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THE CAVE CONSERVATIONIST

The Cave Conservation and Management Section of the NSS

Conservation of Bermuda Caves

Thomas M. Iliffe

In February 2002, a large cave was uncovered by blasting and quarrying activities in Wilkinson Quarry, Bermuda, a privately owned quarry producing limestone aggregate for local construction purposes. Bedrock in the quarry consists of the highly cavernous Walsingham limestone formation of early Pleistocene or late Pliocene age. Also located on quarry property is Admiral's Cave, one of the largest, most historically significant, and most massively decorated dry caves in Bermuda.

The first outside note on the existence of this newly discovered cave occurred when a quarry worker reportedly brought a large and freshly broken stalagmite into a local bar. Word spreads quickly on a small island like Bermuda. As a result, the Government Conservation Officer and the Curator of the Natural History Museum came to examine the cave and only after strenuously stating their authority to the quarry manager, were allowed into the cave. They found an exquisitely decorated cave with actively growing speleothems throughout. The cave was reported to be quite deep, ending in a tidal, sea level pool. Having spent 11 years in Bermuda, investigating the biology of this island's caves, I was invited to visit the cave and evaluate its significance for the Bermuda Dept. of Conservation Services. In June 2002, I spent three days exploring, diving, and collecting biological specimens from the cave. Although previously approved, a fourth trip to the cave was canceled when the quarry management informed me that I was no longer permitted access to the quarry property or the cave.

The entrance to the cave is on the north side of Wilkinson Quarry at an elevation of approximately 20-m above sea level. The cave, which initially lacked any natural entrances, was broken into at its highest elevation during quarrying operations. The entrance consists of a 4 to 5-m diameter hole, now mostly covered with steel plates.

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Conservation Task Force

The Conservation Task Force Division of the NSS stands ready to lend assistance with advice, networking, and other help to any group of conservation oriented cavers who care about the future of the underground. Whether it be a single cave or an entire region, a situation requiring secrecy or publicity, often the best way to get a job done is to recruit some like-minded friends, and do it ones' self. Call upon the experience of other's to help get the job done. Contact David H. Jagnow, CTF Coordinator, at David@jagnow.com

Group and Grotto Conservation Awards

"This year the Group & Grotto Conservation Award was presented to…."

Presented by the NSS Cave Conservation and Management Section these awards are given annually to an NSS group and an NSS grotto that do the most for cave conservation and management. They are a continuation of the NSS Conservation Award that was presented from1975 to 1993 to an internal organization. In 1994, the NSS changed criteria of the Conservation Award. Under the new rules the NSS Award is has always gone to an Individual. The Section decided to continue the group award in order to encourage NSS groups to work for cave conservation.

Each award recipient receives a check for $100 and a certificate. Each award consists of a plaque with the names of all past recipients engraved on it. The plaque is kept in the NSS office in Huntsville, Alabama.

This year the Group Conservation Award was presented to the Southeastern Regional Associations', SERA Karst Task Force Committee. Charles Maus was presented the NSS Conservation Award.

Web Resources:

Cave Conservation & Management Section
http://www.acave.us/ccmc

Southeastern Regional Association
http://www.caves.org/region/sera

Call for Articles - NSS News Conservation Issue

It is time to send in write-ups on cave and karst conservation activities. Help produce a thorough NSS overview of conservation research, projects, and cave/karst awareness efforts. The upcoming Conservation Issue will include as section focusing on specific restoration and speleothem repair techniques. This issue will highlight especially successful, conservation-wise techniques in cave restoration and speleothem repair.

Submit conservation articles from one paragraph to several pages. Please do not exceed 2500 words (or a 15,000 character and space count). Photos can be submitted as slides, prints, or e-files. Check the NSS News Submission Guidelines and Style Sheet available on the NSS website www.caves.org (We prefer to receive submissions by email before December 31, but the final deadline is January 15, 2005. Submit articles, updates, protection concerns, photo's, kudos for individuals or groups and conservation efforts or opportunities.

Please give notice that you plan to submit by sending an email now.

Jim Werker and Val Hildreth-Werker, NSS Conservation Division Co-Chairs
PO Box 207, Cuna Cueva Hwy 27, Hillsboro, New Mexico 88042-0207
Email: werks@zianet.com

Call for NSS Conservation Articles

Conservation of Bermuda Caves

By climbing down though a hole between the plates and bedrock wall, one enters a room floored with breakdown on one side and massive flowstone columns on the other. A near vertical slope directly underneath the plates drops to the east side of a tidal lake. Large amounts of very fresh looking and apparently recent collapse, probably from quarrying operations, block this portion of the lake. The dry part of the cave consists of one large, steeply sloping chamber, subdivided into two sections by a flowstone barrier reaching from floor to ceiling.

The entire cave is exceptionally active with dripping water and abundant speleothem deposition. While flowstone covers most of the cave floor, numerous stalagmites, stalactites, draperies, soda straws, and helictites adorn all parts of the cave. Larger speleothems occur in a variety of colors ranging from brown to red and yellow, while the cave's soda straws and helictites are characteristically white to translucent.

A series of exploratory and photographic dives documented the extent of the submerged portions of the cave. Beginning from the main lake, a 10-m wide by up to 5-m high underwater gallery extends to the north. This passage has a smooth, down sloping ceiling with large, breakdown boulders on the floor. After about 50-m, the cave opens out into a large and exquisitely decorated underwater chamber. A profusion of extraordinarily long soda straws hangs from the ceiling or lies in piles on the floor. One wall contains the largest, most densely packed, and best preserved display of helictites that I have ever witnessed in any underwater cave in the entire world. Many of these are more than 30 cm long. The total extent of the underwater cave is approximately 150-m, while the maximum depth reached was 18-m, typical of most Bermuda caves.

Considerable destruction, ostensibly related to three separate events, has taken place within the cave. First, during opening of the cave by quarrying operations, large blocks of breakdown cascaded down the steep slope on the east side of the cave, breaking speleothems on the entrance slope and filling that section of the lake. Since the cave had no prior connection to the outside environment, opening of the cave has produced changes in humidity and temperature that may slow the rate of speleothem growth. Second, flowstone slopes and associated columns in multiple locations within the cave have been shattered or sheared in two, presumably by the effects of nearby blasting. Solid blocks of flowstone as much as a meter or more in thickness have been literally blown apart. Third, willful smashing of all manner of speleothems has occurred especially in the area of the entrance and the handline descending to the lake. According to Government Conservation Officer Jeremy Madeiros, most of this latter destruction took place between his first and second visits to the cave. A profusely decorated ledge near the entrance now contains only smashed remnants of pure white soda straws, stalactites and helectites. Sizeable stalagmites have also been intentionally broken.

Prof. Arrigo Cigna, a former president of the International Union of Speleology (UIS), Cumberland Caverns manager Mr. Roy Davis, and Canadian mining engineer Dr. Peter Calder were hired by the quarry management to support the case for quarrying away the cave. All three quarry consultants submitted written statements in support of destroying the cave, arguing that the cave is 1) small, 2) structurally compromised by blasting activities in the quarry and thus unsafe, and 3) not ecological or aesthetically significant. I have quite different opinions. The cave is approximate 200-m long with a depth of nearly 40-m including an 18-m deep, wholly submerged section of the cave. On a relatively small island like Bermuda where caves are confined to an even smaller region, this cave is of significant size. Regarding the structural integrity of the cave, large cracks are evident in several places, even splitting apart a 2-m flowstone slope in the cave; however most fragile soda straws and helictites that were not intentionally smashed by quarry employees have not been harmed. Since this cave has apparently never had a natural entrance to the surface, all speleothems are dripping and actively depositing new crystal. In the underwater galleries, meter long soda straws and dense clusters of 30-cm long helictites, formed during low stands of sea level in the Ice Ages, are present and perfectly preserved. At least four species of stygobitic crustaceans collected from the cave are on the 2003 IUCN (International Union for the Conservation of Nature) Red List as "critically endangered", the highest threat level accorded to organisms. Since these animals are only known from this and a very small number of other caves in Bermuda and since

(See Conservation of Bermuda Caves Pg. 4)

"The entire cave is exceptionally active with dripping water and abundant speleothem deposition"

Conservation of Bermuda Caves

"*This we damaged it, therefore we should destroy it philosophy sets a vary dangerous precedent*"

the groundwater quality in many parts of the island is declining, the survival of these species is uncertain. If further time were permitted for study of this cave, I am confident that additional endemic, cave-adapted species would also be found. The intentional destruction of their cave habitat is totally unwarranted.

The quarry owner is asking to be rewarded by continuing quarry operations and destroying the cave in return for having severely damaged it. This "we damaged it, therefore we should destroy it" philosophy sets a vary dangerous precedent which could eventually lead to the destruction of many Bermuda caves and the extinction of much of Bermuda's endemic cave fauna. Indeed, the very large and historically significant Admiral's Cave is situated on the edge of the quarry and is in severe peril due to blasting and other activities at the quarry - see: *NSS News*, August 2003:216-224. On one hand, the quarry operator has argued that blasting and other quarrying activities can be carried out without jeopardizing nearby caves, but here takes the case that his actions have made the Quarry Cave so structurally unsound and unsafe that it needs to be destroyed. Ironically, the owner of the quarry also owns the only two show caves in Bermuda.

A tribunal requested by the quarry manager in order to lift the current government ban on further blasting in the area of the new cave and originally scheduled for October 20, 2004 has been canceled. However, a court case with the quarry seeking a loss of income settlement from the government is still possible. I have thus set up a web page to document the situation. The Bermuda Department of Conservation Services has asked me to help identify professionals who could provide informal feedback concerning Prof. Cigna's plan for collapsing the cave and the potential effects on the cave fauna. Also, statements from cave experts who have viewed the diving video at my web page and feel that the cave is significant would be useful. At this point, it would be helpful just to find out what support can be relied upon. In lieu of carefully crafted letters, individuals can just provide some indication of what they can contribute. We will need some strong statements on the importance of the cave and the potential impact of its destruction on the fauna. I would very much appreciate it if you would e-mail an informal note to Jack Ward at jaward@gov.bm along with a copy to me at iliffet@tamug.edu

Wilkinson Quarry Cave - A Gravely Imperiled Ecosystem
http://www.tamug.edu/cavebiology/Bermuda/Quarry/Wqcave.html

Abstracts for 2005 NSS Convention Huntsville, AL

NSS conservation activities will be scheduled throughout the week of Convention. The Conservation and Management Section of the NSS and the NSS Conservation Division are accepting abstracts for papers to be presented at the 2005 NSS Convention, to be held in Huntsville, Alabama, July 4-8, 2005.

Send any questions or submit your abstracts for the NSS Restoration Forum and the NSS Conservation and Management Section by mail or e-mail to: Jim C. Werker & Val Hildreth-Werker, NSS Conservation Division Co-Chairs, PO Box 207, Cuna Cueva Hwy 27, Hillsboro, NM 88042-0207.
Submissions by email preferred werks@zianet.com

Wilkinson's Quarry Cave, Bermuda

John M. Wilson

In the 1970's several cave periodicals published editorial comments by writers nominating other cavers for the fictitious "*Cave Pimp of the Year*" Award.

In most cases the recipient had taken money for serving as a cave guide or providing caving expertise for some form of recreational activity. The nomination appeared to rest on the premise that no one should be materially compensated for caving knowledge, skill, or ability, especially if it related to recreation.

Maybe the writers were guilty of hyperbole. Or, maybe, the authors were caught up in the "money is bad syndrome" of the times.

It appeared to me that some of the Cave Pimp nominations could have been better presented. The writers did not compare all the good and bad. They did not determine if the nominee's actions had negative impact on the cave environment and whether or not the alternative of not providing these services would have resulted in a net gain for society?

Since then, a change has come to the group mentality of our society. Short-term profit is now all-important, and possible adverse effects to society as a whole are increasingly overlooked. Many cavers and other conservation-oriented people are amongst those taking a longer view of human-caused consequences.

After I received the email from Dr. Thomas Iliffe, Professor of Marine Biology, Texas A&M University at Galveston with copies of letters from the three consultants, I anticipated a comprehensive, long-term evaluation on the operator's proposal to destroy Wilkinson's Quarry Cave. Unfortunately, I was disappointed.

The hired consultants, Roy Davis, Peter N. Calder, and Arrigo A. Cigna evaluate and all reach the same conclusion, that the cave is small, dangerous, and not suitable for commercial development. Peter N. Calder recommends "*the quarry be collapsed by implosion; and that any remaining crater be backfilled with crushed stone, prior to excavating through the area. In this way, the safety hazard can be eliminated without disruption and the orderly depletion of the quarry can proceed*." This is a very effective and simple final solution for cave safety.

In evaluating a solution to a problem, one should determine not only if it accomplishes the desired goal but also that there are no better solutions that should accomplish the goal without as many negative consequences. An alternative that was not presented was gating and not quarry the cave area. All three rely heavily on the argument that the government should put absolute safety above any other benefit. But the driving factor seems to be the economic interests of the quarry and its contribution of limestone aggregate to the economy. There was no discussion of some other alternatives of allowing scientists, cavers, or the public, under the supervision of qualified adventure guides to enter the cave. The risk factors were not quantified. There is no discussion of the very long-term interest of the island in finding alternatives to quarrying their island. All three consultants failed to put in perspective that all caves are inherently unstable and unsafe in geologic time.

(*See Wilkinson's Quarry Cave Pg. 6)*

"I anticipated a comprehensive, long term evaluation on the operator's proposal to destroy Wilkinson's Quarry Cave. Unfortunately, I was disappointed"

Web Resources:

CCMS: Wilkinson Cave Letters
http://www.acave.us/ccms/wilkinsoncave.htm

IUCN Red List Threatened Species
http://www.redlist.org

Wilkinson's Quarry Cave, Bermuda

An alternative procedure of installing barriers to prevent unauthorized entry was not explained.

Davis has determined that "*The subject cave is not significant. If the integrity of the ceiling had not been compromised, it would have no potential as a show cave. The plan of the cave is very steep and a person would not see anything exciting on his/her way down in and back up. This cave does not have the charm that caves can afford. The quality of its decoration, which is not bad, is not good enough. As an experienced cave enthusiast, I want to see caves preserved and enjoyed. However, in this cave, there is no potential. I cannot imagine anyone going in to (sic) this cave and thinking that it was a wonderful experience. Such a person would be naive with caves…. the cave has no features that make it exceptional… no potential as a show cave*."

Apparently, Davis has determined that the minimum standard for a cave is that it must have charm, a person who enters it must have a wonderful experience, and it must have exceptional features. If this criterion from Davis is applied to all cave conservation situations, what would be the consequences? Roy Davis appears not to know any of the thousands of cavers who go into small tight caves. The Davis standard is not recognized in any speleological organization as being an acceptable standard for cave protection or conservation. I suspect that Davis would find extensive disagreement from many cavers.

Arrigo A. Cigna stated, "*I have examined the formations in the Quarry Cave and can report that there is nothing of scientific interest in these formations, which, on the other hand, are bountiful in other Bermuda caves that I have inspected, in particular Crystal Cave and Fantasy Cave. I have also had the opportunity to visit and inspect most of the accessible Bermuda caves during my two visits to Bermuda*."

Since Bermuda is a group of small islands and with other bigger or more interesting caves near the quarry, Cigna apparently means that there are enough caves to meet his standard of a cave quota and smaller ones can be removed if there is short-term economic interest to do so. The idea that, on a small island even a small cave may be of interest to scientists, cavers, and some tourists is not addressed. According to the Cigna standard, only the biggest and best caves in an area need to be protected. If the Cigna standard becomes accepted, let's hope that no one ever finds another use for Spider Cave in New Mexico. With Lechuguilla Cave and Carlsbad Caverns in the vicinity, what chance would Spider Cave have?

Peter N. Calder reported "*During my inspection, I entered the cave on a number of occasions. I observed numerous areas where parts of the ceiling was fractured and observed many large pieces of rock, which had fallen to the floor…In my opinion, the rock mass enclosing the cave has been severely damaged by blasting, and possibly by other natural processes. This damage is irreversible. The cave is a safety hazard. As long as it remains open, there is the probability that persons will continue to enter it. This is not safe and cannot be made safe. It also represents a serious hazard to persons working in the quarry."*

Throughout all of the evaluation no one has seen a rock fall in the cave. The risk is present but the extent of the risk is not known, since the fallen rock may have fallen over an extended period of time. Calder's statement that the cave "*is not safe and cannot be made safe.*" is suspect. This kind of absolute statement often reflects another agenda. Perhaps he meant to write that it is "…not cost effective to make the cave safe." but he didn't. Calder's "*implosion and backfill*" solution to an environmental risk management situation seems crude, simplistic, and inappropriate in a society that respects the natural world.

I saw no overall cost benefit analysis from the consultants, just opinions based upon the person's specialty interest. The case for destroying Wilkinson's Quarry Cave has not been made as it now stands. It is based on faulty criteria and many options are not addressed. The ethics discussion by the consultants is sloppy at best. Possibly the case has been made somewhere else and all factors considered. But I have not seen any unifying case that evaluates all factors in a long-term perspective. If Calder's plan is adopted there is no second chance, all other options are gone forever.

I wonder what the editorial writers for the 1970's cave periodicals would have said about these three consultants.

The Cave Conservationist

The Cave Conservationist is the official publication of the Cave Conservation and Management Section of the National Speleological Society. All regular members of the Section receive copies. There is also occasional distribution to others interested in cave conservation. Materials that are unsigned may be attributed to the Editor. Opinions expressed herein are not necessarily those of the NSS, CCM Section or the Editor. Permission is granted to NSS publications to reprint articles published in *The Cave Conservationist* providing credit is given to the author and *The Cave Conservationist* except where a copyright accompanies a specific item. Others who want to reprint material should contact the Editor. Newsletter contributions should be submitted to the Editor as a document or an attachment formatted to MS Word. Typed contributions are preferred, but handwritten will be accepted if the item is brief. Photo contributions for publication should be submitted electronically to the Editor.

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See Membership Application in this Issue

Cave Conservation and Management Section of the National Speleological Society

We're on the Web!
See us at:

http://www.acave.us/ccms/

Join our Section Discussion List!
E-mail:
conservation@wingedseed.com
Type "subscribe" in the subject field

Membership in the Conservation and Management Section

The NSS Conservation and Management Section is open to all members of the National Speleological Society as well as those interested in the conservation, management and protection of caves. Annual membership costs $5.00/ year and up to three years can be paid in advance.

The section gives an annual award to an Internal Organization or other NSS group (conservancy, conservation task force, project, etc.) that has made significant contributions to speleology in the field of conservation. Nominations may be made either by the group or others on their behalf.

Interested in conservation, management and the protection of caves?

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CONSERVATION AND MANAGEMENT SECTION – NOV 2004
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Application For Membership

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