Cockscomb Basin Wildlife Sanctuary

Contents

Management Effectiveness Report Prepared By:

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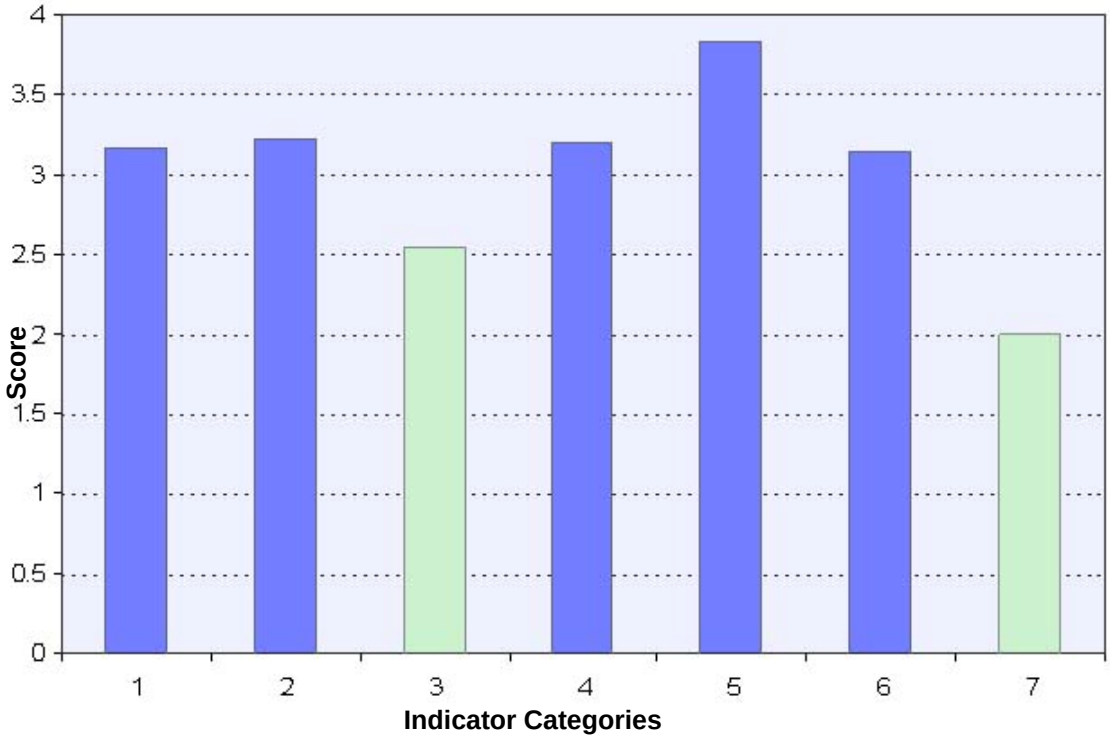
Summary of Assessment

The evaluation questionnaire for this assessment was completed by Belize Audubon Society, the co-management organization for Cockscomb Basin Wildlife Sanctuary, in August 2006, facilitated by Wildtracks. The following report is an analysis of the data provided in the questionnaire.

Individual Indicators*	
Indicator Category	**Average Score**
1. Resource Information	3.17
2. Resource Administration, Management and Protection	3.22
3. Participation, Education and Socio-Economic Benefit	2.55
4. Management Planning	3.20
5. Governance	3.83
6. Human Resources	3.14
7. Financial and Capital Management	2.00
Overall	**3.02**

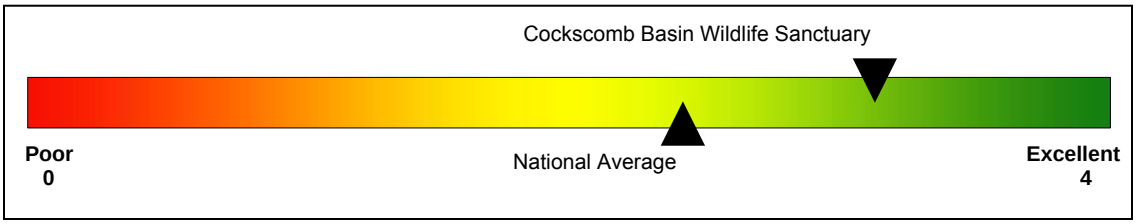
***** Indicators and Indicator categories used are from Young et. al.



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

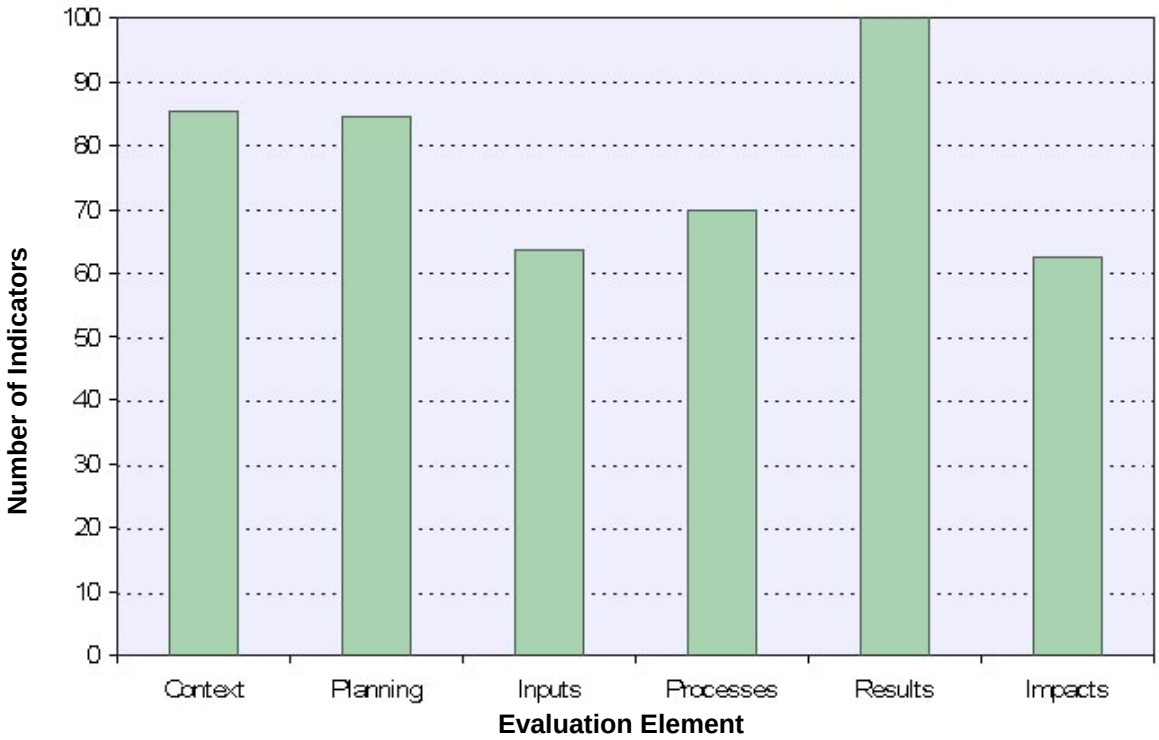
Indicator Category average scores for management effectiveness of Cockscomb Basin Wildlife Sanctuary

Whilst this assessment is not designed to give comparisons between protected areas, it is useful to compare the performance of Cockscomb with the average for all protected areas assessed. Overall, the assessed protected areas score a total average of **2.51**. When averaged across the seven Indicator Categories, Cockscomb Basin Wildlife Sanctuary scores **3.02**.



Evaluation Elements Summary Table*				
	No. Indicators	Total score	Total score feasible	% effective
Context	12	41	48	**85.4**
Planning	8	27	32	**84.4**
Inputs	11	28	44	**63.6**
Processes	24	67	96	**69.8**
Results	1	4	4	**100.0**
Impacts	2	5	8	**62.5**

***** Evaluation Elements used are from WCPA



Summary of percentages for management effectiveness of evaluation elements for Cockscomb Basin Wildlife Sanctuary

Evaluation Elements Summarized	
	% effective
Socio Economic Indicators	**71.1%**
Administrative Indicators	**82.4%**
Biophysical Indicators	**78.3%**
Management Effectiveness Overall Average	**77.3%**

Overall management effectiveness is considered to be **SATISFACTORY**. The biophysical and administrative background is strong, though there is some room for strengthening, particularly in the socio-economic context**.**

Conclusions and Recommendations

With an overall rating of **SATISFACTORY,** Cockscomb Basin Wildlife Sanctuary can be considered to have management that is effective in all areas (particularly administration), but with some scope for strengthening. The presence of a management plan with an integrated conservation planning element strengthens the framework under which future management will be implemented.

Areas of Strength:	Governance Management Planning
Areas of Weakness:	Participation, Education and Socio-Economic Benefits Financial and Capital Management

1. Resource Information

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the areas of information on the physical environment, resource use, in the identification of conservation targets, and in the implementation of a systematic threat analysis. It needs strengthening in the areas of information on biodiversity, cultural and archaeological resources, environmental monitoring, in the implementation or research activities and in data management. This mix of areas of strengths and weaknesses reflects the presence of a recent management plan for Cockscomb Basin Wildlife Sanctuary.

2. Resource Administration, Management and Protection

Management strengths of Cockscomb Basin Wildlife Sanctuary in this section are considered to be in its legal status, in the permitting process and in having best practices guidelines. There is scope to strengthen its visitor and tourism management activities, and a need to strengthen surveillance, enforcement, visitor monitoring, and boundary demarcation.

3. Participation, Education and Socio-Economic Benefit

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the area of public participation. Whilst several areas within public participation were considered present but insufficient for management, the remote nature of the protected area and its distance from any communities indicates that in reality they probably are sufficient for management. Nonetheless, there is scope to strengthen public participation.

4. Management Planning

Management of Cockscomb Basin Wildlife Sanctuary is considered to be relatively strong in management planning, in having a recently completed management plan for VPNM and for Cockscomb Basin Wildlife Sanctuary. The areas of management planning, operational planning, implementation of zoning regulations and programme monitoring are areas that should be strengthened further – necessitating more extensive baseline information on the biodiversity within this quite inaccessible protected area.

5. Governance

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the area of governance – a reflection of the long-established organization structure and capacity of the Belize Audubon Society.

6. Human Resources

Management of Cockscomb Basin Wildlife Sanctuary is considered to be generally strong in areas of human resources, except for the availability of operational staff and of technical, scientific and professional staff – areas that need strengthening. There is also scope for the strengthening of site manager qualifications, and in enhancing training and capacity-building for staff.

7. Financial and Capital Management

Management of Cockscomb Basin Wildlife Sanctuary is considered to be weak in the area of financial and capital management. Revenue generation, financial management, availability of equipment and infrastructure, signage and maintenance of equipment and infrastructure are all considered in need of strengthening.

1. Introduction

Belize has an impressive record of establishing protected areas, with a total of 94 recognised reserve areas, including marine and terrestrial reserves, archaeological reserves and recognized private reserves (Meerman, 2005). Whilst Belize can claim to have almost 2 million acres of national lands within the terrestrial protected areas system, the majority of them administered under the Forest Department, there has been no comprehensive analysis of management effectiveness across the system, and no indication of the conservation status of these protected areas. At one end of the scale are areas considered as functional conservation units, with the structure and human resources to meet many of its objectives and goals. At the other end of the spectrum are reserves that lack any on-site (or, in some cases, even off-site) management or infrastructure, with extensive illegal extraction of natural resources, that can be considered as 'paper parks' within the system – protected areas that are not fulfilling the objectives for which they were established, and characterized by forests with reduced levels of game species, illegal logging and incursions for land clearance and settlement. Without an understanding of broad scale barriers to management effectiveness, it is hard for the Forest Department to identify and coordinate strategies to strengthen the protected areas system under its mandate. Assessing management effectiveness is an essential part of the management cycle, providing this understanding at the national level, whilst also enabling site-level managers to focus on areas within their management that require further input and focus.

This review of management effectiveness covers 44 of these protected areas, administered by the Forest Department of the Ministry of Natural Resources and the Environment - 47% of all protected areas in Belize. These include five different categories, dependent on the management regime under which they are managed:

- Forest Reserves
- National Parks
- Natural Monuments
- Nature Reserves
- Wildlife Sanctuaries

1.1 Assessing Management Effectiveness

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 (Figure 1; 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

Figure 1

This monitoring system, developed by the Regional Environmental Program for Central America (PROARCA), uses the internationally recognised World Commission on Protected Areas (WCPA) conceptual framework and guidelines, based on the evaluation of effectiveness of planning elements within the framework – context, planning, inputs, processes, results and impacts (Table 1). This methodology has been used as a basis in the development of national evaluation programmes for measuring management effectiveness in Costa Rica (1999), Honduras (2000), Guatemala (2001), Nicaragua (2001), Panama (2002) and El Salvador (2003).

Under the National Protected Areas Policy and System Plan, Belize has developed the **Monitoring Package for Assessing Management Effectiveness of Protected Areas** (Young et. al, 2005), which is not structured to be directly comparable with the WCPA framework. Analysis under this protocol is followed by further assessment in live with the WCPA planning elements incorporated into the PROARCA regional framework.

2. Assessment Structure

The assessment is not intended to assess the commitment and effectiveness of individual protected area managers, but to provide an overview of the effectiveness of the FD-administered protected area system as a whole. It will also allow identification of common strengths and weaknesses across the protected areas being assessed, and give recommendations on strategies that can strengthen protected area management effectiveness.

The protocol developed under the National Protected Areas Policy and System Plan - the **Monitoring Package for Assessing Management Effectiveness of Protected Areas** (Young et. al, 2005) – provides a framework to report on progress of protected area management towards achieving the national objective of a functional protected area system, through effective management of the protected areas.

The management effectiveness assessment is structured in two sections – the first provides the background information on the protected area – establishment details, biodiversity importance etc. - and outlines threats to the biodiversity. The second section is divided into seven distinct categories, each has a series of indicator areas, with a total of 58 indicators (Figure 2).

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

1. Resource Information

1.1 Inventory: Physical Environment
1.2 Inventory: Biotic Environment
1.3 Inventory: Cultural and Archaeological Resources
1.4 Inventory: Social, Cultural, and Economic Context
1.5 Inventory: Resource Use and Occupancy
1.6 Inventory: Tenures and Claims
1.7 Site Assessment: Conservation Target
1.8 Site Assessment: Systematic Threat Assessment
1.9 Traditional Knowledge
1.10 Information Management Systems
1.11 Environmental Monitoring Activities
1.12 Functional Research Activities

2. Resource Administration, Management and Protection

2.1 Legal: Legal Status
2.2 Legal: Boundary Survey and Demarcation
2.3 Legal: Registration, Permit, and Approval Processes
2.4 Tenure and Claim Conflict Resolution
2.5 Guidelines and Best Management Practices
2.6 Protection: Surveillance Activities
2.7 Protection: Enforcement Activities
2.8 Visitor and Tourism Management Activities
2.9 Visitor and Tourism Monitoring Activities

3. Participation, Education, and Socio-Economic Benefits

3.1 Communication Activities
3.2 Educational Activities
3.3 Dissemination of Knowledge and Information
3.4 Participation: Level of Participation in Management
3.5 Participation: Local Actors Leading Management
3.6 Participation: Volunteer Activities
3.7 Participation: Strength of Social Capital
3.8 Participation: Capacity Building Work
3.9 Benefits: Socio-Economic Benefits Program
3.10 Benefits: Extent of Local Economic Benefits
3.11 Benefits: Recognition of Protected Area Benefits

4. Management Planning

4.1 Management Plan Implementation
4.2 Operational Plan Implementation
4.3 Regulation and Zoning Implementation
4.4 Guidelines and Best Management Practices
4.5 Long Term Management Needs Identification
4.6 Program Monitoring and Evaluation

5. Governance

5.1 Protected Areas Objectives
5.2 Co-Management Arrangements
5.3 Administrative Autonomy
5.4 Operating Procedures: Advisory Committee
5.5 Operating Procedures: Board
5.6 Interorganizational Mechanisms

6. Human Resources

6.1 Site Manager Preparation
6.2 Site Manager Availability
6.3 Admin Staff Availability
6.4 Technical, Scientific, and Professional Staff Availability
6.5 Operations Staff Availability
6.6 Human Resource Surveys
6.7 Training and Development

7. Financial and Capital Management

7.1 Funding Adequacy
7.2 Revenue Generation
7.3 Financial Management
7.4 Infrastructure Adequacy
7.5 Equipment Adequacy
7.6 Internal Access Adequacy
7.7 Signage Adequacy
7.8 Maintenance Adequacy

Indicators of the NPAPSP Monitoring Package for Assessing Management Effectiveness of Protected Areas (Young et. al, 2005)

Figure 2

It was found necessary to make a series of assumptions prior to analyzing the data, to ensure standardization across all assessments:

1. That the protected areas administered under the Forest Department have the protection of biodiversity and the involvement of and benefits to local communities as key components to their long term goals
2. That for the majority of protected areas (excluding Forest Reserves), where no natural resource extraction is permitted, the legal framework for permits under Forest and Fisheries Departments legislation is considered to exist (eg. research permits).

3. Where visitation is not permitted (Nature Reserves), exclusion of visitors and management of scientific researchers is sufficient for visitor management, other illegal visitation being covered under enforcement legislation
4. That stakeholder participation in management is necessary for all protected areas for long term viability
5. That education is a necessary component of management of all protected areas
6. That monitoring and evaluation are essential activities in the effective management of all protected areas
7. That where no dedicated site manager exists, the site manager is considered to be the District Forest Officer
8. That patrols and infrastructure, however minimal, are required for the effective management of protected areas
9. That all protected areas should be managed with the participation of an Advisory Committee formed from key stakeholders

2.1 Limitations and Constraints

1. Young et. al. (2005) recommended site level assessment of outcomes should be through use of the 5 S system – an, involved process requiring significant biological knowledge of the protected area, not available to most protected area managers. This is unrealistic in the context of Belize's terrestrial protected areas at this point, so only the management function-biased assessment could be conducted. This led to a heavy bias reflecting the management capacity of the protected areas being assessed, but little information on the success of protected area management in achieving goals and objectives…outcomes. Whilst providing a general idea of the patterns of relative management effectiveness throughout the protected area system, the results are therefore possibly not accurately representative of the true status, showing protected areas to be more effective than is actually the case when the known levels of incursions for hunting and xate extraction, for example, are taken into account

2. This assessment gives an overview of only 47% of Belize's protected areas (though this is actually higher than the recommended goal of 30% required under the CBD)

3. This assessment protocol is not directly comparable with the internationally recognised WCPA framework used by other countries in the region, and there is little guidance within the methodology as to how the data should be analyzed

3. National Results

The data was analyzed at both national and site level, to form an overview of management effectiveness in those protected areas under the National Protected Areas System in Belize that are administered by Forest Department, and to provide site-level protected area managers and co-management agencies with recommendations for strengthening management. When results from all the protected areas are averaged per indicator, they clearly identify the areas of relative strengths and weaknesses of the FD-administered system of protected areas (Figure 3).

3.1 Areas of Strength

Eight indicators scored an average of between three and four across the board, indicating strengths within the present protected areas system (Table 1; Figure 3).

Two of these indicators (1.6, and 2.1) are linked to the strong legislative context within which the national protected areas are defined and regulated. Apart from the ministerial right to dereserve part or all of a protected area, all national protected areas are clearly described by statutory instrument, and mapped as per their status (National Park, Wildlife Sanctuary, Forest Reserve etc.), resulting in 89% of protected area managers scoring legal status (2.1) as 4. When created, all took into account existing land claims and tenures, so these are currently not an issue (in the majority of cases). With the majority of the protected area categories being non-extractive, registration, permits and approvals (Indicator 2.3, with a high average score of 3.22) pertain primarily to the issuing of research permits, which is regulated through the Forest and Fisheries Departments, through a clearly defined procedure. In the Forest Reserves, where timber or other natural resource extraction occurs, this too is structured through a regulated licensing system.

Table 1: Eight highest scored indicators
In descending order

Indicator	Average Score
2.1 Legal status	3.89
5.5 Board of Directors	3.59
1.6 Inventory: Tenures and claims	3.24
5.1 Protected area objectives	3.24
5.2 Co-management agreements	3.24
2.3 Registration, permits and approval	3.22
5.3 Administrative autonomy	3.14
5.6 Interorganizational mechanisms	3.03

The second set of indicators (5.1, 5.2, 5.3 and 5.5) are linked to the co-management system that is favoured by Forest Department – the majority of participating protected areas are managed through strong co-management agreements, either for conservation or timber extraction purposes. The co-management organisations generally have well defined organizational structures, with a Board of Directors, and experience a high degree of administrative autonomy. A pre-requisite for the development of these co-management agreements is the prospective co-management partner organisations having a clear set of objectives, though this frequently lacks the strong foundation of a management plan to provide the framework for management. Management capacity in these co-management organisations has been strengthened over the last few years by the identification of the need for strategic planning and training by lead funding organizations.

This co-management structure and the recent increase in stakeholder participation in national conservation initiatives (such as the Meso-American Biological Corridors Program and the Meso-American Barrier Reef System Program) has led to much greater communication between

conservation organisations, both nationally and regionally, as indicated by the presence of Indicator 5.6 within the strengths of the system.

Many of the protected areas are managed through co-management agreements that are, in the majority of cases, considered to be adequate for management. Co-management partners range from large non-governmental organisations such as Belize Audubon Society (BAS) and the Toledo Institute for Development and the Environment (TIDE), to community-based organisations with limited infrastructure, human and financial resources, but whatever the scale, the majority of these NGOs and CBOs have well defined governing structures, with a functional Board of Directors, and experience a fair degree of administrative autonomy. On-site management in many cases scores highly, indicating that Belize has a pool of site managers with extensive experience and sufficient training for their roles.

3.2 Areas of Weakness

This assessment identified eight areas of weakness (Table 2; Figure 3). Following the initial assessment, four areas stand out as particularly weak – scientific research (1.12), funding (7.1, 6.4, 7.5, 7.7) and perhaps most importantly, management planning, implementation, and monitoring and evaluation (4.1 and 4.5).

One of the weakest points, and the second lowest scored indicator over the entire FD-administered protected areas system was the presence (or absence) of a management plan, and management plan implementation. Very few participating protected areas have approved current management plans (though a number are in the process of developing them), and even fewer had a mechanism in place to monitor and evaluate the success of these management plans in fulfilling protected area objectives. This will be strengthened by implementation of the National Management Plan Framework, developed under the National Protected Areas Policy and System Plan, which incorporates many of the requirements for effective management highlighted by the indicators.

Operational plan implementation is also an area of weakness, being within the fifteen lowest scored indicators (with a score of 2.14). The combination of these two (management plans and operational plans) within the lowest indicators identifies one of the largest gaps within the system, both for FD managed and co-managed protected areas…less than 30% of protected areas scored above 2 for management plan implementation, and less than 46% for operational plans. Both of these are critical for the day-to-day and long term management effectiveness of a protected area, as are monitoring and evaluation, also within the ten lowest scored indicators.

Funding inadequacies are reflected in several of the eight indicators – the need for more technical, scientific and professional staff, for greater emphasis on functional and applied scientific research, for more equipment, more signs…all these are indicative of the under-funding of the current protected areas system.

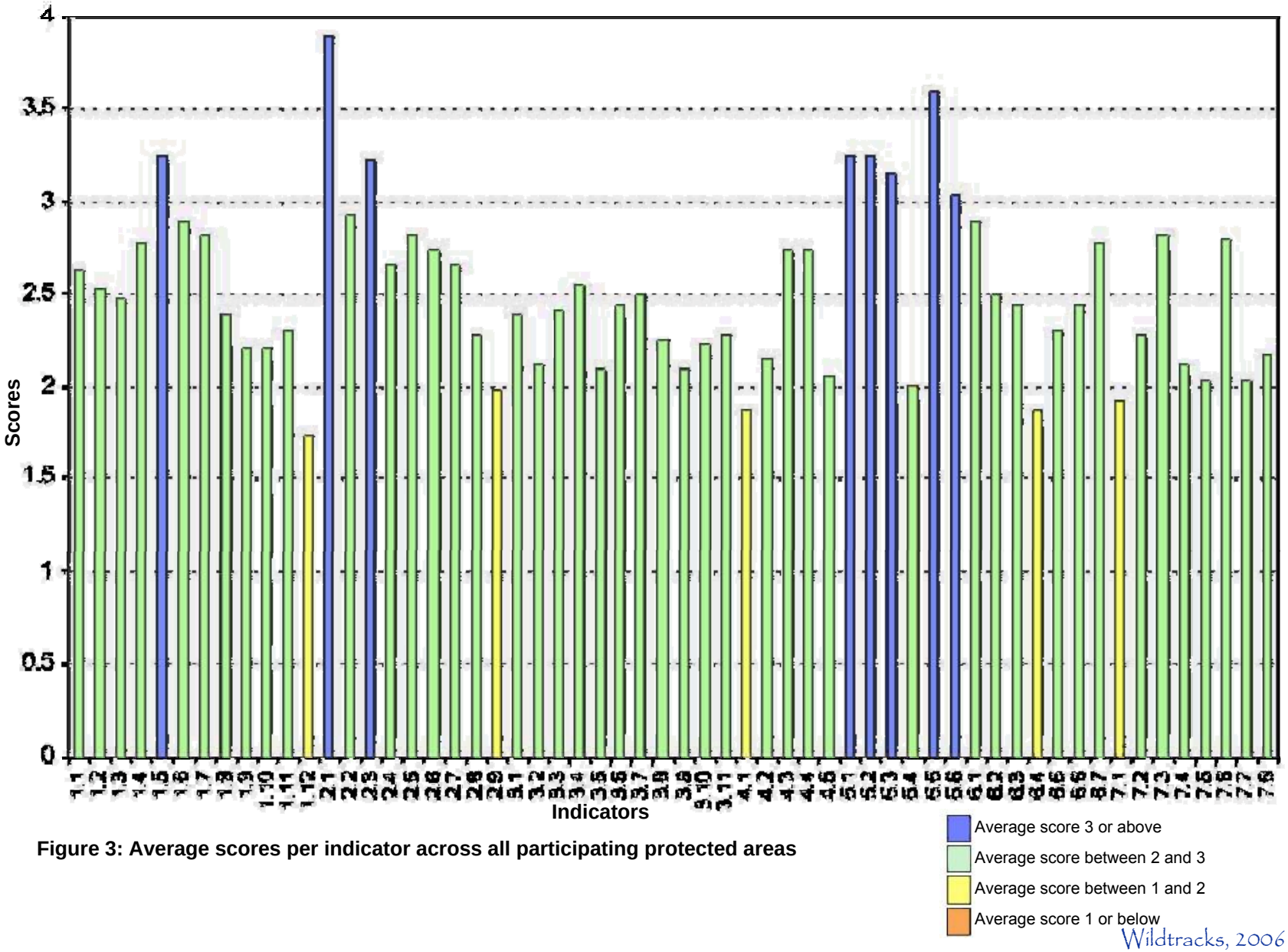


Figure 3: Average scores per indicator across all participating protected areas

Table 2: Eight lowest scored indicators In ascending order	
Indicator	**Average Score**
1.12 Scientific research activities	1.73
4.1 Management plan	1.86
6.4 Technical, scientific and professional staff	1.86
7.1 Funding adequate for management	1.92
2.9 Visitor and Tourist Monitoring Activity	1.97
5.4 Advisory Committee	2.00
7.5 Equipment adequate for management	2.03
7.7 Signage adequate for management	2.03

Overall, the lowest scored indicator across the protected areas is that of scientific research activities (1.12), with the availability of technical, scientific and professional staff (6.4) also scoring in the bottom three, reflecting the low priority given to functional scientific research within protected areas in Belize.

Also weak throughout the protected areas system (within the lowest ten indicators) are strategies to ensure social and economic benefits to local communities and stakeholders. Whilst many of the co-management agencies are strong in encouraging participation of local stakeholders, there appears to be a lack of focus in the formation of socio-economic benefit strategies, an area that would benefit from strengthening through professional input.

4. Protected Area Description

Geopolitically, Cockscomb Basin Wildlife Sanctuary straddles both Stann Creek and Toledo Districts, two of six administrative districts within the country. It lies within the Maya Mountains – a landscape of ridge crests, rolling hills and river flood plains, cloaked in tropical broadleaf evergreen forest. The 3,640-acre core of this national protected area was declared a Wildlife Sanctuary in 1986 - the first protected area worldwide to be created specifically for the conservation of the jaguar. The Sanctuary was then extended in 1990 to include the Forest Reserve, and again in 1997 to include a corridor of land (previously part of the Maya Mountain Reserve) that provides connectivity with Bladen Nature Reserve to the south. More recently, the adjacent 4,847 acres of the Victoria Peak Natural Monument has also come under Belize Audubon Society management, bringing the total area to an estimated 127,107 acres.

It is one of nine national protected areas managed through a co-management agreement between the Government of Belize and Belize Audubon Society, a non-governmental membership organization established in 1969, dedicated to the sustainable management of Belize's natural resources. Lying within the Peten-Veracruz Ecoregion (as defined under the WWF Terrestrial Ecosystems Initiative), the Sanctuary has a range of ecosystems defined by underlying geology, soil type, altitude and rainfall. These ecosystems reflect not only geographical variation, but also logging and hurricane impacts from the past hundred years. The area is rich in wildlife, providing protection for 319 species of bird, and with a mammal list of 96 species. 80 reptile and amphibian species have been recorded from the area to date. It also encompasses two major upper watersheds, South Stann Creek and parts of Monkey River, with four distinct drainage areas: Cockscomb East Basin, West Basin, Trio Branch and Richardson Creek.

Since its protection as a Wildlife Sanctuary in1986, human impacts have decreased to a much lower level. Whilst the Cockscomb Basin Wildlife Sanctuary has no major threats at this time (other than natural hurricanes and dereservation), it does have a number of less severe threats and impacting factors that need to be addressed over the next five years, and which are highlighted within the management plan.

4.1 Establishment of Cockscomb Basin Wildlife Sanctuary

Cockscomb Basin Wildlife Sanctuary is national land, designated by Statutory Instrument under the National Parks System Act. The core area has had protected status since 1984 (first as a Forest Reserve, then as a Wildlife Sanctuary), and as such, there are restrictions on activities that can take place within the area. Research, educational and recreational activities are permitted, but no extractive use (sustainable or otherwise) is currently allowed. The initial core area was extended in 1990, and again in 1997, to include part of the Maya Mountain Forest Reserve, to give connectivity to Bladen.

4.2 Protected Area Objectives

Goal: To maintain biodiversity, cultural resources and watershed areas within a functional conservation area, as an integral part of the National Protected Areas System

Objectives:

1. To maintain biodiversity, ecosystems, cultural resources and watershed areas within a functional conservation area, as an integral part of the National Protected Areas System
2. To provide an enabling environment for economic opportunities for local communities and society, towards sustainability
3. To engender greater public support, public awareness and participation to increase acceptance and security
4. To develop Cockscomb Basin Wildlife Sanctuary as a nationally and internationally known research site
5. To strive towards a greater level of sustainability through expansion and further development of tourism, compatible with biodiversity

4.3 Critical Activities in the Management of the Protected Area

Critical issues to be addressed were identified during management planning, and include:

Active Threats identified during Conservation Planning as Priorities

- Hunting
- Fishing
- Looting of Archaeological Sites
- Logging
- Fire
- Killing of Jaguars in adjacent communities
- Killing of Scarlet Macaws in adjacent communities
- Tourism Impacts
- Pesticide Drift

4.4 Ecological Characteristics

A total of 19 terrestrial and 2 aquatic ecosystems have been identified within CBWS, extending the ecosystem mapping and UNESCO ecosystem definitions of Meerman & Sabido (2001). Under the Belize Ecosystems mapping (Meerman and Sabido, 2001), a total of 11 terrestrial ecosystems are represented in Cockscomb. A further 8 terrestrial ecosystems were identified in the CBWS survey for the development of the current management plan, and 1 mis-identification corrected (Tropical evergreen seasonal needle-leaf lowland dense forest amended to Tropical evergreen seasonal needle-leaf lowland hill forest) – accepting the likely re-inclusion of the Ben's Bluff / Tiger Fern area within the Sanctuary.

Three of these systems have been identified as conservation targets during the conservation planning process:

1. ***Elfin Woodland*** (including both Elfin Woodland and Elfin Shrubland)
2. ***Needle-leaf Forest*** (Tropical evergreen seasonal needle-leaf lowland hill forest)
3. ***Broadleaf Forest*** (including Lowland and Upland Broadleaf Forest ecosystems, but excluding Elfin Woodland)

Despite the limitations of the baseline surveys to date, it is clear that Cockscomb is home to a very significant percentage of the species found in Belize. Over 58% of Belize's mammals, 56% of its birds and 69% of its amphibians have been recorded as present in Cockscomb to date. So far only 42% of Belize's non-marine reptiles have been recorded in the Sanctuary, but this is more an indication of the paucity of data on the snakes of CBWS – once a comprehensive survey has been undertaken, this figure is likely to increase to around 65%.

Despite the considerable spatial limitations of faunal surveys within Cockscomb and the absence of widespread species surveys across the 'major' taxa, it can be concluded that CBWS harbours a very significant percentage of the species found in Belize. With reportedly very high hunting pressure on game species throughout the adjacent forest reserves (and reportedly seriously depleted game populations and unknown impacts on the faunal communities as a whole), even with the current level of hunting in Cockscomb the Sanctuary remains a critical stronghold for many species – amongst a mosaic of 'paper parks'**.**

Table 3: Conservation Targets - Priority Areas of Action for Cockscomb Basin Wildlife Sanctuary

Priority	Rank	Conservation Target	Principal Threat
High	1	Archaeological Sites	Looting
	1	Game Species	Hunting
	1	Aquatic Vertebrates	Fishing
Medium	4	Scarlet Macaw	Killing of Scarlet Macaws
	4	Jaguar	Killing of problem Jaguars
	6	Elfin Woodland	Tourism Impacts
Lower	7	Needle-leaf Forest	Fire
	8	Broadleaf Forest	Logging

4.5 Socioeconomic Context

A total of seventeen stakeholder groups were identified as being associated with Cockscomb, and the impact the protected area has on their activities and/or income was assessed. They were then also evaluated as to their impact on the protected area.

Within this analysis, the buffer communities have been divided into three categories, dependant on their relationship with Cockscomb Basin Wildlife Sanctuary and Belize Audubon Society. Type (I) communities are those that feel that they benefit from the presence of the protected area - at present this only includes Maya Centre.

Type (II) communities are those that perceive that they can benefit from the presence of the protected area, and are working, or willing to work, towards this goal but at present are still causing overall negative impact to the area, and do not feel they themselves are being positively impacted at this point in time (2004). This category has only one community – Maya Mopan.

Type (III) communities are those that have an overall negative impact on the protected area, and have not yet developed a good working relationship with CBWS. This is partly a reflection of the shifting seasonal workforce and lack of social structure within these communities (Red Bank, San Roman, Santa Rosa, San Pablo and Kendal), a lack of contact (as in the case of Trio Farm and Bladen Village, buffer communities that affect the newly annexed Maya Mountain extension), and a lack of continuity in BAS liaison, with several staff changes in the position of community liaison officer during the last three years.

Tourism Industry: Cockscomb is the foremost of Belize's terrestrial national protected areas – a valuable asset for many of the tourism stakeholders (hotel owners, tour operators and

tour guides) within the area, especially with the increased importance of tourism to the local and national economy. Tourism is also essential to the survival of Cockscomb as a protected area, as financial self-sustainability has to become a major goal in the present economic climate. Cockscomb also achieves greater recognition and enhanced protection with increased visitation, particularly by people from within Belize, who, with increased awareness and appreciation, can help assure its survival. Cockscomb has a lot to offer visitors looking for a wilderness experience, though whilst tourism *per se* is a critical component of the management of the protected area, it can bring some negative impacts as well, unless properly managed. Currently, tourism activities that are potentially in need of greater management are the increasing cruise ship visitors, and youth expeditions. These impact not only the environment, but also the experience of other visitors to the Sanctuary, and particular concerns have been raised about potential impact on the fragile Elfin forest ecosystem on Victoria Peak, and the elfin woodland habitat in the upland area of Outlier.

There also needs to be greater liaison with stakeholders within the tourism industry – particularly the Belize Tourism Industry Association, local tour operators and guides – to ensure that visitor expectations can be met, with minimal impact on the environment.

Economic base:

Citrus, banana, cattle and shrimp are the major, large-scale agricultural industries within the immediate vicinity of Cockscomb. They dominate not only the land use patterns adjacent to the Sanctuary, but also the economy of the area.

Citrus is the most significant agro-industry in Belize, earning more than US$37 million for the country in the 2000/2001 crop year (Belize Citrus Growers Association, 2003). The majority of citrus produced in Belize is processed into concentrate by the two factories located in the Stann Creek Valley, the traditional heart of the citrus industry since 1926. Current world markets have, however, reduced the market price, resulting in interest in diversification towards less traditional crops and cattle.

The banana industry, the second major agricultural industry in the area, is the country's largest employer - a source of about 10 per cent of total employment countrywide, and 45 per cent of employment within Stann Creek District. It is also a major contributor to the GDP - however again market uncertainties and high production costs are affecting both production and marketing (Caribbean Banana Exporters Association, 2003). Both the citrus and banana industries employ large numbers of seasonal workers from outside not only the local area, but also outside Belize, the latter rather limiting the financial benefits of these industries to Belize's economy. Large cattle farms are starting to appear in the area, again providing employment opportunities – once again, primarily to Central American immigrants, willing to work for lower wages.

Adjacent to the Cockscomb Basin Wildlife Sanctuary, there are a number of large commercial agricultural initiatives, principally Aquamar (citrus, cattle and shrimp), under M. Dunker, and Mayan King (bananas and cattle) under J. Zabaneh. This has resulted in an associated concentration of seasonal migrants, with it being estimated that over 1,000 labourers work on these farms during the busiest work periods, the majority from other Central American countries (primarily Honduras).

As well as this international migration of seasonal labourers to the large agricultural companies, there has also been an internal migration within Belize, with Maya from the villages in southern Toledo District moving north into Stann Creek in search of better farmlands, and creating new settlements such as Maya Mopan and Maya Centre, adjacent to Cockscomb. This, too, has generated greater stress on the natural resources of the area, as community development spreads into the buffer areas adjacent to Cockscomb.

There has recently been a shift towards a more service-orientated economy, with increasing tourism and financial services. Cruise ship tourism in particular has shown massive growth over the last two years, with an increase of passenger arrivals in 2003 of 79.9%, from 319,690 passengers in 2002, to 575,196 in 2003 (Belize Tourist Board, 2004). Belize's attraction to overseas visitors is the abundance of natural and cultural resources, terrestrial and marine protected areas such as Half Moon Caye. Whilst at present centered on destinations accessed from Belize City, the opening of a second cruise ship disembarkation point in Dangriga, potentially in 2005/2006, will significantly increase the volume of visitors in the Stann Creek area, with the potential to provide a resource that can be tapped by BAS and Cockscomb in the future in a planned and sustainable way. With this increased accessibility, Cockscomb is likely to become a prominent attraction in the developing industry of cruise ship tourism in southern Belize.

5. Results

Under the National Protected Areas Policy and System Plan, management effectiveness is evaluated through the **Monitoring Package for Assessing Management Effectiveness of Protected Areas** (Young et. al. 2005), based on seven different 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

The following series of tables summarizes the result of the 2006 management effectiveness assessment for Cockscomb Basin Wildlife Sanctuary.

1. Resource Information

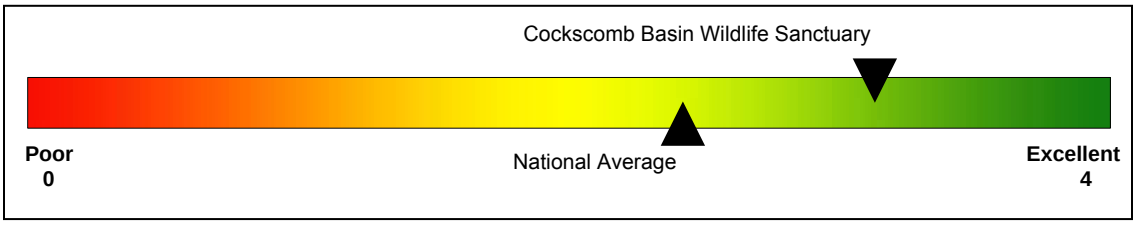
Indicators with a score of 1 or 2	Score	Evaluation Element
1.10 Information management system	2	Inputs
1.11 Environmental monitoring activities	2	Processes
1.12 Scientific research activities	2	Processes

Indicators with a score of 3	Score	Evaluation Element
1.3 Inventory of cultural and archaeological resources	3	Context
1.4 Inventory of social, cultural and economic context	3	Context
1.6 Inventory: Tenures and Claims	3	Context
1.9 Traditional knowledge	3	Context

Indicators with a score of 4	Score	Evaluation Element
1.1 Inventory of physical environment	4	Context
1.2 Inventory of biotic environment	4	Context
1.5 Resource Use and Occupancy	4	Context
1.8 Systematic threat assessment	4	Context
1.7 Conservation targets identified	4	Planning

Summary of Results	
Average Score	3.17

Whilst this assessment is not designed to give comparisons between protected areas, it is useful to compare the performance of Cockscomb with the average for all protected areas assessed. Overall, **Section One: Resource Information** scores an average of **2.54** for all protected areas assessed, and **3.17** for Cockscomb Basin Wildlife Sanctuary.



2. Resource Administration, Management and Protection

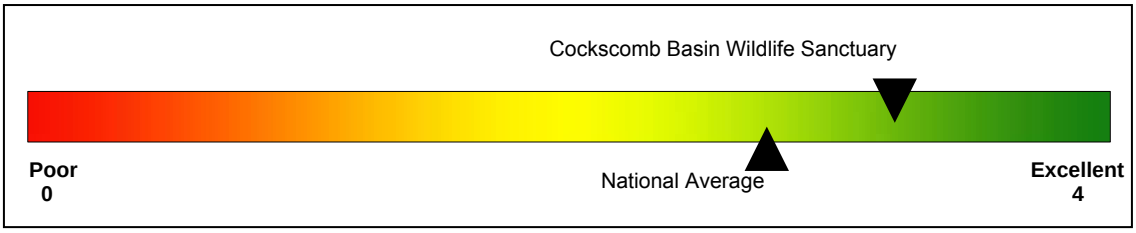
Indicators with a score of 1 or 2	Score	Evaluation Element
2.9 Visitor and tourism monitoring programme	2	Processes

Indicators with a score of 3	Score	Evaluation lement
2.5 Guidelines and best management practices exist	3	Planning
2.4 Tenure claim conflict resolution activities	3	Processes
2.6 Enforcement activities	3	Processes
2.7 Surveillance activities	3	Processes
2.8 Visitor and tourism management activities	3	Processes

Indicators with a score of 4	Score	Evaluation Element
2.1 Legal status	4	Context
2.2 Boundary survey and demarcation	4	Context
2.3 Legal registration, permit and approval process	4	Processes

Summary of Results	
Average Score	3.22

Overall, **Section Two: Resource Administration, Management and Protection** scores an average of **2.77** for all protected areas assessed. Cockscomb Basin Wildlife Sanctuary scores an average of **3.22**.



3. Participation, Education and Socio-Economic Benefit

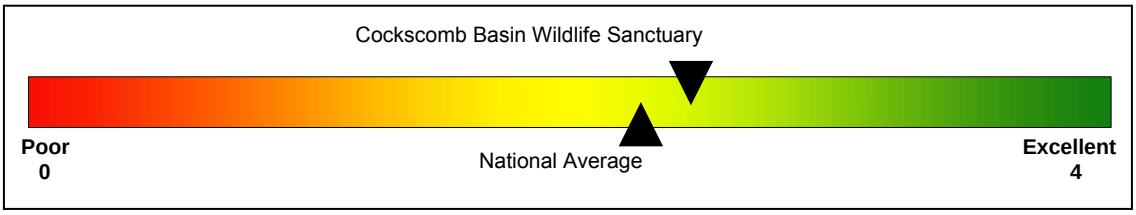
Indicators with a score of 1 or 2	Score	Evaluation Element
3.5 Local actors leading protected area management	1	Processes
3.4 Level of stakeholder participation in management	2	Processes
3.7 Strength of social capital	2	Context
3.10 Extent of local economic benefits	2	Impacts

Indicators with a score of 3	Score	Evaluation Element
3.1 Communication plan	3	Planning
3.2 Educational activities	3	Planning
3.3 Dissemination of knowledge and information	3	Processes
3.6 Volunteer programme	3	Inputs
3.8 Existence of capacity building strategy	3	Processes
3.9 Existence of socio-economic benefits strategy	3	Processes
3.11 Local recognition of protected area benefits	3	Impacts

Indicator with a score of 4	Score	Evaluation Element
No indicators scored 4		

Summary of Results	
Average Score	2.55

Overall, **Section Three: Participation, Education and Economic Benefits** scores an average of **2.25** for all protected areas assessed. Cockscomb Basin Wildlife Sanctuary scores an average of **2.55.**



4. Management Planning

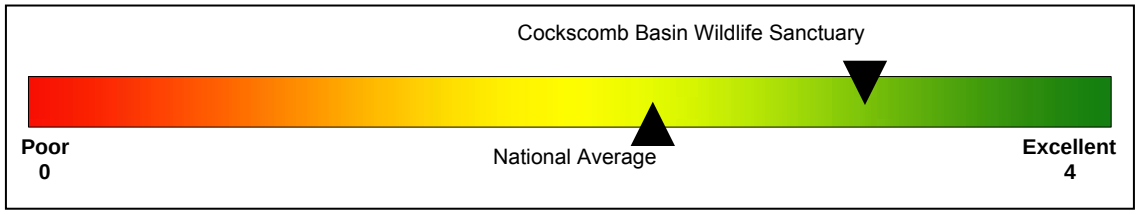
Indicators with a score of 1 or 2	Score	Evaluation Element
No indicators scored 1 or 2		

Indicators with a score of 3	Score	Evaluation Element
4.1 Management plan	3	Planning
4.2 Operational plan	3	Planning
4.3 Regulation and implementation of management zones	3	Processes
4.5 Programme monitoring and evaluation	3	Processes

Indicators with a score of 4	Score	Evaluation Element
4.4 Identification of long term management needs	4	Planning

Summary of Results	
Average Score	3.20

Overall, **Section Four: Management Planning** scores an average of **2.28** for all protected areas assessed. Cockscomb Basin Wildlife Sanctuary has an average score of **3.20.**



5. Governance

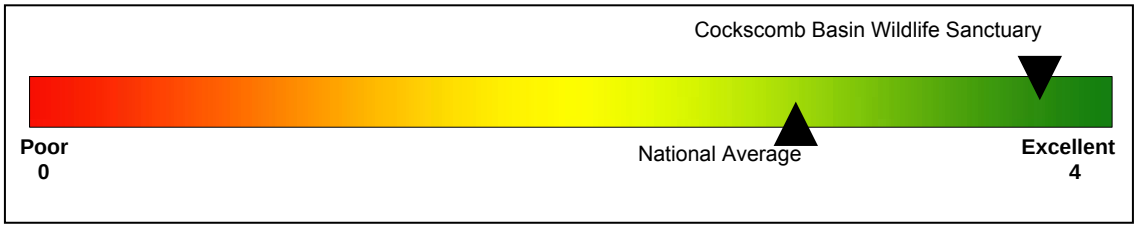
Indicators with a score of 1 or 2	Score	Evaluation Element
No indicators scored 1 or 2		

Indicators with a score of 3	Score	Evaluation Element
5.2 Co-management agreements	3	Processes

Indicators with a score of 4	Score	Evaluation Element
5.1 Protected area objectives	4	Planning
5.3 Administrative autonomy	4	Processes
5.4 Advisory Committee	4	Processes
5.5 Board of Directors	4	Processes
5.6 Interorganizational mechanisms	4	Processes

Summary of Results	
Average Score	3.83

Overall, **Section Five: Governance** scores an average of **3.03** for all protected areas assessed**.** Cockscomb Basin Wildlife Sanctuary scores an average of **3.83**.



6. Human Resources

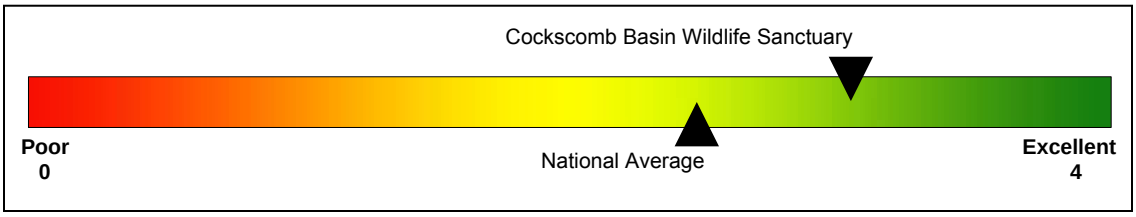
Indicators with a score of 1 or 2	Score	Evaluation Element
6.4 Technical, scientific and professional staff	2	Inputs
6.5 Operational staff	2	Inputs

Indicators with a score of 3	Score	Evaluation Element
6.1 Qualified site manager	3	Inputs
6.7 Training and development activities	3	Processes

Indicators with a score of 4	Score	Evaluation Element
6.2 Site manager availability (part time / full time)	4	Inputs
6.3 Administrative staff	4	Inputs
6.6 Human resource assessment	4	Results

Summary of Results	
Average Score	3.14

Overall, **Section Six: Human Resources** scores an average of **2.44** for all protected areas assessed. Cockscomb Basin Wildlife Sanctuary scores an average of **3.14**.



7. Financial and Capital Management

Indicators with a score of 1 or 2	Score	Evaluation Element
7.3 Financial management	1	Processes
7.1 Funding adequate for management	2	Inputs
7.2 Revenue generation	2	Processes
7.4 Infrastructure adequate for management	2	Inputs
7.5 Equipment adequate for management	2	Inputs
7.7 Signage adequate for management	2	Inputs
7.8 Maintenance adequate for management	2	Processes

Indicators with a score of 3	Score	Evaluation Element
7.6 Area accessibility	3	Context

Indicators with a score of 4	Score	Evaluation Element
No indicators scored 1 or 2		

Summary of Results	
Average Score	2.00

Overall, **Section Seven: Financial and Capital Management** scores an average of **2.24** for all protected areas assessed. Cockscomb Basin Wildlife Sanctuary scores an average of **2.00**

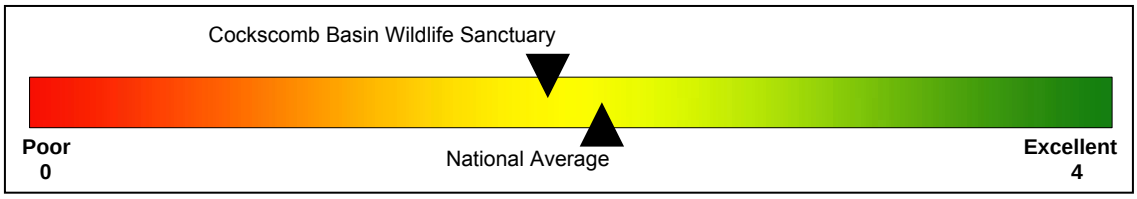
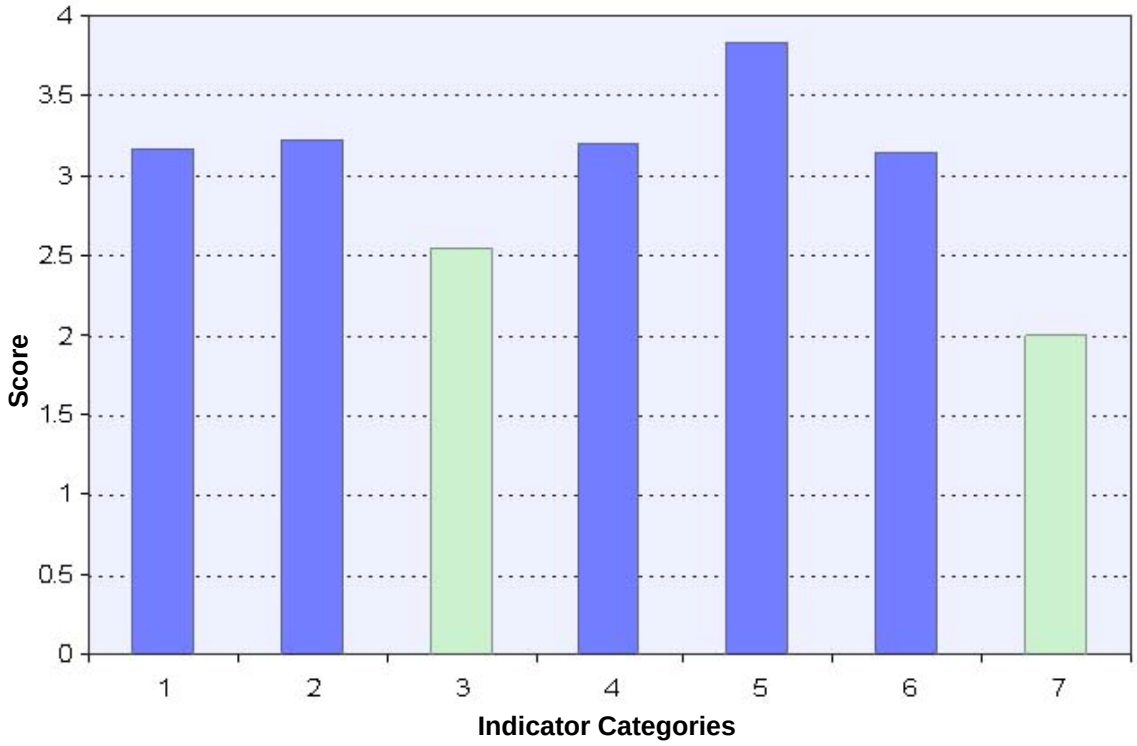


Table 4: Individual Indicators	
Indicator Category	**Average Score**
1. Resource Information	3.17
2. Resource Administration, Management and Protection	3.22
3. Participation, Education and Socio-Economic Benefit	2.55
4. Management Planning	3.20
5. Governance	3.83
6. Human Resources	3.14
7. Financial and Capital Management	2.00
Overall	**3.02**

In the majority of the seven indicator categories, Cockscomb scores relatively highly (above 3). The weakest areas are those of **Participation, Education and Socio-Economic Benefit** and **Financial and Capital Management –** particularly the latter (Table 4; Figure 4).



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

Figure 4:
Range of Indicator Category average scores for management effectiveness of Cockscomb Basin Wildlife Sanctuary

To enable analysis in the regional context, each indicator has also been linked to one of the six **evaluation elements** of the World Congress of Protected Areas (WCPA) framework for assessment, developed to encourage international standards for assessment and reporting, and harmonize assessment around the world (Table 5).

Table 5: WCPA Framework

Elements of Evaluation	Explanation	Criteria that are assessed
Context	***Where are we now?*** Assessment of importance, threats and policy environment	▪ Significance (Cultural, biological, economic) ▪ Threats (Internal, external, resource extraction) ▪ Vulnerability (Legal status, demarcation, fragility) ▪ National Context (Political) ▪ Partners
Planning	***Where do we want to be?*** Assessment of protected area design and planning	▪ Protected area legislation and policy ▪ Protected area system and design (comprehensive, representative, connectivity and viability) ▪ Reserve design (Viability, connectivity, land tenure, traditional use) ▪ Management planning (Clear objectives and management plans, identification of resources)
Inputs	***What do we need?*** Assessment of resources needed to carry out management	▪ Resources of agency (Staff, funds, equipment, infrastructure) ▪ Resources of site (Staff, funds, equipment, infrastructure)
Processes	***How do we go about it?*** Assessment of the way in which management is conducted	▪ Suitability of management processes (Maintenance, control and protection, training, education, research, monitoring and evaluation, visitor management, natural resource management, conflict resolution, personnel management, control of budgets and finance)
Results	***What are the results?*** Assessment of the implementation of management programmes and actions; delivery of products and services	▪ Results of management actions (Evaluation of management plan implementation, annual plans, and annual budgets) ▪ Services and products (Quantificatoin of goods and services generated by the management process)
Impacts	***What did we achieve?*** Assessment of the outcomes and the extent to which they achieved objectives	▪ Impacts: effects of management in relation to objectives (Qualitative and quantitative impacts, impacts of management plans etc. in relation to the objectives and the management category).

The indicators are grouped into three indicator categories:

- Socio-economic indicators
- Administrative indicators
- Biophysical indicators

…within which they are divided into the WCPA elements of evaluation (Table 5):

The results are then analyzed using the following scale:

Very poor management effectiveness	≤25%
Poor management effectiveness	25.1% - 50%
Moderate management effectiveness	50.1% - 75%
Satisfactory management effectiveness	75.1% - 100%

5.1 Assessment of socio-economic indicators of management effectiveness

Table 6: Socio-economic Indicators		
Context	3.7 Strength of social capital	**2**
Context	1.4 Inventory of social, cultural and economic context	**3**
Context	1.5 Resource Use and Occupancy	**4**
	Total score for Context	**7**
	%	**75%**
Planning	3.1 Communication plan	**3**
Planning	3.2 Educational activities	**3**
	Total score for Planning	**6**
	%	**75%**
Inputs	3.6 Volunteer programme	**3**
	Total score for Inputs	**3**
	%	**75%**
Processes	3.5 Local actors leading protected area management	**1**
Processes	3.4 Level of stakeholder participation in management	**2**
Processes	2.4 Tenure claim conflict resolution activities	**3**
Processes	3.3 Dissemination of knowledge and information	**3**
Processes	3.8 Existence of capacity building strategy	**3**
Processes	3.9 Existence of socio-economic benefits strategy	**3**
Processes	5.4 Advisory Committee	**4**
	Total score for Processes	**15**
	%	**67.9%**
Impacts	3.10 Extent of local benefits	**2**
Impacts	3.11 Local recognition of protected area benefits	**3**
	Total score for Impacts	**5**
	%	**62.5%**

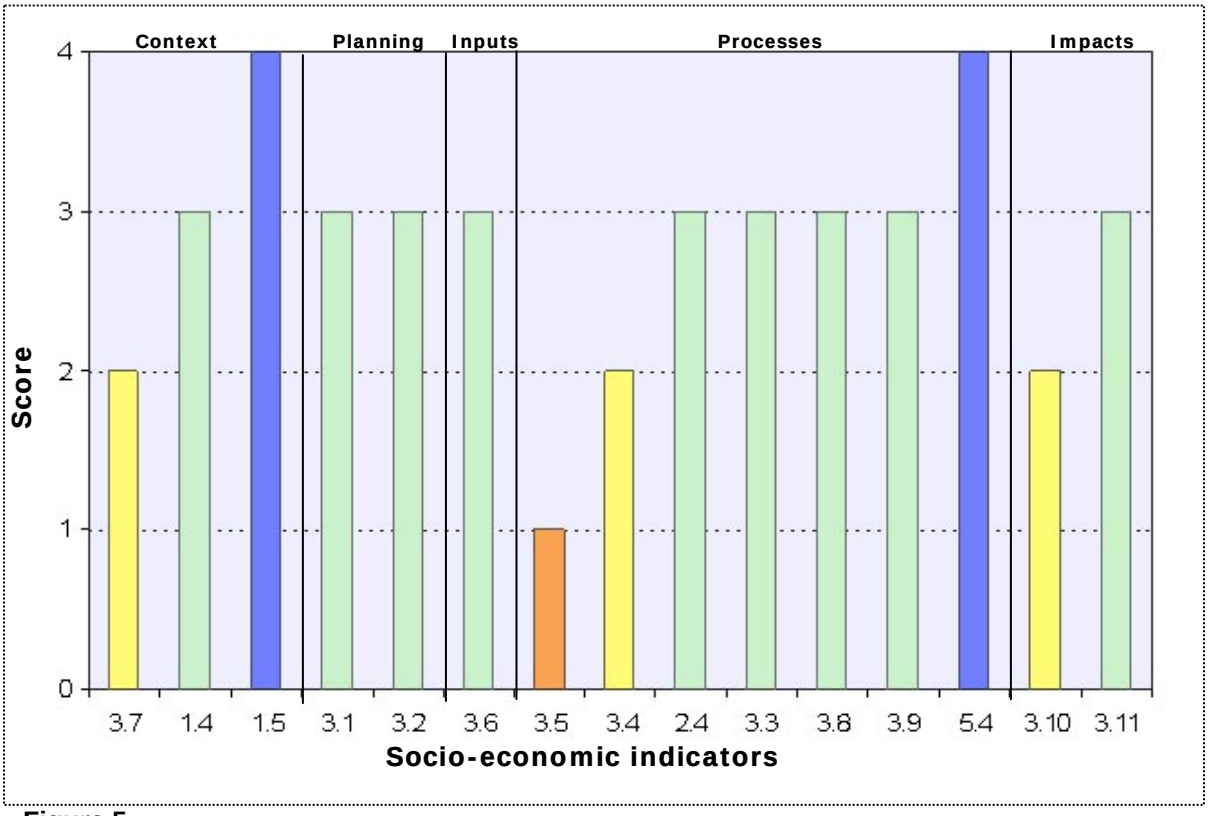


Figure 5:
Range of scores for Socio-economic indicators of Cockscomb Basin Wildlife Sanctuary

Table 7: Socio-Economic Indicators	
Score	**Results**
1	Only one indicator scored 1 (3.5 – Local actors leading protected area management) – Cockscomb Basin Wildlife Sanctuary is managed under a co-management agreement with Belize Audubon Society, which has recently completed a co-management project attempting to increase the level of local participation of community leaders in management. Following analysis of the results, it has been shown that currently, the social capacity of the local communities is not sufficiently developed for taking on a fully participatory role in management.
2	The three indicators scoring 2 are associated with local communities – the first (3.7) suggesting a need for capacity building to strengthen local social capacity, and the second (3.4), reflecting the level of local participation in management. The third (3.10) concerns the level of economic benefit being received directly by the communities
3	Nine indicators scored three, many of these reflecting strategies for dissemination of information to local communities through communication and education (3.1, 3.2, 3.3).
4	Two indicators scored 4. The first (1.5) reflects the comprehensive data Cockscomb has on resource use and occupancy within the area. The second (5.4) indicates the presence of well structured Local Advisory Committees in each of the stakeholder communities. For both of these, however, this does not necessarily reflect success - the presence of information on illegal resource use doesn't indicate success in enforcement, and well structured LACs are not necessarily active.
Average Overall Score	**2.80**

Table 8: Socio-Economic Evaluation Elements		
Evaluation Element	%	**Comment**
Context	**75%**	BAS has an extensive understanding of the socio-economic context in which it operates
Planning	**75%**	Well developed strategies are in place to ensure local community awareness and actively increase participation and socio-economic benefits
Inputs	**75%**	Through BAS, CBWS has an active volunteer programme, though volunteers are seldom from the local communities
Processes	**67.9%**	BAS is very aware of the importance of community participation and has developed a Local Advisory Committee in each of the identified stakeholder communities…however at present, Processes – the implementation of strategies – falls short of the Planning of those strategies
Impacts	**62.5%**	Local recognition of the benefits of the protected area is moderate, whilst the extent of local benefits scores only 2. The recognition stems primarily from the extensive and continuous work BAS has completed in stakeholder communities (particularly Maya Centre and Maya Mopan) throughout its stewardship of the protected area, and its importance as a tourism venue within the protected areas system of Belize.
Overall	**71.1%**	

Cockscomb Basin Wildlife Sanctuary has a strategy for increasing local stakeholder participation in management, with the establishment of Local Advisory Committees in adjacent communities, and ensuring they have the ability to gain socio-economic benefit from the protected area. This is reflected in recognition of the perceived and actual benefits of the protected area.

It should be borne in mind, however, that this may not necessarily reflect success - the presence of information on illegal resource use doesn't indicate success in enforcement, and well structured LACs are not necessarily active.

With an overall percentage of 71.1% (Table 8), Cockscomb Basin Wildlife Sanctuary can be said to have a **MODERATE** level of management effectiveness in the area of socio-economic issues.

5.2 Assessment of administration indicators of management effectiveness

Table 9: Administration Indicators		
Context	1.6 Inventory: Tenures and Claims	3
Context	7.6 Area accessibility	3
Context	1.8 Systematic threat assessment	4
Context	2.1 Legal status	4
Context	2.2 Boundary survey and demarcation	4
	Total score for Context	**18**
	%	**90%**
Planning	2.5 Guidelines and best management practices exist	3
Planning	4.1 Management plan	3
Planning	4.2 Operational plan	3
Planning	4.4 Identification of long term management needs	4
Planning	5.1 Protected area objectives	4
	Total score for Planning	**17**
	%	**85%**
Inputs	6.4 Technical, scientific and professional staff	2
Inputs	6.5 Operational staff	2
Inputs	7.1 Funding adequate for management	2
Inputs	7.5 Equipment adequate for management	2
Inputs	7.4 Infrastructure adequate for management	2
Inputs	7.7 Signage adequate for management	2
Inputs	6.1 Qualified site manager	3
Inputs	6.2 Site manager availability (part time / full time)	4
Inputs	6.3 Administrative staff	4
	Total score for Inputs	**23**
	%	**64%**
Processes	7.3 Financial management	1
Processes	2.9 Visitor and tourism monitoring programme	2
Processes	7.2 Revenue generation	2
Processes	7.8 Maintenance adequate for management	2
Processes	2.7 Enforcement activities	3
Processes	4.5 Programme monitoring and evaluation	3
Processes	2.6 Surveillance activities	3
Processes	6.7 Training and development activities	3
Processes	2.8 Visitor and tourism management activities	3
Processes	4.3 Regulation and implementation of management zones	3
Processes	5.2 Co-management agreements	3
Processes	2.3 Legal registration, permit and approval process	4
Processes	5.3 Administrative autonomy	4
Processes	5.5 Board of Directors	4
Processes	5.6 Interorganizational mechanisms	4
	Total score for Processes	**44**
	%	**73%**
Results	6.6 Human resource assessment	4
	Total score for Inputs	**4**
	%	**100%**

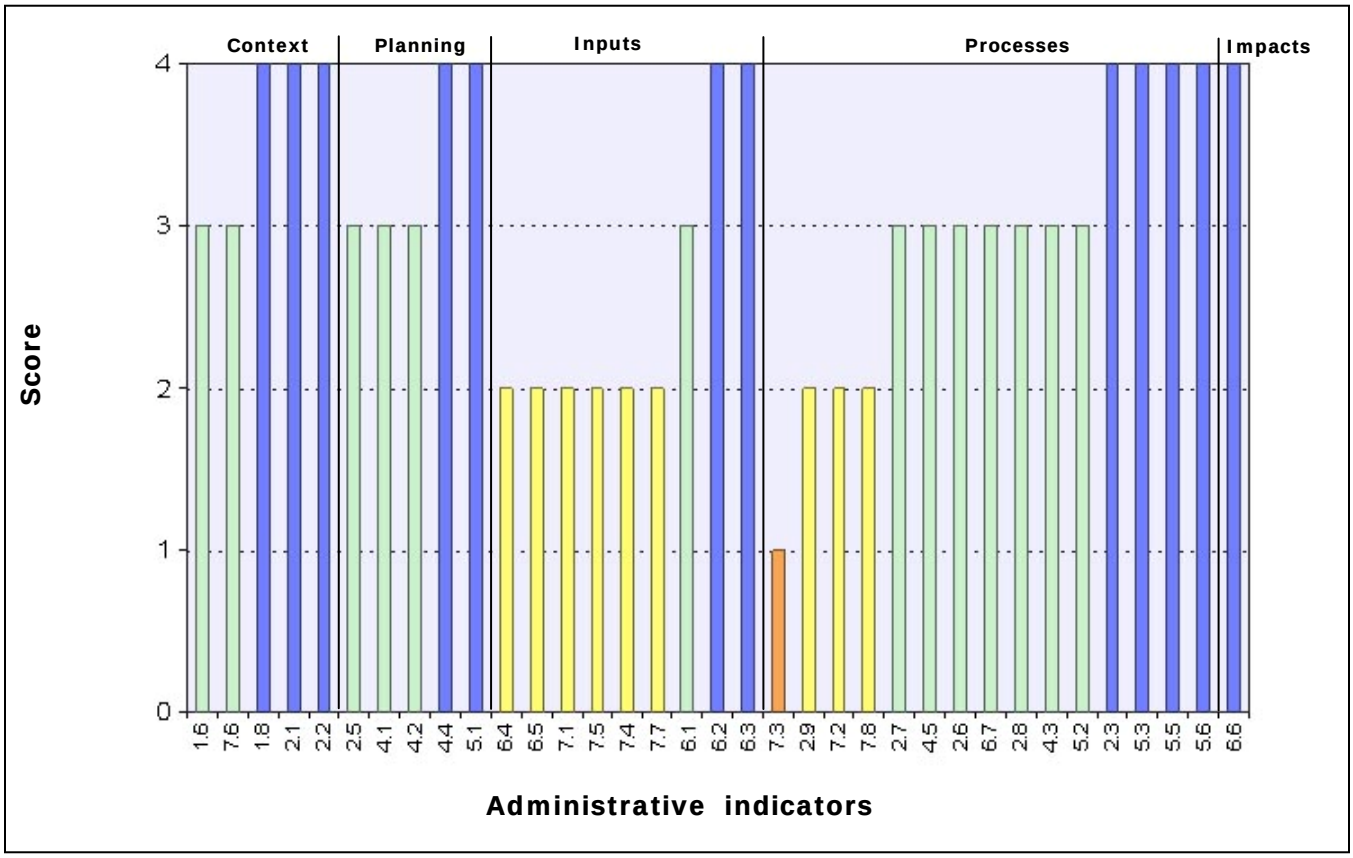


Figure 6:
Range of scores for Administrative indicators of Cockscomb Basin Wildlife Sanctuary

Table 10: Administrative Indicators	
Score	**Results**
1	One indicator had the lowest score of 1 – reflecting a need for stronger financial management (7.3)
2	Nine indicators scored two, the majority of these being indicators of financial and capital management
3	Thirteen indicators scored three, reflecting the well developed organizational structure of Belize Audubon Society, with management and operational planning in place for the protected area (4.1, 4.2, 4.3), programme evaluation and monitoring (4.5), surveillance and enforcement in place (2.6, 2.7), and a well established visitor management programme (2.8)
4	Twelve indicators scored four, reflecting the secure tenureship of the protected area within the Forest Department framework (2.1, 2.2). Indicators also reflect the well developed organizational structure of Belize Audubon Society (5.5, 5.6, 6.2, 6.3, 6.6).
Average Overall Score	**3.03**

Table 11: Administration Evaluation Elements		
Evaluation Element	%	**Comment**
Context	**90%**	The high percentages in each of the evaluation elements reflect the strength of Belize Audubon Society as a protected area management organisation, with a well developed administrative structure. The main limitation identified for effective administration is that of funding, reflected by the lower score given to the Inputs category
Planning	**85%**	
Inputs	**64%**	
Processes	**73%**	
Impacts	**100%**	
	Overall	**82.4%**

Cockscomb Basin Wildlife Sanctuary is managed by Belize Audubon Society, and therefore benefits from the administrative advantages of management by a large, well established organization. Within this well-developed organizational structure, staff roles are clearly defined, with specific administrative, operational and technical staff. With a comprehensive administrative baseline from which to operate, Cockscomb also benefits from the recent completion of a management plan that incorporates conservation planning and the development of specific strategies to meet identified threats.

The protected area is, however, hampered by financial constraints, reflected by the low percentage given for Inputs (mostly finance linked), and the low score for Financial Management

With an overall percentage of 82.4% (Table 11), Cockscomb Basin Wildlife Sanctuary can be said to have a **SATISFACTORY** level of management effectiveness in the area of administration.

5.3 Assessment of biophysical indicators of management effectiveness

Table 12: Biophysical Indicators		
Context	1.3 Inventory of cultural and archaeological resources	**3**
Context	1.9 Traditional knowledge	**3**
Context	1.1 Inventory of physical environment	**4**
Context	1.2 Inventory of biotic environment	**4**
	Total Score for Context	**14**
	%	**88%**
Planning	1.7 Conservation targets identified	**4**
	Total score for Planning	**4**
	%	**100%**
Inputs	1.10 Information management system	**2**
	Total score for Inputs	**2**
	%	**50%**
Processes	1.12 Scientific research activities	**3**
Processes	1.11 Environmental monitoring activities	**3**
	Total score for Processes	**6**
	%	**75%**

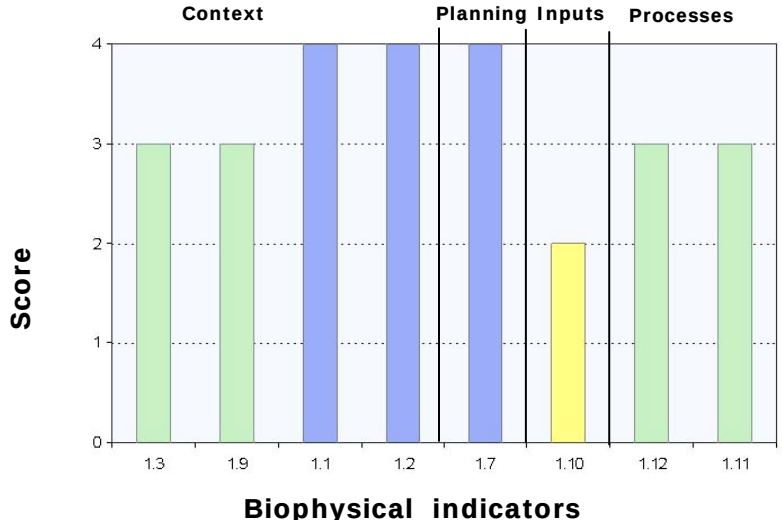


Figure 7: Range of scores for Biophysical indicators of Cockscomb Basin Wildlife Sanctuary

Table 13: Biophysical Indicators	
Score	**Results**
1	No indicators scored one – the protected area generally has a working knowledge of the biophysical environment in which it is operating
2	One biophysical indicator scored two (1.10 - Information management), suggesting a need for further standardisation of data collection, storage and dissemination
3	Four indicators scored three – inventories of culture and archaeological resources (1.3), and traditional knowledge (1.9) have not been updated, but do exist (as does the knowledge that these resources are being eroded by looting activities, and lost to modernization). Limited scientific research activities are taking place, and being used to fill gaps in biodiversity knowledge
4	Three indicators scored 4, indicating an extensive knowledge of the biophysical environment, with conservation targets identified in conservation planning as part of the management plan
Average Overall Score	**3.25**

Table 14: Biophysical Evaluation Elements		
Evaluation Element	%	**Comment**
Context	**88%**	The biophysical environment can be considered satisfactory for management, though some gaps still need to be filled – developing greater scientific research, and implementing environmental monitoring strategies, both of which are addressed within the new management plan
Planning	**100%**	
Inputs	**50%**	
Processes	**75%**	
Overall	**78.3%**	

With an overall percentage of 78.3% (Table 14), Cockscomb Basin Wildlife Sanctuary can be said to have a **SATISFACTORY** level of management effectiveness in the area of biophysical information, conservation planning, and information management.

5.4. Overall Summary

Table 15: Evaluation Elements Summarized	
	% effective
Socio Economic Indicators	**71.1%**
Administrative Indicators	**82.4%**
Biophysical Indicators	**78.3%**
Management Effectiveness Overall Average	**77.3%**

Overall management effectiveness is considered to be **SATISFACTORY** (Table 15). The biophysical and administrative background is strong, though with some room for improvement, particularly in the socio-economic context.

6. Conclusions and Recommendations

The following general conclusions have been made based on the assessment results:

1. Resource Information

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the areas of information on the physical environment, resource use, in the identification of conservation targets, and in the implementation of a systematic threat analysis. It needs strengthening in the areas of information on biodiversity, cultural and archaeological resources, environmental monitoring, in the implementation or research activities and in data management. This mix of areas of strengths and weaknesses reflects the presence of a recent management plan for Cockscomb Basin Wildlife Sanctuary.

2. Resource Administration, Management and Protection

Management strengths of Cockscomb Basin Wildlife Sanctuary in this section are considered to be in its legal status, in the permitting process and in having best practices guidelines. There is scope to strengthen its visitor and tourism management activities, and a need to strengthen surveillance, enforcement, visitor monitoring, and boundary demarcation.

3. Participation, Education and Socio-Economic Benefit

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the area of public participation. Whilst several areas within public participation were considered present but insufficient for management, the remote nature of the protected area and its distance from any communities indicates that in reality they probably are sufficient for management. Nonetheless, there is scope to strengthen public participation.

4. Management Planning

Management of Cockscomb Basin Wildlife Sanctuary is considered to be relatively strong in management planning, in having a recently completed management plan for VPNM and for Cockscomb Basin Wildlife Sanctuary. The areas of management planning, operational planning, implementation of zoning regulations and programme monitoring are areas that should be strengthened further – necessitating more extensive baseline information on the biodiversity within this quite inaccessible protected area.

5. Governance

Management of Cockscomb Basin Wildlife Sanctuary is considered to be strong in the area of governance – a reflection of the long-established organization structure and capacity of the Belize Audubon Society.

6. Human Resources

Management of Cockscomb Basin Wildlife Sanctuary is considered to be generally strong in areas of human resources, except for the availability of operational staff and of technical, scientific and professional staff – areas that need strengthening. There is also scope for the strengthening of site manager qualifications, and in enhancing training and capacity-building for staff.

7. Financial and Capital Management

Management of Cockscomb Basin Wildlife Sanctuary is considered to be weak in the area of financial and capital management. Revenue generation, financial management, availability of equipment and infrastructure, signage and maintenance of equipment and infrastructure are all considered in need of strengthening.

7. References

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Management Effectiveness Assessment Summary: Cockscomb Basin Wildlife Sanctuary				
1. Resource Information				
Indicator	**Criteria**	**Score**	**Comments**	**Next Steps - Recommendations**
1.1 Inventories Physical Environment	Essential *required inventories* on the physical environment have been completed and are fully *sufficient* for management	4	CBWS Management plan summarizes soils, hydrology, geology. Topographic sheets available for the entire country i.e. covering this protected area. Information exists as GIS coverages. Info on the protected area exists as subsets of national data sets. Such info includes soils, geology, elevation contours. Soil data may be most reliable as it was derived from field work, and aerial and satellite imagery.	Watershed information needs to be developed. Water bodies and rivers need to be verified and mapped
1.2 Inventories Biotic Environment	Essential *required inventories* on the biotic environment have been completed have been completed and are fully *sufficient* for management	4	Same as above regarding GIS data. GIS vegetation data may be on too broad a scale to be representative. Species lists exist for the area and info on flora and fauna summarized in CBWS management plan. Much information is species specific e.g. howler monkeys. Much information available on flagship species (jaguar) from past and present research. Some mammal (including bats) surveys have been conducted dating back to 1989 and 1999. A more comprehensive ecological survey dates back to 1987 (Kamstra), however, no such effort has recently been undertaken to update results. Gaps in information on other taxa (e.g. fish), and other species of importance including tapir (endangered), crocodile, macaw, curassow.	Kamstra's original environmental assessment should be updated with extensive groundwork, and targeting of research to fill gaps in information Ground truthing of ecosystem mapping Gaps in knowledge need to be filled on species of conservation importance Implementation of biotic specific activities from management plan

1.3 Inventories Cultural and Archaeological Resources	Most *required inventories* on the cultural and archaeological resources have been completed. However, this information has not yet been comprehensively documented and mapped, and is not *sufficient* in key areas for management	3	Archaeological expedition has mapped six large sites and documented the existence of many smaller sites, but these may have not been mapped.	Continued collection of data on archaeological sites during patrols. Mapping of information Liaise with Institute of Archaeology re. information sharing
1.4 Inventories Social, Cultural and Economic Resources	Most *required inventories* on the social, cultural and economic resources have been completed. However, this information has not yet been comprehensively documented and mapped, and is not *sufficient* in key areas for management	3	Socio-economic info provided by CBWS Management plan and Leikam evaluation.	Socio-economic information needs to be kept current – update once every five years, before updating management plan
1.5 Inventories Resource Use and Occupancy	Essential *required inventories* on current resource uses and occupancy have been completed and are fully *sufficient* for management	4	CBWS management plan records traditional use of sanctuary area i.e. farming, logging. Current Darwin project intends to map and provide further biological detail of historical farm areas. Some mechanisms in place to record resource use i.e. patrol reports of hunting, logging etc.	Ensure illegal hunting activity GPS points are mapped to give knowledge of extent and location of activity
1.6 Inventory Tenures and Claims	Most *required inventories* on current tenures and claims have been completed. However, this information has not yet been comprehensively documented and mapped, and is not *sufficient* in key areas for management	3	Tenure information should be available from the Lands Department and LIC. However, BAS does not have an updated, comprehensive tenure coverage of lands surrounding the protected area.	Develop comprehensive tenure information on lands adjacent to CBWS – location, size, ownership and use.
1.7 Site Assessment Conservation Targets	Conservation targets have been identified for the site based on appropriate methodology and consultation and are fully *sufficient* for planning and management	4	CBWS Management plan identifies targets based on adaptation of WCS and TNC conservation planning methodologies, and clearly outlines activities for implementation.	Implement strategies
1.8 Site Assessment Systematic Threat Assessment	A systematic threat assessment has been conducted within the past five years based on appropriate methodology and consultation. This assessment is fully *sufficient* for management	4	A systematic threat analysis was done as part of the conservation planning for the CBWS Management Plan.	Implement strategies

1.9 Traditional Knowledge	Traditional knowledge processes are being implemented. However these processes are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Traditional knowledge incorporated in employment of indigenous persons as wardens. Some tour guides are also sources of traditional knowledge. Traditional knowledge also incorporated through participation of communities in LAC.	Develop strategies for incorporating tradition knowledge into management activities more effectively
1.10. Information Systems	An information system exists, but is poorly designed, unordered, incomplete and/or is not being used	2	Much information exists on the protected area (Management plans, research data and reports, etc). However this is not managed in a way that collates all the information and makes it easily accessible for management purposes. It is hoped that this will be addressed by participation in BERDS. The use of GIS as a data analysis tool also needs to be integrated into the information system. Also need to look at 'repatriation' of information especially data and results of research carried out within the protected area.	Reorganise information system per protected area, incorporating GIS information Participation in BERDS Repatriate data from past research within CBWS
1.11 Environmental Monitoring Activities	Environmental monitoring activities are being implemented. However, these activities are narrow in scope relative to need, under funded, and/or not being evaluated, and are not *sufficient* for management	3	Management plan outlines activities to be carried out to monitor environmental and ecological health but these have yet to be implemented. Why: Lack of funds and human resources	Locate funding for monitoring activities, and implement Further training for staff in implementation
1.12 Scientific Research Activities	Functional scientific research activities are being implemented. However, these activities are narrow in scope relative to need, under funded, and/or not being evaluated, and are *not sufficient* for management.	3	Long term research on flagship species (jaguar) has and is presently conducted and used to support major goal of sanctuary. CBWS Mgt plan outlines other priority needs/activities for research to support management. Some avenues for collaboration in implementing these are being pursued.	Liaise with external researchers to tackle highlighted areas of priority research
2. Resource Administration, Management and Protection: How well are we protecting our protected area?				
2.1 Legal Status Legal Status	The site has been designated by strong legislation or equivalent permanent legal recognition or international recognition (eg. Ramsar, UNESCO)	4	Legally recognized under the National Park Systems Act.	

2.2 Legal Status Boundary Survey and Demarcation	The boundaries have been legally defined in the documents designating or establishing the site, and at least 75% of the planned surveys and demarcation has been completed	4		
2.3 Legal Status Registration, Permit and Approval Process	Necessary registration, permit or approval processes are being implemented. These processes are adequate in scale relative to demand, adequately funded, regularly evaluated, and *sufficient* for management	4	Research permit application procedure in place.	
2.4 Legal Status Tenure Claim Conflict Resolution Activities	Conflict resolution activities are being implemented. However these activities are small in scale relative to need, and/or under funded and/or not being evaluated, and therefore are not *sufficient* for management	3	Tenure claims and conflicts are addressed as they arise. These are addressed through collaboration with relevant government agencies e.g. FD and the LACs.	Ensure all potential areas of conflict are dealt with pro-actively if possible
2.5 Management Status Guidelines and Best Management Practices	Guidelines and/or best management practices have been completed for most management activities, but are not being fully implemented. These are not *sufficient* for management without greater implementation.	3	CBWS Management plan completed and some activities are already being implemented e.g. boundary demarcation. However full implementation may require more financial resources than is currently available.	
2.6 Protection Surveillance Activities	Surveillance activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and are not *sufficient* for management	3	Wardens conduct patrols, however these are not regularly implemented, and human resources not enough to cover all areas. The greatest impediments, however, are finances and safety concerns.	Should be a higher priority than at present. Greater support is needed from Forest Department Continue liaison with BDF / Police
2.7 Protection: Enforcement Activities	Enforcement activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Wardens do enforce sanctuary regulations (no hunting, no fishing) when they can. Again safety is an issue for wardens in enforcing park regulations.	Should be a higher priority than at present. Greater support is needed from Forest Department Continue liaison with BDF / Police

2.8 Visitor Management Visitor and Tourism Management Activities	Visitor and tourism management activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Much of the time and efforts of wardens are expended on tourism management. Nevertheless, increasing visitation may be putting a strain on the available human resources, and may interfere with other sanctuary activities e.g. surveillance/patrolling. Standard procedures need to be developed for hosting visitors.	Locate sufficient funds to fulfill staffing requirements
2.9 Visitor Management Visitor and Tourism Monitoring Activities	Visitor and tourism monitoring strategy exists, but is not being implemented	2	Basic visitation statistics are available e.g from ticket sales however these need to be fed into an integrated monitoring plan. CBWS Mgt plan outlines visitor monitoring strategy.	Implement visitor monitoring programme Training for staff in implementation
3. Participation, Education and Socio-Economic Benefits: Is there stakeholder participation and benefit?				
3.1 Stakeholder Involvement Communication Activities	Communication activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Communication with communities takes place through LAC and BAS liaison officer. However there is room for improvement outlined in the CBWS Management plan.	Ensure continued communication activities
3.2 Stakeholder Involvement Educational Activities	Education activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Active Education Program exists, however, funding is a constraint.	Give greater priority to Education activities
3.3 Stakeholder Involvement Dissemination of Knowledge and Information	Some local stakeholders and communities have been provided with information about the protected area and its ecological and cultural resources and related threats, but most communities and stakeholders have only a partial understanding of these resources and related threats	3	Cockscomb has concentrated on increasing community awareness of activities over recent years through the co-management programme, and has a mechanism for dissemination of information through the local advisory committees in each community. Doesn't always work	Ensure continued community awareness activities in all identified stakeholder communities
3.4 Stakeholder Participation Level of Participation in Management	Local stakeholders and communities are consulted about planning issues	2	Well defined participation structure of local advisory committees and regional advisory committee. Participation is primarily through consultation, as communities lack the capacity for participation directly into management Locals are hired for work	Increase the active participation of LAC members through planned activities

3.5 Stakeholder Participation Local Actors Leading Protected Area Management	Local actors are informed and consulted about decisions taken by protected area management	1	Well defined participation structure of local advisory committees and regional advisory committee. Participation is primarily through consultation, as communities lack the capacity for participation directly into management	This is not currently an objective of BAS, and should probably not be used as an indicator in future assessments. Stakeholder participation is being developed at the advisory level.
3.6 Stakeholder Participation Volunteer Activities	Volunteer activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3	Volunteer activities carried out as they arise. Usually they are matched with an identified need of the protected area. However, proactive recruitment of volunteers is not a priority, and funding to subsidize volunteer activities in not available.	
3.7 Stakeholder Participation Strength of Social Capital	Few local stakeholders have a limited functional capacity that would enable them to participate effectively in the management of the protected area. They can provide input, but no assume any management role	2	Young communities with limited leadership	Should be removed as an indicator
3.8 Stakeholder Participation Capacity Building	Capacity building activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3		
3.9 Stakeholder Participation Socio-Economic Benefits Programme	Socio-economic benefits programmes are being implemented. However, these programmes are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3		
3.10 Benefits Extent of Local Economic Benefits	Local communities and stakeholders receive a few direct economic benefits from the protected area	2	Some people benefit from jobs as wardens, laundry service, taxi and tour guide services for tourists	Investigate further ways to extend economic benefits to more local people
3.11 Benefits Recognition of Protected Area Benefits	Most local community members or stakeholders (between 50% and 75%) recognize the goods and services the protected area provides them	3		

4. Management Planning: Are management processes in place?				
4.1 Management Planning Management Plan Implementation	An up-to-date management plan has been completed with full stakeholder participation. However, only some of its strategies and programmes are being implemented	3	A comprehensive Management plan has been developed. However, only some of the strategies are currently being implemented as a result of financial constraints.	
4.2 Management Planning Operational Plan Implementation	An operational plan is being implemented in agreement with some of the activities established in the management plan	3	Operational Plans developed as part of Management plan.	
4.3 Management Planning Regulations and Zoning	Well designed regulations and zoning have been established. However, these are not being implemented, and/or are thus not *sufficient* for management	3	Zones designated within the management plan will be marked as part of the demarcation of boundary activities(to be completed by Dec. 2006). Researchers entering CBWS will be encouraged to gather information in relation to these zone.	
4.4 Management Planning Long-term Management Needs Identified	Plans provide an up-to-date and comprehensive identification of management resource needs. These are fully *sufficient* to guide management	4	CBWS Mgt plan serves as a good basis for identifying resources needed to achieve management objectives.	
4.5 Management Planning Programme Monitoring and Evaluation	Programme monitoring and evaluation activities are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not itself being evaluated	3	Operational plans are evaluated at the end of each year, with a monitoring programme built in to the management plan	
5. Governance: Is there effective governance in place?				
5.1 Governance Protected Area Objectives	Existing objectives are adequate in scope, up-to-date, and *sufficient* for planning and management	4	Site objectives clearly defined in CBWS Mgt plan.	
5.2 Governance Co-management Arrangements	Mandates are established in an up-to-date and adequate formal agreement	3	BAS co-management agreement revised in 2004, however, analysis is needed to evaluate how the current management plan impacts the agreement.	

5.3 Governance Administrative Autonomy	Protected area management has some authority over its administrative and technical affairs, but must sometimes consult with the central NGO office or line ministry (agency authority) concerning its administration decisions	4	BAS management within CBWS has been receiving international and national recognition and respect from authority as one of the best management site of Belize.	
5.4 Operating Procedures Advisory Committee	Advisory committee operating procedures do not exist	4	Both local and regional advisory committees exist	
5.5 Operating Procedures Board	Board operating procedures exist for the governing body of the protected area organization. These procedures are up-to-date and adequate for board management	4		
5.6 Operating Procedures Interorganizational Mechanism	The protected area management maintains regular communication with all most important related organisations through established mechanism to exchange information, co-operate on joint projects, and share in planning and/or decision making	4	Communication need to be improve with communities to ensure that expectations of communities are clear to both parties(BAS and Communities)	
6. Human Resources: Are there sufficient human resources in place?				
6.1 Human Resources Site Manager Preparation	The site manager has at least a high school diploma and between 6 and 9 years of combined relevant post-secondary education and/or experience directly related to his or her management responsibilities her management responsibilities	3	Present manager has and associate degree from Agriculture and Natural Resources Institute(central farm, Now UB). Train teacher (pass his 1st class teachers exam) and taught for over 10 years.	
6.2 Human Resources Site Manager Availability	The site manager is available and dedicated to management of the protected area for up 75% to 100% of the time	4	Presently not living on site but has 24 hours communication.	
6.3 Human Resources Administrative Staff Availability	Between 75% and 100% of the necessary administrative workers are available for basic administration of the area	4	Have hired an assistant park manager with an associate in business background (marketing)	

6.4 Human Resources Technical, Scientific and Professional Staff Availability	Between 25% and 50% of the necessary technical, scientific, and professional workers are available, but many technical, scientific, and professional functions as defined in the management plan cannot be carried out because of small staff size	2	Research activities are base on funding and interest on international research institutions. Discussion are being held with UB	Continue liaison with international researchers and encourage use of CBWS as a research site, especially for priority areas. Liaise and collaborate with other organizations to increase access to other technical and professional workers
6.5 Human Resources Operations Staff Availability	Between 25% and 50% of the necessary operations workers are available to carry out all assigned operational work as defined by the management plan, and most key operational functions can be carried out	2	Presently the park manager works out the office in Belize City. Best scenario is to have him on site.	Increase number of operational staff available on site Park Manager should be located on-site
6.6 Human Resources Human Resource Surveys	Human resource surveys have been conducted. These surveys are *sufficient* for management	4		
6.7 Human Resources Training and Development	Training and development strategies are being implemented. However, these activities are small in scale relative to need, and/or under funded, and/or not being evaluated, and therefore are not *sufficient* for management	3		
7. Financial and Capital Management: Are there sufficient funds and infrastructure in place?				
7.1 Funding and Infrastructure Funding Adequacy	The protected area has funding that covers less than half (<50%) of its planned capital and operating costs	2		Investigate alternative methods of sustainability Develop and implement long term business plan
7.2 Funding and Infrastructure Revenue Generation	No long term funding plan, but funding mechanisms are in operation and some minimal funding is being raised	2		Develop and implement long term business plan Increase marketing of CBWS as a tourism venue
7.3 Funding and Infrastructure Financial Management	No standard operating procedures have been established for financial management	1		Establish financial operating procedures
7.4 Funding and Infrastructure Infrastructure Adequacy	Between 25% and 50% of the planned infrastructure built or under construction	2	Presently the project “toward sustainability of BAS managed protected areas” is being implemented. This is the start of infrastructure of the site.(Water system, road, bathroom, sheds, etc)	Complete implementation of current infrastructure project

7.5 Finance and Infrastructure Equipment Adequacy	Between 25% and 50% of the required equipment is available and appropriate for its intended purpose	2	Existing infrastructure need improvement and maintenance	Complete implementation of current infrastructure project
7.6 Finance and infrastructure Internal Access Adequacy	Staff have access to between 50% and 75% of the area they need to visit in order to carry out their responsibilities	3		Be cautious of increasing access to hunters and xateros - this indicator should probably be removed from the assessment
7.7 Finance and infrastructure Signage Adequacy	Between 25% and 50% of the required signage exists	2	Need for safety signs at different site(tubing, VPNM, Falls, trails)	Install safety signs
7.8 Finance and infrastructure Maintenance Adequacy	Maintenance is provided for between 25% and 50% of the infrastructure, equipment, and signs in the protected area	2		Increase maintenance adequacy