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The CRF Newsletter is a quarterly publication of the Cave Research Foundation, a non-profit organization incorporated in 1957 under the laws of Kentucky for the purpose of furthering research, conservation, and education about caves and karst.

Newsletter Submissions & Deadlines: Original articles and photographs are welcomed. If intending to jointly submit material to another publication, please inform the CRF editor. Publication cannot be guaranteed, especially if submitted elsewhere. All material is subject to editorial revision unless the author specifically requests otherwise. To assure timely publication, please adhere to the following deadlines:

February issue	by December 15
May issue	by March 15
August issue	by June 15
November issue	by September 15

You don't have to wait until the deadline to submit stuff!

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Message From The Editor

I hope you enjoy this issue as it features a narrative from Joe Mieman who saw Chris Groves fall and helped with his rescue. It was written shortly after the accident and documents the thoughts and actions of Joe during the event. Very interesting reading as it is less sterile or clinical than most accident reports. Chris also wrote a report on his thoughts of the accident. While on the subject of rescue, I wrote an article on rigging a hauling system from your SRT gear. I hope some of you learn something new, and practice rigging a haul system. Lastly, Chris Groves provided an update on CRF's activities in China. Call this the Chris Groves issue! I didn't plan it this way, it just happened.

As editor I have three goals for the newsletter: (1) get it out on time; (2) improve the printing quality and print color photos; (3) feature articles that show CRF is world class leader on cave research. I have only been able to accomplish the second goal on the list.

Getting the newsletter out on time as been problematic. This is partly due to people submitting material late, partly due to delays in printing, and mailing has also been a problem. The February newsletter almost was going to sit for three weeks unless someone stepped forward to mail it out. Fortunately, Richard Maxey volunteered to pick up and mail the newsletters. As I write this, no permanent solution to mailing the newsletter has been established.

I want interesting articles showing the excellent work CRF members accomplish, instead of just trip reports. I cannot do it unless people take initiative to write articles, keep their commitment to submit articles, and submit them on time.

Unless these problems are corrected, this will be my last newsletter as editor. It was a tough decision to make, but under these conditions I cannot create the newsletter I envision, and it is not enjoyable use of my time.

Paul Nelson

CRF's website is :

www.cave-research.org

Contact your operations manager for the user id and password for the members only section

About the Covers

Photos by Peter Bosted

Front: Caver in Dixon Cave, a large trunk fragment near the historic Mammoth entrance

Back: Left, Jim Borden by a gypsum flower in Roppel Cave
Right, cave adapted crayfish in Roppel Cave

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Hamilton Valley Update

by Elizabeth Winkler

We are now coming into our sixth month of operation, so I felt like it was time for an update on the facility. The good news is that, so far, nothing has exploded, erupted, caved in or completely failed on us. There are a number of building issues that need to be dealt with, but these are generally expected problems associated with a new building and are covered under our year-long warranty. Dick Maxey (Maintenance Manager) is working with the contractor to assure repairs are being completed.

We have been able to rent the facility to a variety of groups and individual scientists, so income is coming in, though we are still far from self-sufficient. The NSS Mammoth Cave clean-up filled both bunkhouses for two days last October and later in the month the Hoffman Institute (CRF BOD member Chris Groves) sponsored three Chinese researchers from the Guanxi Karst Tourism group. In February, Dr. John Mylroie brought his graduate-level Karst Processes class to the facility for a three-day course. He wrote after the trip that they thoroughly enjoyed using the facility. He will be back for a week in July with ten high school earth science teachers. In March, Dr. Jonathan Martin of the Department of Geological Sciences at the University of Florida brought his graduate Hydrologic Processes class to look at karst hydrogeologic features around the Mammoth Cave area. They stayed at the facility three nights. In addition, Rick Toomey (CRF BOD member) and Mona Colburn stayed at the facility in January and March while working on a CRF/Mammoth Cave National Park/Illinois State Museum joint research project. The facility has hosted CRF Eastern Operations expeditions as well and served as a grouping area during the rescue of Chris Groves from Sides Cave.

The functioning of the facility has been facilitated by many volunteers, both official and spontaneous. Erik Sicorra (assisted by Karen Willmes, Courtney Siccora, and Lacie Brayley) have been developing the paperwork (insurance and liability) which is required from renters. Roger McClure (assisted by Rick Olson and Stan Sides) has been taking care of the land. When we can keep him and the tractor out of the sinkholes, Roger keeps the

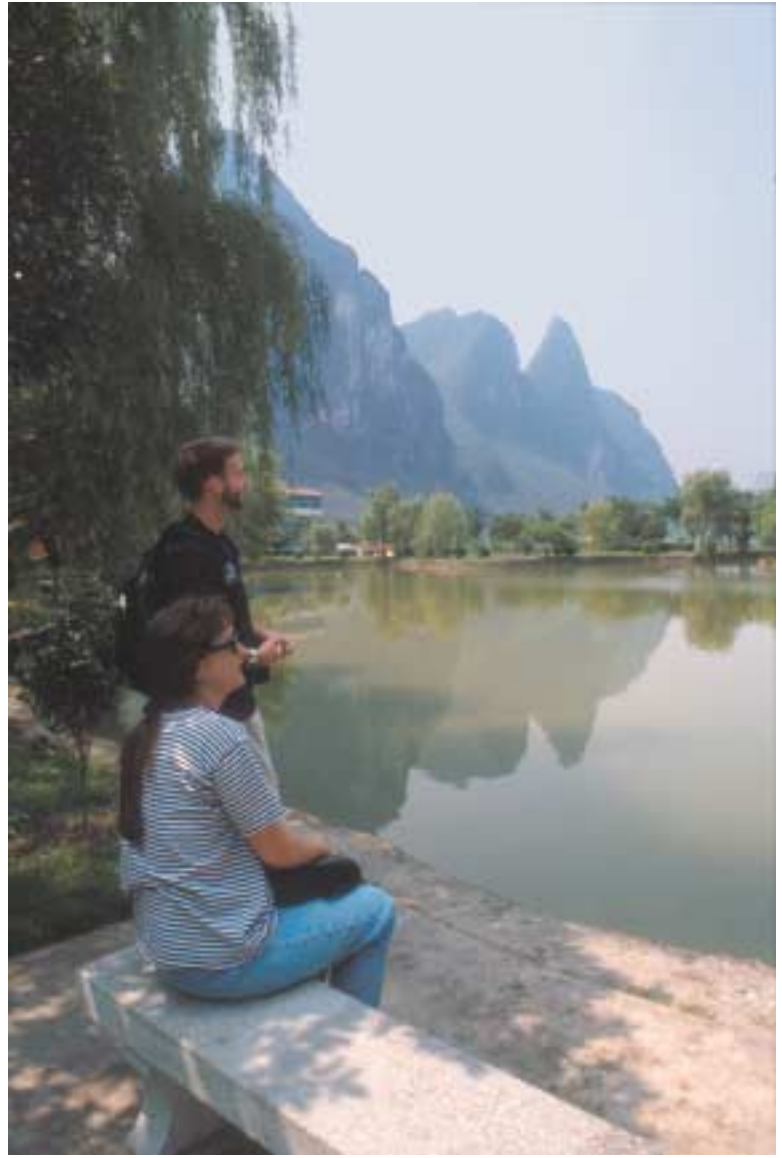
land bush-hogged and manages all of the federal and state programs with which we are involved. These programs generate a significant amount of funding for HV. Dick Maxey, as mentioned previously, is coordinating our ongoing building repairs, assisted by Joyce Hoffmaster and Daniel Gregor, who are also working with Dave Hanson in the upgrading of the Hoffmaster House. The Hoffmaster House is now heated and the installation of the drywall has been completed.

We will be shortly be able to access information about the facility via the CRF website thanks to the work of Jim Borden. He is developing materials to facilitate the promotion of the facility to renters. Jim has also been planning a money-making project for us. This Summer he will host a pre-NSS convention camp at HV. Look for more information on this soon on our website www.cave-research.org!

Terry Davis, our on-site caretaker, has done an excellent job of keeping an eye on things and providing keys when necessary. His presence certainly reduces our risk of theft and vandalism.

The following people have made material and equipment donations to HV which have eliminated much of our original setup costs: Gordon and Judy Smith, Red and Patty Watson, Peg and Bob Winkler, Beverly Toomey, Sue Hagan and Mick Sutton, Rick Toomey, Courtney and Erik Siccora, Kriste Lindberg, Lacie Brayley, Phil DiBlasi and Jan Hemberger, Paul Cannaley, John DeLong, and Jack Freeman. In addition, Pete and Karen Lindsley donated a New Braunfels Smoker which we've really enjoyed cooking on at expeditions. Roger McClure and others of the Ohio group have donated a riding mower and a tractor. I apologize in advance if I have missed anyone. The contributions have been so constant, it is hard to keep track of them all.

Things are beginning to fall into place. We are still a work in progress. If you have ideas, materials, or monetary donations, please feel free to share them. Hope to see you all soon at Hamilton Valley!



Upper Left: Two Chinese cavers (and a few women washing lettuce) at the lower entrance to Seven Star Cave.

Upper Right: Alan Glennon and Deana Groves enjoy the peak cluster karst near Fengyu Cave.

Below: Peak cluster karst at the Karst Institute's Experimental Research Site.

Photos by Chris Groves



CRF and WKU China Caves Project in 2000

by Chris Groves and Alan Glennon,
Hoffman Environmental Research Institute, Western Kentucky University

Introduction

In June, 2000, Chris and Deana Groves, along with Alan Glennon, traveled to Guilin, China, in a cooperative research project between the Cave Research Foundation, the Hoffman Environmental Research Institute at Western Kentucky University, and the Karst Dynamics Laboratory (KDL) of the Institute of Karst Geology of the Chinese Academy of Geological Sciences. With roughly 300 karst geologists, hydrologists, and graduate students in residence, the Institute is the primary karst research center in the China. It is an agency of China's Ministry of Land and Resources (roughly equivalent to a combination of the US Geological Survey and the US Environmental Protection Agency), and is responsible for karst resource management.

The city of Guilin, on the Li River, has a long-standing reputation as a setting of great beauty, and has developed as a significant domestic and international tourist destination. The economic benefits of tourism have led Guilin to become one of the more prosperous regions of southern China. An important aspect of this prosperity is that it has given the region the resources to begin to concentrate on solutions to environmental problems.

Project Background

There has been a history of karst research activities between WKU and Chinese cave scientists, which has increasingly involved CRF, and in particular the Guilin KDL. In 1994, Chris and Deana Groves hosted Professor Zhang Shouyue, a leading karst scientist with the Chinese Academy of Sciences in Beijing, for a week at Mammoth Cave during a US lecture tour. Professor Zhang interacted with numerous students and scientists at WKU and Mammoth Cave National Park, and gave several lectures on research projects in China.

In 1995, Chris and Deana visited Guilin and the KDL for the first time, where he presented results of carbonate geochemistry research in the Mammoth Cave area. While in Guilin, he also discussed UNESCO's International Geological Correlation Program (IGCP) Project 379: Karst Processes and the Global Carbon Cycle, with the project's director and Karst Institute founder Professor Yuan Daoxian. This began a period of collaborative work in support of IGCP Project 379. During the trip, they also visited Beijing to meet with Professor Zhang at the Chinese Academy of Sciences.

In 1998, a group of organizations including CRF hosted a successful international meeting of IGCP Project 379 in Bowling Green, Kentucky. Three members from the KDL attended the Kentucky meeting along with another 110 scientists and students from a total of 17 countries. Many of those in attendance were among the top karst scientists in their respective countries, and the meeting was very successful in promoting the goals and results of the project. Nearly \$20,000 in funding was obtained from WKU, the National Park Service, American Chemical Society, Cave Research Foundation, and the Karst Waters

Institute to support travel and registration expenses of students and scientists from around the world. Numerous CRF members attended the meeting and gave scientific presentations. CRF was especially active in organizing and leading several field trips on and beneath the surface of the Mammoth Cave area, which gave the participants a chance to see the great cave at whatever level of intimacy (and difficulty!) they chose, and have it interpreted by those most knowledgeable about it.

CRF Visit to China In June 2000

In June 2000, Chris and Deana, with CRF member Alan Glennon, again visited the KDL in Guilin. They presented a three-day workshop on Geographic Information Systems (GIS) tools for study of karst geomorphology, hydrogeology, and resource management, led by Alan. Chris presented results of the Mammoth Cave working group of Project 379, and the joint Chinese-US team also participated in field research into landscape evolution of the Li River Valley using newly developed methods of cave sediment dating by isotopic analysis being pioneered by Darryl Granger.

The GIS workshop was presented to a group of 15 karst scientists and graduate students at the KDL, some of whom had traveled from as far away as Beijing for the class. The workshop concentrated on developing tools for the three-dimensional import and analysis of cave and karst hydrogeological data. Several Chinese data sets were developed using combinations of Compass, Walls, Cave Tools, and the ArcView extensions: Spatial Analyst, 3D Analyst, and Image Analysis. The fabulous "peak cluster" tower karst areas of the KDL's experimental field site east of Guilin were especially striking when rendered with these tools. CRF funding allowed us to donate copies of the several of the most useful ArcView extensions to the KDL.

An important goal was to go actually through the entire process of developing these data sets, and writing an instruction guide in Chinese. In this way, by the time we left China a small group at the KDL had enough familiarity with the details of the process that they could in turn teach others, and thus the skills were effectively transferred.

After the workshop, and a day to travel through the spectacular Li River Gorge between Guilin and Yangshou, we spent three days visiting caves to search for quartz sediments within abandoned stream passages in the higher elevations of the karst towers of the Li River Valley. Recently developed isotopic dating techniques developed by Darryl Granger of Purdue University measure the time when the sediments were washed into the cave, and thus when the stream passage was active. Since the caves in the towers tend to be rather horizontal and developed at the base of the towers, dating of a high, abandoned cave passage tells when the base of the tower was at that elevation, and thus can give landscape evolution rates. This is an important first step in unraveling the geomorphic history of the area, since estimating the age of the landscape can tell us what

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Rescue of Chris Groves at Sides Cave

Introduction by Paul Nelson

When I became aware that Chris Groves had been rescued from Side's Cave, I thought the story would make an excellent article for the newsletter. Joe Meiman was with Chris, and has written a narrative from his perspective. I call it a narrative because it contains his thoughts and emotions instead of a clinical accident report which only lists the details. I found it very interesting. I was also able to convince Chris to write an article from his perspective. Thus you will have two perspectives of the accident.

I want to thank Joe and Chris for providing me with the material on short notice and for putting up with my constant harassment to submit material.

Narrative of Chris's Rescue

by Joe Meiman

Chris Groves, Brice Leech, and I entered Sides Cave at 10:30 am on Wednesday, January 31, 2001, to retrieve dye receptors placed in the cave by the CRF last October. (I had initiated dye trances from Cooper Spring hoping to find a sub-surface intercept to Pike Spring, the ultimate discharge point for the basin.) Chris and I had made tentative plans for this trip several times since November, but we could not find the right third person for such a nasty trip, so we kept putting it off. Late Tuesday afternoon Brice Leech stopped by the office. I asked him if he wanted to go on the Sides Cave trip with Chris and me the next day and he readily agreed. Brice, being a tough caver and a clear thinker, was the perfect companion for the trip.

The entrance is a 10-inch belly crawl over gravel and cobbles for 50 feet. Afterward, it's a low hands-and-knees water crawl, with a few welcome moments of stooping, for 1450 feet. Chris and Brice led the way as I, being a slower crawler, took up the rear. I met them 45 minutes after entering the cave at the end of the crawl at a pit known as Safety Dome, because this represents the first point of relative safety beyond the flood-prone crawlway.

The water from the crawlway cascades down into the pit, where it is met by a tall canyon perpendicular to the crawl. Safety Dome bisects the canyon at the terminus of the crawl. Chris and Brice were across the pit and canyon when I entered the intersection. I crawled across a large, thick ledge to the left, slightly overhanging the canyon and pit. After a bit of hassle -I got my feet stuck in a tight slot in the ledge- I managed to traverse the canyon to where they were sitting. We then decided which receptors we would retrieve first.

After picking up the receptors, we returned to Safety Dome to exit the cave with Chris leading the way, followed by Brice, and me. While Chris crossed the canyon and onto the ledge above the pit in order to enter the water crawl, Brice and I waited our turn. This was at 1:10 p.m. I took notice of the time as to see how long it would take us to make the crawl. Suddenly, I heard a loud crash of rock and saw Chris fall over the waterfall and into the Safety Dome pit!

My first reaction was "this did not happen". It all seemed very much unreal. I ran to the edge of the pit and yelled for Chris.

I saw Chris lying face-down in a pool of water at the base of the pit; about 2.5 feet deep, with a very irregular floor due to the collapsed ledge now laying in the bottom. At this time I really do not have a firm grasp on the passage of time. I knew that Chris was in dire trouble. My first thought was that he was dead, or he soon would be as only the seat of his coveralls were above water. Literally, the next thing I remembered was crossing the pool, expecting to be met by a crimson wash. I crossed the pool to Chris and grabbed him by the belt-line of his coveralls and between his shoulder-blades which were under water. I lifted him out of the water and onto a low ledge at the water's edge.

I do not know how much time transpired between his fall and pulling him from the water, nor do I know how I got to the bottom of the pit. I suppose 5-10 seconds might have passed, but it could have been 2 seconds. I do remember I took the most direct route, down a chimney climb through the canyon, to the edge of the pit at the canyon floor, which is about half-way down the approximately 30-foot pit, and then down the waterfall.

When I pulled Chris from the water his eyes were wide open, water drained from his mouth and nose, and he was not breathing. A small trickle of blood from a cut under his left eye was running down his face. He immediately started breathing and coughing. He had survived the fall!

His caving helmet remained square on his head. I called up to Brice, who kept his head throughout and was not foolish in following me down a pit that we did not know if we could get out of. I told Brice that Chris was alive and we needed to find a way to get him out of the pit. The waterfall continued to spray us. I checked Chris to see if he had any compound limb fractures. I was very concerned when I saw his left glove folded back on his forearm, but his glove was merely half off his hand. I did not see any twisted limbs.

Meanwhile, Brice was assessing what materials we had available and was scouting a climbing route out of the pit. Brice recalled seeing a short piece of static rope at the top of the canyon we noticed on the way in. (Earlier, we laughed at the rope on the way in. What good is a 15 feet of rope in Sides Cave?)

Sides Cave



For the first five minutes, Chris was unable to speak. He coughed and made painful sounds like a severe stroke patient might sound speaking. After about 10 minutes out of the water, he was able to speak coherently. "Where am I?" Chris asked. "You're at the bottom of Safety Dome," I replied. Chris then asked, "How did I get here?"

"The ledge broke and you fell." Over the next few minutes the same questions were repeated.

Meanwhile, Brice had found a way out. He appeared with the rope on the floor of the H-Survey canyon, about 15 feet from the floor of the pit; halfway to the top. By this time I was able to ask Chris where he hurt. He said his right shoulder and right side were hurting, but other than that, he felt OK. At this point, as we had no rigging or other means of getting him out of the pit, it was apparent that he was going to have to climb out with our assistance. It was a matter of gauging the recovery of his mental and physical faculties versus the certain onset of hypothermia. When Chris could tell me where he was, how he got there, and how we were going to get him out of the pit, along with showing us he could stand unassisted and grip with his left hand, I decided it was time climb out of the pit. This was about half an hour from the time of the fall.

By this time, I was getting quite chilled, and as Brice is a trained Wild Cave Guide familiar with assisting climbs, we decided to switch positions. I climbed to the H-canyon floor and Brice climbed to the bottom of the pit. Brice had tied the ends of the rope into a slip-loop. He placed one end of the loop over Chris' left forearm, while I anchored the top end. Chris was able to assist quite a bit – it was really the only way it could have been done with such limited gear.

Slowly we guided Chris up the pit wall and onto the canyon floor. He was now out of the water. While Chris was out of the immediate danger of hypothermia, the bottom of the H-canyon is not a particularly comfortable place to wait for a rescue. After Chris caught his breath, we took the same positions and assisted him up a fairly easy chimney climb to the upper tube over the H-canyon. This move took at least 15 minutes, as he was not moving very fast and in obvious discomfort.

Once we reached the relatively level floor of the upper tube we were again relieved, as this was a good place to wait for a rescue party. We took this opportunity to check a few vital signs. Chris's pulse was strong and seemed to be of a reasonable rate, considering the situation. There was no external swelling of his head, no external bleeding (except for the small cut under his left eye), and both pupils were equal and responsive to light. At this point, Brice and I put the next stage of the rescue into action. Because of Brice's guide skills, we decided it would be best if he remained with Chris while I left the cave to call for a rescue.

We were assessing what materials we had in our cave packs, when Chris asked what we were doing. At this time Chris knew where we were, what had happened, why we were in the cave, and in what order we had traversed the cave to collect the dye receptors. I told him that Brice would sit with him while I would exit the cave and call for a rescue. Chris said that he didn't really think that would be necessary and that he could crawl out of the cave under his own power.

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Chris Groves in Sides Cave on an earlier trip.

Another Perspective of the Side's Cave Adventure

by Chris Groves

Looking back on being involved in a cave accident in Sides Cave nearly two months later, it was probably the weirdest thing that has ever happened to me. The first irony, other than falling into a pit named Safety Dome, is that while it is unlucky to find oneself on a big ledge that's collapsing into a pit, given that it happened, I turned out to be damned lucky. I had two extremely competent, very good pals with me who put their own lives in jeopardy to save mine. A sweet, warm, and beautiful wife waiting for me at the entrance who then didn't leave my side for the next three weeks. Numerous cavers who came to help me, many of whom were my friends but many also whom I had never met.

I appreciate very much Joe Mieman's description of the trip as a record of that strange day and he did a great job—this narrative is just to make a few additional observations from my perspective, as those experiences diverged as the day went on. His description of our trip matches mine right up until this big chunk of rock I was crawling across decided to collapse. This was nothing that could have been prepared for. The good part about that is there is no reason for us to look boneheaded in *American Caving Accidents*, which is natural to wonder about during a rescue.

Joe saved my life by somehow climbing straight down Safety Dome within seconds. I'll go back there sometime and look the scene. This was really nothing short of one of those deals you hear about when someone lifts a car up with one hand and pulls their baby out from under with the other. I don't know how he did not end up hurting himself up in the process. There is a rational way to climb down that involves climbing down a canyon some distance from the pit and then moving back towards it halfway down. However, on that trip we had not discussed it, and Brice and Joe didn't know the way. Under these conditions Brice wisely waited at the top, and it was these split-second decisions that kept me alive in the early stages of the event. The reason I talk about this is that I've thought through what lessons there are to be learned from all of this, and one of them is to not be complacent about those with whom you go caving. They well may need to react with the same speed and clarity.

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Joe Mieman Narrative (continued from page 7)

Brice and I did not, even for a moment, consider such a notion. Chris was obviously not in a condition to negotiate the 1450-foot water crawl, and he would first have to cross the Safety Dome pit to reach it. In addition, since the ledge was now gone, we were not sure how difficult it would be for us. As it turned out, it was easier with the ledge missing. Chris insisted that he could get out of the cave without a rescue, stating that it's just a crawl.

Brice and I recalled, from numerous accounts of cave rescues (mostly from Accidents In American Caving) that self-rescue attempts have ended in disaster when the victim convinces the rest of the party that they can make it. There may be a time and place that a self-rescue is prudent, but since we had Chris out of immediate danger and the Park could summon a quick full-fledged rescue, this was neither the time nor the place for a self-rescue. Chris was still not totally convinced. I could see his point of view. A caver would rather avoid the embarrassment of a rescue. But I had to convince Chris that if he gave out on us halfway through the crawl, he would be in a dire situation. I asked him to demonstrate his ability to crawl. He gave it a try, and after about a minute was able to painfully traverse about 15 feet across the dry and level floor of the tube. Still he was not convinced, and said he would just take his time, after all, it only took him about five minutes to get out of the pit. I told Chris that it took an hour and 15 minutes to get him out of the pit, not five minutes. That seemed to convince him.

Brice and I made our plans. He was to keep Chris warm while I made for the entrance as quickly as I could to call in the rescue. Brice found a small cache at the top of the Safety Dome pit containing two plastic trash bags, one handily filled with extra trash bags and short candles. He began to wrap Chris in the bags and construct a "carbide-tent" with the candles and his Autolite to keep Chris and himself warm.

I departed for the entrance at 2:25 p.m. Just before leaving I recalled that prior to Chris' fall, I gave him a bag to collect the last receptor that he had placed on the upstream end of the ledge on his way in. He had put the bag in his coverall pocket before crossing the ledge that broke. Chris remembered at once and gave me the bag. I crossed the pit, and to my surprise, the only portion of the ledge that had not fallen into the pit was the portion, about a foot long, that the receptor was tied to. I placed the receptor in the bag and headed out.

The entire trip out of the cave was almost dreamlike. The mental 'video-tape' of Chris falling into the pit kept playing in an endless loop through my head. I kept reviewing the incident, knowing I would have to brief the rescuers. The crawl seemed to go on forever. I felt I was moving in slow-motion. The tape kept playing. At last I could see daylight.

The pool at the entrance was deeper than it had been when we had entered the cave a few hours before. I dipped my carbide light; which did not happen on the way in. It was obvious that the flow had not increased, but rather while squeezing into this crawl we had kicked up a gravel dam on the downstream end of this pool.

I was on the surface at 2:50 p.m.; 25 minutes after leaving Brice and Chris. I had parked my government jeep on the farm road about 200 feet from the entrance. I was able to make radio contact with the Ranger Division almost immediately to call for the rescue.

While driving up the hill towards Sides' cabin I explained the situation to the rangers. I recall asking if Rick Olson was back from his meeting in Elizabethtown, as he was the only other park employee who had been in Sides Cave. (Rick was a member CRF survey party that had placed the dye receptors in October). Rick, experienced in past cave rescues, would be an obvious choice and a valuable asset to the first team into the cave. The rangers said Rick was in the Park and was preparing his gear.

I arrived at the Ranger Station, soaking wet, shortly after 3:00 p.m. to find Incident Command underway. I spent the next half hour or so briefing the Incident Commander Brad McDougal and the first team (Rick, and rangers Ken Kern and Dave Gibbons). I was leaving great puddles of water everywhere I went, and realized that I was quite cold. I changed into dry clothes and called Deana Groves to let her know what was happening.

I tried to call my wife Beth at her school, but was unable to get through, so I called home and talked to my youngest boy, T.J. I told him that I would be a bit late and that I would talk to Beth later. After being keenly aware of time up to this point, the rest of the afternoon and early evening seemed to have passed without notice of time. Rick knew the way to Sides Cave and left with the first team. Shortly thereafter the first cave rescue team from TRACER arrived. I briefed them and led them to the cave. I spent the rest of the evening at the entrance, with short trips to the CRF headquarters at Hamilton Valley to shuttle wet rescuers from the cave.

The entire evening the 'video tape' of the fall kept playing through my head. Most of my time was occupied with entrance logistics. I spent most of my time with John Fry, Chuck DeCroix, John McKay and a few of the guys from maintenance who were blocking air-flow into the entrance and pumping water so crews could dig gravel out of the entrance squeeze.

The situation with all the rescuers showing up and in and out of the cave never became a wild scene. The rescue effort took an up-swing when the folks from NCRC showed up.

About 4:00 am, just before Chris was brought to the surface, Deana arrived. The on-scene doctor started an IV and got Chris into dry wraps. A few of us NPS folks carried Chris up the hill to a ranger SUV where he was carted to an ambulance waiting on the Northtown road. Beth met me at the road, who had travel with Deana. It was great to see Beth.

I checked out with Incident Command at 7:00 am. I began to drive home when I realized I had not analyzed the dye receptors. I headed to the lab and processed the samples. All were negative from the trace from Cooper Spring. I stopped by the office on the way home, and then on to Brice's place. I told him that seeing how we had the day off, and seeing that I did not feel like sleeping with the 'video tape' still playing in my head - although the images were not quite as sharp and graphic as they once were- I planned on heading into town and fetching a mess of beer. Brice, Alan Glennon, Chuck, and I met on my deck at about noon. The sun was shining, the beer was cold, and music was playing on the deck speakers. Our friend was alive and we were most happy.

I had never been unconscious before and coming to from that was the most bizarre part of the whole experience. Progressing through stages, at first I had no idea what was going on. As things began to clear slightly, there was a time where I was beginning to understand the things around me, but not enough to even know anything was wrong. At some point I realized we were in Side's Cave, but I couldn't remember anything about the trip, what we were doing in the cave, or how we had gotten there. It was that frustrating and strange enigma that first gave me any sense that something weird and bad had happened. Eventually I finally realized what the deal was, and from then on it was pretty much concentrating on how to get out of there.

Brice found the way down and eventually we somehow climbed up the pit, the whole thing still very much like a weird dream. It was indeed not long after when I found out that it had taken more than an hour to do so (I thought it had been 5 minutes), that I realized how screwed up things really were and became resigned to a rescue. I am glad about that now. I had been sincere about wanting to crawl on out with Joe and Brice, but in retrospect I think that was mostly just wanting to leave with the minimum of fuss and especially delay. I don't really have any new wisdom about self-rescues and when to use them, except to use them sparingly.

When Joe took off, Brice and I made carbide tents from garbage bags—thankfully he had a carbide light because I didn't. He really sacrificed during the four hours we waited. He shared his light with me, but I must have had it just about the whole time. We were both soaked and pretty cold, but he put up with it and really helped me out. When I'd give it back to him it wasn't long before I would start to shiver and with hurt ribs that really sucked. Whether he realized that I don't know, but he did put up with plenty of shivering so that I could be as comfortable as possible, in retrospect at a considerable risk to his own safety. We talked to pass the time for as long as we could think of stuff to talk about, and right about when I was silently beginning to get concerned that Joe had drowned in the crawlway and that nobody was coming for us, we heard the voices of the first crew from NPS. That was a nice moment.

Fortunately my time clock was still screwed up, and the ten hours or whatever it took to get out through the crawlway really went by relatively quickly. (Since Joe did not mention it and for those not familiar with cave, the 1,450 foot long entrance is named Bob, after the bridge by the same name in Colorado). It was definitely cold and wet, but it became clear to me in the whole ordeal was, what you can put up with, when there is no choice. I am thankful for the folks that showed up to drag me through cold and cramped conditions. The only especially nasty part on this night was having to get out of the thing they were dragging to crawl and squeeze through a few especially awkward tight meanders.

It is remarkable that the infrastructure that took care of me that night exists. A hundred cavers showed up from three states. At the entrance was a doctor, my lovely wife Deana, my friends, a SUV, an ambulance, and a helicopter got me to the University of Louisville Trauma Center within an hour.

I have reflected a lot on things that happened in the subsequent weeks. One is that Sand Cave, where Floyd Collins died, lies just three miles to the south of Side's Cave. If the rescue

folks that came to help me had been there for him, he would not have died. I guess it's also true that if the folks who had come to help him, had been the ones to come for me, I'd still be in the cave. I've always thought of Floyd in terms of this grand character of legend, but I can understand a little better now that he was regular guy who really suffered because he went into caves and there was nobody sufficiently competent to help him when he ran into trouble. These things can happen to anybody that goes into caves, and we are just really lucky to live in an age and place that there are folks who take the time and effort to train themselves in cave rescue. Deana told me that from her perspective on the surface, the whole operation went like clockwork and she was really impressed how so many folks, many of whom had never met one another, could work as a team.

My message, I suppose, is to realize that these things can happen at any time, and to prepare for, and travel through, caves accordingly. Do not get complacent about your caving experiences, those that you cave with, the equipment you use, and the way you approach your trips. My colleagues and I were not complacent on this trip, but I know that I have occasionally been though the years. Things can happen with no warning and through nobody's fault. In this case, things went the absolute best that they could have in every way, and the consequences were the inconvenience of broken bones, ten days in the hospital, \$34,000 in medical bills (fortunately covered by WKU workman's comp except for \$8.26), and a month off of work. It could have been anyone on that ledge at the wrong moment. Please think carefully about all aspects of your trips, and do have medical insurance.

I want to thank everybody who has made my experience as pleasant as possible. This includes lots of cavers, including those from Mammoth Cave, my students from WKU, the TRACERS, NCRC folks from Indiana, and many friends who live and cave in the area. Deana and I got many warm wishes and cards (and even a crate of oranges from one especially thoughtful couple I know) from friends as far away as Alaska and Hawaii that really helped when my recovery got tedious. My folks called everyday and made sure I had everything I needed. Deana (who is fortunately little) curled up on two desk chairs at the hospital for ten nights in a row and this must have been harder on her than me, but she was always right there and cheerful. Kind friends including Alan Glennon and Beth Meiman also stayed with her at the Park's ranger station while the rescue itself went on. And of course, thanks to Joe and Brice who saved my life.



Creating a Hauling System From Your SRT Gear

By Paul Nelson

Your group has reached the lake at the bottom of the cave, you have eaten lunch, and are on your way out of the cave. Suddenly, Fred slips on a muddy rock and falls down a small slope and hurts his shoulder and knee. Fred can't raise his arm without causing pain and he doesn't think he can make it up the rope. He is conscious, not bleeding, and no spinal injuries are suspected. Three choices are, get help for an organized rescue, self rescue, or leave Fred behind to fend for himself. The nature of the injury doesn't necessarily require an organized rescue and Fred and his family would be upset if you left him there, so the group decides self rescue using the equipment they already have. The hauling systems I am going to describe can be put together using the SRT gear from a standard Frog ascension system. Including a small pulley and prusik cord in your gear bag, you can make these systems more efficient.

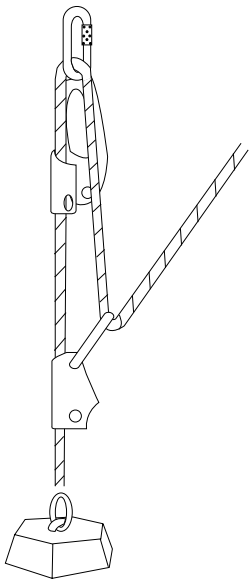


Figure 1 The basic Z-rig for 3:1 mechanical advantage

The Z Rig (3:1)

The Z rig is a standard haul system that gives a 3 to 1 ratio, which means for every three feet of rope is pulled, the load will rise 1 foot. Ideally, if there was no friction, only 33 percent of the load's weight would be required to lift the load. Thus if Fred weighs 200 lbs, then 66 lbs of force would be required to lift him. The gear required is the following:

- 2 Locking carabiners
- 2 Rope grabs (Ascension and Croll ascenders, or 2 prusik loops)

The handled ascender attaches to the anchor carabiner, and the Croll ascender is attached upside down to the main line below the anchor as shown in Figure 1. (Note: the end of the rope should be tied to the anchor so you don't accidentally drop the rope down the pitch.) However because of friction, assume the aluminum carabiner is only about 50 percent efficient, then the theoretical mechanical advantage (TMA) is only 1.75:1!¹ Much of your effort is lost to friction!

You must also constantly inspect the carabiners for excessive wear. I can't emphasize enough to check the aluminum carabiners frequently if you're running a rope through them. A muddy rope lifting 200 lbs can cut through an aluminum crab very quickly, so steel carabiners are recommended.

Pulleys Make it Easier

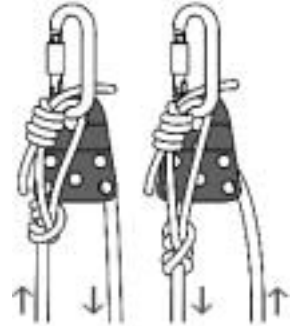
Using pulleys in the system reduces frictional losses significantly, and yields a TMA of 2.71:1.² Table 1 compares the haul-

¹Each time the rope passes through the carabiner, 50 percent of the force is lost, so for each carabiner the $TMA = 1 + 0.5 + 0.25 = 1.75$.

² Assuming 90 percent efficiency of the pulley,

ing systems using carabiners and pulleys. Add the pulley onto the anchor carabiner orienting the ascender and pulley inline with each other so no twists occur.³ Next, add a second pulley to the Croll ascender. Attach the main line into the lower pulley, and slide the Croll down the rope toward the load as far as you can while making sure you can still grab the rope. Pull the rope and lift the load until the Croll reaches the anchor. At this point the upper ascender will hold the load. Now slide the Croll down the rope and repeat. If needed, you can change the direction by adding another pulley near the anchor. Be aware that this re-direction creates another friction point.

Figure 2 Use of a prusik minding pulley with a prusik loop



The rigging can be varied to suit your situation. First, if you are using a prusik-minding pulley, you can replace the upper handled ascender with a prusik loop as shown in Figure 2. This will free the hand ascender if you want to use it as a grab when pulling on the rope.

Selecting a Pulley

Which pulleys to choose? I suggest pulleys similar to the Petzl Mini (\$32, 80 grams) or Petzl Fixe (\$20, 90 grams). Both are lightweight, have metal sheave (wheel) and sealed ball bearings. The Mini costs more, but has a moving side gate so it can be placed mid-rope and works with a prusik loop as a rope grab. This is called a prusik-minding pulley because the wide gate at the bottom loosens the prusik knot as you pull up the rope through the pulley. This technique also reduces the amount of friction in the system, and if the load is suddenly jerked a prusik will not cut the rope. The Fixe is cheaper, but cannot be attached mid-rope and is incompatible with a prusik loop. The weight of two pulleys is comparable to two aluminum carabiners and takes up little space in your bag.

If you don't have enough pulleys, place the pulley closest to the person(s) doing the hauling, and the carabiner closest to the load. The last pulley to be placed would be at the anchor. This will maximize the efficiency through the hauling system.

Prusik vs Mechanical Ascenders

The problem with using mechanical ascenders as rope grabs is, should a shock load occur, they may damage or cut the rope. The worst scenario of a shock load would be at the top of a pitch

$$TMA = 1 + 0.9 + 0.81 = 2.71.$$

³ I tested the system using a Petzl Mini pulley and the Petzl Expedition hand ascender on the same carabiner. The set-up worked without any binding or twists in the rope. The set-up probably won't work with Jumar style ascenders because they are too thick and the rope will not line-up straight into pulley.



Petzl Mini (left) has a moving side gate and is a prusik-minding pulley, and Fixe (right)

when very little rope is available to absorb the energy. This could easily happen when a person is trying to climb over a slippery lip when there is slack in the system. A Petzl Basic ascender under a shock load will damage a 11mm rope at 2.35 kiloNewtons.⁴ This is a realistic scenario of a 200 lb person falling 1 meter. Prusik knots, because they tend to slip under severe load (7 to 9 kiloNewtons, or 1,574 to 2,023 lbs), will probably not cut the rope. Most rescue organizations with advanced training

prefer the prusik over mechanical rope grabs. Another advantage of prusiks is low cost. The disadvantage is when adjusting the system they don't slide as easily; which is why cavers use mechanical grabs for ascending systems. For prusik loops, I recommend about three feet of 8 mm static cord.

Complex 5:1

The Z-rig can be easily modified to provide more lifting power giving you a five-to-one system, even if you don't have pulleys available. Using a short piece of 8 mm cord (perhaps from your cow's tail) tie two loops at each end. First tie onto the anchor, but do not use the same carabiner as the pulley or it might bind. Next, run the cord through the lower pulley (removing the main line), clip a pulley on the other loop, then clip it onto the main line near where you're going to haul from. The cord now runs from the anchor, through the lower pulley, then clips to the main line.

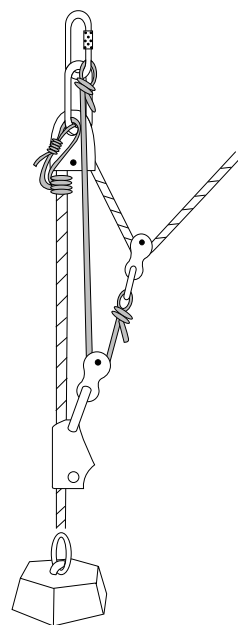


Figure 3. The addition of a cord can create a 5:1 hauling system which works with pulleys or carabiners.

The main line runs from the anchor pulley then through the pulley attached to the cord. The setup is shown in Figure 3. The longer the cord, the more you can pull up at a time without having to reset the Croll.

This system works well if the anchor is at or below the persons doing the hauling, and you have a ledge to stand on. The direction can be changed by adding another pulley at the cost of increased friction, or you can rig using the system described below.

⁴ Information from Petzl literature included with the B07 Expedition ascender mentioned the test was 80kg (176 lbs) dropped on 1m of static rope. This yields about 529 lbs-force.

Alternative Complex 5:1

The Z rig can be quickly modified to get five-to-one system, and also change the direction of the haul. This would be useful if the anchor is above the persons doing the hauling. However, this system requires an additional rope grab which is not part of a person's standard frog system, but a prusik loop can be used. Due the friction of carabiners, it works better with pulleys. Table 1 shows that when carabiners are used, it has a lower TMA than the Z-rig haul system using carabiners.

Attach a pulley to the main line closest to the haul person. Next clip the pulley to a rope grab placed on the main line between the anchor pulley and the lower pulley as shown in Figure 4. Adjusting the system after each haul cycle is a little more complex because now two rope grabs must be adjusted.

Summary

One never knows when a situation will occur that requires the group to perform a self-rescue. By using your existing SRT gear and carrying two or three pulleys and prusik loops, a haul system can quickly set-up. If you only have one pulley, then place it closest to the person doing the hauling. If carabiners are used instead of pulleys, check them for wear! If using mechanical grabs, be very careful of the possibility of shock loading, as the data indicates, a large person falling about three feet could damage the rope.

If you look at the difference between the efficiency between using pulleys and carabiners, and the safety issue of using aluminum carabiners, it is obvious to carry pulleys. **If it is club policy for everyone to carry at least one pulley and prusik loop, then any of these haul systems can be set up.** A pulley doesn't take up much room or weight in your caving bag and is valuable to haul up your gear bag when you're tired. Finally, practice setting-up and using a hauling system before you suddenly need it in a cave. This way you can identify any possible problems with your specific gear and develop solutions, so when the day comes that you desperately need a haul system, you can rig one in minutes!

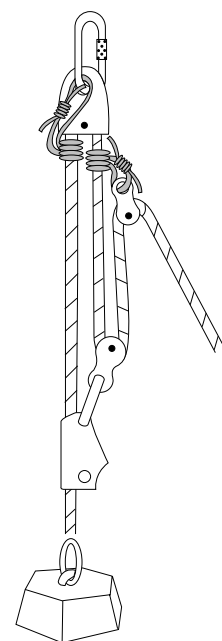


Figure 4. Alternative Complex 5:1. A quick modification of the Z-rig creates a 5:1 system when three pulleys are available

Mechanical Hauling Systems					
	Rope Grabs	Carabiners	Pulleys	TMA Pulley	TMA Carabiner
Z-Rig (3:1)	2	2	2	2.71:1	1.75:1
Complex 5:1	2	3	3	4.42:1	2.5:1
Alt Complex 5:1	3	3	3	4.149:1	1.625:1

Theoretical Mechanical Advantage: Assume pulleys are 90 percent efficient, and carabiners 50 percent efficient.

Lava Beds Research Center Progress Report

by Janet M. Sowers
Chair, Capital Campaign Committee

In April 1998, CRF signed a Memorandum of Agreement with the National Park Service (NPS) and the Lava Beds Natural History Association (NHA) to raise funds to build a 1664 sq. ft. research facility on NPS property at Lava Beds. The total cost of the project is estimated to be \$200,000. This past year we obtained permission from the NPS and the NHA to extend the deadline for fund raising one additional year, to April of 2001. The project is on track and we expect to have the funds raised by the deadline.

Fundraising Activities

We held regular meetings of the Capital Campaign Committee about every two months. Committee members include Janet Sowers (Chair), Peri Frantz, Bill Frantz, John Tinsley, Christopher Richard, Bruce Rogers, Pat Rice, Peter Bosted, Amy Ponsetti, and Richard Minert. At these meetings, we continued work on the fund raising materials, brainstormed lists of people and organizations who might be interested in donating, discussed who to ask next, and strategized publicity for caving conventions such as the NSS convention, the NCRC, and Western Regional. We also held two meetings at Lava Beds with monument staff.

Janet Sowers and John Tinsley attended the NHA board meeting in Tulelake on November 4, 1999. Kim Kirby, Business Manager of the NHA, is doing an excellent job keeping the books and sending acknowledgment letters.

Janet Sowers and John Tinsley spent time at the Foundation Center in San Francisco and downloaded information on 30 different grant making organizations. Christopher Richard culled it down to three promising candidates. He is preparing applications and is planning to ask for \$30k.

Contributor breakdown

<u>Category</u>	<u>Persons</u>	<u>Organizations</u>
\$30,000 +		1 Minert Architects
\$20,000 +	2	1 NPS
\$15,000 +		1 CRF Lava Beds
\$10,000 +	2	1 CRF Board
\$5,000 +	1	
\$3,000 +	1	1 NHA
\$1,000 +	10	1 Western Region NSS
\$500 +	16	3 NSS Grottos +HQ
\$100 +	14	2 NSS Grottos

Publicity materials were published in the Cal Caver and the CRF Newsletter (August 2000). A classified ad was submitted to the NSS News. Janet, John, and Bruce Rogers gave a program on the LBRC for the San Francisco Bay Chapter of the NSS. Grotto members here are among our largest donors.

Peri Frantz completed the construction of our website. The address is: www.pwpconsult.com/lbrc.site. It explains the pro-

Disclaimer

Setting up a haul system requires experience in rigging a solid anchor and good judgment. This article is intended as a supplement to additional training. Performing a rescue is a skill requiring extensive training and experience. NEVER attempt to haul an unconscious person in a harness because blood flow can be stopped. Know your limits when deciding to self rescue or call for help. If you think you're over your head, get help.

Thanks to Bryan Lavender with San Bernardino County Sheriff's Cave Rescue for providing the efficiency calculations and reviewing the accuracy of this article. Bryan has been involved with SAR since 1985, and is the Coordinator for the Cave Rescue Team since 1993. He is the lead instructor in the Sheriff's Department for technical rescue. Bryan is also a National Cave Rescue Commission instructor, course coordinator, and member at large on the Education Board.

Additional Information

Considerations for rope rescue written by Kenneth N. Laidlaw of the Bay Area Search and Rescue.

www.basarc.org/papers/roperescue/index.html

The Western Region rescue website.

www.caves.org/region/western/rescue.html

National Cave Rescue Commission.

www.caves.org/io/ncrc/

Mountain Rescue Association

www.mra.org/

Hamilton Valley Building Fund Update

by Paul Cannaley

As you may be aware, the Foundation had to borrow \$60,000 from our Endowment Fund to finance the second bunkhouse. The good news is we are paying ourselves back; the bad news is we still owe over \$57,000 on this debt!

Please continue to send your tax-deductible contributions to:

Paul Cannaley
CRF Treasurer
4253 Senour Road
Indianapolis, IN 46239-9437

The following people and organizations contributed to the Hamilton Valley Building Fund since the publishing of the last Newsletter. Contributions for the period totaled over \$13,000.00!

Antrum, Inc. / Bill Baus	Rich Hoechstetter
Doug Alderman	Ernst Kastning
Joan Brucker	Tom Murphy
Tom Brucker	Mike Nardacci
Tom Cottrell	Cleve Pinnix
John Delong	Greg Sholly
Fred Dickey	Roger Smith
Dennis Drum	John Stellmack
Burnell Ehman	Gail Wagner
Jeff Farr	Spike Werner
Jack Freeman	LaJuana Wilcher
John Hess	

Continued on Page 18, Column 2

Regional Expedition Reports

Sequoia and Kings Canyon, California

Summary of 2001 Expeditions

John Tinsley

A total of 14 expeditions were mounted during the 2000 field season. Only one expedition went to Mineral King, owing to a series of early season storms that, beginning with Labor Day weekend, seemed destined to frustrate efforts to conduct operations at elevations above 9000 feet. The effort was invested in Redwood Canyon, mainly directed at support of cave diving by Bill Farr, exploration of new swallets that opened in Redwood and Pebble Pile creeks, and facility maintenance.

Two early spring expeditions to Redwood Canyon were canceled owing to snow dropped by late winter storms. Following a rather dry, cool early season in January, near-normal precipitation levels occurred, with most of the snow and rain coming in February and March as closely-spaced, relatively intense storms. Memorial Day weekend, the mid-June expedition, and July 4 weekend were dedicated mainly to exploring three promising swallets that opened above parts of the Lilburn Cave system in result of the late winter storm activity. Arduous digging led either to grossly unstable conditions or to narrow cracks in bedrock that would admit lots of water but no cavers.

The July 4 expedition and the next several weekends were dedicated to supporting the exploration of the Upstream Rise cave diving project headed by Bill Farr. Numerous SCUBA tanks were hauled into the Canyon and to points near the dive site within the Hex Room, a point safely above known flood levels during summer. An exploratory dive revealed that winter runoff had buried much of the 1000+ feet of dive line laid the previous year. This meant that several dives had to be dedicated to freeing the dive line or installing new dive line prior to conducting any "push" dive activities that would extend the cave beyond the point of maximum penetration. Finally, by October, Bill was able to dive; however, a faulty regulator caused him to call the dive a little more than 800 feet into the Upstream Rise. An early rain increased turbidity and flow velocity through the flooded conduit, and defeated any further attempts to push the dive beyond prior exploration. There is a possibility of additional diving in January or February, if the winter is dry and/or snowy enough to limit runoff through the cave. Overall, the results have to be rated as disappointing for Bill as well as his team of dedicated sherpas.

The sedimentology project registered 1999-2000 as another year of modest runoff, as measured by volumes of sediment moved through the cave. Bill Frantz made trips to the Jefferson Passage and the Jefferson Memorial conducting cave restoration operations. Bill Howcroft continued to make progress writing up his Ph.D. hydrologic study of the Redwood Canyon karst, despite the temporary departure of his advisor, Jack Hess, to Washington D.C. as a Congressional Fellow. The cartographic effort directed by Peter Bosted has pushed Lilburn Cave to about 17.3 miles of surveyed length. Work on field-checking the quadrangle maps continues.

Mineral King received but one expedition that was led by Jeff Cheraz. New leads were found on the eastern side of the valley. Early storms knocked out the next two expeditions, but Roger Mortimer continues his work on the White Chief map and maps of caves located beyond Timber Gap to the north of Mineral King valley.

Lava Beds

CRF Lava Beds 2000 Annual Report

by Janet M. Sowers

Cave Survey, Inventory, and GPS Location

An important event this year was the retirement of Bill Devereaux, freeing him up to do what he loves, be at Lava Beds. He worked for the Resources Management division all summer as a volunteer, putting in over 575 hours. He spent much of his time on the 438 cave files, specifically, reviewing the existing files for completeness and bringing all the files up to standard, including visiting many of the caves to complete their reconnaissance inventory, numbering and monumenting. This was a monumental task and a great service to Lava Beds. Bill says there is still more to do!

Cave survey continues at a steady pace. A total of 13 caves were surveyed this year. However, cave map drafting has not kept pace with surveying. To help with this problem, we have initiated the following steps:

- 1) Copies of survey notes are now left at Lava Beds in the Resources Management office before going home. This way Kelly and Chuck will know what was done and will have the raw data if the book person does not follow through.
- 2) Cave survey data is entered into Compass and line plots printed by the book person.
- 3) The cave maps are drawn up in pencil by the book person. The map should be laid out neatly with cross sections, profile, and scale properly placed. A copy of this interim product may be given to LBE as a place holder in the cave files until the inked version is prepared.
- 4) The inked version may be prepared by anyone with computer drafting or inking skills that can trace the pencil drawing. Bruce Rogers has offered his services.

Bruce Rogers has been computer drafting some the cave maps that we have been preparing. He is now experimenting with enhanced, annotated and illustrated maps in which he adds photographs, captions, and text in the margins that help describe and interpret the cave. They are very professional looking.

Monitoring

We continued with long-term monitoring of ice levels in the ice caves, and winter bat population counts. Bill Devereaux has led the ice level recording effort, recording ice levels in six caves

twice a year at the time of their expected minimum and maximum ice levels. Bill and Janet Sowers have both periodically monitored the rapid loss of ice at Merrill Ice Cave.

Gating project

The cave gating project, headed by John Blum and Mike Sims, is being conducted on specific caves of concern at the request of the monument. This year the gate on Post Office Cave was repaired, and a new gate was installed at Gemini Cave.

Personnel

Janet M. Sowers: co-Project Manager, Technical Director
William C. Devereaux: co-Project Manager, Field Operations
Mike Sims: Principal Investigator for cave gating projects
Bruce Rogers: Principal investigator for cave mapping
Bill and Peri Frantz: PI's for virtual reality cave tour

2000 Lava Beds Expedition Log

Thanksgiving Weekend, 1999

Leader: Bill Devereaux

Participants: Todd Niles, Janet Sowers, Mike Wang, Jeff DeVries, Lisa Tesler, Chris Phoenix, Robert Mudry, Lynne Jesaitis, Iris Heusler, Jim Marley, Heidi Green, Charlie Hotz, John Brecht.

Accomplishments: Monitored ice levels in Caldwell, Cox, Skull, Merrill, Heppe, Big Painted. Surveyed several small caves in the Garden Bridges area along with the sink connecting them, including Chute Cave, Backwash Cove, and Siamese Bridge. Conducted general resources inventory of Bear Paw Cave.

President's Day Weekend, February 19-21, 2000

Leader: Janet Sowers

Participants: Jonah Perez, Bill Devereaux, Veda DaPaep, Iris Heusler, Scott Linn, Todd Niles, Lisa Tesler.

Accomplishments: Surveyed Terrace Bridge, Hidden Cave, Cave B, and the sink margins between these caves. Jonah worked with Kelley Fuhrman (LABE staff) converting the cave database from Dbase III to Access 97. Recorded ice levels in Caldwell, Cox, Frozen River, Merrill, and Skull. We met with LABE staff to discuss the problem of getting the cave maps drawn up in a timely manner. We came up with a plan that included a weekend where we would sit in the office and draw maps. We also discussed the CRF-LABE Working Agreement, the Cave Management Plan that needs rewriting, and the Research Center fundraising project.

May 5-8, 2000

Participants: Cindy Heazlit, Janet Sowers, Bill Devereaux.
Drafted three cave maps and gathered cave data.

May 13-14, 2000

Bill Devereaux.

Cave recon card drafting at 12 caves in Caldwell Butte area and Juniper Pole cave.

Memorial Day Weekend, May 27-29, 2000

Leader: Bill Devereaux

Participants: Veda DePaepe, Judi Ellard, Cindy Heazlit, Robert Mudry, John Link, Terry Silva, and Iris Heusler

Accomplishments: Finished survey of Lazaroff's Hole. Recorded ice levels in Cox Ice Cave, Skull Ice, Merrill Ice Cave, Frozen River, Upper Ice, and Caldwell Ice. Tied together the monuments of several small caves in the Garden Bridges area. Surveyed Labrynthian Bridge Cave, Garden Arch, That Bridge, Tube-in-Tube Cave, and Cave A. Installed monument at Siamese Bridge.

June 16-18, 2000

Participants: Bill Devereaux, Dan Weinberg, Mike Sims, and John Blum

Accomplishments: Tried to install the new Gemini Gate, but it did not fit. Remeasured the opening. Removed the damaged gate to Post Office Cave to transport it to Oregon for repair.

Labor Day, September 1-4, 2000

Leader: Bill Devereaux

Participants: Gary Fisher, Douglas Alderman, Fred Douglas, James Wilson, Cindy Heazlit, Jeffrey Dick, Cari Knight, Kathleen Johnson, Michael Cooper, Veda DePaepe, Iris Heusler, Bill Devereaux.

The group measured ice levels in four caves, mapped Backwash Cove, mapped South end of Blue Grotto with four entrances, made recon card for Underpass Bridge, found Red Crescent Cave.

Sept 15-17, 2000

Participants: Ashley Kaiser, Dan Weinberg, John Blum, Mike Sims, Bill Devereaux.

The group worked on Post Office and Gemini gates. Made recon card for Red Crescent Cave, Frontage Road Cave, Little Neck Cave, and The Fool Katcher Cave. Kelly Fuhrman found the pins at Mushpot (missing for 5 months), Little Neck, and Cheetah caves. Measured ice levels at Merrill and Skull cave.

Columbus Day Weekend, October 6-9, 2000

Participants: Bruce Rogers, Pat Helton, Bill Devereaux

Inventoried Hercules Leg - Juniper Cave. Bill completed recon cards at Cheetah, Paradise

Alleys, Hercules Leg and Juniper Caves. Recorded ice levels at Skull and Merrill with Cindy Bell. The cavity at Merrill Cave has grown larger by a third in one year. Field checked the data in the Garden Bridges area for completion of cave maps. Bruce brought computer enhanced maps for Arroyo, Bloody

Caldwell, Foyer Amusement, Lava Lizard Bridge, Glasser 116, Hidden and Channel Z caves. Conducted a geomorphological survey for the proposed new Visitor Center & parking facility. Discussed with the monument staff geological constraints on the siting of the new visitor center relative to underlying caves, and interpretive ideas.

October 13-18, 2000

Bruce Rogers prepared a report to the Park Service detailing his geomorphological survey of lava features at the two proposed visitor center sites. He also discussed issues with NPS staff by phone.

Ozarks

September 2000 to February 2001

Mick Sutton

Mark Twain National Forest

There was one field trip during this period, to do biological inventory in Hanley Cave (Phelps County) in the Mark Twain National Forest Rolla District. The cave is quite rich biologically, although multiple entrances keep the cave cold and unlively in the winter. The party noted that human visitation has been fairly light. They also mapped nearby Hanley Crawl Cave for all of 25 ft. The air flow induced by the multiple entrances will be a factor to consider during planned prescription burns in the area, especially since the cave is a summer bat roost.

Missouri Department of Conservation (MDC); Education

There was a visit to Susan Cave, a fairly long and austere cave in Washington County, to assess the cave for use during the MDC "Beyond Becoming an Outdoors Woman" program, which CRF personnel are assisting. The cave features plenty of mud and water but few technical difficulties, making it a good beginner's cave. In fact it's regularly used for this purpose by a local YMCA camp and a Boy Scout group. A biological inventory showed that the cave is rich in terrestrial invertebrates, fueled by a huge input of dung from raccoons and/or other small mammals. Also of considerable interest, we discovered a small Indiana bat roost (a State and Federal endangered species) within the twilight zone. The "Outdoors Woman" course will take place in April, with Sue Hagan leading the group on behalf of CRF.

We have also been cooperating with the MDC as part of a small-grant program to add CRF biological data to Bill Elliott's state-wide Missouri Biospeleology Database. In partial fulfillment of this agreement, all of our detailed unpublished biological records for 1999 and 2000 have been added to the state-wide database, representing 44 caves and more than 70 species. The other phase of this project will be to deposit some representative specimens at the Entomology Museum at the University of Missouri, Columbia.

Missouri Department of Natural Resources

The survey of Fisher Cave, a large show cave in Meramec State Park, continued in September. During a short evening trip, one party mapped the "Colors Room" area of the main trunk for a total of 350 ft., including a variety of spray shots. Difficulties with the instruments led to a slow survey, and they did not quite finish this area. The next day, during another short trip, a larger party continued the "pit crawl" surveys at the end of a major north-trending side passage. One crew surveyed the left branch at the beginning of the pit crawl while the other party surveyed beyond a small breakdown room, through a constriction, and slightly beyond before running out of time. The total added to the survey was 390 ft.

On a return trip in November, some mop-up survey in small side passages was accomplished by two crews. One party surveyed the continuation of the blowing crawl from the September trip, which they hoped would go to a stream. It did but only went a short distance further. The second party surveyed the upper level mess off the tour trail near the waterfall. Parts of it opened into the canyon below. Afterwards they surveyed a few shots into the Coal Bin Passage which went to a breakdown room where they quit surveying for the day.

Participants: *Hanley Cave*—Scott House, Jerry Wagner, George Bilbrey; *Susan Cave*—Sue Hagan, Mick Sutton; *Fisher Cave*—1) Scott House, Michael Carter, Tom Clifton; 2) Scott House, Doug Baker, Paul Hauck, Michael Carter, Rick Haley, Kathleen Tatham; 3) Doug Baker, Dawn Cardace, Kathleen Tatham; 4) Scott House, Paul Hauck

Eastern Operations

Mammoth Cave, Labor Day Expedition, September 1-4, 2000

Expedition Leaders, Bob and JoAnne Osburn

The 2000 Labor Day expedition was small but productive. Twenty people attended all or part of the expedition with intent to cave and three others were present as camp support. The expedition was fielded from Maple Springs due to delays in completing the Hamilton Valley facility and will be the last expedition from there.

Five caving parties were fielded on Saturday and three on Sunday. All were survey teams and they combined for a total of just over 5,000 feet of survey, 2,365 feet new and 2,730 resurvey. Fortunately the weather was dry, since many of the objectives weren't.

Two parties went to Hawkins River to survey overflow routes of the T survey. They surveyed two branches of what was previously thought to be a high water overflow route. The first went south and a little west and was followed for 1,040 feet and goes on with little air flow. The second had 28 prior stations. The latest survey added an additional 15 stations and about 300 feet. It continues with a gale of air but only for smallish people. This was all new survey of virgin passage.

A party headed to Echo River. They did not survey, but rather added the low water shoreline to a previous sketch. They also checked the area thoroughly for low water leads and found none. To assist their biological inventory, they brought along an underwater diving light. Although they didn't accomplish their goal of finding cave shrimp, they did observe eyeless fish, juvenile and adult eyeless crayfish, one beetle, a midge fly larva, and numerous gnats. They also saw two brown fish (with eyes) which appeared to be "accidentals," perhaps washed in during higher water.

Two parties worked on the Prybar Junction area of Bed quilt. On the first day the party had some difficulty with the trail to the cave, and accidentally circled back to the parking area. Once they got in the cave, they resurveyed 685 feet of simple, silt-floored passage. Most of their shots were over 40 feet. The next day the party walked straight to the cave. They surveyed a side passage they believed to be unsurveyed for about 400 feet.

One party resurveyed 1034 feet in the Blue Arrow passage of Salts Cave. They almost made it all the way to Salts Trunk but ran out of time. They noted an apparently unsurveyed passage in this area.

In the Ruth's Room area of Pohl Avenue one party resurveyed 500 feet of passage. On the second day a party went to the same vicinity and surveyed a total of 1100 feet, 600 of which they believe to be previously unsurveyed. Full wetsuits and elbow pads will be needed to continue. They became the last CRF party to almost miss the ferry!

Survey Crews

Hawkins T-survey - 1) Scott Fee, Scott Parvin, Bud Dillon, Randy Schriber; 2) Scott Fee, Scott Parvin, Ed Klausner, Courtney Sikora; **Echo River** - Candy Leek, Rick Olson, Dick Market, Jason Walz; **Bedquilt** - 1) Elizabeth Winkler, Erik Sikora, Ed Klausner, Courtney Sikora; 2) Elizabeth Winkler, Janice Tucker, John Delong, Matt Mezydlo; **Salts** - Scott House, Joel Despain, Janice Tucker, Matt Mezydlo; **Ruth's Room** - 1) Tom Brucker, Bill Napper, Scott Cundiff, John Delong; 2) Tom Brucker, Dick Market, Rick Olsen, Erik Sikora.

Bonnie DeLong was very helpful around camp.

No Mammoth reports were submitted for trips during October 2000 through January 2001.

Mammoth Cave, Presidents' Day, February 16-19, 2001

Expedition Leaders, Dick Maxey and Cheryl Early

Twenty-seven JVs participated in the expedition. Nine parties were fielded—one in support of both paleontology and Mammoth Cave cartography; two others in support of Mammoth Cave cartography; one in support of Roppel cartography; and five in support of the Lesser Cave Inventory. The cartography trips logged 1,389 feet of survey (286.9 ft new, 1,102.1 ft. replacement survey). Extremely heavy rains for several days

prior to Saturday's trips forced the ferry to shut down Saturday morning due to the large debris coming down the Green River. This kept the Lesser Cave Inventory work confined to the south side of the river.

Rick Olson, representing the park, gave a safety talk to the whole expedition at Saturday's morning meeting discussing in detail the following points: 1. Kentucky caves are dark, cold, and there is little to eat; 2. Strive to avoid accidents, but be prepared; 3. Be especially careful in and around vertical shafts; 4. Watch the weather; 5. Stay in reasonable shape, and know your limits. Rick Olson and Gary Berdeaux gave a brief synopsis of their involvement in Chris Groves' rescue.

One party went into the Bedquilt entrance to continue work beyond Prybar Junction. From a T-intersection, they surveyed in one direction until they reached a damp and breezy breakdown terminus. Then they returned to the T-intersection and surveyed in the direction of a pit complex, for a total of 327 feet. Plenty of work remains in this area.

A combined paleontology/survey team went to the Y survey below the end of Frost Avenue in Proctor. The surveyors achieved 386 feet in a canyon notable only for its popcorn features, including a soda straw with popcorn growing on it. The paleo team members found a number of bones in the stream, ranging in size from woodrat to deer. The bones may have recently washed in, or they may be older material. Rick Toomey reports that "one possible source of the bone is that it is eroding out of the cemented gravels that have previously (at least partially) filled the canyon."

Two parties worked on Lesser Cave Inventory objectives. One team relocated Davids Goliath, Bluff, Rubble, Union City #3, and A.L. Morrison caves in the Union City area. The second team went looking for three small caves in Floating Mill Hollow. They didn't find Roleff Pit, only a small depression, a mound of dirt, and a frozen puddle. They didn't find an entrance for Floating Mill Hollow Cave, and Purwell Cave was only 1 foot above river level with the river rising. It went for only a body length before becoming too small. The party then went to Silent Grove Springhouse Cave along Blowing Spring Branch and surveyed 166 feet until the water got deep.

A survey party headed into the Austin Entrance to survey in the DC area off Ralph Stone Hall. A convenient bypass was found to the short rope drop. The party surveyed 121 feet and closed several loops. A number of leads were noted—there is still virgin passage to be found here!

One party went to Roppel Cave.

Sunday was devoted to lesser caves. One party surveyed all of Slingshot Pit. The entrance "pit" is a 9-foot climbdown into a passage that is 15 feet wide, 3-4 feet tall, and nicely decorated with columns, soda straws, stalagmites, and stalactites. A 12-foot high canyon leads to a dome room but then gets too narrow to traverse. The entire extent of the cave is 146 feet.

Ten people headed to David's Goliath to survey and inventory the cave, but after examining the entrance climbdown four cavers elected to go ridgewalking instead. Inside, the cave has a 25-foot diameter room with two side passages and three pits. The team surveyed 243 feet. The lower level awaits a crew with more vertical gear. The paleo team noted abundant bone, includ-

Continued on Page 18, Column 2

range of tectonic and climatic events have left an imprint on the landforms. Six caves were visited, including Tie Xing (Iron Star) Cave, Seven Star Cave, Maomaotou Cave, Panlong Cave, Shuinan Cave, and Luti (Reed Flute) Cave. Suitable gravels were located and collected from Tie Xing Cave, at an elevation of 290 m, and Shuinan Cave, at 180 m. Since the current land surface between the towers, formed by the floodplain of the Li River, is at an elevation of 150 m, these sediments should provide preliminary estimates for the time when the surface was 30 and 140 m higher than today, and thus the lowering rate of the plain over this period. The highest date obtained previously was from 30 m above the Li River plain at Through Cave by Paul Williams in the 1980's. The new samples were derived from several quartz sources, and will allow chemical determination of the purity of the quartz to determine which are the most chemically suitable for the method. The samples were shipped from China to Dr. Granger at Purdue, and are currently under analysis.

Two other projects included a visit to the Institute's Experimental Field Site near Yaji Village, east of Guilin. The 2 km² site was established in 1986 to study various aspects of hydrogeology and karst evolution in the semitropical tower karst

Alan and several scientists from the KDL group hike past fish ponds to a cave near the Karst Institute's Experimental Research Site.



of south China, and recently to look at carbon cycling and the impact of karst processes on the global carbon cycle. We also traveled 110 km south to the Shanhe Town area to visit Fengyu Cave, a large tourist cave that has been developed with the assistance of the KDL, and opened to tourists in 1994. This wonderful tour is 5.3 km long, with 2 km of walking paths through several large and well decorated chambers, including one with a floor area of 25,000 m², and then a 3 km boat trip from which visitors eventually emerge from a large and beautiful spring entrance at the base of several large karst towers. After the cave trip we met with the directors of the cave, and discussed common aspects and problems of tourism development. The economic development, including hotels and other amenities, which has followed from the cave's opening appears to have made a significant impact on the quality of life in the area, which formerly was relatively impoverished as in many rural areas of south China.



Professor Yuan Daoxian examines water chemistry at the institute's Experimental Research Site.

Chinese Visit Kentucky

In November 2000, the Hoffman Institute and CRF hosted a visit by three Chinese, including Professor Jiang Zhongcheng from the KDL, and two tourism officials from the Guilin Tourism Corporation, Qi Xiang Dong and Yang Jin Hua. The group became the first foreign visitors to CRF's newly-opened Hamilton Valley Research Station, and visited south-central Kentucky for eight days. We had help from overlapping groups including CRF (Rick Olsen, Rick Toomey, and Joel Despain), Mammoth Cave (Joe Meiman, MaryAnne Davis, Vicki Carson, and Bob Ward), and other local cave experts (Gary Berdeaux, Dave Foster, and Mike May). We led them on a week of field activities and meetings to spots that included Mammoth Cave National Park, Hidden River Cave, Diamond Caverns, the Bowling Green/Warren County Tourism Commission, and the Corvette Museum and Factory. The contingent was able to meet with many of the administrators and managers at Mammoth Cave National Park to discuss differing approaches to tourism and natural resource management. The group especially enjoyed interacting with Dr. Rick Toomey to learn of his paleontology work in the cave. On one of Rick's trips into the cave, they were joined by about 110 students from Chris' intro geography class, who enjoyed hearing stories about Rick's vampire bat fossil discoveries in the cave. Professor Jiang gave a lecture on environ-

mental problems in south China to a group of about 60 faculty and students at WKU, attended by numerous CRF members including Chris and Alan, Rick Fowler, Nick Crawford, Joel Despain, Rick Toomey, Rick Olsen, Katie Shaw Seadler, Joe Meiman and Bill Curry. A radio interview with Dr. Jiang on WKU's public radio station, along with a news article in the Bowling Green daily paper, brought community attention to the visit.

Future Plans

A Memorandum of Cooperation is currently under development that has the following goals:

- To enhance communication between Chinese and North American karst scientists and students, and the mutual sharing of expertise and methods.
- To introduce American scientific techniques and experience to China's New Round of Land and Resources Survey, particularly of China's karst regions.
- To conduct research into karst resource management in both China and North America, and in particular the relationship between landuse and hydrogeology. Primary research field sites will include the southeastern United States, and Guanxi and Guizhou provinces of China, expanding outward as appropriate.
- To continue research into karst geomorphology.
- To continue research into the relationship between karst processes and the global carbon cycle.

We are really just at the beginning of the possibilities for meaningful and productive exchange with the Guilin group. They have major responsibilities to the Chinese government for inventory and study of karst resources in the 500,000 km² south China karst region, including GIS development, which will extend at least over the next decade. It's worth noting, as well, there are very likely thousands of kilometers of unexplored cave passages yet to be mapped in Guanxi and Guizhou provinces, to which Ian Baren and the China Caves Project members can attest!



Address Update

If you have changed phone numbers (ie area code split), e-mail address, or have moved since 1999, please send you information to:

Phil DiBlasi
PO Box 126
Louisville, KY 40201-0126
pjdiblasi@louisville.edu

This will help us send out a new and accurate address list!

Eastern Operations Reports (continued from page 16)

ing box turtle, colubrid snake, deer, raccoon, opossum, and bat.

The expedition leaders and several other people walked over to Side's Cave to see if it was feasible to send in a party to recover equipment left in the cave from the rescue of Chris Groves, but the water level was too high and a fairly good sized stream of water was going into the icicle covered entrance.

Thanks to the many who helped around camp and especially Daniel Greger and John Feil who worked all day on Saturday putting up the large overhead door on the utility building. Thanks to Ed Klausner and Gary Berdeaux for swapping out bunk house door locks.

Survey and Paleontology Crews

Bedquilt - Joyce Hoffmaster, Courtney Sikora, Randy Schriber, Dave Moore; **Proctor** - Elizabeth Winkler, Rick Toomey, Rick Olson, Erik Sikora, Matt Mezydlo; **Small cave inventory** - 1) Scott House, Pat Kambesis; 2) Ed Klausner, Bob Osburn, Bill Curry; Ralph Stone Hall - Tom Brucker, Bill Baus, Clarence Bud Dillon, Lacie Braley, Janice Tucker, Alan Wellhausen; **Slingshot Pit** - Pat Kambesis, Lacie Braley, Janice Tucker, Alan Wellhausen; **David's Goliath** - Bob Osburn, Joyce Hoffmaster, Janice Tucker, Dave Moore, Elizabeth Winkler, Rick Toomey; **Ridgewalking** - Scott House, Dan Greger, Ed Klausner, Courtney Sikora.

Thanks to Karen Wilmes for editing all of the reports from expedition leaders for Eastern Operations. —Paul

Lava Beds Research Center (continued from page 12)

ject and gives background information both about the project and about Lava Beds.

We obtained a pre-bid estimate for construction from a Klamath Falls contractor. He estimates \$145-165k, so we are in the right ballpark.

Plans for 2001

First, is to finish raising the money by continuing to solicit individuals and completing the grant application process. As of January 5, 2001, \$174,000 has been raised of the \$200,000 requirement. Next, we will begin working with Lava Beds staff to draft a management plan for the facility to ensure that the building is used for its intended purpose and provides the maximum benefit to research, resources management, and education programs at Lava Beds.

If all goes according to schedule, the monument will conduct a site topographic and utilities survey and Richard Minert will prepare the final construction drawings this winter of 2001. The drawings will then be reviewed by the regional National Park Service office. This spring the drawings will be revised accordingly, and a bid package prepared. The bid package will go out this summer and the contractor selected by the fall. The contractor will then be able to build the research center either Winter or Spring of 2002.

2001 EXPEDITION CALENDAR

Before attending any expedition, you must contact the expedition leader as trip sizes may be limited. Failure to contact the leader may prevent you from attending the expedition as the trip may be full.

MAMMOTH CAVE

Memorial Day, May 25-28, Rick Toomey,
toomey@museum.state.il.us, 520-586-4138

Independence Day Week, June 29-July 8,
Scott House, 314-282-3246, rshcrf@aol.com,
Dave West <d270@bellatlantic.net> and Karen Willmes
<kver@bellatlantic.net>, 410-366-5038

August, 10-12, Pat Kambesis, 770-491-8587,
Kambesis@bigfoot.com

Labor Day, August 31-September 3, Bob Osburn,
314-984-8453, Osburn@levee.wustl.edu

Columbus Day, October 5-8, Chris Groves,
270-777-1891, Chris.Groves@wku.edu

Thanksgiving Day, James Borden, JimBorden@attglobal.net

New Years, December 28-31, Paul and Monica Cannalley,
317-862-5618, Cannaley1@home.com

All Eastern Operations CRF members who have not attended an expedition safety orientation must do so before participating in expedition activities. The safety orientation is scheduled at the beginning of each expedition after the morning meeting. Those who have attended one safety orientation are not required to participate in another. New members should arrange to be at the expedition early enough to attend the orientation. Those who do not attend will not be allowed to participate in expedition activities. Contact expedition leader for more details about the orientation.

OZARKS

Please contact: Scott House, 314-282-3246, rshcrf@aol.com for caving in the Ozarks. Fitton trips are limited to 16 persons.

May 5, Fisher Cave, Meramec State. Park., Missouri

May 12-13, Ozark N.S.R./Powder Mill Creek Cave

June 9-10, Ozark N. S. R. /Powder Mill Creek Cave/Cookstove Cave

June 16-17, Fitton Cave, Buffalo National River, Arkansas

July 28-29, Ozark N. S. R./Powder Mill Creek Cave

August 18-19, Ozark N.S.R./Powder Mill Creek Cave/Big Cave

September 8-9, Ozark N. S. R./Powder Mill Creek Cave

CKKC - Roppel Cave, Kentucky

As a result of the partnership between CRF and Central Kentucky Karst Coalition (CKKC), CRF cavers are welcome to participate in Roppel Cave Project trips. For more information on trip schedule contact Jim Borden at jimborden@attglobal.net

Lincoln National Forest/ Capitan Peak Study Area

October 8-12, Dick Venters, Expedition Leader, 505-892-6121,
rventers@aol.com

CALIFORNIA Lilburn / Mineral King

Memorial Day Weekend, May 26-28, Lilburn, Bill & Peri Franz, 408-356-8506, frantz@pwpconsult.com

June 23-24, Lilburn, Lynne Jesaitis, 650-314-0453,
lynnej@reconstructive.com

July 7-8, Lilburn, Mark Scott, 650-967-6861,
mark.i.scott@lmco.com

August 4-5, Mineral King, Jeff Cheraz, 626-359-2050,
gephc@loop.com

August 11-12, Lilburn, Damion Grindley, 707-433-5643,
cavin_pom@yahoo.com

Labor Day Weekend, September 1-3, Mineral King,
Jeff Cheraz, 626-359-2050, gephc@loop.com

September 22-23 or 29-30, Mineral King, Bill Frantz,
408-356-8506, frantz@pwpconsult.com. **Check with leader for which dates the weather permits.**

October 6-8, Lilburn, Peter Bosted, 650-234-9966,
bosted@slac.stanford.edu

Veterans Day Weekend, November 10-12, Lilburn,
John Tinsley, 650-329-4928, jtinsley@usgs.gov, and
Paul Nelson, 909-869-7623, california_caver@yahoo.com

Lava Beds

September 1-3, Bill Devereaux, 541-594-2211 x166, dev-
ereauxw@yahoo.com

October 6-8, Bill Devereaux, 541-594-2211 x166, dev-
ereauxw@yahoo.com & Cindy Heazlit

November 22-25, Janet Sowers, 510-236-3009,
lmsowers@aol.com

CRF Sequoia & Kings Canyon Annual Planning Meeting

January, 5, 2002, site to be announced, Mike Spiess,
559-434-3321, mikes@caver.com

GUADALUPES

Carlsbad Caverns National Park

Contact Barbe Barker, Area Manager, cavers@gte.net

Memorial Day Weekend, May 25-29

June 17-22, Restoration Field Camp

Labor Day Weekend, August 31-September 3

Thanksgiving Weekend, November 21-25

HSS/CRF Hawaii Caving - Big Island

Contact Pat Kambesis, 815-863-5184, kambesis@bigfoot.com

China Caves Project - Guizhou Province

Four-to-six-week trips are run every other year. Contact Ian Baren, Project Coordinator, 914-478-5133, chinacave@aol.com



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