

# **INTRODUCTION**

## **Management statement**

This management plan is designed for a five year period, with re-evaluation and updating on a 2.5 year cycle. Annual operations plans will be derived from the management plan.

This management plan is a tool, designed to be a guide in attaining specified objectives for Blue Hole National Park (BHNP).

## **The Setting**

Belize, bounded on the north by Mexico, on the west and south by Guatemala, and on the east by the Caribbean Sea, has a land area of 22,963 square kilometers (8866 miles), a population of about 200,000, and an annual per capita income of about US\$1500.

Two environmental features of Belize are significant: 1) a range of forest ecosystem covers an estimated 60 percent of the country, providing habitat for many species endangered or extinct in the rest of Central America, and 2) there is a magnificent coastal and marine ecosystem whose core is the Belize Barrier Reef, a potential world heritage site.

## **The Park**

BHNP is a 233 hectare (574.5 acre) protected area of uneven topography located roughly in the center of Belize. It is 19 kilometers (12 miles) southeast of the capital city, Belmopan, in the northeast quadrant of the Cayo District. The Government of Belize (GOB) acquired part of the area in the early 1960's and the remainder in the 1970's. BHNP was declared a National Park in December, 1986.

Two primary features of interest at BHNP are 1) Blue Hole, a collapsed karst sinkhole about 30 meters (100 feet) deep and 90 meters (300 feet) in diameter; a pool in the base is about 8 meters (25 feet) deep and, when clear, of a sapphire color, and 2) St. Herman's Cave. The cave entrance (60 meters or 200 feet wide) is in the base of the large sink hole, and the main passage in places exceed 15 meters (50 feet) in height and 30 meters (100 feet) in width. The water in the cave flows perennially, though water levels may vary considerably according to the season and rainfall. The distance from mouth to mouth in the cave is, depending upon the route taken, approximately 0.76 kilometers (2500 feet). The cave also has archeological significance.

The Blue Hole is at the north east corner of the BHNP, while St. Herman's cave is in the southwest. In between is an interesting karst landscape of irregular terrain, small sinkholes, caves, cliffs, and shattered surface rock. This landscape has a cover of secondary tropical semi-deciduous forest in various stages of succession. There is evidence of past clearing, as well as logging and other extractive activities. There is an apparently healthy wildlife population under light hunting pressure.

# **NATIONAL CONTEXT**

## **Administrative**

The national park system Act (NPSA) of 1981 is the enabling legislation in Belize for the establishment of national parks, natural monuments, wild life sanctuaries, and nature reserves. The act assigns administrative responsibility to the Forestry Department, Ministry of Natural Resources.

Due to a lack of funding and personnel at the Forestry Department, responsibility for the management of certain protected areas has been temporarily entrusted to the Belize Audubon Society (BAS).

BAS is a Belizean non-governmental organization (NGO) whose objectives include protected areas management, environmental education, and conservation promotion. In its Mission Statement (1991), BAS states that it is "... dedicated to the promotion of the sustainable use and preservation of our natural resources in order to maintain a balance between people and the environment."

BAS manages seven protected areas. These are: 1) Guanacaste National Park, 2) Blue Hole National Park, 3) Crooked Tree Wildlife Sanctuary, 4) Cockscomb Basin Wildlife Sanctuary, 5) Society Hall Nature Reserve, 6) Bladen Nature Reserve, and 7) Half Moon Caye Natural Monument. Due to financial constraints, a management presence is maintained only at the first four areas listed above. BAS also assists in the management of the Community Baboon Sanctuary.

According to the Belize Tropical Forestry Action Plan (ODA, 1989), the arrangement between the Government of Belize (GOB) and BAS is "... not entirely satisfactory. The terms of the agreements do not guarantee BAS enough authority to feel secure in making long term plans. Clear lines of authority are lacking."

The newly formed Conservation Division of the Forestry Department is slated to eventually take over management of protected areas from BAS. This process may take five years or more.

BAS feels that the system of protected areas could benefit from some amendments to, or revision of, the NPSA. At present, areas may be de-reserved at any time by ministerial fiat. BAS recommends that the NPSA be changed so that the agreement of the House of Representatives be obtained before protected areas could be de-reserved.

BAS also recommends that 1) a section on fees and concessions be added to the NPSA that stipulates that revenues generated at the protected areas be reserved for utilization at the protected areas, 2) more designation should be added to the NPSA, e.g., forest reserves, and, 3) provisions be made in the NPSA for private and community reserves.

## **Financial**

BAS is almost entirely dependent on international donor organizations (primarily United States based) for its funding. This creates an atmosphere of uncertainty for management and planning. In addition, donor funds are not limitless. BAS must begin to diversify income sources and generate revenues for self support. At present, GOB provides no Belize-generated funds for management and development of BAS.

A proposed Revenue Generation Strategy for Protected Areas has been developed by American consultants for GOB. This Strategy envisions, among other items, creation of a Protected Areas Conservation Trust to collect and disperse funds through a complicated formula. Presently, it is not known 1) when this Strategy will be implemented, 2) how much of the proposed user fees collected will be reinvested in the protected areas, and, 3) how much of the revenues generated will be reinvested at the site collected.

In the meantime, BAS must seek financial solutions other than requests from international donors. In June, 1992, a proposal for protected areas admission fees was submitted by BAS to the Ministry of Natural Resources. The proposal is currently awaiting approval.

GOB had made ecotourism a cornerstone of its economic development plans. The protected areas managed by BAS, such as Blue Hole National Park plays a pivotal role as hubs of ecotourist visitation.

## **REGIONAL CONTEXT**

Blue Hole National Park is located about 19 kilometers (12 miles) southeast of Belmopan, Belize's administrative capital. Belmopan is also 80 kilometers (50 miles) west of Belize City, 48 kilometers (30 miles) east of Xunantunich archeological site, and about 148 kilometers (92 miles) east of Tikal National Park in Guatemala. Belize City is about 20 air minutes from San Pedro, Ambergris Caye, Belize's major tourism center.

Belize City is home to one in three Belizeans and is the commercial and cultural heart of Belize. The population of Belize City is predominantly of Creole, or Afro-European descent. About twenty-two miles west of Belmopan is a population center near the Guatemalan border; it consists of a group of towns and villages around the Cayo District hub of San Ignacio. Most people in this area are of either Mestizo or Maya descent.

BHNP is located directly on the Hummingbird Highway, which originates just outside Belmopan and links it with the south of the country. Though currently undergoing improvement, the Hummingbird Highway carries a light traffic load due to 1) poor surface and, 2) lack of large population centers to the south. At Belmopan, the Hummingbird intersects the Western Highway, the primary east-west route in Belize. Belmopan is clearly the regional transportation center.

Though only 19 kilometers (12 miles) southeast of Belmopan, BHNP is difficult to reach by public transportation. Buses pass by BHNP only about four times daily in each direction (less frequently on weekends). The buses are often reluctant to stop at BHNP for northbound passengers. Most visitors thus arrive in private vehicles or tourist vans. Some hitchhike. BHNP is, in sum, difficult to reach for the Belizean citizen without access to an automobile, and for the foreign visitor on budget.

With an estimated 6000 people, Belmopan is the largest settlement in the BHNP's general vicinity. The closest significant settlement to BHNP is Armenia village, four miles north of the park on the Hummingbird Highway. Growing rapidly since 1990, Armenia has an estimated population of 400. Salvadoran and Guatemalan refugees comprise the majority of the population. Most of the residents are farmers; some of the BHNP staff also live there. Many international and Belizean non-governmental organizations are pursuing development projects in Armenia with varying degrees of vigor.

In the Caves Branch valley of the west of the BHNP boundary is an agricultural development area, owned by Caribbean Investments LTD., and currently utilized for both citrus and cattle grazing. An 800 hectare (2000 acre) expansion of citrus is reportedly being planned for this property. There is a small human settlement in the valley, occupying housing built for a failed cacao venture.

About 4.6 kilometers (3.0 miles) east of BHNP is Hummingbird Hershey LTD., a cacao and citrus development currently owned by a United States multinational, the Hershey Corporation. This venture is in the process of being sold to new owners, who have plans for a significant expansion of both citrus and cacao acreage.

Hershey presently has under cultivation about 162 hectares (400 acres) of cacao and 61 hectares (150 acres) of citrus. Proposals call for an expansion to 243 hectares (600 acres) of cacao and 284 hectares (700 acres) of citrus (Personal Communication, Richard Burn, 1992).

About thirty people live in a “company town” associated with the Hershey development. There is a school with about 150 students, many of them based from Armenia Village (to the north) and St. Margaret’s Village (to the south). A school is currently under construction in Armenia.

Across the highway from the Hershey development is Hummingbird Citrus, a citrus development associated with the citrus company of Belize (CCB). This venture is reported to have expansion plans for up to 809 hectares (2000 acres) of citrus (Personal Communication, Richard Burn, 1992).

Due east of, and contiguous with BHNP, is a small settlement officially known as Ringtail Homestead; locally it is referred to as Ringtail Village. A pilot project that was initiated ten years ago, with 405 hectares (1000 acres) of land, and cacao as its focus, Ringtail did not attract enough families to succeed. There are now only about seven families occupying the area; there is clearing for agricultural use abutting BHNP’s eastern boundary. Ringtail’s potential for future development bears watching. Possible options for Ringtail land are discussed in the Management Plan section on “ Land Uses and Trends”

Generally, the BHNP area is lightly populated; the landscape is predominantly forested hills, with agricultural activity located in the valleys accessible from the Hummingbird Highway. Tourism particularly of the nature or ecotourist variety is increasing in inland Belize. With interest in tropical forests swelling in the developed world, expanding tourist visitation can be expected at BHNP. This should provide economic opportunities for people in the communities near BHNP. The tourism infrastructure in the BHNP area is currently underdeveloped.

# **DESCRIPTION OF THE PARK**

## **Location**

88°41" W, 17°N. Nineteen kilometers (12 miles) southeast of Belmopan, 68 kilometers (42 miles) northwest of Dangriga.

## **Biogeographical Classification**

Neotropical Realm, Tropical Humid Forest Biome, Campechan Province.

## **Topography**

BHNP's hilly landscape, usually described as "rugged" rises quickly from the Caves Branch Valley. Elevations range from about 60 meters (200 feet) on the Hummingbird Highway to over 200 meters (650 feet) in the hilly interior.

## **Hydrology**

BHNP has a complex hydrological scheme due to the dissolved limestone features of its landscape. Water flows under, over, and through the BHNP. An extensive cave river system feeds and integrates with nearby Caves Branch Brook (a tributary of the Sibun River).

## **Climate and Weather**

BHNP is located in the subtropical climate belt. Average annual rainfall is estimated to be about 2000-2200 millimeters (80-85 inches). The mean monthly minimum temperature is 16°C in winter and 24°C in summer. The mean monthly maximum temperature is about 28°C in winter and 33°C in summer.

January through April or May is considered a dry period, with a shorter dry period often occurring in August. This typical pattern can be altered by either "northerns," which bring heavy rains and cools temperatures during November-February, or by hurricanes, forty-three percent of which have occurred during September. Hurricanes can cause (and have caused) serious damage to inland forest resources.

## **Geology and Soils**

It has often been said that Belizean geology is a study in limestone. The northern half of Belize which includes BHNP, rests on the Yucatan Platform, a Tectonically stable limestone shelf. The limestones of Belize range in age from 135 million to less than 2 millions years old. They have been laid down in shelf-like layers. Limestone formation is still taking place in the shallow waters of the Caribbean coast.

BHNP's principally limestone geology had formations of sinkholes (or cenotes) and caves formed by the solution of limestone.

In the upland section of BHNP, soils are shallow. In the flatter areas, there is some deposition of alluvial soil from Caves Branch Brook.

### **Ecological life zone**

Under the Holdridge Life Zone System, BHNP falls into the “Tropical moist-transition to subtropical” zone. This zone occurs south of the Western Highway, in an arc around the northern and northeastern foothills of the Maya Mountains (including BHNP). The forest of this zone, at least in the low hills of BHNP, is similar in species composition to the “Subtropical moist” forest found in Guanacaste National Park and other areas to the north. Trees in this zone, however, are usually taller, and there is more complex mix of tree species.

### **Forest Cover**

BHNP’s forest is secondary growth in various stages of succession, ranging from young growth in an abandoned cacao plantation near the northern boundary to fairly mature in the upland areas. The area’s dry season gives the forest cover a semi-deciduous quality.

There are two broad forest types in BHNP: Cohune Palm forest (“Cohune Ridge,” in Belizean usage) and Broadleaved Hardwood forest (“High Bush”).

Cohune Palm and Broadleaf Hardwood types are often contiguous or intermixed; this is true in BHNP, but the Cohune Palm forest type is the most common on the lower and flatter sites. The type is named after the most common tree in Belize, The Cohune Palm.

The forest cover of the BHNP has been altered in the past by selective logging, chicle tapping, fruit gathering and other extractive uses, possible Maya silviculture, and clearing for various types of agricultural practices.

A list of the trees common to the BHNP is found in the Appendix.

### **Fauna**

BHNP sustains a diverse resident and transient wildlife population. Three wild cats, the jaguar, ocelot, jaguarundi, have been sighted within the BHNP boundaries. Other mammals reported in BHNP include tapir, squirrels, coati (quash), opossum, white-tailed and brocket deer, kinkajou, bats, and armadillo. Reptiles reported include the iguana, green snake, blacktail snake, fer-de-lance, coral snake and boa constrictor. Over one hundred species of birds have been reported at BHNP.

### **Cultural**

Belize has a rich heritage of Maya sites and artifacts. It is estimated that a thousand years ago there may have been a million Mayas living in what is now Belize. The St. Herman’s cave complex, in addition to playing both recreational and natural history roles, represents and archeological resource.

Caves were important to the Maya as sites for homage to the gods of rain and the underworld. Many of Belize’s caves contain remnants of vessels used to collect zuhuyha, or virgin water, for use in religious ceremonies.

St. Herman’s cave still contains Maya artifacts, though many have been removed in the past. The current concrete steps into the St. Herman’s cave were constructed over steps built by the Maya during the classic period (0-900 A.D.).



Access to Belize's caves is controlled by the Department of Archeology, although visitors to BHNP may enter ST. Herman's cave without having to obtain a permit.

**Visitor Use and Analysis**

BHNP is a day-use park. Full-year visitation data are only available for 1991. During that year there were 4634 visitors – 2971 foreign visitors and 1663 Belizeans.

Visitor numbers and origin are determined by the use of a sign-in log at the BHNP warden post/reception area. Not all visitors sign the log in the first half of 1991, because, all of the staff was sometimes deployed, on maintenance duties, away from the reception area. This situation no longer applies. Visitor data should, however, be considered in light of this fact.

## Major Issues

**SECURITY:** Inadequate security for both visitors and facilities. In the two years ending September, 1992, there has been one assault of a visitor, several armed robberies of visitors, and numerous vehicle break-ins. Since September, 1992, a private security firm, contracted by the Belize Tourism Board, has provided day time security. This has helped the situation somewhat, but is not deemed completely adequate or effective.

**TRAILS:** The current trail network, laid out and constructed in the late 1980's, was shut down in September, 1992, due to physical deterioration, lack of adequate budget and personnel for maintenance, and concern for visitor safety. The current trails present an untenable maintenance burden. Sections of the trails will have to be permanently abandoned. New trails are in the process of design and construction.

**AGROCHEMICAL DRIFT AND RUN OFF:** There are large and expanding areas of citrus development in the BHNP vicinity. There is concern about adverse impacts on BHNP's flora and fauna through pesticide and fertilizer use. The impact of agrochemicals on the area's complex hydrology could also be detrimental. Recommendation: BAS, the landowners, and appropriate GOB agencies should cooperate in 1) monitoring agrochemical use and, 2) developing and implementing least-use or integrated pest control methods.

**INHOLDING:** There is an approximately 4 hectare (10 acres) at the north end of the park. It is flat and adjacent to the Blue Hole. The area is not part of the BHNP, but is under the control of Caribbean Investments Ltd. The current parking and reception area is located on this parcel, through an agreement with the Caribbean Investment Ltd. Recommendation: this parcel should be acquired as part of BHNP, either through purchase or donation.

# **MANAGEMENT CONSIDERATIONS**

## **Major Park Objectives**

1. Protect outstanding features of central Belize's karst landscape.
2. Retain in perpetuity a portion of the Maya Mountains foothills ecosystem
3. Provide recreation and education opportunities for Belizean and international visitors in a manner that is compatible with the natural and cultural environment.
4. Secure biological and social sustainability of the protected area through community development programs that benefit local people.

## **Limitations and Constraints**

### Biophysical factors:

- \* BHNP has a limited and constrained land area, bounded by the Hummingbird Highway to the north and west, agricultural development to the west, and agricultural and settlement development to the east; private land to the south prevents contiguity with the Sibun Forest Reserve.

### Socio-Economic Factors:

- \* Funding for management plan implementations is not secure under present BAS/GOB agreement.
- \* Little positive local involvement in BHNP affairs.
- \* Increasing tourism in Belize
  - \* Personnel, equipment, and transport are inadequate to assist in meeting BHNP objectives

## **Zoning**

For ease of management, BHNP has been divided into zones. A zone can be defined as an area where activities compatible with the natural resources and each other can be grouped.

There are three zones in BHNP: the Intensive Use zone, the primitive zone, and the Historical –Cultural zone. BHNP does not currently have buffer zones, but this plan does contain recommendations for them.

### **BUFFER ZONES**

A buffer zone is an area on the edge of the protected area which allows only activities compatible with the objectives of the protected area; appropriate activities might include tourism, forestry, agroforestry, etc. The objective of such zones is to give added protection to the reserve and to compensate local people for the loss of access to the biodiversity resources of the reserve (McNeely, 1988)

#### **INTENSIVE USE ZONE**

DEFINED: A zone in which the environment is kept as natural as possible, but in which the presence and influence of concentrations of visitors and facilities are accepted.

MANAGEMENT OBJECTIVE: to facilitate environmental education and intensive recreation in a manner that causes the least possible negative environmental impact.

BHNP LOCATION: This type of zone can be found in the vicinity of the Blue Hole Recreation Area/Warden Sub-post, the St. Herman's Cave Rest Area, and the BHNP Visitor's Center.

#### **PRIMITVE ZONE**

DEFINED: A zone which consists of a natural area which has received little human caused-alteration. The zone can tolerate moderate human use, such as trails.

MANAGEMENT OBJECTIVE: To preserve the natural environment, while facilitating environmental education, research, and primitive forms of recreation.

BHNP LOCATION: This zone covers most of the park.

#### **HISTORICAL-CULTURAL ZONE**

DEFINED: A zone in which are located human cultural artifacts and sites which need to be preserve and/or interpreted to the public.

MANAGEMENT OBJECTIVE: to protect the artifacts and sites as integral parts of the natural environment.

BHNP LOCATION: this zone encompasses St. Herman's Cave.

**Please refer to the Zones and Development Map.**

## Land Uses and Trends

Most of the land use in the area around BHNP involves agriculture. Citrus development is expanding in the valley west of the park, in some cases up to the BHNP boundary. This area, controlled by Caribbean Investments Ltd., is slated for an increase to 2000 acres of citrus. Recommendation: A buffer strip should be established on this boundary, in cooperation with the landholder, before any additional land is cleared for citrus planting.

The area east of, and contiguous to, BHNP known as Ringtail Village (described under “Regional Context”) is a source of concern to BHNP management. Continued agricultural and village development is a real prospect here. Potential impacts from this area include erosion, agrochemical and sewage derived pollution, groundwater depletion, crime, wildlife habitat fragmentation, wildlife harassment and poaching, unauthorized trails, and wildfire. Some of these impacts are already present, to small extent.

### **RINGTAIL**

It is recommended that appropriate Government of Belize authorities be contacted in an attempt to add the Ringtail area to BHNP. Part of the area, already settled and fronting the Hummingbird Highway, could become part of the National Park proper.

South of BHNP is more property of the Caribbean Investments Ltd. It is mostly hilly and forested landscape. It includes two important cave complexes, Petro glyph and Mountain Cow. Recommendation: the landholder be contacted for possible donation of land in this area. There have been indications from the landholder in the past that such a donation would be considered. A corridor could be established across this property that would link BHNP with the Sibun Forest Reserve. This would increase the size of BHNP and provide a more realistic environment to fulfill BHNP objectives.

North of BHNP, across the Hummingbird Highway, is an area of forested land also controlled by Caribbean Investments Ltd. Local sources report that Ringtail residents are already exploring ways to purchase part of this land for agricultural use. Recommendation: that a portion of this land be donated to the BHNP for use as a buffer zone.

# **MANAGEMENT PROGRAMS**

## **Introduction**

In order to achieve the objectives of the park, action by the management is required. Different types of work must be carried out. This work is described in the plan as various activities.

The activities are grouped, for management efficiency, into programs and subprograms. The subprograms have objectives, activities, and guidelines.

There are four programs: the Resource Management and Protection Program, the Human Use Program, the Research and Monitoring Program, and the Administration Program.

The programs are not discrete units, standing alone; they all work together to form an integrated management concept. For example, the Community Development subprogram and the tourism subprogram are interrelated; neither will work well without the other. It is the synergy among programs that makes the plan more than the sum of its parts.

## **THE MANAGEMENT PROGRAMS**

**RESOURCE MANAGEMENT AND PROTECTION:** This program focuses on the activities and necessary for the protection of the biological resources of, and the visitors to, the park. The program has two subprograms:

- \* Protection
- \* Resource Management

**HUMAN USE:** this program comprises activities that encompass all aspects of use, by people, of the park. The program has five subprograms:

- Recreation
- Tourism
- Interpretation
- Education
- Community Development

**RESEARCH AND MONITORING:** The activities of this program help to provide information about human and ecological processes in and around the park, in order to guide management decisions and actions. There is one subprogram:

- \* Research and monitoring

**ADMINISTRATION:** This program includes all the operational, personnel, and financial activities needed to run the park. There are two subprograms:

- Administration
- Maintenance

The timing of the activities is presented in the **Implementation Schedule**.

### **THE ANNUAL OPERATIONS PLAN**

Annual operations plans (AOP) will be prepared by park managers for use in day-to-day operations. The AOP will also contain a budget estimate. This estimate will reflect current income and costs. The estimate will also weigh fiscal and political circumstances too time-sensitive for the Management Plan.

## **RESOURCE MANAGEMENT AND PROTECTION PROGRAM**

### **SUBPROGRAMS:**

#### **Protection Subprogram**

##### Objectives:

- A secure environment will be maintained for visitors.
- The vegetative cover will be maintained.
- The wildlife population will be protected.
- St. Herman's cave will be protected from looting, vandalism and overuse.
- The Blue Hole will be protected from overuse, erosion, and pollution.
- The park will be protected from agrochemical runoff and drift.

##### Activities:

- Regular patrols
- Ensure 24-hour warden coverage.
- Liaise with local Conservation Division Officers.
- Create living barriers at unauthorized entry points.
- Utilize community members that are in the park for income generation purposes as indirect guardians
- Create and erect picture warning and regulation signs
- Erect handrails at St. Herman's Cave entrance and steps.
- Create warden post as part of new Visitor Center as St. Herman's Cave entry road.
- Build erosion control structures at Blue Hole (ref.: Houseal, 1986)
- Create and implement pesticide handling and erosion control education programs for community members and major developers.
- Upgrade Blue Hole recreation Area warden sub-post.
- Establish viable communications network within BHNP, Guanacaste National Park, and GOB.

##### Guidelines:

- Protection and education activities should complement each other.
- Transport should be readily available to wardens for protection activities.



## **RESOURCE MANAGEMENT SUBPROGRAM**

### Objectives:

- Tree outplanting programs in disturbed border areas near agricultural development will be facilitated.
- Rural community development will be promoted through a program for selective extraction of non-timber forest products.

### Activities:

- Create small nursery at BHNP.
- Select outplanting sites.
- Devise outplanting and maintenance schedule.
- Designate sites for selective extraction of non-timber forest products.
- Develop a permit system for selective extraction of non-timber forest products.

### Guidelines:

- Extraction activities should begin only after appropriate research has been completed.
- Non-timber products include, but are not limited to, medicinal plants and herbs, food plants, fruits and nuts.
- For outplanting program, use tree species native to BHNP and appropriate to site.

## HUMAN USE PROGRAM

### SUBPROGRAMS:

#### Recreation Subprogram

##### Objective:

- Recreation will be facilitated in a manner that is compatible with the natural and cultural environment.

##### Activities:

##### Swimming:

- Upgrade access trail to, and infrastructure at, Blue Hole swimming point.
- Institute visitor numbers control if necessary.
- Upgrade signage at swimming point.
- Upgrade changing areas.

##### Picnicking:

- Maintain picnic area free of litter.
- Obtain and place litter barrels.
- Construct barbecue pit.
- Encourage visitors to carry out all their trash.

##### Hiking and Wildlife Viewing:

- Lay out and construct new trail network.
- Create and print trail map and guide to new self-interpretive trail.
- Trail maintenance and upgrade.
- Institute visitor numbers control if necessary.
- Create living barriers at entrances to closed trails.
- Erect a trail map sign with distance indicated.

##### Caving (St. Herman's Cave):

- Institute visitor number control if necessary
- Repair and maintain seating area near St. Herman's Cave entrance,
- Build railing down steps into entrance and construct railing around viewing area at cave mouth.
- Install warning signs.
- Purchase and have available for use of an emergency stretcher suitable for cave rescue
- Have sufficient flashlights (torches) available and ready for cave rescue.

**Guidelines:**

- Horses, bicycles, and vehicles should be excluded from the swimming zones and trails.
- Picnicking only in designated areas.
- No eating on trails.
- New trails should adhere to internationally recognized guidelines for design and construction.
- Cave visitors should always be accompanied by a local guide, once a local guide corps has been established.

**Tourism Subprogram****Objectives:**

- Visitors will be assisted in utilizing lodging, eating, and other facilities in the BHNP area.
- Visitors will be assisted in being transported to BHNP.
- Local businesses, community groups, and other neighbors of BHNP will be assisted by having tourist business directed to them.
- International visitors will be assisted in having a cultural, as well as a natural history, experience.

**Activities:**

- Promote creation of a directional/information sign in Armenia village center.
- Create an informative promotional brochure on Armenia for distribution at Guanacaste and Blue Hole Visitor Centers.
- Foster creation of a horse rental business in Armenia.
- Install tourism information board in Visitor Center.
- Promote creation of minibus shuttle connecting BHNP, Guanacaste National Park, and Belmopan.
- Promote creation of “Bed & Breakfast” (posada) facilities in both Armenia Village and Ringtail.
- Promote and facilitate the creation of a corps of BHNP guides from the local population.

**Guidelines:**

- Involve residents of the BHNP/Guanacaste Park region in creation of the shuttle.

**Interpretation Subprogram****Objectives:**

- Visitors will have the opportunity to become oriented to park facilities and resources.
- Visitors will learn the importance of both the park and regional resources and why they deserve protection.

- Visitors will comprehend and support management objectives.
- Visitors will learn of park hazards and how to avoid them.
- Visitors will have an opportunity to be oriented to local history and culture.

Activities:

- Create and install interpretive exhibits in Visitor Center.
- Create self interpretive trail.
- Develop guided interpretive walk program.
- Develop introductory talk for warden delivery.
- Maintain and upgrade self-interpretive trail.

Guidelines:

- Interpretive subprogram should focus on forest ecology, geology, and local history and culture.

### **Education Subprogram**

Objectives:

- An understanding and appreciation of BHNP's natural and cultural resources will be disseminated to neighboring communities.
- BHNP will be integrates into the national environmental education effort.

Activities:

- Schools within easy reach will be regularly visited by warden with small displays and talk.
- School groups will be transported to BHNP for field trips.
- An annual essay competition will be held.
- There will be in-park activities for older students, .e.g. , maintenance, interpretation activities.
- There should be coordination between BHNP education personnel and Education Department officials and Peace Corps Volunteers active in the national Environmental Education program.

Guidelines:

- Park appreciation by local adults, major developers, and school dropouts needs to be encouraged.
- The Guanacaste Park Education Officer might also serve as the BHNP Education Officer.

## **Community Development Subprogram**

### Objective:

- The park will help provide employment and entrepreneurial opportunities for residents of surrounding communities.

### Activities:

- A refreshment stand/restaurant should be set up in Armenia.
- A local crafts sales and exhibit center will be promoted in Armenia Village, connected with a small cultural/interpretive center.
- Local people will be hired for casual labor.
- Explore creation and implementation of rural community development (RCD) activities in the BHNP region.

### Guidelines:

- It is preferable that income generating activities in BHNP be carried out by cooperatives or groups (such as women's groups), rather than individuals.
- A volunteer with experience in small business development should be requested for assignment to BHNP.
- RCD activities may include 1) training in sustainable agricultural practices, 2) pig rearing objects, and 3) vegetable production projects.
- RCD activities should be designed and implemented in cooperation with GOB agencies and RCD NGO's.

## **RESEARCH AND MONITORING PROGRAM SUBPROGRAM:**

### **Research and Monitoring Subprogram**

#### Objectives:

- Park managers will obtain information they need for making informed management decisions.
- Baseline data will be acquired, so that future changes (due to succession or public use) in natural communities may be monitored.
- Opportunities will be provided for training and educating Belizean researchers and scientists.

#### Activities:

- A protocol should be established for researchers desiring to conduct studies in BHNP.
- A list of perceived biological information gaps should be produced by BAS managers.
- The protected Areas Manager and BAS staff should develop outreach programs to locate appropriate researchers.
- A quantitative floral (primarily forest) inventory should be conducted.
- Staff should maintain faunal observation records.
- A faunal inventory should be conducted.
- Staff should help facilities in the Christmas Bird Count.
- Any Maya sites should be investigated.
- With the assistance of GOB agencies, a rudimentary water quality monitoring program should be implemented.

#### Guidelines:

- Research permits should be obtained from the Forestry Department after consultation with BAS.
- Use Belizean researchers and students whenever possible.
- Involve BHNP wardens in research activities.
- Require foreign researchers to provide training opportunities for Belizeans as a condition of BHNP use.
- Copies of all research results must be deposited with the Belize Audubon Society and Forestry Department.

## **ADMINISTRATION PROGRAM SUBPROGRAM:**

### **Administration subprogram**

#### Objective:

- Park managers will have the human, training, and financial planning resources they will need to support the other Management Programs of this plan
- Park managers will have the administrative support structures necessary to assure the satisfactory functioning of BHNP.

#### Activities:

- Create an annual operations plan.
- Create an annual budget.
- Request and acquire necessary materials and equipment.
- Produce a list of training needs.
- Manage park accounts.
- Plan and regulate personnel requirements (includes hiring).
- Represent BHNP in meetings with BAS staff and board, GOB, and community members.
- Develop and/or implement personnel training programs.
- Create a BHNP library and promote its use by park personnel.
- The Protected Areas Manager will develop job descriptions for park personnel.
- The Protected Areas Manager will develop job descriptions for park personnel.

#### Guidelines:

- Personnel will be utilized in various activities of the subprograms according to their aptitudes and training and depending upon the number of personnel available.
- Wardens should be recruited from among local residents.
- All wardens should be literate.
- Equal employment opportunity for women should be encouraged.
- Transportation on hand should be two motorcycles.
- Type and Number ( ) of Personnel:  
BHNP/BAS Staff:
  - Head Warden/Director (1)  
[Primary base at Guanacaste National Park]
  - Senior Warden (1)
  - Assistant Warden (3)
  - Interpretive/Public Education Officer/Warden (1)
- Casual Labor:
  - As needed and as budget allows

## **Maintenance Subprogram**

### Objectives:

- Park staff will maintain park infrastructure in optimum condition.
- Park staff will ensure that the natural and constructed assets of BHNP receive the upkeep needed to assure the safe, smooth, and efficient operation of BHNP.

### Activities:

- Develop and implement a regular maintenance program for buildings, grounds, trails, and equipment.
- Maintain a system for the collection and disposal of trash.
- Take periodic equipment and inventories.
- Have personnel trained in the use, maintenance, and repair of park equipment.



# **DEVELOPMENT PROGRAM**

## **Introduction**

This program details what is necessary, in the terms of infrastructure improvements and construction, to help transform the natural resources of BHNP into functioning structure for conservation, recreation, and education.

Development AREAS are created where physical development is required to support management in meeting park objectives. They should be located and constructed so as to have the minimum impact on the park's resources.

Activities take place at SITES within each Development Area. Examples of sites include parking areas, building, latrines, and picnic shelters.

This plan contemplates three development areas in the park: the Blue Hole Recreation Area/Warden Sub-post, the St. Herman's Cave Recreation Area, and the BHNP Visitor Center. These sites are located on the **Zones and Development Areas Map**.

## Development Area 1

Name: **Blue Hole National Park Visitor Center.**

Background: BHNP does not currently have a Visitor Center.

Objectives: 1) The visitor will have the opportunity to be oriented to the park's facilities and resources, and to be educated about the park and the natural and cultural environment.

2) The visitor will be provided with the following facilities:

- Latrines
- Water for washing and drinking
- Vehicle parking space
- Picnicking sites
- Sites for rest and contemplation
- Camping sites
- Barbecue grill

3) The visitor will have the opportunity to purchase refreshments.

4) Park staff will have the facilities for:

- Office management
- Equipment storage and repair
- Communications
- Interpretive exhibits and presentation
- Selling of BAS souvenirs
- Collecting of fees
- Staff library
- Overnight accommodations
- Cooking meals
- Registering and counting visitors
- Protection and regulation activities

Architectural Theme:

The building should blend with their site and be as unobtrusive as possible. A hip-roof style main building with wooden shuttered windows, similar in design to Guanacaste National Park multipurpose building, is contemplated here. Due to constraints of security, safety, and ease of maintenance, the structures should be constructed of cement block with metal roofs.

Existing Structures:

None.

Physical Structures and Facilities to be constructed:

- Multipurpose building of approximately 1150 square feet in two stories.
- Concrete structure with improved designed latrines.
- Two thatched roofed picnic structures.
- One thatch roofed camping shelter.
- Three gravel pads for tent sites.

Infrastructure and Support Installations Existing:

An unimproved road to the St. Herman's Cave entrance trail.

Infrastructure and Support Installation Needed:

- Parking areas with gravel surface and appropriate drainage.
- Entry and regulations signs that blend with the environment and are aesthetically appropriate.
- Two ferroconcrete rain tanks.
- Convert road to trail.
- Landscape area with native plants, as needed.
- Solar power installation for lights and radio.
- Metal barbecue grill.

Guidelines:

- Employ volunteer architect and landscape architect to design this Development Area and Facilities.
- Maintenance of management presence at night (wardens) is essential for the security and integrity of this Development Area.

**Development Rea 2**

Name: **St. Herman's Cave Rest Area**

Objective: To provide a rest and contemplation site for cave visitors.

Architectural Theme:

The buildings should blend with their site and be as unobtrusive as possible.

Existing Structures:

None.

Physical Structures and Facilities to be Constructed:

- Thatched roof hut

Infrastructure and Support Installation Existing:

None.

Infrastructure and Support Installations Needed:

- Benches in hut.
- Interpretive signs.

### Development Area 3

Name: **Blue Hole Recreation Area/Warden Sub-post.**

- Objectives:
- 1) Visitors will have the opportunity to view and swim in the Blue Hole.
  - 2) Visitors will have the opportunity to picnic.
  - 3) Visitors will have the opportunity to engage in wildlife viewing and hiking.
  - 4) Visitors will be provided with the following facilities:
    - Latrines
    - Building for clothes changing.
    - Picnicking sites
    - Metal barbecue grill
  - 5) Park staff will have the facilities for
    - Registering and counting visitors
    - Shelter from the weather
    - Communications
    - Protection and regulation activities

Architectural Theme:

The buildings should blend with their site and be as unobtrusive as possible.

Existing Structures:

- Thatched roof guard station (open sides).
- Latrine (in poor condition).
- Changing hut (in poor condition).
- Picnic shelter.

Physical Structures and Facilities to be Constructed:

- Upgraded guard station.
- Improved design latrines.
- New picnic shelters.

Infrastructure and support Installation Existing:

- Parking area with gravel surface.
- Concrete stairs to, concrete shelf at, Blue Hole.
- Regulatory signs.

Infrastructure and Support Installation Needed:

- New erosion control structures at Blue Hole (ref.: Houseal, 1986).
- Stairway and railing repair at Blue Hole (ref.: Houseal, 1986).
- Upgraded regulatory and interpretive signs that blend unobtrusively with the surroundings.

# **IMPLEMENTATION SCHEDULE**

## **Introduction**

The following schedule presents a sequence for implementing the Management Plan.

Rather than designating particular fiscal years for activity implementation, the Schedule is presented in four stages.

The use of the Stages allows for maximum management flexibility. The rate of Plan implementation at BHNP will be dependent on financial, political, and other factors that cannot be predicted for a full five year period.

Using the Schedule as a guide, those activities deemed feasible in a given fiscal year will be included in the Annual Operations Plan.

**Thus, the Schedule represents a statement of priorities.**

The Stages express priorities in this fashion:

- \* **Stages I and/or II:** What can be implemented first, given financial, administrative, and logistical constraints; what urgently requires implementation.
- \* **Stages I and/or III:** What seems possible, or necessary, in the midterm.
- \* **Stages III and/or IV:** What must probably be put off until the end of the 5-year period, given estimated constraints; what does not require urgent implementation.
- \* **All Stages:** What must be accomplished every year, through out the 5-year planning period.

**The implementation Schedule is an at-a-glance tool for conveying the entire time sequence of the Management Plan to those responsible for budget preparation.**

Activities in the Schedule correspond to the Activities listed in the subprograms above.

## IMPLEMENTATION SCHEDULE

ACTIVITY	STAGE			
	I	II	III	IV
<b>Protection</b>				
1. Regular patrols	x	x	x	x
2. 24 hour Wardens		x		
3. Liaise with Forestry	x	x	x	x
4. Plant living barrier		x		
5. Utilize Community members		x	x	x
6. Warning and regulation signs	x			
7. Handrails at cave		x		
8. New warden post		x		
9. Erosion control, Blue Hole			x	
10. Stairway repair, Blue Hole			x	
11. Pesticide ed. Programs	x			
12. Upgrade warden sub-post		x		
13. Establish comm. Network			x	
<b>Resource Management</b>				
1. Create small nursery		x	x	
2. Select outplanting sites		x		
3. Devise outplanting Schedule				
4. Design sites for extraction				x
5. Develop permit system				x
<b>Recreation</b>				
1. Upgrade swimming points			x	
2. Number control/swimming		x		
3. Upgrade swimming signals			x	
4. Upgrade changing areas	x			
5. Maintain picnic areas	x	x	x	x
6. Place litter barrels	x			
7. Construct barbecue pit				x
8. Trash removal program	x	x	x	x
9. Construct new trails	x			
10. Print trail map		x		
11. Trail maintenance/upgrade	x	x	x	x
12. Numbers control/trails				x
13. Living barriers	x			
14. Trail map sign		x		
15. Number controls/cave				x
16. Repair seating area	x			
17. Build railings/cave		x		
18. Warning signs/cave	x			
19. Purchase emergency stretcher		x		
20. Purchase flashlights		x		

ACTIVITY	STAGE			
	I	II	III	IV
<b>Tourism</b>				
1. Directional/ info sign	x			
2. Informative brochure		x		
3. Horse rental		x		
4. Information Board		x		
5. Create shuttle		x		
6. Promote Bed & Breakfast		x		
7. Guide Corps		x		
<b>Interpretation</b>				
1. Install exhibits			x	
2. Create self int. trail		x		
3. Guided int. walk program		x		
4. Introductory talk		x		
5. Maintain self-int. trail		x	x	x
<b>Education</b>				
1. Visit schools	x	x	x	x
2. Transport groups		x	x	x
3. Essay competition		x	x	x
4. Older student activities		x	x	x
5. Coordinate w/Env. Ed.	x	x	x	x
<b>Community Development</b>				
1. Refreshment stand		x		
2. Crafts sales center		x		
3. Hire casual labor	x	x	x	x
4. Explore RCD activities		x		
<b>Research and Monitoring</b>				
1. Researcher protocol	x			
2. Produce info gap list	x			
3. Locate researchers		x		
4. Floral inventory		x		
5. Maintain obser. Records	x	x	x	x
6. Faunal inventory		x		
7. Facilities Bird Count	x	x	x	x
8. Maya sites investigated		x		
9. Water quality monitoring				x
<b>Administration</b>				
1. Annual operations plan	x	x	x	x
2. Annual budget	x	x	x	x
3. Acquire materials	x	x	x	x
4. Produce list training needs	x			
5. Manage accounts	x	x	x	x
6. Personnel requirements	x	x	x	x
7. Represent BHNP	x	x	x	x
8. Develop Training		x	x	x



9. Create Library	x
10. Develop Job descriptions	

ACTIVITY	STAGE			
	I	II	III	IV
<b>Maintenance</b>				
1. Develop Maintenance program	x	x	x	x
2. Maintain trash removal	x	x	x	x
3. Equipment inventories	x	x	x	x
4. Train personnel		x	x	
<b>DEVELOPMENT PROGRAM</b>				
1) BHNP Visitor Center		x		
2) St. Herman's Cave Rest Area			x	
3) Blue Hole Recreational Area	x			

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