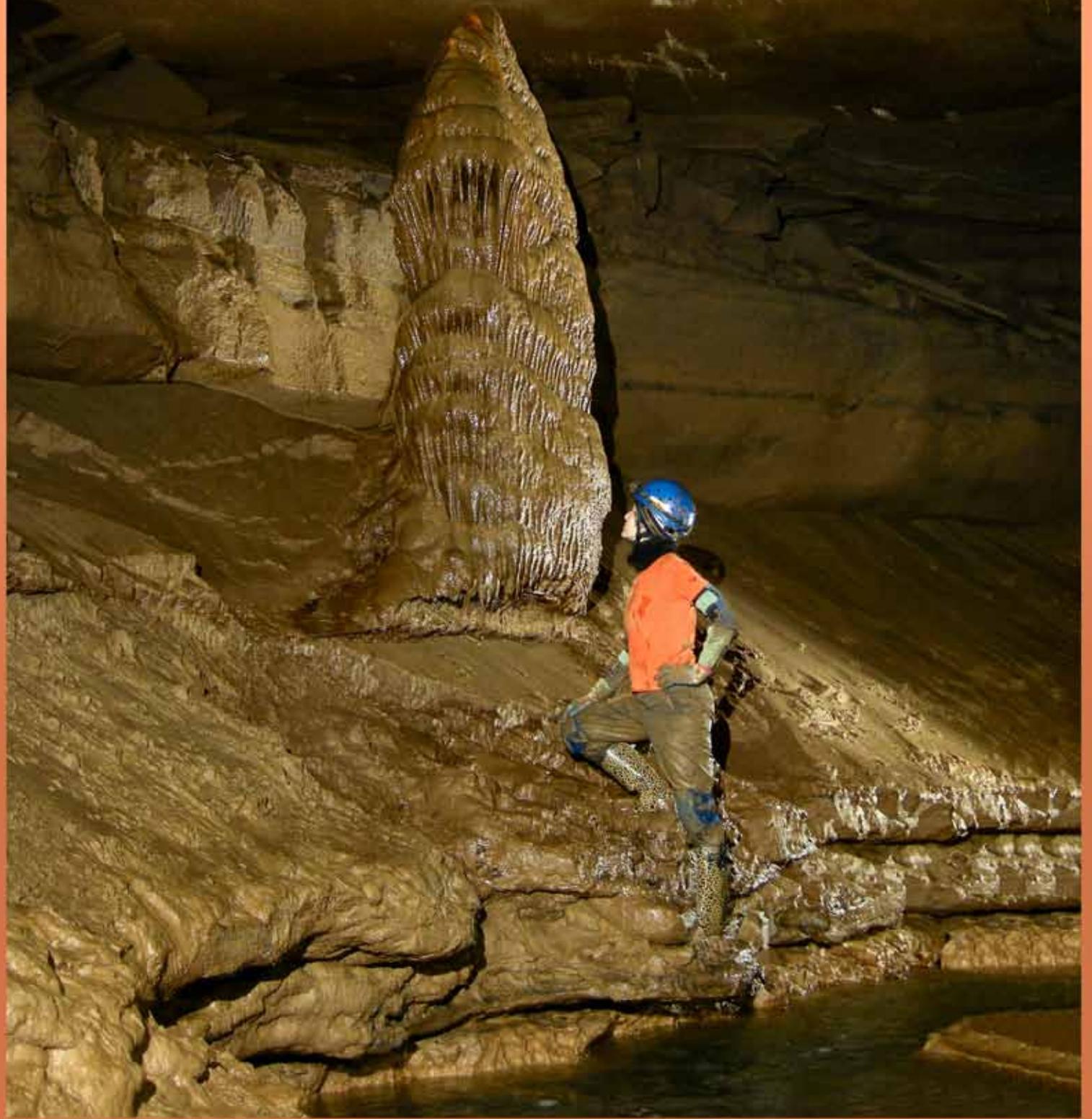


# IKC UPDATE

A Quarterly Publication of the Indiana Karst Conservancy  
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Number 94



# INDIANA KARST CONSERVANCY, INC

PO Box 2401, Indianapolis, IN 46206-2401

[ikc.caves.org](http://ikc.caves.org)

Affiliated with the National Speleological Society



The Indiana Karst Conservancy 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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**QUARTERLY MEETING REMINDER**  
**SATURDAY, SEPTEMBER 12th, 5:00 PM EDT**  
**BORDEN, INDIANA**  
**HOME OF SALISA & JERRY LEWIS**

The quarterly meetings are for the elected Board to conduct business and for our members and other interested persons to have an open forum to talk about caves and karst conservation and related topics. Past, present, and future IKC projects are discussed to solicit comments and input from our members and the caving community as a whole. The meetings are informal, and everyone is encouraged to attend and participate. The IKC Board wants your input.

Preliminary Agenda Items: Brief recap of the last quarter's activities (including pre-meeting workday); Land Acquisition proposal; Buddha reforestation / USFWS cost-share agreement; Robinson Ladder Cave Preserve enrollment in Classified Forest Program; Endless Cave gate project recap; White-nose Syndrome issues; Indian Creek Conservation Easement update; Treasurer's report; and more...

Following the quarterly meeting (around 7 PM) will be the annual pitch-in cook-out. The main entree this year will be self-roasted wieners over a campfire. Please bring a salad, dessert, and/or other covered dish to share. If there are enough entries, we will also have a dessert contest (otherwise Keith Dunlap will just claim victory by default). Please bring a lawn chair if you want to sit.

Meeting directions: See the inside back cover (page 19)

**ACTIVITIES CALENDAR**

**Sept 12 – IKC Quarterly Meeting, Borden (see above)**

**Sept 12 – Robinson Ladder Property Workday, Milltown (see page 14)**

**Sept 19 – Lost River Tour, Orleans (see page 5)**

**Sept 19 – 3rd Annual Bat Festival, Terre Haute (see page 13)**

**Dec ?? – IKC Quarterly meeting (date and location to be determined)**

For more information on the Indiana Karst Conservancy, visit our website at [ikc.caves.org](http://ikc.caves.org) or write to our PO box. Membership to the IKC is open to anyone interested in cave and karst conservation. Annual dues are \$15. Please see inside the back cover for a membership application form or to make a much-appreciated donation. Donations can also be made by credit card using the donation button located on our website's home page.

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 and caving community informed of IKC activities and other news related to cave/karst conservation. Submission of original or reprinted articles for publication is encouraged.

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## RAMBLINGS FROM THE PRESIDENT...

So much has gone on recently that it sort of boggles my mind....Salisa and I got back from our anniversary trip to France and our underground exploits there (a story to be told elsewhere) in time for the International Congress of Speleology/NSS Convention (more on that starting on page 10). Salisa had been fretting about the prospects of being at an international meeting with 1500 people she didn't know. That concern didn't last long... the first person we saw inside the door at Schreiner University (Kerrville, Tex-

this wasn't a unanimously popular decision, the consensus was that the purpose of the gate was to protect the cave's Indiana bat population. Thus, it was about the cave and the bats, not about the owner, who happens to be the DNR.

On the weekend of August 15th, Salisa and I drove up to see how the gate was progressing and take a few pictures. I had an ulterior motive...I hadn't been in a wild cave since my shoulder surgery six months prior in February, but I thought I could probably handle walking into Endless a hundred feet or so. It felt great to get my boots wet again and soak in the ambience of the cave. We were pretty much astonished by the amount of work involved in building the gate. Over the years I've gone through dozens of gates, and, yes, maybe even crawled under one or two, but I'd never participated in building one. With my shoulder being held together by surgical screws I wasn't going to be participating in this one either, but seeing was indeed believing when it came to appreciating the colossal amount of work involved.

As we stood by taking photos, four-man teams carried in the steel bars, passing them off to another team, who then installed and welded them into place. Out in the parking area several hundred feet away the other part of the team was moving the steel beams off the trailer and cutting them to size. It was like watching a bee hive, with each of the workers busily conducting their task. Although the gate is an impressive engineering feat, I was struck more by the people building it on behalf of the bats. The IKC will receive a small payment for constructing the gate, probably less than the engineering planning is worth, much less the construction of the gate itself. The people building the gate, however, received absolutely nothing other than a lot of sore muscles and the feeling of accomplishment of a job exceedingly well done. Perhaps the DNR will keep this in mind when making future decisions about the management of caves and cavernicoles.



as) was Bob Vandeventer! Within the first five minutes as we were talking to Bob it started to look more like an IKC meeting than the ICS, so we were definitely among friends.

On the home front the IKC has had lots of irons in the fire. Here I'm going to focus on the gating of Endless Cave at Cave River Valley. With the entry of Indiana DNR into the White-nose Syndrome arena, the Endless gate started to look like it was going to morph from a project into some sort of political statement. I received a number of e-mails from concerned IKC members urging that we reconsider our involvement as the contractors for the construction of the gate. The gist of the concerns were related to the mixed message we were receiving from the DNR, contracting with IKC to build the gate at Endless (part of Spring Mill State Park), while seemingly slamming the door in our face in other Indiana caves.

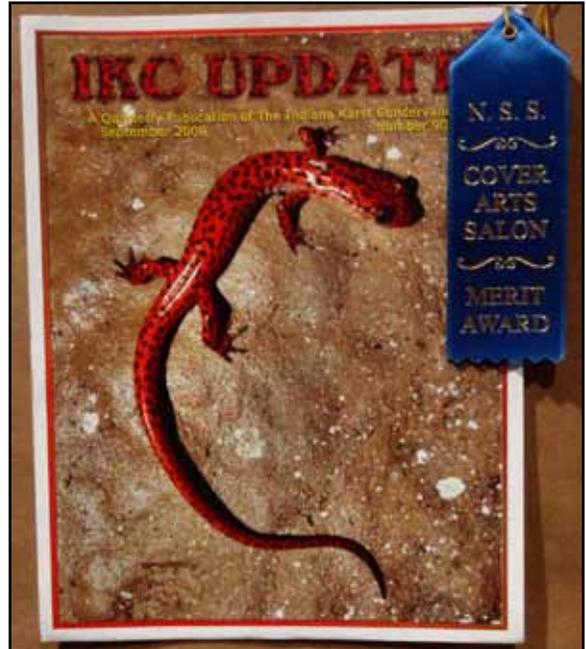
The short version is that the gate is now built (see Keith's report starting on page 6). Although

*Jerry Lewis*

## NEWS BRIEFS...

□ Since 2001 when the IKC acquired the Buddha Karst Nature Preserve property, we have had an on-going reforestation project there where we would plant 1 to 2 acres of hardwood seedlings per year using volunteers (primarily cavers and scout troops). To date we have planted about 10 acres. Recently, we were made aware of a private landowner program sponsored by the USFWS for habitat restoration and after some discussion with them, the IKC has entered into a cost-share agreement to mechanically plant an additional 12 acres of trees in 2009 using a professional contractor. The agreement calls for USFWS to cover approximately 95% of the initial weed control this fall and the purchase and planting of 8300 trees next spring. The IKC will pay for the remaining 5% of the initial costs, plus subsequent years of weed control, as needed. In 2011, we may resume some manual planting to fill in some of the remaining areas, but we won't know that until after next year's planting. In the future we may also need to eradicate the remaining fescue in the areas we previously manually planted with trees in order to qualify the property for the Classified Forest/Wildlands program. Enrolling in this program has long-term property tax advantages.

□ The IKC annually enters its *IKC Update* covers in the NSS Graphic Arts Salon. While we have won awards in the past, it has been several year. At this year's International Congress of Speleology/NSS Convention, our September 2008 cover received a Merit Award ribbon. Dave Everton provided the photograph of the salamander and Keith Dunlap did the layout.



□ Bob Armstrong of the Lost River Conservation Association will be conducting his last Lost River guided auto/hiking tour of the season on September 19th. The tour starts from the east at its head waters in Washington County, through Orange County to its disappearance near Orleans, and on to its rise near Orangeville. The orientation lecture starts at 7:40 AM EDT at the southeast corner of the square in Orleans and will depart promptly at 8 AM. Reservations are not required. Tours will go, *especially if it rains*. There will be some moderate hiking so sturdy footwear and long pants/sleeves are strongly recommended. The tour is free, but a small donation is suggested for the optional printed handouts. This is a must-do tour, if you are interested in Indiana karst.

□ The IKC had one new member in the past quarter. Welcome Michael Brown (485). Our paid membership stands at 174.



Panorama view of the entrance area Endless Cave during the gate construction project. *Photo by Jerry Lewis*

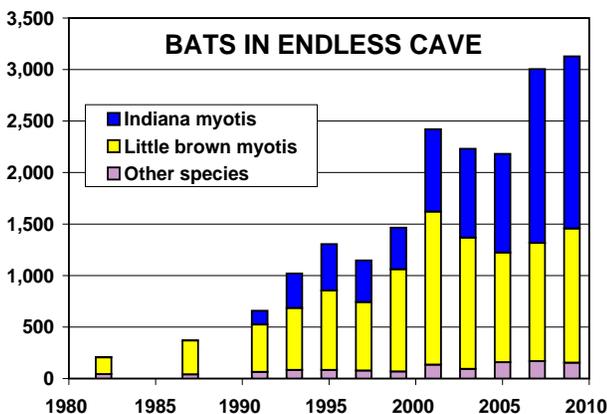
# PROTECTING THE BATS IN ENDLESS CAVE

by Keith Dunlap

Nearly every Indiana caver who has been active for more than a few years knows of Cave River Valley and likely has visited this property at least once. My first trip there was in 1976 and I have easily visited “the valley” dozens of time since then. The history, beauty, and *the caves* make this place special. Settled early and the site of several cave stream-powered mills, later attempts to commercialize Endless and River caves and develop “the valley” into a viable tourist attraction was never really successful, yet cavers would love to visit, camp, and cave there.

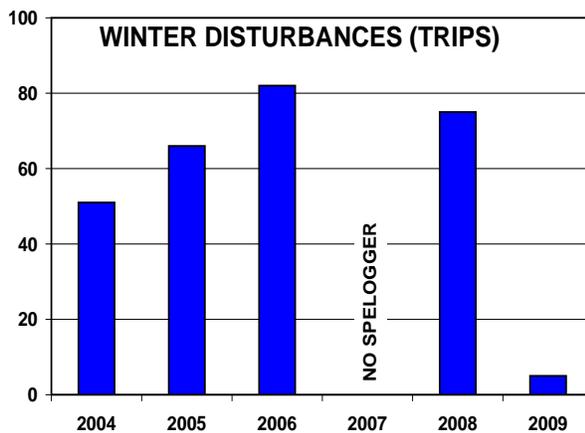
Since the late seventies, the owner of the property has been Burt Engler. He maintained the property and allowed access and camping for a small fee, although I suspect the revenue generated barely paid for the road gravel and mowing. In 2007, he approached the DNR and expressed his interest in seeing the property “preserved” as a public park. With the assistance of The Nature Conservancy, a deal was struck and TNC became the interim owner in August of 2008. In the spring of 2009, the DNR (under the stewardship of Spring Mill State Park) took ownership with some strings attached as a significant portion of the funding came from the US Fish & Wildlife Service to assure the caves and property are managed for the benefits bats, with compatible recreational opportunities allowed, but secondary.

There lies one of the complexity of managing Cave River Valley. If you ask most organized cavers, they are completely unaware of the bat population in Endless Cave and are surprised to know there are Indiana bats there. This is actually pretty understandable as there were few bats of any kind in the cave twenty years ago and the occurrence of the Indiana bat is even more recent. In 2009 there were over 3100 bats



of five species, of which 1671 were the Indiana bat (making Endless a Priority 2 hibernacula). What is even more remarkable about this recent population surge is that it occurred despite significant winter disturbances, something Indiana bats generally do not tolerate well.

Since 2004, the DNR has been passively monitoring winter visitation in Endless using two IKC-designed SpeLoggers. On average between 2004 and 2008 there were 70 “trips” detected between mid-September and early May. Since many of these trips were several hours in duration where the bats were disturbed on the inward trip, returned to tupor, then were disturbed again as the visitors leave the cave,



this really equates to over 100 disturbances per winter, wasting valuable energy the bats needs to survive until spring. It should be noted however, that Mr Engler was not supportive of a winter closure of his caves and thus allowed access to anyone who paid their \$5 to enter the property (including organized cavers who were unaware they shouldn't be entering Endless).

This all changed with the acquisition of the property by the DNR. Last winter the DNR temporarily closed Cave River Valley and heavily signed the entrance of Endless. Obviously there was a significant drop in visits, but there were still five recorded unauthorized trips in addition to the biennial census. While this number of trips may be tolerable, from the USFWS's perspective, the only acceptable number of disturbances is zero.

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This brings us to the subject of a gate on Endless Cave. While I and others had mixed emo-



tions on this topic, it really was the right thing to do for the bats. At other caves that were showing sustained growth despite disturbances, eliminating those disturbances resulted in an even greater rate of growth. This was true at Coon, at Grotto, and at Wyandotte; and while there are no guarantees, it should be true at Endless. Endless has very good potential to become the next major hibernacula in Indiana (discounting the real possibility of White-nose Syndrome).

So my main concerns about a gate on Endless were not the justification for one, but rather: 1) aesthetics, 2) access to the cave during the non-closure months, and 3) the technical aspects (it would be a large gate).

The first concern was addressed by proposing that the gate be located approximately 100 feet into the cave around the first bend, so as to not spoil the very natural and scenic entrance. The second concern on summer access was more difficult to address since multiple agencies (and divisions within agencies) were involved with no one having a clear understanding of how the cave should be managed during the “open” months (unrestricted access would seem desirable, but what happens if Endless is over-used and abused due to the increased visitation it may get as a part of a state park system). In the end, the park’s management plan ([www.in.gov/dnr/parklake/files/sp-CRVNManagementPlan\\_Mar09.pdf](http://www.in.gov/dnr/parklake/files/sp-CRVNManagementPlan_Mar09.pdf)) states that “self-guide tours” during the summer months are an expectation of the visitors and at least suggests they may be allowed. Of course this plan was drafted before the DNR closed all of its caves due to concerns with WNS, so who knows what the future will bring.

The third concern was the technical/physical aspect of the gate. The ceiling height is over 18 feet requiring more equipment to work safely and the base of the gate is in water, requiring special consideration for welding and drilling, both which require electrical power. Finally, there was a respectable distance and elevation change from where the steel and equipment could be unloaded and staged, to the work site. This was not going to be a project easily completed.

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Planning for the gate actually started with informal discussions before TNC closed on the property in 2008. Last fall, I met with Scott Johnson (DNR non-game), Scott Pruitt (USFWS) and Lori Pruitt (USFWS) at the cave to discuss placement

of the gate and design alternatives (traditional ACCA angle-iron bat gate or an open-chute top) and the pros and cons of various “door” styles. I also took some rough measurements to provide the agencies with a ballpark cost estimate.

In late April, Tom Sollman and I returned to select the exact location of the gate. We then erected two PVC pipes to simulate the vertical columns and took about fifty measurements to accurately define the cave’s cross section at that location. This allowed me to “build” a complete virtual 3D gate in the comfort of my computer that then allowed the DNR and USFWS to review and approve the design. It also allowed me to precisely determine all the materials needed, eliminating much of the expensive scrap typically generated from the “order more than you need to be sure we have enough” approach to cave gate building.

In June, I submitted a final quote for the project and started procuring materials and equipment. This included ordering the steel and pre-fabricating the many detailed parts like the removable bar hardware, the “jail bar” assembly that goes below the first horizontal bar, and the storage hangers for removable bars. Originally I was going to rent scaffolding, but later discovered that Ray Sheldon owned six sections. Still we had to buy additional walk board. I also needed to purchase a backup DC welder since a welder failure on-site would bring the entire project to an unpleasant halt. For personal protection while working in wet conditions with electrical equipment, I also ordered wader boots for everyone. Finally, I had to plan and shop for the food to feed the crew for the weekend.

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On Friday, August 14, the installation weekend had arrived. Terry Clark and Bob Sergesketter drove up from Kentucky with Terry’s heavy-duty trailer and picked up the majority of the steel in Indianapolis, then they and I, with my truck and trailer (full of equipment and the pre-fabricated components) headed south, arriving at Cave River Valley around 3 PM. The three of us unloaded my truck and trailer in the staging area (adjacent to the concrete bridge over the stream from River Cave). Shortly afterwards, Bruce Trotter, Ray Sheldon, and Jerry Walker arrived with their trailer packed full of scaffolding, walk boards, and an array of hand tools. We unloaded that trailer and spend the next four hours shuttling scaffolding, welders, torches, and other equipment from the staging area up and over the saddle to the work site. We

also worked on trenching the entrance area, eventually lowering the water about 8 inches (by Saturday morning, there was only about 3-4" at the gate site). As the afternoon passed, Tom Sollman, Bob Zatarski, and Dick & Sue Vernier arrived to help out. While others worked on setting up three sections of scaffolding, Terry and I uncoiled and secured the welding and electrical cables to the right wall to keep them high and dry. The last activity for the day was to locate and hammer drill the two 1-inch diameter holes (6 inches deep) for the ceiling pins, which would later anchor the main vertical columns. We called it a day around 9 PM.

The next morning, Steve Weinzapfel arrived and we were "on the clock" by 8 AM. We first repositioned the scaffolding from under the pins so we could drop plumb lines from the upper pins to locate the bottoms of the two vertical columns. We then measured the ceiling to floor lengths and relayed the measurements back out to the staging area where the 4-inch angle iron (3/8" wall) steel beams were cut and hauled in (four volunteers per piece). We then manhandled the 18 foot long, 200 lb columns into their vertical position, attaching them to the upper pins and tweaking the bottom ends until they were perfectly parallel and aligned with each other. We then drilled the lower pin holes, sledged in the fifteen inch long pins, and welded the upper and lower pins to the columns.

The next step was to determine the vertical position of the first horizontal bar. This position was actually based upon multiple measurements from various ceiling ledges. This was done so when we got twenty-some bars up, we didn't end up with the wrong spacing between the bars and the ceiling. I had previously calculated all of this from the measurements taken in April, but wanted to verify the measurements a second and third time since a screw-up at this point would cause real headaches later. Once the bottom bar was positioned, we had to install the pre-fabricated "jail bars" that extend



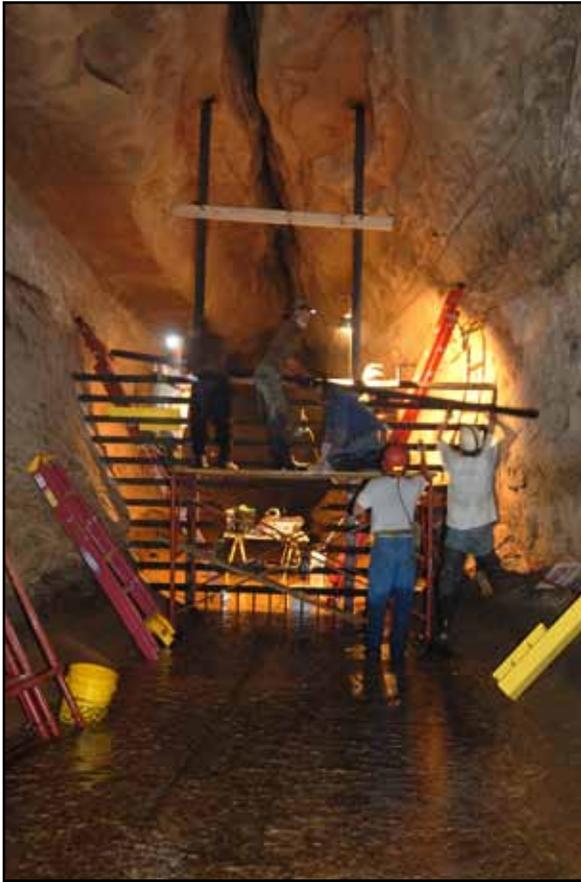
below the first horizontal bar into the water. We used a "scribing" technique to measure and cut each bar to the proper length to exactly match the contour of the floor. This worked perfectly, but took more time than I anticipated.

From that point on, the measuring, cutting,



hauling, positioning, and welding of each bar was pretty much routine. For all but the shortest bars, we drilled and pinned each end to the walls using six inch long by 5/8" diameter steel pins. The third, fourth, and fifth bars had removable center sections, but all this was pre-fabricated and installed as an assembly, so installation of these bars were not too much different than the others. As we gained elevation, we assembled scaffolding in front of the gate to work from safely. We ended up with three sections high at the gate and two sections high in front of that to be able to move the steel to the upper positions. At one point, we were placing a horizontal bar about every thirty minutes. We called day two at 8 PM after installing bar number 18 (of 24).

On Sunday, we lost Ray Sheldon and Steve Weinzapfel, but gained Jake Trotter. The remaining bars went quickly (they were getting shorter and lighter) and it was around 10 AM when the last horizontal bar was put in place. Bob Zatarski worked on welding the two vertical "face plates" onto the gate while Tom Sollman and I debated on how to secure the ceiling slot while still providing a flight path for the bats. My original plan called for a single vertical pipe positioned off the top horizontal bar, but neither Tom or I felt that would be sufficiently secure. So we ended up extending a 2-inch angle iron horizontally from the left column and pinning the other end to the ceiling. From that piece, we extended two vertical plates into the ceiling slot and located two 1-inch diameter horizontal bars spaced seven inches apart. This kept the majority of the area open for the bats, but prevents someone from climbing the gate and try-



ing to slip through the slot.

The last task for the gate was to install the two “storage racks” to secure the removable bars to when the cave is open during the summer (at whatever point the DNR caves are re-opened). These racks were pre-fabricated so they only needed to be positioned on the back side of the right vertical column and welded in place.

We finished the gate around 1 PM. However, some of the equipment and material start to disappear hours before (as soon as it was no longer needed), the rest was pretty much back to the staging area by 2 PM. We broke for lunch, then started loading trailers. We were out of the valley by 4 PM. Per Mark Young’s instructions, we left the trench and electrical cable hangers in place to facilitate his Young Hoosiers Conservation Corp crew that would be painting the gate the following week.

In all, we transported over 4000 lbs of steel into the cave, as well as several thousand pounds of scaffolding and equipment to the work site and back. We only have one minor equipment failure (a torch regulator) but we had a backup.

The twelve volunteers put in approximately 250 man-hours on site constructing the gate. I put in another 40 man-hours fabricating parts off-site in my garage and purchasing materials and equip-

ment. I also had about 40 man-hours in the design. If you throw in travel time, the IKC volunteered over 400 man-hours to complete this project.

Am not sure how a regular contractor would bid on such a project, and I know they would not have been able to construct the gate in the time we did (there is a huge learning curve which we are well beyond and it takes a lot of custom equipment which we have developed over the years). I’m hesitant to even guess what this might have cost using the traditional contract bid approach, but it is safe to say that it would have been several times the IKC quote. In reality, I suspect the design work and bid package preparation costs would have been more than what we charged to install the gate.

In summary, the project was a *lot* of work, but is something the IKC and the volunteers wanted to do as our contribution to the partnership of TNC, DNR, and USFWS to help promote the recovery of the Indiana bat and other bats in Indiana.



Volunteers in front of the finished gate in Endless Cave (Left to Right): Tom Sollman, Jerry Walker, Jake Trotter, Bob Sergesketter, Bob Zatarski, Terry Clark, Bruce Trotter, Sue Vernier, Keith Dunlap. Not pictured: Ray Sheldon, Steve Weinzapfel. Behind the camera: Dick Vernier.

## TWO BIOLOGY TRIPS AT THE 2009 INTERNATIONAL CONGRESS OF SPELEOLOGY

by Jerry & Salisa Lewis

Flying into the Austin we stared at the ground below and marveled at how brown and desolate Texas looked from the air. We picked up our rental car at the airport, then started the two hours drive Kerrville – it looked just as burnt on the ground. Our Tuesday evening arrival was timed to get us there in time to go on the biology field trip “endangered species and endangered caves” the following morning.

The biology field trip was organized by Dr Jean Krejca, a biologist working in Austin, Texas. It was apparent from the offset that this wasn't going to be an intimate sort of event as we were loaded onto two large buses. The first stop was at the federal fish hatchery at San Marcos. Although most of the grounds were covered by fish rearing ponds, all were empty as the fish hatchery no longer hatches fish. It has been converted to a facility to maintain populations of endangered species endemic to the groundwater of the Edwards Aquifer. We were led to a pole barn, where inside we found rows of long water-filled tanks. We had hoped to see *one* of the unique Texas blind salamanders on the trip....imagine how we felt to taking our first look into a tank and seeing dozens of the endangered salamanders wandering the bottom (see below). Another species kept at the facility was the amphipod *Stygobromus pecki*. Dr John Holsinger had named this species after Dr Stewart Peck back in the 1960's when they were grad students. Both were at the ICS and enjoyed mugging for the cameras while enjoying Stewart's namesake.

The next stop was San Marcos Springs, an enormous spring that provided a nice backdrop



Texas blind salamanders being raised in captivity



Stewart Peck and John Holsinger checking out an amphipod

for our box lunches. After lunch we took a glass-bottomed boat trip on the spring, learning about the extensive efforts by scuba divers to remove exotic plants and replant the spring bottom with native species. Across the street from the spring was the Texas State University groundwater monitoring station at the famous San Marco artesian well. Unassuming in appearance at the wellhead, this well taps the Edwards Aquifer to a depth of over a thousand feet and is the highest biodiversity site in North America for obligate subterranean aquatic species. Among other things, it is the type-locality for the Texas cave salamander, two species of cavefish, and over a dozen kinds of crustaceans.

The final stop on the our first biology trip was Natural Bridge Caverns. We saw some cave crickets, spiders, and terrestrial isopods, but the main attraction was gawking at the cave itself. The towering formations were reminiscent of Carlsbad Caverns.

The next day we signed up for an evening trip to watch the emergence of over a million Mexican free-tailed bats from The Nature Conservancy's James River Cave preserve. We were told at registration that Jim Kennedy from Bat Conservation International was leading the trip, but upon arrival at the bus he had apparently deferred the trip to a different person who will remain unnamed. Scheduled to leave at 5:00 so as to arrive in time for the 6:30 bat emergence, we departed half an hour late. About 6:30 we found ourselves driving down a dead-end road into a quarry. To make a long story short, the trip “leader” had never been to James River Cave



and didn't know how to get there. We were over 30 miles from the cave, about 10 miles down a dead end road heading toward nowhere.

We finally arrived at the cave at 8:50, a few minutes before dark, having missed most of the emergence. The cave itself is very modest, essentially not much more than a room where the bats roost. While I photographed the bat flight in the

waning light, a steward from The Nature Conservancy told us about the preserve and its bat colony. Walking over to the stream of bats she snagged one with a net and brought it over for our inspection. Despite the trip leader, it was a worthwhile, if abbreviated, experience to view the emergence from James River Cave.



Salisa posing in front of San Marcos Springs



The ICS biology field trip at San Marcos artesian well



James River Cave during Mexican freetail bat emergence



Bat flight from James River Cave



Close up of a Mexican freetail bat

## IKC EDUCATION AND OUTREACH COMMITTEE REPORT

*by Kriste Lindberg, Chairman*

The International Congress of Speleology did well for us! Our IKC display as well as a load of materials for it and the salons made it to and from Texas just fine, thanks to Bob Vandeventer, our official representative at the event.

While there, the display graced the hallway along with a built in LCD slide show viewer for folks to see our IKC Education and Outreach Committee Highlights for 2008. It was a big hit. So much so that not much longer after it was set up, others followed suit and added slide viewers to their displays!

In addition, the IKC was awarded both a merit award for our partnering with the NSS Environmental Education Committee and West Virginia Cave Conservancy on a national storm drain marking effort, and an honorable mention for our IKC poster in the Symbolic Emblems Salon. Not bad! We'll take it... (See: <http://www.caves.org/committee/salons/Symbolic%20Emblems.shtml>)

As mentioned in the last committee report, Dianne Gillespie has accepted the position of both NSS Education Division Chief and NCKRI Association Director of Education. She was here in Indiana to visit for three days in August. We are in the process of conferring on how to update our efforts now that there are more of us working towards advancing cave and karst education efforts across the country (the IKC education and outreach expansion plan is being viewed as a model). A few of the endeavors we are pursuing include developing a plan for engaging more people in education, working more with teachers and conducive professional organizations, attending conferences, and... of course... finding ways to increase funding! For example, we've already spoken with the teachers that joined us at the Indiana Cave Symposium earlier this year – they are anxious to get on board and help us further our mutual interests! We'll keep you posted...

On other, related business... We held our IKC quarterly education and outreach meeting before the summer IKC quarterly meeting in June. The four committee members were in attendance at The Trojan Horse in Bloomington. Items discussed included adding to our traveling trunks

(remember, we received a second karst/groundwater model this spring!), involvement with upcoming events, and more.

Before you think we only do our thing above ground... we have also been going below to help the Hoosier National Forest with baseline studies in various caves in relation to White-nose Syndrome. Although this destructive affliction may be inevitable in the area, we are doing what we can to work with others to maximize knowledge of the overall subject, educate the public, and hopefully slow down negative effects.

During the quarter, I attended a Project WET (Water Education for Teachers) specialty workshop on stormwater. It was facilitated by a colleague I hadn't seen for awhile, Jill Hoffmann, and taught at the City Hall in Jasper. It was good to network and go over advanced teaching techniques on the subject, delve into activities on human activities as they relate to watersheds, and more in this beautiful town. Afterwards, I walked along the Patoka River on their new multi-use riverwalk trail to decompress before having a bite at the Schnizelbank and driving back to Bloomington. A productive and fulfilling day – a good combination.

Speaking of Project WET, Cathy Meyer of Monroe County and I co-taught a combination Project WET & Project Wild (yes, "wet and wild") workshop in Ellettsville. It was hosted by the same teacher that we did the sinkhole project with in the spring, Judy Morran. Several area educators attended to learn how they can better incorporate the language arts into aquatic and animal teachings.

Later, Cathy and I co-taught a combination Hoosier Riverwatch and Project WET sampler at IU to introduce incoming instructors of the Bernard Harris Summer Science Camp, hosted at Indiana University, to the subjects of water quality monitoring and how we plan to fit them in with the camp. The camp's theme was "Water". Over a two-week time, we hosted 80 middle school students from across the state and encouraged them in the pursuit of the sciences through the study of water. We presented them with karst groundwater model demonstrations

*Quarterly Education Question: What watershed is Sullivan Cave in? Answer to be provided in the next issue...*

and more. We had big plans to take them to see a rain garden that filters water from a county highway garage that drains to Leonard Springs Nature Park and do a tour there, as well. Along the way, they would learn about GPS and so on, however, as luck may have it, it rained that morning so we were unable to go. Fortunately, we had a backup plan – PowerPoint/Google Earth presentations – so they were able to do the tours virtually. We can't complain too much... water is what makes our caves! Throughout the camp, they were engaged in water quality monitoring and storm drain marking, conducted experiments, visited water treatment plants, toured a virtual reality department at IUPUI, and so much more! For their contributions, the City of Bloomington awarded the students with Citizen Scientist, Jr Certification. Thanks to Monroe County colleagues for the assistance with the program – Cathy Meyer (MC Parks and Recreation), Heidi Russell-Wagner (MC Planning), and Todd Stevenson (MC Highway Drainage Engineer). Also thanks to *The Herald-Times* and *Indiana Daily Student* for excellent articles they ran on the camp.

Later, turning attention to home, I hosted a trip to Mammoth Cave for our annual family vacation. It was my niece's first caving trip! She did great on the kids-only tour and is looking forward to more underground adventures. We also floated along the spring-fed Green River and popped into a little cave along the way.

This quarter's report was capped off by a Project Underground teleconference in late August. We are currently focusing on updating our Internet presence and will have a new web site as well as Facebook and Twitter presence soon... Stay tuned!

Our next IKC education and outreach committee meeting will precede the IKC fall quarterly meeting on September 12th. Details will be released soon...

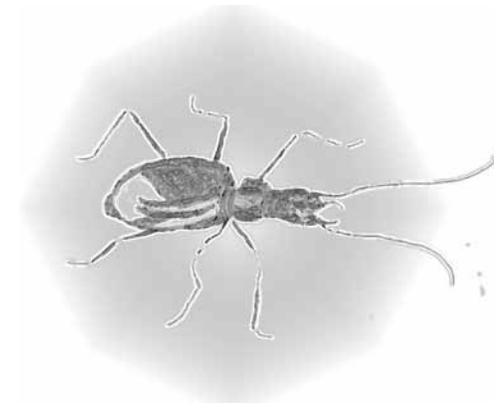
#### Upcoming events

- **4th Annual "Gone Caving"**. Spring Mill State Park, August 29. [*editor's note: ironically there will be no actual caving at this year's event*]
- **3rd Annual Indiana State Bat Festival**, Indiana State University, Terre Haute, September 19. All sorts of presentations and information on bats will be available! The IKC will be co-hosting a Project Underground workshop (see the next bullet) and have our inflatable cave, karst/groundwater, and more present. See:

<http://www.indstate.edu/biology/centers/bat-festival.htm>.

- **Project Underground workshop**. Indiana State University, Terre Haute, September 19. We are hosting a Project Underground workshop in conjunction with "Bat Festival" this year. Participants will learn how to present cave and karst activities, including how to develop responsibly in karst areas, and more during this workshop. They will also receive the activity guide, a cave poster, many handouts, and a cloth tote bag to put them all in.
- **Hoosier Outdoor Experience 2009**, Fort Harrison State Park, September 25-27. The Indiana DNR is hosting this first-time-ever event and it will be *HUGE!* They have asked for us to be there with our inflatable cave. We won't let them down...
- **Willis Blatchley 150<sup>th</sup> Birthday Celebration and Nature Outings**, Bloomington, October 2-4. This three-day event to celebrate the 150<sup>th</sup> birthday of noted Indiana naturalist, Willis Blatchley, is sponsored by the Sassafras Audubon Society and related agencies. It will cover a variety of outdoor activities, including a tour of Leonard Springs Nature Park to visit karst features, creek walks, bird watching, and more. For updates, visit: [www.sassafrasaudubon.org](http://www.sassafrasaudubon.org)
- **Project Underground Workshop**. Bloomington Parks and Recreation, December 5. For a description of the workshop, see above.

Special thanks to Dianne Gillespie, Steve Harris, Laura Hohman, Don Ingle, Cathy Meyer, Whitney Schlegel, and Bob Vandeventer for their efforts this quarter. If you would like more information on any of the above and/or wish to help, please contact me at [kriste.lindberg@gmail.com](mailto:kriste.lindberg@gmail.com) or (812) 339-7210. Thanks.



## WHAT'S NEW AT THE SINKS OF INDIAN CREEK

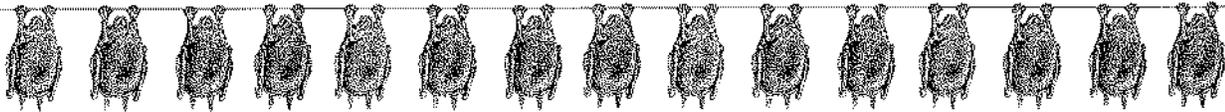
by Jerry Lewis

The IKC's conservation easement at the Sinks of Indian Creek is comprised of parts of seven subdivided lots. The purpose of the conservation easement is to protect the area where Indian Creek sinks underground (the water re-emerges about five miles away at Harrison Spring – Indiana's largest spring). As the newly appointed "monitor" for this property, I am responsible for inspecting the property at least annually, documenting my observations, and working with the lot owners to correct any easement violations or other issues compromising the conservation values of the property. As part of the inspection process, this year I wrote each of the owners a letter and followed up with a site visit a month later. When my daughter Alexandra and I walked the conservation easement we immediately found that it was very difficult to tell where it was. Thus, the plan is to have the easement boundaries re-surveyed and permanently mark in the coming year.

Two of the lots are owned by Jeremy and Holly

Ward, including the area where much of the water actually sinks underground. We chatted with the Wards, who were very friendly and anxious to do anything that might be helpful in the conservation of the sinks. They were concerned about the subsidence of their property into the sinks, which appears to be slowly swallowing some of their land. Jeremy had been attempting to slow the process by rip-rapping the steep creek bank.

After talking with a variety of persons versed in land management, the consensus was that the best to proceed would be decreasing the slope of the bank with "back-grading". Salisa and I visited the site again in August to have a second look at the problem. Indeed, the stream bank is nearly vertical, with land and trees being sucked into the sinks. We all agreed that the rip-rap was just being swallowed by the sinks along with everything else. The plan is to leave the situation alone until a way can be found to stem the subsidence with grading and re-planting.



### ROBINSON LADDER CAVE PROPERTY WORKDAY

September 12, 2009

Whenever possible, we try to plan a workday on the same day as the IKC quarterly meeting so Board members and others who might be attending the meeting can conveniently participate in an activity. This quarter's workday will be at our Robinson Ladder Cave preserve. In addition to checking on our prairie restoration progress, we have two tasks to complete.

First we need to eradicate a number of Tree of Heaven (*ailanthus*) trees. These trees are non-native and considered invasive. Eliminating these trees is a recommendation of the District Forester. We plan to spray the trunks of these trees with PathFinder II (triclopyr) herbicide which is the recommended method for controlling this plant.

The second task is to re-hang one of the barn doors that fell off last year. These doors are very heavy and may require reinforcing the hinge mounting point. We may replace the hinges on the other doors too before they fail.

Start time will be 11 AM EDT and we will wrap up by 4 PM to have time to travel to the meeting location by 5 PM. If you need directions or have question, you can contact John Benton or Keith Dunlap (see page 2 for contact information).

## BOOK REVIEW

by Salisa Lewis

***Hydromythology and the Ancient Greek World: An Earth Science Perspective Emphasizing Karst Hydrology.*** Cindy Clendenon, Finline Science Press, 2009 (paperback, 520 pages)

Cindy Clendenon, an Indiana native and graduate of Indiana University, links ancient myth with natural geologic features in *Hydromythology*. Karst hydrology is explored through myth and the eyes of an environmental scientist specializing in water-related geology. Or, in the author's words, "the science of water's interactions with rock on land and underground as it appears in ancient Greek texts from Homer to Pausanias."

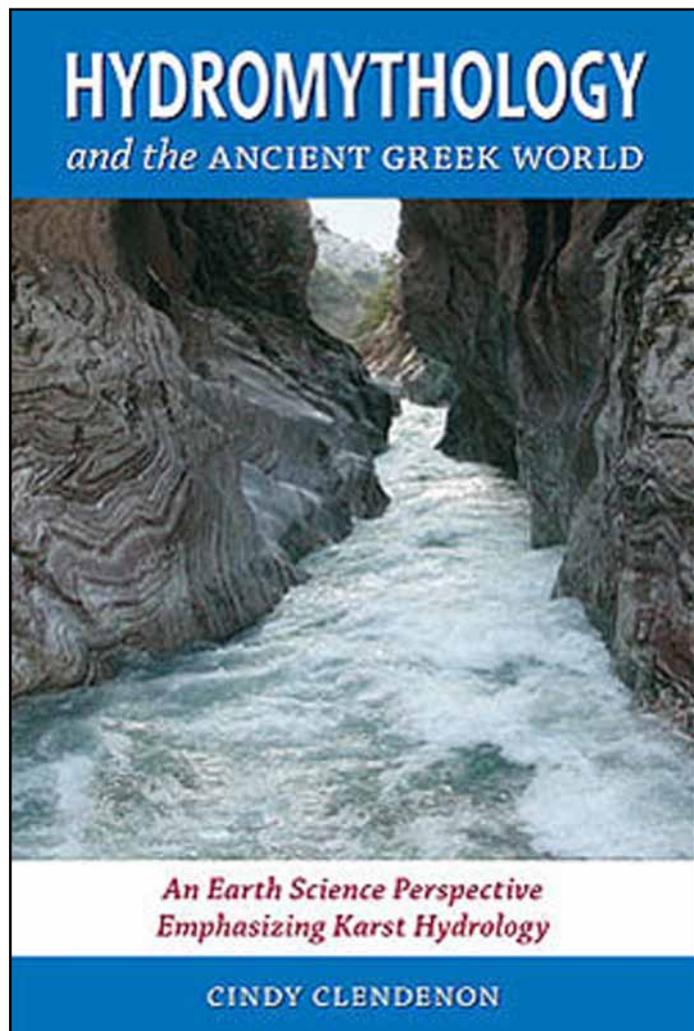
The discussion of karst includes sinkholes, swallow holes, spewing geysers, unpredictable springs, caves, subterranean rivers, swirling cauldrons, and rocky coasts, all of which are backdrops for many myths of the Mediterranean. The book is divided in eight sections: the first two describe how the book formed and its historical and cultural contexts, parts three and four move on to spirits of the freshwater environment, then part five talks about the sea coast. Parts six and seven discuss karst and subterranean habitats, and part eight narrows to a discussion of the Argonaut myths. The last chapter discusses volcanoes.

Strange events from antiquity that were explained by myth about water and caves are now explained, "by applying the principles of earth science", in the stories of the Danaids, Poseidon, and Hera which reportedly represented karstified landscapes of Arcadia and the Argolid. The sudden catastrophic drainage of the Stymphalean Lake was due to a dislodged sinkhole plug. An earthquake triggered a karstic collapse that swallowed one of the heroes during the Seven against Thebes battle. Extinct Lake Tritonis was a brackish coastal lagoon in Libya. The myth of Alpheus and Arethusa describes the possibility of long-distance freshwater travel in the ocean. All these events show how mythical transformations occurred in karstic landscapes. In other myths, carbon monoxide (instead of methane and ethylene) may have influenced the Delphic Oracle; and the archaic Greek vision of hell was based on a roiling, karstic

vortex, later superseded by the concept of a volcanic lake of fire.

The book has several areas of speculations and digressions on topics outside karst hydrology (technology of dyes, an instinctive interpretation of the Hydra as flesh-eating bacteria, and references from Homer about volcanic eruptions). These are interesting and add to the cultural relevance, but sometimes make it difficult to follow the author's thoughts. Clendenon's scientific knowledge and experience lends an original interpretation to classic greek mythology in this book. The glossary, index, and included references to sites with more information and both helpful and suggest further investigation by the individual according to his own interests. *Hydromythology* is an entertaining, thought-provoking read for those times when you can't be underground.

Available from *Speleobooks*.



**INDIANA KARST CONSERVANCY TREASURY REPORT**

**Income/Expense Statement  
From April 1, 2009 to June 30, 2009**

**INCOME:**

Dues Apportionment and Residuals	648.75	
Donations - General	817.72	
Donations - Land Acquisition Fund	65.00	
Stewardship reimbursement (Robinson Ladder)	2551.25	
Interest	<u>538.54</u>	
		\$4,621.26

**EXPENSES:**

IKC Update (printing, production, mailing)	423.97	
Education / Outreach	801.90	
Business (safety box, renewal letters, taxes, etc)	116.59	
Transfers to/from restricted funds/other adjustments	<u>295.05</u>	
		(\$1,637.51)

**NET OPERATING EXCESS (DEFICIT) THIS PERIOD:** \$2,983.75

**Balance Sheet  
June 30, 2009**

**ASSETS:**

Cash in Checking / Saving Accounts / CDs	100910.10	
Accounts Receivables (NRCS reimbursement)	1938.75	
Wayne Cave Preserve (20.00 acres)	75000.00	
Robinson Ladder Cave Preserve (40.40 acres)	75000.00	
Sullivan Cave Preserve (28.00 acres)	72000.00	
Buddha Karst Nature Preserve (36.84 acres)	29000.00	
Orangeville Rise Nature Preserve (3.01 acres)	7000.00	
Indian Creek Conservation Easement (valued at \$1/acre)	<u>13.16</u>	
		<u><u>\$360,862.01</u></u>

**LIABILITIES & OPERATING EXCESS:**

Land Acquisition Restricted Fund	34757.59
Deferred Dues Restricted Fund (173 members)	3761.25
Stewardship Endowment Restricted Fund	29913.66

Previous Operating Excess	31445.76
Net Excess (Deficit) This Period	<u>2983.75</u>
Current Operating Excess (unrestricted funds)	34429.51
Real estate liquidity (basis value)	<u>258000.00</u>

**Total Liabilities & Operating Excess** \$360,862.01

## IKC QUARTERLY MEETING MINUTES

Saturday, June 27, 2009 – IU Geology Building, Bloomington, Indiana

### BOARD MEMBERS PRESENT:

James Adams (proxied by Tom Rea)  
 Bruce Bowman  
 Keith Dunlap, Treasurer  
 Dave Haun (proxied by Carla Winner)  
 Don Ingle  
 Jerry Lewis (proxied by Sue Vernier)  
 Kriste Lindberg  
 Bob Sergesketter  
 Bruce Silvers  
 Karen Silvers  
 Tom Sollman  
 Bob Vandeventer  
 Richard Vernier  
 Jamie Winner

### BOARD MEMBERS ABSENT:

Steve Lockwood

The meeting was called to order at 6:07 PM at the Geology Building at Indiana University in Bloomington, IN. Dunlap officiated the meeting for the absent Lewis. Tom Rea, Carla Winner, and Sue Vernier were accepted as proxies. Ingle recorded the minutes for the absent Adams. Lindberg brought refreshments from the Bakehouse, some iced tea and cookies, which were much appreciated by all present.

### E-vote summary

There was one e-mail vote conducted since the last meeting. Details were provided by Lewis and taken on April 28, 2009. It reads as follows:

President Lewis announced via e-mail that the seasonal closure for the Indiana bat at Grotto, Coon, and Robinson Ladder caves ends on May 1. He suggested a continuation of the closure through the end of May to allow the board to attend the USFWS meeting concerning white-nose syndrome for “stakeholders”.

He called for discussion and motion. Board member Haun motioned (4/27/09): “I move that we extend the winter bat closure of our controlled caves until 30 May 2009.” Board members Ingle and Lindberg seconded the motion.

Shortly after the motion was seconded, Lewis received a call from Andy King at the Bloomington office of the USFWS. This was a courtesy call informing the IKC that USFWS and IDNR were announcing closure of their respective caves on Thursday, April 30, to be effective on Friday, May 1. It was requested that if the IKC was going to participate in this closure that it be communicated to them so that the information could be included in their news release.

At that point Lewis e-mailed the IKC Board with the new information and subsequently asked that the motion be amended to close Grotto, Coon, and Robinson Ladder caves until the beginning of the usual winter closure of these Indiana bat caves (essentially closing these three caves until May 1, 2010). The motion was so amended by Dunlap and seconded by Vernier. A vote was requested by Lewis on 4/29/09 and passed on 4/30/09. The vote was 14 – 0 – 0.

### Treasurer’s report

Dunlap reported a total of \$100,893.92 in cash. This was a new record for us. It broke down as \$4,380.00 in the form of deferred dues, \$32,072.72 in the general fund, \$34,757.59 in the acquisition fund, and \$29,683.61 in the stewardship fund. The membership stands at 172 members, with 19 not yet renewing for this year.

### Education and Outreach

There was an Education committee meeting at the Trojan Horse in Bloomington prior to the IKC Board meeting. All four committee members were in attendance. Lindberg announced that we have received the new karst ground water model for use by the educators in their educational endeavors, and also we have made another inflatable cave, this one for use by the Educational/Outreach committee alone. Vandeventer will be representing us at the NSS Convention in Kerrville, TX. He’ll be bringing the IKC display along with him. Some discussion on utilizing various graphic illustrations from several different sources that would be used to post on the display followed.

### Robinson Ladder Cave Preserve

Dunlap reported that the WHIP paperwork has been finished and submitted (thanks to Winner and Property Manager John Benton). Discussion then followed about the possible need for another spring burn at the property. It was agreed that another burn should be done, and the permit for it will be pursued over the coming months. Getting the property registered as a classified forest is still pending. The small barn on the upper field also still requires repair as one of the large doors had fallen off. It was suggested that it might be a good project prior to the fall meeting.

### Wayne Cave Property

Robert Sollman submitted his annual property report. Several people were at the property the afternoon prior to the Board meeting. Autumn olive was eradicated in spots, trash was picked up along the road, and the property was mowed and weed wacked. Similar work was conducted over at the nearby Hancock Property by other volunteers. ▶▶

### **Indian Creek Conservation Easement**

There has been a vacancy in the position of property manager, and Lewis volunteered to take it on. Vernier moved that we accept his kind offer, and Bowman seconded. Motion then passed 13 – 0 – 1. Lewis has performed the annual inspection of the property and communicated his findings with the property owners. All seemed fine, save one property where some erosion had been noted. Lewis will be working with that owner to control that erosion. There is a need for a survey of the easement boundaries for better monitoring, and some possible options for people who would perform the survey was then discussed. Bowman moved that we provide for up to \$2,000 to pay for the survey, Ingle seconded. The motion passed 14 – 0 – 0. Dunlap will work with Lewis to get the boundaries surveyed.

### **Buddha Karst Preserve**

Dunlap mowed the trails at the property for the second time this year, and he and Property Manager George Cesnik sprayed around the latest tree plantings. The new seedlings were doing well and had received adequate rain so far. There also was a big shade tree that had died next to the parking area which had been discussed via e-mail as needing to be cut down (Bowman volunteered). Soon after the discussion, the point became moot as a REMC line crew had gone past the property and later contacted Lewis to see if they could cut it down, as they were worried that it could take their power lines down if it fell on its own. He told them that would be fine and this was done, but some of the tree remained on site blocking a significant portion of the parking lot. Bowman volunteered to cut up the rest of the tree and scatter it around the property. This will be done soon.

### **Sullivan Cave Property**

The property has been mowed three times so far this year. Discussions on getting the Port-O-Let by the camping area serviced followed. Vandevanter will pursue getting this done. Vandevanter also reported that the last lock on the gate has been installed and there is a need to purchase replacement locks for future use. Dunlap will take on that task.

### **Houghton Hole Cleanup**

Brenda Shultheis has made a request for the IKC to contribute toward the cost of a dumpster to fill with the trash from the entrance pit. The CIG, under her direction, has been working on this project for some time and they have already removed an impressive amount of trash from it. Sergesketter moved that we provide \$150 to help pay for the dumpster. Vandevanter seconded and the motion was carried 14 – 0 – 0.

### **Steve Harris**

Steve Harris, the new Hoosier National Forest Karst Coordinator was present. He spoke of a desire to keep the lines of communication open with cavers, and he

is available for any questions or comments anyone might have about WNS and the resulting closure order on the Hoosier. Monitoring work, however, still needs done on the Hoosier in their caves. Resource inventorying, surveying, and scientific work is also still allowed, as long as the appropriate permits are arranged beforehand and proper decontamination methods are followed. Recreational caving is not permitted at this time. Bowman asked about whether or not the IKC/HNF quarterly meetings would be started back up again, and Steve said that would be desirable and asked for input on possible dates. The meetings would be at the Bedford office as it has been in the past.

### **WNS Issues**

Potential changes were discussed related to our liability waivers to reflect new WNS protocols that need to be established to help protect our caves against the encroaching threat of White Nose Syndrome. When the new waivers are completed they will be forwarded to the board for approval then posted to the web for dissemination. It is hoped that our waiver, once completed, will become a template for other organizations to emulate. Dunlap indicated he would work on drafting the language.

### **Endless Cave Gating**

The USFW has stated definitively that there will be a gate put on the cave, the only real question is when it will be done and by whom. A quote from the IKC has been prepared, but not submitted yet. The proposed gate will have three removable bars to open and close the gate. There was general consensus that a gate would be necessary to protect the hibernating bats in Endless that have been significantly increasing over the past ten years. The increases have happened despite fairly regular winter disturbances that occurred before the acquisition by the IDNR in 2008. It is hoped that the gate will greatly increase the winter population of bats in Endless. If the DNR accepts the IKC quote, the gate will need to be in place by August 30th. No new Board action was required since submitting a bid was previously approved by the Board.

### **Land Acquisition Activities**

None to report.

### **Items From The Floor**

Karen Silvers was praised for the good work she has been doing for the bats in the state. She had been instrumental in transporting a colony of bats from a public area that was endangered. All the bats are doing well.

The next meeting will be held at Jerry and Salisa Lewis's home on Sept. 12th. This will be a cookout, with the meeting preceding the cookout. Jerry will let us know the specific time.

The meeting was adjourned at 7:36 pm.

**DIRECTIONS TO THE LEWIS HOME (if lost: 812-967-7592):**

**From the north** – Take I-65 south to Exit 9 –Indiana State Road 311 (Sellersburg/New Albany). At the bottom of the ramp, at the split go right toward New Albany and Starlite attractions. At the first stop light, **set odometer to 0.0**. Get into middle lane.

Mileage: 0.0 - stop light (Ohio Avenue), get into middle lane, continue straight on Hwy 311; 0.5- stop light, **turn right** onto old Hwy 60; 0.8 - stop sign at T-intersection, **turn right** on Hwy 60 (just past Carepets on the right); 4.2 – T-intersection Hwy 60 with Hwy 111, stoplight is immediately past railroad tracks; turn right and continue on Hwt 60 (toward Salem); 7.8 – landmark: Deam Lake on right (continue straight on SR 60); 9.9 -- landmark: Bogie Golf Course. If you like golf, we'd suggest continue just driving on past this one... 10.0 –landmark: Dow Knob Road to left (Huber Winery et al.), **continue straight** on 60,

but **start slowing down**; 10.3 - metal guard rail on both sides of road; 10.4 –**turn left**. After turning, continue left 180 degrees onto frontage road, then right onto last gravel drive leading back to house (immediately before the “Park Closed” sign barring the road. You will see the sign on left side of our lane if you are going the right way. 10.7 – circle in front of house (GPS N38 26 41.5 / W85 54 30.1)

**From west I-64** – Take I-64 to –I-265 (bypass around north side of Louisville metro area). On I-265 take Exit 3 Grant Line Road (Indiana SR 111) At the stop light at the top of exit 3 ramp, **set odometer to 0.0**.

Mileage: 0.0 - stop light (top of Exit 3 ramp), turn left onto Grant Line Road (SR 111); 0.2- stop light, continue straight on Grant Line Road (SR 111); 0.3 - stop light, Hausfeldt Lane, continue straight on Grant Line Road (SR 111); 0.5 – IUS, stop light, continue straight on Grant Line Road (SR 111); 0.7 – IUS, stop light, continue straight on Grant Line Road (SR 111); 3.1 – Railroad crossing, continue straight on SR 111; 6.5 – Stop light, intersect SR 111 and SR 60, continue straight toward Borden on SR 60; 10.2 – Landmark: Deam Lake, continue straight on SR 60; 12.2 – Landmark: Bogie Golf Course; if you like golf, just keep on driving....continue straight on SR 60; 12.3 –landmark: Dow Knob Road to left (Huber Winery et al.), **continue straight** on 60, but **start slowing down**; 12.6 - metal guard rail on both sides of road; 12.7 –**turn left**. After turning, continue left 180 degrees onto frontage road, then right onto last gravel drive leading back to house (immediately before the “Park Closed” sign barring the road. You will see the sign on left side of our lane if you are going the right way. 13.0 – circle in front of house (GPS N38 26 41.5 / W85 54 30.1)

**From west state road 60 from Salem/Mitchell** – At the yellow light in downtown Borden, **set odometer to 0.0**.

Mileage: 0.0- yellow light, downtown Borden; 0.9 – Landmark: Borden post office, continue straight on SR 60; 1.3 – Point of interest: cute single female available for dating on right in frame house at corner of SR 60 and Koetter Road; otherwise continue straight on SR 60; 2.5 –**turn right** onto access road to our house. After turning, then immediate dogleg to left 90 degrees onto frontage road, then right onto last gravel drive leading back to house (immediately before the “Park Closed” sign barring the road. You will see the sign on left side of our lane if you are going the right way. 2.8 – circle in front of house (GPS N38 26 41.5 / W85 54 30.1)

**INDIANA KARST CONSERVANCY, PO BOX 2401, INDIANAPOLIS, IN 46206-2401**

I would like to help the IKC protect Indiana’s unique caves and other karst features. Enclosed is:

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

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

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

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

\_\_\_\_\_ I would like to volunteer to help. Please contact me.

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Make checks payable to the Indiana Karst Conservancy, Inc. and mail to the IKC Treasurer, c/o Indiana Karst Conservancy, PO Box 2401, Indianapolis, IN 46206-2401. The IKC is an IRS recognized 501(c)(3) non-profit organization with membership dues and donations fully tax deductible.

