

# TKC UPDATE

No. 11 - December 1988





**INDIANA KARST CONSERVANCY, INC.**

PO Box 461, Plainfield, IN 46168

*Affiliated with the National Speleological Society.*

The Indiana Karst Conservancy, Inc. is a non-profit organization dedicated to the conservation and preservation of caves and karst features in Indiana and other areas of the world. The Conservancy encourages research and promotes education related to karst and its proper, environmentally compatible use.

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Cover photo by Gavin Newman, courtesy Speleo Projects.

Publishing facilities courtesy of the Central Indiana Grotto; Editor and Publisher Keith Dunlap, Assistant Angie Manon.

**\*\* QUARTERLY MEETING REMINDER \*\*****SATURDAY, DECEMBER 10th, 7:30 PM****BLOOMINGTON, INDIANA  
IU MEMORIAL UNION  
DISTINGISHED ALUMNI ROOM**

The quarterly meetings are for members and other interested persons to have an open forum for discussing past, present, and future IKC projects, a place to voice opinions and make suggestions, and in general, a way to let the Directors know what are the concerns of the caving community. The meetings are informal, and everyone is encouraged to attend and participate.

Agenda: Research & Science Committee activities; Strategy planning for stopping the polluting in Pless and Doghill-Donohue caves; Update of other current IKC projects; Proposed by-laws changes.

Meeting Directions: See inside back cover.

Meeting arrangements courtesy Bill Baus and the Indiana Cave Survey.

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**EVENTS CALENDAR**

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|--------|---|---|
| 10 DEC | = | IKC QUARTERLY MEETING, Bloomington (see above). |
| 11 DEC | = | CLEANUP TRIP TO WAYNE'S CAVE (see page 4).      |
| ?? JAN | = | IKC DIRECTOR'S MEETING.                         |
| ?? MAR | = | IKC ANNUAL BUSINESS MEETING, Indianapolis.      |

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Membership to the IKC is open to anyone interested in cave and karst conservation. Annual dues are \$15. Please see inside back cover for the membership application form or to make a donation.

The *IKC Update*, distributed for free, is published quarterly for members and other interested parties. The purpose of this newsletter is to keep the membership informed, and to document past, report on current, and announce future IKC activities and business. Submission of articles for publication pertaining to the IKC or any other related conservation subjects are encouraged. Forward material to the *IKC Update*, PO Box 461, Plainfield, IN 46168.

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## RAMBLINGS FROM THE PRESIDENT...

This issue's ramblings is derived from an article written by columnist "Bayou" Bill Scifres (*Indianapolis Star*, October 16, 1988). I say "derived" because his original article was about the plight of hunters and hunting. I have taken liberties with the article by adapting it to cavers and caving with a few appropriate substitutions.

OWNERS GENERALLY NOT LIABLE  
FOR CAVERS ON PRIVATE LAND

In the good ol' days when you pulled into a farmer's barnlot and asked for permission to *cave*, the answer was "help yourself." But things have changed.

There still is a lot of private land open to *caving* for those who will seek permission and conduct themselves as gentlemen while using the land of others. But some private land has been closed over the years and one of the most important reasons for the closure is not inconsiderate *cavers*.

It is a feeling among landowners that they are liable for damage should a *caver* be injured while *caving* on their land.

This undoubtedly was a legitimate concern of farmers and landowners for many years, but the 1983 Indiana General Assembly adapted Public Law to eliminate the liability of those who permitted others to use their land for most recreational purposes without compensation.

The law states:

"Any person who goes upon or through the premises including, but not as a limitation, lands, caves, waters, and privateways of another with or without permission to hunt, fish, swim, trap, camp, hike, sightsee, or for any other purposes, without payment of monetary consideration, or with the payment of monetary consideration directly or indirectly on his behalf by an agency of the state or federal government, is not thereby entitled to any assurance that the premises are safe for such purpose."

"The owner of such premises does not assume responsibility for nor incur liability for any injury to person or property caused by an act or failure to act of other persons using such premises."

The law further states that nothing in this section "... shall excuse the owner or occupant of premises for liability for injury to persons or property caused by the malicious or illegal acts of the owner or occupant."

The original 1983 "sportsman" law (Indiana Code 14-2-6-3) was actually amended in 1984 to include the direct reference to caves in its first sentence as quoted above. Despite this specific legal protection, landowner permission is still often difficult to obtain for liability reasons. The problems lie in the fact that landowners do not know the law exists (for which education of the landowners can help), and/or a mistrust that the law provides any real immunity in this era of a "sue-happy" society (a legitimate concern). In the years to come, the IKC should explore ways to minimize both of these problems.

## IKC Cleanup Trip - Wayne's Cave

by Keith Dunlap

The IKC is sponsoring the third annual cleanup trip into Wayne's Cave. This cleanup is being held in conjunction with the Central Indiana Grotto's monthly caving trip, so it should be well attended. Our intention is to have a little fun while performing some much needed conservation work.

For those unfamiliar with Wayne's Cave, it is Monroe County's longest with 4.25 miles of mapped passage. Wayne's is notorious for its 1250 foot crawlway connecting "Old Wayne's" and the rest of the cave. This cave is very demanding and is *not* for the first time caver, but if you are in good physical shape, have been caving a few times, and have a good set of knee pads, this could be *the* cave for you.

The cleanup effort will be concentrated in "Old Wayne's" thru Camp II. Haul bags will be provided by the IKC, but the majority of the trash has already been removed during cleanup trips. There will be wire brushes available for graffiti removal, and we may try to do a little "brown washing" where wire brushing is ineffective or impractical.

If you have not been in Wayne's since the IKC started managing it, you may be presently surprised at the improvements. The most encouraging part of expending effort in this cave is that it *remains* an improvement, due to the regulated access policy the IKC has imposed.

One final note, the IKC Quarterly Meeting is the preceding evening. Hopefully the membership will attend both events and support our cause.

## OBITUARY

Gene Jurgonski, NSS 6625

Gene Jurgonski, a new member to the IKC, but a long time caver and member of the CIG (since 1963), died in an automobile accident on Saturday, November 5, 1988. Gene was an active supporter of the NSS and the Central Indiana Grotto, holding several offices for the latter in the late sixties. The Indiana State Highway Department, his employer for thirty years, consulted him when considering highways in southern Indiana. Often times he brought leads, either on the right-of-way or nearby, to check on CIG grotto trips. In the seventies and eighties he continued his interests in caves, attending meetings, cave trips, and rarely missing a Capers. He guided many scout and church groups through Buckner or Sullivan's Caves always stressing safety and conservation. He was a quiet person, always willing to help at Capers and, more recently, on IKC work trips. He was often present on cleanup trips to Wayne's Cave or Buckner or wherever. He was a conscientious person with a continuing interest in caves - not a scientist or speleo-politician, just a caver. . .Bill Tozer.

## RESEARCH AND SCIENCE COMMITTEE REPORT

by Kevin Strunk, Chairman

Since the Research and Science Committee was reactivated at the Directors meeting held at Cave Capers, we have had a few meetings and have made some contacts within the NSS, the science community at large, and within Indiana State government.

The IKC Directors voted at Cave Capers meeting to grant \$100.00 in research aid to support IUPUI Geology Department cave sediment studies in the Buckner/Trap Door System in Garrison Chapel Valley. Researchers are Sally Letsinger and Marta Corbin. The NSS Geologic Grants Committee came up with \$700, and the Indiana Academy of Science awarded a grant of \$1200. Sediment collection work is completed in Trap Door Cave and lab work will commence in December. The researchers will do particle size analysis, lithologic composition work on the pebbles, and x-ray diffraction analysis on the clay-size particles. A speleothem sample was obtained from the rear of Trap Door Cave and was sent to the US Geological Survey for a Uranium-series date. Work in the Volcano Room of Buckner is in a preliminary stage, but work done so far should allow for gross correlation with the results obtained from Trap Door. Work will continue through August, 1989, and results will be available. Mules may be needed on future field trips.

Dr. Tom Miller of Indiana State University has recently published a fairly complete bibliography of scientific articles related to Indiana Karst. The articles listed are taken chiefly from "hard science" sources, and not many grotto-level publications. If anyone has additions or corrections, please inform the RSC or Tom Miller. The IKC has received permission to republish the list and intends to do so either in the *Update* or as a separate special publication. An original of the publication, which includes a paper on the formation of Wind Cave can be obtained from Tom Miller (\$2.00, Professional Paper 18, Dept. of Geography and Geology Indiana State University, Terre Haute, IN).

Preliminary contacts were made with the Indiana Department of Environmental Management (IDEM) and Indiana Department of Natural Resources (IDNR) concerning a more comprehensive, integrated, and informed karst protection policy. Initial contacts confirmed that both agencies really have no expertise beyond that of some staff member who happen to be cavers. The situations at Pless and Doghill caves are status quo and will probably remain so until IKC or some other caving organization pushes for action. The RSC believes that with the upcoming switch in gubernatorial powers in the State House, many interesting things will occur in the area of environmental and resource protection within the State of Indiana. We plan to reestablish contact with IDEM and IDNR staff in January after the transition is complete.

The RSC believes that the IKC must move in the very near future to bring the caving scientific and sporting communities, and the various State and Federal agencies together in a comprehensive fashion. Many divisions of IDNR and sections of IDEM have overlapping, and poorly defined responsibilities for biologic, groundwater, land use, access, and preservation aspects of karst resources. The Federal Fish and Wildlife folks, and the Army Corps of Engineers have other oversight. Local county and regional planning, sewage, and drainage commissions have great control on what happens inside given counties. The cities of Bedford, Bloomington, Mitchell, Salem, and Corydon

have great control over local projects. Cavers need to be lobbying county commissioners, city council members and the like to make sure poorly conceived projects are not approved. Let them know you vote!

The RSC calls upon the Indiana cavers to forget silly "caver turf wars" such as who gets a key to Wayne's or who gets a copy of the ICS State cave list, or "how can we trust a non-caver?" and begin acting as if we are actually adults who pay taxes and vote for the very elected officials we need to interact with! The IDEM and IDNR employees work for us! If certain cavers cannot bring themselves to act like adults who are truly interested in the environment, then the hell with them. Why should the IKC and ICS let a few childish cavers with limited interpersonal skills and limited knowledge of State government and the environmental community at large dictate what the rest of us do? Moreover, why should only a few "Big Name Cavers" serve on all the different boards and groups, thus controlling speleopolitics as they see fit. They can't possibly do all their tasks well if they are to do any one task well. Where are the rest of us?

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#### HOOSIER FORESTS PROJECT COMMITTEE QUARTERLY REPORT

by Kathy Hornaday, Chairman

There has been no formal activity by the Committee this quarter, although individuals have continued to work on the Tincher Hollow area and to check out proposed parcels for exchange by the Forest Service. To date, no significant caves have been found. The parcels for exchange have yielded only two "cracks", neither of which was large enough to permit entry. A final report on these exchange parcels has been sent to the Forest Service, as requested.

With amendments to the Forest Plan moving toward completion, and with the passage of the Federal Cave Protection Law and the signing of a Memorandum of Understanding between the U. S. Forest Service and the NSS, there should be opportunity in the future to help develop standards and guidelines for caves and karst areas in the Forest.

The committee will probably meet after the first of the year, to plan activities for 1989.



## NEWS BRIEFS...

- The IDNR has solicited help in a bat study being conducted by Dr. John Whitaker at ISU. The study is of a large colony of little brown bats and their movement and migration patterns between their summer roost and winter hibernacula sites. Dr. Whitaker has banded a large representative sample of this colony. Our assistance would be in the form of documenting observation of these banded bats in the caves we might visit. Siting information requested is date, location, and tag number (if it can be taken without disturbing the bats). For more details, see the announcement on page 20.
- This winter the IDNR sponsored biannual bat census for the Indiana bat will be conducted. The small game grant is still being processed, but it appears that Dr. Virgil Brack will again be conducting the census and that approximately ten caves will be included in the survey (all the previous caves with significant populations plus a couple of new ones that have the potential to have small populations in them). From a brief conversation with Virgil, he again plans to utilize the assistance of the IKC in his research. Persons interested in helping should contact Keith Dunlap for more details.
- The Hoosier National Forest solicited comments on the management plans for the Deam Wilderness in early November via an "Analysis Overview" brochure which allowed for voting on the different proposed management alternatives. The IKC reproduced approximately 20 copies of this 14 page brochure and distributed them to interested parties (a mass mailing to members was not done because of costs and the imposed deadline for comments). Three IKC members (Tom Rea, Kathy and Tem Hornaday) were also working group participants on formulating one of the proposed alternatives.
- The paper entitled "Leases as a Management Tool for Privately Owned Caves" (presented by Kathy Hornaday at the NSS Convention during the Symposium on the Management of Privately Owned Undeveloped Caves) was reprinted in the *Cave Conservationist*, the newsletter of the Cave Conservation and Management section of the NSS. All the papers presented at this symposium are to be published as a special proceeding. The IKC will consider distributing the publication to our membership.
- Word from the Stewart's (landowners living across from the Hancock Property) is that observed traffic on the property has been reduced significantly since the IKC sign was erected at the old parkig area.
- The CIG sponsored a grotto/cleanup trip to Trapdoor Cave in October. The IKC supplied haul bags and wire brushes. Observations are that vandalism has increased since the entrance was enlarged, allowing for easier access. A partial list of particapants: Steve Newton, Bambi Erwin, Bob Vanderenter, Kim Hunt, Kevin Wools, Barry Welling, Spike Selig, Robin Fitch, Frank Oz, and Kenny Carrigan.
- Dean Myer of Myer's Surplus donated a percentage of his sales at Cave Capers to several caving organizations. The IKC received approximately \$21. Thanks to Dean and those who selected the IKC as their recipient.
- The IKC has been receiving a lot of requests for information on caves recently (via our PO box and the Buckner registration forms). Kathy Hornaday and Mike Miessen have been handling the responses, usually sending out an information package and contacts for the nearest grotto.
- It is not too soon to be thinking about IKC elections to be held during our annual business meeting in late March. If you are interested in serving on the Board, please let a current Director know.



## BATWING CAVE SURVEY

by Keith Dunlap

Last Summer, the IKC was involved in two projects with the Indiana Department of Natural Resources pertaining to Batwing Cave. The first was our assistance in installing a gate on the cave to protect the hibernating Indiana bat. The second was to perform a geometric survey the cave and construct a detailed map. The map is to be utilized for conducting and better documenting the biannual bat census.

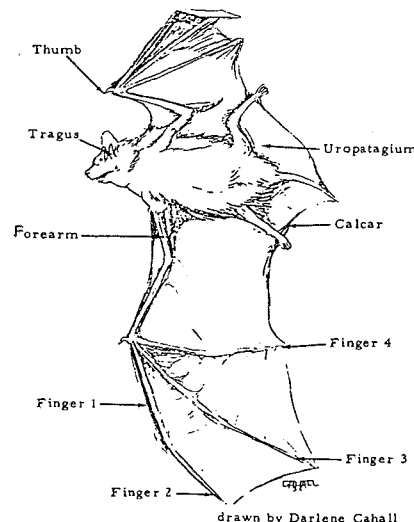
A previous survey and published map had been completed in 1971 by CHUG members Bill Steele, Cathy Roundtree, and Greg Spaulding. This map depicted the majority of the upper level and the main passage below the pit in the lower level. However, the map lacked much of the passage detail and the numerous side passages, making it nearly impossible to accurately document the location of the hibernating bats. The original survey included approximately 400 feet of passage. The IKC surveyed all the known passages, totaling 1140 feet. The greatest discrepancy between the two surveys was the latter's inclusion of a 100 foot long canyon passage that lead to a 22 foot dome room. Off of this room was a 75 foot "virgin" crawl that apparently had not been pushed, and more significantly was a 23 foot "climb" that lead to approximately 150 feet of new passage (this passage was discovered on a reconnaissance trip preceding the actual survey trip).

The survey took two days and approximately 80 personhours to complete. The first day was spent in the lower level with the primary survey team consisting of Keith Dunlap, George Brutchen, and Steve Collins. A second team made up of Steve Reesman, Angie Manon, Kenny Carrigan, and Hank Huffman was utilized to obtain detail passage measurements following the primary team. The second day was spent mopping up some loose ends in the lower level and then concentrating on the upper level passages. Participants on the second day included Keith, Angie, Steve, George, and Colleen Friend.

During the survey, additional notes were taken on various observations including locations of guano, a possible site of saltpeter mining (reportedly done many years ago), and "historic" graffiti including several early NSS numbers.

The final draft of the map was drawn in a relatively large scale (1" = 15') to allow for sufficient detail. The map's master measures 22" x 34" and is being photographically reduced to fit a "B" size format. Approximately 40 hours was required to produce the map.

NOTE: At the request of the IDNR, the map of Batwing Cave will not be published in the *Update* (a published map might foster interest in a cave whose best protection is to obtain as little publicity as possible). Those individuals involved in the project or others that have a legitimate reason may request and receive a copy of the map with the understanding that it is not to be copied or circulated.



## FIFTH ANNUAL HOOSIER ENVIRONMENTAL CONGRESS

by Lynn Miller

The fifth annual Hoosier Environmental Congress and Business Meeting was held on October 8th and 9th in Indianapolis. The Congress was held Saturday at the Hilton on the Circle and the business meeting was held Sunday at St. Maur's Priory. Both were all day events. For those who don't know, the Hoosier Environmental Council is a coalition of approximately fifty environmentally oriented groups. Some of the member organizations are Izaak Walton League, Sierra Club, Save the Dunes Council, Forest Preservation Group, PAHLS (People Against Hazardous Landfill Sites), Forest Watch, and several chapters of the Audubon Society. The caving community is represented by the Central Indiana Grotto and the Indiana Karst Conservancy. All of these groups have one common bond - they want to preserve and protect or clean-up some part of the environment.

The theme of this year's Congress was waste. There were speakers on recycling and hazardous waste, of course, but the keynote speaker, Dr. Joel Hirschhorn brought forth the real theme with an excellent talk on Pollution Prevention. The key to the future is not in recycling, but in preventing the generation of pollution in the first place. A fairly simple, straightforward theory, but it would call for some drastic changes in our modern lifestyle.

There were several other speakers and various workshops during the day. Almost all were addressing waste reduction not waste recycling. Waste reduction/pollution prevention will be the battle plan for the future wars on pollution.

At lunch we were joined by Lt. Governor John Mutz. Due to some poor scheduling we were evicted from the restaurant as Mutz was bravely defending himself to some unhappy environmentalists. Much to the surprise of more than a few Congress participants he adjourned with us to the meeting rooms and subjected himself to more rigorous questions and accusations concerning both past and future environmental issues.



At dinner we were addressed by Secretary of State Evan Bayh, Mutz's Democratic opponent. He received a much warmer reception than Mutz had earlier in the day. Although put on the spot a few times, Bayh perceived what the crowd wanted to hear, let them hear it, and more importantly, convinced them he meant it! Of course, by the time you read this the Gubernatorial issue will have been decided.

Sunday's business meeting was to have begun at 9:30 a.m., but as it seems with all meetings, it got started late. And someone forgot to bring the coffee! A large part of the day was spent discussing the HEC 1989 Action Plan. Basically, it will be a continuation of the 1988 Plan. The HEC will continue to fight against pollution of the air, ground, and water on several different fronts. It will continue to support the formation of the Patoka River National Wildlife Refuge. Other key issues the HEC will be involved in are the battle to stop the rape of the Hoosier National Forest by the U.S. Forest Service and to prevent the formation of an \$83 million commercial development in the Tillery Hill area of Patoka Reservoir. HEC will also continue to monitor the

activities of state and federal environmental agencies (which seem sometimes to bury their heads in the sand unless there is someone standing behind them with a large foot aimed at their complacent rumps). In short, the HEC in its brief five year existence has grown from an inquisitive puppy into a guard dog to be reckoned with, and they are trying to guard everyone who breathes the air, drinks the water, or walks upon the ground!

Rather than have me continue to babble on about the HEC, why don't you (or your organization) join. Call or write to me if you need more information.

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### BUCKNER CAVE CLEANUP

by Keith Dunlap

The IKC continued with the Buckner Renovation Project with a workday on October 1st. Despite a very dismal, drizzly day, we had over a dozen cavers help with the cleanup. Participants included Mike Miessen, Sherri Miessen, Eric Newlon, Eric Schmidt, Ernie Payne, Dave Everton, Robin Fitch, Bill Baus, Keith Dunlap, and Paul Mason with a small group from ISU.

Because of the inclement weather, almost everyone sought shelter in the cave (except for Mike who stayed above ground to do his "PR" work and cleanup some surface trash). The crew broke into several small group. Paul and his people made the circle route to pick up trash. Dave, Robin, Eric Schmidt, and Keith concentrated their efforts in the highly traveled areas near the "T-room", picking up trash and "brown-washing" several graffiti covered walls. They also removed most of the trash in the crawlway on their way out. The remainder of the cavers worked in the Entrance Room and the first part of the crawlway removing trash and graffiti. About ten large bags of trash were removed. While trash is still being deposited by visitors, it doesn't seem to be accumulating nearly as fast as before the Project was started. We are making some progress, but it is definitely an uphill battle with no end in sight as long as the current access policy remains.

For those who participate, those who don't because they would rather be caving somewhere else, and most importantly, those who criticize the work as a waste of time and effort, keep in mind the underlying purpose of the project - EDUCATION! Buckner gets a tremendous amount of traffic every weekend (somewhere between 100 and 250 novice cavers). When we are in the cave, visibly working, *we are making a very positive impact on those that pass by*. Most stop and chat, many expressing their appreciation for our efforts. Hopefully all will go on their way with a thought of cave conservation (and cave safety if they are improperly equipped). And remember, many of the cavers at Buckner today will be venturing to other caves tomorrow (perhaps your favorite one). Let's send them with a little knowledge of leaving nothing but footprints, and killing nothing but time, take nothing but pictures.

ADDENDUM: The weekend after this cleanup trip, several CIG cavers made a trip into Buckner to review our progress. Their report was that fresh graffiti had already been sprayed on the brown-washed walls (paint odor was still in the air). I suspect that several more occurrences have happened since then. It has been suggested before, but it is worth repeating, that a "stake-out" to catch a vandal in Buckner could probably net someone an easy \$500 or more.

# Who's Endangered and What Can We Do?

by Gary F. McCracken

Reprinted from BCI's  
BATS, Fall 1988

Each year the International Union for the Conservation of Nature (IUCN), the world's largest independent conservation organization, updates its *Red Data Book* which lists worldwide plant and animal species known to be endangered, vulnerable or rare. Out of approximately 950 species of bats in the world, the 1988 *Red Data Book* lists only 33 bat species in these categories—less than 4% of the total. This proportionately small number should lead anyone with even a remote awareness of the worldwide extinction crisis to be suspicious. Why then, does the red list stray so far from an accurate picture of the real problem?

First, consider that the IUCN red list has a substantial geographic bias toward North American species. There are 39 species of bats in North America (exclusive of Mexico),<sup>1</sup> comprising about 5% of the worldwide bat diversity. However, five of the 33 species on the list are North American\*—thus a fauna comprising only 5% of the total accounts for 15% of the number considered threatened or endangered.\*\* Far from reflecting reality, the red list reflects our ignorance regarding the status of most species. We simply have more knowledge about the status of bats in North America than we do for most other parts of the world. In fact, our igno-

rance is so extreme that we are not even certain how accurate the IUCN list is for many North American species. We simply do not have the data to determine whether they are stable, increasing or decreasing, and at what rates. Given this lack of information and the fact that most bats investigated are declining, the IUCN red list gives an inaccurate and minimal assessment of the current crisis.

## A different approach

Conservation biologists recently have suggested that constructing red lists has been a major tactical error.<sup>2</sup> The mere existence of such lists can lead to the assumption that if a species is not listed, it is not in jeopardy. A great many species that are not on any threatened or endangered list, should be, but we do not know enough about them. A major problem is that to be included, the extent and rate of decline must be documented, but since in many cases, past populations have not been studied, this data is often not available. To correct this problem, it has been suggested that rather than putting together red lists, we should construct "green lists." Green lists would index species known to be secure.\*\*\* Species that are *not* green-listed would include those whose status is undetermined; given the grand scale of wildlife habitat loss throughout the world, we should consider all species not on a green list to be threatened and act accordingly. Thus, the burden of proof would be shifted to those who maintain that all is well with a species.

Bird conservationists are already

proposing green lists. Even though much more is known about the status of the world's birds than of its bats, ornithologists concede that fewer than one third of the worldwide bird species would qualify for inclusion on a green list. This means that green lists are all the more important for bat species, since they are considerably less studied. I suspect that far fewer than one third of the world's bats would qualify for green list status.

With our ignorance as a perspective, consider some of what we do know about the status of bats—particularly, North American cave bats. Among the 39 species, cave roosting sites are essential for 18 of them, and some of the remaining 21 are occasionally found in caves. Thirteen of the 18 utilize caves year-round, both for reproduction and as winter roosts. The other five rely on caves only for hibernation, but roost elsewhere during the reproductive season.<sup>1</sup>

All North American bats listed by the IUCN are cave dwellers, and four of the five require caves year-round (the Indiana bat utilizes caves for winter hibernation only). Although it is certainly true that many cave bats are in jeopardy, there is undoubtedly a bias toward cave dwelling species because they are more easily censused. Many non-cave dwellers may be just as seriously threatened, but they are often neglected because they are much more difficult to observe.

## A vulnerability to extinction

Bats have rates of population growth far lower than those of other small mammals. Many females do not begin reproducing until their second year, and most species give birth to only a single pup annually. Bats typically have long life spans (10 to over 30 years), which under normal circumstances counter their low reproductive rates. Consequently, their

\*The five species listed by the IUCN as endangered are the Indiana bat (*Myotis sodalis*), Gray bat (*M. grisescens*), Big-eared bat (*Plecotus townsendii*), Sanborn's long-nosed bat (*Lep-tonycteris sanborni*) and the Mexican long-nosed bat (*L. nivalis*).

\*\*The official U.S. Endangered Species List, our own "red list," contains even fewer bat species than that of the IUCN. The 1987 List includes only 11 bats worldwide. Three of the species listed (Indiana, Gray, and two subspecies of big-eared bats) are from the continental U.S. Sanborn's and Mexican long-nosed bats are scheduled to be added to this list in 1988.

\*\*\*A good criterion for inclusion on a green list might be: known not to be declining in numbers now, and unlikely to decline substantially in the next decade.



populations are built up over a long span of time, reducing the rate and probability of recovery from severe losses.

Bats have other characteristics which contribute to their vulnerability. One of the most significant is that they roost in large aggregations. The fact that so many concentrate into a few roost sites greatly increases their vulnerability. Mexican free-tailed bats (*Tadarida brasiliensis*) are an excellent example. Single cave roosts of these bats can contain tens of millions, so the loss of even one such roost would impact a significant portion of the species.

### Roost disturbance

Wherever bats concentrate, they are vulnerable to a variety of human-caused disturbances. At least three endangered species (Indiana, Gray and Sanborn's long-nosed bats) have abandoned traditional roost sites because of cave disturbance or commercialization.<sup>3,5</sup> Others lose their caves entirely during quarrying operations. I have personally observed numerous examples of vandalism such as burning old tires or shooting guns inside bat caves. Although intentional vandalism is well documented, unintentional disturbance often poses an even greater threat. In the temperate zone, bats typically encountered by cave explorers are either hibernating or rearing young. Disturbance as seemingly trivial as merely entering a roost area or shining a light can result in decreased chances for survival, outright death, or abandonment of the roost site. Although there is some controversy about the significance of "innocent" disturbance, my own experience has led me to the opinion that it can be serious. The impact is somewhat species-specific, and the timing of the disturbance is crucial.

Unintentional disturbance of a maternity colony can cause individuals to abandon roost sites, particularly if it occurs early in the reproductive season when females are pregnant. As a result, females tend to break up into smaller groups, often moving deeper into the cave to less ideal roosts, where a variety of factors can greatly reduce growth rates and survival of young. In addition, disturbances can cause the outright death of young that are dropped by panicked mothers.<sup>5</sup>

Maternity aggregations are, at least



Indiana bats (*Myotis sodalis*) hibernate in just a few critical caves, packing into tight clusters where they are extremely vulnerable to disturbance. This endangered species is believed to have declined by 55% in less than 10 years.

PHOTO BY MERLIN D. TUTTLE

in part, a strategy for creating the high temperatures necessary to successfully raise young. Not only do clustering bats gain heat benefits from surrounding individuals, but in the case of very large colonies, they also benefit from the overall temperature increase in the cave. If the size of a colony decreases, individual thermal benefits may be lost, and it may become less advantageous, perhaps even impossible, for females to raise pups in that roost. When a colony reaches a certain low threshold number of individuals, roost temperatures are no longer sufficient for rearing young, and the roost must be abandoned.

Problems caused by disturbing hibernating bats also relate to energy requirements. During winter, bats in hibernation go for long periods without eating, allowing their body temperatures to drop, often to near freezing. The energy reserves they accumulate prior to hibernation may be only slightly more than what is needed to survive the winter. Disturbance during hibernation can cause bats to arouse prematurely, elevating body temperatures and utilizing stored energy. They may return to a state of torpor after a disturbance,

but without sufficient energy to survive until spring.

Roost site disturbances also can seriously impact bat species that do not form large aggregations. For example, many tropical bats roost in hollow trees, which are being cut down as more tropical forest is converted for agriculture. For many of these species, if not for most, there are no population estimates and therefore no way of determining the impact that this loss of habitat may have on their populations.

Closer to home, it seems probable that the decline of the Indiana bat may be attributed, in part, to loss of tree roosts or feeding habitat. Indiana bats hibernate in caves and abandoned mines, and there is no question that disturbance of such sites has contributed to their decline. However, in the midwestern U.S., several large hibernating populations continue to decline even though they are now protected.<sup>6</sup> We can only speculate on the reasons. Indiana bats roost and give birth in tree hollows and under loose bark, and the loss of these roosts may very well be a factor in their continuing decline. This does not imply that disturbances within their hibernation roosts are unimpor-

Continued...

tant. Rather, it emphasizes the importance of protecting hibernating sites so as not to add additional stress.

### Habitat degradation

General habitat alteration and degradation can be important. For instance, two North American bats on the IUCN red list, in addition to being disturbed in their cave roosts, also are threatened by declining food resources. Both endangered long-nosed bats inhabit desert regions of the southwestern U.S. and Mexico, feeding on the nectar of desert flowers. Wild agaves provide a major food source during the bats' annual migrations, but these plants have been severely reduced by cattle grazing and by moonshiners who harvest them for making tequila. As long-nosed bats decline, their loss in turn threatens organ pipe, saguaro and other giant cacti. The decline of these cacti is evidently attributable, in large part, to the decline of their bat pollinators.<sup>4,7</sup>

Modern crop and forest monocultures provide a prime example of how bat feeding habitat is lost.<sup>8</sup> Bats, as well as many other insectivorous animals, do best when varied habitats support a diversity of insect species whose differing hatching cycles assure a continuous food supply. Vast crop lands or forest plantations may produce many insects, but the few kinds that live in such places tend to hatch all at once, leaving bats without food between hatches.

Insecticides have had a negative impact on many bat populations.<sup>9</sup> At least two likely effects are direct poisoning and changes in the food resource base of insectivorous bats. Direct poisoning by DDT (now banned for use in the U.S.) and other organochlorine pesticides has been widely implicated in the declines of many populations.<sup>9-11</sup> At present, we know little regarding the long-term effects on the insect prey base of bats. While pesticide poisoning has clearly been a factor in bat decline, there has been a tendency to over-emphasize its importance, distracting attention from other, more significant, causes.<sup>5,9,12</sup> This does not exonerate pesticides, but rather points to what are often even more important causes of bat population decline: roost site interference and the reduction of feeding habitat.

### Protecting critical habitat

From what we know about the impact of human activities on bat populations, roost site disturbance, vandalism and habitat destruction have all had severe effects, particularly on cave dwelling bats. Given the special problems of cave dwellers, I believe that the strategy of red lists and green lists may also be applied to cave habitat just as effectively as to the species that occupy them. People who visit caves, both professionally or for sport, need to be acutely aware of the potential damage they can do to the resident bats. There are caves which should be designated as "red caves" and not be visited by people at any time or only during certain times of the year. Designated "green caves" would be those not important to bats or other endangered animals, and these would be open to visitation any time.

Bats select cave sites because they fulfill very specific requirements, involving cave structure, air circulation patterns, temperature profiles and location relative to feeding sites.<sup>5,13</sup> Since these requirements are highly specific, suitable caves are relatively rare. For many bat populations, there

may be only one or two acceptable roost sites, making these sites absolutely essential to their survival. Less than 5% of the caves surveyed in the southeastern U.S. were found suitable for Gray bat maternity or hibernating use. These caves must be placed on our cave red list. Conversely, the vast majority of caves do not satisfy these requirements and are not important as bat roosts. These can be placed on the green list, unless they contain other endangered animals.

The major problem is determining which caves belong on the green versus the red list. One obvious criterion is that major hibernation and maternity roosts of endangered bats or those of unknown status should be red-listed, at least during the seasons when bats require them. Many caves not occupied by bats, and for which there is no evidence of prior occupancy, would be green-listed. Judgments will have to be made, often with only limited information. It can be argued that historically important roosting sites that are now abandoned should be red-listed, at least temporarily, in the hope that they may be reoccupied. Caves with only



*The U.S. Fish and Wildlife Service coordinates and carefully plans censusing for endangered bats, conducting them at two-year intervals to minimize disturbance. Cave-dwellers such as these endangered Gray bats (*Myotis grisescens*) return year after year to the same roosts and are easily observed and censused, so their decline is more likely to be noticed.*



small colonies should be red-listed also for the purpose of gene pool conservation. Caves essential to migrants during seasonal movements should be red-listed during the relevant seasons. On the other hand, there may be no harm in green-listing some caves that contain relatively small numbers of abundant, widely dispersed species (such as those of eastern pipistrelles), particularly if those caves are of interest to sport cavers.

Listing caves for no access or restricted use can be controversial. In the United States, several local grottos of the National Speleological Society already have constructed such lists or are in the process of evaluating them. These people should be supported in their efforts.

The original idea of constructing red lists was probably a good one at the time and, no doubt, has helped save many species from extinction. Today, however, this approach may not be enough. Conservationists worldwide acknowledge that many wildlife species and their habitats are in an accelerated rate of decline for

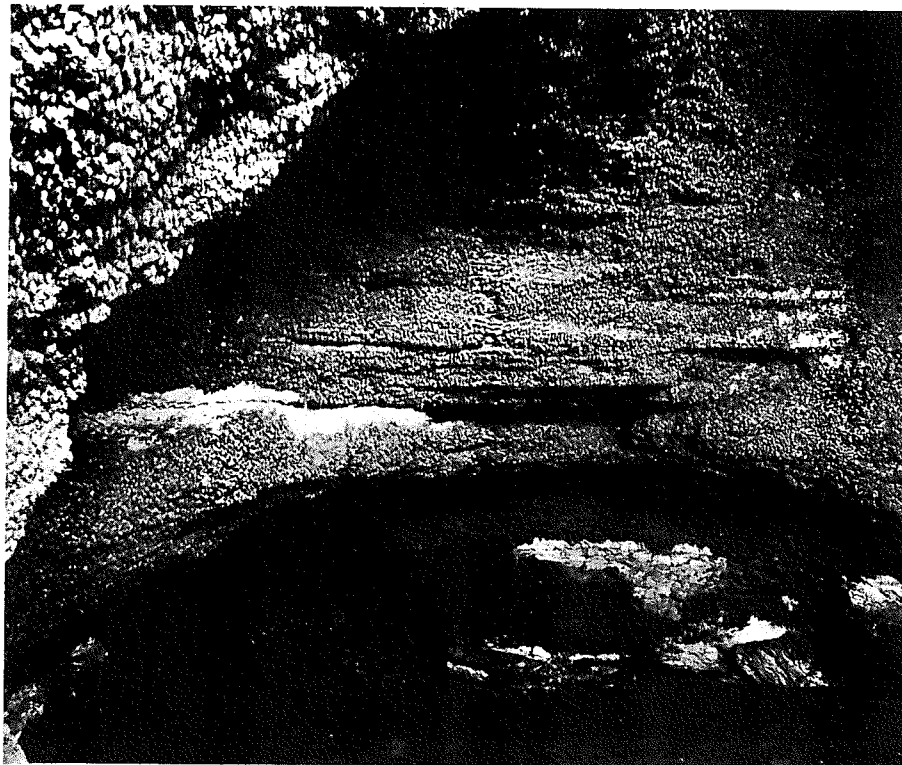
many reasons, but mostly human related. Thinking in terms of green lists broadens our concern and emphasizes the critical need for more information on the status of most species.

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Gary F. McCracken is an Associate Professor in the Department of Zoology and the Graduate Programs in Ecology and Ethology at the University of Tennessee, Knoxville. He has studied genetics and behavior of bats since 1976.

NOTE: This article is based, in part, on McCracken's lecture, "Special Problems with Bats," presented at the 1988 annual convention of the National Speleological Society.

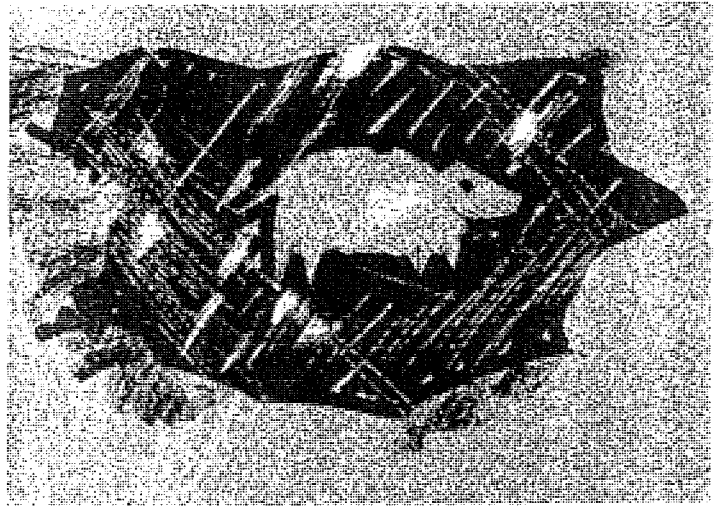


Most of the U.S. population of Mexican free-tailed bats (*Tadarida brasiliensis*) rears young in just 12 caves, each of which contains many millions. Therefore, loss of a single cave roost could have major impact on the entire species population. Here, thousands of square feet of cave walls are covered with bats—up to 500 per square foot.

PHOTO BY MERLIN D. TUTTLE

# CAVE GRAVES

Reprinted from IDNR's  
*Outdoor Indiana*, July/August 1988



*By Ronald Richards*

In the stark sunlight of a crisp, April day, I stood, mud-caked, at the entrance of a Crawford County cave, still not believing that I had just pulled a perfectly preserved jaw of the extinct flat-headed peccary from its Ice Age tomb.

For more than 23 years, I have recovered countless bones from numerous southern Indiana caves. Only once before had I gathered a few scraps from this now-extinct relative of the modern, collared peccary, or pig, that today inhabits parts of the southwestern United States and Mexico.

Like its modern counterpart, the ancient, flat-headed peccary (*Platygonus compressus*) traveled in herds, sometimes sheltering in caves and under rock coverings. It is in those caves that their bones are best preserved, with the greatest numbers having been found in Welsh Cave, Kentucky (31 individuals), and Zoo and Bat caves, Missouri (81 and 98 individuals respectively).

Flat-headed peccary remains are known from more than 80 localities from California to New York and Michigan to Florida. The flat-headed peccary was thought to have inhabited prairies and open woodlands south of the glacial ice 11,000 to 100,000 years ago. Why they and other large mammals became extinct is still unknown.

In the past, Indiana has made a sparse contribution to understanding the

distribution and paleobiology of the flat-headed peccary, boasting only three localities, yielding only a couple dozen bones of several individuals. But that spring day in that Crawford County cave, with that fine jaw in hand, I realized Indiana may have at last revealed its largest peccary herd.

This peccary business began late last fall, when I received a phone call from Dick Adams of the Indiana University Zooarchaeology Laboratory, Bloomington, under whom I had studied some 17 years before. Two students had recovered some bone fragments and teeth from a Crawford County cave that Adams believed were of peccary. Adams knew that the cave should be checked further.

The remains, when mailed to me, did prove to be of the flat-headed peccary. The most recent radiocarbon dates for the peccary in the eastern United States are 9,440 (Missouri) and 10,560 (Tennessee) years before present. I knew that the surface, as well as buried bone, was extremely valuable in understanding the life and environment of Indiana's Ice Age.

Events moved swiftly. The peccary remains were donated to the Indiana State Museum where they were preserved in glyptal to prevent cracking and warping. I arranged a trip to the cave with one of its owners, Victor Megenity.

After rummaging through a muddy, cave floor, I emerged with the finest of peccary jaws, a bucket of peccary bones and 15 gallons of the surrounding floor

sediments. These sediments would be washed in the museum's lab to examine bones of small animals associated with the peccary remains. Megenity donated these and all future remains from the cave to the ISM where they could be preserved, studied and displayed to show all Hoosiers a part of prehistoric Indiana.

That bucket of bones and 15 gallons of sediment yielded parts of three adults and a juvenile peccary, bones of black bear, fisher, plains pocket gopher, mice, shrews and snakes. A large number of peccaries were in the cave, as well as ecologically sensitive, small animals that could allow us to understand the environment at the time when the peccaries were deposited. Better yet, those silty sediments, unlike many sticky cave clays, readily washed through the window screen mesh of my sieve, leaving the many smaller bones concentrated on the screen. I had a vision of a great cave dig.

I estimated that it would take nine days to remove and wash those deposits. Could we do it? We had no equipment or other trained personnel. I walked about those sediment-filled chambers and rethought the whole project. Although haunted by the prospect of several difficulties, I knew we should proceed.

Saturday, Aug. 22, we began the largest cave bone dig ever undertaken in Indiana. We had acquired all necessary equipment (screens, pump, hoses, buckets, ropes, helmets, lights and digging tools) and a handpicked crew of ISM staff selected as diggers, recorder/



photographer, bucket haulers, screeners and even a troubleshooter. We eventually added an archaeologist to our crew.

The actual bone site was situated approximately 160 feet inside the cave. This location required crawling, stooping and squeezing through a sometimes slippery, horizontal passage, and a descent to the bottom of a 15-foot-deep pit. Here, the remains of two peccaries were unearthed, their bones intermingled, though scattered, within a small area. Bones of other animals, including peccaries, were unearthed where they had been washed or scattered about the pit. Occasional camera flashes accented the work as the bones were photographed, sketched in position, tabbed and loaded with their encasing sediments into buckets bound for the above-ground screens.

**This well-preserved jaw of the ancient flat-headed peccary was collected from the Crawford County site. Radiocarbon dates on samples have shown some of the bones to be more than 20,000 years old.**

Three concerns haunted me throughout those digging days: failure of the water pump necessary to wash the sediments; failure of the brittle, crumbly sandstone ceiling; and failure to reach bedrock. Good cave diggers know they are never finished until they hit bedrock where the oldest remains can be found.

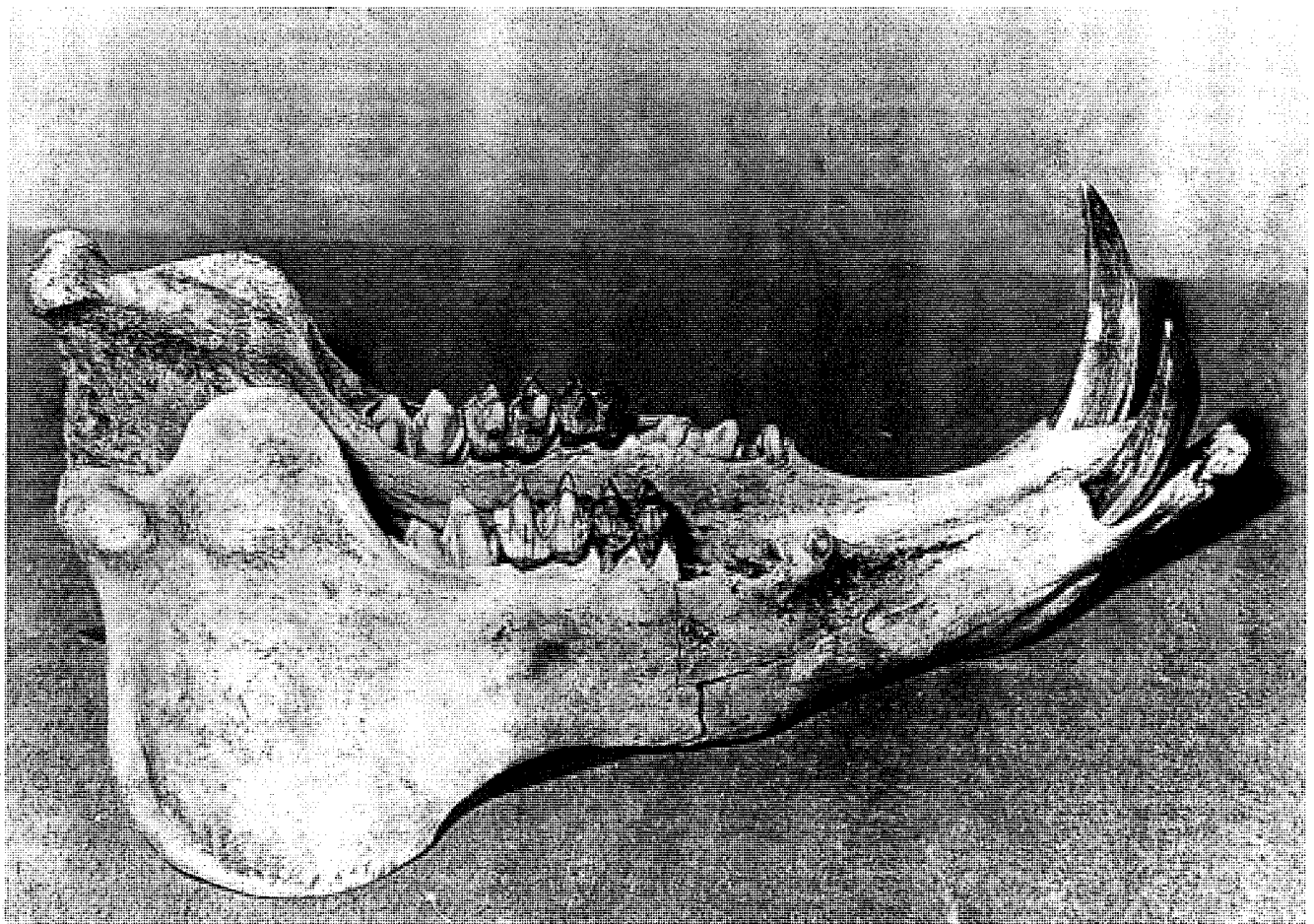
Writing now, I still have visions of those nine days in August: the sight of the manganese-blackened bones, the diggers' green helmets beaming with the yellow glow of the carbide lamps, the cramped digging in contorted positions where a major comfort was a small piece of plywood or a twisted boot to sit on, the seeping water muddying the pit floor which constantly obscured digging and how much larger those small cave rooms seemed after a week.

Sediments were washed above ground, 400 feet from the cave entrance. Chilly water from a nearby spring was pumped through hoses to three screen stations, where mud was washed from the bones which bore cave sediments. This was a world of sun-brightened, dark-green forest, saturated with the smell of damp

leaf litter, the plopping of minute toads along the sandstone bluff, the startled rustling of the brilliant, blue-tailed, five-lined skinks among the leaves and the abode of the friendly, little, hognose snake. It was the world, too, of the sullen copperhead, usually unseen, but ever present. It was the place where diggers and screeners met, each group knowing that the other had seen what they had not.

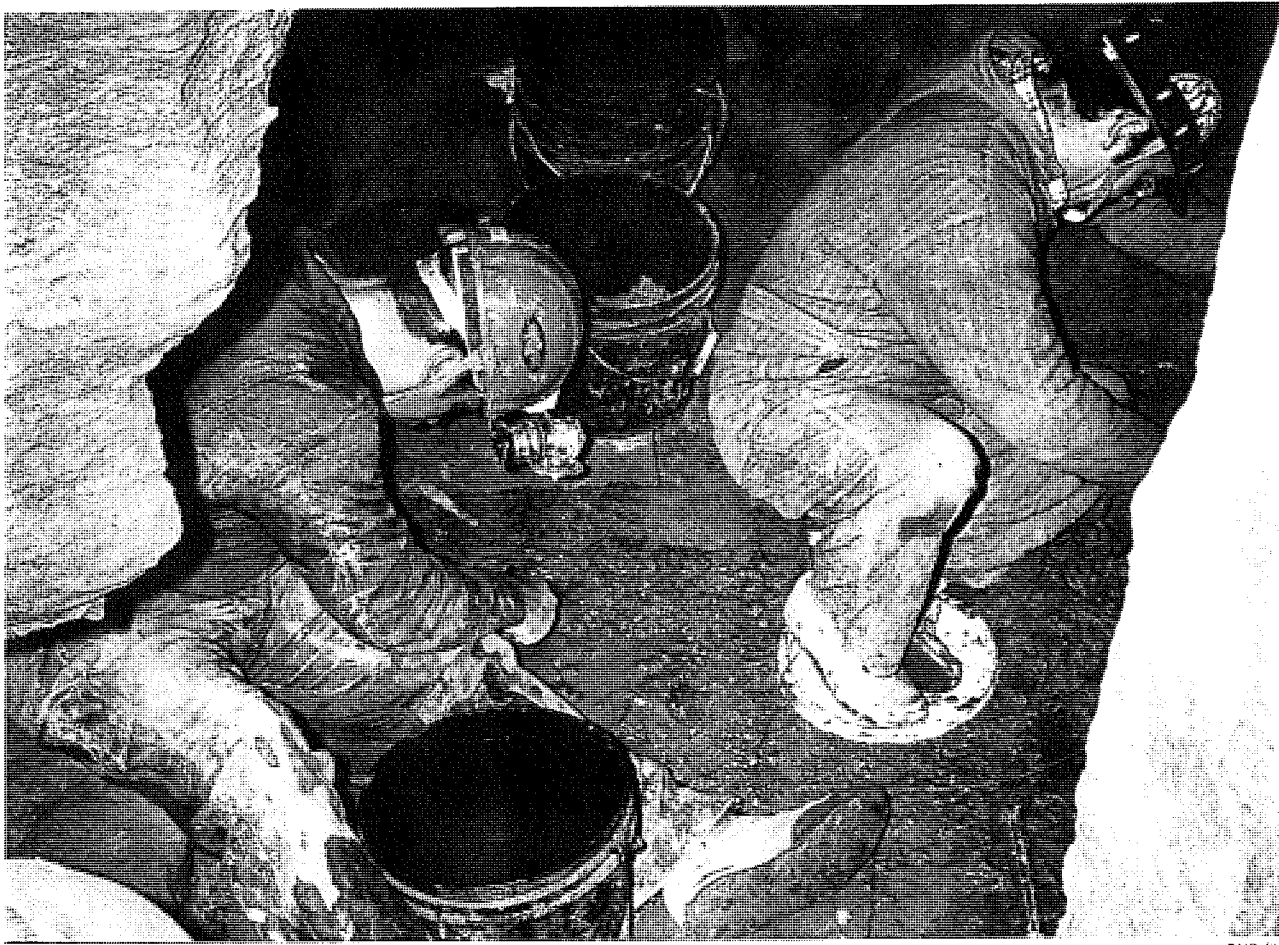
On the last Saturday, Aug. 29, we hit the big bone deposit in a small, dome room adjacent to the main pit. Only four crew members remained, as the others had left the day before when bedrock had been reached in the main peccary room. The new task was enormous, and because camp had been dismantled and for fear of looting, we decided to remove the bone deposit immediately.

The dome room contained thousands of bones and fragments of peccaries and other animals, such as otter and coyote, that were cemented into the surrounding sands or jumbled in a bone bed. This deposit, usually less than a foot thick, had apparently been redeposited from a nearby fissure.



Fred Lewis photo

Continued...



DNR file photo

Life became simple as we undertook two days' work into one. Our world consisted of food, warmth, the carbide lamp and the drive to keep working for that "gold" of bone. With the surface so far away in time and the daze of a dulled, fatigued mind and body, a common companion of those who trek underground, we cleared the deposit to bedrock.

In the past, it appears that the cave was a commonly used shelter for flat-headed peccaries. Although at one time there may have been other entrances, peccaries probably sheltered along the same passage where we entered. The partially washed out passage apparently presented a more level walkway thousands of years ago, when an occasional peccary toppled into the pit. The short drop would have killed few of the peccaries; most would have wandered about, finally perishing of starvation and exposure.

In all, we recovered remains of more than 44 peccaries, one of the largest herds in North America. Except for the lack of good skulls, there was an abundance of complete bone, including that of juveniles, providing excellent research

and display material. An abundance of associated small animals, including the red-backed vole which is no longer found in Indiana, will be important for paleoecological interpretation. Two radiocarbon dates on the peccary bone have given ages of 23,000 and 31,000 years before present, considerably older than I had anticipated.

The "pig dig" was a life experience for many of those involved. Some participants will long to return to the underground, to root through the sediments for evidence of ancient crises. Others, though, have a fear of low, tight, dark places or wet, seeping chasms and will choose to stay above ground.

It was on the fourth day of the dig that I stood quietly on a bluff near the cave entrance with no one in sight. I knew there were buckets thumping underground, and although it was unheard, the pump was humming on the other side of the hill. Suddenly, I realized how miniscule this great happening seemed in the vastness of the forest. I knew then, too, that the ISM had begun to come of age by generating its own investigative

**Donning helmets and carbide lanterns, DNR archaeologists carefully excavate the actual bone site approximately 160 feet inside the cave.**

information with an excellent effort by museum staff, volunteers and a vision of cave-owner Victor Megenity.

Today, the task of sorting, spoon by spoon, all of the concentrate gathered on the screens has been completed. Preservation of the pieces is finished, mending is underway and cataloging will be followed by identification. Understanding just why the deposit exists and what it tells us about peccaries and their Ice Age environment still lies before us — for my job as keeper of the bones is far from done.

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*Ronald Richards is curator of paleobiology at the Indiana State Museum. He has worked for the DNR for seven years.*

INDIANA KARST CONSERVANCY, Inc.  
All Funds - Statement of Receipts, Expenditures, and  
Changes in Fund Balance for the Quarter Ending 09/30/88

General Fund

Receipts		
Reimbursement from State of		
Indiana for Batwing Project	693.00	
Dues	102.75	
Donations	305.00	
Interest	<u>24.15</u>	
Total Receipts		1124.90
Expenditures		
Reimbursement to volunteers		
on Batwing Project	693.00	
Update Postage	55.25	
Hancock Property Sign	37.43	
Postage & Stationary	22.95	
Cave Capers door prizes	21.90	
Wire brushes	6.98	
Keys - Waynes	3.95	
HNF phone calls	<u>0.51</u>	
Total Expenditures		<u>841.97</u>
Excess to Fund Balance		<u>282.93</u>
Fund Balance, 06/30/88		1349.79
Fund Balance, 09/30/88		<u>1632.72</u>

Buckner Fund

Receipts		- 0 -
Expenditures		
New lock for donation box	<u>26.95</u>	
Total Expenditures		<u>26.95</u>
Excess to Fund Balance		<u>(26.95)</u>
Fund Balance, 06/30/88		286.59
Fund Balance, 09/30/88		<u>259.64</u>

HNF Fund

Receipts		- 0 -
Expenditures		
Phone calls	<u>25.73</u>	
Total Expenditures		<u>25.73</u>
Excess to Fund Balance		<u>(25.73)</u>
Fund Balance, 06/30/88		25.73
Fund Balance, 09/30/88		<u>- 0 -</u>

<u>Total Balance - All Funds, 09/30/88</u>		<u>1892.36</u>
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\*\*\* WELCOME NEW MEMBERS \*\*\*

Bud Brady  
1 North Lane  
Richmond, IN 47374

Timothy Heppner  
10405 S. Seeley Ave  
Chicago, IL 60643

Brian Leavell  
1526<sup>1</sup>/<sub>2</sub> North A Street  
Elwood, IN 46036

Barry Woolsey  
1002 Pheasant Ridge  
Lake Zurich, IL 60047

## MINUTES - IKC QUARTERLY MEETING

September 24, 1988  
Indianapolis, Indiana

Directors Present: Keith Dunlap  
Ernie Payne  
Mike Miessen  
Lynn Miller

Directors Absent: Cindy Riley  
Noel Sloan  
Tom Rea  
Kathy Hornaday

The meeting was called to order at 10:15 a.m.; introductions were made.

A Buckner's work day was announced for Saturday, October 1, 1988, at 9:00 a.m. Contact Mike Miessen for details.

Hoosier Forests Project Committee - Periodic meetings are ongoing with the Forest Service. Volunteers are needed to field check properties the Forest Service is considering exchanging. Ridgewalking to evaluate these properties needs to be completed by the end of November. Contact Kathy Hornaday.

Attendees were reminded of the closure of bat caves during the winter hibernation period - September 1 through March 31. Affected caves have been posted by the IKC and/or IDNR. Please observe these closings.

John Whitaker (Professor, Indiana State University) is requesting information on Brown bats. He has been tagging them to track their movements. If you observe tagged bats, please notify Keith Dunlap or John Whitaker. (Members were again cautioned against disturbing hibernating bats). A memo from John Whitaker has been distributed by Scott Johnson (IDNR) to all Indiana grottoes.

Batwing Cave Project. This gating project has been successfully completed. The IDNR will be conducting observation of swarming behaviors, etc., to monitor the bats' response to the gate.

Hoosier Environmental Congress and Business Meeting will be held October 8 & 9. The focus of this year's congress is waste reduction. Lynn Miller is the official IKC delegate to this gathering of environmentalists from around the state.

BY-LAWS revisions have been proposed and were published in the most recent Update. These recommendations will be voted on at the next Director's meeting.

Cave Status. The Coon/Grotto clean up was well attended. Both caves are now closed for the hibernation season. Wayne's is still receiving good traffic; there have been no recent problems with the gate.

The merits of the quarterly meeting were discussed. Suggestions for publicizing meetings and a possible member questionnaire were discussed.

The next Quarterly Meeting will be held in Bloomington on Saturday, December 10, at 7:30 p.m.



There will be a Wayne's Cave clean up Sunday, December 11 beginning at 9:30 a.m. Why not make a weekend of it?

Suicide Cave and 150 acres of land are for sale.

Discussion was held concerning IDNR and the Nature Conservancy's policies/approaches to protecting significant caves.

The meeting adjourned at 11:45 a.m.

Submitted by Jane Miller for Kathy Hornaday.

ATTENTION  
Observations of Banded Little Brown Bats Needed



Dr. John O. Whitaker, Chairman of the IDNR Nongame Mammal Technical Advisory Committee, has initiated a banding study of little brown bats (*Myotis lucifugus*) in west central Indiana. Over 2000 bats from a single maternity colony in Clay County, Indiana were banded during the summer of 1988, and observations of banded individuals are needed to determine the species' movement and migration patterns between summer and winter roost sites. An orange band with a black number was placed on the forearm of each marked bat. Persons observing these banded little brown bats should report the observation (date, location, and band number) to:

Dr. John O. Whitaker, Jr.  
Department of Life Sciences  
Indiana State University  
Terre Haute, Indiana 47809  
(812) 237-2383

# EQUIPMENT TIPS

## Gas-Powered Graffiti Remover High-Pressure Washer

by Mike Bilbo

One of the important Lubbock Area Grotto contributions to cave conservation is a device invented and built by Noble Stidham and Jeff Thom to help remove graffiti. The Forest Service, Lincoln National Forest and the Bureau of Land Management, Carlsbad Resource Area, have the only two PGR's built so far.

Noble decided that after hours of wire brush operation there had to be a better way and constructed the first system for the BLM. Noble and Jeff together built the Mark II about a year later for the Forest Service. The Mark II, a compact man-packable device, weighs only 12 pounds (not including water and CO<sub>2</sub>) and is built for off-shelf hydraulics. It consists of two hydraulic cylinders mounted back to back, a logic system, a series of valves and a CO<sub>2</sub> gas power source with regulator.

A two-pound CO<sub>2</sub> bottle and a couple of gallons of uncontaminated water will last approximately one hour. The job dictates the charge/water longevity.

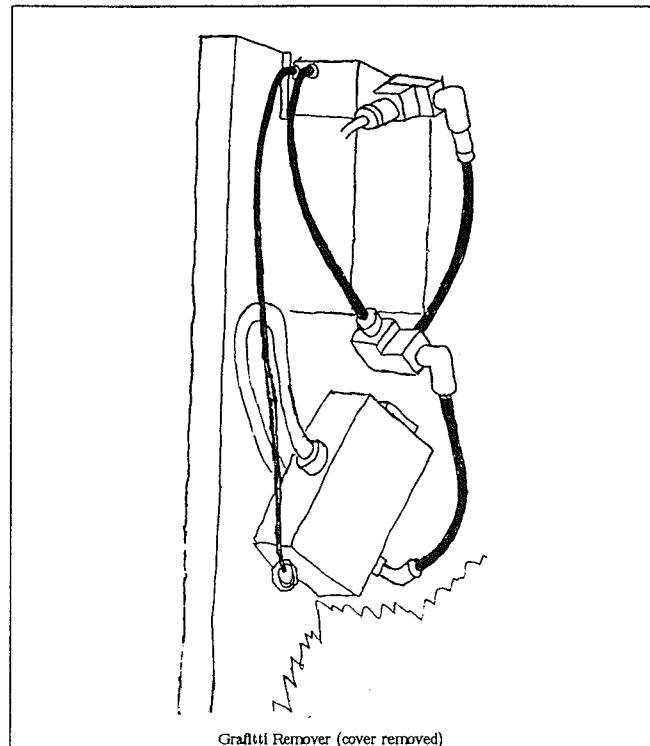
The BLM's PGR is carried in a leather case with a shoulder strap while the Forest Service version is in an attache-like aluminum case. The weapon requires only two people: a gunner to carry the PGR, and an assistant gunner to carry the water and CO<sub>2</sub> bottle. Weapon? That's right, because it's a real battle out there between us and a bunch of spray paint packin' idiots.

The PGR depends on paint solvents to first loosen paint. The water is powered from the nozzle at about 175 pounds through the nozzle orifice, which is .010 diameter. Tests over a period conducted by the BLM have proven the PGR to be very helpful in removing graffiti from delicate formations and porous surfaces.

Other than lamp black from carbide and candles, water itself is not sufficient for the removal of spray paints. The primary advantages in the use of the Graffiti Remover are the elimination of foreign material from porous areas such as popcorn, helictites and cracks, and the savings in the amount of water which must be carried into the cave for ordinary scrubbing with conventional methods.

Liquid aerosol cans of graffiti removers (strippers) are applied to the paint and allowed to work their softening action on the paints. Solutions of dilute muriatic acid are also used to soften paints. When these chemicals have done their work, the pressure of the water blast from the PGR will eliminate the residue. Certain stubborn paints require more than one series of

applications for total elimination. Several brands of aerosol spray removers have been tried and each has been found to have a distinct advantage with various kinds of paints. Experimentation (during each project) with a particular type of graffiti will more than likely be necessary (Operators' manual.) The chemical residue from certain brands of aerosol removers is completely neutralized by the application of the water.



Graffiti Remover (cover removed)

The Mark I PGR has been extensively used by the BLM at Hicks and Wind (not South Dakota) Caves and at all of the McKittrick Hill Caves. Jim Goodbar has used it at Texas Parks and Wildlife's new acquisition, Kickapoo Cave State Park. Ransom Turner is using the Mark II at Cottonwood Cave.

This is a very important device and may well have applications in areas other than caves, such as outdoor sites in state and national parks and on rock outcroppings along highways.

Noble says he will furnish plans or additional information to those interested.

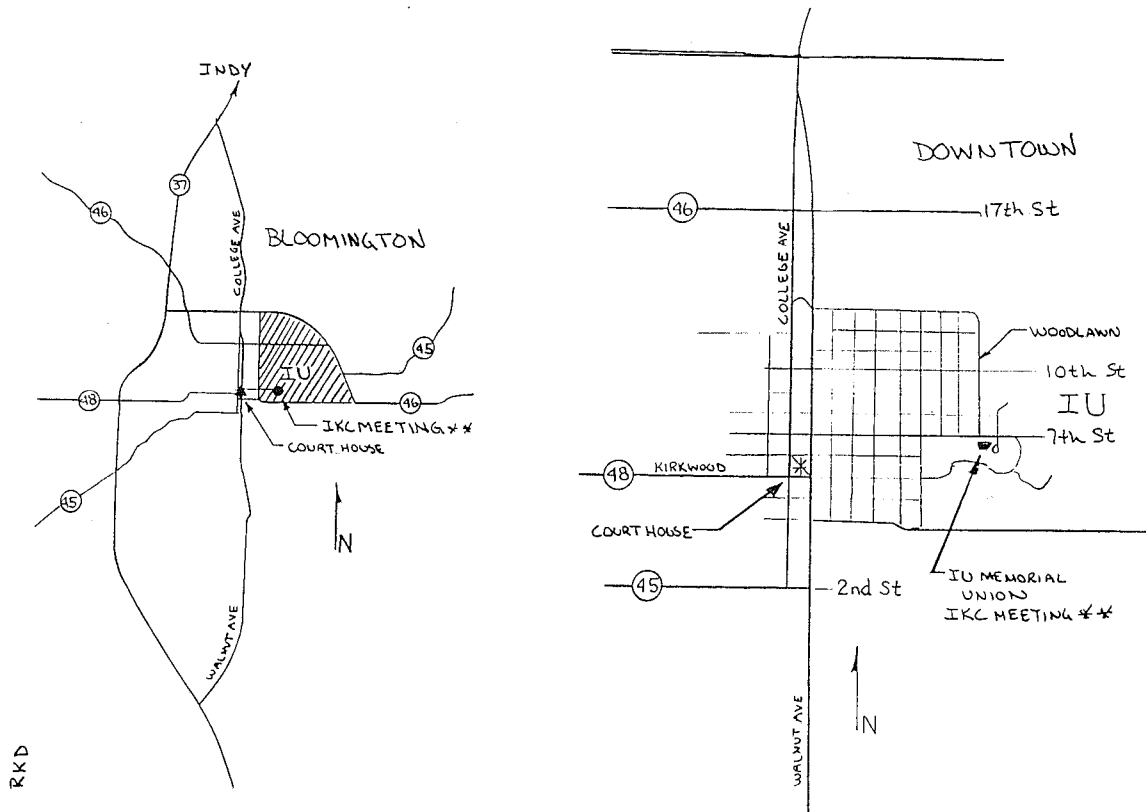
Carry on.

Reprinted from the Texas Caver, June 1988  
which was reprinted from the LAG News, Vol 3, No 1.

## MAP AND DIRECTIONS TO THE IKC QUARTERLY MEETING

SATURDAY DECEMBER 10th, 7:30 PM

Head towards downtown Bloomington to the courthouse. Take Walnut one block north to 7th Street. Head east on 7th for approximately eight blocks. Just past Woodlawn Avenue (a four way stop), turn south (right) into the Memorial Union's circle drive and parking lot. Enter the Union through the entrance on the circle drive. Proceed in and up the staircase to the mezzanine level. Continue straight past the elevators, then left down the hall. The Alumni room is on the left as the hall turns right.



INDIANA KARST CONSERVANCY, INC: PO Box 461, Plainfield, IN 46168

I would like to help the IKC conserve Indiana's unique cave and other karst features.

Enclosed is:

\$\_\_\_\_\_ for IKC membership at \$15 per year (dues expire March 31st each year, you may pro-rate @ \$1.25/month, if you wish).

\$\_\_\_\_\_ donation to the general IKC fund.

\$\_\_\_\_\_ donation restricted to a specific IKC project. Please specify: \_\_\_\_\_

\_\_\_\_\_ I know an area worthy of protection. Please contact me.

\_\_\_\_\_ I would like to volunteer to help.

Name \_\_\_\_\_ Make checks payable to the INDIANA KARST CONSERVANCY and mail

Address \_\_\_\_\_ to the IKC TREASURER, PO Box 461, Plainfield, IN 46168. The

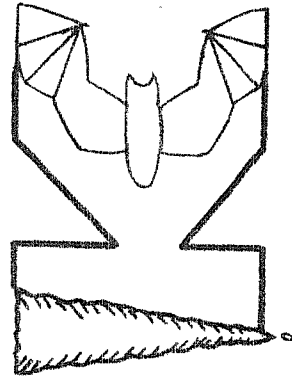
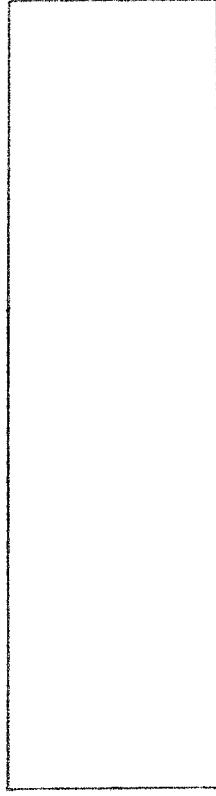
City/state/zip \_\_\_\_\_ IKC is an IRS recognized 501(c)(3) non-profit organization

Suggestions for other interested persons (names and addresses please):

\_\_\_\_\_

\_\_\_\_\_

**Indiana Karst Conservancy**  
**PO Box 461**  
**Plainfield, IN 46168**



**PROTECTING CAVES THROUGH ACTIVE CONSERVATION**