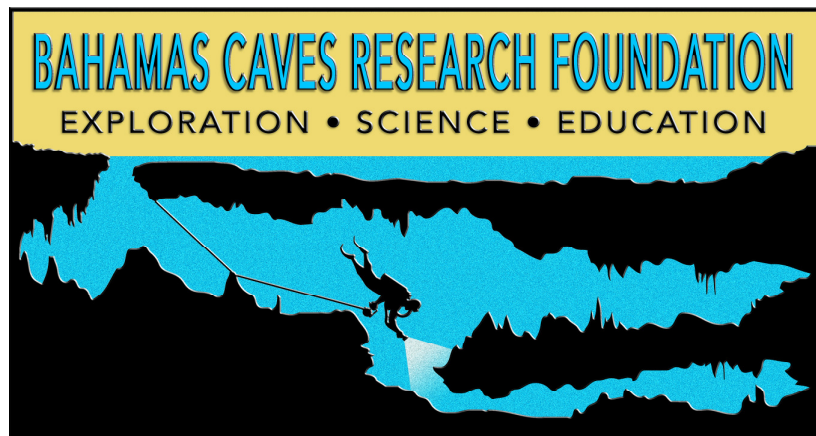


# **Proposed Protection for Karst Features (Blue Holes and Underwater Caves) in the Bahamas**

**Prepared by Brian Kakuk  
Bahamas Caves Research Foundation  
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## Introduction

Throughout the shallow limestone banks that comprise the islands, cays and rocks of the Bahamas are hundreds of submarine sinks and cave systems known as blue holes. An erosional process known as karstification, has allowed this large limestone platform to become riddled with sinks, blue holes, fracture caves and solution caves known as karst features. Therefore for the purposes of this proposal, all blue holes and submerged cave systems will be collectively called karst features. The entrances to most of these karst features are now submerged below the present sea level and currently hold hydrological, archaeological, paleontological and biological treasures found nowhere else in the world. In the case of most inland features, they also hold a large amount of our potable water supply.

### Marine (Ocean) Blue Holes



Photo by Curt Bowen



Photo by Curt Bowen

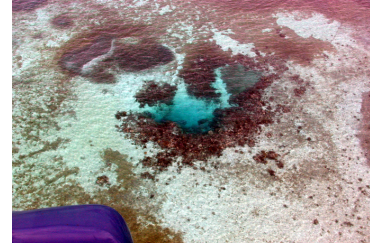


Photo by Brian Kakuk

All submerged cave systems in the Bahamas are filled with vast amounts of seawater that move both in and out of the caves during rising and falling tides. Since the Bahamas has diurnal tides, the water is drawn into and expelled from these caves at a rate of several thousand gallons per minute twice per day. On occasion, the sea is drawn into some of these caves with such ferocity that the surface water above the entrance is turned into a massive whirlpool. As surrounding seawater is siphoned into these systems, it carries with it an enormous amount of planktonic marine life and detritus that is used as food by thousands of cave dwelling animals both in the entrances of the caves as well as thousands of feet into the dark passages.

Some of the cave dwelling animals dependent on the food bearing currents are lobsters, crabs and shrimp. Many creatures such as sea stars, sea cucumbers and cowries graze the walls and floors of these dark, but life filled conduits. Further into the reaches of both marine and inland caves are specially evolved fish and crustaceans that have adapted to the very fragile existence in a world of eternal darkness. Many of these species are completely new to science, found nowhere else in the world, and some are specific to only one particular cave. Others are closely related to species that live in abyssal depths of the open ocean.

All of these organisms rely on clean, plankton filled seawater being concentrated into a very small area (the cave passage) to support their unique ecosystem. It is this concentration of the seawater into such a small area that can indicate a change in water quality (i.e., the introduction of pollutants). Nitrogen rich water caused by human waste, surface run-off, siltation from dredging projects and agricultural chemicals leads to a vast increase in algal growth, especially in harbors, creeks, and bays. Once this water is concentrated into the areas of the cave entrances by the tidal currents, the increase in algae growth appears to be dramatic. The algae soon smother corals and other filter feeding organisms in the entrance areas. These algae also retain accumulated sediments in the areas of the caves. As more sediment is introduced into the interior of the cave, the passages slowly begin to fill with fine mud that eventually reduces the passage size and water flow, thus increasingly reducing the flushing effect of the tidal water.

When water flow is reduced, the amount of food being introduced to the passages is also reduced. This polluting process begins a systematic collapse of the cave ecosystem with the result being a “dying” cave system. The Author believes that, due to the large amounts of water being concentrated into the systems (in the case of marine caves), these features would be one of the first ecosystems to be effected by local pollution, thus making the cave’s fringing entrance reefs and passages, excellent indicators of “things to come” for nearby coral reef systems. In the case of inland systems, the entrance pools are virtual windows into the fresh water lens of the islands, allowing us to view the health of the local water supply. The direct affects of nitrogen rich water on the far interior of the caves are still not understood. Ongoing research and baseline data are now being collected by researchers in an attempt to better understand these affects if any.

### **Inland (anchialine) Blue Holes**



Photos by Curt Bowen

Although the marine systems carry seawater, they are geologically intertwined with their freshwater, inland counterparts. It is the inland blue holes that are directly related to each island’s potable freshwater supplies. The inland blue holes are virtual reservoirs of fresh drinking water. The destruction or degradation of one system (be it marine or inland), directly affects the other.

Inland karst features are highly specialized systems both from a biological and archaeological and paleontological standpoint. The fresh water lenses of the islands support systems of unique troglobitic (cave adapted) marine life found nowhere else in the world. Tiny white or translucent crustaceans of many different class, order, family, genus and species are found through out the Islands of the Bahamas. Many of these animals are found in only one particular cave system, indicating how isolated and

specialized these systems truly are. Due to the unique chemical properties of water in the inland systems (hydrogen sulfides and sulfur reducing bacteria) there are areas that have reduced oxygen levels (anoxic), creating a natural preserving environment for archaeological and paleontological remains. Many artifacts continue to be discovered in these systems, largely because of the protection of this unique chemistry. The anoxic areas are not only natural storehouses for Bahamian history, but are also host to strange groups of troglobitic life that have adapted to living in the low oxygen environments. How the animals survive in waters where there is no detectable oxygen level is a mystery yet to be unraveled but this ecosystem has high significance to the scientific community.



Photo by Curt Bowen



Photo by Brian Kakuk



Photo by Brian Kakuk

As noted previously, the fresh water held within the surface pools of the inland systems is of vital importance to the Bahamas, as they act as natural reservoirs for our fresh drinking water. On Andros Island for example, there is so much fresh water (and thus blue holes) that millions of gallons are exported daily due to the fact that the natural fresh water reserves on New Providence are incapable of supporting the ever-increasing population of that island. If the fresh water lens on Andros were to be damaged by overuse or pollution, the impact would be felt nation wide. Deforestation and development in the areas of high blue hole concentrations on this island should be monitored with the greatest scrutiny.

The species of marine life that inhabit marine caves are many. Snapper, grouper, lobster, crab, parrotfish and squirrelfish can be seen by the dozens in most marine cave entrances. Within the caves are multitudes of small filter feeding animals that line every available surface of the passages. Sponges of every imaginable color and shape, tunicates and hydrocorals are just a few of the scores of marine species that use the currents of the marine caves to supply them with food. Many of these animals have been the subject of bio-prospecting studies, as an attempt by scientists to find anti-cancer and anti-bacterial compounds found naturally in some specialized marine organisms.

Over the last 45 years, hundreds of blue holes and submerged cave systems have been explored by specially trained divers, revealing some of the deepest and longest systems in the Bahamas. These explorers have seen first hand, how human impact through pollution, development and over fishing affects these delicate ecosystems. Some once pristine, inland systems are now fouled by floating television sets, refrigerators and cars, while many marine systems suffer the insult of car batteries used as anchors, abandoned

lobster and fish traps, tires, engine blocks, as well as damaged corals from spear fishermen extracting their spears and catch from their entrances.

The life within the marine caves is also **highly** subject to the adverse affects of excessive siltation created by near-by dredging projects. Observations made in Mystery Cave, located beneath Stocking Island, Exuma, showed that a two month dredging project killed 2/3rds of the marine life that inhabited the walls of the cave. These animals were literally abraded from the walls of the cave by the mass of sand and silt from a downstream dredging project. In the case of Mystery Cave, the marine life had been well documented in conjunction with bio-prospecting investigations before the dredging project. Those investigations are now defunct due to the removal of several key species.

There are many other blue holes in the Bahamas that currently exhibit symptoms of human influence. The entrances of two blue holes in the area of Elizabeth Harbor near Georgetown, Exuma, are a classic example. Many of the corals near the entrances of Crab Cay Crevasse and Master Harbor Cave are dead. It is assumed that this is in part due to the large amounts of human waste dumped onto the harbor by the hundreds of visiting sailing vessels which anchor there during the winter months, as well as some poorly designed or maintained local septic systems that leak into the sea from shoreline homes, hotels and restaurants.

Conversely, there are still abundant blue hole and submerged cave systems in the Bahamas that have not yet been affected by human influence and snorkelers and divers are still able to see massive, healthy coral gardens that crowd their entrances. There are blue holes near almost every one of the Family Islands that boast just such places and it must be noted that within many of the blue holes, the colonies of filter feeding animals and cave adapted marine life are still the most prolific in the world, indicating that there is still time for conservation efforts.

Fortunately, the Bahamas Antiquities, Monuments and Museums Corporation (AMMC) and the Bahamas National Trust (BNT) have realized the importance of these geological wonders and are currently taking the first steps in their protection. There is one blue hole located on Great Abaco Island that has been designated as off limits to un-permitted divers by the AMMC due to the discovery of what has been described as the “greatest fossil find in the history of the West Indies”. This discovery has given researchers and the AMMC an unprecedented look at the island’s early animal life prior to human habitation.

Another effort to be applauded is the protection of one of the highest densities of inland blue holes in the world, located on Andros Island. This park is part of a proposal submitted by the Andros Conservation and Trust (ANCAT) and the BNT that includes not only blue holes, but heritage fishing and crabbing grounds, as well as off shore reef systems. The blue holes within this proposed park hold millions of gallons of fresh water and are a well-known tourist destination for visitors including divers, explorers and scientists.

It is hoped that the blue holes within these areas will be used as models for conservation efforts for the future.

The Bahama Caves Research Foundation (BCRF) applauds the efforts of all the agencies listed above for their foresight and concern for these amazing and fragile ecosystems. This document has been prepared in an effort to inform these organizations as well as other governing ministries as to which systems currently known, are believe to be of the highest priority to the Bahamian people and the international scientific communities based on hydrological, biological, archaeological, paleontological or economic importance. The list presented here is an evolving one, based on new information received from researchers, explorers and dive tour operators throughout the Bahamas. The features discussed here are not ranked with any priority other than acknowledging that they are in need of immediate attention. It is the intent of the Author that the decision of priority be placed by the governing organizations involved, based on the information presented, as well as information obtained from other sources.

### **Suggested Points of Protection**

There is much debate as to what types of protection any marine ecosystem should, or can be, subject to. In many **Marine Protected Areas** (MPA's) the use of "no take zones" where all fishing regardless of the purpose is prohibited, have shown a marked increase in fisheries species and an overall increased size of these species, not only within the MPA itself, but outside the borders (overflow areas) of the protected zones, thus having a positive affect on local fishing activities. Other MPA's allow "traditional" types of fishing only; to offset any actual or perceived hardships on local fisherman. **Park or Recreation Area** status is also given to areas that are considered worthy of maintenance by local residence or governmental agencies as a draw for tourism. **National or World Heritage** sites (both inland and marine) are another form of protection given to those areas that define a significant aspect to the uniqueness, either of the area itself, or the culture within that area.

The determination as to the extent of protection that can or should be issued to a specific site is one that should be made based on biological, hydrological, paleontological and economic significance and the impact on the system and surrounding area. After close collaboration (and support) of local communities and local governments, MPAs, Park or Recreation Areas and National or World Heritage Sites become an object of pride, giving communities a sense of ownership and responsibility over the sites. With the simple declaration of areas as parks or MPA's, these sites can even trigger a tourism draw in places where one never existed before. The benefits to the communities come not only in the form of tourism dollars, but also in an increased knowledge of the environment within the community and how best to maintain it for future use.

The negative aspects of tourism must also play a part in the decision making process of declaring protected areas. It is an unfortunate reality that no matter how well intended or regulated, the use of these areas by humans, will have some sort of negative impact. These negatives can come in the form of disruptions to the natural state of fragile ecosystems, or habitats (in the case of underwater caves, the breaking of very fragile

crystal formations, or disturbance of unique water chemistry) or by the introduction of waste products that inevitably accompany humans (where people go, their trash will follow). The status given to any particular area should take into consideration the type and amount of recreational use that the area can sustain and to and plan accordingly.

The BCRF realizes that not all karst features in the Bahamas can be designated as protected sites. Therefore a list of 16 proposed sites, encompassing nearly 100 entrances nationwide, has been assembled below. A brief description of each feature or groups of features is also given with suggestions for potential levels of protection or status as well as the current threats to that specific site. These sites and the suggestions are based on investigations conducted by various explorers, researchers, and tour dive operators throughout the Bahamas. Due to the extensive nature of underwater cave systems, the total area suggested for protection would include the entire geological footprint of each system (i.e. fracture zones, freshwater recharge areas and associated reefs (marine systems)). It makes no sense to protect one entrance of a system if the other entrances or overlying areas are being used for waste disposal or large developments. The suggestions presented here should be considered a first step in preserving these important national treasures for future generations of Bahamians and the biological, geological, archaeological and paleontological treasures within.

## **16 Bahamian Karst Features deemed “in need” of protection.**

**\*Numbers in ( ) represent numbers of known entrances in each system.**

**Note 1-** References to **development and dumping** listed below refer to both solid waste (i.e. trash, discarded appliances etc.) and liquid wastes, such as raw and treated sewage as well as petroleum products such as oil, gasoline and diesel fuels.

**Note 2 –** References to **use by unqualified divers**. It is the opinion of the Author and the entire international cave diving community that cavern or cave tours should only be guided by qualified, certified cave or cavern divers, using the appropriate redundant equipment. Unfortunately most dive tour operators in the Bahamas do not use this protocol. This has led to fatalities in the past, and will continue in the future unless legislation is passed regulating qualifications for diving guides leading tours into blue holes and underwater cave systems in the Bahamas.

**Note 3 –** References to **dredging and siltation** due to development. The dependence of clean seawater being siphoned into marine caves to feed their inhabitants is well documented. Siltation due to nearby dredging projects has already shown that up to 2/3rds of the marine life living on the cave passage walls can be destroyed over a short period of time. The rejuvenation period for these animals (if one even exists) is unknown at this time.

## Stargate Blue Hole, The Bluffs, South Andros (1)



Photo by Bill Stone

Stargate Blue Hole is a large, inland, faultline cave system first explored by Rob Palmer. This now famous blue hole contains a unique ecosystem that contains species and genera found nowhere else in the world. The cave's deep vertical passages also hold some of the Bahamas most unique Lucayan artifacts yet discovered. In 1998, Rob Palmer discovered and retrieved the only Lucayan burial canoe on record. The Lucayan remains associated with this artifact are still on site. This Blue Hole is considered a must see destination by most cave divers worldwide.

**Current Threat(s):** Encroaching development near or at the entrance, or over the fracture area.

**Recommended Protection Status:** Bahamian Heritage site

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**



## Oven Rock Cave, Great Guana Cay, Exuma (1)



Photo by Brian Kakuk



Photo by Brian Kakuk



Photographer unknown

This isolated inland and highly decorated lens cave system is situated on a high bluff on Great Guana Cay, Exuma Cays, near Farmers Cay. This large, dry entrance cavern has been a tourist destination for many years, led by local guides from Farmers Cay. There are more than 1,400 feet of explored underwater passages associated with Oven Rock Cave. Due to the diverse and rare marine life found in this cave, Dr. Thomas Iliffe, of Texas A&M University, has declared the site as the most biologically important cave system in the Bahamas, and possibly the world. New species and genera of troglobitic crustaceans are still found in this system on nearly every investigation. Also found in the underwater passages are the remains of huge ancient bat colonies, dating back at least 10,000 years. Fossilized bat skeletons are found at depths of 65 feet, evidence that the cave was once above water.

**Current Threat(s):** Use by tourists and locals not informed of the fragility of the ecosystem within. Insect repellents and sunscreens should be removed prior to entry into the water here. Use by recreational divers not trained in cave diving (site is advertised as a “good tank dive” in a local cruising guide). Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Bahamian Heritage Site

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers- Guided diving or permitted diving only**

## Basil Minns Blue Hole, Great Exuma Island. (2)



Photos by Brian Kakuk

Basil Minns Blue Hole, an inland cave system, is located on private property, just a few miles south of Georgetown, Great Exuma Island. The entrances are located at either end of a large saline pond that is used by migratory birds, including Cormorants and King birds. Even though this is an inland system, there is a small, but healthy, population of small snapper, hound fish and Mojara (shad) in the pond. It is also one of the best places in the Bahamas to see the *casiopia* (upside-down mangrove jelly fish). This cave has quickly become the second most biologically important cave in the Bahamas, with nearly as many newly identified species as Oven Rock Cave. Several new species of sponges containing significant chemical properties have been discovered in this system. The cave has over 1,500 feet of explored, highly decorated cave passages. The main room in this cave resembles an underwater forest of stalactites and stalagmites. The cave is one of the only underwater caves in the Bahamas that contains a large, dry dome room near the end of the cave. Divers must actually decompress prior to surfacing into the 30-foot diameter underground pool. With its close proximity to Georgetown, this area could easily be developed as a bird and bush walk park, including snorkeling.

**Current Threat(s):** Development. Survey roads have recently been cut up to the lake in which the cave system lies. This privately owned land will eventually be sold off for development.

**Recommended Protection Status:** Park/Recreation area/Bahamian Heritage Site

### Notes:

**1 No development/no dumping zone**

**3 References to dredging and siltation due to development.**

### Dan's Cave/Ralph's Sink, Great Abaco Island (1)



Located on Abaco Island, this extensive, inland lens cave has been explored for nearly 10 years by various explorers. Dan's Cave is considered by most explorers and researchers as one of the most extensively decorated caves in the world. Presently this cave has revealed more than 20,000 feet of explored underwater passages and is very close to being connected to Ralph's Sink adding an additional 10,000 feet of passage to the system. Biological collections by Dr. Jill Yager of Antioch College and Dr. Thomas Iliffe of Texas A&M University have revealed an extremely diverse troglobitic ecosystem that rivals Oven Rock and Basil Minns Blue Hole. Local dive operators currently use this cave as a tour dive destination.

**Current Threat(s):** Development. The biodiversity in this cave is one of the top 5 in the Bahamas. All measures should be taken to protect the habitat above and life within the cave. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area/Bahamian Heritage Site

**Notes:**

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## **Pirate's Mew Cave System, Grand Bahama Island (8)**

### **No Photos**

This cave system is located approximately 2000 feet to the west of the current western boundary of the Lucayan Caverns National Park created for the Lucayan Caverns cave system. Once regarded as the longest underwater cave in the world Lucayan Caverns system holds numerous species of troglobitic cave life and is the site of the discovery of an entirely new CLASS of crustacean known as *Remipedia*. The recently found and explored (December 2005) Pirates Mew system lies beneath the Queen's Highway with entrances on both sides of the road and within the adjacent mangrove swamp. There is little doubt that due to the direction of the known passages that this system will soon connect into Lucayan Caverns National Park. It is therefore suggested that in order to fully protect the footprint of the Lucayan Caverns National Park, that the western boundary of the park be extended well west of the Pirates Mew cave system in order to incorporate the new entrances of the cave.

**Current Threat(s):** Development. The biodiversity in this cave is one of the top 5 in the Bahamas. All measures should be taken to protect the habitat above and life within the cave.

**Recommended Protection Status:** Inclusion into the Lucayan National Park/Recreation Area/Bahamian Heritage Site

### **Notes:**

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

**3 References to dredging and siltation due to development.**

## **Mermaid's Lair/Owl's Hole cave system, Grand Bahama Island (2)**

### **No Photos**

A highly decorated lens cave system, this inland cave system represents some of the best cave diving in the Bahamas. Relatively easy accesses by divers, and shallow depths have made this cave one of the primary dive sites for local diver operators specializing in cavern and cave diving. An estimated 8,000 feet of explored passages hold a healthy troglobitic ecosystem. The Owl's Hole entrance is closed during certain times of the year due to nesting of the Giant Barn Owls. This cave system is routinely used by local dive operators as a tour destination. As this system lies beneath land that has been designated for a major resort development, governing organizations should work with developers on how best to minimize their impact on the system.

**Current Threat(s):** Development. The site is currently being developed for a major resort. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

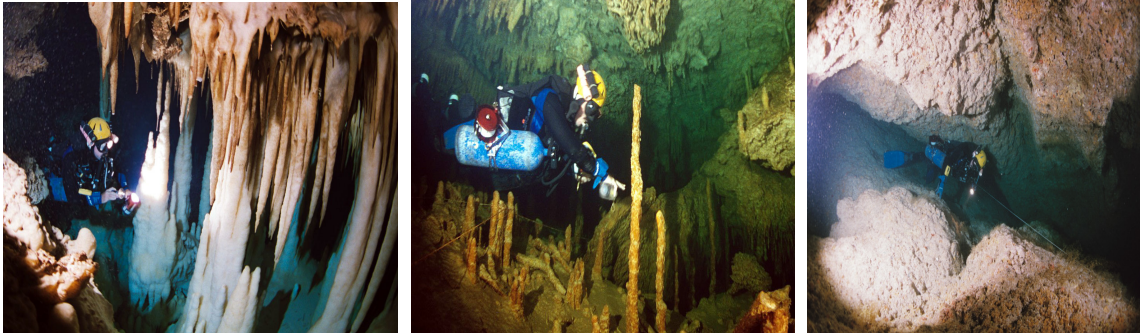
**Recommended Protection Status:** Park/Recreation Area

#### **Notes:**

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## The Zodiac Caverns & Great North Road Systems, Sweetings Cay, and Big Creek area East End, Grand Bahama (35)



Photos by James Rozzi

First dived by explorer Rob Palmer, these now famous caves are tightly gathered in a 6 mile line along a large fracture zone which parallels the North West Providence channel near the east end of Grand Bahama (Sweetings Cay, Lightbourn Cay). There is a unique combination of lens caves and deep marine fracture caves associated with this area. The lens caves represent some of the most highly decorated caves in the Bahamas, while the deep fracture caves offer some of the most challenging cave diving found anywhere in the world. Continued research in these caves has revealed a highly diverse troglobitic ecosystem, in both inland and marine cave systems. The shallows around most of the marine sites are already used by local guides as prime bone fishing areas.

**Current Threat(s):** Development. Encroaching refuse into the lakes that supply the water to these systems. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## Evan's Ocean Blue Hole, Nichols Town, North Andros (1)



Photos by Chris Spires

A large sinkhole-type cave system, Evans Blue Hole sits within one of the last old growth bush areas on Andros. The land is privately owned and maintained by the Evans Family. This amazing place has revealed some of the largest cave passages in the Bahamas, with subway like tunnels leading off in giant lens formed manner. More than 3,000 feet of huge underwater passages have been explored to date. No biological collections have been conducted here yet but many troglobitic species have been observed during initial exploration. This system boasts a deep freshwater lens, indicating that the dense forestation of the area continues to bring in sufficient rainwater to support the local community. This blue hole is visited by hundreds of hiking and swimming visitors each year. It is a classic example of the Bahamian interior in its natural state, with many large (30 feet high x 100 feet wide) dry caves in the sides of this huge karst depression. It is also the nesting area of at least one Giant Barn Owl.

**Current Threat(s):** Development. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Bahamian Heritage Site

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## Guardian Blue Hole System, Salvador Point, North Andros (6)



Photos by Brian Kakuk

One of the deepest blue hole systems in the Bahamas, Guardian Blue Hole is an extensive fracture cave system that has been explored to a depth of 440 feet, with more than 3,000 feet of passages combined in the 4 entrances. The cave is decorated with formations, and has sheer vertical canyon like walls, making this blue hole a primary dive site for local tour operators. Advanced “specialty” dives have been conducted by various tour operators in the area since its discovery in 1996. Biological collections within this system have revealed two species of Remipedia, with one of these species being found nowhere else on earth. Many other common cave adapted forms of marine life have also been collected at these sites. The system includes the entrances of Guardian Blue Hole, Little Frenchman Blue Hole, K-3 Blue Hole, and Swimming Hole as well as two off shore entrances.

**Current Threat(s):** Development. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**



## Arieto Blue Hole, Mastic Point, Central Andros (1)



Photo by Billy Cooksey



Photo by Brian Kakuk



Photo by Brian Kakuk

Surrounded by a beautiful green natural botanical garden of bromeliads, ferns and buttonwood trees, Arieto Blue Hole is a small, but important, fracture cave system in desperate need of protection. Recent explorations have revealed not only 2,000 feet of highly decorated passages, but also human remains and a small, ceremonial wooden canoe hull. Experts at the Bahamas Antiquities, Monuments and Museums Corporation have stated that these artifacts, if not Lucayan in origin, could possibly be some of the only artifacts of Seminole Indian heritage found on Andros Island. Some of the northern settlements of Andros lay claim to Seminole ancestry, but this would be the first documented evidence that Seminole Indians were ever actually on Andros. The artifacts have been photographed and proposals from the Bahama Caves Research Foundation are now under consideration for recovery of the items.

Biological collections have not yet been conducted at this site, but various species of cave adapted marine life have been observed at this site. It is not known if these species are common or new to science.

Unfortunately, the site has recently been turned into a dumpsite for the local primary school at Mastic Point as well as for other items such as appliances and vehicles. The property is privately owned and the owners have only recently been made aware that the dumping is taking place.

**Current Threat(s):** Dumping. This cave is a technically challenging dive. Use by divers not well versed in side mount diving operations poses a threat to the cave, artifacts and has the potential for fatalities.

**Recommended Protection Status:** Bahamian Heritage Site

### Notes:

**1 No Development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## The String of Pearls Blue Holes, South Andros (20)



Photo by Brian Kakuk

The longest continuous fracture cave system in the world, this massive system boasts at least 20 entrances that are suitable for diving, with many more entrances lying beneath beautiful, healthy coral reefs that have situated themselves over top of the system. This part of the fracture begins near Kemps Bay, South Andros and extends south, parallel to the Tongue of the Ocean to Dolly Cays. Within this fracture are some of the most famous and challenging caves in the Bahamas, luring explorers from all over the world. These explorers have documented depths within the caves of over 400 feet.

Biological collections within the String of Pearls systems have revealed many new species of cave adapted crustaceans as well as some sponges. The potential for biomedical discoveries in this system is considered high by researchers. The magnificent patch reefs that surround the many entrances to these caves are some of the healthiest reefs in the Bahamas, making them magnets for local snorkel tour operators. The associated reefs are also heavily relied upon by local fisherman as a source habitat for crawfish, grouper and snapper. There has been little direct evidence of negative effects from this level of fishing, though some coral damage has been noted, possibly from anchors of fishing vessels.

**Current Threat(s):** Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

**Notes:**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## Great Exuma Marine Caves (Elizabeth Harbor area) (9)



Photos by Brian Kakuk

Elizabeth Harbor contains 3 large fracture systems each one responsible for several underwater cave systems. The easternmost fracture runs directly under Stocking Island, just to the east of Georgetown, Great Exuma and contains 4 cave entrances, 3 of which are accessible to divers. These openings are Angelfish Blue Hole, Mystery Cave and Bottomly's Blue Hole. This system contains nearly 10,000 feet of underwater passages, with some areas within the cave reaching depths of 230 feet. These blue holes have been used for more than 20 years as dive destinations from local dive tour operators. The protected waters (they are nearly encircled within a small bay or "hurricane hole") allow tour operators to dive these sites when inclement weather keeps them from reaching off shore reefs.

Other systems within Elizabeth Harbor include Crab Cay Crevasse, Squeezy Cave, and Masters Harbor Blue Hole. These caves are situated along two other major fracture systems within the Harbor, each one nearing 200 feet in depth. All of these caves are used recreationally by visiting divers and explorers, as well as important destinations for local snorkel tour operators. The greatest concern to all of the systems within Elizabeth Harbor are the intake of polluted water due to inadequately engineered or maintained local sewage systems, injection wells, overboard discharge of liquid waste from annual yachts or "cruisers" and in some instances, dredging from shoreline developments.

**Current Threat(s):** Development over the sites would introduce waste, and petroleum products. Dredging has already affected the interior of the some of these caves. Wastewater from vessels and local septic systems is affecting the harbor that feeds these marine caves. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

### Notes:

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

**3 References to dredging and siltation due to development.**

## South Bight Blue Holes, South Bight, South Andros (9)

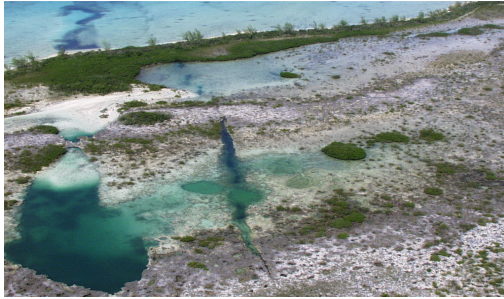


Photo by Brian Kakuk



Photo by Bruce Partridge

This system holds some of the most famous blue holes in the Bahamas. The South Bight (SB) blue holes run north and south along two major fracture systems between Driggs Hill and Lisbon Creek, South Andros. Local dive operators visit this area on a routine basis, using the healthy patch reefs that surround these entrances as an easy to reach snorkeling destination. These small associated reefs harbor every form of marine life that is found on the offshore reefs giving dive operators a site that is protected within the Bight when inclement weather keeps them from the offshore reefs.

The caves themselves are visited regularly by live aboard dive vessels carrying cave divers and explorers from all over the world. The entrances in this group include the famed Benjamin's Blue Hole (SB-4), SB-2, and Exley's Boiling Hole (SB-5). In 2000, a new passage was discovered in Benjamin's Blue Hole that is actually running southwest, up the south bight away from the sea. This is a significant discovery geologically, as well as nearly doubling the known length of the cave. Many new troglobitic species are sure to be discovered in this area.

The currents that feed these very deep systems (up to 350 feet deep) carry food for a variety of marine organisms, including some animals previously found only in anchialine caves (see information on Conch Sound Blue Hole below). These sites are directly connected to the sites listed below in the Driggs Hill/Congo Town Fracture area, and should also be considered for protection under the auspices of the proposed Gibbon McKenzie Foundation and National Blue Hole Park.

**Current Threat(s):** Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

### Notes:

**2 Use by unqualified divers – Guided diving or permitted diving only**

**3 References to dredging and siltation due to development**

## **Driggs Hill/Congo Town Fracture Area (The Gibbon McKenzie Foundation and National Blue Hole Park) (10)**

### **No Photos**

This area is the southerly, inland extension of the South Bight Blue Holes systems. These large inland blue holes and submerged caves were the focus of the late Mr. Gibbon McKenzie, a long time proponent of eco-tourism on South Andros. Mr. McKenzie conducted hundreds of bush, birding, and blue hole tours within this area, describing the wildlife, botany and the formation of land caves and underwater caves to hundreds of visitors to the Bahamas. His knowledge and concerns for this area have been passed down to local residents. Environmentalists and local eco-tour/resort operators have kept his legacy alive. Currently, Tiamo Resorts, owned by Mr. and Mrs. Michael Hartman, have been spearheading efforts to ensure that Mr. McKenzie's dreams of a National Blue Hole Park are kept alive. There is strong local support and conservation meetings are held monthly.

The submerged caves themselves are classic inland fracture caves; some harboring cave adapted marine life found nowhere else on earth. Explorer Rob Palmer investigated a few of these blue holes back in the 1980's, discovering one filled with small jellyfish. How these jellyfish found themselves so far inland is still a mystery. The systems are huge reservoirs of fresh water (20 to 30 feet of fresh water sitting on top of sea water), ensuring a potable water supply for generations to come.

Though some of the entrances are still very remote, others are in now in jeopardy from encroaching roads and new development. A road has now been cut between a blue hole known as Swimming Hole and another known as the Jellyfish Hole. Unless these areas are zoned, as non-development areas, trash and raw sewage from housing areas will surely find their way into these amazing submerged cave systems, possibly compromising local fresh water supplies and endangering a very fragile and unique submarine ecosystem.

**Current Threat(s):** Development. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area/National Heritage Site

#### **Notes:**

**1 No development/no dumping zone**

**2 Use by unqualified divers – Guided diving or permitted diving only**

## Conch Sound Blue Hole, Conch Sound, North Andros. (1)



Photos by Chris Crumley

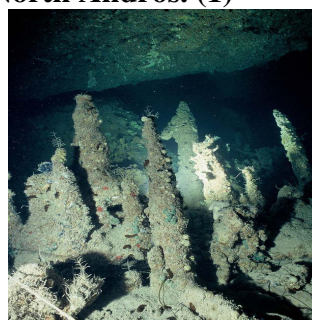


Photo by Brian Kakuk

This major marine cave system lies within wading distance off the shoreline of the Conch Sound Settlement. The cave has a long history of exploration by various explorers. Twice within recent history, the cave has held the record for the longest ocean (marine) cave in the world. The current known length of the cave is 6,223 feet from the entrance, and associated passages would add another 1,500 feet. The cave is highly decorated with huge formations that have been encrusted with millions of marine animals collecting food from the strong tidal currents. The cave has a strong draw for tour divers and snorkelers as well as world-class explorers wishing to penetrate the extensive passages of the mammoth system.

In 2001, while setting the current distance record in this cave, researchers found a huge room (150 feet long x 250 feet wide and 75 feet high) that contains literally millions of cave adapted animals that have only been known to anchialine or inland caves. This was the first discovery of these types of animals in a completely marine cave, making this the discovery of the room a significant one. Ongoing identification of these animals has revealed several new species of cave adapted crustaceans found no where else on earth.

The entrance to the cave is used by local fisherman for crawfish, snapper and baitfish. The local community has a definite sense of pride in this site, and a person has been hired on by local Government to maintain the parking and picnic area adjacent to the entrance. These efforts should continue underwater and local interested parties who are qualified to conduct dives in this system are currently planning a “Conch Sound Blue Hole Clean Up”.

**Current Threat(s):** Development. Dumping. Use by unqualified divers could lead to destruction of habitat and possibly fatalities.

**Recommended Protection Status:** Park/Recreation Area

### Notes:

**1 No development/no dumping zone**

**2 Use by Unqualified divers – Guided diving or permitted diving only**

**3 References to dredging and siltation due to development.**

## Dean's Blue Hole, Dean's Bay, Long Island. (1)



Photo by Tamara Thompsen

Having long held the world depth record for blue holes, Dean's Blue Hole is considered one of the largest underwater rooms in the world. In 1995, Mr. Jim King descended solo to the bottom of Dean's Blue Hole to an astounding depth of 663 feet. Aside from setting depth records, Mr. King's team also explored several cave passages in the shallower portions of the cave, some to nearly 1,000 feet in length. These passages are highly decorated in some areas and are in need of biological investigations.

Dean's Blue Hole is considered a geological oddity, as the processes that take place in creating blue holes have not been known to happen at the maximum depths obtained in Dean's. It is assumed that this feature is actually two blue holes stacked on top of each other, the newer one collapsing into the older one.

Regardless of how this system came to be, it represents the classic Bahamian blue hole feature and the unique geography found only in the Bahamas.

**Current Threat(s):** Development. Use by unqualified divers could lead to destruction of habitat and possibly fatalities, possible dredging activities associated with local development.

**Recommended Protection Status:** Park/Recreation Area/National Heritage Site

### Notes:

**1 No development/no dumping zone**

**2 Use by Unqualified divers – Guided diving or permitted diving only**

**3 References to dredging and siltation due to development.**

## **Conclusion**

It should be noted that this list is an evolving one, and represents sites that are considered important not only to the Bahamian public, but to the Bahamian and international scientific communities as well. As more exploration and investigations are conducted, other sites of even greater significance will eventually be revealed.

Bahamian law states that no person may own any body of water within the Commonwealth of the Bahamas. Other laws protect against the destruction or pollution of these waters, as well as those feeding the amazing inland and marine cave systems. The karst features presented here and the water within them belong to all Bahamians. It is only through exploration, research and education that we can provide appropriate information for Bahamians and their law makers to formulate well informed conservation efforts.

It is the hope of the Bahamas Caves Research Foundation that this proposal has brought the governing bodies of the Bahamas one step closer to understanding just how important these karst features are and what steps may be necessary for them to effectively protect these unique natural resources. Whether a site requires a logical plan for sustainable use or it is completely set aside for research purposes only, it is the intention of this proposal to ensure that these places will be here for use by future generations of Bahamians as a vital source of scientific information, drinking water and a major component of the tourism industry.

For more information on blue holes and underwater cave systems, the reader is encouraged to contact:

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[www.bahamasunderground.com/](http://www.bahamasunderground.com/)

[www.cavebiology.com/](http://www.cavebiology.com/)

[www.blueholes.org/](http://www.blueholes.org/)

[www.smallhopebay.com/](http://www.smallhopebay.com/)

[www.tiamoresorts.com](http://www.tiamoresorts.com)