institute for Development and Environment, and Wildlife Conservation Society.

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