



STRATEGIC PLAN 2018 -2022

Written by: Fernando Simal

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CARIBSS is an open, all-inclusive and diverse group of people and institutions working for the preservation and protection of caves in the Island of Bonaire and the Dutch Caribbean region, having as core disciplines scientific research, exploration, education and conservation.

Introduction

Virtually all governments, nature organizations and individuals in the Caribbean recognize caves as important features in the landscape and are aware of one or several of their values. Numerous attempts to implement proper protection and management in the different islands have been conducted with different degrees of success. However, we are not aware of a financially sustainable and efficient management system on any of the islands yet. Successful conservation of caves in the Dutch Caribbean can only be achieved through the integration of multiple disciplines, institutions and people, organized by means of a strategic plan, which is presented in this document.

According to Dinerstain et al. (1995), the arid ecosystem of the Caribbean is characterized as “vulnerable” due to the increase of change from natural woods to urban, tourism and recreation spaces. Several species of endemic animals and plants are under risk of extinction (Densmore, 1986; Collar et al., 1992; UN, Statistical Office, 1997; Stattersfield et al. 1998; <http://www.natureserve.org/infonatura/>; <http://www.biodiversityhotspots.org>). The Dutch Caribbean is a good example in which dry ecosystems are undergoing a drastic reduction of natural areas due to land conversion, mainly driven by development projects. Most of the caves that still remain in these islands are not protected inside the existent National Parks or similar figures.

Approximately 50% of the bat species that live in the Dutch Caribbean islands rely on caves as diurnal and maternity roosts. One cave can be used simultaneously by different species occupying different parts of the cave, but some species can also form mixed colonies. In most cases, the caves used by these bats in the islands are not included in the existing system of protected area. This represents a considerable hazard for the bat colonies present in them, because large colonies of bats can easily attract the attention of people that disturb and sometimes these disturbances have resulted in high mortality of colonies. This type of disturbance is particularly harmful and can cause high mortality during those months of the year when bats are giving birth and nursing their offspring.

Protecting the bat fauna of these islands is essential to preserve their biodiversity. Bat-plant mutualistic interactions (associations from which bat and plants both benefit) are vital for sustaining life in the arid and semiarid ecosystems in the Caribbean region (Fleming and Racey 2010). In the ABC islands, two nectar-feeding bats, Miller's Long-tongued Bat (*Glossophaga longirostris*) and the Curaçaoan Long-nosed Bat (*Leptonycteris curasoae*), are the main pollinators and/or seed dispersal agents of several species of columnar cacti (*Cereus repandus*, *Pilosocereus lanuginosus*, *Stenocereus griseus*) and agaves (*Agave cocuy*) in the region (Nassar et al., 1997; Petit, 1995, 1997; Soriano et al., 1991). Columnar cacti not only support nectar-feeding bats in these ecosystems, but they also provide food and water to a broad range of vertebrates and invertebrates.

Caves have been crucial for human survival practically on every continent since the apparition of hominids on the planet, and have played key roles in the history of past and existing civilizations and countries. They have been used for housing, refuge, storage, many types of religious rituals, art expressions, water and food sources, exploration, advances on the field of natural science and much more. It is no wonder that caves have vast historical and cultural values. Caves in the Dutch Caribbean are not exception to these values and many of them have been recognized and a few even protected with physical structures (e.g. protective metal bars over inscriptions at Onima, Bonaire and in the National Park Arikok, Aruba). But many others are still poorly known and vulnerable to threats, including vandalism. The protection and promotion of these values is addressed on this strategic plan.

The recreational value of caves is well known and has been exploited for economic benefit for many years in the Dutch Caribbean. Virtually in all our islands cave tour operators are available and cave tours happen daily. However, the situation is far from optimal and there is significant conflict between the different stakeholders (e.g. tour operators, local residents, management institutions and island governments). Some of the most common concerns brought up by stakeholders are the damage caused to caves by non-regulated visits, lack of certification for cave tour guides, carrying capacity, the vandalizing of iron gates to protect bat maternity chambers (e.g. Aruba and Curaçao) and the shortage of caves available for tourism in some islands (e.g. Bonaire), where caves can become too crowded when more than one operator coincides at the site with non regulated visitors or another tour operator. Unfortunately, the lack of capacity and financial constrains of nature management organizations and governments in the islands has not allowed for proper management and supervision of cave tourism in the Dutch Caribbean. CARIBSS will address this issue as one of the priorities in this strategic plan.

VISION

To ensure that the caves in the Island of Bonaire and the Dutch Caribbean and their values are recognized, respected and protected by residents and visitors.

MISSION

CARIBSS aims to explore, document and preserve the cave systems of the Island of Bonaire and the Dutch Caribbean while ensuring their optimal management, and to serve as a forum where all the different organizations or individuals can share information, projects and initiatives.

MAIN GOALS:

- To protect, conserve and restore (if applicable) the natural, cultural, historic, esthetic, recreational and scientific values contained in the cave systems of the Dutch Caribbean, including, but not limited to, the native flora and fauna, the speleological formations and ancient inscriptions for future generations;
- To ensure that the conservation of these values is given priority in all public decision-making processes;
- To ensure that the residents of, and visitors to, Bonaire receive quality education and information about the ecological importance and protection of caves and the values contained in them;
- To promote and ensure that the resources contained in these cave systems are used in a sustainable manner
- To ensure that human safety is given the highest priority during all cave-related activities.

WORKING GROUPS

In order to have a more efficient organization and management to work towards the achievement of our goals, the society initiates activities in 2018 with four working groups:

- 1) Exploration
- 2) Bat Conservation (PPRABC)
- 3) Archaeology
- 4) Education, Tourism and Recreation

CARIBSS has identified 4 main threats that include the majority of factors affecting the damage to caves and their values in the Dutch Caribbean.

THREAT 1: CAVES LOSS TO DEVELOPMENT

Cave loss to development is a product of not taking caves and their values in consideration when executing development projects. On the Dutch Caribbean there are many examples of this undesirable situation and in some cases, the existence of the cave was not discovered until the construction started, which translated into a big financial loss for the owner of the

plot and high bat mortality and the loss of an important roost. This situation illustrates the importance of exploration and documentation of the existing caves in the entire karst system of the islands.

GOALS, OBJECTIVES AND INDICATORS TO PROTECT CAVES FROM DEVELOPMENT

GOAL 1: TO PREVENT AND REDUCE THE LOSS OF CAVES CAUSED BY HUMAN ACTIVITIES WITH AN EMPHASIS IN CAVES USED BY BATS AS MATERNITY ROOSTS.

OBJECTIVE 1.1: Keep constant supervision to ensure that local authorities enforce the environmental laws and actions are taken according to environmental legislation when human activities potentially could cause an effect on the bats (e.g. building permits and land use designation).

INDICATOR - Number of activities in which caves have been considered in human activities that have an effect on cave.

OBJECTIVE 1.2: To ensure that caves are included on methodologies, guidelines and protocols of Environmental Impact Assessments carried out on the ABC islands.

INDICATOR - Number of studies of environmental impact in which caves have been considered vs. number of studies in which they have not been considered or that have been carried out inadequately.

GOAL 2: TO CREATE CAVE SYSTEMS NATURE RESERVES ACCORDINGLY TO IUCN GUIDELINES IN THE DUTCH CARIBBEAN

OBJECTIVE 2.1: To create a cadaster-like cave database for the Dutch Caribbean that includes a map of each cave, both on land and underwater.

INDICATOR - Number of caves partially or fully documented added to the database.

OBJECTIVE 2.2: To obtain international recognition through RELCOM in the form of AICOMs and SICOMs for the caves of importance for bats.

INDICATOR - Number of AICOM and SICOM designated on each island.

OBJECTIVE 2.3: To get legal protection for the AICOM and SICOM sites if they are located outside natural protected areas.

INDICATOR: - Number of caves inside AICOMs and caves designated as SICOM with any kind of legal protection vs. number of these caves without any legal protection.

GOAL 3: TO INFORM AND EDUCATE ABOUT THE ECOLOGICAL IMPORTANCE OF CAVES AND THE BENEFITS THEY PROVIDE TO HUMAN BEINGS IN ORDER TO PREVENT THEIR DESTRUCTION.

OBJECTIVE 3.1: To prepare a group of presentations in Papiamentu, Dutch, English and Spanish for kids of different school ages and adults. These presentations should clearly show the ecological importance of our caves and the consequences of their destruction. The presentations should be regularly offered in schools and public places.

INDICATOR - Number of presentations and number of assistants to each one.

OBJECTIVE 3.2: To create a web page, a Facebook page, a CARIBBS blog and keep them actualized.

INDICATOR - Number of visits to the web page, Facebook likes and blog posts.

OBJECTIVE 3.3: To communicate bats' importance through press, TV and radio shows.

INDICATOR - Number of press articles and shows on radio and local and international TV shows.

THREAT 2: CONTAMINATION

In general, caves are exceptionally vulnerable to contamination due to the little exchange with the exterior. Contaminants accumulate faster and take longer to dilute or biodegrade. In fact, the air and water found in some caves (e.g. sulfur mine in the Island of Saba) is so toxic that aerobic life is not possible. Therefore, pollution should be avoided as much as possible and great efforts should be made to preserve the environment inside caves as pristine as possible. Cave contamination takes many forms (e.g. solids, wastewater, noise and light) and virtually every time it happens, it is the consequence of a combination of irresponsibility and lack of information of the person(s) leaving these contaminants. In order to reverse this undesirable situation, a well-balanced combination of education and law enforcement has to be applied. Light and noise contamination is generally directly related to uncontrolled cave visitors and will be addressed in the next section of this strategic plan.

GOALS, OBJECTIVES AND INDICATORS TO PROTECT CAVES FROM CONTAMINATION

GOAL 1: TO PREVENT CONTAMINATION OF SOLIDS AND LIQUID WASTE.

OBJECTIVE 1.1: To ensure that vehicles cannot come within 100m from cave entrances by blocking dirt roads that provide access to them and improve existing parking spaces plus prohibition signs made out of concrete.

INDICATOR - Number of caves with blocked access for vehicles and signs.

GOAL 2: TO PREVENT CONTAMINATION OF NOISE AND LIGHT

OBJECTIVE 2.1: To create a cave park with proper trails to access cave entrances and signage including cave maps showing the different levels of difficulty, safety indications and highlighting cave values. It will be imperative that these improvements will not transform the area into a "six flags like" recreational park and the "rough natural look" of the cave areas remains part of the experience.

INDICATOR - Number of available caves and values added to the park.

OBJECTIVE 2.2: To design and implement a certification cave guide course.

INDICATOR - Number of certified guides.

OBJECTIVE 2.3: To have a hot line for cave incidents.

INDICATOR - Acquiring of the hot line number.

THREAT 3: UNCONTROLLED VISITS

Not all uncontrolled visits are damaging to caves, however the major and too often irreversible damage caused to caves and the values contained in them are the product of this type of visits. Extreme losses like breakage and removal of speleothemes and/or objects

with archaeological values, damage to ancient inscriptions and graffiti are examples of some of these incidents. Regarding the biodiversity inhabiting caves, too many accounts of incidents with high mortality of bats, especially during lactation, caused by uncontrolled visits are available. Burning fires to intentionally kill bats or for the celebration of an event or social gathering are often common as well. Another very undesirable aspect of uncontrolled visits is human safety. Accidents caused

by visitors with a lack of knowledge, experience and adequate equipment are quite common events in caves and have sometimes ended in human death (e.g. Saba's sulfur mine). This strategic plan will address this threat as one of its main priorities.

GOALS, OBJECTIVES AND INDICATORS TO PROTECT BAT MATERNITY CAVES FROM UNCONTROLLED VISITORS

GOAL 1: HAVE CONTROLLED ACCESS TO BAT MATERNITY CHAMBERS AND CAVES

OBJECTIVE 1.1: To close with physical barriers and gates the main maternity chambers in all islands.

INDICATOR - Number of maternity chambers with restricted access.

THREAT 4: EXOTIC INVASIVE SPECIES

Listed as one of the most important threats to native wildlife all over the world, but especially on small islands, exotic invasive species also have a negative impact on caves dwelling species, specially bats. During mist netting nights conducted for bat research on the ABC Islands, rats have been observed attacking bats immediately after getting entangled in the nets (F. Simal and J. Nassar personal comment). Feral cats have also been observed close to entrances of maternity caves around dusk time and it is well known that cats are successful bat predators. Abundant video footage and pictures of cats hunting and eating bats are available in the media. In this document we propose to provide quantitative assessments of the magnitude of the problem and start control actions if needed.

GOALS, OBJECTIVES AND INDICATORS TO PROTECT CAVE-DWELLING BATS FROM EXOTIC INVASIVE SPECIES

GOAL 1: TO REDUCE THE NEGATIVE EFFECT OF INVASIVE SPECIES ON THE CAVE DWELLING BATS IN THE DUTCH CARIBBEAN.

OBJECTIVE 1.1: To evaluate the magnitude of the invasive rats problem by estimating rat and abundance inside and near maternity caves entrances.

INDICATOR: -Number of maternity caves where rat abundance has been estimated.

OBJECTIVE 1.2: To evaluate the magnitude of the feral cat problem by estimating their abundance inside and near maternity caves entrances.

INDICATOR: - Number of maternity caves where feral cat abundance has been estimated.

Depending on the results of objectives 1.1 and 1.2 in threat 4, we will engage in actions to control these exotic invasive species with an emphasis during mating, pregnancy and lactation periods of the cave dwelling bats.