



**Technical Assessment of the
Management Capacities
of the Maya Mountains Massif**
April, 2008



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Technical Assessment of Management Capacities within the Maya Mountains Massif

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Acknowledgments

Over 100 participants took part in this Technical Assessment...and we would like to thank all of them - those who participated in the CAP workshops, associated technical meetings, community meetings and RAPPAM process - for ensuring that this output is as accurate as possible, based on the data available.

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.... Nellie Catzim for her assistance with the Socio-Economic sections

...and, as always, Adam Lloyd, for producing the maps

A full list of participants is included within the **Summary - Technical Assessment of the Maya Mountains Massif** report



Technical Assessment of the Maya Mountains
Massif – Management Capacity Assessment
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Management Capacities within the Maya Mountains Massif

I. Introduction

Background

The Maya Mountains Massif / Montañas Mayas, extending from Belize into Guatemala, is considered the eighth largest block of contiguous tropical forest in Mesoamerica, one of the areas of highest global biodiversity (TNC, 2006; CI, 2006.), and as such, has been highlighted as both a global and an ecoregional conservation priority (TNC, 2006; CI, 2006). Within Belize, the Maya Mountains Massif has also been recognized as the foremost national terrestrial conservation priority, under the National Protected Areas Policy and System Plan (NPAPSP, 2005), in recognition of its critical role in Belize's National Protected Areas System, its value for environmental services, including biodiversity conservation, and in contributing towards the fulfillment of Belize's commitment to global biodiversity conservation, under the Convention on Biological Diversity for in-situ conservation of natural resources.

The Maya Mountains Massif, consisting of fourteen protected areas within Belize, is biodiversity-rich, and encompassing thirty-seven globally threatened species (four species considered 'Critically Endangered', thirteen classified as 'Endangered' (IUCN, 2008), and twenty classified as 'Vulnerable'¹. Eighteen endemic species have been identified to date in the rich matrix of ecosystems. Despite its protected status, the Maya Mountain Massif is subjected to a number of threats throughout its range, including illegal and unsustainable harvesting of xate, illegal hunting and fishing, farming incursions and increased fire impacts. There is recognition of the need for more effective system-level management of the area, greater participation from stakeholder communities in management decisions, and greater trans-boundary collaboration with the management stakeholders of the contiguous Chiquibul / Montañas Mayas of the Southern Petén area of Guatemala (NPAPSP, 2005).

The Forest Department of Belize, with the support of The Nature Conservancy, is conducting a **Technical Assessment of the Maya Mountains Massif** as the first of a number of steps towards the consolidation of the fourteen adjacent protected areas into a single, multi-zoned management unit. Outputs from the technical assessment include recommended strategies towards more effective management of individual protected areas, and greater collaboration between protected area managers and co-managers, increased participation and engendering of greater support from adjacent communities, as mechanisms towards increased management effectiveness.

As part of the technical assessment, the present management capacities of the protected area management bodies have been assessed using the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) methodology (WWF, 2003). The findings from the RAPPAM process, collated from meetings and interviews conducted between April and June, 2007, are summarized within this report, which also highlights gaps in management in the Maya Mountains Massif, and strategy recommendations for increased coordination between management units, with the objective of strengthening the overall national and regional integration of the Maya Mountains Massif into an amalgamated protected areas system, with management focused on system-wide goals and objectives.

¹ These estimates for number of threatened species per IUCN category include three aquatic / marine species present within the estuarine and lower river ecosystems of Deep River, covered under the Maya Mountains Marine Corridor Conservation Action Plan

1.1 Scope and Coverage of Assessment

The Maya Mountains Massif area covers an estimated 1,260,800 acres of Belize (approximately 510,330 hectares), stretching from Vaca Forest Reserve at its most northerly extent to Columbia River Forest Reserve in the south, and is composed of a total of fourteen protected areas (FD, 2007). It is highlighted as a priority area under the Maya Forests Ecoregional Plan (TNC, 2006), and, together with Complejo III (Reserva de Biosfera Montañas Mayas-Chiquibul), of the Guatemala protected areas system, which forms part of the Chiquibul / Montañas Mayas, one of the largest remaining areas of contiguous forest in Mesoamerica.

The area is biodiversity-rich, and includes at least seventeen species considered critically endangered / endangered (IUCN, 2006), and a further twenty classified as vulnerable. Eighteen endemic species have been identified to date in the rich matrix of ecosystems, and as increasing survey work is conducted, particularly in the upper elevations, this is still increasing. Despite its protected status, the Maya Mountain Massif is subjected to a number of threats throughout its range, including illegal hunting and fishing, fire, illegal and unsustainable harvesting of xate and timber, and farming incursions.

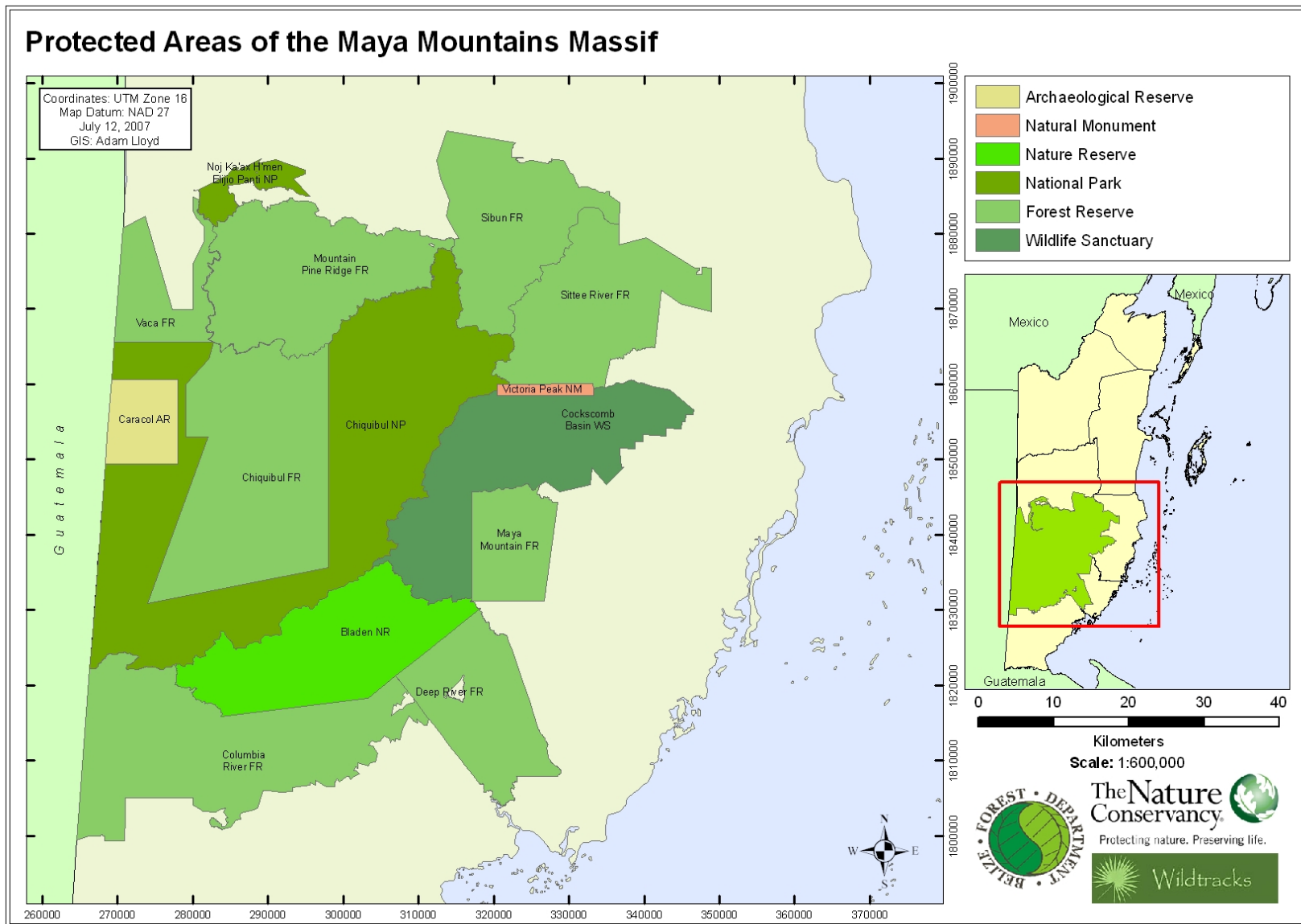
The fourteen protected areas within the Maya Mountains Massif vary in size and status, ranging from Victoria Peak Natural Monument (the smallest of the protected areas, designated for its national importance as the highest peak in Belize) to Chiquibul National Park, important for both its biodiversity and watershed protection roles (Table 1).

NAME	STATUS	IUCN CAT	ACRES
Sibun*	Forest Reserve	VI	96564.45
Vaca	Forest Reserve	VI	34886.89
Chiquibul	Forest Reserve	VI	147823.10
Maya Mountain	Forest Reserve	VI	38259.77
Sittee River**	Forest Reserve	VI	92316.59
Columbia River	Forest Reserve	VI	148302.97
Deep River	Forest Reserve	VI	67304.82
Mountain Pine Ridge	Forest Reserve	VI	106,352.70
Cockscomb Basin*	Wildlife Sanctuary	IV	122,260.14
Victoria Peak	Natural Monument	III	4,840.56
Noj Kaax Me'en Eligio Panti	National Park	II	12,657.30
Chiquibul	National Park	II	264,003.25
Caracol	Archaeological Reserve	II	25,549.46
Bladen	Nature Reserve	Ia	99,673.80
APPROXIMATE AREA (ACRES)			1,260,800

* Boundaries currently being redefined

** Includes Davis Falls

Table 1: Protected Areas of the Maya Mountains Massif



Map 1: Protected Areas of the Maya Mountains Massif

1.2 The National Protected Areas System of Belize

Belize's National Protected Areas System is managed under the recently approved National Protected Areas Policy and System Plan (NPAPSP, 2005), which provides a framework of general principles within which this assessment has been developed.

National Protected Area Policy Declaration

Recognizing that:

Protected areas in Belize provide irreplaceable public benefits from ecosystem services such as clean water, clean air, carbon sinks, gene pools, baseline data for research and development, all of which contribute to the local, national and regional economies,

And that:

Protected areas are an important resource base for the development and strengthening of economic activities and contribute to poverty elimination by supporting industries such as agriculture, tourism, fisheries, timber and non-timber products, research, bio-prospecting, mining, water and energy services among others:

The Government of Belize shall promote the sustainable use of Belize's protected areas by educating and encouraging resource users and the general public to properly conserve the biological diversity contained in these areas in order to maintain and enhance the quality of life for all. This shall be achieved by facilitating the participation of local communities and other stakeholders in decision making and the equitable distribution of benefits derived from them, through adequate institutional and human capacity building and collaborative research and development.

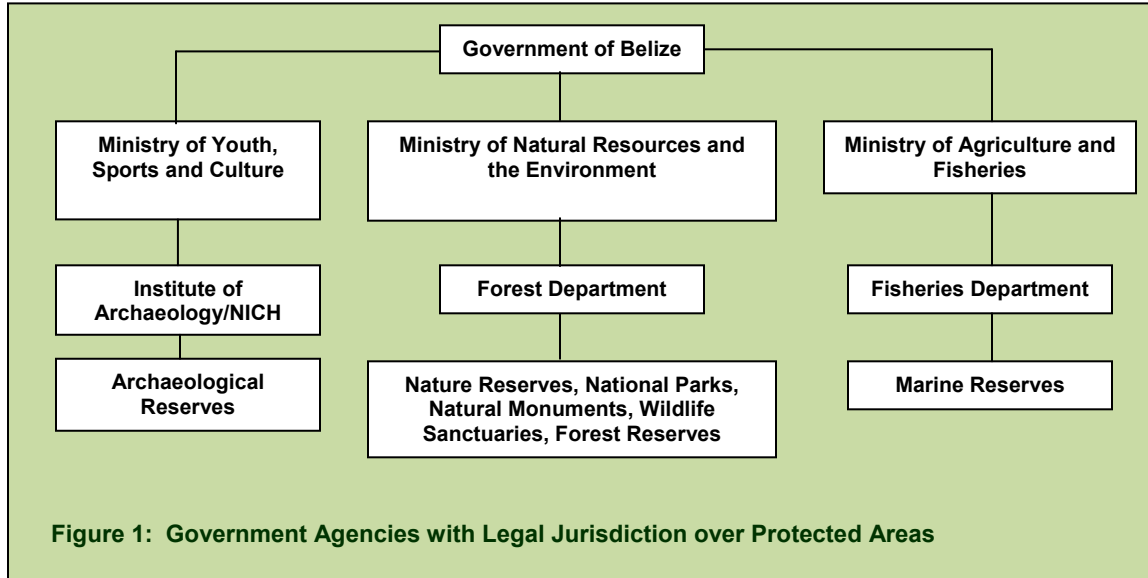
General Principles:

The Government of Belize shall:

- 1. Assure, for all Belizeans, safe, healthy, productive, aesthetically and culturally pleasing surroundings by preserving important historic, cultural, aesthetic and natural aspects of Belize's natural heritage;***
- 2. Promote the widest range of beneficial uses of biodiversity without degradation, risk to health or safety, or other undesirable and unintended consequences in order to provide for sustainable economic development;***
- 3. Achieve a balance between population and biodiversity resource use which will permit a higher standard of living and the conservation of natural resources for future generations;***
- 4. Enhance the quality of renewable resources and strive for the optimum use of non-renewable resources.***

NPAPSP, 2005

Within Belize, three different Government Ministries currently have mandates for the creation of national protected areas, two of which have protected areas within the Maya Mountains Massif. The first, the Forest Department of the Ministry of Natural Resources and the Environment, is responsible for the administration of the Forest Act and the National Parks System Act. The second, the Ministry of Youth, Sports and Culture, is responsible for the creation of Archaeological Reserves under the Ancient Monuments and Antiquities Act (Figure 1), and managed by the Institute of Archaeology.



1.3 Current Protected Area Status

All but one of the protected areas of the Maya Mountains Massif are established under the Forest Department through the National Parks System Act, and fall within five distinct categories, each with restrictions strictly defined by law. 42% of the Maya Mountains Massif is designated for the conservation of biodiversity and cultural resources. This includes three of the protected area categories (National Park, National Monument and Wildlife Sanctuary), providing full protection to the natural resources, with use concentrating on tourism, research and education.

Cockscomb Basin, 10% of the total area and the only Wildlife Sanctuary within the Maya Mountains Massif system, was designated for its importance as a key site for jaguars. It is also one of only three protected areas within the Maya Mountains Massif to have significant visitation (the others being

Caracol Archaeological Reserve and the Mountain Pine Ridge Forest Reserve). Cockscomb is combined with Victoria Peak Natural Monument (less than 1% of the area) as a single management unit, under a co-management agreement with Belize Audubon Society (Table 3).

Status	Extractive Use	Tourism	Research	Education
Forest Department				
Nature Reserve	No	No	Yes	Yes
National Park	No	Yes	Yes	Yes
National Monument	No	Yes	Yes	Yes
Wildlife Sanctuary	No	Yes	Yes	Yes
Forest Reserve	Yes	Yes	Yes	Yes
Institute of Archaeology				
Archaeological Reserve	No	Yes	Yes	Yes

Table 2: Permitted activities per designated status of protected areas of the Maya Mountains Massif

Bladen Nature Reserve covers 8% of the MMM, and is considered equivalent to IUCN category Ia, being designated as a Nature Reserve, the strictest category available in Belize, restricting access to only research and educational activities providing a core preservation area with minimal disturbance to the biodiversity.

Status	Hectares	% total
Forest Department		
Nature Reserve	40,336.72	8%
National Park	111,961.00	22%
Natural Monument	1,958.91	<1%
Wildlife Sanctuary	49,447.12	10%
Forest Reserve	301,536.46	58%
Institute of Archaeology		
Archaeological Reserve	10,339.54	2%

Table 3: Relative areas of each FD and IoA protected area status designations

The remaining non-extractive protected areas under Forest Department management cover 24% of the Maya Mountains Massif, encompassing two National Parks – Chiquibul

National Park (the largest of the protected areas within the Maya Mountains Massif), and Noj Ka'ax H'Men Elijio Panti National Park, one of the smallest. There are currently plans for two smaller National Parks to potentially be excised from Sittee River Forest Reserve – Davis Falls and Swim Pools, both to be co-managed under agreement with Friends of the Valley, a local community-based organization.

The fifth FD management category, the Forest Reserves, cover 58% of the area, and is designated for controlled, sustainable resource extraction - primarily timber extraction, though leaf extraction for thatching, xate harvesting, hunting, and the collection of a number of non-timber forest products (seeds, orchids, palms etc.) are also permitted with the appropriate licenses

The Archeological Reserve status covers 2% of the Maya Mountains Massif – a single protected area – Caracol Archaeological Reserve – designated for its importance as the largest archaeological site in Belize. This is managed under the Institute of Archaeology (Ministry of Youth, Sports and Culture), rather than the Forest Department (Ministry of Natural Resources), and as with the non-extractive categories managed under the Forest Department, allows for tourism, research and education use.

1.4 Protected Area Management Organizations

Management responsibility for the protected areas of the Maya Mountains Massif is divided between two Ministries - the Ministry of Natural Resources and the Environment and the Ministry of Culture. All but 2% of the Maya Mountains Massif is under the mandate of the former, through the Forest Department, which shares this responsibility with a number of co-management agencies and long-term forest license concession holders (Table 4):

Belize Audubon Society: One of the most established conservation organizations within Belize, currently with a ten-year co-management agreement covering Cockscomb Basin Wildlife Sanctuary and Victoria Peak Natural Monument, as well as a seat on the Executive Board of the Bladen Management Consortium.

Bladen Management Consortium: The co-management partner for Bladen Nature Reserve, the BMC Board consists of a consortium of agencies – Forest Department, Belize Audubon Society, Belize Foundation for Environmental Education, Ya'axche Conservation Trust, Toledo Institute for Development and Environment and the international organization Flora and Fauna International.

Friends for Conservation and Development: The co-management partner for Chiquibul National Park, and working in close collaboration with other management bodies within the Chiquibul area, and within the Maya Mountains Massif as a whole, towards integrated management of the Maya Mountains Massif.

Itzamna Society: Has the co-management agreement for the Noj Ka'ax H'Men Elijio Panti National Park.

Friends of the Valley: Recognised as potential co-manager, Friends of the Valley, a local community-based organization, has an informal management agreement for Davis Falls and Swim Pools, two

prospective National Parks potentially to be excised from Sittee River Forest Reserve and developed for their recreational properties and biodiversity protection.

Of the eight **Forest Reserves**, six are being managed under long term (20 - 40 year) logging concessions, and similar agreements are being discussed for two of the remaining extractive reserves. One (Sibun Forest Reserve) is currently being managed under a short-term (10 year) agreement. Vaca Forest Reserve is currently under a logging moratorium following past heavy, unsustainable and illegal extraction.

Protected Area	Current Co-management Agencies	Agreement Type	Date Agreement first signed
a) Biodiversity and Cultural Conservation			
Cockscomb Basin Wildlife Sanctuary	Belize Audubon Society	▪ Co-Management Agreement	1986 (most recently renewed in 2004)
Victoria Peak Natural Monument			
Bladen Nature Reserve	Bladen Management Consortium	▪ Co-Management Agreement	August 1996 (most recently renewed in 2007)
Noj Kaax Me'en Elijio Panti National Park	Itzamna Society	▪ Co-Management Agreement	June, 2001
Chiquibul National Park	Friends for Conservation and Development	▪ Co-Management Agreement	June, 2007
b) Extractive Use			
Chiquibul Forest Reserve	Bull Ridge Company	▪ Long Term Logging License (40 yrs)	October 2006
Columbia River Forest Reserve	Atlantic Industries (in limbo)	▪ Long Term Logging License (20 yrs)	1997
	2 proposed		-
Deep River Forest Reserve	Thomas Gomez and Sons	▪ Long Term Logging License (40 yrs)	September 2005
	The Wood Depot	▪ Long Term Logging License (40 yrs)	2003
Maya Mountain Forest Reserve	1 proposed Long Term Forest License	▪ None	In process
Mountain Pine Ridge Forest Reserve	Pine Lumber Company	▪ Long Term Logging License (40 yrs)	2002
	1 proposed	▪ Long Term Logging License	In process
Sibun Forest Reserve	Noel Codd	▪ 10 year Logging License	2007
Sittee River Forest Reserve	New River Enterprises	▪ Long Term Logging License (40 yrs)	2006
Vaca Forest Reserve	Proposed 9 year recovery	▪ None	-

Table 4: Co-management agencies within the Maya Mountains Massif

A site-specific co-management agreement has been signed between the Institute of Archaeology and Friends for Conservation and Development for the Chiquibul cave system, and similar proposed co-management agreements are under discussion between the IoA and Forest Department for the cave systems of Mountain Pine Ridge, and with Itzamna Society for the co-management of Offering Cave, within Elijio Panti National Park.

2.0 Management Capacities in the Maya Mountain Massif

2.1 Introduction

Protected areas are one of the most important conservation tools available to Belize's efforts towards the goals laid out under the Convention on Biological Diversity. However unless these protected areas are managed effectively, they will not fulfill their objectives of biodiversity conservation, environmental management and the protection of cultural heritage.

The importance of evaluating management effectiveness was identified in the early 1980's, and was included in the IUCN World Conservation Strategy in 1984. More recently, in 1992, it has been recognised by the Fourth World Parks Congress as one of four main global priorities for protected areas. Based on the outcomes of the Congress, the IUCN World Commission on Protected Areas (WCPA) developed a conceptual framework that is now recognised as the international base standard for evaluating management effectiveness (Hockings et. al. 2000). Evaluation of protected area management effectiveness has also been incorporated into the framework for implementation towards biodiversity targets for 2010 by the Conference of the Parties to the Convention on Biological Diversity in 2004, as stipulated in Goal 4.2 (CBD, 2004):

Goal 4.2: To evaluate and improve the effectiveness of protected area management

Target: By 2010, frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties.

**COP-7
Convention on Biological Diversity, 2004**

Belize first conducted a national management effectiveness assessment in 2006, focused on the 44 terrestrial protected areas managed under the Forest Department, with four overall recommendations coming out of the process (Figure 2). These recommendations are as relevant to the Maya Mountains Massif system today, as they were to the National Protected Areas System in 2006.

Overall Recommendations of National Management Effectiveness Assessment, 2006

A number of themes are repeated throughout the indicator sections, leading to a series of overall recommendations for strengthening the protected area system.

1. **Sharing of resources – administrative, technical, rapid response enforcement, education**
2. **Continued capacity building for protected area managers and staff, with training in all areas of protected management**
3. **More training in development and effective use of protected area management tools – management, conservation, operational and business plans, limits of acceptable change, monitoring and evaluation etc.**
4. **Forest Department is under-staffed for its role in protected area management and needs greater capacity, with a department dedicated solely to this role**

Walker and Walker, 2006

Figure 2: Recommendations of the 2006 Management Effectiveness Assessment

2.2 Rapid Assessment and Prioritization of Protected Areas Management

Following the identification of the scope of the assessment by the Forest Department, and of the protected areas to be included within the Maya Mountains Massif system, an assessment of the current **management capacities** has been conducted, looking both at local level effectiveness, and of abilities to address trans-boundary areas and issues.

The protocol used for this assessment is the **Rapid Assessment and Prioritization of Protected Areas Management Methodology (RAPPAM)** (WWF, 2003), developed under the WWF's Forests for Life programme to provide a tool for the rapid assessment of management effectiveness within a particular country or region, towards enhancing the viability of protected area networks worldwide.

The RAPPAM methodology is designed to give broad-level comparisons across a protected area system. Whilst it has not been developed to give in-depth, site-specific protected area assessments for adaptive management purposes, it does provide guidance for protected area management within the broad context of the system being assessed, leading to identification of areas where greater integration and / or collaborative efforts will improve management effectiveness over the system. It also provides information that facilitates:

- Identification of management strengths and weaknesses of individual protected area management
- Analysis of the scope, severity, prevalence and distribution of the identified threats and pressures facing the protected area management within the Maya Mountain Massif system
- Identification of areas of high ecological and social importance and vulnerability
- Indication of the urgency and conservation priority for individual protected areas within the Maya Mountain Massif system
- Assistance in the development and prioritization of appropriate policy interventions and recommendations for the improvement of protected area management effectiveness

This methodology provides a standardised tool that incorporates the evaluation framework developed by the World Commission on Protected Areas (Hockings et.al. 2000), with the six assessment elements consistent with other management assessment tools (Table 5).

An initial workshop was held with protected area managers on 11th April, 2007 to introduce the RAPPAM tool, and calibrate the questionnaire to ensure that there was consensus on the meanings of both the questions and the possible choices (Annex 1).

This was followed by a series of on-site interviews with protected area staff – both the managers and the field staff – conducted between April and June, 2007 for completion of the questionnaire. Additional consultation was also conducted with FD staff, and key stakeholders in communities identified as potentially impacting the natural resources of the adjacent protected areas.

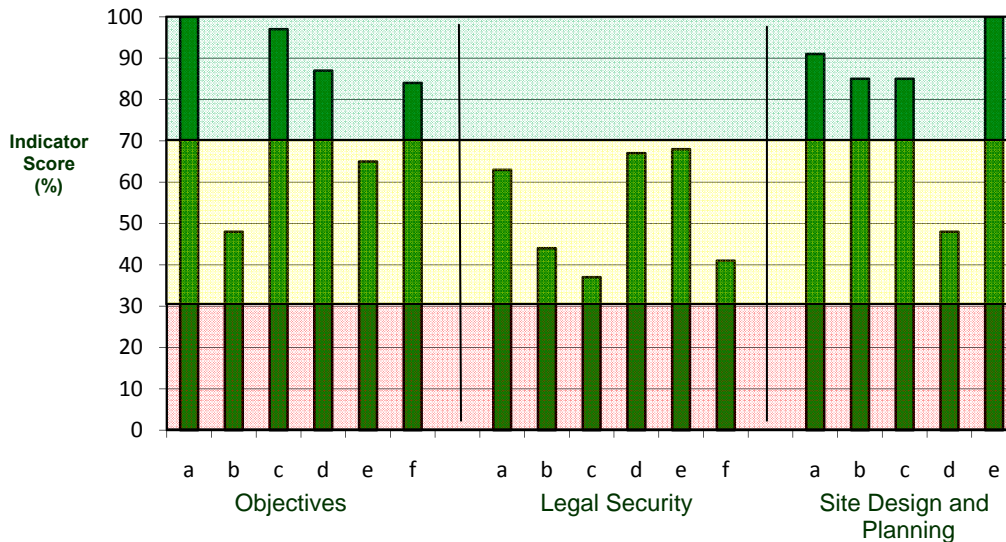
WCPA Framework		
Elements of Evaluation	Explanation	Criteria that are assessed under RAPPAM
Context	<i>Where are we now?</i> Assessment of importance, threats and policy environment	<ul style="list-style-type: none"> ▪ Threats ▪ Biological Importance ▪ Socio-Economic Importance ▪ Vulnerability ▪ PA policies ▪ Policy Environment
Planning	<i>Where do we want to be?</i> Assessment of protected area design and planning	<ul style="list-style-type: none"> ▪ Protected Area Objectives ▪ Legal Security ▪ Site Design and Planning ▪ Protected Area System Design
Inputs	<i>What do we need?</i> Assessment of resources needed to carry out management	<ul style="list-style-type: none"> ▪ Staff ▪ Communication and Information ▪ Infrastructure ▪ Finances
Processes	<i>How do we go about it?</i> Assessment of the way in which management is conducted	<ul style="list-style-type: none"> ▪ Management Planning ▪ Management Practices ▪ Research, Monitoring and Evaluation
Results	<i>What are the outputs?</i> Assessment of the implementation of management programmes and actions; delivery of products and services	<ul style="list-style-type: none"> ▪ Threat Prevention ▪ Site Restoration ▪ Wildlife Management ▪ Community Outreach ▪ Visitor Management ▪ Infrastructure Outputs ▪ Planning Outputs ▪ Monitoring ▪ Training ▪ Research
Impacts	<i>What did we achieve?</i> Assessment of the outcomes and the extent to which they achieved objectives	<ul style="list-style-type: none"> ▪ Pressures

Table 5: WCPA Framework

2.3 Assessment of Planning

Assessment of **Planning** under the RAPPAM process focuses on three categories:

- **Objectives**
- **Legal Security**
- **Site Design and Planning**



*The Indicator Score is the total scores summed across all protected areas within the system, represented as a percentage of the possible highest total score (75)

Figure 3: Planning Indicator Scores over the Maya Mountains Massif System

Objectives: The majority of protected areas within the Maya Mountains Massif system are considered to have strong objectives, promoting effective management towards the protection and maintenance of biodiversity and cultural integrity, and supported by strong national legislation. Weaker areas restricting effective protected area management include lack of support from local communities, and the lack of management plans with clearly stated specific biodiversity management objectives, especially for the Forest Reserves within the system.

Indicator Categories: Objectives

- a Objectives provide for the protection and maintenance of biodiversity
- b Specific biodiversity objectives are clearly stated in the management plan
- c Management policies are consistent with the protected area objectives
- d Protected area employees and administrators understand the protected area objectives
- e Local communities support the overall objectives of the protected area
- f Protected area objectives are supported by the national policies and legislation

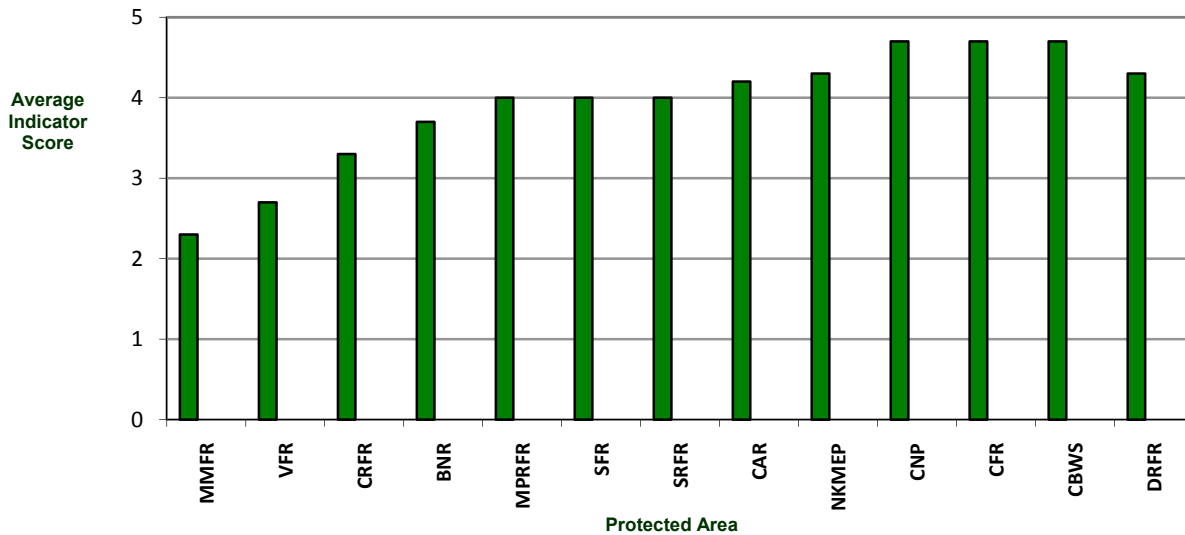


Figure 4: Objective Indicator Scores per Protected Area

Legal Security: In Belize, all national protected areas are considered to have long term, legally binding protection, but this indicator has not been scored at 100%, as many protected area managers and field staff felt that the ease with which protected areas can be de-reserved is contradictory to their legal protected status. There is also concern over loopholes in the co-management agreements currently in place, weakening the agreements. Few protected area managers consider they have adequate staff or financial resources.

Indicator Categories: Legal Status

- a The protected area has long-term, legally-binding protection
- b There are no unsettled land tenure or use disputes
- c Boundary demarcation is adequate
- d Staff and financial resources are adequate
- e Conflicts with local communities are resolved fairly and effectively
- f There is a strong, legally binding agreement between co-managers

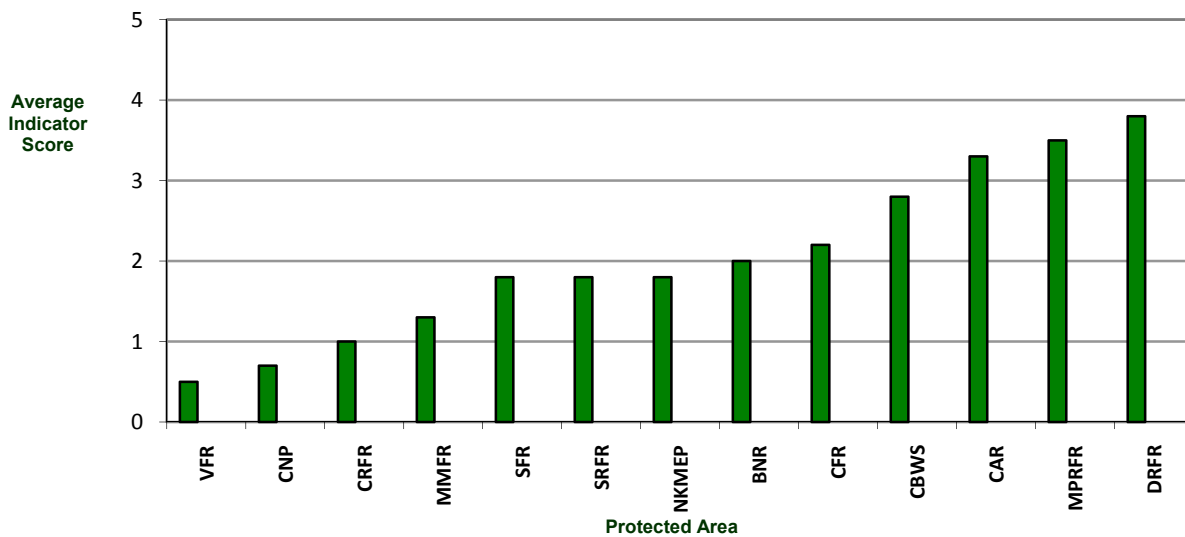


Figure 5: Legal Status Indicator Scores per Protected Area

A number of protected areas have unsettled land tenure conflicts – the biggest issue being for those protected areas along the Belize / Guatemala border, where a 1km Adjacency Zone exists on either side of the border until bi-national conflicts can be resolved. Past and present agricultural incursions by Guatemalan farmers have been recorded, as have ongoing attempts to establish communities within Belizean protected areas adjacent to the border.

Site Design and Planning: The majority of the protected areas within the Maya Mountains Massif are considered to be well sited in relation to biodiversity conservation requirements, with significant connectivity. Where zoning exists, the zones are considered to be adequate for management. Land use in adjacent areas, however, is generally not considered conducive to effective protected area management, opening the boundaries to illegal incursions, as well as producing 'edge effects' from increased light and wind penetration.

Indicator Categories: Site Design and Planning

- a The siting of the protected area is consistent with protected area objectives
- b The layout and configuration of the protected area optimizes the conservation of biodiversity
- c The protected area zoning system is adequate to achieve the protected area objectives
- d Land use in the surrounding area enables effective protected area management
- e The protected area is linked to another area of conserved or protected land

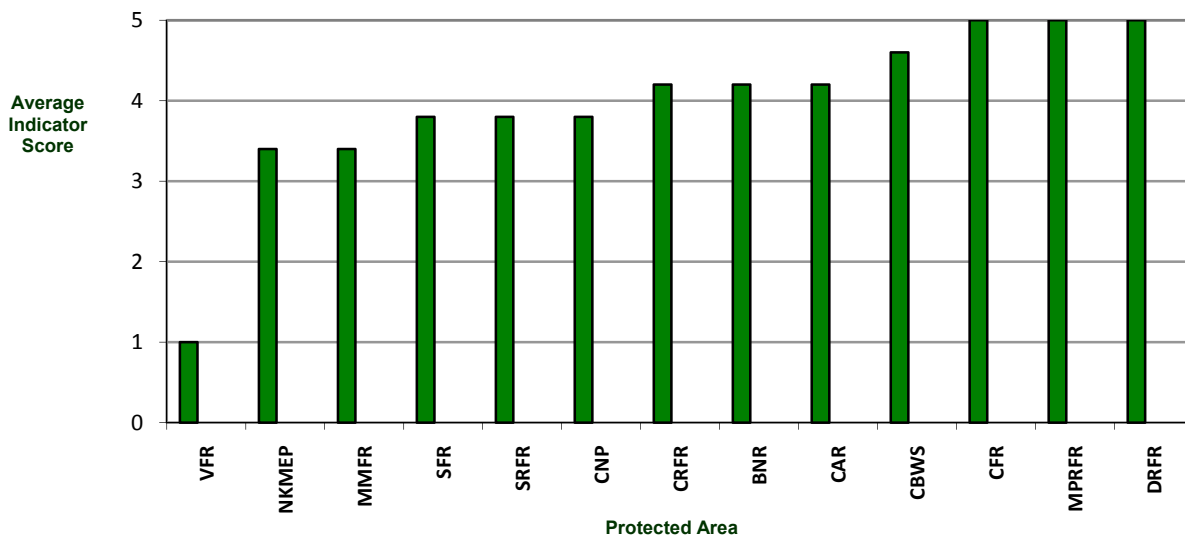


Figure 6: Site Design and Planning Indicator Scores per Protected Area

Overall, **Legal Status** is the weakest of the Planning areas - whilst the majority of protected areas within the system have strong objectives and are sited to fulfill the role for which they were designated, protected area managers and co-managers rate legal security as the least effective of the three Planning categories. This is currently being strengthened through the formation of the National Protected Areas Commission (NPAC), and through the National Protected Areas Policy (NPAPSP, 2005).

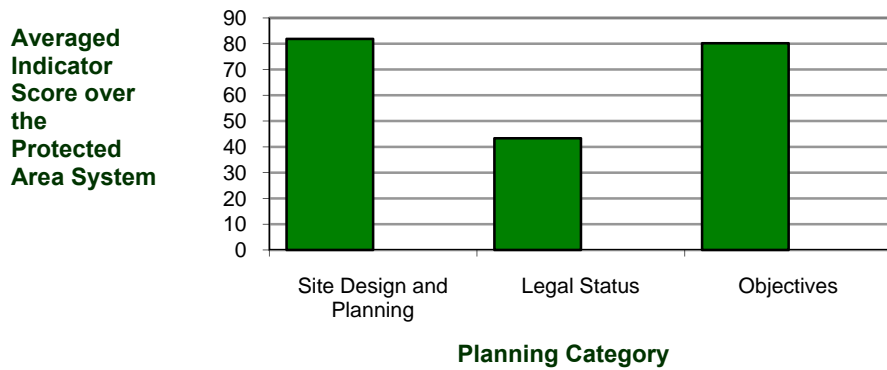


Figure 7: Summary of Planning Indicator Scores per Planning Category

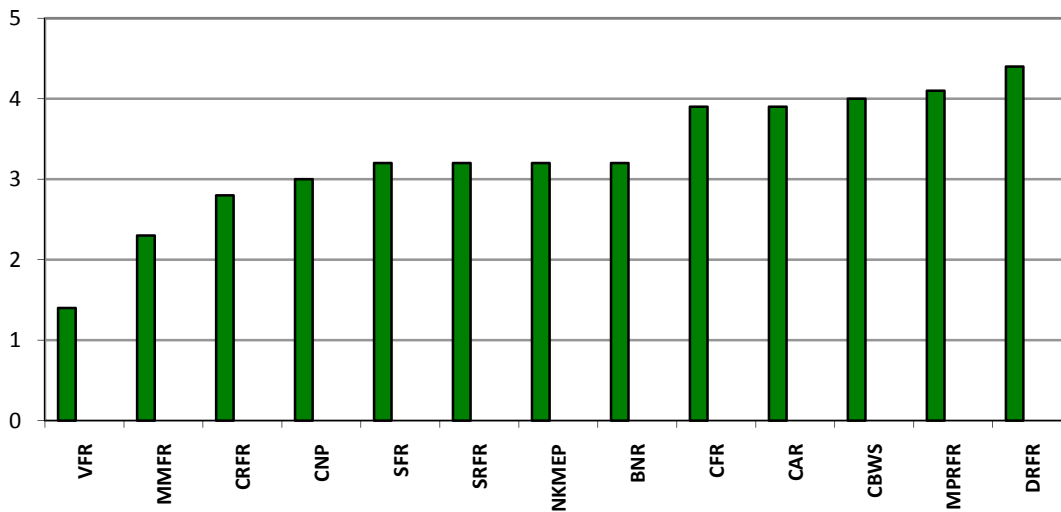


Figure 8: Average Planning Indicator Scores per Protected Area

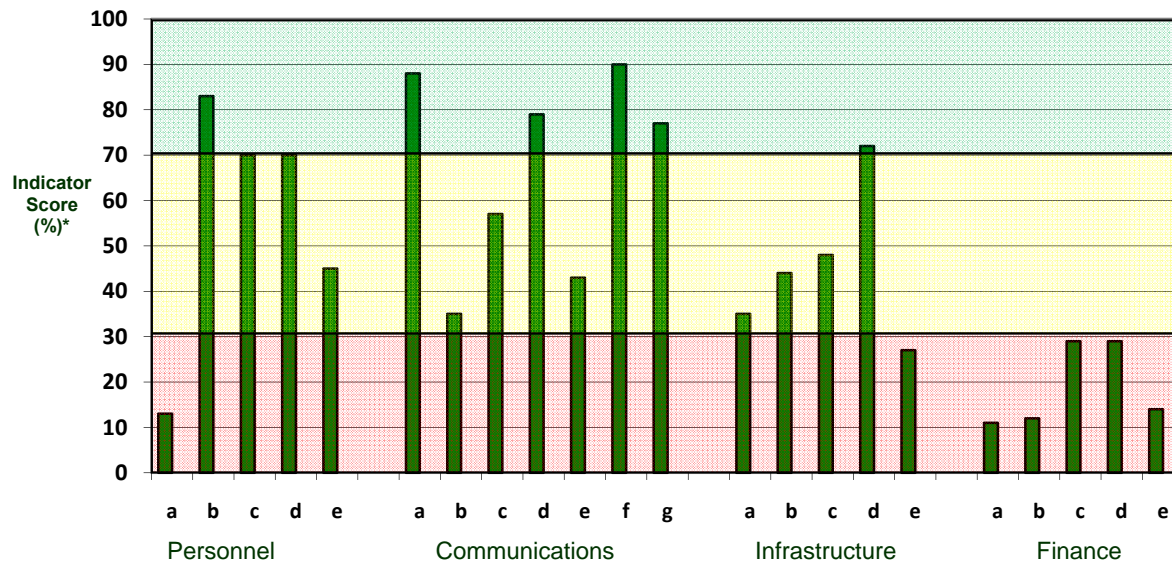
Planning Indicator Summary:

1. The strongest areas of **Planning** at site level across the system are the focus of objectives on biodiversity conservation and the contiguity of the system.
2. The weakest areas of **Planning** at site level across the system are those associated with legal security, and the limited number of protected areas with current management plans.
3. The five protected areas with the highest **Planning** indicator scores are Deep River Forest Reserve, Mountain Pine Ridge Forest Reserve, Cockscomb Basin Wildlife Sanctuary, Caracol Archaeological Reserve and Chiquibul Forest Reserve.
4. Those Forest Reserves with highest **Planning** indicator scores are those managed under private sector long term forest licenses
5. The protected areas with the lowest **Planning** indicators scores are Vaca and Maya Mountain Forest Reserves, both lacking in on-site management

2.4 Assessment of Inputs

Assessment of **Inputs** under the RAPPAM process focuses on four categories:

- **Personnel**
- **Communications**
- **Infrastructure**
- **Finance**



*as a percentage of the possible highest total score (75)

Figure 9: Input Indicator Scores over the Maya Mountains Massif System

Personnel: Lack of adequate staffing rates as one of the weakest indicator categories across the Maya Mountains Massif system, with an averaged Indicator score of less than 15%, demonstrating that very few protected area managers consider they have sufficient staff for adequate management – those few that do represent the long-term forest license holders, with a vested economic interest in protection and management of their timber resources. Forest Reserves managed directly by the Forest Department, and not currently under long-term forest licenses, rate particularly poorly in this indicator area, several forest reserves having no on-site presence at all, with human resources being too thinly spread across the system to be able to allocate personnel to specific protected areas.

Indicator Categories: Personnel

- a The level of staffing is considered adequate for management of the area
- b Staff members have adequate skills for critical management activities
- c Training and development opportunities are appropriate to the needs of the staff
- d Staff performance and progress on targets is periodically reviewed
- e Staff employment conditions are sufficient to retain high quality staff

Human resources may be low in the remaining protected areas, but the majority of protected area managers consider that their staff, whilst limited in number, have adequate skills for critical management activities, and that training opportunities are readily available and appropriate for protected area needs, primarily through the Forest Department. The majority of protected area staff also consider that appropriate review processes are in place, though generally these are dictated by criteria set as

requirement by funding partners for measures-of-success frameworks for project implementation, rather than by management-plan driven processes.

A smaller number of protected area managers have staff members who consider that employment conditions are sufficient to retain staff in the long term, this indicator area scoring lower than 50%. The majority of the concerns expressed by staff members were linked to the risks to rangers, associated with confronting xateros unarmed. High staff turnover has also been noted in a number of the co-management organizations at all levels, leading to changes in management emphasis and lack of continuity.

In contrast, despite the low availability of staff for protected area management within the Forest Department, where the Government structure guarantees some form of stability, job fidelity is particularly high and staff have greater capacity for enforcement, one of the biggest challenges currently facing all protected area managers.

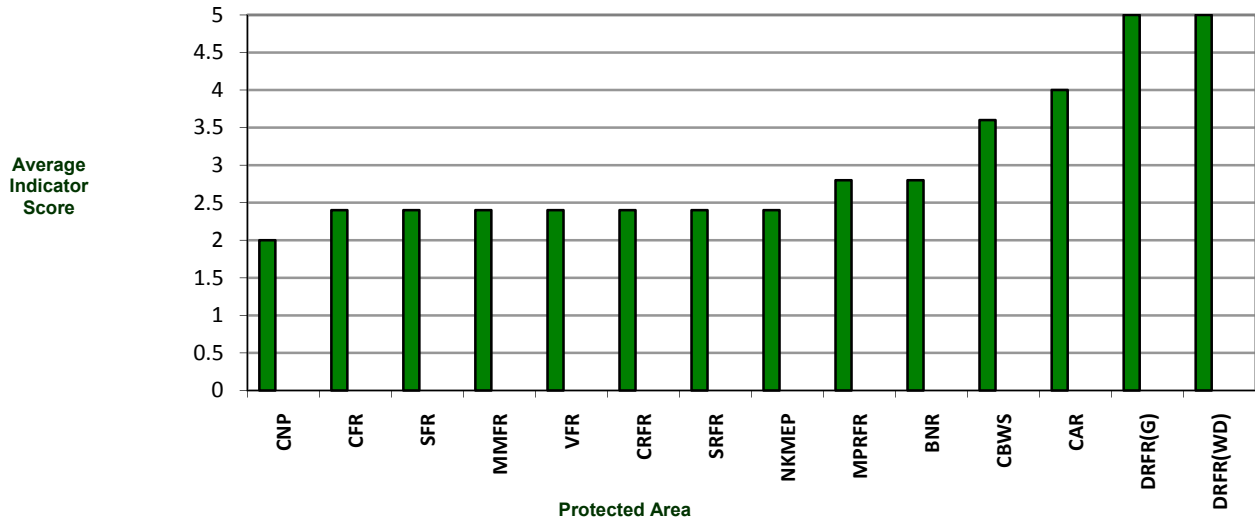


Figure 10: Personnel Indicator Scores per Protected Area

Communications and Information: The Maya Mountains Massif system is considered particularly weak in two indicator areas – the availability of adequate information available for management, and the level of communication with local communities - both these have indicator ratings below 50%. Also of concern is the low indicator rating for adequate data collection systems highlighted as necessary for informed management, whether ecological or socio-economic. The majority of protected area managers, however, do consider they have the infrastructure for processing, storing and accessing the information once collected.

Communication within and between management organizations is considered to be a strength of the protected areas system, with increased liaison and collaboration between protected area managers of the Maya Mountains Massif, and increasing opportunities for exchange of information through workshops and meetings.

Indicator Categories: Communications and Information

- a There are adequate means of communication between field and office staff
- b Existing ecological and socio-economic data are adequate for management planning
- c There are adequate means of collecting new data
- d There are adequate systems for processing and analyzing new data
- e There is effective communication with local communities
- f There is adequate communication between co-managers and Forest Department (where applicable)
- g There is adequate communication between co-managers

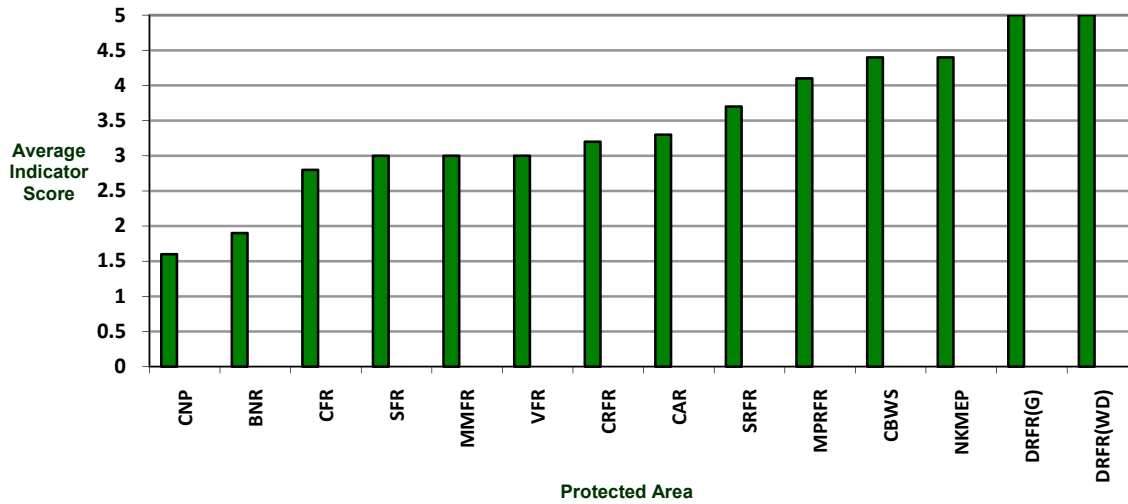


Figure 11: Communications and Information Indicator Scores per Protected Area

Infrastructure: More than half of the averaged indicators within this indicator category score below 2.5 (50%), an indication that protected area managers across the system consider availability of adequate transportation and equipment to be a limiting factor in the effective implementation of critical management activities. This is also considered to be the case with visitor facilities - few protected area managers consider that they have facilities appropriate for the level of visitation.

Indicator Categories: Infrastructure

- a Transportation infrastructure is adequate to perform critical management activities
- b Field equipment is adequate to perform critical management activities
- c Staff facilities are adequate to perform critical management activities
- d Maintenance and care of equipment is adequate to ensure long term use
- e Visitor facilities are appropriate for the level of visitation

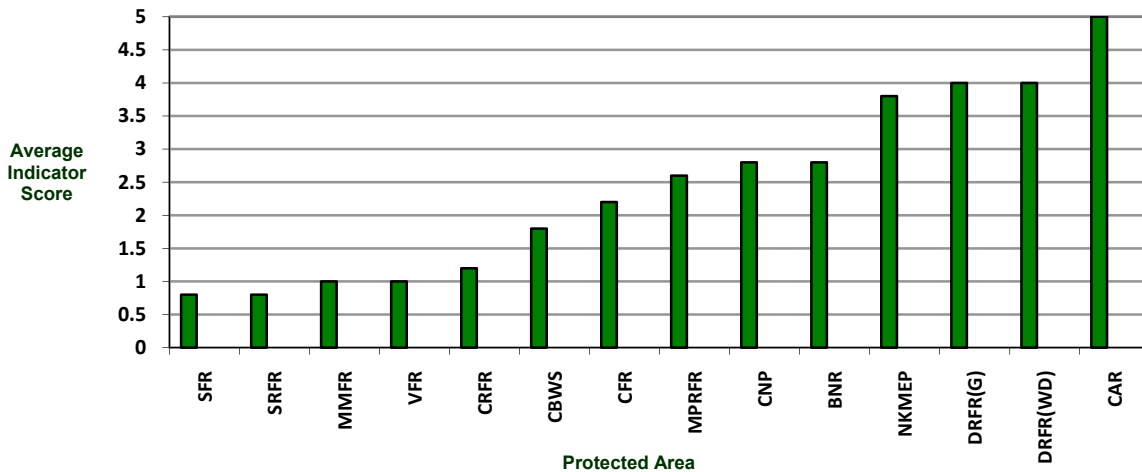


Figure 12: Infrastructure Indicator Scores per Protected Area

Finance: Financial sustainability, not surprisingly, is one of the weakest areas of the Maya Mountains Massif system, with all five system-level indicator ratings being lower than 30%, and the majority being lower than 20%. Several Forest Reserves do not receive any specific funding for critical management activities, whilst those being managed under long-term forest licenses rate at the higher end of the scale.

- Indicator Categories: Finance**
- a Funding in the past five years has been adequate to conduct critical management activities
 - b Funding for the next five years is adequate to conduct critical management activities
 - c Financial management practices enable efficient and effective PA management
 - d The allocation of expenditures is appropriate to protected area priorities and objectives
 - e The long-term financial outlook for the protected area is stable

The two protected areas with significant income from visitation, Caracol Archaeological Reserve and Cockscomb Basin Wildlife Sanctuary, both have relatively low average indicator ratings of around 2 to 2.5 as income in both these cases is used to support other, less sustainable protected areas under the same management bodies, outside the Maya Mountains Massif system. Three other co-management organizations, Friends for Conservation and Development (Chiquibul National Park), Itzamna Society (for Elijio Panti National Park), and Bladen Management Consortium (for Bladen Nature Reserve), also rate over 1.5 for finance – these are grant-reliant, and currently in the process of having funding and implementing grants. However this is a short term situation, and doesn't necessarily give any indication of financial sustainability in the long term.

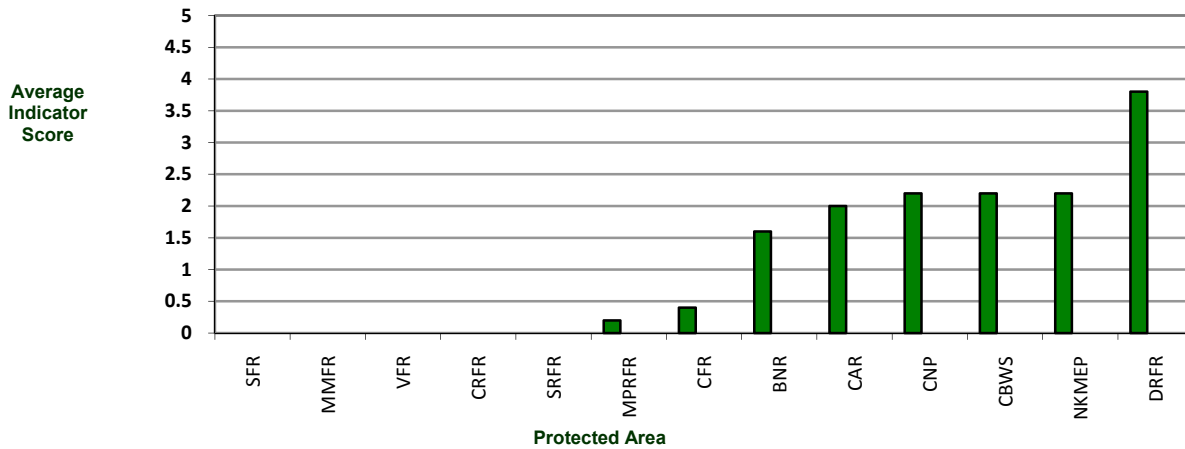


Figure 13: Finance Indicator Scores per Protected Area

Overall, **Finance** is the weakest of the Input areas, with **Infrastructure** also scoring below 2.5 (50%). **Staffing**, whilst rated higher than Finance and Infrastructure, is still considered to require strengthening. **Communication and Information** rates highest of the four areas, though this is based on the good communication, liaison and collaboration that exists at the majority of levels of management within the system. The Information aspect of this indicator category would benefit from further strengthening.

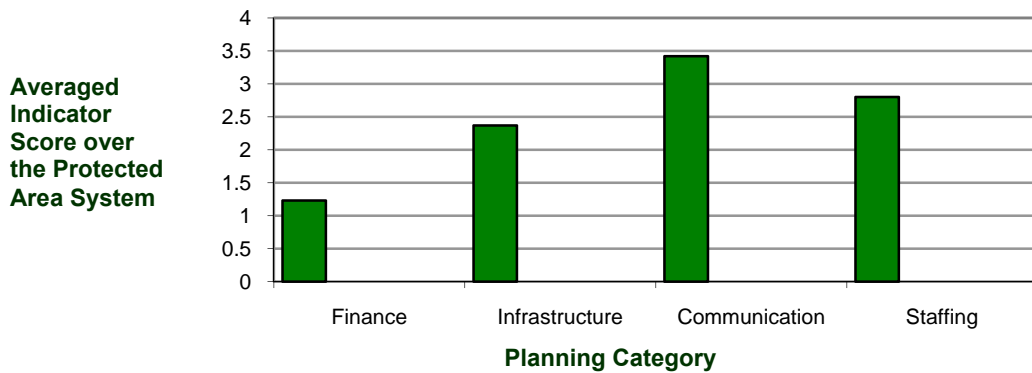


Figure 14: Planning Indicator Scores per Planning Category

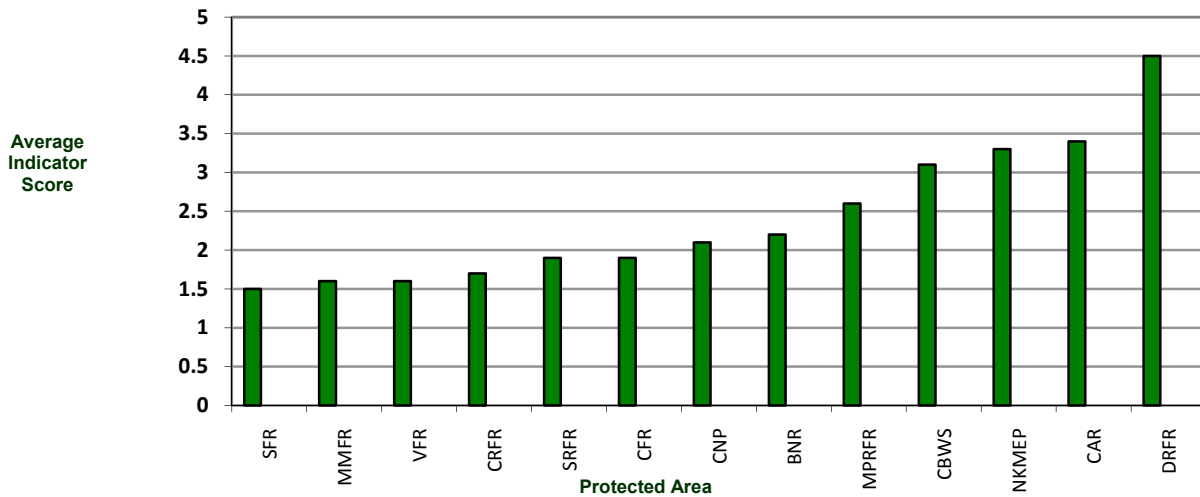


Figure 15: Input Indicator Scores per Protected Area

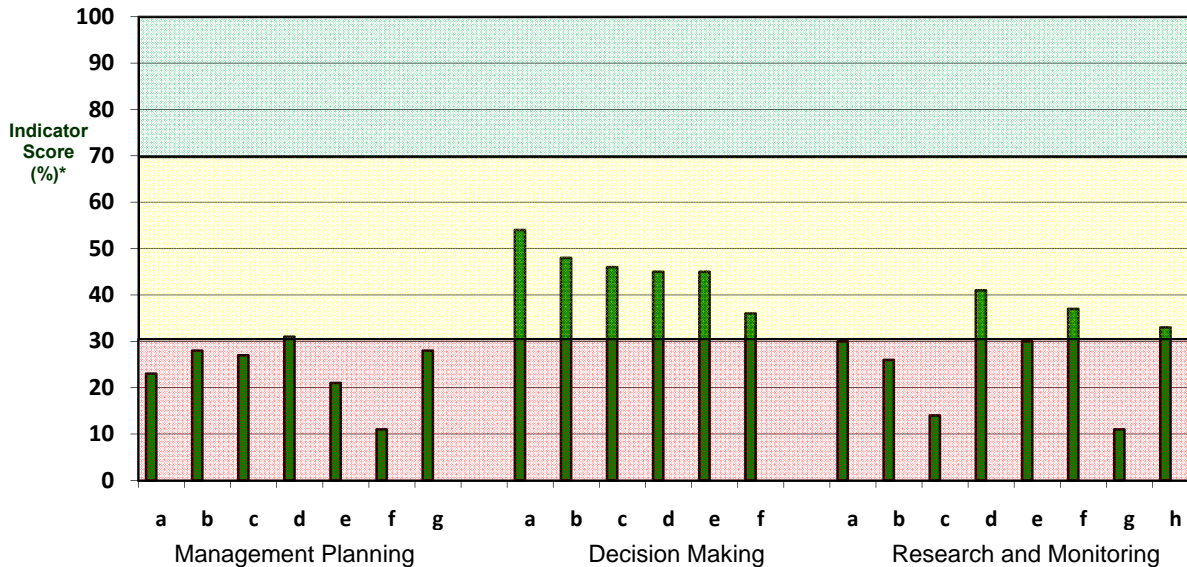
Input Indicator Score Summary:

1. The strongest areas of **Inputs** at site level across the system reflect the increasing communication and collaboration between protected area co-managers and the Forest Department.
2. The weakest areas of **Inputs** at site level across the system are adequate staffing and finance, followed by infrastructure. There is also inadequate information on biodiversity, cultural resources and the social context available for effective management
3. The five protected areas with the highest **Input** indicator scores are Deep River Forest Reserve, Caracol Archaeological Reserve, Eljijo Panti National Park, Cockscomb Basin Wildlife Sanctuary, and Mountain Pine Ridge Forest Reserve,.
4. Those Forest Reserves with highest **Input** indicator scores are those managed under private sector long term forest licenses, with investments being made into long term management
5. The protected areas with the lowest **Input** indicators scores are Sibun Forest, Maya Mountain and Vaca Forest Reserves, all three lacking in on-site management

2.5 Assessment of Management Processes

Assessment of **Management Processes** under the RAPPAM protocol focuses on three categories:

- **Management Planning**
- **Management Decision Making**
- **Research and Monitoring**



*The Indicator Score is the total scores summed across all protected areas within the system, represented as a percentage of the possible highest total score (75)

Figure 16: Input Indicator Scores over the Maya Mountains Massif System

Management Planning: Very few of the protected areas surveyed during this RAPPAM assessment have a comprehensive management planning structure, with only three protected areas (Cockscomb, Victoria Peak and Bladen) currently having effective management plans in place. A further two are under development (Chiquibul and Elijio Panti National Parks). With a standardized management plan framework now in place in Belize, developed under the NPAPSP, stipulating the need for conservation planning based on adequate baseline information, and integrating a measures of success system there is a positive correlation between those protected areas that have management plans and those that have comprehensive species inventories, threat assessments and monitoring plans. Many of the Forest Reserves were identified as lacking any formal management strategies at all, though portions of these areas are gradually being included under long term forest licenses, and therefore are starting to have well developed planning in place, focusing on management and extraction of timber resources. One major gap identified during the RAPPAM process is the lack of financial planning within the protected areas system. There is also a need for more comprehensive natural and cultural resource inventorying throughout much of the Maya Mountains Massif system, to provide the information required for effective conservation planning and management.

Indicator Categories: Management Planning

- a There is a comprehensive, relatively recent written management plan
- b There is a comprehensive inventory of natural and cultural resources
- c There is an analysis of, and strategy for addressing, PA threats and pressures
- d A detailed work plan identifies specific targets for achieving management objectives
- e The results of research and monitoring are routinely incorporated into planning
- f There is a Financial Plan, Business Plan or equivalent
- g There is a means of measuring success

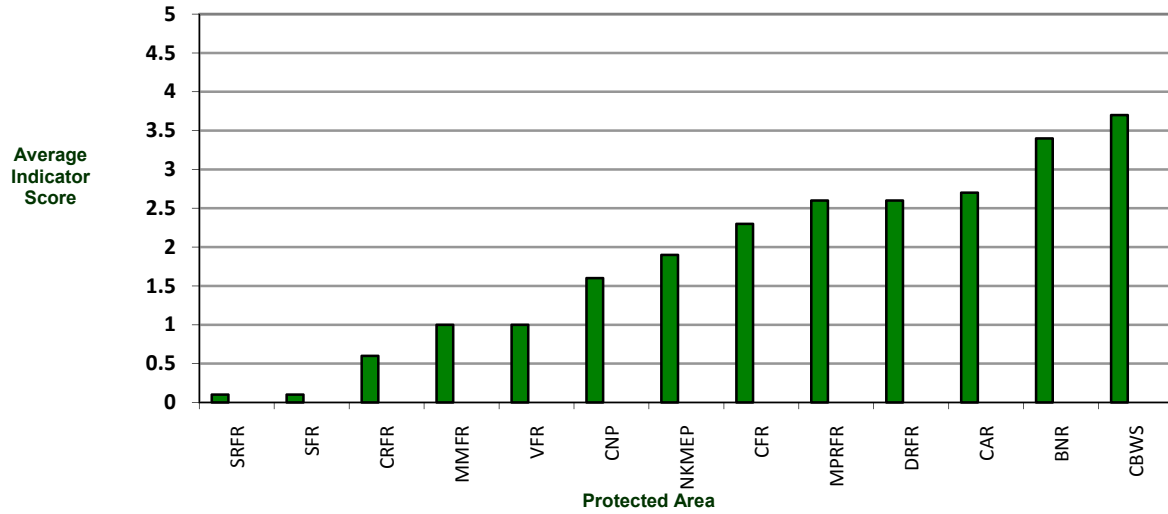


Figure 17: Management Planning Indicator Scores per Protected Area

Management Decision Making: Only one indicator scores above 50% - the presence of clear internal organization in management and co-management organizations. The remaining five indicators all score between 30% and 50%, indicating a need to strengthen the management decision making process generally across the protected areas system of the Maya Mountains Massif. Whilst there is significant effort to increase participation by stakeholder communities in many of the non extractive protected areas, the indicators suggest that there is still a large gap between the wish to provide the broad-scale stakeholder participation called for in the NPAPSP, and the reality on the ground.

Indicator Categories: Management Decision Making

- a There is clear internal organization
- b Management decision-making is transparent
- c PA staff regularly collaborate with partners, local communities, and other organizations
- d Local communities participate in decisions that affect them
- e There is effective communication between all levels of PA staff and administration
- f Management decisions are made in partnership between co-managers, with mutual agreement

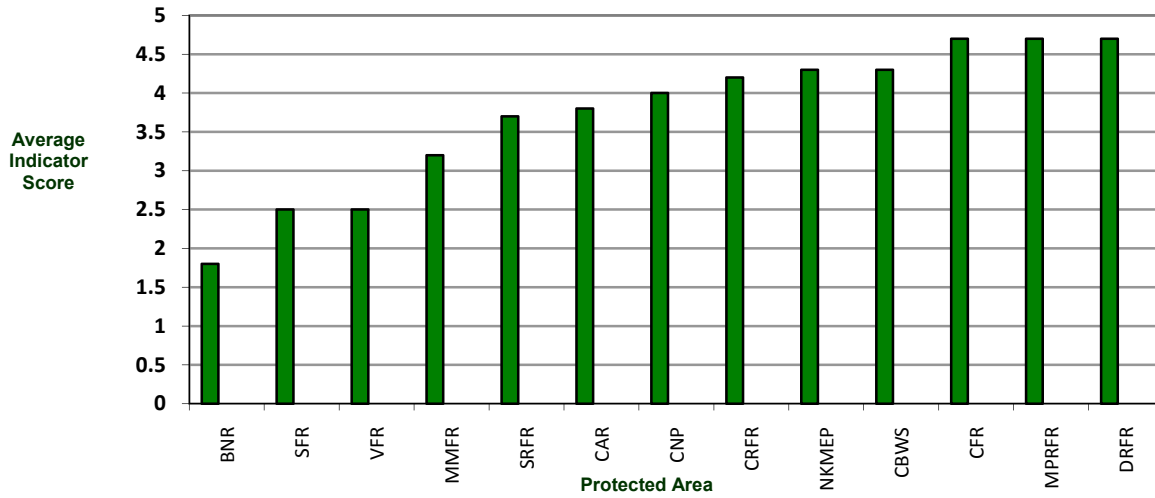


Figure 18: Management Decision Making Indicator Scores per Protected Area

Research and Monitoring: Site and system-level research and monitoring would benefit from significant strengthening. The majority of indicators fall below 30%, suggesting that there is currently a disconnect between research activities taking place within the Maya Mountains Massif and management activities. Monitoring for legal and illegal activities, whilst present in the majority of protected areas, are not considered sufficient for effective management, and critical research needs, even when identified, are not generally implemented. Where a current management plan is in place, developed under the standardized, national management planning framework (NPAPSP, 2005), critical research and monitoring needs have been developed (indicator f) – but this is only true of a small percentage of the protected areas in the system. Even so, limited finances result in some implementation of monitoring requirements (indicator h), but seldom of research requirements (indicator g).

Indicator Categories: Research and Monitoring

- a The impact of legal and illegal uses of the PA are accurately monitored and recorded
- b The impact of legal and illegal uses of the PA are accurately monitored and recorded
- c Research on key social issues is consistent with the needs of the PA
- d PA staff members have regular access to recent scientific research and advice
- e Critical research needs are identified and prioritized
- f Critical monitoring needs are identified and prioritized
- g Critical research needs are implemented
- h Critical monitoring needs are implemented

Whilst long term forest license holders are also required to submit monitoring and research plans under their concession licenses, these are generally restricted to extractive resource needs, and do not include the focused biodiversity component required of other, non-extractive protected areas.

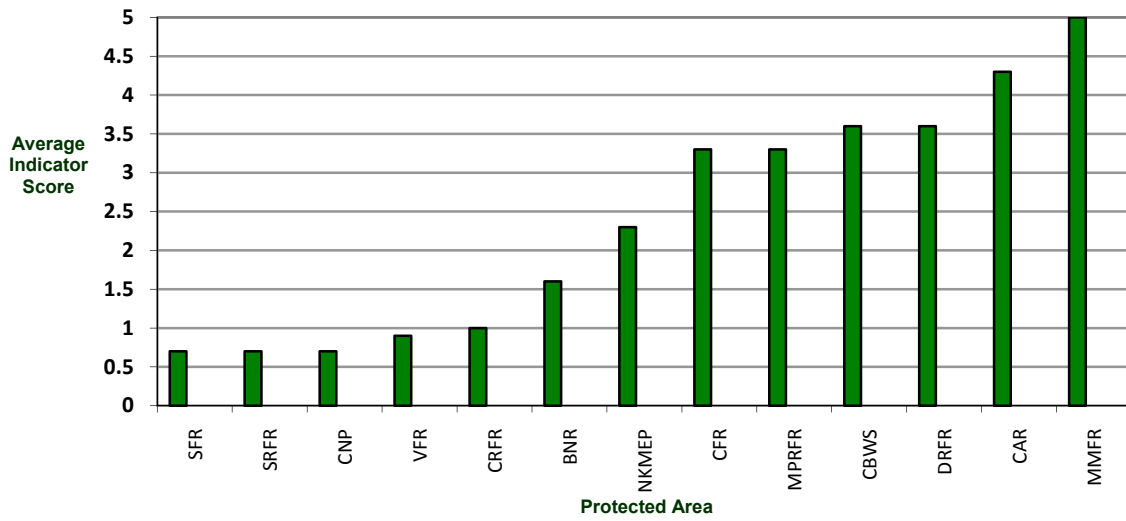


Figure 19: Research and Monitoring Indicator Scores per Protected Area

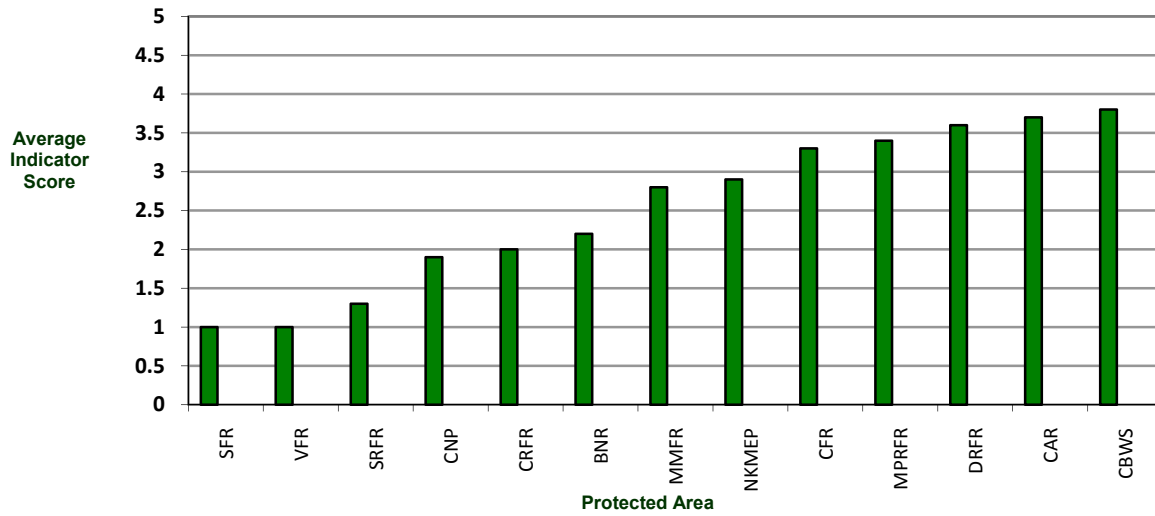


Figure 20: Management Processes Indicator Scores per Protected Area

Management Processes Indicator Score Summary:

1. The strongest areas of **Management Processes** at site level across the system are the areas of decision making, though these indicators all score under 60%, and most score under 50%.
2. The weakest areas of **Management Processes** at site level across the system are the lack of site level financial and / or business planning, and the limited collaborative cost-effective efforts in areas other than surveillance and enforcement. Baseline information is also identified as a critical weakness at both site and system-level planning.
3. The five protected areas with the highest **Management Processes** indicator scores are Cockscomb Basin Wildlife Sanctuary, Caracol Archaeological Reserve, Deep River Forest Reserve, Mountain Pine Ridge Forest Reserve and Chiquibul Forest Reserve
4. Those Forest Reserves with highest **Management Processes** indicator scores are those managed under private sector long term forest licenses – it should be borne in mind that the majority of their management is focused on effective management of the timber resources, not necessarily of the watershed characteristics, or the biodiversity and cultural resources generally.
5. The protected areas with the lowest **Management Processes** indicators scores are Sibun, Sittee and Vaca Forest Reserves, all three lacking in on-site management

2.6 Outputs at System-level

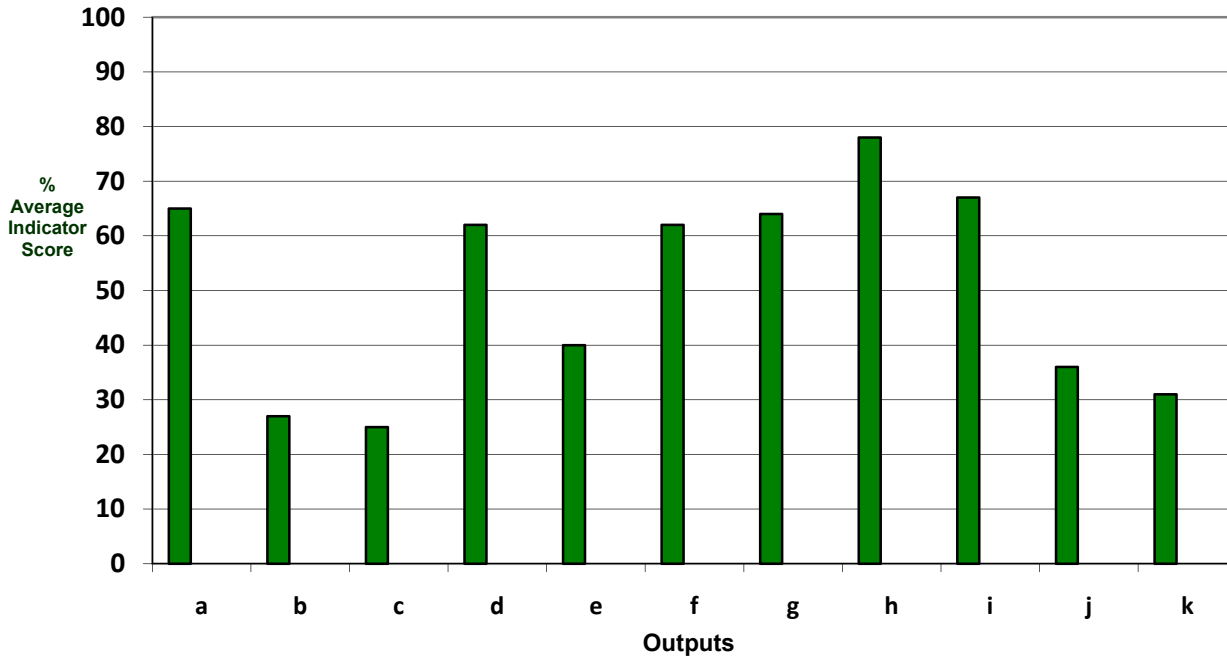


Figure 21: Output Indicator Scores per Protected Area

Indicators that Score > 50%

Threat prevention, detection and enforcement: Many of the protected area managers consider that surveillance and enforcement is consistent with the threats and pressures, PA objectives and annual work plans (where these exist). However this does not reflect the situation on the ground - the protected areas, whilst implementing surveillance activities as outlined in their workplans, are on the whole not able to effectively lower or prevent threats within much of the system. Several concentrate on a small, focal area, where tourism activities occur, yet have limited resources to extend to the rest of the management area.

Collaborative efforts are currently being implemented in the Maya Mountains West to increase effectiveness of surveillance and enforcement, with active participation from other sectors – Belize Defense Force, Immigration and the Police Department. The Maya Mountains East have not yet achieved this level of collaboration, though some sharing of human resources between protected areas is taking place, to increase the effectiveness of patrols.

However, the scale of incursions from Guatemala will require greater input than protected area managers and co-managers can achieve with their current enforcement capacity, even with these collaborative partnerships.

Indicator Categories: Outputs

In the last two years, the following outputs have been consistent with the threats and pressures, PA objectives, and annual workplan:

- a Threat prevention, detection and enforcement
- b Site restoration and mitigation efforts
- c Wildlife or habitat management
- d Community outreach and education efforts
- e Visitor and tourist management
- f Critical Infrastructure development
- g Management planning and inventorying
- h Staff monitoring, supervision and evaluation
- i Staff training and development
- j Research and monitoring outputs
- k Financial sustainability

Recommendations:

- Increase collaboration towards threat prevention, detection and enforcement in the Maya Mountains East, based on the Maya Mountains West model
- Establishment of a trained patrol team to be deployed at system-level in surveillance and enforcement hotspots

Community outreach and education efforts: The majority of co-managers have community outreach and education programmes, though these are limited to some extent by the budget and focus of funding agencies. The Forest Department, as managers of the Forest Reserves, and the private sector long-term forest license partners, recognize the importance of community engagement and increasing awareness of the value of the protected areas, especially in terms of environmental services, but have not yet taken adequate steps to implement effective outreach and education programmes.

Recommendations:

- Increase collaboration towards more effective community outreach, developing synergies and reducing repetition in areas of stakeholder overlap
- Investment by long-term forest license holders in collaborative community outreach and education efforts by protected area co-managers working in this area with stakeholder communities, to achieve effective results for mutual and system-level benefit

Critical Infrastructure Development: The majority of protected areas consider that critical infrastructure is present, though could be improved. In reality this is a generous rating for this indicator, critical infrastructure being assessed relative to that of other protected areas – rather than relative to that in more effectively managed reserves elsewhere in the region.

Recommendations:

- Increase protected area staff and managers' awareness of the mechanisms and infrastructure of effectively managed PAs in the region to help raise the bar of standards and identify infrastructural gaps to be prioritized for strengthening.
- Develop system-level goals for minimum standards for infrastructure for effective site-level management.

Management planning and inventorying: The averaged score for this indicator obscures the discrepancies across the system – protected areas either have current management plans and associated inventories, or they do not. Those with current management plans score quite highly, those without do not.

Recommendations:

- Move towards all protected areas within the Massif having up to date site management plans, with associated resource inventorying
- Ensure that these site-level management plans reflect system-level zonation and programmatic priorities and responsibilities

Staff monitoring, supervision and evaluation: Management effectiveness in this area was generally thought to be good – in fact it was the highest scored indicator in this grouping. Most PA staff felt that they have adequate supervision and evaluation.

Recommendations:

- Increase system-level collaboration between protected area managers to help give structure to those scoring more poorly in these aspects of staff management.

Staff training and development: In the majority of protected areas, most staff felt that they had been given adequate training to effectively carry out their work. There is however scope for improvement, with the relatively high score partly reflecting lack of exposure to, and knowledge of, specific areas where increased training can pay significant dividends.

Recommendation:

- Provide system-level training opportunities for PA staff, particularly in the areas of surveillance and enforcement, monitoring, tourism management and hospitality skills, record-keeping and reporting

Score 31 – 50%

Visitor and tourist management: Few protected areas of the Maya Mountains Massif have active tourism, or active tourism management. There is scope for significant improvement in visitor management in even the most effectively managed protected areas in the Massif. It is generally recognized that most PA staff lack the capacity and/or training, infrastructure and management support for effective visitor management.

Recommendations:

- Provide system-level support training and guidelines for basic visitor management.
- Investigate feasibility and conduct a cost/benefit analysis for allocating tourism concessions, following system-level guidelines and standards, and providing profit-sharing returns to the PA managers or authority.

Research and monitoring outputs: Protected area staff and managers rated their effectiveness in this area as being in need of significant strengthening. Whilst some management bodies have attempted to implement some biodiversity monitoring, there has generally been insufficient or haphazard training, with a lack of clearly identified objectives. Lack of use of any resulting data has been a deterrent to PA staff to continue data collection.

Recommendations:

- Identify system-level priorities for research and monitoring, and the protocols to be used
- Develop a system-level framework for training PA staff in these protocols
- Develop a system-level framework for the implementation, coordination and supervision of research & monitoring activities by PA managers and staff
- Develop a system-level framework for the collation, analysis and interpretation of data collected by PA managers, and for the dissemination of outputs in a meaningful format

Financial sustainability: All protected area staff and managers rated their effectiveness in this area as being in need of significant strengthening. It is broadly recognized that most protected area managers lack business and financial planning skills, without which financial sustainability remains unattainable.

Recommendations:

- Increase training opportunities for PA managers to strengthen business and financial planning skills
- Increase collaboration between protected area managers to facilitate skills transfer in the area of financial planning
- Investigate strengthening PA financial sustainability through collaborative partnerships with the private sector – e.g. through profit-sharing tourism concessions.
- Investigate system-level funding mechanisms (eg. Payment for Environmental Services and Carbon Sequestration)

Score ≤ 30%

Site Restoration and Mitigation Efforts: Few of the protected areas are considered to require any site restoration or mitigation efforts – those that do are protected areas with significant areas of pine forest and savanna, where a combination of Southern Pine Bark Beetle and fire have resulted in degradation, with reduced pine density. Mountain Pine Ridge, which has been badly impacted by both these factors in the last few years, now has large scale replanting efforts underway to restore the system. In other pine ecosystem areas, the Forest Department is encouraging the development of long term forest licenses with private sector, as seen in the two 40 year concessions for Deep River Forest Reserve, promoting investment in reforestation. A similar strategy is being used for Columbia River Forest Reserve, where hurricane damage has been followed by extensive salvage extraction, and on-site resource management will assist natural regeneration

Wildlife or habitat management: As with the above indicator, there are few instances in the protected areas of the Maya Mountains Massif where active wildlife or habitat management is required – over and above the surveillance and enforcement activities that are assessed separately. The low scores for this indicator are therefore a reflection of this general lack of need rather than lack of capacity.

2.7 Summary of Management Effectiveness Results

The data was analyzed at both system and site level, to form an overview of management effectiveness in the protected areas of the Maya Mountains Massif System, and to provide system-level recommendations for strengthening management.

When results from all the protected areas are averaged per indicator, they identify the areas of relative strengths and weaknesses of management across the system (Figure 22). Only two of the Indicator Categories score over 50% - **Planning** and **Management Processes**, and neither of these scores more than 70%, suggesting that on average, Planning and management processes are not present across the System, but are present in those protected areas with a strong management presence, and a management plan in place.

Input and **Outputs** both score below 50%, suggesting that significant strengthening is required in these areas – limited funding and personnel being linked to low management effectiveness.

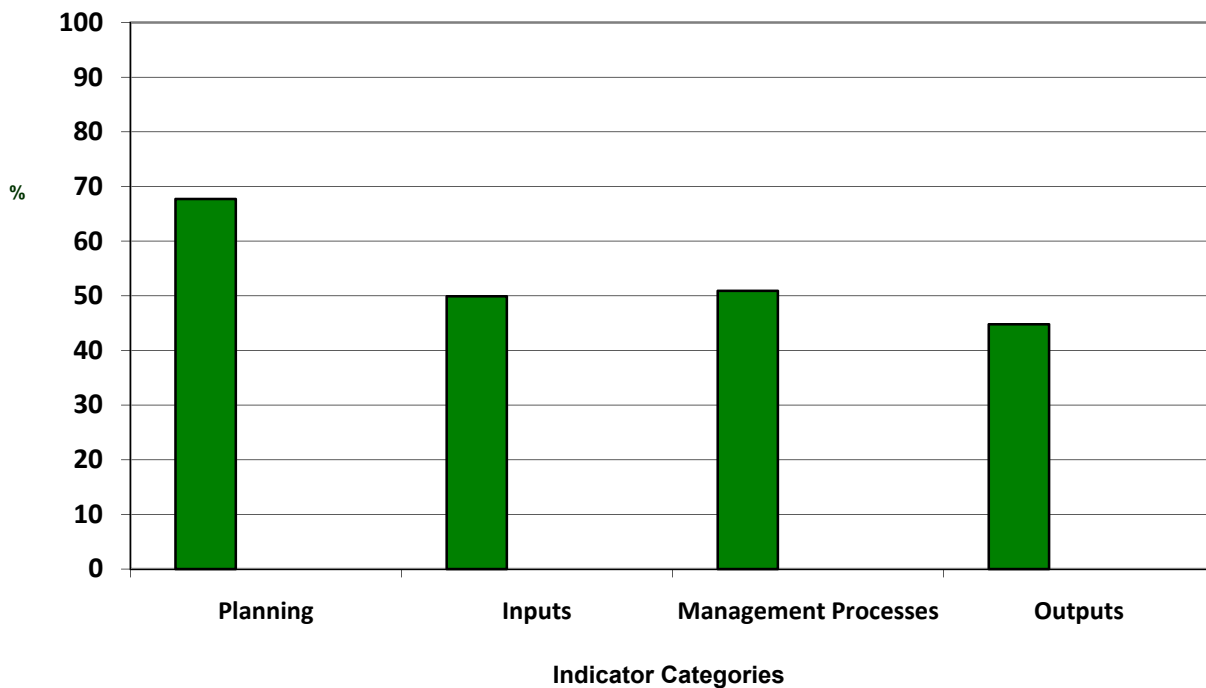


Figure 22: Averaged Management Effectiveness Scores per Indicator Area

Each protected area was also assessed in terms of total management effectiveness, using an average of the scores for the Indicator areas (Figure 23). This highlights those protected areas that are considered to have relatively strong management:

Deep River Forest Reserve	under a long-term forest license
Caracol Archaeological Reserve	managed under the Institute of Archaeology, with significant visitation
Cockscomb Basin Wildlife Sanctuary	managed under the Belize Audubon Society, with significant visitation and strong education component
Mountain Pine Ridge Forest Reserve	strong forestry base, with long term forest license, and significant visitation

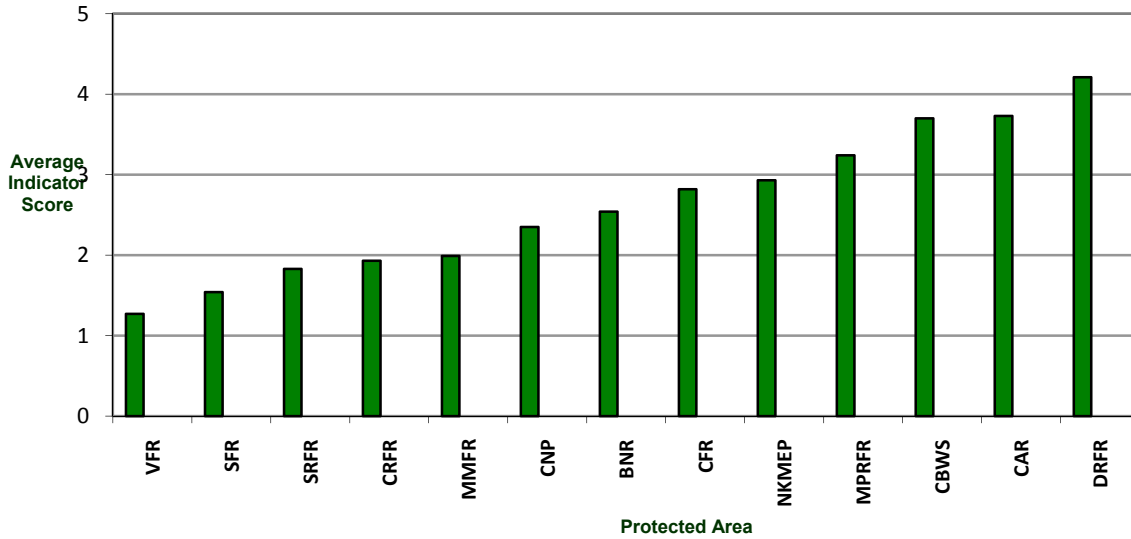
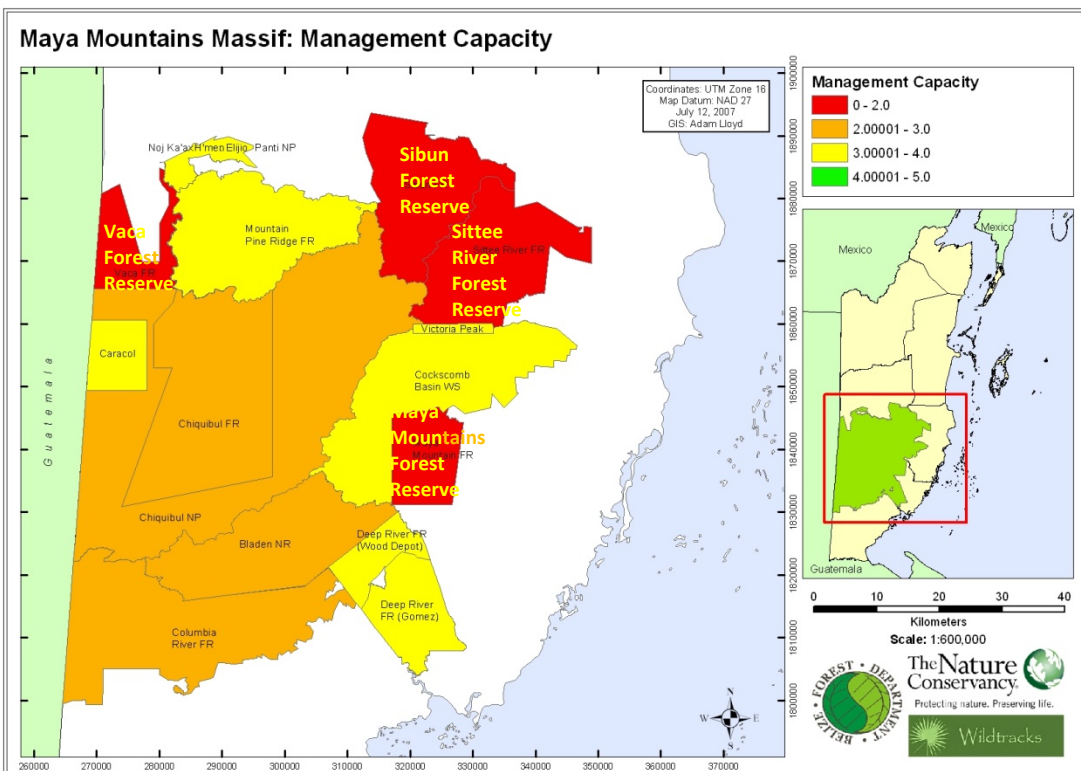


Figure 23: Summary of Management Effectiveness Indicator Scores per Protected Area

The RAPPAM results also provide a clear identification of the significant management gaps within the Maya Mountains Massif, highlighting four protected areas (Table 6) – Vaca, Sibun, Sittee River and Maya Mountain Forest Reserves as in critical need of strengthening management presence and management activities (Map 2). These four are all extractive reserves, but with topography that provides a distinct physical barrier to their use for timber extraction. All are also under pressure for dereservation, with agricultural and hunting incursions occurring on an ongoing and unrestricted basis.



Map 2: Maya Mountains Massif – Management Capacities (RAPPAM assessment, 2007)

Table 6: Site-level Strengths, Weaknesses and Recommendations			
Protected Area	Primary Strengths	Primary Weaknesses	Recommendations
Bladen Nature Reserve	Biodiversity importance Biodiversity protection Watershed protection Low human impact	Non-functional management structure Limited community engagement Limited footprint of surveillance and enforcement activities	<ul style="list-style-type: none"> ▪ Disband BMC and seek a single co-management organization to take on management role ▪ Engage stakeholder communities and industries, based on public and awareness and environmental education – particularly focused on environmental services (especially clean water)
Cockscomb Basin Wildlife Sanctuary	Strong co-management agency Established tourism destination Some financial sustainability Biodiversity importance Biodiversity protection Watershed protection Socio-economic importance to local stakeholders Functions as an educational resource Low human impact	Weak surveillance and enforcement Limited footprint of surveillance and enforcement activities Limited environmental awareness / education in stakeholder communities	<ul style="list-style-type: none"> ▪ Strengthen strategic alliances and collaboration with other protected area managers of the Maya Mountains East ▪ Build on current tourism investments ▪ Increase public awareness of environmental services in stakeholder communities
Chiquibul National Park	Biodiversity importance Watershed protection Strong management framework Established strategic alliances with partners – FD, IoA, BDF, Police	Extensive impacts from illegal xatero presence Agricultural incursions from Guatemala Border conflicts Ceibo Chico gold mining located within National Park	<ul style="list-style-type: none"> ▪ Build on FCD initiatives to strengthen strategic alliances with other protected areas of the Chiquibul forest ▪ Strengthen ongoing, multi agency collaboration towards more effective surveillance and enforcement ▪ Ensure that a strict EIA is required when Erin Ventures applies to renew mining license ▪ Ensure that a thorough EIA is required before any new mineral exploration license is granted

Table 6: Site-level Strengths, Weaknesses and Recommendations /2			
Protected Area	Primary Strengths	Primary Weaknesses	Recommendations
Chiquibul Forest Reserve	Biodiversity importance Sustainable use through long term forest license for timber resources Socio-economic importance through forestry employment Presence of Las Cuevas Research Station Important cultural/karstic sites – Natural Arch, Chiquibul Cave system Some financial sustainability	Extensive impacts from illegal xatero presence Las Cuevas not managed to full potential Surveillance, enforcement and monitoring activities associated with logging concession are limited to the concession blocks Limited effectiveness in management of xate concession	<ul style="list-style-type: none"> ▪ Support and strengthen FCD initiatives to develop strategic alliances with other protected areas of the Chiquibul forest (Maya Mountains West)
Deep River Forest Reserve	Long term forest license in place Important role in maintaining connectivity to coast	Fire management Agricultural incursions	<ul style="list-style-type: none"> ▪ Strengthen fire management, in collaboration with other protected area managers of the southern coastal plain
Elijio Panti National Park	Cultural importance of caves Biodiversity importance	Weak management structure Limited community engagement Limited collaboration with other protected area managers Illegal xatero activities	<ul style="list-style-type: none"> ▪ Strengthen management organization ▪ Increase community participation through development of a Local Advisory Committee ▪ Increase collaboration with other protected area managers of Maya Mountains West
Columbia River Forest Reserve	Biodiversity importance Watershed protection Sustainable use through establishment of long term forest license in place for part of protected area Revised zoning structure	Agricultural incursions from southern communities Logging incursions from Guatemala Agricultural incursions from Guatemala Extensive impacts from illegal xatero presence Limited human resources to effectively monitor post-hurricane salvage licenses Limited community engagement	<ul style="list-style-type: none"> ▪ Develop alliance / co-management agreement with local NGO for more effective management of non-LTFL area ▪ Increase community engagement ▪ Develop five year management plan ▪ Increase collaboration with other protected area managers of Maya Mountains East

Table 6: Site-level Strengths, Weaknesses and Recommendations / 3			
Protected Area	Primary Strengths	Primary Weaknesses	Recommendations
Sibun Forest Reserve	Watershed protection Biodiversity importance Important role in maintaining forest connectivity	No management presence Agricultural incursions No community engagement Illegal xatero activities Weak governance - vulnerability to further dereservation	<ul style="list-style-type: none"> ▪ Seek tourism concession / co-management partner ▪ Develop five year management plan ▪ Increase collaboration with other protected area managers of Maya Mountains East
Sittee River Forest Reserve	Watershed protection Biodiversity importance Community engagement through Davis Falls and Swim Pool Some tourism	No management presence Agricultural incursions Limited community engagement Illegal xatero activities Weak governance - vulnerability to further dereservation	<ul style="list-style-type: none"> ▪ Establish community site management agreement for Davis Falls and Swim Pool, as template for other community tourism initiatives ▪ Seek tourism concession / co-management partner ▪ Develop five year management plan ▪ Increase collaboration with other protected area managers of Maya Mountains East
Maya Mountain Forest Reserve	Biodiversity importance Watershed protection	No management presence Illegal xatero activities Illegal logging Weak governance – vulnerability to further dereservation	<ul style="list-style-type: none"> ▪ Seek a co-management partner
Mountain Pine Ridge Forest Reserve	Established management under Forest Department Established tourism destination Opportunities for financial sustainability	No entrance fee structure Noise pollution and fire hazard from military training activities Illegal xatero activities	<ul style="list-style-type: none"> ▪ Develop five year management plan ▪ Develop entrance fee mechanism to feed into system-level sustainability ▪ Increase collaboration with other protected area managers of Maya Mountains West

Table 6: Site-level Strengths, Weaknesses and Recommendations / 4			
Protected Area	Primary Strengths	Primary Weaknesses	Recommendations
Caracol Archaeological Reserve	<p>Cultural importance</p> <p>Effective management of core area under Institute of Archaeology</p> <p>Established tourism destination</p> <p>Established research programme</p> <p>Forming strategic alliance with FCD</p> <p>Some financial sustainability</p>	<p>Agricultural incursions</p> <p>Extensive impacts from illegal xatero presence</p> <p>Management footprint doesn't extend beyond core area</p>	<ul style="list-style-type: none"> ▪ Develop five year management plan ▪ Increase collaboration with other protected area managers of Maya Mountains West, especially for more effective surveillance and enforcement
Vaca Forest Reserve	<p>Watershed protection</p>	<p>No management presence</p> <p>Agricultural incursions</p> <p>Illegal xatero activities</p> <p>Illegal land allocations</p> <p>Weak governance - vulnerability to further dereservation</p> <p>Impacts from dam construction and impoundment</p>	<ul style="list-style-type: none"> ▪ Encourage community co-management partnerships / site management agreement for honey production ▪ Increase collaboration with other protected area managers of Maya Mountains West

Table 7: System-Level Recommendation Leverage / 1													
Recommendation	Bladen Nature Reserve	Cockscomb Basin Wildlife Sanctuary / Victoria Peak	Chiquibul National Park	Chiquibul Forest Reserve	Deep River Forest Reserve	Elijio Panti Forest Reserve	Columbia River Forest Reserve	Sibun Forest Reserve	Sittee River Forest Reserve	Maya Mountain Forest Reserve	Mountain Pine Ridge Forest Reserve	Caracol Archaeological Reserve	Vaca Forest Reserve
<ul style="list-style-type: none"> Strengthen strategic alliances and collaboration with other protected area managers and co-managers of the Maya Mountains West and East 													
<ul style="list-style-type: none"> Strengthen ongoing, multi agency collaboration towards more effective surveillance and enforcement 													
<ul style="list-style-type: none"> Strengthen management capacity of management / co-management organization 													
<ul style="list-style-type: none"> Increase community participation through development or strengthening of a Local Advisory Committee 													
<ul style="list-style-type: none"> Increase public awareness of environmental services in stakeholder communities 													
<ul style="list-style-type: none"> Ensure that a thorough EIA is required before any new mineral exploration license is granted, or current license is renewed 													

Table 7: System-Level Recommendation Leverage / 2													
Recommendation	Bladen Nature Reserve	Cockscomb Basin Wildlife Sanctuary / Victoria Peak	Chiquibul National Park	Chiquibul Forest Reserve	Deep River Forest Reserve	Elijio Panti Forest Reserve	Columbia River Forest Reserve	Sibun Forest Reserve	Sittee River Forest Reserve	Maya Mountain Forest Reserve	Mountain Pine Ridge Forest Reserve	Caracol Archaeological Reserve	Vaca Forest Reserve
<ul style="list-style-type: none"> Develop five year management plan 													
<ul style="list-style-type: none"> Increase community engagement 													
<ul style="list-style-type: none"> Strengthen fire management, in collaboration with other protected area managers of the southern coastal plain 													
<ul style="list-style-type: none"> Investigate establishment of community site management agreement 													
<ul style="list-style-type: none"> Develop entrance fee mechanism to feed into system-level sustainability 													
<ul style="list-style-type: none"> Build on current tourism investments 													
<ul style="list-style-type: none"> Seek tourism concession / co-management partner 													
<ul style="list-style-type: none"> Strengthen fire management, in collaboration with other protected area managers of the Mountain Pine Ridge area 													

Table 7: System-Level Recommendation Leverage / 3													
Recommendation	Bladen Nature Reserve	Cockscomb Basin Wildlife Sanctuary / Victoria Peak	Chiquibul National Park	Chiquibul Forest Reserve	Deep River Forest Reserve	Elijio Panti Forest Reserve	Columbia River Forest Reserve	Sibun Forest Reserve	Sittee River Forest Reserve	Maya Mountain Forest Reserve	Mountain Pine Ridge Forest Reserve	Caracol Archaeological Reserve	Vaca Forest Reserve
<ul style="list-style-type: none"> Develop alliance / co-management agreement with local NGO for more effective management of non-LTFL area 													
<ul style="list-style-type: none"> Disband BMC and seek a single co-management organization to take on management role 													

This allows us to identify those management strategies that will strengthen all protected areas:

- Strengthen strategic alliances and collaboration with other protected area managers and co-managers of the Maya Mountains West and East
- Strengthen ongoing, multi agency collaboration towards more effective surveillance and enforcement
- Strengthen management capacity of management / co-management organization
- Increase community participation through development or strengthening of a Local Advisory Committee
- Increase public awareness of environmental services in stakeholder communities
- Ensure that a thorough EIA is required before any new mineral exploration license is granted, or current license is renewed

Those strategies that will affect more than half of the protected areas:

- Develop five year management plan
- Increase community engagement

And those that are more site specific:

- Strengthen fire management, in collaboration with other protected area managers of the southern coastal plain
- Investigate establishment of community site management agreement
- Develop entrance fee mechanism to feed into system-level sustainability
- Build on current tourism investments
- Seek tourism concession / co-management partner
- Strengthen fire management, in collaboration with other protected area managers of the Mountain Pine Ridge area