

# MANAGEMENT PLAN FOR KNOX CAVE PRESERVE

## INTRODUCTION

The Knox Cave Preserve has been owned by the Northeastern Cave Conservancy (NCC) since 1979. The preserve consists of two parcels of land totalling 9.4 acres. Access to the main parcel, which is landlocked, is via a 30' wide right-of-way to the east (this is the old road to the cave). The other parcel is a 40' wide strip of land running from the main parcel north to Middle Road, has never been cleared, and is not presently available for visitors to use.

There are two known caves on the property. These are Knox Cave, known since at least 1787 and commercialized from 1933 to 1958, and Crossbones Cave, which was discovered by digging in the "New Sink" in early 2000. Passages in the two caves lie near each other, but there is no known connection.

Within a mile, there are five other known caves: Skull Cave (closed, and the second-longest known cave in the state), Ella Armstrong Cave (also owned by the NCC), Two-Second Pit (closed), Knox Annex (basically a roofed-over fissure), and Ken's Kave.

## PURPOSE OF A MANAGEMENT PLAN

The purpose of a management plan is to describe what is on a property and how it should be managed. A plan is not a static document that once written is placed on the shelf and forgotten. It is a document that is to be used and referenced on a regular basis. The property manager must follow the plan unless there is a compelling and over-riding reason for doing otherwise. Unless there is an immediate need, nothing should be done at a property that is not in the plan. If something new is desired, the plan should be amended only after careful, complete, and thorough analysis of the proposed changes or additions. Then, the amendments must be approved by the NCC Board.

If the management plan is the basis for a management agreement with a third party, then the changes must also be approved by the third party.

## HISTORY OF THE PROPERTY

Knox Cave is a former commercial cave and has a long, complex, and unusually well documented history. It has been known since at least 1787. A map made that year by Will Cockburn, then the Surveyor-General, shows the cave located in lot #47. The map was drawn for Stephen Van Rensselaer the elder and is of West Rensselaerwyck (Albany County). The cave does not appear on earlier maps of the same area made in 1768 and 1775.

On December 20, 1834, Jacob Van Auken purchased lot #47 from Hannah Coe.

An unknown author wrote about Knox Cave in the American Railroad Journal in 1835. The cave, says the author, was first explored by Thaddeus Chapman and more thoroughly on September 4, 1835 by Chapman, Peter Osterhout and Dr. L. Hubbard. The entrance was described as 40 feet deep and three-fourths of the cone-shaped depression as nearly vertical. After the entrance a second perpendicular descent of 38 feet followed by a 65-foot long downward sloping passage heading south was

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encountered. While much of the later description is fanciful, this account of the entrance passage is not. The current entrance passage does indeed slope downward to the south. It is between 80 and 100 feet long, and the total descent between the bottom of the depression and the floor of the first room is 63 feet. When the cave was commercialized in the 1930's, considerable alterations were made in the entrance passage. The American Railroad Journal description is that of an exceedingly well-decorated, large cave with 100-foot ceilings and stalactites eleven to twelve feet long. One can only conjecture on the existence of the stalactites, but there is a 70-foot dome in the cave and 70 feet may as well be 100 feet when you are trying to pierce the darkness with only a lantern.

Doc. L Hubbard, who first entered Ball's Cave in Schoharie, pronounces that much celebrated cavern far inferior in grandeur of appearance to the one above mentioned.

Lewis C. Beck visited Knox Cave when he was writing *Mineralogy of New York*. He also made the first map of the cave, which unfortunately lacks two things: an entrance and a direction indicator. Beck wrote:

*In the town of Knox, twelve miles northeast of Schoharie courthouse there is a cavern about five hundred feet in length, a ground plan of which is given in the annexed cut. This cavern contains masses of calcareous spar, in the forms which are usual in such localities. The specimens, however, are seldom so beautiful as those which are found in the caverns of the county of Schoharie.*

Mather mentions the cave only and likely did not visit it. *French's Gazetteer* (1860) mentions "two caves supposed to be of considerable extent, about 1/4 mi. N. of Knoxville." The second cave may be Skull Cave. A Prof. Solomon Sias of Schoharie Academy visited the cave in 1879. In 1886 a YMCA group of 30 youngsters used rope ladders to enter the cave, according to Walter Armstrong, a local resident at that time. Little is known about the cave between the 1840's and the 1930's except these trips and that the cave, for a while, was called Roach's Cave after one of the landowners.

The commercial history of Knox Cave started in 1933. On February 5th of that year, an article in the *Albany Times-Union* credits this date as the re-discovery of the cave. The February 5th article by Herbert C. Campbell is entitled, "Another Huge Cavern, About Mile Long, Is Uncovered in Helderbergs." The exploration party included Burdell J. Truax (the owner of the farm), his brother, his cousin, a hired man, and D.C. Robinson. Robinson was described as an "Esperance farmer who explored Howe's Caverns and Secret Caverns before they were open to the public." It is Robinson who would commercialize the cave.

The March 3, 1933 Schenectady Union-Star stated that "work on the new caverns at Knox will be started some time next week with a view of having the cave open for public exhibition early in May." The same newspaper carried an article on March 11th: "Will Use Dynamite To Enter Corridor Of Cave Near Knox," and it was referring to exploration of the parallel fissures called the Finger Passages near the Big Room. Discoveries here were credited to Duane Featherstonehaugh, a Union College student.

In the Spring of 1933, Robinson leased the cave property from Burdell J. Truax, and the commercialization of Knox Cave proceeded at a fast pace. The sink and entrance were cleared of debris by blasting, lights were installed, and stairs put in the cave. Opening for the first time on May 30, 1933, the parts of the cave exhibited were the Big Room, Dungeon, Indian Passage, the first two of the Finger Passages, and the route leading to the Gunbarrel.

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A warrant deed dated August 12, 1935, but not recorded in the county courthouse until January 31, 1946, transferred land from Ida C. Lautenbach to the Caverns Operating Corporation. This land was adjacent to the cave property on its eastern boundary & contained about 200 acres in three parcels. The land was on both sides of the County Route 252, Knox Cave Road. A farmhouse, built around 1810 with additions in about 1835, and a few small buildings came with the property. It is believed that in 1937 D.C. and Ada M. Robinson first took up residence near the cave by moving into the farmhouse. Naturally in later years this was known as the Robinson Farmhouse and it was one of the few structures on the property.

In 1935 Robinson commenced the construction of the Knox Roller Rink next to the cave, aided by R.A. Stephenson. Before its completion, Stephenson decamped with the funds for the rink and was never apprehended. A further setback occurred when the lighting system was destroyed by lightning, but it was restored immediately. Work on the rink was continued by Robinson, and two years later the rink opened for business under the direction of Charles Zwetsch. Since that time the rink was leased by a number of people up until the early 1960s when the last operator was Merlin Tubbs.

During the 1930's the cave had gained so much in popularity that on certain weekends up to 1,000 people were reported to have been guided through it. In maintaining the cave, Robinson was assisted by Mel Duell, D.S. Brown, and R.F. Peugh.

On November 13, 1945, Burdell J. Truax deeded over the nine-acre parcel containing Knox Cave to Ada M. Robinson. Apparently D.C. Robinson had been leasing the cave property from Truax since 1933.

In 1953 and 1954 Cliff Forman, Robert Kronsberg, and Warren Enck operated the cave and undertook extensive clearing operations. Prior to this time all that was known of the cave was the section which extended to the Broken Room. In 1954 a large new area was discovered by probing through breakdown in the Broken Room, including most of the known cave north of the entrance sink. Credit for this discovery is attributed to an explorer named Negley, who is also reputed to have discovered a 2400 foot passage beyond the Alabaster Room and a passage leading from the Fish Pool. He claimed to have found a passage rising behind a six-inch curtain to the east of the Big Room above the floor level, which led to a room so vast that he could not see the other side. Later rumor and legend called this the Football Room because it is said to be as big as a football field. Negley's fear of losing track of the entrance passage prevented his exploration of the room. He was later unable to locate the room. Over two decades of exploration by other cavers have failed to uncover any of these three areas, although efforts will continue to do so.

In 1957 and 1958 the cave was operated by Perry Waldorf, with Jim Proper of Berne and Jim Lane of Delanson as guides. This was the last commercial venture of Knox Cave. D.C. Robinson died in January of 1959, but apparently both the Roller Rink and the cave were operated until 1960.

In the mid-1960's, Al Polizzi of Howes Cave, NY, assumed ownership of the land under the name of Organa Industries. He did very little with the land, buildings, or cave, but he did commence a significant excavation effort on the surface in the Indian Sink. It was apparent from the detail of the 1962 Map that the Indian Passage in the cave runs directly under the Indian Sink, and that collapse forming the Indian Sink had blocked the passage below. Since subterranean efforts had failed to pass

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the breakdown blockage, Mr. Polizzi reasoned an excavation from the surface would reach new passages. To this end, he brought in a crane and bucket in 1966 or 1967 and started digging. What he found is subject to many rumors deliberately circulated, but most knowledgeable individuals agree he never found a thing. However, Mr. Polizzi is credited with greatly enlarging the Indian Sink. The vandalized crane has since been bulldozed into the sink. The Indian Sink and the remains of the crane are presently owned by Karin & Stanley Busch of Middle Road.

Al Polizzi had failed to pay the taxes on the property. On June 26, 1968 a public auction was held at the Roller Rink. The sale resulted in the property being divided into three parcels as follows:

200 acres including the cave, the roller rink, the Robinson farmhouse, and acreage to the east were sold to Dr. Dominic A. DeLisa of Schenectady for \$19,050,

130 acres farther to the east was purchased by a Mr. Donaghy of Schoharie, executor of Ada Robinson's estate, for \$13,000, and

20 acres immediately west of the cave property including the Indian Sink were sold to Richard Loden for \$3,000. (This has since been bought by Karen and Stanley Busch.)

On August 11, 1968, the Knox Roller Rink and a nearby shed were completely destroyed by fire of suspicious origin. Then, on October 21, 1968, - a rainy Monday evening, the Robinson Farmhouse and out buildings were completely destroyed in a fire also of suspicious origin.

In 1970 and 1971 a group of experienced cavers removed the staircase from the First Pit. This was done without Dr. DeLisa's permission or knowledge. Their intentions were good - to take away the easy staircase, which had shown signs of decay, and to leave a 25-foot pit. The rank beginners and the Knox Cave party-goer should have been discouraged from going into the cave, and rescues should have been minimized. Precisely the opposite effect was achieved. The inexperienced visitor still wanted to see the cave, and employed some of the worst climbing techniques imaginable. The neophytes used any rope available. Logs and boards were jammed down the drop, and some even tried to climb down on the flimsy electrical lamp cord that was left over from the days of commercialization. Apparently most were successful in climbing down the pit (the laws of gravity were on their side), but climbing up after exploring the cave created the biggest problem. With no knowledge of proper vertical caving techniques, the first attempt was hand-over-hand up a small diameter rope or electrical wire. The first pit quickly became a trap and a cause for many rescues much to the local fire department's annoyance and dismay.

In Fall 1971 a new sinkhole was found in the southwest corner of the property. Formed by the collapse of the surface, the New Sink, as it was named, had the dimensions of a 10-foot diameter and six foot depth in February of 1972. Today it is the entrance to Crossbones Cave.

October 13-14, 1973, the Boston Grotto and Franklin Pierce College Outing Club completed the installation of the steel ladder in the first pit. It is an extremely sturdy ladder, constructed of welded steel rungs placed into box steel girder handrails. The whole affair is firmly anchored into reinforced concrete platforms at both the top and bottom of the pit, and the handrails have been filled with concrete as well.

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In Summer 1974, Dr. DeLisa approached John Mylroie, then chairman of the Northeastern Regional Organization of the National Speleological Society, about the possibility of donating Knox Cave to the NSS. Mylroie started investigations into the matter. However, events were to overtake the plans for donation.

On May 3, 1975, a group of beginners from State University of New York at Albany (SUNYA) were waiting at the bottom of the sinkhole to enter the cave. There was still considerable ice in the sink. Everyone had entered except Glen Bumpus and Jayne Schiff. A chunk of ice said to be 10' x 10' x 3' fell from the wall of the sink and killed Bumpus and left Schiff a paraplegic. In August, 1975, Dr. DeLisa was named as a defendant in a lawsuit with Schiff, the injured girl, as the plaintiff.

In September 1975, Dr. DeLisa posted his land and fenced and posted the Knox Cave sinkhole. Local law officers were requested to actively arrest trespassers on the property. Dr. DeLisa's lawyers requested that negotiations on the donation of the cave be suspended until the suit was settled. The Board of Governors of the NSS also wanted to see the outcome of the lawsuit.

The NSS eventually declined donation of the cave. In 1979 the Northeastern Cave Conservancy was formed to accept the cave. The cave continued to be frequented by many people without getting permission. The barricade at the road was often removed and people drove back to the cave. In 1987, several tons of limestone rip-rap were placed where the eastern right-of-way enters the property. This, coupled with a policy of having trespassers arrested, cut the unpermitted visits to the cave significantly.

In late 1995 Steve McLuckie found a northern extension off of the Alabaster Room after a 20 minute dig. In 2000 McLuckie returned and was joined by Québec cavers who squeezed into a stream passage. The new passage added 940 feet to the cave. This was the most significant addition to the cave since 1954.

In early 2000 a group of cavers led by Tony Hopkins and Tom Barton requested and were given permission to dig in New Sink. They removed fill bulldozed into the sink by the Busches and followed the sinking stream to the top of a 60-foot dome. Crossbones Cave, the newly opened cave, has about 500 feet of passage. The west end of Crossbones lies above and in line with the Indian Passage in Knox.

## **UNDERGROUND RESOURCES**

**BIOLOGICAL** - No troglobites are known to exist in the cave. It is possible that *Stygmobromus alleghaniensis*, an amphipod, exists in the cave. Also, likely to be present would be a cave cricket, *Ceuthophilus maculatus*, the cave moth, *Scoliopteryx libatrix*, harvestmen, *Leiobunum* sp., and snails, *Mesomphix* sp. More significant is the bat population. The bat count performed on 12/08/86 counted a total of 571 bats. Of these, 549 were little brown bats (*Myotis lucifugus*). There were 11 small footed bats (*M. leibii*), 5 northern long-eared bats (*M. septentrionalis*), and 6 eastern pipistrelles (*Pipistrellus subflavus*). This is nearly double the number of bats counted in 1980. A subsequent bat count showed a significant increase in populations. Of a total of 1948, 1820 were little brown bats, 6 were small footed bats, 4 were northern long-eared bats, 57 were eastern pipistrelles, and 61 were unidentified. The bat population has been drastically reduced by White Nose Syndrome, and the cave has been the site of multiple scientific studies related to WNS. The bat population should continue to be monitored according to recommendations by the NYS DEC.

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## GEOLOGICAL & HYDROLOGICAL - by Art Palmer

Geologic Setting - Knox Cave is located near the northeastern edge of the Appalachian Plateau in limestones of Silurian and Devonian age (about 380-420 million years old). These include, from oldest (lowest) to youngest, the Brayman Dolomite, Cobleskill Limestone, Rondout Dolomite, Manlius Limestone, Coeymans Limestone, and Kalkberg Limestone. There are very few other caves anywhere in the world that extend through so many different rock formations. These rocks are all moderately to highly soluble, and together they host the majority of large caves in New York. At Knox Cave the rocks dip to the south-southwest at about two degrees. They are highly jointed, with most joints oriented vertically with trends clustering at NNE-SSW and approximately E-W.

Although no dating has been attempted in the cave, other large caves in the region are known to predate the latest glaciation, and most appear to be at least half a million years old. Caves of the Knox area have developed along with the erosion of the surrounding landscape. As preglacial stream valleys were cut into the limestones, underground water flow became rapid enough to allow solution conduits to develop.

During the past several tens of thousands of years, glaciers covered the region to thicknesses of more than a mile. Many caves were partially filled by sediment plastered down by the moving ice, and some of the valleys into which they drained were partly filled with glacial sediment, blocking former springs and perhaps diverting the underground water to outlets higher in the valley walls.

Cave Origin - Knox Cave was formed by subsurface drainage from the limestone plateau to the north, which contains a variety of fissures and partly filled shafts. These openings are not presently traversable by explorers, as they are either too tight or have been clogged by glacial sediment. When the cave originated, the plateau was probably more extensive than it is now and could have supplied a greater flow to the cave than what we see today. Glacial meltwater may also have contributed to the cave enlargement, but there is no evidence for past flow rates higher than those during floods today.

The cave-forming groundwater followed a direction more or less down the local bedrock dip to one or more springs in the valley of Beaverdam Creek, just north of the Town of Knox. Water in the cave discharges into at least one of the present springs in the present valley (Woodland Spring, and perhaps also Beaverdam Spring). These springs are near the top of the Coeymans Limestone, so water in the caves has to rise across the stratigraphic section to reach them. Of course the overall flow is downhill, but the beds dip at a rate steeper than the water table. Glacial sediment filled the valley to depths of a few tens of feet in places, apparently reducing the efficiency of groundwater outflow. There is great evidence in Knox Cave for past flooding, and floods continue to fill the lower parts of the cave even today, despite the small drainage basin that feeds it. Much of the glacial sediment seems to have been removed by erosion since the final glacial retreat (about 14,000 years ago), but remnants remain at the surface and in nearby caves.

The confusing nature of passages in Knox Cave can be explained partly by this varied flow history. The cave consists of three major passages, which are probably descendants of one another, fed by the same general catchment area to the north: (1) a high canyon consisting of the canyon leading from the Alabaster Room, which continues as the entrance passage, Big Room, and Indian Passage; (2) a wide tube consisting of the Football Room, Alabaster Room, room north of the Gunbarrel, and passage south of the Gunbarrel; and (3) the presently active stream passage that underlies the northern half of the

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cave. Level 1 was segmented by collapse at the entrance sinkhole and at the Indian Sink. Level 2 is discontinuous because of partial sediment fill. It appears to have been obliterated by fill and breakdown beneath the room at the base of the metal access ladder. Level 3 ends in tight sumps both upstream and downstream, which may be divable with effort.

Superimposed on these major passages are many subsidiary passages, mainly fissures. They were formed by periodic flooding, accentuated by the blockage of passages farther downstream. The fact that scallops are seen in only a few places in the cave may be the result of passage enlargement by relatively static floodwaters. The lower parts of the cave still flood rather severely during periods of heavy runoff, when water pours into the entrance sink from the field to the west. Vegetal debris clings to the passage ceiling in the vicinity of the Fish Pool. At times the rooms south of the entrance partly fill with water to depths of at least 10 feet. I have seen water roaring into the entrance at a rate that would instantly carry people away if they attempted to enter. Half-inch-long scallops in the Salamander Fissure indicate very fast flow of more than 10 feet per second. Scallops elsewhere in the cave (for example, in the Keyhole area) are generally a few inches long, indicating considerably slower flow.

Some of the fissures appear to have been enlarged partly by descending vadose water (e.g. the fissures south of the entrance sinkhole). They exhibit strong differential solution and fluting, and contain active drips today. Enlargement seems to have been greatest in the Manlius Limestone, which leads to the question of why the descending water has not enlarged the fissures nearer the surface as well. There are two possible reasons. First, the fissures have simply been widened from pre-existing floodwater passages, which were clustered in the Manlius. Second, the descending water probably retains much of its solutional aggressiveness as it moves downward through the Kalkberg, because fissures in that shaly limestone become lined with insoluble residue, which is not washed away by diffuse seepage, retarding dissolution. The Coeymans is coarser grained than the Manlius and dissolves a bit more slowly, although the resulting difference in solution rate is small.

The large rooms south of the entrance were formed at least partly by collapse between adjacent fissures. Much of the debris still covers their floors, and some apparently has dissolved away as the result of periodic water flow.

Geologic Details - The cave offers a view of an unusually thick exposure of the local limestones. All of them were deposited in a shallow sea that covered this part of the continent during the Silurian and Devonian Periods. Changes in water depth, wave action, location of the shoreline, and water chemistry account for the differences among the rock units.

The shaly and cherty Kalkberg Limestone is exposed in the sloping walls at the top of the entrance sinkhole. It contains a variety of delicate fossils representative of rather quiet-water conditions. The tiny grotto known as the Mouse Room, located directly above the main entrance, is the only passage in the cave located in the Kalkberg. The Coeymans Limestone is coarsely crystalline, thick-bedded, and contains thick-shelled fossils, all of which indicate considerable wave agitation while the rock was being deposited. It forms the vertical walls of the entrance sinkhole and extends about half-way down the entrance passage. The total thickness of the Coeymans is locally about 50 feet. Its contact with the underlying Manlius Limestone is located at the uppermost break between thick and thin beds. An erosion surface separates the two, and in places the contact shows minor irregularities where the top of the Manlius was eroded slightly before the Coeymans accumulated on top of it. The ceiling of the

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canyon passage south of the Alabaster Room is at the base of the Coeymans.

The Manlius Limestone consists mainly of thin limestone beds with shaly interbeds, with a couple of thick beds near the top that contain the swirly shapes of algal fossils. The total thickness of the Manlius is 45-50 feet. Except for some of the upper beds, it was deposited in rather quiet lagoonal water and contains small, delicate fossils. Most of the passages in the cave are located in the Manlius. It is thanks to differential solution of the Manlius that it is so easy to scramble up and down some of the climbs in the cave. The Manlius has supplied the thin breakdown slabs so common in the cave, such as those in the Broken Room and the Football Room.

Few New York State caves extend below the Manlius. Knox is a major exception. The Keyhole and the passage leading to the Gunbarrel are located mainly in the Rondout Dolomite. The Rondout consists of 8 feet of fine-grained, thin-bedded, clay-rich dolomite with virtually no fossils. It was deposited near shore under highly evaporative conditions. Close inspection often shows thin laminations within many of its beds. The contact with the overlying Manlius is located a couple of feet above the floor of the Salamander Fissure, near the ceiling level of the Keyhole, at the wide part of the Gunbarrel, and at the point where the wide, low crawl north of the Alabaster Room drops into the recently discovered stream passage. The contact lies just beneath the floor of the Football Room.

The underlying Cobleskill Limestone is only about 8 inches thick. It is a yellow-weathering, shaly limestone that forms one or two thin beds that in places are rich in fossil corals, which give weathered surfaces a mottled appearance. Depositional conditions were somewhat turbulent. It is located near the ceiling level of the alcove that contains the Fish Pool. It also appears in the upper walls of the room near the upstream sump that terminates the active stream passage, at the very north end of the cave.

The cave's biggest geologic surprise is the Brayman Dolomite, which appears in the walls of the Fish Pool. It is mainly shale, but with a high percentage of dolomite that makes it soluble enough to form caves where conditions are favorable. Fossils are rare. It was deposited in muddy near-shore water where considerable sediment was being washed in from the adjacent land. A few relatively competent dolomite-rich beds stand out from the cave walls in the Brayman, but in general its surfaces are muddy, slippery, and crumbly. Seventeen feet of Brayman is exposed in the cave, and this may represent its entire thickness in the Knox area. The ceiling of the active stream passage drops well below the top of the Brayman. This is the only known cave passage to extend entirely into the Brayman without having eroded its way downward from initial passages in the overlying Cobleskill. In places the passage follows a bedding-plane thrust fault lined with white strontianite crystals, which apparently served as the initial route for the water that formed the passage.

Relation to Other Caves - Knox Cave is probably one of the oldest caves in the local plateau. Its main passages lie at an elevation well above those of nearby Skull Cave. Skull appears to have formed simultaneously with the later phases of Knox but because of its larger catchment area has outstripped Knox in size. Today the drainage from both Knox and Skull parallel each other and drain to springs in the same part of the Beaverdam valley. Ella Armstrong Cave is slightly higher than Knox Cave, both in elevation and stratigraphically, and may be older still.

Crossbones Cave is a downstream segment of Knox Cave, separated only by breakdown and fill beneath the Indian Sink. The continuation of the Indian Passage and at least parts of the Big Room in Knox are seen in the westernmost passage of Crossbones. In Knox these passages have been enlarged

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by a combination of collapse and solution, but in Crossbones the passage is partly obscured by sediment fill. This Crossbones passage is certainly not the huge downstream continuation of Knox that many people once hoped for. The east-west passage in Crossbones is a crawlway that correlates in level with the oldest of the main passages in Knox. It may have been a temporary strike-oriented passage that formed at the water table, fed by water from Knox that came down the dip from the north. This interpretation is tentative, though, since the Crossbones passage is a mere fragment and flow indicators are ambiguous. Drainage from the Salamander Fissure in Knox appears to pass right under Crossbones without connection, on its way to the present spring.

Ken's Kave (formerly Fiato's Cave) lies at the southern edge of the plateau downdip from Knox. It is located mainly in the Coeymans Limestone and gives the impression of having formed by floodwater overflow from the main drains of Knox and other caves. It takes considerable water today from its own local catchment area, but the severity of flooding in the cave suggests larger sources from overflow. Many of the passages in Ken's Kave terminate in clay chokes extending from floor to ceiling, which suggests that the entire cave was once clay-filled. This is most likely the result of ponding by glaciers and glacial sediment. Today, during high flow, water squirts upward through small fissures in the soil in many places at the southern edge of the plateau. A line of sinkholes extends between Knox Cave and Ken's Kave. Some show promise of giving access to passages intermediate in the system, with the aid of digging.

The present sediment fill in the Beaverdam valley does not appear thick enough to form a major barrier to groundwater flow, but clogging of former springs and open fissures with glacial till may still have a considerable effect. Geophysical examination of the valley and its preglacial configuration are in progress. Knox Cave and its related caves undoubtedly hold many clues to the glacial and erosional history of the area.

PALEONTOLOGICAL - No significant resources are known to exist.

ARCHEOLOGICAL - No significant resources are known to exist.

HISTORICAL - Despite a 1930s publicity stunt involving "Mormon tablets," there are no significant resources known to exist.

## **SURFACE RESOURCES**

BIOLOGICAL - Knox Cave was last operated as a commercial cave in 1958. The roller rink continued operation until 1960. Thus, the land has been "wild" for only the last several decades. Because of this, much of the property is typical of an old field ecosystem. Besides an abundance of grasses and annuals such as goldenrod (*Solidago* sp.), Queen Anne's lace (*Daucus carota*), spotted knapweed (*Centaurea maculosa*), chicory (*Cichorium imtybus*), and mountain thyme (*Thymus serpyllum*) a number of early successional woody scrubs and trees are common. These include, but are not limited to: gray dogwood, *Cornus racemosa*; quaking aspen, *Populus tremuloides*; white pine, *Pinus strobus*; buckthorn, *Rhamnus cathartica*; staghorn sumac, *Rhus hirta*; white cedar, *Arbor vitae*; oaks, *Quercus* sp.; and ash, *Fraxinus* sp. Also present are: red osier dogwood, *Cornus sericea*; hawthorn, *Crataegus* sp. probably *C. succulenta*; American elm, *Ulmus americana*; and large-toothed aspen, *Populus grandidentata*. In the southwest part of the property is a small wetland. Typical vegetation here is gray dogwood, *Cornus racemosa*; red osier dogwood, *Cornus sericea*; sedges, *Carex* sp.; and sensitive fern, *Onoclea sensibilis*.

The most common mammal is probably the meadow vole, *Microtus pennsylvanicus*. The property is

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frequented by white tail deer and a well-worn deer trail crosses the property.

**GEOLOGICAL & HYDROLOGICAL** - The surface of the Knox Property is basically flat. Along the southern boundary is a small wetland. The only relief is provided by the sinkholes. The Knox Cave Sink and Crossbones Cave provide windows into what lies immediately below the surface. This is the Kalkberg Limestone. The Kalkberg is a fossiliferous limestone. Its outcrop on the property is not unique or unusual.

**PALEONTOLOGICAL** - No significant resources are known to exist.

**ARCHEOLOGICAL** - No significant resources are known to exist.

**HISTORICAL** - No significant resources are known to exist.

## **ASSUMPTION OF RISK STATEMENT**

Cave exploration and hiking on karst terrain may involve risk or injury, even death from various hazards, both obvious and obscure, including, but not limited to, slippery and uneven ground, open pits, injury by acts of other people, falling, being struck by falling objects, becoming lost, the presence or sudden appearance of water, and hypothermia. All cave visitors will abide by the normally accepted rules of safe and conservation minded caving as outlined by the National Speleological Society, 6001 Pulaski Pike, Huntsville, Alabama 35810-1122.

## **ACCESS POLICY**

Visitors to the Knox Cave Preserve are required to obtain a permit and to follow the guidelines listed below. Visitors who fail to obtain a permit or abide by these guidelines are considered to be trespassing and are subject to arrest. The permit is available from the Property Managers via electronic or standard mail, and will be printed on NCC letterhead. The permit should be clearly displayed on the dashboard of a vehicle. Vehicles must park in the designated parking area where the eastern right-of-way meets Knox Cave Road. Vehicles not displaying a permit may be towed at the owners' expense.

### **Guidelines:**

1. The minimum group size is 3. In special circumstances, permission may be granted to 2 individuals.
2. All visitors entering the cave must have a helmet with chinstrap and at least 3 sources of light (one of which must be mounted on or attached to the helmet).
3. All cavers are expected to abide by the normally accepted rules of safe and conservation minded caving as outlined by the National Speleological Society, 6001 Pulaski Pike, Huntsville, Alabama 35810-1122 ([www.caves.org](http://www.caves.org)).
4. Knox Cave and Crossbones Cave must be treated as unique natural resources, and nothing should be taken out of the caves except trash.
5. All work projects must be clearly defined and authorized beforehand.
6. Each group is expected to clean up any trash in the caves or on the property.
7. Groups where any money has exchanged hands including, but not limited to, cave-for-pay, camps, schools, colleges, and outdoor education programs, as well as churches and scouts, must contact the Special Use Coordinator for information on access to the cave at [specialuse@necaveconservancy.org](mailto:specialuse@necaveconservancy.org)

**Periods of Access:** At the present time Knox Cave is closed from October 1 until May 15 or when the sinkhole is ice-free, whichever comes later. As a matter of clarification, this refers to all ice, not just

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ice on the wall of the sink. This is for the safety of visitors as well as to protect hibernating bats. Crossbones Cave is open all year.

For Knox Cave, it is strongly recommended that individuals be belayed down the ladder.

Crossbones Cave is a vertical cave. All cavers must have their own equipment for descending and ascending. Rope adequate for rigging the entrance drop will be required.

## **USE CONFLICTS**

There is often a conflict between cave access and cave closure for bats. Officially, Knox Cave has been closed for hibernating bats since 1980. For many years, this closure was ineffective due to heavy trespassing, however, monitoring of the preserve and a number of arrests seem to have brought this issue under control. With the opening of Crossbones Cave in 2000, there is potential for a new issue. At present Crossbones Cave is open year-round. Should Crossbones and Knox be connected, Crossbones should adopt the same closure schedule as Knox.

## **RESEARCH RULES**

All research carried out on the NCC preserve must meet the following criteria:

1. Researchers must initially contact the NCC Science Coordinator.
2. The goals and objectives of the research must be clearly defined.
3. There must be a clear beginning and end to each project, with the exception of long-term monitoring studies.
4. The work must not cause permanent damage to any caves, natural features, native biota, or historical resources nor interfere with natural hydrologic or chemical processes.
5. The research plan must assure the maximum safety of all concerned.
6. The work must not interfere with the "experience" of other property visitors.
7. Unless specifically authorized by the NCC Board, researchers must operate within the confines of the established management plans for each property.

## **EXPLORATION RULES**

The main possibility for exploration on the Knox Cave Preserve is digging. Any digging projects will have to be approved by the Preserve Manager. Persons proposing a dig project shall submit a plan to the Manager detailing where they plan to dig, how long they plan to dig, and where they plan to dispose of the spoils. Plans should also include how the diggers plan to remediate the dig should it be abandoned. Projects that include potential passage modification require specific approval from the Preserve Manager. Any dig that is not worked on for more than one year, excluding cave closures for bat hibernation, shall be considered abandoned and any subsequent work in the same area will require Manager approval.

## **PUBLICITY POLICY**

The cave is not publicized in magazines or newspapers of general circulation. Caver's publications like *The Northeastern Caver* and the *NSS News* may contain information on the latest discoveries. Some grotto publications may also have information, but again these have limited circulation and usually do

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not give locations.

## **SURFACE MANAGEMENT**

There are to be no fires without permission.

The Preserve Manager may issue hunting permits each year at their discretion. Hunters will be required to check the parking area to ensure that no cavers are present on the property.

An informational kiosk should be maintained on the property.

In addition to more frequent routine checks of the trails and sinkholes, the perimeter of both parcels and the electrical right-of-way which crosses the main parcel should be inspected at least annually.

## **RESCUE CONSIDERATIONS**

Both Knox and Crossbones Caves pose problems with respect to cave rescue because of tight passages that are difficult to access.

Knox Cave - For rescue planning Knox Cave has long been split between that part of the cave north of the Gunbarrel and that part south of it. The opening of the Gunbarrel Bypass somewhat obviates the need for this bifurcation. However, it will be maintained for the sake of discussion and rescue from the Gunbarrel will be discussed separately.

South of the Gunbarrel - There are three (3) danger areas in Knox Cave south of the Gunbarrel. These are the ladder, the Finger Passages, and the end of the Indian Passage.

During the period between the removal of the stairs at the end of the entrance passage and the installation of the ladder in October 1973, there were a number of rescues in the cave. These resulted from individuals climbing down branches or fencing or wires to gain access to the cave. There were so many rescues that the Knox Volunteer Fire Dept tried to have the cave permanently closed. This threat ended when the ladder was installed. The ladder poses its own problems. These include a wide spacing between rungs, very smooth rungs, and a step that is hard to use due to its proximity to the concrete deck at the top. Most of these problems could be eliminated by belaying people while on the ladder. Thus, it should be recommended to groups, especially those with beginners, that they consider belaying individuals using the ladder. For individuals under 16 years old, belaying should be mandatory.

Over the years a number of individuals have dug at the end of the Indian Passage. The loose material in the collapsed dome at the end of the passage makes this an extremely dangerous undertaking. The discovery of Crossbones Cave would seem to eliminate the need to dig here. Because of the danger and the apparent pointlessness, individuals should be discouraged from digging here. If they insist, special precautions such as continuous shoring need to be put in place.

The Finger Passages are both tight and have vertical relief. This combination makes rescue from this area problematic. Clearly, a SKED stretcher would be needed to evacuate a patient from the Finger Passages. However, due to vertical drops with limited space at the top of the drop, it may be necessary

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to place bolts to create points for re-directing the haul line. Thus, a hammer-drill and bolting kit might be necessary for removing an injured caver from the Finger Passages.

The Gunbarrel - Since the ladder was installed, the majority of incidents in the cave have resulted from individuals getting stuck in the Gunbarrel. This is typically caused by a knee getting stuck in the narrow slot at the bottom of the passage. Such incidents are not to be taken lightly. The individual is in close contact with the bedrock and could become hypothermic very easily. In the past it was often difficult to free someone from such a situation because typically the knee is distal to the rescuers and the passage is small. With the Gunbarrel Bypass such rescues should be considerably easier as it will permit a rescuer to approach the trapped individual from the north end of the passage.

North of the Gunbarrel - Until the opening of the Gunbarrel Bypass, cavers dealt with rescues beyond it by hoping none would be necessary. The prospect of working an individual in a stretcher through the Gunbarrel was daunting. The bypass has greatly simplified the planning for a rescue beyond the Gunbarrel. However, it has also created a situation that may increase the need for a rescue.

The entrance to the bypass is much more inviting than the Gunbarrel and trespassers will have no problem finding their way to it (after the bypass was open, the first group arrested for trespassing had found the route without a problem). This will bring less experienced individuals to the Great Divide. The Great Divide is a 30-foot climb up into the passage to the Alabaster Room. Cavers must either make this climb or bypass it via the Lemon Squeeze. Over the years there have been a number of incidents here. Fortunately, none have resulted in the need for a full-fledged rescue. Whether this record will be maintained is unknown, but it is the 30-foot exposed climb at the Great Divide which poses the biggest concern north of the Gunbarrel. While a rescue from the base of the Great Divide would not be trivial, the presence of the bypass will simplify the execution of such a rescue.

If a rescue is necessary beyond the Great Divide, it will likely be necessary to place anchors for hauling a stretcher up from the Alabaster Room or for lowering one from the top of the Great Divide or both. As with the Finger Passages, a hammer-drill and bolting kit might be necessary for such a rescue.

Crossbones Cave - Probably the most troublesome aspect of a rescue from Crossbones Cave is the entrance. At the top of the entrance drop is the Toilet Bowl, a tight squeeze through a chert layer. This is sufficiently tight that single rope techniques are often supplemented with a cable ladder. A rope/hauling system for the entrance dome would likely be needed. This will entail the need for a tripod as there are no usable trees near the entrance. Also, for a hauling system, there are two bolts available (the normal rig points, a redirect with pulleys could bring a haul line to the surface to assist in getting a caver up and out). Whether a patient in a stretcher could be evacuated through the Toilet Bowl is not known. A test effort should be made using a dummy in a stretcher.

Beyond this, the cave contains a number of tight squeezes through dig areas and some climbdowns. A second cable ladder/hauling system would be needed if the lowest level of the cave is involved.

## **FUTURE PLANS & RECOMMENDATIONS**

The boundary of the property needs to be walked on an annual basis. The Posted signs should be maintained as needed to ensure that the land is properly posted in accordance with the NYS Environmental Conservation Law and the Penal Law.

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The boundary should be fenced in selected areas to ensure that locals are not using ATVs to access the property.

The boundary line should be blazed or otherwise marked.

New Sink - now Crossbones Cave - was discovered in 1971. A thorough search of the property should be made for other karst features.

Bat counts should be performed periodically on the advice of the NYS Department of Environmental Conservation.

The gate on Crossbones Cave should be upgraded. Instead of a chain, a long rod with provision for a lock should be installed.

Some mock rescues should be held in Knox Cave from either the Finger Passages or from the base of the Great Divide or both periodically. A mock rescue with a dummy in a stretcher should be attempted through the Toilet Bowl in Crossbones Cave.

Removal of invasive species from the preserve should be considered.

Consideration should be given to whether any further remediation of the damage done to the southwest corner of the main parcel during the 2014-2015 winter is warranted.

A restoration of the portion of the trail that descends into the Knox sinkhole, which has been degrading over the past several years, should be planned and executed.