STATE OF BELIZE'S PROTECTED AREAS 2009



Management Effectiveness Assessment of Belize's Protected Areas

INTRODUCTION

Belize has long been considered a leader in conservation within the Mesoamerican region, with the designation of 36% of its terrestrial area for conservation or sustainable resource use and 13 protected areas (608,740 acres) of its marine territory, focused on management of the diverse marine life. At its heart, Belize has the Maya Mountains Massif – one of the few remaining large, intact blocks of forest left in Central America. Running parallel to the shore, the Belize barrier reef is a valuable resource for traditional fishing communities, and Belize's marine-based tourism industry.

Past anthropogenic pressures have been limited, maintaining Belize's position as a natural resource-rich conservation success story and eco-tourism destination. However rapid population growth and economic

development are now increasing pressures on the National Protected Areas System and biodiversity, whilst socio-economic challenges both within Belize and across the border in Guatemala, are increasingly impacting Belize's protected areas. With impacts such as unsustainable resource extraction, land use change and reduced water quality, the role of the protected areas system becomes ever more important in the maintenance of environmental goods and services including water security, climate change mitigation, marine resources, and timber and non-timber forest products.

How Effective is the National Protected Areas System?

Belize's National Protected Areas System is well founded within the Forest and Fisheries Department legislative framework. However, significant strengthening is required at system-level to tackle management challenges. At one end of the scale are reserves considered as functional conservation units, with the structure and human resources to meet many of their objectives and goals. At the other end of the spectrum are protected areas that lack on-site management or infrastructure, and are considered as 'paper parks', not fulfilling the objectives for which they were established. *Whilst management processes are assessed as largely being in place, the biodiversity assessment indicates that protected areas are not adequately fulfilling their mandate of biodiversity conservation.*

Wildtracks - all photos except: Cover below: R. Graham Page 5: Whale shark (Ron Spilman / SEA) Watermark (R. Graham) Page 9: Gladden Spit (SEA) Page 12: Jaguar (WCS/Wildtracks) Page 15: Water mark (R. Graham) GIS: Adam Lloyd /Wildtracks

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- cept: This assessment seeks to highlight:
 - whether the National Protected Areas System is meeting its goals of conservation and socio-economic benefits
 - information for national, system and site-level adaptive management
 - capacity building requirements
 - knowledge gaps
 - where strategic investments will be most effective

Priority recommendations identified during the assessment:

- The National Protected Areas Policy and System Plan should be fully adopted by all partners, and the National Protected Areas Commission established as the authority responsible for implementation of the NPAPSP.
- Significantly and urgently strengthen enforcement of the protected areas legislation and policies
- The critical importance of following due process in development, concessions, permitting and license allocations within protected areas, with increased collaboration, communication and transparency between Government Departments and co-management agencies.
- Payment Environmental for Services (including carbon sequestration) should be established as a mechanism to provide financing and financial sustainability for core operational for protected costs areas management.
- Establish and implement unambiguous land-use policies or legislation to operationalize identified biological corridors

PROTECTED AREAS SYSTEM OF BELIZE



Keel-billed Toucan (National Bird)

National Protected Areas System				
Те	Terrestrial Protected Areas			
	1. Extractive Reserves			
	Forest Reserves (17)			
	2. Non-Extractive Reserves			
	National Parks (16)			
	Natural Monuments (3)			
	Nature Reserves (3)			
	Wildlife Sanctuaries (5)			
М	arine Protected Areas			
	1. Multiple Use Reserves			
	Marine Reserves(8)			
	2. Non-Extractive Reserves			
	National Parks (1)			
	Natural Monuments (2)			
	Wildlife Sanctuaries (2)			
	3. Spawning Aggregation Sites (11			
Pr	Private Protected Areas			

Private Protected Areas (8)

This review of management effectiveness covers the 49 protected areas administered by the Forest Department (Ministry of Natural Resources) and 8 Marine Reserves managed by the Fisheries Department (Ministry of Agriculture and Fisheries), as well as 11 spawning aggregation sites, 7 bird colonies and 8 private protected areas recognized under the National Protected Areas System. These encompass nine different management categories, dependent on the legislative framework under which they were designated:

Forest Department

- Forest Reserves (17)
- National Parks (17)
- Natural Monuments (5)
- Nature Reserves (3)
- Wildlife Sanctuaries (7)

Fisheries Department

- Marine Reserves (8)
- Spawning Aggregations (11)
 Other
 - Bird Nesting Colonies (7)
 - Private Protected Areas (8)

Thousand Foot Falls Natural Monument

BIODIVERSITY VALUES

Belize lies within Mesoamerica, recognised as one of the richest biodiversity areas on this planet, ranking second only to the tropical Andes in terms of diversity and endemism. Despite contributing only one percent to the world's terrestrial land area, Mesoamerica is thought to have seventeen percent of all known terrestrial species. This species richness and diversity can be traced back in part to the geological history of the area, which forms a transition zone between three biogeographically distinct regions – the Nearctic, Neotropical and the Caribbean.

Belize, with its large extent of intact tropical forests, rolling mountains, open savannas, and lagoons, and the network of natural ecosystems within the protected areas system, provides a critical landscape function within Mesoamerica, contributing towards the maintenance of regional biodiversity and maintaining viable populations of many species considered threatened throughout their range. Belize's natural resources – including timber, medicinal plants, house construction materials (leaves, vines and poles) and game species - contributes towards national and local sustainability.

The functional ecosystems and intact natural vegetation of the protected areas of the Maya Mountains and associated foothills, from the Peccary Hills in the north to the Columbia River Forest Reserve in the south, encompass a wide range of ecosystems over an altitudinal gradient, and provide connectivity from mountain ridge to coastal areas and on to the Belize Barrier Reef. The carbon sequestration functions of the intact forest canopy and the hydrological processes that provide water security to the coastal plains, all add to the importance of these protected areas for maintenance of quality of life for people throughout Belize. The Selva Maya, which continues the connectivity to the forests of the north-west, makes this the second largest contiguous area of tropical rainforest in the Americas, after the Amazon.

The large lagoons of northern Belize provide foraging grounds for many waterbirds – Crooked Tree Wildlife Sanctuary, recognised internationally as a RAMSAR site, a globally important wetland, supports rich waterbird populations within the shallow, open lagoons and forest-lined creeks. Corozal Bay and Southern Lagoon provide critical ecosystems for the slow-moving West Indian manatee, and mangrove cayes support nesting colonies of hundreds of birds – white ibis, wood stork, reddish egrets, magnificent frigatebirds and roseate spoonbills among them.



Wood stork at Crooked Tree Wildlife Sanctuary



Overlooking the forest of Sittee River Forest Reserve 4 from Outlier, Cockscomb Basin Wildlife Sanctuary

The presence of top predators such as jaguars suggests that the trophic structure is still largely intact, with viable populations of prey species. This, however, is changing as the increasing human footprint and higher levels of poverty within Belize are starting to impact the natural resources. There are also pressures on Belize's natural resources and land from neighbouring Guatemala, with poverty driving border community members to enter Belize in the remote Chiquibul and Columbia River forest regions, to harvest these resources to the point of depletion.

This biodiversity richness is also reflected in the Belize reef system, with its crystal clear waters, barrier reef and offshore coral atolls. It is considered the largest, and possibly the least impacted reef in the Atlantic–Caribbean region, with the highest diversity of fish species. It encompasses some of the most important components of the Mesoamerican Reef system, stretching from the littoral forest and mangroves of the coastline, across the shallow coastal lagoon with its scattering of idyllic cayes and near-pristine reefs, to the barrier reef itself and the reef drop-off, where grouper and snapper



Whale shark, Gladden Spit and Silk Cayes Marine Reserve (Ron Spilman/SEA)

gather in huge spawning aggregations. From the immense, impressive whale sharks to the smallest coral polyp, the reef and the associated seagrass and other marine ecosystems are a complex, integrated series of ecosystems that support viable populations of threatened species, sustain coastal fishing communities, and draw significant tourism to Belize.

Seven marine protected areas form the Belize Barrier Reef World Heritage Site which, together with a further six marine protected areas, form the core of Belize's conservation strategies for sustainable use of marine resources.

Coastal communities preserve a traditional way of life that is closely tied to these marine resources, with fishermen freediving for lobster and conch from locally built sailboats, or catching snapper and grouper for local fish markets. These communities are seeking to maintain their cultural values and heritage, and their links with the marine environment as they are forced by declining marine resources to move into other livelihoods such as tourism.

Hawksbill turtles still swim in the clear waters and nest on the coral sand cayes – however, numbers of this critically endangered species are declining, as are those of the commercial fish stocks – grouper, snapper, lobster and conch among them – as increasing human pressure is placed on the marine system. Coastal developments, overfishing, aquaculture and agricultural runoff, and oil exploration are ever

increasing threats to the integrity of the marine ecosystems.

Marine Species of International Concern						
Critically Endangered						
Staghorn Coral	Acropora cervicornis					
Elkhorn Coral	Acropora palmata					
Goliath Grouper	Epinephelus itajara					
Hawksbill Turtle	Eretmochelys imbricata					
Endangered						
Loggerhead Turtle	Caretta caretta					
Green Turtle	Chelonia midas					
Nassau Grouper	Epinephelus striatus					
Fire Coral	Millepora striata					
Star Coral	Montastraea annularis					
Star Coral	Montastraea faveolata					
Great Hammerhead	Sphyrna mokarran					
Vulnerable						
Queen Triggerfish	Balistes vetula					
West Indian Manatee	Trichechus manatus					
Marbled Grouper	Dermatolepis inermis					
White Grouper	Eninenhelus flavolimbatus					
	Lpinepiielus jiuvoiinibutus					
Snowy Grouper	Epinephelus niveatus					
Snowy Grouper Hogfish	Epinephelus niveatus Lachnolaimus maximus					
Snowy Grouper Hogfish Mutton Snapper	Epinephelus niveatus Lachnolaimus maximus Lutjanus analis					
Snowy Grouper Hogfish Mutton Snapper Cubera Snapper	Epinephelus jiavoinnbutus Epinephelus niveatus Lachnolaimus maximus Lutjanus analis Lutjanus cyanopterus					
Snowy Grouper Hogfish Mutton Snapper Cubera Snapper Yellowmouth Grouper	Epinephelus niveatus Lachnolaimus maximus Lutjanus analis Lutjanus cyanopterus Myctoperca interstitialis					
Snowy Grouper Hogfish Mutton Snapper Cubera Snapper Yellowmouth Grouper Whale Shark	Epinephelus jiavoinnbutus Epinephelus niveatus Lachnolaimus maximus Lutjanus analis Lutjanus cyanopterus Myctoperca interstitialis Rhincodon typus					
Snowy Grouper Hogfish Mutton Snapper Cubera Snapper Yellowmouth Grouper Whale Shark Whitelined Toadfish	Epinephelus jiuvoinnbutus Epinephelus niveatus Lachnolaimus maximus Lutjanus analis Lutjanus cyanopterus Myctoperca interstitialis Rhincodon typus Sanopus greenfieldorum					

Left: Sarteneja Fishing Boat

BIODIVERSITY VALUES

ENVIRONMENTAL SERVICES

Critical Ecosystem Functions of the Forests, Savannas and Wetlands of Belize

Ecosystem Services

- Air and water purification
- Climate maintenance
- Water security drought and flood control
- Nutrient cycling
- Economic value tourism
- Hydro-power generation
- Pollination
- natural disaster mitigation

Direct Products

- Timber
- Food (Game species, fish)
- Medicines
- Traditional building materials
- Craft materials
- Xate

Inspirational and Cultural Attributes

- Cultural products (e.g. copal)
- Aesthetic landscapes
- Spiritually significant caves
- Relaxation
- Traditional folklore



Big Rock Falls

The National Protected Areas System provides protection for the rich biodiversity of Belize – of the forests and reef, the lagoons and cayes. It also provides a number of ecosystem services essential for the health and well being of people throughout Belize.

Water Security

The catchment functions of the intact forest canopy of protected areas of the Maya Mountains Massif and the private lands of the northern foothills are important in the role of watershed protection and water security for much of Belize, as well as a significant portion of the Petén, in Guatemala.



Chiquibul National Park

 The lagoons of the flat northern and coastal plains provide important flood control functions, acting as sinks for excess water during storm events.

Carbon Sequestration

• The extensive, intact forest canopy contributes towards global climate control, through carbon sequestration, assisting in the reduction of green house gas emissions.

Natural Resource Use

 Many communities situated adjacent to protected areas (particularly in southern Belize) rely on natural resources for house construction materials, medicinal plants, craft materials and other activities.



Above: Natural

Resource Use in southern Belize

 Pacaya and cabbage palm are harvested for food, whilst game species such as great curassow and paca are important in supplementing the basic diet in these rural communities.

Tourism and Recreation

The aesthetic landscapes of the national parks of Belize are an important recreational resource, both as a tourism destination and as part of Belize's natural and national heritage. Scenic vistas, waterfalls and caves all provide inspiration and educational opportunities to both Belizean and international visitors.





Above: Marine Resources of the Belize reef Below: Tourism and Education Activities



The Marine Protected Areas of Belize encompass some of the best, representative examples of the Mesoamerican Reef. The Barrier Reef and sheltered, clear waters, the coral sand cayes, near-pristine atolls and multi-species spawning aggregations are of particularly high ecological value, contributing significantly to the maintenance of marine biodiversity in the region.

Marine Resources

- The reef is of economic importance to Belize, supporting the traditional lobster, conch and finfish fisheries and providing incomes for fishermen from coastal communities.
- The no-take zones within the marine protected areas ensure that there are viable populations of commercial species for subsistence and commercial fishing.
- The spawning aggregation sites, mangroves, seagrass and coastal lagoons provide critical habitats as spawning and nursery areas, and are vital in the maintenance of commercial species.

Coastline Protection

- The barrier reef and coastal mangroves provide significant protection against the impacts of tropical storms and hurricanes, protecting property and infrastructure, as well as lives.
 - Mangrove roots protect shorelines and cayes from erosion during storm events

Tourism and Recreation

The dazzling arrays of coral and fish are of high touristic value, attracting snorkelers and divers from all over the world, benefitting Belize's growing number of tourism operations, based from both the cayes and the mainland.

Educational and Outreach Resources

 Access to pristine marine areas and marine life for educational activities, building awareness of Belize's natural resources encouraging future good stewardship.



Critical Ecosystem Functions of the Marine ecosystems and Resources of Belize

Ecosystem Services

Mangroves

- Nutrient cycling
- Protection of shorelines from storm surges
- Filtering of runoff for reduced sedimentation and water pollution
- Roots provide important nursery areas for commercial and non-commercial species
- Provide nesting structures for important bird colonies

Coral Reef

- Barrier reef protects coastline from storm surges
- Provides coral, a major component of beaches and cayes
- Source of spawn recruitment for much of the Caribbean
- Value as a tourism resource

Seagrass

- Nutrient cycling
- Stabilizing substrates and settling water turbidity

Direct Products

- Lobster, conch and shrimp
- Fin fish
- Seaweed
- Sand

Inspirational and Cultural Attributes

- Aesthetic land/seascapes
- Relaxation
- Traditional vacation location

ENVIRONMENTAL SERVICES

STATE OF THE

BIODIVERSITY

Range **Biodiversity Viability Rating** (%) **VERY GOOD** Does not need human intervention >75% **GOOD** Populations reduced, but should recover >50 - 75% with limited human intervention FAIR Populations will decline if there is no human >25 - 50% intervention **POOR** Populations are in danger of disappearing ≤ 25% from the area, even with human Intervention

Belize's terrestrial protected areas encompass a wide range of representative ecosystems, and protect a high diversity of species, ranging from the critically endangered Morelet's Treefrog to the wide-ranging and charismatic jaguar. A series of seventeen biodiversity indicators has been selected and assessed to provide an

overview of the status of the terrestrial biodiversity in Belize's protected areas system. Overall, the viability of the terrestrial protected areas SPECIES OF INTERNATIONAL CONCERN system of Belize is considered to rate at the lower end of GOOD, with an effectiveness of 57.0%.



- Species of International Concern average a viability score of 58.3% (at the lower end of GOOD), suggesting the protected areas are reasonably effective for the conservation of these threatened indicator species.
- The averaged level of risk to these species is considered HIGH, with two species, the hicatee and the yellow-headed parrot, assessed as Very High.
- Species of National Concern rate as GOOD, averaging a viability score of 55.8%
- However, these National indicator species are also considered to have a HIGH risk level. Three indicator species are considered as VERY HIGH risk - the scarlet macaw, white- lipped peccary and ocellated turkey, and in danger of local extirpation in some protected areas; the latter two are heavily hunted in areas in which they occur.



CROWN BIRD COLONIES

Seven Crown Bird Colonies were established in 1977 under the Lands Act for the protection of key bird nesting and roosting sites. These cayes are considered critical in the maintenance of colony nesting species such as magnificent frigatebirds, brown pelicans, wood storks, roseate spoonbills, white ibis and more.

Bird Colony Name	Management Presence
Monkey Caye	No
Little Guana Caye	Intermittent
Los Salones	Intermittent
Bird Caye	No
Un-Named	No
Man of War Caye	Yes
Dubloon Bank	No

Only one of these cayes is fully integrated into the National Protected Areas System, being located within South Water Caye Marine Reserve, an active protected area, and few have any significant management presence.

Decreasing Population Trend



Dermatemys mawii Critically Endangered

Turtle (Hicatee)

Central American River

Status in Belize: Fair Risk Level: Very High



Yellow-headed Parrot Amazona oratrix

Endangered Status: Fair Risk Level: Very High



Great Curassow Crax rubra

Vulnerable Status: Fair Risk Level: High

SPECIES OF NATIONAL CONCERN



White lipped Peccary Tayassu pecari





Status: Fair Risk Level: Very High

Scarlet Macaw

Ara macao

¹ Based on 29 protected areas considered to have sufficient valid data on biodiversity

Belize is known worldwide for its pristine dive sites, extensive mangroves and seagrass, and high fish diversity. Over the last ten years, however, these values are being increasingly impacted by anthropogenic/human

activities. Twenty one indicators have been selected to provide an overview of the current status of the biodiversity across the marine protected areas. These include ecosystems and species of concern, commercial species, and species flagged for their touristic importance.

Overall, the marine protected areas of Belize average a rating of GOOD under this assessment, with a viability score of 63.0%, though this is considered to be overpositive when compared with parallel assessments, and was downgraded to FAIR during the validation exercise.

- Species of International Concern average a score of 55.5% (GOOD), with an average risk level of Medium.
- The critically endangered goliath grouper and hawksbill turtle are considered at Very High risk, along with the Nassau grouper, queen triggerfish, hogfish, loggerhead and green turtles.
- Species of National Concern average a score of 64.2% (GOOD), with an overall Risk Level of Medium.
- Lobster and conch, the two primary commercial species on which Belize's fishing industry is based, are both identified as at High risk across the system.

SPAWNING AGGREGATION SITES

Spawning aggregations - sites where thousands of grouper, snapper and other fish gather to reproduce - are critical to the maintenance of Belize's commercial fish stocks. The congregations at these sites have crashed throughout Belize since first being targeted by fishermen. Whilst seasonal protection is in place for the majority of these sites, and most are maintaining low numbers, few are showing true signs of recovery, and some have completely collapsed.

Since 2003, monitoring of selected key spawning aggregation sites has been ongoing, showing that Nassau Grouper aggregations continued to decline until 2008, before starting to show signs of recovery.

Eleven of these sites have been protected since 2003, and a further two Nassau grouper sites have seasonal protection, with a provision for continued fishing by traditional fishermen under special license for many of these sites.

Risk level

Very High: Significant risk of extirpation	≤ 1.00
High: Severely decreasing population	>1.00 - 2.00
Medium: Gradually decreasing population	>2.00 - 3.00
Low: Relatively stable population	>3.00

The risk level is calculated from the combined viability and trend scores per species.

Protected Spawning Sites Rocky Point Dog Flea Caye Cave Bokel Sandbore South Point Lighthouse Emily / Caye Glory Northern Glover's Gladden Spit **Rise and Fall Bank** Nicholas Caye Seal Caye



Above: Spawning congregation at Gladden Spit (SEA)

SPECIES OF INTERNATIONAL CONCERN

Goliath Grouper Epinephelus itajara

Critically Endangered Status in Belize: Fair Risk Level: Very High

Hawksbill Turtle Eretmochelys imbricata



Hogfish Lachnolaimus maximus

Vulnerable Status in Belize: Good Risk Level: High



ECOSYSTEMS

Coral Reef



Status in Belize: Fair Risk Level: Very High

Mangroves

Status in Belize: Very Good



Status in Belize Very Good



STATE OF THE BIODIVERSITY

IMPACTS

Impacts – Pressures and Threats on the National Protected Areas System

There are increasing human impacts on both the terrestrial and marine components of the National Protected Areas System, with unsustainable resource extraction, weak implementation of Government legislation and policies, coastal development and transboundary incursions being highlighted as significant issues across the 35 protected areas for which data is available.



Impacts across the Terrestrial Protected Areas System

- The greatest impacts on the terrestrial protected areas system in terms of geographical scope are hunting, logging and transboundary impacts, all of which affect more than 40% of the 35 protected areas for which there is data.
- The three protected areas with the highest combined pressure /threat scores are those that lie along the Guatemala / Belize border – Sarstoon Temash National Park, Columbia River Forest Reserve, and Chiquibul National Park.
- Illegal natural resource extraction particularly hunting, xate harvesting and fishing, and poaching of parrots and macaws

 is having profound impacts on biodiversity, as are the increasing number of agricultural incursions. Protected area
 management at both site and system level is not considered to be adequately protecting many species, including the
 Critically Endangered Central American river turtle (hicatee), the scarlet macaw, white-lipped peccary, ocellated turkey,
 and yellow-headed parrot.



National extirpation of some of these species is a distinct

possibility in the near future if the impacts of illegal activities

Pressures are considered as past direct and indirect negative impacts on the biodiversity, whilst threats are the future potential negative impacts



Above: Mapping agricultural incursions across the protected areas **Right:** Agrochemical pollution is an increasing impact on both terrestrial and marine resources



Impacts across Marine Protected Areas (MPAs)

For each marine protected area, the primary four pressures and threats were identified and assessed. This resulted in a total of eleven key impacts identified across the marine protected areas of Belize, each impacting at least one, or as many as 12 of the 13 marine protected areas

- Climate change, as a global threat, is considered to be a high impact on reef ecosystems, and superimposed on all other threats.
- Of the eleven system-level impacts, three are identified as key impacts affecting over 50% of marine protected areas across Belize:
 - Overfishing / illegal fishing
 - Coastal/ caye development
 - Tourism impacts
- Pollution and illegal transboundary fishing are assessed as key impacts on between three and six of the marine protected areas.
- This was followed by boat groundings and the associated contamination of water by oil spills.

Future threats have been assessed in the same way. In the majority of cases, the pressures currently impacting the marine protected areas are assessed as being likely to remain the same, or increase, over the next 5-year period.

The highest potential threat has been identified as boat groundings and the associated contamination of water by oil spills. Whilst such occurrences are only occasional, they have the potential to seriously impact large areas of reef. The



increased movement of petroleum products by ship through Belize waters increases this threat.

Mangrove clearance is identified as the second highest future threat, reflecting the increasing development of coastal and caye properties for tourism and retirement. Mangroves are critical for many reef species, including those targeted commercially, particularly for protection during the juvenile life stages. Mangrove removal throughout the marine sector may therefore have significant implications on future commercial fish stocks.

Left: Coastal and caye development Is an increasing impact on the marine environment







Above: Aqua-cultural run off from coastal shrimp farms and unsustainable fishing pressures on commercial species especially lobster and conch - are among the impacts affecting the long term viability of Belize's marine resources



MANAGEMENT EFFECTIVENESS

Management Effectiveness

Assessing management effectiveness provides a framework for reporting on progress of protected area management towards achieving the national objective of a functional protected areas system. The Management Effectiveness Assessment Tool does this through a series of 64 indicators, organized into seven indicator categories, all of which rate as **MODERATE** in the 2009 assessment:

Indicator Categories

- 1. Resource Information
- 2. Resource Administration, Management and Protection
- 3. Participation, Education and Socio-Economic Benefits
- 4. Management Planning
- 5. Governance*
- 6. Human Resources
- 7. Financial and Capital Management*



- * **Note:** In this iteration of the management tool:
 - Governance indicators focus on site-level, and do not reflect the need for strengthening of central governance
 - Financial Indicators represent financial management processes only

1. Resource Information

Effective protected area management is reliant on knowledge of the area to be managed – the ecosystems, the biodiversity, the identification of species and

systems of conservation concern, resource use (both legal and illegal), as well as other impacts on biodiversity of the area. Overall, the protected areas system rates at the lower end of **MODERATE** for this section, with a mean effectiveness score of 2.14 out of 4.00 (53.5%).



Recommendations for Improved Resource Information

- Ensure resource information collection and management within the context of the primary mandates
 of biodiversity conservation and watershed protection.
- Ensure protected area managers are fully informed on the socio-economic context within which they
 are operating.
- Prioritize monitoring of natural and cultural resources to ensure that resource status and use information is current.
- Ensure that structured processes are in place and utilized to fully integrate available resource information into adaptive management.

2. Resource Administration, Management, and Protection

Belize is considered to have strong legislation for the establishment

of protected areas, and a legislative framework within which protected areas can be managed and operate effectively. The protected areas system rates as **MODERATE** for Indicator Category Two, with a mean score of 2.74 out of 4.00 (68.5%).



Recommendations for Improved Resource Administration, Management and Protection

- Prioritize strengthening of the capacity of protected area managers and staff to significantly strengthen and prioritize enforcement.
- Support current initiatives to increase inter-departmental communication and collaboration within government, to ensure full compliance with legislation and policies relating to protected area administration and management.

3. Participation, Education and Socio-Economic Benefit

A central theme of the National Protected Areas

Policy and System Plan (NPAPSP) is the involvement of local communities and stakeholders in the management of protected areas, and ensuring that the protected areas are providing socio-economic benefits. The NPAPSP also recognizes that the National Protected Areas System is strengthened through widespread recognition of the goods and services provided by the protected areas. The protected areas system rates at the lower end of **MODERATE** for this section, with a mean score of 2.14 out of 4.00 (53.4%).

 Public and political awareness of the importance of the protected area system's contribution to the national economy, in watershed protection and water security, natural disaster mitigation, and climate buffering, is considered inadequate, threatening the long-term security of Belize's social and financial investments in its protected areas



Recommendations for Improved Participation, Education and Socio-Economic Benefit

- System level development and implementation of activities to strengthen education, dissemination of information, stakeholder engagement and access to socio-economic benefits, including employment.
- Prioritize recognition of benefits arising from the protected areas system at all levels.

4. Management Planning Effective management relies on the implementation of effective management planning processes - management plans, operational plans, regulations and zoning – as well as the processes of management, including monitoring and evaluation. The protected areas system rates at the lower end of **MODERATE** for Management Planning, with a mean score of 2.20 out of 4.00 (55.1%).

 Significant progress has been made by several protected area managers in management plan development and implementation since the 2006 assessment, but many critical protected areas still lack both management and operational plans – and on-site management (if any) is therefore ad-hoc, unplanned, unstructured and therefore less effective.



Recommendations for Improved Management Planning

- Prioritize development of comprehensive management planning for key protected areas
- Continue collaboration with donor agencies to secure funding for prioritized system level conservation plans, with integration of site level management planning under system level management frameworks towards greater conservation success
- Continue capacity building of management teams and co-management partners to effectively use management plans as a central resource and management tool.

5. Governance Effective management relies on the establishment of authority, responsibility, and accountability, with essential governance structures and supporting processes that are well designed and implemented. Overall, protected areas score an average of 2.75 out of 4.00 (68.8%), rating as **MODERATE** for Governance. This indicator currently does not reflect the need for strengthening of central governance.

 Site level governance is generally good across the system in terms of objectives and organizational structure, though many protected areas lack functional advisory boards – which are recognized as being part of an effective mechanism to establish and maintain consensus in decision-making, transparency, and accountability, particularly with local stakeholders.



Recommendations for Improved Governance

- Strengthen the organizational capacity of co-managers, particularly CBOs, for management and project implementation.
- Ensure that effective mechanisms are in place to integrate advisory committee inputs into the management decision-making processes.
- Adopt and implement the National Co-management Framework and sign new comanagement agreements using the new template with a clear division of roles and responsibilities.

MANAGEMENT EFFECTIVENESS

MANAGEMENT EFFECTIVENESS

6. Human Resources The presence of sufficient, adequately educated and trained staff, with high staff satisfaction and motivation to ensure high productivity, is critical for effective management. Overall, this section scores an average of 2.49 out of 4.00 (62.3%) across the protected area system, with a rating of **MODERATE**.

- Human resource capacity in protected area management organizations has increased significantly over the last decade, but few protected area managers consider they have adequate operational, technical and administrative staff.
- Marine Reserves benefit from investment from Government in essential on-site staff and an adequate administrative support structure. Other national protected areas, however, are often severely understaffed, primarily as a result of financial limitations.
- There is a need for Government to recognize the equal importance of terrestrial protected areas, and invest in core operational costs particularly human resources so as to build and retain capacity at all levels.



Recommendations for Improved Human Resource Management

- Seek greater human resource funding for NGO / CBO management organizations, to provide stability and long term commitment for staff retention, with Government investment in core site-level staffing of identified critical terrestrial protected areas, through the comanagement agencies
- Ensure that human resource investments are distributed where most needed within each management body through effective human resource assessment, building and retaining capacity at all levels – but with emphasis on identified gaps

7. Financial and Capital Management Adequate funds are required for effective management, to ensure that the necessary protected area infrastructure, equipment, signs and other assets in place and maintained. Overall, the protected areas system scores **2.50** for Financial and Capital Management, rating as **MODERATE***.

- Funding adequacy for protected area management is a significant limiting factor for the protected area system, particularly for the terrestrial protected areas.
- The use of partnership and co-management mechanisms by the Fisheries and Forest Departments is effective in accessing funding that would not otherwise be available for protected area management, but greater national investment in system-level support (particularly enforcement) is critically needed.
- Financial management is generally good amongst NGOs and the management authorities, though often very weak amongst CBOs.
- Co-management NGOs and CBOs remain too dependent upon grant funds, greater focus is needed for the development of income generating mechanisms to increase financial sustainability and security.



Recommendations for Improved Financial and Capital Management

• An economic evaluation is required of the protected areas system, including watershed functionality and other environmental services, natural resource use, visitation and employment, so as to better inform leaders and the general public of the value and contribution of Belize protected areas to the nation.

* Note: In this iteration of the management tool, the Financial Indicators reflect financial management *processes*, and not actual financial management *outputs* which validation shows to be considerably lower.

How Effective is Management of the National Protected Areas System?

	POOR Aguacate Lagoon (PPA) Grant's Works Forest Reserve Monkey Caye Forest Reserve Aguas Turbias National Park			Overall Management effectiveness of the National Protected Areas System is rated as MODERATE 61.1% (2.44 out of 4.00)
	FAIR Monkey Bay National Park Honey Camp National Park Burdon Canal Nature Reserve Five Blues Lake National Park Freshwater Creek Forest Reserve Bacalar Chico National Park Machaca Forest Reserve Mayflower Bocawina National Park Vaca Forest Reserve Spanish Creek Wildlife Sanctuary Sittee River Forest Reserve			Ten protected areas rate as VERY GOOD , scoring above 75% in terms of overall management effectiveness. Sixteen protected areas are highlighted as requiring significant strengthening and support, with scores under 50% (< 2.00 our of 4.00). Four protected areas score 25% (1.00 out
	Sibun Forest Reserve Gales Point Wildlife Sanctuary Swallow Caye Wildlife Sanctuary Columbia River Forest Reserve Runaway Creek Nature Preserve Billy Barquedier National Park Caye Caulker Forest Reserve		ŀ	of 4.00), rated as POOR.
otected Areas	Manatee Forest Reserve Maya Mountain Forest Reserve Mango Creek (4) Forest Reserve Mango Creek (1) Forest Reserve Rio Blanco National Park Community Baboon Sanctuary Corozal Bay Wildlife Sanctuary		,	
Pr	Swasey-Bladen Forest Reserve Aguacaliente Wildlife Sanctuary Tapir Mountain Nature Reserve TIDE Private Protected Lands Shipstern Nature Reserve (PPA) Actun Tunichil Muknal Natural Monument Guanacaste National Park			t Reserves onal Parks onuments e Reserves e Reserves cted Areas
	Monkey Bay Wildlife Sanctuary (PPA) Deep River Forest Reserve South Water Caye Marine Reserve Sapodilla Cayes Marine Reserve Peccary Hills National Park Nojkaaxmeen Elijio Panti National Park			Fores Fores Natural M Natural M Natur Marin Private Prote
	Gra Gra Lagoon National Park Gladden Spit and Silk Cayes Marine Reserve St. Herman's Blue Hole National Park			Protected Area Management Categories
	Caye Caulker Marine Reserve			Poor: ≤ 1.00 Fair: > 1.00 - 2.00
	Thousand Foot Falls Natural Monument			Moderate: >2.00 – 3.00 Very Good: >3.00
	Mountain Pine Ridge Forest Reserve Chiquibul National Park Crooked Tree Wildlife Sanctuary Bacalar Chico Marine Reserve Glover's Reef Marine Reserve Bladen Nature Reserve Chiquibul Forest Reserve			All management categories have average scores of 50.0% (2.00 out of 4.00), and are therefore rated as MODERATE or VERY GOOD . Natural Monuments, administered under
	Port Honduras Marine Reserve		8	the Forest Department, with a co-
	VERY Payne's Creek National Park GOOD Golden Stream Corridor Preserve (PPA) Victoria Dack Natural Manument Victoria Dack Natural Manument			management agreement with Belize Audubon Society, have the highest rating
	Cockscomb Basin Wildlife Sanctuary		1	(VERY GOOD), with an average score of
	Rio Bravo Conservation and Management Area (PPA) Blue Hole Natural Monument Half Moon Caye Natural Monument Sarstoon Temash National Park Hol Chan Marine Reserve		-	75.5% (3.02 out of 4.00). The weakest management sub-category is that of the Forest Reserves, with an average score of 53.5% (2.14 out of 4.00), rating at the lower end of MODERATE .
		0 20 40 60 80 100 % Effectiveness Scores	-	10 protected areas score above 3.00 out of 4.00, rating as VERY GOOD

Mean Management Effectiveness Score per Protected Area

Management Effectiveness Indicators (Young et. al. 2005)

	1. Resource Information	4. Management Planning	
	1.1 Inventory: Physical Environment	4.1 Management Plan	
	1.2 Inventory: Biotic Environment	4.2 Operational Plan	
	1.3 Inventory: Cultural and Archaeological Resources	4.3 Regulation and Implementation of	
	1.4 Inventory: Social, Cultural, and Economic Context	Management Zones	
	1.5 Inventory: Resource Use and Occupancy	4.4 Identification of long term Management	
	1.6 Inventory: Tenures and Claims	Needs	
	1.7 Site Assessment: Conservation Target	4.5 Program Monitoring and Evaluation	
	1.8 Site Assessment: Systematic Threat Assessment	4.6 Research Planning	
	1.9 Inductional Knowledge	5. Governance	
	1.10 Information Management Systems	5 1 Protected Areas Objectives	
	1.12 Scientific Posearch Activities	5.2 Co-Management Agreements	
	1.12 Scientific Research Activities	5.3 Administrative Autonomy	
	2. Resource Administration, Management and	5.4 Operating Procedures: Advisory Committee	
	Protection	5.5 Operating Procedures: Roard of Directors	
	2 1 Logal · Logal Status	5.6 Inter-organizational Mechanisms	
	2.2 Legal: Boundary Survey and Demarcation		
	2.3 Legal: Permit and Approval Processes	6. Human Resources	
	2.4 Tenure Claim Conflict Resolution	6.1 Site Manager Prenaration	
	2.5 Guidelines and Best Management Practices	6.2 Site Manager Availability	
	2.6 Natural Resource Management	6.3 Admin Staff Availability	
	2.7 Protection: Surveillance Activities	6.4 Technical Scientific and Professional Staff	
	2.8 Protection: Enforcement Activities	Availability	
	2.9 Visitor and Tourism Management Activities	6.5 Operations Staff Availability	
-	2.10 Visitor and Tourism Monitoring Activities	6.6 Human Resource Assessment	atte a
		6.7 Training and Development Strategies	
	3. Participation, Education, and Socio-Economic Benefits	6.8 Staff satisfaction	
	3.1 Communication Activities	7 Financial and Canital Management	Carl San
	3.2 Stakeholder Engagement	7. Financial and Capital Management	T. T.
3	3.3 Educational Activities	7.1 Funding Adequacy	
N	3.4 Dissemination of Knowledge and Information	7.2 Revenue Generation	Lit Marke
21	3.5 Participation: Level of Stakeholder Participation in	7.3 Financial Management	
	Management	7.4 Infrastructure Adequacy	a state of the
	3.6 Participation: Local Actors Leading Management	7.5 Equipment Adequacy	Si the in
1	3.7 Participation: Volunteer Activities	7.6 Internal Access Adequacy	A CARL
	3.8 Participation: Strength of Social Capital	7.7 Signage Adequacy	
	3.9 Participation: Capacity Building Strategies	7.8 Maintenance Adequacy	
	3.10 Benefits: Extent of Socio-Economic Benefits Strategy		0
	3.11 Benefits: Extent of Local Economic Benefits		1.
	3.12 Benefits: Sustainable Use for Economic Benefits		4 39
	3.13 Benefits: Employment in activities related to the		2 have
-	protected area	March Production of the second	
	3.14 Benefits: Local Recognition of Protected Area		
	Benefits	Contraction of the second second	Star Marine





Protected Areas Conservation Trust

Facilitated By:







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