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*Proposed areas for inclusion in the SPAW list*  
**ANNOTATED FORMAT FOR PRESENTATION REPORT FOR:**

**Glover's Reef Marine Reserve  
Belize**

Date when making the proposal : *October 5<sup>th</sup>, 2010*

**CRITERIA SATISFIED :**

Ecological criteria

**Critical habitats**

**Connectivity/coherence**

Cultural and socio-economic criteria

**Cultural and traditional use**

**Socio-economic benefits**

**Area name: Glover's Reef Marine Reserve**

**Country: Belize**

**Contacts**

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# **SUMMARY**

Chapter 1 - IDENTIFICATION

Chapter 2 - EXECUTIVE SUMMARY

Chapter 3 - SITE DESCRIPTION

Chapter 4 - ECOLOGICAL CRITERIA

Chapter 5 - CULTURAL AND SOCIO-ECONOMIC CRITERIA

Chapter 6 - MANAGEMENT

Chapter 7 - MONITORING AND EVALUATION

Chapter 8 - STAKEHOLDERS

Chapter 9 - IMPLEMENTATION MECHANISM

Chapter 10 - OTHER RELEVANT INFORMATION

# **ANNEXED DOCUMENTS**

# Chapter 1. IDENTIFICATION

## **a - Country:**

Belize

## **b - Name of the area:**

Glover's Reef Marine Reserve

## **c - Administrative region:**

Caribbean/Central America

## **d - Date of establishment:**

1/1/93

## **e - If different, date of legal declaration:**

not specified

## **f - Geographic location**

*Longitude X:* -87.791111

*Latitude Y:* 16.823056

## **g - Size:**

350 sq. km

## **h - Contacts**

*Contact adress:* Belize Fisheries Department, Princess Margarite Drive, Belize City Belize

*Website:* [www.fisheries.gov.bz/](http://www.fisheries.gov.bz/)

*Email address:* eck.allie@gmail.com

## **i - Marine ecoregion**

68. Western Caribbean

## **Comment, optional**

none

# Chapter 2. EXECUTIVE SUMMARY

**Present briefly the proposed area and its principal characteristics, and specify the objectives that motivated its creation :**

not specified

**Explain why the proposed area should be proposed for inclusion in the SPAW list**

The proposed area should be proposed for inclusion in the SPAW list to provide protection for the physical and biological resources of Glover's Reef, in order to maintain and sustain these resources for the benefit of current and future generations. To increase awareness and understanding of the natural resource of Glover's Reef through education and research. To provide a resource for recreation and tourism

**According to you, to which Criteria it conforms (Guidelines and Criteria B Paragraph 2)**

Critical habitats  
Connectivity/coherence

**Cultural and socio-economic criteria**

Cultural and traditional use  
Socio-economic benefits

# Chapter 3. SITE DESCRIPTION

## a - General features of the site

**Terrestrial surface under sovereignty, excluding wetlands:**

0 sq. km

**Wetland surface:**

0 ha

**Marine surface:**

200 sq. km

## b - Physical features

**Brief description of the main physical characteristics in the area:**

See details below.

**Geology:**

The main Barrier Reef sits on top of a prominent northeast-southwest fault, running

parallel to the coast of Belize. A series of tilted submarine escarpments (major fault blocks caused as a result of the eastward subsidence of the Bartlett Trough during the Pliocene, about seven million years ago (Schafersman 1972) (Figure 12)), have resulted in the development of three offshore atolls – two of these (Lighthouse Reef and Glover's Reef) being located on the third, most easterly escarpment furthest from the mainland. Glover's Reef Atoll is the most southerly of the three atolls of Belize, covering approximately 200km<sup>2</sup>, being 35km long and up to 7.5km wide. The Atoll sits on metamorphic rock, which has been identified at a depth of between 777 m and 959 m below Glover's Reef. This base rock is overlain with about 250 m of calcareous siltstone of Late Cretaceous age (100 million years ago), and 560 m of Tertiary (64 million years ago to the present) reef accumulation. It is thought to have been formed in areas where limestone build-up has been at a rate equal to or greater than the subsidence caused by the movement on the faults, resulting in the formation of carbonate platforms surrounded by water that gets progressively deeper to the east, reaching 4000m. The reef platform is probably a wave-cut reef of last interglacial age on which the overall physiography of the atoll, including the rim, lagoon, patch reefs, and channels, have developed following rising sea levels.

Sediments from reef and fore reef are comprised of fragments of coral, red algae and *Halimeda*. In contrast, sediments of the back reef area contain more mollusk fragments and have lower percentages of *Halimeda* (Gischler 1994).

Sediments associated with the patch reefs are poorly sorted coarse-grained carbonates, composed primarily of *Halimeda*, coral, coralline algae, mollusc and other skeletal particles. The lagoon floor is muddy, composed of fine-grained carbonate sand, with the sand fraction rich in *Halimeda*, mollusc and foraminifer grains (James & Ginsburg 1979).

#### **Sand dunes:**

Long Caye North (Lomont Caye) This small shingle caye or islet originally had an area of 0.5ha but was heavily impacted and eroded by Hurricane Mitch in 1998. It now has very little sand and has the characteristic of a sandbore.

#### **Others:**

Mean annual precipitation (in mm) 1750mm.

## **c - Biological features**

### **Habitats**

**Brief description of dominant and particular habitats (marine and terrestrial)\*: List here the habitats and ecosystems that are representative and/or of importance for the WCR (i.e. mangroves, coral reefs, etc):**

Ecosystem mapping divides the Atoll ecosystems into six major ecosystem categories, each with a number of subcategories. Fore Reef, Patch Reef, Other Reef, Shallow Lagoon Floor, Other Habitats, Caribbean Open Sea. These are further broken down as follows: Shallow lagoon floor – sparse seagrass, Shallow lagoon floor - medium density seagrass, Shallow lagoon floor - dense seagrass, Sand and sparse algae, Diffuse patch reef, Dense patch reef, Forereef – dense massive and encrusting corals, Forereef - sparse massive and encrusting corals, Low relief spur and groove, Deep reef/wall/escarpment, Reef Crest

and Reef channels.

Terrestrial Habitats: Mangrove, Rubble beach, Sandy beach, Caye littoral forest, Brackish pond and Palm.

**Detail for each habitat/ecosystem the area it covers:**

<i>Marine / coastal ecosystem categories</i> <i>Detail for each habitat / ecosystem the area covers</i>	Size (estimate)		Description and comments
	unit	Area covered	
Terrestrial ecosystems	Size (estimate)		
	unit	Area covered	

**Flora**

**Brief description of the main plant assemblages significant or particular in the area:**

National populations of several of the plant species found on the cayes of the Atoll have undergone significant decline in recent years, as coastal beaches are cleared and developed for coconut plantations, tourism and residential use. Those cayes with significant areas of littoral forest and herbaceous beach communities, such as Middle Caye and Northeast Caye, in particular, play a crucial role in the continued survival of these ecosystems.

A total of 34 naturally occurring native species of plant, representing 22 families, have been reliably identified as currently occurring within the littoral forest and herbaceous beach community of the cayes of Glover’s Reef Atoll (Meadows 1998; Walker, 2007). Whilst earlier surveys recorded up to 40 species, past anthropogenic impacts have had huge impacts upon the flora of the cayes – and the introduced coconut palm continues to have a very major impact. An comprehensive, updated vegetation assessment of the cayes would be beneficial.

There is quite a diverse species assemblage for this ecosystem type, especially in view of the distance of Glover’s Reef Atoll from other island and mainland populations. As previously noted (Stoddart, 1962), the flora of island ecosystems is dynamic in species occurrence and stature – changes often reflecting both natural cycles and anthropogenic impacts.

Species of the littoral forest and of the herbaceous beach community play critical roles in the stabilization of the cayes, and in providing habitat for the fauna. The main plant assemblages can be seen in the table below.

**List of plant species within the site that are in SPAW Annex I**

List of species in SPAW annex I	Estimate of population size	Comments if any

**List of plant species within the site that are in SPAW Annex III**

List of species in SPAW annex III	Estimate of population size	Comments if any
Combretaceae: Conocarpus erectus	not given	Buttonwood
Compositae : Laguncularia racemosa	not given	White Mangrove
Hydrocharitaceae: Thalassia testudinum	not given	Turtle grass

Rhizophoraceae: Rhizophora mangle	not given	Red mangrove
Verbenaceae: Avicennia germinans	not given	Black mangrove

**List of plant species within the site that are in the IUCN Red List. UICN red list : <http://www.iucnredlist.org/apps/redlist/search> You will specify the IUCN Status (CR:critically endangered; EN:endangered; VU:vulnerable).**

List of species in IUCN red list that are present in your site	IUCN Status	Estimate of population size	Comments if any
Laguncularia: racemosa	Unknown	not given	White Mangrove
Rhizophora: mangle	Unknown	not given	Red Mangrove
Avicennia : germinans	Unknown	not given	Black Mangrove

**List of plant species within the site that are in the national list of protected species**

List of species in the national list of protected species that are present in your site	Estimate of population size	Comments if any

## Fauna

**Brief descript<sup>o</sup> of the main fauna populations and/or those of particular importance present (resident or migratory) in the area:**

### Mammals

Whilst the cayes themselves have no native mammal fauna, there are reports of small rodents on two of the cayes, presumably transported to the Atoll in materials, from the mainland.

Spotted, bottlenose and spinner dolphins are seen all year in the deeper waters outside the Atoll and bottlenosed dolphins also venture into the Atoll lagoon, through the channels, and a recent sighting of a large West Indian Manatee (*Trichechus manatus*) on the outer edge of Glover's Reef Atoll in May, 2007, confirms that this vulnerable species (IUCN, 2007) does occasionally reach the Atoll (Gibson, pers com., 2007).

### Birds

The first recorded bird survey of the Atoll was conducted by Salvin in 1862. In 1998 Meadows also carried out a bird survey of Middle Caye (Bright, 1999), and a more recent visit to the Atoll (Balderamas, pers. com. 2007) produced a complimentary species list, bringing the total number of species recorded for the Atoll to 84. These last two surveys, both coinciding with the autumn and spring migrations, emphasized the importance of the cayes for monitoring the movements of these migratory species, and protecting the caye vegetation on which they rely for food. Only a few species, such as brown pelicans (*Pelecanus occidentalis*), kingfishers, herons and ospreys (*Pandion haliaetus*), are resident on the caye, as is the near-threatened white-crowned pigeon (*Columba leucocephala*). Ospreys nest both on the island and artificial nesting platforms (Gibson 1988, Bright 1999). Least terns were reported as nesting on the ground on Long Caye North during April and May, though this small caye has been heavily eroded by Hurricane Mitch, and it is uncertain whether it is still utilized by the terns.



As with the other Atolls of Belize, Glover's Reef is considered important as a migratory bird stopover refueling point. Many thousands of migrants that have meandered off course end up on the Atoll cayes every spring and fall.

The species composition of Glover's Reef is very comparable with that of Half Moon Caye, on Lighthouse Reef Atoll (Walker and Walker, 2005), - a comparison of the migratory species on these Atolls with those of migratory species surveys on the remote San Andres Island, offshore of Columbia shows an approximately 87% overlap of migratory species. Of these, the bluewinged, golden-winged, yellow, blackburnian, cerulean, magnolia, prothonatory, wormeating, Swainson's and hooded warblers are largely believed to fly trans-gulf, relying on making landfall on the Yucatan Peninsula (N. Bayly, pers. com.). An interesting addition to the list of migrants making a stopover on the island is the cedar waxwing, with a flock of approximately 80 individuals observed feeding on the fruit of *Erythralis fruticosa*, an important food source for many of the migratory birds passing through (Figure 31; Walker, 2007). Other migrants that might occur on the cayes but have not yet been recorded include the American kestrel, blacknecked stilt, common tern, least tern, white-winged dove, mourning dove, common nighthawk, olive-sided, alder and least flycatcher, gray kingbird, and Lincoln's sparrow (L. Jones, pers. com.).

### **Reptiles of Glover's Reef Atoll**

The herpetofauna of Glover's Reef Atoll is comprised entirely of reptile species. No amphibians have been recorded there, as the saline conditions, absence of freshwater sources, and distance from the mainland are the main determinants precluding their presence.

Seven reptile species have been recorded from Glover's Reef, four terrestrial (residents of the littoral forest), and the three marine turtles (loggerhead, green and hawksbill). The three marine turtles are all considered to be globally threatened, the hawksbill being listed as 'critically endangered', and the green and loggerhead being 'endangered'. Additionally, the island leaf-toed gecko is rated as Near Threatened on Belize's National List of Critical Species (Meerman, 2005). A crocodile, presumed to be the American Crocodile (*C. acutus*), has been observed on the Atoll - it is believed that fishermen brought a juvenile crocodile there from Turneffe Islands sometime during the period 1993 -1995 (M. Paz, pers. com). Recent reports suggest that it has possibly been killed.

A second gecko species, St. George's island gecko (*Aristelliger georgeensis*), was recorded on Middle Caye for the first time (Walker, 2007), and was found to be significantly more abundant than the endemic *Phyllodactylus insularis*. *Aristelliger georgeensis*, is considered to be a human commensal (Lee, 2000), but it is unclear whether it is a recent colonizer on the island, or whether females and sub-adults had previously been mistaken for *Phyllodactylus insularis*. The Brown anole (*Anolis sagrei*) is abundant on the cayes, and is principally active on the ground and up to 2m elevation on vegetation. Black iguanas (*Ctenosaura similis*) are common on the cayes of Glover's Reef, and are considered part of the natural fauna.

There are two invertebrate species of commercial importance to the Glover's Reef fishery - the Caribbean Spiny Lobster (*Panulirus argus*) and Queen conch (*Strombus gigas*), both of which are fished extensively throughout Belize.

There are a number of fin fishes present on the Atoll but some of the more economically important species include the Nassau Grouper, Black Grouper and Mutton Snapper. Sport fishing fishes include the Permit and Bonefish are present. There are also a number of parrotfish's and grazers present.

### List of animal species within the site that are in SPAW Annex II

List of species in SPAW annex II	Estimate of population size	Comments if any
Reptiles: Caretta caretta	not given	Loggerhead turtle
Reptiles: Chelonia mydas	not given	Green Turtle
Reptiles: Eretmochelys imbricata	not given	Hawksbill Turtle

### List of animal species within the site that are in SPAW Annex III

List of species in SPAW annex III	Estimate of population size	Comments if any
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### List of animal species within the site that are in the IUCN Red List. IUCN Red List : <http://www.iucnredlist.org/apps/redlist/search> You will specify the IUCN Status (CR:critically endangered; EN:endangered; VU:vulnerable).

List of species in IUCN red list that are present in your site	IUCN Status	Estimate of population size	Comments if any
Tursiops: truncatus	Unknown	not given	Common Bottlenose Dolphin
Trichechus: manatus	VU - Vulnerable	not given	A recent sighting of a large West Indian Manatee (Trichechus manatus) on the outer edge of Glover's Reef Atoll in May, 2007, confirms that this vulnerable species (IUCN, 2007) does occasionally reach the Atoll (Gibson, pers com., 2007).
Pelecanus : occidentalis	Unknown	not given	Brown Pelican
Pandion: haliaetus	Unknown	not given	Osprey
Dendroica : magnolia	Unknown	not given	Magnolia Warbler
Bombycilla : cedrorum	Unknown	not given	Cedar Waxwing
Caretta : caretta	EN - Endangered	not given	Loggerhead
Chelonia : mydas	EN - Endangered	not given	Green Turtle
Eretmochelys: imbricata	CR - Critically endangered	not given	Hawksbill Turtle
Phyllodactylus : xanti	Unknown	not given	Peninsular Leaf-toed Gecko
Ctenosaura: similis	Unknown	not given	Black iguana
Panulirus : argus	Unknown	not given	Caribbean Spiny Lobster
Epinephelus : striatus	EN - Endangered	not given	Nassau Grouper
Mycteroperca : bonaci	Unknown	not given	Black Grouper
Lutjanus : analis	VU - Vulnerable	not given	Mutton Snapper

## List of animal species within the site that are in the national list of protected species

List of species in the national list of protected species that are present in your site	Estimate of population size	Comments if any
Phyllodactylus: xanti	not given	Peninsular Leaf-toed Gecko

## d - Human population and current activities

### Inhabitants inside the area or in the zone of potential direct impact on the protected area:

	Inside the area		In the zone of potential direct impact	
	Permanent	Seasonal	Permanent	Seasonal
Inhabitants	46	17	not given	not given

### Comments about the previous table:

There are 6 resorts on the Glover's Atoll but only 5 are operational as Mata Ray Resort is up for sale. One Caye, Middle Caye does not have a resort but it has a research station and the Belize Fisheries Department is located there as well. The research station has guest periodically throughout the year and varies from year to year. The Fisheries Department has staff working on rotations but always has someone on site. The other resorts have minimum of a cook, a boat captain and a watchman on staff at any given time unless it's a resort that the owners live at. Visitation to the resorts is seasonal.

### Description of population, current human uses and development:

The Atoll is a traditional fishing area for lobster, conch and finfish, with the greatest activity occurring during the opening of the lobster and conch seasons. Thirty-five boats were recorded as active within the Atoll in 2005, primarily from Sarteneja, Hopkins, Dangriga, Belize City and occasionally Placencia, with an estimated total of 108 fishermen (73 sailboat fishermen, and 35 using skiffs) (Gibson and Hoare, 2006). In 2009, 50 boats were recorded to be actively using the Atoll from the communities of Sarteneja, Hopkins and Dangriga with an estimate total of 130 fishermen. Peak times for fishing were recorded as the opening of the Lobster and Conch season.

Tourism is becoming an increasingly important economic activity on Glover's Reef Atoll, though with accessibility far harder than Lighthouse and Turneffe, much of the tourism is based on live aboards, or based from the five resorts currently operating from the cayes within the Atoll. Visitors also arrive from other resorts on the mainland and other cayes on a daily basis, such as Hamanasi Adventure and Dive Resort, from the mainland near Hopkins, and from hotels on Tobacco Caye. Sailboats from The Moorings charter yacht business based in Placencia visit the atoll for snorkeling and diving, and other private boats and yachts also visit the reserve, but on a relatively small scale.

Activities concentrate on scuba-diving, kayaking, wind surfing, sport fishing and fly fishing, with the impressive reef structures of the reef edge and the sheltered waters of the inner lagoon providing perfect conditions for these activities.

At peak occupancy, there are estimated to be approximately 120 guests on the Atoll in

total, though the average occupancy is 50% of that. Residential staff number approximately 38 (these figures do not include Middle Caye, the location of the WCS research station and the Fisheries Department base). With the high costs of transport, the majority of the resorts operate on a weekly itinerary, offering all-in packages with a single arrival /departure day. Two of the companies – Slickrock and Island Expeditions – focus on kayak activities, based from camp facilities, whilst Isla Marisol and Off the Wall have a much greater investment in infrastructure. Most of the resorts close for one to two months of the year, or in some cases longer. Most are open, however, from October to April/May.

Whelks have been harvested at Glovers in the past under special license; however a moratorium has been put in place by Fisheries Department, pending further data on abundance and distributions of this species (Fisheries Department, 2005). Research was conducted in 2005 under the Department, showing that the whelks had a limited distribution, being confined to the reef crest, and that there were signs of over-harvesting, with densities being higher within the Conservation Zone, and greater numbers of individuals occurring in the larger size categories.

Activities	Current human uses	Possible development	Description / comments, if any
Tourism	unknown	unknown	Users: 2803. Seasonality: July – October is the slow season.
Fishing	unknown	unknown	Users: 130.
Agriculture	unknown	unknown	0 User.
Industry	unknown	unknown	
Forestry	unknown	unknown	0 User.
Others	not specified	not specified	

## e - Other relevant features

Nassau Grouper: closed season from December 1st to March 31st of the following year.

Size limit for this specie is between 20 – 30 inches during the open season. The spawning aggregation site for this specie is closed to fishing all year round.

## f - Impacts and threats affecting the area

### Impacts and threats *within* the area

Impact and threats	level	Evolution In the short term	Evolution In the long term	Species affected	Habitats affected	Description / comments
Exploitation of natural resources: Fishing	very important	increase	increase	- Epinephelus striatus (Nassau Grouper) - Apsilus dentatus (Black Snapper) - Lobster - Strombus gigas (Queen Conch)	- Reef shelf - Atoll	Reef shelf at the Nassau Grouper Spawning Aggregation site which is closed to fishing all year round. Threats to Glover's Reef Atoll, whilst far from the mainland, is an important resource for a number of the coastal communities – primarily

				<p>- Spear Fish -          Fin Fish -          Barracuda -          Blackfin          snapper -          Yellow eye -          Yellowtail -          Black Grouper          - Deep-water          Grouper - Jack          - Mutton          Snapper</p>	<p>Sarteneja, Hopkins and Dangriga, with an estimated maximum of 170 or more fishermen using the area (using the maximum number of fishermen per boat, Glover's Reef Annual Report, 2006). Whilst the presence of prime commercial species such as grouper and snapper indicate that marine resources are relatively healthy by regional standards, the pressure on marine stocks is increasing, with an increasing number of fishermen, and incursions from neighboring countries. Overfishing of commercial marine species has resulted in reduced catch per unit effort and a shift in the community and population structures of both fish and invertebrates harvested. Overfishing was identified as occurring throughout the General Use Zone, and illegal fishing activities were recorded from the Conservation Zone and the Seasonal Closure Zone. Lobster fishing out of season was also reported habitats and species. Whilst the majority of extractors are artisanal fisherman, free diving primarily for lobster and conch, and spear fishing fin-fish, the impact on the commercial marine species of the atoll has been immense, with the majority of fishermen and tour guides reporting reduced numbers of lobster and conch and commercial species (Consultations, 2007). Both the inside and</p>
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						outside of the western side of the atoll, is fished year-round, and several species are targeted (barracuda, blackfin snapper and yellow eye being the most fished species).
Exploitation of natural resources: Agriculture	limited	not specified	not specified			Not commented
Exploitation of natural resources: Tourism	limited	not specified	not specified			Not commented
Exploitation of natural resources: Industry	limited	not specified	not specified			Not commented
Exploitation of natural resources: Forest products	limited	not specified	not specified			Not commented
Increased population	limited	not specified	not specified			Not commented
Invasive alien species	very important	increase	increase	Pterois volitans (Lionfish)	Area	Lionfish poses a serious threat to the area.
Pollution	limited	not specified	not specified			Not commented
Other	significant	unknown	unknown	Strombus gigas	- Sand Flats - sea grass beds	Sand Flats and sea grass beds that are Conch Habitat.

### Impacts and threats around the area

Impact and threats	Level	Evolution In the short term	Evolution In the long term	Species affected	Habitats affected	Description / comments
Exploitation of natural resources: Fishing	limited	increase	increase	- Barracuda - Blackfin snapper - Yellow eye	Outside atoll	Both the inside and outside of the western side of the atoll, is fished year-round, and several species are targeted (barracuda, blackfin snapper and yellow eye being the most fished species)

Exploitation of natural resources: Agriculture	limited	not specified	not specified			Not commented
Exploitation of natural resources: Tourism	limited	not specified	not specified			Not commented
Exploitation of natural resources: Industry	limited	not specified	not specified			Not commented
Exploitation of natural resources: Forest products	limited	not specified	not specified			Not commented
Increased population	limited	not specified	not specified			Not commented
Invasive alien species	very important	increase	increase	Pterois volitans (Lionfish)		Lionfish poses a serious threat to the area.
Pollution	significant	increase	increase		- Marine wildlife	Solid waste originating from the cayes and mainland is another concern. Some types of garbage have been shown to be very detrimental to marine wildlife, such as plastics to sea turtles. There is also concern over the increasing levels of solid waste originating from international shipping, particularly with the increase in cruise shipping and freight shipping destined for, and departing from, Belize. Liquid Waste & Sewage: A more insidious impact is the leaching of nutrients and chemicals into the ground water or fresh water lens of the cayes, which then percolate through the sandy soil into the sea. Groundwater is an important source of freshwater on the cayes, and is also important for supplying the mangrove areas and coral reefs with fresh water. If the groundwater becomes

						polluted, these ecosystems are affected. The leakage of sewage from island resorts can cause algal blooms, visible as a ring around the cayes or patches of increased algal growth near the highest impacted areas, due to nutrient enrichment. This impact, however, is relatively low due to the current small scale of operations and low level of visitation, as well as the use of closed sewage systems on a couple of the islands. At present, although there is little sign of the impacts of water contamination by excessive nutrients, and the majority of developments on the cayes appear to include adequate sewage treatment, results of recent nutrient testing (Gibson and Hoare, 2005) when compared with previous results (Tomasko and LaPointe 1991), suggest that nutrient runoff from the cayes should be carefully monitored.
Other	limited	not specified	not specified			Not commented

## h - Information and knowledge

### Information and knowledge available

#### List of the main publications

Title	Author	Year	Editor / review
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#### Briefly indicate in the chart if any regular monitoring is performed and for what groups/species

Species / group monitored (give the scientific name)	Frequency of monitoring (annual / biannual / etc...)	Comments (In particular, you can describe here the monitoring methods that are used)
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# Chapter 4. ECOLOGICAL CRITERIA

*(Guidelines and Criteria Section B/ Ecological Criteria) Nominated areas must conform to at least one of the eight ecological criteria. Describe how the nominated site satisfies one or more of the following criteria. (Attach in Annex any relevant supporting documents.)*

## **Critical habitats:**

Red mangrove, littoral forest and herbaceous beach communities play a critical role in stabilizing island structure, reducing coastal erosion, beach loss and sedimentation. Among the most underrepresented ecosystems within the protected area system of Belize, their loss is accelerating as the developmental value and demand for beach frontage escalates. This ecosystem is critical for nesting sea turtles, for the Island leaftoed gecko, a species with extremely disjointed distributions, and for numerous migratory bird species.

## **Connectivity/coherence:**

Clearance on the cayes of the Atoll greatly reduces connectivity within an already seriously fragmented ecosystem, reducing the scope for gene-flow and recolonization after natural and anthropogenic impacts. It also greatly undermines the stability of the islands themselves, making them, and any infrastructure thereon, a great deal more susceptible to the impacts of hurricanes. The long-term sustainability of cayebased tourism and residential developments can be made significantly more financially viable through the maintenance of this ecosystem.

# Chapter 5. CULTURAL AND SOCIO-ECONOMIC CRITERIA

*(Guidelines and Criteria Section B / Cultural and Socio-Economic Criteria) Nominated Areas must conform, where applicable, to at least one of the three Cultural and Socio-Economic Criteria. If applicable, describe how the nominated site satisfies one or more of the following three Criteria (Attach in Annex any specific and relevant documents in support of these criteria).*

## **Cultural and traditional use:**

The Atoll is a traditional fishing area for lobster, conch and finfish, with the greatest activity occurring during the opening of the lobster and conch seasons. Thirty-five boats were recorded as active within the Atoll in 2005, primarily from Sarteneja, Hopkins, Dangriga, Belize City and occasionally Placencia, with an estimated total of 108 fishermen (73 sailboat fishermen, and 35 using skiffs) (Gibson and Hoare, 2006). In 2009, 50 boats were recorded to be actively using the Atoll from the communities of Sarteneja, Hopkins and Dangriga with an estimate total of 130 fishermen. Peak times for fishing were recorded as the opening of the Lobster and Conch season.

### **Socio-economic benefits:**

There are 6 resorts on the Glover's Atoll but only 5 are operational as Mata Ray Resort is up for sale. One Caye, Middle Caye does not have a resort but it has a research station and the Belize Fisheries Department is located there as well. The research station has guest periodically throughout the year and varies from year to year. The Fisheries Department has staff working on rotations but always has someone on site. The other resorts have minimum of a cook, a boat captain and a watchman on staff at any given time unless it's a resort that the owners live at. Visitation to the resorts is seasonal.

Tourism is becoming an increasingly important economic activity on Glover's Reef Atoll, though with accessibility far harder than Lighthouse and Turneffe, much of the tourism is based on live aboards, or based from the five resorts currently operating from the cayes within the Atoll. Visitors also arrive from other resorts on the mainland and other cayes on a daily basis, such as Hamanasi Adventure and Dive Resort, from the mainland near Hopkins, and from hotels on Tobacco Caye.

Sailboats from The Moorings charter yacht business based in Placencia visit the atoll for snorkeling and diving, and other private boats and yachts also visit the reserve, but on a relatively small scale. Activities concentrate on scuba-diving, kayaking, wind surfing, sport fishing and fly fishing, with the impressive reef structures of the reef edge and the sheltered waters of the inner lagoon providing perfect conditions for these activities. At peak occupancy, there are estimated to be approximately 120 guests on the Atoll in total, though the average occupancy is 50% of that.

Residential staff number approximately 38 (these figures do not include Middle Caye, the location of the WCS research station and the Fisheries Department base). With the high costs of transport, the majority of the resorts operate on a weekly itinerary, offering all-in packages with a single arrival /departure day. Two of the companies – Slickrock and Island Expeditions – focus on kayak activities, based from camp facilities, whilst Isla Marisol and Off the Wall have a much greater investment in infrastructure. Most of the resorts close for one to two months of the year, or in some cases longer. Most are open, however, from October to April/May.

## **Chapter 6. MANAGEMENT**

### **a - Legal and policy framework (attach in Annex a copy of original texts, and indicate, if possible, the IUCN status)**

#### **National status of your protected area:**

Marine Reserve

The approximately 86,653 acre Glover's Reef Marine Reserve was established as a protected area in 1993 (SI 38 of 1993) under the Fisheries Act (Ch. 210).

#### **IUCN status (please tick the appropriate column if you know the IUCN category of your PA):**

IV

**Comments:**

The protected area is considered to be within IUCN category IV – a Habitat/Species Management Area, with active management targeted at conservation through management intervention (IUCN, 1994).

**b - Management structure, authority**

Fisheries Department of the Ministry of Agriculture and Fisheries.

**c - Functional management body (with the authority and means to implement the framework)****Description of the management authority**

Fisheries Department of the Ministry of Agriculture and Fisheries.

Glover's Reef Marine Reserve was established as a protected area in 1993 (SI 38 of 1993) under the Fisheries Act (Ch. 210), and encompasses the marine area of the Atoll, managed under the Fisheries Department of the Ministry of Agriculture and Fisheries. It is considered one of the highest priority areas in the Mesoamerican Caribbean Reef system, providing recruitment, nursery, feeding and dwelling areas for lobster, conch and finfish, and providing unique fish habitat in the interior lagoon (WWF, 2002). It is an important component of not only Belize's national marine protected areas system.

**Means to implement the framework**

Belize Fisheries Department, Government of Belize.

Funding is gotten from Central Government and funds are also collected from Park Fees. This is used to pay staff and maintain engines and so forth. More funding is needed but with the current financial situation of the country it is seen as moderate.

**d - Objectives (clarify whether prioritized or of equal importance)**

Objective	Top priority	Comment
Provide protection for the physical and biological resources of Glover's Reef, in order to maintain and sustain these resources for the benefit of current and future generations	Yes	<ul style="list-style-type: none"> <li>• to preserve the outstanding beauty, uniqueness and naturalness of the atoll</li> <li>• to regulate use of the area to ensure the sustainability of its resources, resilience of its ecosystems, and maintenance of ecological processes</li> <li>• to provide protected habitats for commercially important species in order to enhance recruitment and replenishment, thus achieving sustainable yields, and to demonstrate these benefits to fishermen</li> <li>• to protect critical habitats for endangered species</li> <li>• to manage the</li> </ul>
Increase awareness and	Yes	<ul style="list-style-type: none"> <li>• encourage use of the atoll for applied scientific research by</li> </ul>

understanding of the natural resource of Glover's Reef through education and research		the national and international scientific community, and to feed the results of research into the marine reserve's management decision process • to foster use of the atoll as a study center by both local and international students • to foster awareness of the importance of the marine environment, and the marine reserve specifically, through educational and interpretive programmes to encourage use of the reserve as a training center in marine resources and MPA management, and for demonstrating the benefits of MPAs
Provide a resource for recreation and tourism	Yes	• to provide undisturbed areas for tourism and recreation in a controlled and well informed manner • to enhance the social and economic benefits of the area by promoting uses compatible with conservation and sustainable development principles

## **e - Brief description of management plan (attach in Annex a copy of the plan)**

Management Plan Exists

### **Management plan - date of publication**

: not specified

### **Management plan duration**

: not specified

### **Date of Review planned**

: not specified

## **f - Clarify if some species/habitats listed in section III are the subject of more management/recovery/protection measures than others**

### **Habitats**

Marine / costal / terrestrial ecosystems	Management measures	Protection measures	Recovery measures	Comments/description of measures
Mangroves	no	no	no	
Coral	no	no	no	
Sea grass beds	no	no	no	
Wetlands	no	no	no	
Forests	no	no	no	
Others	no	no	no	

## Flora

Species from SPAW Annex 3 present in your area	Management measures	Protection measures	Recovery measures	Comments/description of measures
Combretaceae: Conocarpus erectus	no	no	no	
Compositae : Laguncularia racemosa	no	no	no	
Hydrocharitaceae: Thalassia testudinum	no	no	no	
Rhizophoraceae: Rhizophora mangle	no	no	no	
Verbenaceae: Avicennia germinans	no	no	no	

## Fauna

Species from SPAW Annex 2 present in your area	Management measures	Protection measures	Recovery measures	Comments/description of measures
Reptiles: Caretta caretta	no	no	no	
Reptiles: Chelonia mydas	no	no	no	
Reptiles: Eretmochelys imbricata	no	no	no	

### **g - Describe how the protected area is integrated within the country's larger planning framework (if applicable)**

not specified

### **h - Zoning, if applicable, and the basic regulations applied to the zones (attach in Annex a copy of the zoning map)**

Name	Basic regulation applied to the zone
General Use Zone	General Use Zone
Seasonal Closure Zone	Seasonal Closure Zone
Conservation Zone	Conservation Zone
Wilderness Zone	Wilderness Zone

#### **Comments, if necessary**

A fifth zone has recently been created to offer greater protection to the north-east spawning aggregation site.

## i - Enforcement measures and policies

The zone has been demarcated.

## j - International status and dates of designation (e.g. Biosphere Reserve, Ramsar Site, Significant Bird Area, etc.)

International status		Date of designation
Biosphere reserve	no	
Ramsar site	no	
Significant bird area	no	
World heritage site (UNESCO)	no	
Others:	no	

## k - Site's contribution to local sustainable development measures or related plans

not specified

## l - Available management resources for the area

Ressources		How many/how much	Comments/description
Human ressources	Permanent staff	4	We are understaffed and need more rangers and fuel allotment. 1 Manager, Bachelor's Degree 1 Biologist, Associate's Degree 1 Ranger, 1 Ranger. Yes there are training programs that occur throughout the year for field staff. We sometimes get assistance from Central Office Staff from the Conservation Compliance Unit when we need assistance in enforcement.
	Volunteers		
	Partners		
Physical ressources	Equipments	- Capacity to respond to emergencies - Marines vehicles	There is a headquarters that provide housing and kitchen for the staff while out in the field. The reserve has vessels to do enforcement and there is basic monitoring equipment.
	Infrastructures	- Signs on the main accesses - Guard post on the main accesses	
Financial ressources	Present sources of funding	Funding is gotten from Central Government and funds are also collected from Park Fees. This is used to pay staff and maintain engines and so forth. More funding is needed but with the current financial situation of the country it is	We sometimes get additional monitoring funding from Non-governmental organizations such as Wildlife Conservation Society and The Nature Conservancy.

		seen as moderate.	
	Sources expected in the future		
	Annual budget (USD)		

**Conclusion Describe how the management framework outlined above is adequate to achieve the ecological and socio-economic objectives that were established for the site (Guidelines and Criteria Section C/V).**

See management Plan.

## Chapter 7. MONITORING AND EVALUATION

**In general, describe how the nominated site addresses monitoring and evaluation**

There are a monitoring programme. The monitoring program is viewed as being satisfactory.

Recommendations from the monitoring program is reviewed by the Fisheries Department and used in amending the Statutory Instruments of the area.

**What indicators are used to evaluate management effectiveness and conservation success, and the impact of the management plan on the local communities**

Indicators by category	Comments
<i>Evaluation of management effectiveness</i>	
Not commented	
<i>Evaluation of conservation measures on the status of species populations within and around protected area</i>	
Not commented	
<i>Evaluation of conservation measures on the status of habitats within and around the protected area</i>	
Not commented	
<i>Evaluation of conservation measures on the status of ecological processes within and around the protected area</i>	
Not commented	
<i>Evaluation of the impact of the management plan on the local communities</i>	

# Chapter 8. STAKEHOLDERS

**Describe how the nominated site involves stakeholders and local communities in designation and management, and specify specific coordination measures or mechanisms currently in place**

Stakeholders involvement	Involvement	Description of involvement	Specific coordination measures	Comments (if any)
Institutions	yes	- Belize Fisheries Department, Government of Belize -Members of the Glover's Reef Advisory Committee		
Public	no			
Decision-makers	no			
Economic-sectors	no			
Local communities	no			
Others	no			

# Chapter 9. IMPLEMENTATION MECHANISM

**Describe the mechanisms and programmes that are in place in regard to each of the following management tools in the nominated site (fill only the fields that are relevant for your site)**

Management tools	Existing	Mechanisms and programmes in place	Comments (if any)
Public awareness, education, and information dissemination programmes	no		
Capacity building of staff and management	no		
Research, data storage, and analysis	no		
Surveillance and enforcement	no		
Participation of exterior users	no		
Alternative and sustainable livelihoods	no		
Adaptative management	no		



# Chapter 10. OTHER RELEVANT INFORMATION

## Contact addresses

	Name	Position	Contact adress	Email adress
who is submitting the proposal (national focal point)	BELIZE Belize MPA	Focal point		belizempa@mpa.com
who prepared the report (manager)	ECK Alicia	Reserve Manager	Belize Fisheries Department, Princess Margarite Drive, Belize City Belize	eck.allie@gmail.com

**Date when making the proposal : 10/05/2010**

## List of annexed documents

Name	Description	Category
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