

American Caving Accidents 1999–2001

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Front Cover

NCRC students move a patient through Pettijohns Cave, Georgia, during a mock rescue. Training exercises like this one are an integral part of the NCRC regional and national cave rescue training seminars. Photograph Copyright © 2003 John Hickman.

Back Cover

More action from the recent NCRC Southeastern Region Modular Cave Rescue Seminar – Top: Preparing the patient for transport in Eudy Cave, Alabama. Photograph Copyright © 2003 Brian Krebs. Bottom Left: Rigging the litter for a vertical lift in Pettijohns Cave, Georgia. Photograph Copyright © 2003 John Hickman. Bottom Right: Moving a patient through small passage in Eudy Cave, Alabama. Photograph Copyright © 2003 Brian Krebs.

An Overview of the 1999, 2000, and 2001 Reports

Following the example of previous issues of *American Caving Accidents (ACA)*, the reports have been separated into two general categories: regular caving and cave diving, and then further classified by result or outcome and by causes and contributing factors. The cave diving incidents are grouped separately, and an overview is presented at the end of this section. Once again, we have used the category “difficulty on rope,” to encompass such problems as becoming stuck at the lip of a pit, clothing or hair caught in the rappel device, jammed rappel safety, or simply becoming unable to ascend or descend. Our intent is to better describe these situations, which might otherwise be lumped under “stuck,” “trapped/stranded,” or perhaps “equipment problem.”

In reporting the number of incidents versus NSS membership totals, only incidents involving fatalities, injury, or aid were included. The reader should also be aware that the members of the National Speleological Society constitute only a portion of the population of active cavers. Further, not all incidents are reported to *ACA*. These numbers should not be considered reliable indicators of accident rates for caving, or used to draw conclusions about the relative degree of risk or danger involved in caving.

Incident Results

Fatalities

In 1999 there were four incidents resulting in fatalities. Hal Bufford died while on rope in Ellisons Cave, Georgia, possibly due to a combination of hypothermia and harness-induced pathology. First-time caver Robert Canady died, apparently from suffocation, when he became stuck in a tight passage in Hermit Cave, Oklahoma. Francis Reyes, an experienced caver and NCRC instructor who was working as a commercial cave guide, was killed in Cueva Los Angeles, Puerto Rico, when he was swept away as the cave flooded. NSS member Christy Quintana was killed in Sotano del Aire, Mexico, after being struck by rockfall while on rope in the 764-foot entrance pit.

There were two fatal incidents in 2000. Paul Snowburg was killed when he apparently slipped and fell into the 150-foot entrance pit at Birds Drop, Virginia. NSS member Joe Ivy died in O-9 Well, Texas, when he fell during a bolt-climb and his belay system failed.

In 2001 there were five fatalities. Aaron Standage drowned in Redman Cave, Arizona, while attempting to free-dive a sumped passage. Jeffrey Young died in Earthquake 90 Cave, Tennessee, when he either fell or jumped into a 70-foot pit in the cave. NSS member Sharn Cleland was trapped by rockfall in an unnamed cave in Lancaster County, Pennsylvania, and died when the passage collapsed in spite of rescue efforts. A 23-year-old male caver collapsed and died of an apparent heart attack while exploring Bowden Cave, West Virginia. Dr. John Miller collapsed and died, also of a heart attack, while exploring Tumbling Rock Cave, Alabama.

Injury and Aid

Incidents in this category resulted in injury to one or more people, who then required help in order to exit the cave. While many of these incidents involved rescue call-outs and outside

assistance, others were resolved by the cavers themselves without calling for rescue.

In 1999 there were 14 incidents involving injury and aid. Twelve of these resulted from caver falls. Intoxication was reported as a factor in several of these incidents. Notable incidents included two rescues of fallen cavers from Tongue River Cave, Wyoming, a caver who exited Cave Mountain Cave, West Virginia, with the help of his companions after breaking his leg in a fall, and the successful six-day, multi-national rescue of a Canadian caver who fell and was injured at -300 meters in Sistema Tepepa, Mexico.

There were 20 reported incidents in 2000 in which injured cavers required assistance. Fourteen of the incidents involved caver falls. Other causes included rockfall, cuts on sharp rocks, becoming stuck in crevices, hypothermia subsequent to becoming lost and stranded, and bad air. Notable incidents included two more fallen-caver rescues in Tongue River Cave, Wyoming, the self-rescue of a caver who fell and broke his leg in O-9 Well, Texas, several instances of cavers who dislocated their shoulders but were able to exit with help from their companions, and the rescue of two inexperienced cavers who stranded themselves in a pool in Snail Shell Cave, Tennessee, and developed hypothermia.

For 2001 there were 10 reported incidents involving injury and aid. Eight of these were due to caver falls, one involved a caver who dislocated his shoulder on a climb, and one was due to rockfall entrapment. Notable incidents included the rescue of an experienced caver who was injured in a fall in Sides Cave, Kentucky, a caver who fell down a 133-foot pit when

NSS Membership and Number of Incidents

Year	Members	Incidents
1986	6741	45
1987	7203	48
1988	7873	49
1989	8514	51
1990	9028	55
1991	9777	54
1992	10492	60
1993	11164	64
1994	11460	57
1995	11836	44
1996	11140	43
1997	11470	43
1998	11685	32
1999	12098	44
2000	11773	40
2001	11967	33

Only incidents resulting in aid, injury, or fatality are included. Membership figures include all classes of membership.

her rappel rack became detached from her seat harness, and the rescue of a Mexican caver who fell when his descending system failed deep in Resumidero La Joya, Mexico.

Aid, No Injury

Most incidents in this category are rescues of individuals that cavers often refer to as “spelunkers.” They are typically poorly equipped and inexperienced, and are often stranded when they break or lose their flashlights, run out of batteries, descend pits hand-over-hand, or get lost.

In 1999 there were 18 incidents in which uninjured cavers required assistance. Three of these involved cavers who simply became lost. Three others involved inexperienced cavers who became stuck in tight passages. Two involved cavers without proper vertical equipment who became stranded in pits. One incident involved a caver who became stranded on rope in a waterfall, and two others involved cavers trapped by flooding. Notable incidents include the 49-hour flood-entrapment of nine cavers in Hurricane Ridge Cave, West Virginia, a group lost in Organ Cave, West Virginia, for seven hours, the flood-entrapment of 35 students in Cueva Chorreadero, Mexico, and a group of cavers stranded at the bottom of Fantastic Pit in Ellisons Cave, Georgia, when a caver inadvertently pulled up their rope.

There were 15 incidents in 2000, comprised primarily of cavers who became lost, stranded, or stuck in caves. Notable incidents included the flood entrapment of cavers in Cass Cave, West Virginia, the rescue of four stranded teens from the bottom of a 30-foot pit in W-Road Cave, Tennessee, on Easter Sunday, a caver who fell from a cable ladder while climbing unbelayed in Fieldhouse Cave, West Virginia, a group of rock-climbers who became stranded in Wind-Ice Cave, Wyoming when they lost their way while attempting a pull-down through-trip, and a tourist who was left behind by his group while on a guided tour of Mammoth Cave, Kentucky.

For 2001 there were 13 reported incidents involving aid but no injury. Five of these were cavers who became stuck in tight passages or crevices, and three involved cavers who became stranded in pits due to lack of equipment or inexperience. One caver became stranded on rope due to exhaustion and had to be rescued, and one incident involved flooding.

Notable incidents for 2001 included an exhausted and stranded caver rescued from Carpenter-Swago Pit, West Virginia, by her companions (who had the skills and equipment to rig and use a 3:1 Z-rig haul system), the 39-hour flood entrapment of a group of Boy Scouts in Bowden Cave, West Virginia, and the rescue of a 16-year-old boy who became stuck in a crevice in Skunk Cave, Iowa. Sharing vertical gear at pits by passing it up and down the rope is very poor practice, but some people continue to do it, with predictable results. Incidents at Cass Cave, West Virginia and Pinnacles Cave, Nevada, illustrate the consequences.

Injury, No Aid

These incidents resulted in injuries ranging from scrapes and bruises to sprained ankles and broken legs. In each case, the victim was able to exit the cave with minimal assistance from members of the caving party. There were eight incidents in this category in 1999. One involved a caver who was struck by a crowbar while working on a dig. The others were all

caver falls. Of the three incidents in 2000, two were cases of histoplasmosis contracted by visitors to Climax Cave, Georgia, and Cueva Alfredo Jahn, Venezuela. The other was an injury due to a tossed cyalume stick at a party in a cave. Five incidents were reported in 2001, including a twisted ankle, a case of frostbite, a caver fall, a rockfall incident, and a caver who made a grueling self-rescue after breaking her lower leg in a fall in Sistema Purificacion, Mexico. When circumstances permit, getting out of the cave on your own or with the help of your companions is usually a good idea.

No Consequence

Many of these incidents are of the “near miss” category. They are included so that the reader will be aware of the many things that can go wrong. Some of these offer good illustrations of effective self-rescue or small-group rescue. The three incidents reported in 1999 included a near-miss at Devils Pocket Cave, Alabama, when a rig point collapsed while a caver was on rope, and a caver who became stuck in the Gun Barrel in Knox Cave, New York. There was one reported incident for 2000 involving a near-miss with rockfall in Nielsons Cave, Utah. The two reported incidents for 2001 both occurred in Lost Creek Siphon, Montana, where a caver experienced difficulty on rope when his Croll chest ascender became detached while climbing, then suffered a fall on a later trip when the passage floor collapsed beneath him.

Incident Types

Acetylene Hazard or Explosion

No acetylene-related incidents were reported for 1999-2001. This may be due to the increasing use of electric lights.

Bad Air

An 18-year-old man was rescued from Sulfur Cave, Colorado, in September of 2000 when he lost consciousness in the entrance room due to bad air. Bad air was also cited as a factor in incidents at Hermit Cave, Oklahoma (April, 1999), Boy Scout Cave, Florida (December, 1999), and Climax Cave, Georgia (April, 2000). For a discussion of bad air in caves see Bill Mixon’s article in the April 2000 *ACA* and Bill Elliott’s article in December 1997 *ACA*.

Caver Fall

Falls remain the leading type of safety incident or accident in caving, accounting for the majority of injuries and rescues. Many of the incidents could have been prevented by the use of a simple belay. Cavers should consider using a belay whenever the exposure of a climb or traverse is greater than a body-length. A belay should always be used with a cable ladder, as illustrated by the June, 2000 incident at Fieldhouse Cave, West Virginia.

Drowning

Drowning incidents are infrequent in “dry caving,” but two are reported in this issue. The 1999 death of Francis Reyes in Los Angeles Cave, Puerto Rico, during a flood has been mentioned above, as has the death of a would-be sump diver in Redman Cave, Arizona in 2001. There was also a near-miss incident in the summer of 1999 in Dead Mans Cave, Texas.

Equipment Problem

This catch-all category includes rigging failures, slipping ascenders, light failure, rope failure, and misuse or lack of equipment.

Caving Accident and Incident Statistics 1986–2001

Result of Incident

Result	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01
Fatality	4	3	4	1	4	6	5	5	1	2	1	4	4	4	2	5
Injury and Aid	10	15	11	16	18	16	17	22	19	17	16	22	14	14	20	10
Aid, no injury	21	15	20	20	23	20	28	33	26	17	16	13	12	18	15	13
Injury, no aid	10	15	14	14	10	12	10	4	11	8	10	4	2	8	3	5
No consequence	19	16	12	21	9	12	16	3	20	12	11	4	8	3	1	2
Total	64	64	61	72	64	66	76	67	77	56	54	47	40	47	41	35
 Incidents Involving Fatality, Injury, or Aid	 45	 48	 49	 51	 55	 54	 60	 64	 57	 44	 43	 43	 32	 44	 40	 33

Incident Type

Type	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01
caver fall	25	14	20	19	22	22	22	19	20	15	21	27	15	20	17	12
trapped/stranded	-	-	-	-	-	-	-	1	13	18	18	13	9	17	14	9
rockfall	12	17	7	11	11	12	16	11	12	10	5	5	2	4	2	3
lost	8	5	3	9	4	3	4	5	12	7	4	5	3	3	3	1
equipment problem	14	17	20	20	23	21	20	11	11	4	4	2	1	0	0	3
difficulty on rope	-	-	-	-	-	-	-	-	11	4	6	5	1	4	3	1
other	3	4	8	6	8	4	5	4	6	6	3	2	3	2	3	3
hypothermia	1	2	0	5	0	2	4	0	3	6	6	2	2	2	3	1
exhaustion	0	1	1	3	0	2	4	2	4	1	4	1	1	2	3	1
flooding	1	3	3	4	2	2	1	3	1	4	5	2	1	4	1	1
bad air	3	2	1	1	1	2	1	1	2	2	1	0	1	0	1	0
acetylene	3	0	1	1	0	0	0	1	3	0	1	0	0	0	0	0
illness	0	0	2	3	2	1	0	3	3	0	1	1	8	0	2	2
stuck	3	1	0	1	1	3	5	5	2	1	2	0	1	5	3	5
drowning	1	2	0	2	2	2	2	0	0	0	1	0	0	1	0	1
 Caving-related Incidents	 -	 -	 -	 -	 -	 2	 1	 0	 2	 0	 1	 1	 5	 2	 11	 2

Cave Diving Incidents

Result	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01
Fatality (one or more)	7	5	9	4	8	2	5	4	6	5	2	2	0	5	7	9
Injury and Aid	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Aid, no injury	1	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0
Injury, no aid	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
No consequence	1	2	1	1	0	5	1	0	1	0	0	0	0	0	0	0
Total Diving Incidents	9	7	10	5	8	8	7	4	7	6	2	2	1	7	8	9

Flooding

There were six incidents involving flooding, including four in 1999 and one each in 2000 and 2001. Several involved experienced cavers who believed that their knowledge of the cave or the weather would keep them safe. This is apparently a common fallacy; such beliefs have been advanced by the victims of almost every flooding incident reported in *ACA* since 1993. Some of the trapped cavers entered caves that were known to flood or had been the scene of previous well-known flooding incidents in spite of inclement weather or questionable forecasts.

The lesson taught by these incidents is simple: pay attention to the weather conditions. Check the forecast for the caving area, and be alert for the possibility of flooding. If the cave is known to flood and you don't have a clear forecast, go somewhere else. It's just not worth the risk of entrapment, rescue, media attention, closed caves, injury, or death.

Hypothermia

Hypothermia is usually a secondary result in the reported incidents, occurring subsequent to cavers becoming injured, stranded, or trapped in a cave. There were several incidents involving lost or stranded cavers in which some of those rescued required hospitalization and treatment for hypothermia. Remember: hypothermia can kill you all by itself, but it also impairs your brain, which makes it easier to make bigger mistakes.

Illness

There were two incidents of histoplasmosis reported in 2000, and two fatal heart attacks while caving in 2001.

Lost

Most of these incidents involved untrained and ill-equipped cavers with little experience. Many escalate to the "stranded" category when the batteries run out. Several of these incidents also involved hypothermia, with a few cases resulting in hospitalization.

Rockfall

Rockfall remains a serious source of accidents and incidents, causing several injuries and rescues as well as cases of entrapment. The most serious rockfall incidents reported during this period were the death of Christy Quintana in Sotano del Aire and the death of Sharn Cleland in an unnamed Pennsylvania cave. Quintana was struck by falling rocks while on rope in a deep pit in a remote backcountry location. Cleland was trapped by and later died as a result of breakdown collapse while exploring a new cave.

Stuck

Despite popular perception, getting stuck is not much of a hazard in caving. Most victims are inexperienced cavers who just need a little coaching and assistance from their companions. Utah's Nutty Putty Cave is notorious in this respect and was the scene of three of the incidents included in this report. In some cases, however, becoming stuck can be quite serious, as shown by the April, 1999 fatality at Hermit Cave, Oklahoma, the two incidents in 1999 at Knox Cave, New York, and incidents in 2001 at Skunk Cave, Iowa, and Gage Caverns, New York.

Trapped/Stranded

This category is used to describe incidents in which the caver or cavers are prevented from exiting the cave by

rockfall, light failure, lack of equipment, equipment failure, or other causes. In many of the reported incidents, "spelunkers" became stranded due to inexperience, inadequate equipment and/or poor judgment.

There were 17 reported incidents of this type in 1999, including incidents in Pettijohns Cave, Georgia, New River Cave, Virginia, King Blair Cave, Indiana, Bowden Cave, West Virginia, and Clarksville Cave, New York. The 14 incidents reported for 2000 occurred in caves including Queen Blair Cave, Indiana, Grassy Cove Saltpeter Cave, Tennessee, Indian Grave Point Cave, Tennessee, Wind-Ice Cave, Wyoming, Snail Shell Cave, Tennessee, and Jennings Cave, Florida. The nine incidents reported for 2001 included Cass Cave, West Virginia, My Cave, West Virginia, Pinnacles Cave, Nevada, John Browns Cave, West Virginia, Pettijohns Cave, Georgia, and Carpenter-Swago Cave, West Virginia. Long-time readers of *ACA* will no doubt recognize many of these caves from previous reports.

Exhaustion

Several incidents involved cavers who became exhausted while climbing, either on rope or on cable ladders. This type of incident is potentially fatal due to the rapid onset of harness-induced pathology (also known as "harness-hang syndrome" or "suspension trauma"). Studies have shown that an immobile caver hanging on rope can lose consciousness in a matter of minutes, with death occurring soon after. Several articles on the subject are now available on the Internet and can be found with any search engine. A 2002 report prepared by Paul Seddon for the British Health and Safety Executive provides the most comprehensive review of research and literature on the subject published to date.¹ An exhausted or hypothermic caver left suspended will die in a matter of minutes after losing consciousness. Learn how to get yourself or another caver off rope with a change-over or pick-off.

Difficulty on Rope or Ladder

This category includes cavers who become stranded on rope and require assistance, or who experience significant difficulties and require assistance to complete their ascent or descent. There were four incidents of this type in 1999, three in 2000, and one in 2001. The March 1999 incident in Ellisons Cave, Georgia, resulting in the death of Hal Bufford was the most serious incident, and serves as a warning to all of us.

Some of the cavers involved in these incidents were relatively inexperienced and did not know how to use their gear. Others were experienced cavers who were simply out of practice or out of shape. Some were unable to deal with situations such as crossing the lip of a pit with weight on the rope from below, changing from rappel to ascent and vice versa, or climbing a cable ladder. It should go without saying that competent cavers master their systems and know how their equipment works. With practice, skilled cavers can perform a change-over in less than 60 seconds. Spend some time practicing—it could save your life.

Other

This catch-all category includes driving your snowmobile into a pit, getting hit with a tool during a dig, cuts by sharp rocks, dislocated shoulders, being struck by thrown objects, twisted ankles, and other incidents not covered above.

¹ http://www.hse.gov.uk/research/crr_pdf/2002/crr02451.pdf

Cave Diving Incidents

In the three-year period from January 1999 to December 2001, there were 24 reported incidents resulting in 26 fatalities, two rescues, and one case of decompression sickness. Two of the incidents resulted in multiple fatalities. While many of the reported incidents involved non-certified divers who failed to use proper equipment or follow accepted safety practices, there were several fatalities involving well-equipped, certified cave divers with many years of experience.

In 1999 there were seven reported cave diving incidents, all of which occurred in Florida. Four resulted in single fatalities, and one resulted in the death of two divers. Jason Richards was rescued from Wakulla Springs by fellow divers when he lost consciousness during a dive after breathing from the wrong gas bottle for his depth. Henry Kendall died of unknown causes while diving alone in the entrance pool of Wakulla Springs. Steven Wixon died during a dive in Jackson Blue Spring after becoming separated from his diving partners and losing visibility due to siltation. Guido Gaudenzi died in Diepolder Spring when he lost consciousness during the dive after breathing from the wrong gas bottle for his depth. A diver was rescued from Thunderhole after becoming stranded in an air pocket when she entered the wrong passage in the entrance pool. Richard Siaba and Kevin Lynn died in Madison Blue Spring after apparently losing their guideline during a dive. A male diver drowned at Forty Fathom Grotto during a cavern dive to a depth of 237 feet.

There were eight reported cave diving incidents in 2000, including six incidents resulting in single fatalities, one multiple fatality incident in which four divers perished, and one non-fatal incident involving decompression sickness. Michael Hickey died in Little River Spring, Florida, when he apparently lost the route after silting the water. Jill Heinerth suffered decompression sickness after a dive in Cenote Dos Ojos, Mexico. Stephen Turner died during a solo dive in Little River Spring, Florida. Jorge Luis, Lin Enrique, Israel Garcia, and Roberto Lagart died in Pozo de Juan Claro, Cuba, when they apparently became lost and ran out of air. Rafael Mendiburu, President of one of the leading cave diving organizations in Mexico, died from a heart attack while diving in Cenote Sabak Ha. Paul Hayden died when he breathed from

a presumably-poisonous gas pocket while attempting to explore flooded passages in an abandoned mine in California. Gustavo Sallum died in Ceita Core, Brazil, while diving below 80 meters depth on compressed air. A male diver died of unknown causes during a dive in Vortex Spring, Florida.

In 2001 there were nine reported cave diving incidents, all resulting in fatalities. Mark Granger and William Ridenour died in Royal Springs, Florida, after running out of air. Robert Svensson died in Clarksville Cave, New York, when he became stuck while trying to dive a sumped passage. Ron Fraga died in Cenote Escondido, Mexico, after running out of air during his dive. A solo diver failed to return from his dive in Andros Blue Hole, Bahamas, and was presumed drowned. Jason Burns drowned in Emerald Sink, Florida, when he became separated from his companions during a dive and could not find his way out of the cave. Steve Berman died in Devils Ear Spring, Florida, after apparently running out of air during his dive. Christopher Hill died in Ginnie Springs, Florida, while diving alone without equipment. Dr. Ruben Delgado was presumed drowned when he disappeared during a dive in Great Blue Hole, Belize. Jonathan Gol died after losing consciousness during decompression following a dive in Jackson Blue Spring, Florida.

Caving-related Incidents

Once again we have a curious assortment of caving-related incidents, including crime victims and missing persons found in caves, animal rescues, people falling into sinkholes and mine shafts, and another snowmobile incident. In 1999 the body of a murder victim was found in Lost Creek Cave, Tennessee and a man reported as missing was found in an Ohio cave hiding from an anticipated meteor strike. The year 2000 featured the rescue of a stranded calf, a wasp attack at a cave, a kidnapping victim left in an Alabama cave, a fatal fall into a mine shaft, a person who drowned after being swept into a cave entrance, several incidents involving drug or alcohol intoxication at caves, and a snowmobile driven into a pit. In 2001 a woman died after becoming wedged head-down in an opening into a lava tube while trying to retrieve some lost puppies.

Acknowledgments

Once again, we are all indebted to all the people who have contributed reports for this issue. Their willingness to share their experiences makes *ACA* a valuable resource for all cavers. Several notable correspondents have contributed a substantial portion of the material for these reports. They include: Richard Breisch, George Dasher, Scott Fee, Bill Halliday, Cindy Heazlit, Buddy Lane, Chuck Porter, and Bill Torode. Proofreading assistance was provided by Warren Anderson, Richard Breisch, Diane Cousineau, Kris Green, John Hickman, George Dasher, and Dave Hughes. Photographs were provided by Dave Bunnell, Jeff Burns, John Gookin, John Hickman, and Brian Krebs.

Report accidents and incidents via the Internet at www.caves.org/pub/aca

or mail reports and information to:

**American Caving Accidents
National Speleological Society
2813 Cave Avenue
Huntsville, Alabama 35810-4431**

Water Caves

George Dasher

Water caves are the most dangerous type of cave any caver will ever encounter. While maps, guidebooks, and the ever-present speleo-rumor mill can provide valuable hints about the nature of a water cave and any high hideaways located within, these are *not* substitutes for common sense.

There are two items to look for to determine if a cave is a water cave: Does the cave have a stream flowing into its entrance, or is there a stream inside the cave? Since almost all of North America's caves were formed by water, virtually all of these caves are either active or paleo water caves. An "active" water cave is a cave with flowing water inside, or where flood waters can rise and enter the cave—either through the entrance or via a subterranean conduit.

Once we have determined that the cave is a water cave, we need to ask ourselves the following:

- How big is the stream compared to the size of the cave's passages?
- Does the stream flow into or out of the entrance?
- Is there a surface overflow route for the stream to circumvent the cave?
- How big is the drainage basin above the cave?
- What is the current *local* weather forecast? (This is *extremely* important!)

I want to keep things concise and easy to remember. There are four factors which may cause high water. These are:

- Heavy rains
- A light rain when the ground is already saturated
- Any kind of rain after a drought (the ground has formed a crust and the water will run into the cave, not soak into the ground)
- Snow melt (In fact, the worst of the sudden high-water bad boys is rainfall onto snow)

The type of soil cover is also important—rainfall onto limestone bedrock or frozen ground is going to flow into a cave faster than rainfall onto thick topsoil. Also, a winter rain may flood a cave faster than a summer rain, as the lush summer vegetation can absorb or slow groundwater flow.

I will use Cass Cave, a very famous vertical cave in Pocahontas County, West Virginia, as an example. It has been the site of numerous rescues and near-rescues, and I am sure many people think most of these incidents have been vertical in nature. They were not. Since the invention of kernmantle rope, there have been five reported incidents in Cass. Of these, only one was a vertical accident, when a novice caver did his first-ever rappel from the 160-foot high Belay Loft. It did not go well.

The other four documented incidents include two parties who were trapped by high water just inside the entrance and two persons who died on rope in the exact same place on the Suicide Falls drop. Although one of the persons killed was a novice caver, the two did not die from vertical mistakes. They died because they underestimated the dangers presented by water—in short, they both got on rope in water and died of hypothermia. I was on the second body recovery, and this is why I use Cass for my example. I am certain that the caving

community is not seeing Cass for the dangerous water cave it can be. They are concentrating instead on the vertical aspect of the cave. But Cass Cave aside, this same "should we enter the cave today?" formula can be applied to any water cave.

First, a surface stream does flow into Cass Cave. It is a perennial stream, flowing all the time. That's a mark against going into the cave. Second, given the size of the cave passages inside, this stream is a fairly large stream. The cave becomes a crawlway several hundred feet inside, so the possibility of the cave flooding to the ceiling is very real. That's a second mark against going into the cave.

Third, while there is a surface overflow route that circumvents the cave, this overland route does not often flow. Put another way, the cave takes a large amount of water before the stream overflows onto the surface. This is bad news for any caving party underground on a wet day. So this is a third mark against going underground.

Fourth, there is a sizeable drainage basin above the cave—just look up the mountain! Or consult a topographic map before the caving trip. This is a fourth mark against going underground in Cass.

Fifth... This is the variable a caving party can control. If the weather people are calling for severe rain, then don't go into the cave. If there is no forecast of rain, then a caving trip is possible. If the forecast is for light or intermittent rain, then you have to use your own judgment. So, the bottom line is—with four marks against going underground in Cass Cave—any caving party has to be *very* sure about the weather forecast, as there is not a lot of leeway for error.

When it comes to water caves and you want to stay alive, you only have one option: be on the surface when the high water hits. This is especially true in caves with no high hideaways. In other words, all caving trips have abort factors, and not aborting can mean your death. I've seen only one flood underground, and it was literally an instantaneous wall of water. Since there had been no forecast of rain and we were not in a perennial stream passage, this perplexed the two of us on the trip; however, there was nothing we could do but abort our trip and be thankful that the high water hadn't hit us in the crawlway we were planning to survey.

Two other things: It always helps to have local knowledge of your caving area. Make an effort to do this. Talk to people; do the library thing. This is what separates a good trip leader from your run-of-the-mill caver. For example: The name of the stream flowing into Cass Cave is Cold Run, and it is named that for a reason. It is a high-altitude mountain stream, and it is *cold*!

And the last thing: *Do not* get on rope in water if you are not dressed to handle the cold, and don't rappel into deep water without some kind of flotation gear. If the drop is wet, you *have* to be dressed for this before you get on rope. If the passage below is in flood, or if the water there is unexpected, *be prepared* to change over on rope and head for sunshine. Be a rescuer, not someone requiring a rescue...or a dead someone requiring a body recovery.

1999 Reported Incidents

47 cave incidents reported

Date	Cave	Location	Result	Incident Type
January 17	Pettijohns Cave	Georgia	injury, no aid	caver fall
January 23	Diggins Pit	Alabama	aid, no injury	stranded on rope
January 23	Hurricane Ridge Cave	West Virginia	aid, no injury	flood entrapment
February 4	unspecified cave, Green Mountain	Alabama	aid, no injury	stranded, inadequate equipment
February 7	Paradise Cave	Colorado	injury, no aid	caver fall, cable ladder
February 13	Organ Cave	West Virginia	aid, no injury	lost
February 14	Jennings Cave	Florida	injury and aid	caver fall
February 15	Lava Rise E-3 Cave	Hawaii	injury, no aid	caver fall
March 10	Ellisons Cave	Georgia	fatality	stranded on rope, hypothermia
April 6	Hermit Cave	Oklahoma	fatality	stuck, exhaustion, suffocation, bad air
April 16	Pettijohns Cave	Georgia	aid, no injury	stranded, inadequate equipment
April 21	New River Cave	Virginia	aid, no injury	lost, stranded
April 25	unspecified cave near Smyrna	Tennessee	injury and aid	caver fall
May 5	Cueva Chorreadero	Mexico	aid, no injury	flood entrapment
May 15	Alleghany Blowhole	Virginia	injury, no aid	caver fall
May 21	Sinking Cove Cave	Tennessee	aid, no injury	lost, stranded
May 29	Crumbly Cave	Tennessee	injury and aid	caver fall
May 30	Angeles Cave, Rio Camuy System	Puerto Rico	fatality	drowning, flood entrapment
June 5	King Blair Cave	Indiana	aid, no injury	stranded, inadequate equipment
June 12	The Kids Cave	Alabama	no consequence	rockfall, rig point collapsed
June 16	Perseverance Cave	Vermont	injury, no aid	struck by crowbar while digging
June	Bears Plunge	Alaska	aid, no injury	difficulty on rope
July 4	Bowden Cave	West Virginia	injury and aid	caver fall, inadequate equipment
July 24	Knox Cave	New York	aid, no injury	stuck, stranded
July 28	Nutty Putty Cave	Utah	aid, no injury	stuck, stranded
July 31	Bowden Cave	West Virginia	aid, no injury	stranded, inadequate equipment
August 14	B&G Sinkhole	Utah	aid, no injury	stranded on rope
August 22	Sotano del Aire	Mexico	fatality	rockfall, stranded
August 28	Scott Hollow Cave	West Virginia	injury, no aid	caver fall
Summer	Dead Mans Cave	Texas	aid, no injury	near-drowning
September 11	Ellisons Cave	Georgia	aid, no injury	stranded in pit
September 19	Knox Cave	New York	no consequence	stuck
September 19	unnamed pit, Lawrence County	Indiana	injury and aid	caver fall, intoxication
September 26	Tongue River Cave	Wyoming	injury and aid	caver fall
October 25	unspecified cave near Eagle Rock	Missouri	injury and aid	caver fall, climbing hand-over-hand
October 30	Guffey Cave	Alabama	injury and aid	rockfall
October 31	Devils Pocket Cave	Alabama	no consequence	rockfall, caver fall, anchor failure
November 6	Tongue River Cave	Wyoming	injury and aid	caver fall
November 7	unspecified Monroe County cave	Illinois	injury, no aid	caver fall
November 11	J-4 Cave	Pennsylvania	injury and aid	caver fall
November 13	Clarksville Cave	New York	aid, no injury	stuck, inexperience
November 20	Cave Mountain Cave	West Virginia	injury and aid	caver fall
December 4	Luminary Pit	Tennessee	aid, no injury	stranded in pit
December 11	Fern Cave	Alabama	injury, no aid	caver fall
December 12	Marshall Cave	Virginia	injury and aid	caver fall
December 23	Sistema Tepepa	Mexico	injury and aid	caver fall, flood entrapment
December 27	Boy Scout Cave	Florida	injury and aid	stranded, hypothermia

2000 Reported Incidents

41 cave incidents reported

Date	Cave	Location	Result	Incident Type
January 1	Queen Blair Cave	Indiana	aid, no injury	lost, stranded, intoxication
January 4	Onyx Cave	Arizona	injury and aid	caver fall, broken leg
January 9	Emisine Cave	Hawaii	injury and aid	cut by sharp rock
February 12	Cemetery Pit	Georgia	aid, no injury	stranded on rope, inexperience
February 12	Indian Grave Point Cave	Tennessee	aid, no injury	stranded, descended pit hand-over-hand
February 12	Sloans Valley Cave	Kentucky	injury and aid	stuck in crevice
February 16	Jennings Cave	Florida	aid, no injury	stranded in pit, inadequate equipment
February 17	Rattling Cave	Tennessee	aid, no injury	difficulty on rope
February 26	Grassy Cove Saltpeter Cave	Tennessee	aid, no injury	stranded n pit
March 2	Tongue River Cave	Wyoming	injury and aid	caver fall
March 11	Cass Cave	West Virginia	aid, no injury	flood entrapment
March 15	J-4 Cave	Pennsylvania	injury and aid	caver fall
March 16	Brids Drop	Virginia	fatality	caver fall, no belay or safety at pit lip
March 24	Doe Mountain Cave	Virginia	injury and aid	caver fall, dislocated shoulder
April 6	Tongue River Cave	Wyoming	injury and aid	caver fall
April 8	Grassy Cove Saltpeter Cave	Tennessee	injury and aid	caver fall
April 9	Thunderhole	Alabama	aid, no injury	stranded in pit, inadequate equipment
April 18	Cueva Chorreadero	Mexico	injury and aid	lost, stranded, hypothermia
April 22	Mammoth Cave	Kentucky	injury and aid	caver fall, broken ankle
April 22	W-Road Cave	Tennessee	aid, no injury	stranded in pit, inadequate equipment
April 29	Climax Cave	Georgia	injury, no aid	histoplasmosis
April 30	unspecified cave in Sevier County	Tennessee	injury and aid	caver fall
May 13	unnamed cave	Washington	injury and aid	rockfall entrapment
May 20	O-9 Well	Texas	injury and aid	caver fall, broken ankle
Spring	Cueva Alfredo Jahn	Venezuela	injury, no aid	histoplasmosis
June 27	Fieldhouse Cave	West Virginia	aid, no injury	caver fall from ladder, no belay
July 1	Big Springs Cave	West Virginia	injury and aid	caver fall, dislocated shoulder
July 4	Greenville Saltpeter Cave	West Virginia	injury and aid	caver fall
August 5	Nielsons Cave	Utah	no consequence	rockfall
August 12	Clarks Cave	Virginia	injury and aid	caver fall, dislocated shoulder
August 12	Wind-Ice Cave	Wyoming	aid, no injury	stranded, inadequate equipment
August 15	talus cave at Pine Mountain	New Hampshire	aid, no injury	stuck
August 19	Bat Cave	Kentucky	injury and aid	caver fall
August	Duffield Cave	Pennsylvania	aid, no injury	stuck, hypothermia
September 2	Gruta del Palmito	Mexico	injury and aid	caver fall, dislocated shoulder
September 7	Sulfur Cave	Colorado	injury and aid	hypoxia, bad air
September 16	Great Saltpeter Cave	Kentucky	injury, no aid	struck by thrown cyalume stick
September 30	O-9 Well	Texas	fatality	caver fall, belay system failed
October 19	Mammoth Cave	Kentucky	aid, no injury	lost, stranded
December 3	Snail Shell Cave	Tennessee	injury and aid	stranded, hypothermia
December 9	Pink Lime Pit	Utah	aid, no injury	stranded on rope

Report accidents and incidents via the Internet at www.caves.org/pub/aca

or mail reports and information to:

**American Caving Accidents
National Speleological Society
2813 Cave Avenue
Huntsville, Alabama 35810-4431**

2001 Reported Incidents

35 cave incidents reported

Date	Cave	Location	Result	Incident Type
January 31	Sides Cave	Kentucky	injury and aid	caver fall
February 10	Nutty Putty Cave	Utah	aid, no injury	stuck
February 11	Kula Kai Caverns	Hawaii	injury and aid	caver fall, dislocated shoulder
February 24	Rattling Cave	Tennessee	injury and aid	caver fall, equipment failure
February 25	Redman Cave	Arizona	fatality	drowning, inadequate equipment
March 8	Rattling Cave	Tennessee	aid, no injury	stranded in pit, exhaustion
March 10	Alexander Cave	Arkansas	injury, no aid	caver fall, cut by sharp rock
March 17	Nutty Putty Cave	Utah	aid, no injury	stuck
April 7	Bowden Cave	West Virginia	injury and aid	caver fall
April 27	Blue Spring Cave	Tennessee	injury and aid	dislocated shoulder
May 3	unnamed cave at Purgatory Chasm	Massachusetts	aid, no injury	stuck
May 26	Resumidero La Joya	Mexico	injury and aid	caver fall, lost control on rappel
June 2	unnamed pit	New Brunswick	injury, no aid	rockfall
June 23	Carpenter-Swago Cave	West Virginia	aid, no injury	stranded in pit
June	Earthquake 90 Cave	Tennessee	fatality	fell or jumped into pit
July 4	unnamed Lancaster County cave	Pennsylvania	fatality	rockfall entrapment, passage collapse
July 15	Pettijohns Cave	Georgia	injury and aid	caver fall, climbing hand-over-hand
July 15	Road Cut Cave	Kentucky	injury and aid	caver fall
July 28	Bowden Cave	West Virginia	aid, no injury	flood entrapment
July 28	Pettijohns Cave	Georgia	aid, no injury	exhaustion, hypothermia
September 1	Cass Cave	West Virginia	aid, no injury	stranded in pit, sharing equipment
September 1	Lost Creek Siphon	Montana	no consequence	equipment problem
September 1	My Cave	West Virginia	aid, no injury	stranded in pit
September 9	John Browns Cave	West Virginia	aid, no injury	lost, stranded, inadequate equipment
September 15	unspecified pit cave	Indiana	injury and aid	caver fall, no belay or safety at pit lip
October 3	Pinnacles Cave	Nevada	aid, no injury	stranded in pit, exhaustion
October 6	Lost Creek Siphon	Montana	no consequence	caver fall
October 6	Skunk Cave	Iowa	aid, no injury	stuck in crevice
October 7	Gage Caverns	New York	aid, no injury	stuck in crevice
October 20	Bowden Cave	West Virginia	fatality	illness, apparent heart attack
October	unspecified cave	Kentucky	injury and aid	rockfall entrapment
December 2	Lost Creek Siphon	Montana	injury, no aid	difficulty on rope, frostbite
December 3	Lechuguilla Cave	New Mexico	injury, no aid	twisted ankle
December 15	Tumbling Rock Cave	Alabama	fatality	illness, heart attack in cave
December 21	Sistema Purificacion	Mexico	injury, no aid	caver fall, broken leg

Common Vertical Caving Mistakes and Consequences

1. Didn't clear loose rocks from lip – struck by falling rock.
2. Climbing or descending rope hand-over-hand – lost grip and fell.
3. Climbing cable ladder without belay – fell off.
4. Lost control of rappel; no bottom belay or rappel safety – crashed.
5. Out of shape or unfamiliar with climbing system – stranded on rope.
6. Didn't know how to change from rappel to climb – stranded on rope.
7. Didn't know how to change from climb to rappel – stranded on rope.
8. Hair or clothing in rappel device; didn't know how to recover – stranded on rope.
9. Rappelling without wearing climbing system – stranded in pit or on rope.
10. Attempted pull-down trip without map or guide – stranded.
11. Sharing vertical gear; lost equipment passing it up or down the pit – stranded.
12. Didn't tie a knot in the end of the rope – rappelled off the end and fell.
13. Moving around lip of pit without being belayed or on rope – fell into pit.
14. Didn't check attachment of rappel device to harness – became detached from rappel device and fell.

Cave Diving Accidents and Incidents

1999 Diving Incidents

7 incidents reported

Date	Cave	Location	Result	Incident Type
February 10	Wakulla Springs	Florida	injury and aid	lost consciousness, incorrect mixture
February 15	Wakulla Springs	Florida	fatality	lost consciousness, cause unknown
April 18	Jackson Blue Spring	Florida	fatality	siltation, out of air
April 26	Diepolder Springs	Florida	fatality	oxygen toxicity seizure, drowned
June 24	Thunderhole	Florida	aid, no injury	lost, stranded
October 17	Madison Blue Spring	Florida	two fatalities	lost guideline, out of air
November 20	Forty Fathom Grotto	Florida	fatality, injury and aid	unknown problem at depth

2000 Diving Incidents

8 incidents reported

Date	Cave	Location	Result	Incident Type
March 6	Little River Spring	Florida	fatality	siltation, exceeding training
March 11	Cenote Dos Ojos	Mexico	injury, no aid	decompression sickness
May 29	Little River Spring	Florida	fatality	inadequate equipment, out of air
June 26	Poza de Juan Claro	Cuba	four fatalities	no guideline, inadequate equipment
July 13	Cenote Sabak Ha	Mexico	fatality	apparent heart attack
September 17	unnamed well in Goss Canyon	California	fatality	breathed bad air in gas pocket
November 2	Ceita Core	Brazil	fatality	deep diving on air
November 23	Vortex Spring	Florida	fatality	cause unknown

2001 Diving Incidents

9 incidents reported

Date	Cave	Location	Result	Incident Type
February 18	Royal Springs	Florida	two fatalities	no guideline, out of air
February 26	Cenote Escondido (Mayan Blue)	Mexico	fatality	left guideline, out of air
February 26	Clarksville Cave	New York	fatality	stuck, inexperience, out of air
March 1	Andros Blue Hole	Bahamas	fatality	cause unknown
May 5	Emerald Sink	Florida	fatality	lost, inexperience, out of air
May 7	Devils Ear Spring	Florida	fatality	out of air
June 23	Ginnie Springs	Florida	fatality	intoxication, inadequate equipment
August 5	Great Blue Hole	Belize	fatality	cause unknown
October 26	Jackson Blue Spring	Florida	fatality	cause unknown

Common Caving Mistakes and Consequences

1. Didn't carry backup lights – stranded.
2. Primary light failed; backup lights inadequate – stranded.
3. No map, no guide, and poor route-finding skills – lost.
4. Wore inadequate or inappropriate clothing for conditions – hypothermia.
5. Didn't bring extra clothing – hypothermia.
6. Moving but not paying attention – fell.
7. Free-climbing more than a body-length without belay – fell.
8. Traversing above drop without belay or safety line – fell.
9. Ignored rainy weather forecast; entered water cave – trapped by flood.
10. Careless movement in tight passage or crevice – stuck.
11. Entered bat cave or passage without precautions – histoplasmosis.
12. Solo caving and something went wrong – stranded.
13. Didn't tell anyone where we were going – delayed rescue by hours.
14. Vandalized cave formations, gates, or wildlife – criminal prosecution, fines, jail.

Caving-related Incidents

1999 Incidents 2 incidents reported

Date	Cave	Location	Result	Incident Type
June 23	Lost Creek Cave	Tennessee	no consequence	murder victim left in cave
August 10	unspecified cave	Ohio	no consequence	hiding from meteor in cave

2000 Incidents 11 incidents reported

Date	Cave	Location	Result	Incident Type
March 4	Garnet mine near Orogrande	New Mexico	fatality	fell down mine shaft
March 11	Canteen Springs Cave	Utah	no consequence	snowmobile fell into cave
March 19	Let's All Pray to Jesus Cave	British Columbia	injury and aid	rockfall, caver fall
June 15	Lechuguilla Cave	New Mexico	injury and aid	fell while hiking to cave, broken leg
July 9	Steeles Cave	West Virginia	aid, no injury	rescued calf stranded in cave
August 12	Rippled Cave	California	injury, no aid	attacked by wasps while on rope
October 14	Buckners Cave	Indiana	injury and aid	fell into entrance, intoxication
November 10	unnamed cave	Hawaii	fatality	swept into cave entrance, drowned
November 12	unspecified Blount County cave	Alabama	injury and aid	kidnapping victim left in cave
November 15	Spitting Cave	Hawaii	fatality	jumped onto rocks outside entrance
November 18	Indian Cave	Tennessee	injury and aid	illegal drug overdose at party in cave

2001 Incidents 2 incidents reported

Date	Cave	Location	Result	Incident Type
February 14	Emisine Cave	Hawaii	injury, no aid	caver fall, cut by sharp rock
April 24	unspecified lava tube near Hilo	Hawaii	fatality	fell into entrance, stuck head-down



This photo of the entrance to Wolf River Cave, Tennessee, illustrates the flow of air described in John Gookin's article on page 13. The fog layer forms at the interface between layers of warm and cool air as the cave breathes out in response to barometric pressure difference. Photo by Dave Bunnell, Copyright © 2003.

Lightning Safety for Cavers

John Gookin

Numerous cavers have been shocked by lightning. The serious injuries have been near cave entrances, especially when metal cables, cable ladders, and wires were being used. Cavers walking on the surface, to and from caves, are generally at greater lightning risk than they are while caving. In general, it is much safer to be well inside a cave than on the surface during an electrical storm. But some cave entrance areas appear to be even more dangerous than other places on the surface.

One proviso: Non-cavers often call small overhangs “caves.” Small overhangs are especially dangerous. Lightning tends to flash over surfaces, and it easily jumps the gaps of these small pseudo-caves, especially when rain water is running. Humans offer better paths for conducting electricity across those gaps. Be sure to tell non-cavers that cave entrances are dangerous during electrical storms, so they will get the message that these “caves” are poor places to be in a thunderstorm. Real cavers who are underground probably won't even know that a thunderstorm is outside unless someone gets shocked, the water level starts to rise from rain, or they are exiting the cave and hear the thunder rumbling at the entrance.

Cavers as far as a mile underground have been shocked by lightning.¹ Those standing in water seem to get shocked more. People standing in water on the surface have been shocked through the water, at the same long distances from strikes. Touching the cave ceiling while standing on the ground will increase your potential to conduct current.² But cavers well within a cave don't seem to get more than uncomfortable (or slightly debilitating) shocks. It's the cavers in the entrance pits, on cable ladders, or near other metallic conductors, that tend to get seriously hurt by lightning. Wet ropes hanging in an entrance can be as dangerous as cables, but have only been observed as lightning conductors in the mountaineering accident data—not in caves, yet. Metal handrails into show-caves need occasional gaps in the metal to avoid channeling lightning strikes to everyone touching that railing in the cave. These gaps should be feet long, not inches long, and the railings should be well grounded near the surface. Plastic bridges between railings should be in dry locations.

Do particular caves attract lightning?

Some caves definitely get struck more often than others. This has been well documented in the Pyrenees.³ This has also been documented via geomagnetic signatures in lava tubes. But why some caves get struck more than others is open to debate. If you don't care why some caves might get struck more than others, skip to “lightning safety guidelines.”

Caves tend to be exhaling highly conductive air in the afternoons when lightning tends to strike. Diurnal cave

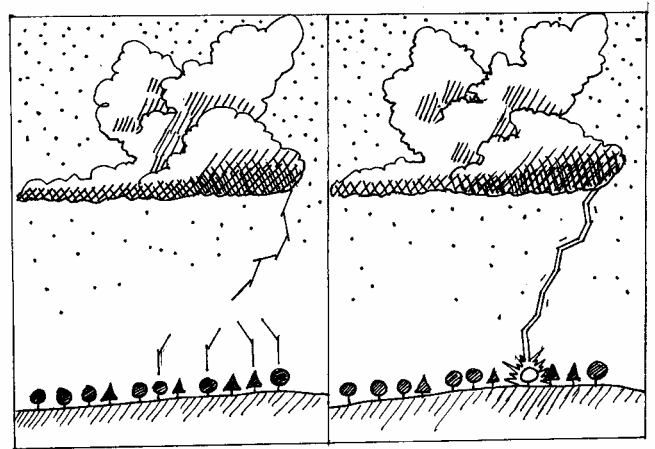


Figure 1 – First, a leader moves down from the cloud in 50m steps. When it is close to the ground, it attracts “streamers” from the closest objects. Second, when the leader connects with the closest streamer, the big “return stroke” travels along its path. Caves would only tend to attract a strike if they had an elevated conductor, like a tree or a column of ionized air, up high where they would connect with more leaders.

breathing is well documented, but exhaled cave air flows downhill and tends to stay together like a river of air—you can feel it. The high conductivity of cave air was documented decades ago.⁴ This needs further examination by analyzing the cave air itself for ions and by looking for electrical fields above exhaling cave entrances.

Look at Dave Bunnell's photo of Wolf River Cave on page 12 to see an example of typical cave entrance air movement. Cool dry air is seeping out of the cave below the fog layer. Dry air is actually heavier than moist air: this is counter-intuitive. And cool air is heavier than warm air. At the thermocline between the cave air and the warm moist surface air, fog forms when the cool cave air condenses the moisture from the warm surface air. If a storm was approaching, the dropping barometric pressure would suck huge amounts of cool air out of the cave. A turbulent storm could mix the air more. Some people who study caves and lightning think this air helps attract lightning to caves that breathe a lot of air, but others dismiss this theory as preposterous.

Another important factor to observe in this photo is that the local stream is flowing from the cave. This is a wet spot in the well-drained karst terrain. Diving or emerging streams are excellent conduits for electrical charge to move in or out of the Earth. This charge helps develop the “streamers” that blaze the trail for a significant lightning strike, and it helps channel ground current from a strike. Cavers have been standing in water a mile underground, and been shocked through the stream of water. Observers at the cave entrances have documented incidents in which lightning repeatedly struck an

⁴ *ibid.*

¹ Personal correspondence from Mike Zawada regarding an incident in 1962.

² Personal correspondence from Cindy Heazlit regarding an incident in 1999.

³ Choppy, J. “Caves Attract Lightning,” Paris, 1994. See John Gookin for an English translation.

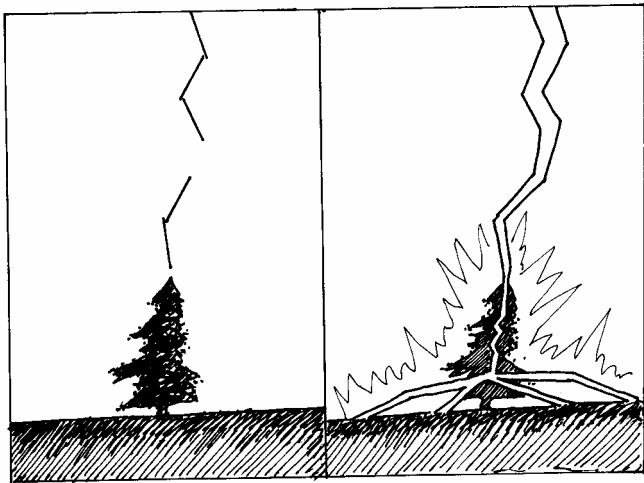


Figure 2 – When lightning strikes, it creates powerful surface arcs above the ground surface and ground currents under the surface. Most victims are killed by ground currents. Any long conductors, such as cables, wet ropes, metal handrails, or streams, tend to channel that ground current as it travels into the Earth. This factor may not make caves attract more direct lightning strikes, but it may channel the energy of nearby strikes into more caves.

entrance, shocking the cavers underneath.⁵ But other observers at cave entrances have noticed that sometimes lightning hits far from the entrance, and still shocks the cavers in the water underneath. The distant strikes that shock cavers are probably connecting to the cave stream via some other stream passage, not via the same entrance the cavers used.

Dale Green is an amateur geophysicist who has been studying lava tubes. While mapping the magnetic fields around lava tubes in Idaho, he has found that the magnetic disturbances caused by lightning strikes are concentrated around entrances of tubes that blow air. These strikes can be detected because intense currents from lightning magnetize the lava and completely alter any previous magnetic field. Away from entrances, lightning strikes were found to be very sparse and randomly placed. The cause for this entrance concentration is unknown, but may be due to moisture in the exhaled air. If this seems like a weak scenario, consider that the main location most houses receive direct lightning strikes is through furnace exhaust vents.

We can actually start looking at real lightning strike data at cave entrances in the lower 48 US States and much of Canada from the National Lightning Detection Network (NLDN). The NLDN is run by Vaisala Global Atmospheric, Inc. (VGAI). To see a real-time map of lightning in the US for the past two hours, go to www.lightningstorm.com. VGAI sells detailed lightning data to anyone who wants it and they can produce color-coded maps showing strike concentrations for specific areas. If you get struck and want to know whether it was a hot strike or a cool one (they can vary from 1-200kA) VGAI can use your exact time and location to tell you more about “your” strike. If you think a local cave is lightning prone, you can hire them to tell you if that location is really a hot spot.

⁵ “An Electrifying Incident Beneath the Arbuckles,” by R.D. Milhollin, *NSS News*, May 2000.

Discussing theories of why some caves are more lightning prone than others is an academic exercise that may eventually help us predict relative risks in certain caves. But it is a fact that some caves are more lightning-prone than others. When the locals tell us that certain caves are lightning-prone, we should be careful around these entrances by minimizing our time of exposure during storms.

Lightning safety guidelines for cavers

- Time your caving trips to avoid thunderstorms.
- Avoid cave entrances during thunderstorms.
- Avoid long conductors during thunderstorms.
- Avoid water, and touching the wall or ceiling if near the surface during a storm.
- Drop into the lightning position (see below) if a lightning hazard exists.

Additional lightning safety guidelines for people on the surface

- Seek a modern building, a car, or safer terrain if you hear thunder.
- Avoid high ground if you hear thunder.
- Avoid relatively tall trees if you hear thunder.

The lightning position

Assume the lightning position⁶ when at risk. This will reduce the chances of getting a direct strike and it may reduce the other effects of lightning, but it offers no guarantees. Some scientists argue that it barely helps protect you; others argue that it is much more valuable because the data says that no one in this position has ever been hurt. This position involves squatting (or sitting) and balling up so you are as low as possible without getting prone. Wrap your arms around your legs, both to offer a safer path than your torso for electrons to flow from the ground, and to be comfortable enough to hold the position for a longer time. Close your eyes.

While the prone position is lower, being spread out increases the potential for ground current to flow through or across you. Keep your feet together so you don't create potential for current to flow in one foot and out the other. If



Figure 3 – Get in the lightning position to reduce risk. Squat or sit, ball up, put feet together, and wrap your arms around your legs.

⁶ We used to call this the lightning SAFETY position, but that name suggests the illusion of safety.

you have any insulated objects handy, like a foam pad or a soft pack full of clothes, squat or sit on them. Avoid backpacks with frames since the frame may concentrate ground current. Don't touch metallic objects. Ground current may trigger your leg muscles to jump while in the lightning position, so take care to avoid being near hazards when you drop into this position. You won't get a warning that a strike is imminent because the lightning event from cloud to ground and back occurs faster than you can blink an eye, so stay in the lightning position until the storm passes.

The lightning position reduces the chances of lightning injuring you as badly, but is no substitute for getting to safer terrain or structure if it is immediately available. If you are concerned enough to assume the lightning position, you should have your group dispersed at least 50 feet apart to reduce the chances of multiple injuries.

Summary

Cavers are probably at greatest risk from lightning while walking to and from caves. But cave entrances offer dangerous spots where we need to exercise a high level of caution, moving past them quickly, just like when passing under potential rockfall. Inside caves, we are only at moderate risk when near the entrance or in the water. Deep in a cave and on dry ground, we are probably safer than anywhere on the surface.

Having said all of that, the leading experts in lightning injury epidemiology say that lightning safety is about two-thirds intelligent behavior and one-third luck. Following lightning safety guidelines can eliminate two-thirds of the lightning injuries in the world.

Cavers aren't just cavers: we are outdoors-people. Knowing how to behave intelligently when lightning threatens can help us in many other activities. Studying up on lightning safety guidelines for other activities we participate in can help us make more informed decisions wherever we are.

Resources

- Learn more about **backcountry lightning safety** at <http://www.nols.edu/resources/research/pdfs/lightningsafetyguideline.pdf>
- Learn more **general lightning safety guidelines** at <http://www.uic.edu/labs/lightninginjury>
- Health professionals can learn more about **lightning injuries** in Mary Ann Cooper MD's "Lightning Injuries" chapter in Paul Auerbach MD's *Wilderness Medicine: Management Of Wilderness And Environmental Emergencies*.
- Sports enthusiasts can see the **NCAA lightning safety guidelines** at http://www.ncaa.org/library/sports_sciences/sports_med_handbook/2002-03/1d.pdf



These cows made three fatal mistakes: 1) They were in an open area during a storm, exposing themselves to a direct strike. 2) They were near a long conductor, which probably channeled high voltage down from a hillside strike. 3) They naturally had their legs spread far apart (about as far apart as a person lying down), providing significantly more voltage to one leg than the others, which drove ground current in one leg and out the others.

1999 Accident and Incident Reports

17 January Pettijohns Cave, Georgia caver fall

Eric Shoemaker and companions were exploring in Pettijohns Cave near the Signature Room. As Shoemaker climbed down into the room, he looked down and saw what appeared to be a hole that seemed to drop about five feet. He started to climb down, but lost his grip and fell down the hole and all the way to the bottom of the room, a distance of about 25 feet. He was bruised and stunned, but not seriously injured, and was able to exit the cave with the assistance of his companions.

Eric Shoemaker, Incident report, 20 January 1999.

Comments: Shoemaker reports that he was almost knocked out by the fall, and that his helmet undoubtedly saved him from serious head injury. He was also glad to have friends with him to help. Pettijohns Cave is popular with all types of cavers, many of whom are poorly equipped, lacking helmets and other basic caving equipment.

23 January Diggins Pit, Alabama stranded on rope

A caver rappelling into Diggins Pit in very wet conditions decided to abort his descent and climb out due to the high water volume. He stopped at a ledge about 40 feet down and changed over to his ascending system. The ascender attached to his seat harness used an adjustable-length sling employing a prusik knot attached to the sling. When he put his weight on the ascender, the prusik slipped and would not grip, making the sling too long and preventing him from reaching the ascender. He decided to change back to rappel and continue to the bottom. He was unable to complete the procedure, decided to cut some of the slings, and wound up stranded. He began to develop hypothermia from the water falling down the drop. His companion rappelled to the ledge and helped him get back on rappel. Both cavers then rappelled to the bottom. The stranded caver was then able to climb out on his own.

Buddy Lane, Personal communication, undated.

Comments: Vertical cavers should know their climbing and rappelling systems intimately, and be capable of performing a change-over with ease. Cavers who were not able to do so have died while hanging in waterfalls. Cutting one's slings is seldom necessary or justified.

23 January Hurricane Ridge Cave, West Virginia flood entrapment

Frank Abbato, Jeff Bray, Yvonne Droms, Tom Malabad, Kristin Matak, Ed McCarthy, Dennis Melko, Phil Murray, and Gary Vermillion entered Hurricane Ridge Cave on Saturday morning for what was intended to be a six-hour photo trip.

The cave entrance is in a small sinkhole with an inflowing stream and a tight vertical climb-down into the cave. The weather forecast predicted rain in the area, but the cavers believed that they could monitor the stream in the cave and that they would be out before flooding could become a problem. The cavers were dressed for cold, wet caving, wearing wetsuits, balaclavas, and neoprene gloves.

The group entered without incident and began their photography work, moving from the lower level water passages into the dry upper regions of the cave. Bray became ill and decided to leave the cave. He exited, accompanied by Matak. When they reached the surface they found that it had started raining.

The rain soon turned into a downpour, with several inches of rain falling in about two hours. A flash flood developed, turning the entrance sink into a whirlpool. When the seven remaining cavers returned to the entrance after four hours, they found it impassable. They retreated to the dry upper level, where candles, a tarp, a sleeping pad, and other supplies had been cached for use on survey trips. Using the tarp, some plastic bags, and survival blankets carried by several of the cavers, they fashioned heat tents, with their wetsuits, coveralls, and the sleeping pad for insulation and the candles for heat and light. The cavers huddled together, rotating the outside people to the inside to warm up.

After the water crested and began to fall, the group made a second attempt to exit. The tight passages and climbs at the entrance remained impassable. They retreated to their camp and settled down to wait, rationing their food and checking the stream level every two hours.

After 33 hours in the cave, they made a third attempt to exit. This time they were able to get within a few feet of the entrance, where they found three plastic bottles containing food and messages from rescuers waiting outside. The messages included the time and date, a weather report, and instructions to wait for rescuers to come get them. The reassured cavers retreated to their camp, cold but in good spirits, and waited for the water to subside.

After 49 hours in the cave, the trapped cavers were relieved when five rescuers arrived at the makeshift camp on Monday morning bearing food and heat packs. After warming up, the cavers exited through a still-strong waterfall, reaching the surface after 52 hours in the cave.

1. *Jeff Bray, Incident report, 31 March 1999.*
2. *Kristin Matak, Incident report, 31 March 1999.*
3. *Yvonne Droms, Incident report, 31 March 1999.*
4. *Carroll Bassett, Incident report, 14 March 1999.*
5. *Nerissa Young, "Seven rescued from Monroe cave," Beckley Register Herald, 26 January 1999, p. 1.*
6. *Associated Press, "Flu-stricken friend saves others trapped in cave," 26 January 1999.*
7. *Kristin Matak, "Hurricane Ridge Incident," West Virginia Caver, v17n2, April 1999, p. 10.*
8. *George Dasher, "Editor's Two Cents," West Virginia Caver, v17n2, April 1999, p. 11.*
9. *Yvonne Droms, "Trapped in Hurricane Ridge Cave," West Virginia Caver, v17n3, June 1999, pp. 4-6.*

Comments: Bray and Matak exited at about 2:00 p.m. Saturday afternoon. The entrance was found to be flooded at about 3:30 p.m. Saturday. Since they knew the trapped cavers were well prepared, Bray and Matak decided to wait to see if the water would go down before calling for help. A group kept vigil at the entrance through the afternoon and night, and again on Sunday.

When the entrance was still flooded Sunday afternoon, they notified Carroll Bassett, a local caver. Bassett and other cavers came to the site to assist, but little could be done while the entrance was flooded. Plastic bottles with food and messages were dropped into the entrance at intervals in an attempt to get supplies and information to the trapped cavers. On Sunday afternoon, contact was made with the group in the cave, but the entrance was still impassable. By Monday morning, the water had gone down enough to allow a group to enter and retrieve the stranded cavers. All were cold and tired, but able to exit under their own power.

As Dasher notes, both the cavers and the rescuers were experienced and took calm and appropriate actions. Rather than rushing in or trying to put divers into the cave, they wisely chose to wait for the water to subside. The trapped cavers were appropriately dressed and equipped for wet conditions, and the presence of the stored supplies made their confinement safer and more comfortable. The use of candles and a heat tent was helpful—even a plastic trash bag and a candle or carbide lamp can be very effective against hypothermia.

Bassett notes in his report that the “message in a bottle” technique worked well, getting supplies and information to the trapped group. He notes the importance of numbering the messages and including the time and date, along with information about the rescue efforts underway. Droms reports that this was very reassuring to the stranded cavers. A lit cyalume stick was included in each message bottle to increase visibility, along with bright flagging tape attached to the outside.

Bassett also advises, “If trapped by water, and people on the surface know you are in the cave (and they should!), get to high ground and keep warm. Those on the surface will come for you as soon as it is safe. Trying to leave before may use up valuable energy you may need to endure the wait and use to leave under your own power.”

Bray, Matak, and Droms report that the cavers were aware of the forecast calling for rain on the day of the trip. Dasher reports that the forecast called for heavy rains and that the rains had been predicted for three days before the trip. He suggests that “with this in mind, perhaps an alternative cave should have been chosen.” Droms states in her report, “We should have known better, but people with our temperaments make a habit of taking chances when we shouldn’t,” and notes that Bray and Matak were somewhat reluctant to lead the trip that day due to the weather report.

Dasher also notes, however, that the weather outside did not appear threatening before the cavers entered, and that the thunderstorm came up suddenly. A second storm later in the day prolonged the entrapment by causing the cave to flood a second time. He observes that “water is the most dangerous thing we encounter underground.”

Dasher and Droms note that the cavers felt that their experience with the cave indicated that it would take at least

four hours for the stream to rise enough to create a problem, and that they believed they could monitor the stream and exit if necessary. Similar beliefs have also been advanced by cavers in many other flood entrapment incidents reported in *American Caving Accidents*. The reality is that no one can predict the weather, the amount of rain that will fall in a given period, or how long it will take a given cave to flood. Is it really reasonable to gamble your life for a little rainy day recreation?

4 February unspecified cave, Green Mountain, Alabama stranded in pit, no equipment

Adam Faulk (13) and his friend Jonathan Graham, accompanied by Adam’s dog, set out to explore a cave that Faulk had spotted on Green Mountain. Faulk brought along a nylon rope for the pit entrance and a flashlight for the cave at the bottom. When the boys reached the cave, Faulk descended the 40-foot entrance pit hand-over-hand and explored a small amount of cave at the bottom. As he tried to climb out, Faulk dropped his flashlight and went back down to retrieve it. He then found that he was unable to climb the nylon rope hand-over-hand, and called for help. Graham ran back to Faulk’s house and told his parents, who called 911. The cave rescue team responded, rigged the pit with a proper caving rope, and sent a rescuer down with a helmet and a harness for Faulk, who was then hauled out of the pit and returned to his waiting parents.

1. *Wendy Reeves, “A young explorer caves in to adventure, learns lesson,” Huntsville Times, 5 February 1999.*
2. *Unknown author, “Youngster who was stuck in cave is OK,” Jasper Daily Mountain Eagle, 6 February 1999.*

Comments: Rescuers invited Faulk to join the Huntsville Grotto. Faulk had read about a meeting of the club in the paper the previous week and wanted to go, but his mother did not allow it. He was reported to be looking forward to learning how to cave safely.

7 February Paradise Cave, Colorado fall from cable ladder

Bruce Albright was reported to have fallen from a cable ladder in Paradise Cave, resulting in abrasions on his back and scalp lacerations requiring six stitches.

Richard Rhinehart, “News and Notes About Caves and Karst,” Rocky Mountain Caving, Spring 1999, p. 5.

Comments: No other information was available. One wonders whether a belay was employed. Falls from ladders can almost always be prevented by the use of a belay, which should be standard procedure. Climbers can be belayed from above or can be belayed from the bottom of the ladder using a simple “slingshot” belay, in which the rope is doubled through a carabiner rigged at the top of the climb. Self-belay systems use a seat harness and a device rigged to slide up the rope automatically as you climb. Regardless of the belay method, it is essential to avoid developing any slack in the system.

13 February Organ Cave, West Virginia lost

George Guntherie and his wife were celebrating their anniversary and decided to take a guided tour of Organ Cave. Guides Joyce Morgan and Shannon Morgan led them on a trip to the Waterfall Room, a large room near the downstream end of the Upper Stream Passage. On the way out, the group missed a turn and wound up at a climb-down to the stream level. Shannon Morgan (who was a novice caver and guide) and George Guntherie climbed down to the stream, where they encountered deep water. The women stayed at the upper level and continued to the Dog Room, where they expected the men to join them.

Unfortunately, the men headed in the wrong direction, going downstream and deeper into the cave rather than upstream toward the Dog Room. When they found themselves in larger passage they realized that they were in unfamiliar cave. Rather than returning the way they had come, they continued ahead for about an hour before deciding that they were lost. They returned to the point where they had first noticed that they were in unfamiliar passage and waited for rescue.

After waiting for some time in the Dog Room, the women decided that the men must be lost, and left the cave to get help. Joyce Morgan called local caver Bob Liebman, who brought his visiting brother Bill Liebman to the cave. After calling some more cavers familiar with the cave to come and help search, the Liebman brothers entered the cave with Joyce Morgan and went to the place where the missing men had last been seen. Leaving notes at junctions, they began to search the main passage along the stream and found the men's footprints heading downstream. They soon found the lost cavers and escorted them from the cave. The men had been lost for about seven hours.

1. *Bob Liebman, "Another Organ Cave Search,"* Monroe County Mudslide, v2n4, March 1999, pp. 4-5.
2. *Bill Liebman, "Organ Cave Rescue,"* Monroe County Mudslide, v2n4, March 1999, pp. 5-7.
3. *Bob and Bill Liebman, "Organ Cave Rescue,"* West Virginia Caver, v17n2, April 1999, pp. 11-12.

Comments: Bill Liebman observes that the group made a mistake by separating when they encountered the water. They were already off-route at that point. However, once the two men realized that they were lost, they returned to the point where they had become lost, stayed put, and waited for searchers to find them.

Organ Cave is a commercial cave offering "wild cave" tours. Guntherie and his wife were first-time cavers and paying customers. Liebman reports that the two guides did not have any training in dealing with emergencies such as lost or injured cavers, carried no emergency equipment such as candles or plastic bags, were not familiar enough with the area of the cave in which they were leading the trip, and did not provide the customers with backup lights or other safety equipment. He also noted that the cave operators did not have an emergency plan or a list of names and contact numbers for

people familiar with the 37-mile long cave system. These things were discussed with the cave operators.

14 February Jennings Cave, Florida caver fall

Brian Williams, Dave Moore, and Jennifer Langford of the Florida Speleological Society accompanied a group of five Girl Scouts and four adult troop leaders on a trip to Jennings Cave. The cave entrance is at the bottom of a 20-foot pit, which the cavers planned to rappel and ascend. While Williams briefed the scouts and their leaders on safety procedures, Moore rigged a rope for the rappel and a cable ladder for the ascent. All the cavers were properly equipped with helmets, lights, and vertical gear.

Moore and Langford descended first. Two of the adult leaders and all five of the scouts descended without incident, with Williams providing assistance and instruction at the lip and Moore providing a bottom belay.

Scout leader Mary Alice Petty (42) rigged in and began her descent, backing toward the edge of the pit. As she approached the lip, her feet slipped, and she fell forward and struck her face against a rock outcrop beside the 3-foot wide entrance. The impact resulted in multiple fractures of her jaw. Williams called for a belay, and Moore held fast while Williams rigged in on a separate line, checked Petty's injuries, and helped her move away from the pit.

Williams then called for Moore and Langford to abort the trip and get the scouts started out of the cave. Moore, an EMT, came up first to tend to Petty, while Williams and Langford assisted and belayed the others as they exited using the cable ladder. All were out in about 30 minutes.

Once all the cavers were safely on the surface, Petty was driven to a hospital for treatment, where she underwent surgery to repair her fractured jaw.

Brian Williams, Incident report, undated.

Comments: Williams reports that Petty apparently slipped in the loose dirt and leaves near the lip of the pit. None of the others experienced any problem. The group was carefully supervised and properly equipped, and made good use of the bottom belay for rappel safety as well as belaying the cable ladder climb.

15 February Lava Rise E-3 Cave, Hawaii caver fall

While negotiating the entrance crawl, Ole Fulks dropped his 5-cell flashlight. It rolled down into a dark area of the entrance room, which is otherwise well-illuminated by light coming through cracks in the ceiling. He crawled on into the room, stood up, and walked down the rocky slope to retrieve the flashlight. While "fiddling with the switch," he stepped backward, thinking there was a ledge behind him. He fell backwards about six feet, rolled off a ledge, and slid another six feet head first on his back before coming to rest.

His helmet, caving clothes, knee pads, and forearm pads protected most of his body from the sharp lava, but he

received lacerations on one forearm and one thigh. His injuries were bandaged and later sutured. Fulks insisted on completing a short re-mapping project and some scientific studies planned for the trip, but the remainder of the trip was cancelled. During the hike back to the car, his wrist began to swell painfully. X-rays later showed a possible chip fracture.

William R. Halliday, Incident report, 17 February 1999.

Comments: Halliday reports that the primary cause of the accident was “overconfidence,” noting that, “initially, lack of light was thought to have been a factor, but probably he would have stepped backward regardless of the amount of light in the alcove where his flashlight had rolled.” Fulks was an experienced caver and had been in the cave several times before. His reasons for using a hand-held flashlight rather than a helmet-mounted light are unknown.

Halliday also notes that the first aid kit carried by the group was “mildly inadequate”, lacking extra bandages and sterile gauze pads. He also offers a warning regarding the dangers of caving on sharp, jagged lava rock. There are several incidents in this issue involving lacerations in lava caves. Stout gloves and pads are advised.

10 March Ellisons Cave, Georgia fatality, stranded on rope, hypothermia

Harold Allen (Hal) Bufford (28) entered the cave with two companions, Chris Andrews (27) and Anthony Bates (25), on Tuesday morning to descend Incredible Pit and explore passages at the bottom. They entered the Stair Step Entrance and descended an initial 80-foot pit and a second 83-foot pit before reaching the lip of 440-foot deep Incredible Pit. There was a sizeable stream flowing into the pit, forming a waterfall for the entire length of the drop. A 1/2-inch rope, left by a group the previous weekend, was already rigged in the pit. The men rigged their own 7/16-inch rope next to it and descended.

After exploring the passages below, they began their ascent late Tuesday evening. Bates and Andrews climbed first and made the ascent without incident. Bufford was the last to climb, and began his ascent at about 11:30 p.m. Bufford climbed about 150 feet up the rope and apparently encountered some difficulty. His companions reported that he began shouting for help at about 12:00 a.m. They could not communicate with him because of the depth of the pit and the noise of the waterfall. After losing contact with Bufford, Bates and Andrews left the cave as quickly as possible and called Walker County 911 at 2:30 a.m. GA DNR and Walker County Cave Rescue were notified and dispatched to the cave.

Volunteer cave rescuers entered the cave and descended to the top of Incredible Pit, arriving at about 9:00 a.m. They called down to Bufford, but there was no response. Rescuers rigged a hauling system with ropes and pulleys and hauled Bufford to the top of the pit. There was no sign of life, and he appeared to have been dead for many hours. His body was placed in a stretcher and carried out of the cave, arriving on the surface late Wednesday evening.

About 60 people from several government agencies and volunteer rescue groups were involved in the operation. Of

those, 35 entered the cave and the rest provided command and support functions on the surface.

1. *"Man Drowns in Pigeon Mountain Cave," Chris Conley, Walker County Messenger, 12 March 1999, pg. 1.*
2. *Bill Putnam, Walker County Cave Rescue, personal notes.*
3. *Allen Padgett, Georgia Department of Natural Resources, personal communication, 5 May 1999.*
4. *Diane Cousineau, Walker County Cave Rescue, personal communication, undated.*

Comments: Bufford was found on rope about 150 feet above the floor of the 440-foot deep pit. From the arrangement of his equipment, rescuers believe that he was attempting to re-rig his equipment to switch from climbing to rappelling, and became stranded on rope when he was unable to complete the change-over procedure. He was found with one ascender on each rope, with both under tension, and with his rappel rack rigged on the 1/2-inch rope below his handled ascender. His weight was on both ropes.

Rescuers believe that he was unable to transfer his weight from the upper handled ascender to the rappel rack to complete the change-over from climb to rappel, eventually lost consciousness from hypothermia and exhaustion, and died hanging in his harness. Cause of death was later determined to be hypothermia plus positional asphyxia. This situation is known as harness-induced pathology, sometimes referred to as “harness-hang syndrome” or “suspension trauma.”

Bufford and his companions rigged their own rope next to another rope that was already hanging in the pit. Two ropes rigged close together in a deep pit will often become tangled. Bates and Andrews reported that they did not have any problems due to tangling, but the ropes were found to be entwined when Bufford’s body was recovered. Whether this occurred before or after his death is unknown.

Bufford was climbing the 1/2-inch rope using Petzl ascenders designed for use with ropes up to 7/16-inch in diameter. These ascenders do not run as smoothly on larger diameter ropes, and this may also have been a factor. Whatever the reason, he apparently decided to change over to rappel and go back to the bottom. The ability to quickly and efficiently change from climb to rappel or rappel to climb while on rope is a basic and essential skill for vertical caving. Cavers should be able to perform either maneuver in less than five minutes. With practice, it can be done in less than one minute. Hanging in a cold waterfall in the dark, your skill with the procedure and familiarity with your equipment could save your life.

Bufford also was not wearing adequate clothing for the cave conditions. The pit has a stream pouring down it year-round. At this time of the year it was near its peak, with a large volume of 35-degree water pouring right down the rope for the entire length. Most cavers would wear a full wetsuit or a PVC or nylon caving jumpsuit over layered polypropylene long-underwear. Bufford was dressed in a plastic rain suit over denim overalls, a cotton thermal undershirt, and a cotton work shirt. Cotton clothing is dangerous for wet caving because it absorbs and holds water against the skin, increasing the risk and effects of hypothermia. Plastic rain suits are not rugged enough for the cave environment.

Bufford's clothing made him more susceptible to hypothermia, and greatly limited the amount of time that he

could hang in the water to arrange his equipment. A wetsuit would have substantially improved his chances of survival. Wearing cotton, survival time in cold water is usually measured in minutes.

This is the first death in Ellisons Cave, and the first caving fatality in Georgia since 1967, when three men were killed in Howards Waterfall Cave (Dade Co.) by fumes from a gasoline explosion caused by a leaking underground storage tank.

**6 April
Hermit Cave, Oklahoma
fatality, stuck, inadequate equipment, bad air**

Robert Canady (21) and two companions spent the night of 5 April camped in Hermits Cave. On the following morning, one of the men had to leave to go to work, but Canady wanted to do some more exploring. He decided to push a small side passage. About 150 feet down the passage he became wedged at a constriction and was unable to free himself. His arms were pinned at his sides and he was face down above a mud floor. His companion was not able to help, and eventually left the cave to call for assistance. When rescuers reached Canady, he had expired, apparently from suffocation.

1. *David Carroll, Incident report, 9 April 1999.*
2. *Michael Smith and Omer Gillham, "Man trapped inside cave found dead," Tulsa World, 7 April 1999.*

Comments: Carroll reports that it was Canady's first caving trip. He was dressed in jeans and a T-shirt and had one flashlight, no backup lights, and no helmet. Carroll also notes that the cave is known to have bad air and is subject to frequent flooding. Rescuers encountered difficulty breathing during the recovery operation, and a ventilation system was used to blow warmed air into the cave. It was thought that Canady became unable to hold himself out of the mud, losing consciousness due to some combination of exhaustion and low oxygen in the crawl.

**16 April
Pettijohns Cave, Georgia
stranded, inadequate equipment**

On Friday night three individuals entered Pettijohns Cave at about 11:00 p.m. By 12:30 a.m. they were about 1,000 feet from the entrance when the last of their light sources failed. They had no backup lights. They spent a cold night and most of the next day sitting in the dark.

The following afternoon, the wife of one of the missing men came looking for them and encountered other cavers, who were there for a cave clean-up project, at the parking area. The cavers called 911 to report the lost party and get some help from the cave rescue team, and then made a quick search of the entrance area and main passage of the cave. More cavers and rescuers arrived, and a thorough search of the cave was planned.

Before the full-scale search could begin, a group of college students who had gone into the cave earlier in the day made their way into a passage near the place where the lost party was stranded. Hearing cries for help, they located the stranded

group, loaned them some warm clothes, and escorted them out of the cave.

Allen Padgett, Incident report, 19 April 1999.

Comments: Flashlight caving: how many of us started caving the same way? Properly equipped cavers carry at least three sources of light per caver, not per group. At least this group let someone know where they were going.

**21 April
New River Cave, Virginia
lost, stranded**

A group of cavers from Concord College was exploring the cave and decide to split into two groups. One caver, David Arrington, became separated from the groups. Each group thought he was with the other, and no one realized he was missing until the two groups were reunited outside the cave. Arrington had last been seen at about 10:30 p.m.

The Concord group re-entered the cave and spent about two hours searching for Arrington, then exited and called in other cavers to expand the search. Groups began entering the cave at about 2:00 a.m. and spent the night searching. Arrington was finally located at about 6:00 a.m. downstream from the China Room. He was able to exit under his own power.

Allison Barth, "New River Cave (Virginia) Rescue," West Virginia Caver, v17n3, June 1999, p. 15.

**25 April
unspecified cave near Smyrna, Tennessee
caver fall**

Timothy Newby (13) and friends were playing in the entrance of a small cave near his home when Newby slipped and fell about eight feet while climbing out of the narrow moss-covered entrance slot. He suffered a broken arm and a concussion.

One of Newby's companions climbed down the slot and stayed with him while others went to call for help. EMS and rescue personnel responded, packaging Newby in a litter and hauling him up the drop. The narrow entrance hampered rescue efforts. Newby was taken to a hospital where he was later reported to be in fair condition.

1. *David Russell, Incident report, 24 August 1999.*
2. *Byron Hensley, "Boy pulled from small cave: Flown to hospital after rescue," Murfreesboro Daily News Journal, 26 April 1999, p. 1.*

Comments: The cave was not known to local cavers before the incident. It was later explored and found to have a low oxygen level.

**5 May
Cueva Chorreadero, Mexico
flood entrapment**

A group of 35 students from the National Polytechnic Institute in Mexico City became trapped in Cueva

Chorreadero when heavy rains caused the caused flooding in the cave. The group retreated to an upper level of the cave and waited for the water to subside. Continuing rains prevented rescuers from entering the cave until May 10, when the trapped students were located and brought out of the cave. All were reported to be in good condition.

1. *Associated Press, "Thirty-five college students missing, feared dead in Chiapas flooding," 10 May 1999.*
2. *Associated Press, "35 students trapped in cave are rescued," San Diego Union-Tribune, 10 May 1999, p. A-11.*

15 May Alleghany Blowhole, Virginia caver fall

Chris Alderson (52) and three other cavers were surveying in virgin passage when they came to an 8-foot climb-down over a boulder to a breakdown pile below. Two of the cavers descended, but as Alderson climbed down over the boulder, it broke loose. Alderson fell, along with the boulder and other smaller rocks. She landed on the breakdown slope and slid another six to eight feet as rocks fell around her. A broken piece of the boulder landed on her forearm, causing a small laceration.

Alderson's arm was bandaged using the group's first aid kit, and she was able to continue the survey trip. On the way out of the cave she experienced some pain in her left side, which was later attributed to a separated rib. She exited with minor assistance.

Chris Alderson, Incident report, 11 September 2000.

Comments: Alderson notes that virgin cave is often unstable. Even though two other cavers had descended the climb without incident, the rocks gave way unexpectedly. Cavers must be alert for loose or unstable rock in caves, but should be especially so when they are in new cave or infrequently traveled passage.

21 May Sinking Cove Cave, Tennessee lost, stranded

Chuck Constable, Patrick Savage, and Anthony Stanaland entered the Boulder Entrance at about 3:00 p.m. planning to make the popular vertical through-trip. The route descends several drops, followed by a squeeze into a low-air-space crawlway that connects to a large stream passage 1,000 feet upstream from the spring entrance. Constable was familiar with the route, but it was the first time through for Savage and Stanaland.

The trip went without incident until the trio reached the squeeze into the water crawl. Constable had warned the others about the tight spot, but was confident that they would both fit through. Stanaland (the larger of the two) started into the squeeze, then backed out and announced that he could not fit. He decided to go back out the upper entrance, and Savage decided to go with him. They had their climbing systems and felt confident that they could find their way back, so they told Constable to go on out the bottom. They split up at about 5:00

p.m., and Constable exited shortly after and returned to the group campsite near the spring.

When Savage and Stanaland had not arrived at the camp by 10:00 p.m., Constable and Martha Hendrix decided to don their caving gear and go looking for them. They entered the Boulder Entrance at about 11:30 p.m. and soon found the missing cavers. They had lost the route in the middle portion of the cave, and decided to wait for their friends to come get them. They had food and emergency blankets, but were out of water. Hendrix and Constable led the way out, and all exited without further difficulty.

Martha Hendrix, Incident report, 16 June 1999.

Comments: Hendrix suggests that it was probably not a good idea for the group to split up, since Savage and Stanaland did not know the cave. When following a guide through unfamiliar cave it is important to take your time and learn the route. Fortunately, the men were well prepared and no harm was done. Hendrix also notes that the tight spot had been significantly enlarged a few years earlier as a result of a similar incident.

29 May Crumbly Cave, Tennessee caver fall

Andy Porter was exploring Crumbly Cave, where he found a small hole opening into a 10-foot climb-down. He squeezed through the hole head-first and started to turn around so he could descend. As he did so, one of his footholds broke loose, causing him to fall head-first down the pit. His head struck the wall as he fell, and he tumbled, landing upright at the bottom.

Porter was stunned by the fall, and bleeding from a cut on his ear. A companion helped him out of the cave, and another applied first aid and accompanied him to a hospital emergency room, where he received seven stitches to close the 1-inch laceration in his ear. He had also received a mild concussion, and suffered headaches for several days after the fall.

Andy Porter, Incident report, 1 June 1999.

Comments: Porter notes that his UIAA-approved helmet saved him from a much more serious head injury. A quality helmet is a wise investment in your caving future.

30 May Cueva Los Angeles, Puerto Rico drowning, flood entrapment

Francis Reyes (34) was working as one of several guides leading a group of clients on a commercial caving trip in Cueva Los Angeles when the group encountered rapidly rising water in the stream passage. One of the clients, Elba Vasquez Gonzales, was unable to reach higher ground in time and became caught in the flood pulse. Reyes went to her aid and rescued her, but was swept away by the strong current and drowned. The other guides led the group to a dry upper passage and waited overnight for the flood to subside.

Rescuers were able to reach the 17 trapped cavers the next day and help them exit the cave. Vasquez Gonzales had suffered a head injury when she was thrown against rocks by

the water, and was hospitalized. She was later reported to be in fair condition and recovering.

1. *Julio Ghigliotty "Era un experto in las cuevas,"* El Nuevo Dia, San Juan, Puerto Rico, 1 June 1999.
2. *Steve Hudson, NCRC Discussion List, 3 June 1999.*
3. *Ray Keeler, Personal communication, 23 July 1999.*

Comments: Reyes was a very experienced caver and guide. He was also an instructor with the National Cave Rescue Commission.

5 June

King Blair Cave, Indiana stranded, inadequate equipment, inexperience

Bill (25), Sarah (20), Josh (18), and Siradan (17) entered the King Blair entrance at about 11:00 a.m. on Saturday. When they did not return home that night, Sarah and Josh's parents called authorities and reported them missing in the cave. The cave rescue team was summoned to the site at 6:00 a.m. Sunday morning. Search groups were sent into the King Blair and Triple-J entrances. At about 9:45 a.m., the King Blair search group located the stranded cavers.

The group had become lost, and eventually stranded when their primary lights failed. Two were dressed in jeans and T-shirts, and two were wearing cotton sweatshirts. All were cold. Only two of them had helmets and helmet-mounted lights. Rescuers gave them food and water, and then escorted them out of the cave.

Jim Johnson, Incident report, Jim's Cave Rescue Page, php.indiana.edu/~jkjohnso/cr1999.html.

Comments: Johnson observes that the group was "underexperienced for a cave of this complexity" as well as "underdressed and underequipped." He notes that they did tell their parents where they were going and when they expected to be out.

12 June

The Kids Cave, Alabama rockfall, rig point collapsed

A group of cavers entered The Kids Cave, descending the 41-foot entrance pit and additional pits of 90, 150, 30, and 40 feet to reach the bottom of the cave. On the way out, Ray Craig (29) was the first to climb the 90-foot pit. When he reached a point about 15 feet below the top, part of the anchor failed, dropping Craig about six feet and sending a shower of rocks down the pit.

The backup rig held the fall, and Craig was not injured. He grabbed a fluted projection on the wall and re-belayed the rope to it, then climbed cautiously up to the lip and over. The primary rig point had been a 3-inch diameter, 7-inch tall stalagmite on a flowstone shelf, backed up to a 2'x2'x7' breakdown slab. Craig found that the entire flowstone shelf had collapsed, breaking loose along hidden internal fractures or cleavage. Most of the larger pieces from the collapse did not fall into the pit. After Craig finished checking the rope and anchor, the others ascended and the group exited without further incident.

Andy Porter, Incident report, 15 June 1999.

Comments: The stalagmite was used to rebelay the rope to get a better angle where the rope entered the pit. The resulting deviation in the path of the rope from the breakdown slab anchor to the pit lip allowed Craig to fall about six feet. Porter calculated that the fall factor was about 0.2.

Static ropes are not designed to catch falls like this. They can also be cut by a caver's ascenders or by a sharp lip under this kind of dynamic loading. Anchor systems should be carefully constructed to minimize, if not eliminate, dynamic loading in the event of partial failure. Formations are suspect anchors, due to their tendency to fracture and the fact that their deposition process tends to hide weaknesses over time.

16 June

Perseverance Cave, Vermont struck by crowbar while digging

John Keogh, Rick Pingree, and Greg Racicot were working on a dig in the entrance passage of Perseverance Cave. Keogh was using a crowbar while trying to move a large rock blocking the passage. He had the crowbar wedged on top of the rock when it slipped and struck him in the face, breaking his nose.

Greg Racicot, John Keogh, and Rick Pingree, "Per-Severance Cave Discovery," Northeastern Caver, December 1999, p. 120.

June

Bears Plunge, Alaska difficulty on rope

Bruce White and six other cavers rigged the 150-foot entrance drop of Bears Plunge, placing the rope to one side to avoid the large waterfall. White descended first, followed by Dan, Connie, and Diane. Mike and Kris decided to stay on top, and Dave descended last. As Dave went down the drop, the rope slipped over to the waterfall side of the pit. Communication from the bottom to the top was not possible due to the water, so they could not get the cavers topside to reposition the rope.

White volunteered to climb out in the water. He made his climb without incident and repositioned the rope for the others. Diane and Connie climbed out without difficulty, and the group waited as Dave began his ascent. Dan remained on the bottom to be the last one up.

After about 30 minutes, White became concerned and rigged a second rope so that he could climb down to a ledge at the lip and check on Dave. He found that Dave was climbing slowly, but appeared to be OK. White went back to the surface and waited another 20 minutes, then descended to check again. Dave had made it about halfway up the pit, and appeared to be struggling. White called down and asked Dave if he needed help, to which Dave replied in the affirmative.

White went back to the surface and picked up some additional equipment, including a pick-off strap, carabiners, and some webbing, and rappelled down to Dave. He found that Dave's chest harness and seat harness had both loosened to the point where Dave was almost unable to climb. The seat

harness was down around his knees and the chest harness was riding up around his neck.

White used the pick-off strap and webbing to rig a safety sling around Dave, and then maneuvered the two onto a ledge in an alcove away from the waterfall. After some struggling to gain the ledge, they were able to adjust and reinforce Dave's harnesses and make them secure. The two then swung back out into the pit and resumed the climb to the surface.

Both were exhausted from the struggle and chilled from exposure to the waterfall. They climbed slowly out, taking frequent rests, and eventually made the surface. Dan then climbed out without incident.

Bruce White, "June 1999, POW, Mission: Drop Bear's Plunge, for the Glory," The Alaskan Caver, v20n4, August 2000, p. 3.

Comments: White notes that Dave was using new gear that he was not familiar with, and had not done any rope work in some time. His skills and ability level were not known to the others on the trip. White observes that had they known, the others might have cautioned him about going down in the wet conditions. All agreed that Dave could have been seriously injured or killed.

Cavers should understand their equipment, practice with it outside the caves, keep it in good working order, and be able to use it in adverse conditions. You can die stranded on rope in a waterfall, as demonstrated in the Ellisons Cave incident reported earlier in this issue. Cavers should also know their companions and be aware of their skills, abilities, and equipment. It is not impolite to inquire about these things—it is just part of good team ethics. If you don't know, ask.

4 July

Bowden Cave, West Virginia caver fall, inadequate equipment, intoxication

Around 11:15 p.m. a group of eight individuals comprised of three women and five men (ages ranging from 15 to 36) entered the Bear Heaven Entrance to Bowden Cave. The group had several flashlights, no helmets, and no safety equipment. They were dressed in jeans, sweat shirts, and tennis shoes, and had minimal caving experience.

As they made their way to a climb-down at a fissure just inside the entrance, Mark Summerfield (19) was on a mud slope above others in the group when he slipped and fell about 30 feet to the bottom of the passage. One of his companions climbed down to him and found him unconscious, with a head injury, broken ribs, and labored breathing.

Members of the party left the cave and called for help. Rescuers responded and placed Summerfield in a litter and carried him out of the cave. He was then taken to a hospital. It was reported that he had a broken collarbone and broken ribs, with possible internal organ damage.

Chuck Hempel, "Bowden Cave July 1999," West Virginia Caver, v17n5, October 1999, p. 8.

Comments: Rescuers reported that members of the party smelled of alcohol, so intoxication may have been a factor. The group also did not have proper caving equipment or safety equipment. Lug-soled boots are much safer than tennis shoes

on mud slopes. A good helmet is essential for safe caving. A belay or handline is worth considering when there is risk of a 30-foot fall.

24 July

Knox Cave, New York stuck, stranded

Eight cavers from the Nittany Grotto entered the cave at about 2:15 p.m. After several hours touring the cave, the group proceeded to the well-known Gun Barrel passage. Five of the cavers went through, and three, including trip leader Rob Martin (31) decided not to go through. After a while, two of the waiting cavers became cold and decided to go outside. By 5:45 p.m., two of the cavers had come back through the Gun Barrel and exited the cave, when another emerged and reported that someone was stuck.

While making her way out of the Gun Barrel, Carrie Shaffer (late 20's) got stuck about ten feet from the end of the passage when her knee became wedged in the slot in the bottom of the passage. First-time caver Rosario Gonzales Martin (early 20's) was behind her in the passage and could not get around.

Martin and the other cavers tried to help Shaffer, pulling on her torso as Gonzales Martin tried from behind to free her leg. They retrieved a digging bar from a nearby dig site and tried to clear rocks and gravel from the slot, but could not free Shaffer's knee. At 6:15 p.m. they sent a caver to the surface to get help. While they waited, Gonzales Martin backed out of the passage into a nearby room to keep warm. Hot packs were passed to Shaffer to help prevent hypothermia. The group tried various methods including applying soap to Shaffer's knee and using a foot loop for her to push against, but still could not free her.

After about 45 minutes, rescuers arrived. A very small caver was able to squeeze past Shaffer in the passage and get behind her. With rescuers digging and clearing material from both sides, Shaffer's knee was freed from the slot at about 10:00 p.m. She had some bruises and abrasions, but no serious injury. Shaffer and Gonzales Martin exited under their own power.

Rob Martin, "Rescue in Knox Cave," Northeastern Caver, September 1999, p. 76.

Comments: Chuck Porter reports that on 11 January, 1970, a 14-year-old boy got his knee wedged in the same place, trapping 17 people behind him in the cave for several hours until he could be freed.

28 July

Nutty Putty Cave, Utah stuck, stranded

Chris Hale (17) and Chris Marrow (17) were exploring Nutty Putty Cave when they came to a small opening into a crawlway. Marrow went in first, followed closely by Hale. Marrow decided that the passage ended, but could not back out because Hale was behind him. Hale tried to exit, but found that he could not make it back through a constriction at the beginning of the passage. He was confined to a small chamber

in the crawlway, with Marrow trapped behind him, head-down in the sloping crawl. Authorities were called by other visitors to the cave who encountered the trapped pair.

When they arrived at the cave, rescuers found that the passage was so tight that only one person could get close to the stranded cavers. Rescuer Shay Lelegren spent six hours in the cave trying various techniques to get Hale through the constriction without success. When Lelegren became fatigued, Kory Kowalis took over, attempting to widen the passage with a rock hammer and providing encouragement to Hale to keep trying. After about four hours, Hale was able to squeeze out of the passage on his third try. Marrow had been lying head-down for over 14 hours by this time, and was exhausted. With Kowalis pulling him by one ankle, he was able to heave and squirm his way up the slope and out of the crawl. The two boys received only minor scrapes from their incident.

1. *Associated Press, "Utah Deputies free teens from cave," CNN Interactive, 29 July 1999.*
2. *Rodney E. Mulder, Incident report, 7 January 2000.*

Comments: Mulder reports that the cave is a popular destination, seeing more than 200 visitors each week. Most are equipped only with flashlights, as were Hale and Marrow. The cave has been the scene of numerous minor injuries, incidents, and escapades. Rescuers have been called to the cave repeatedly, but this was the first reported incident in which the victims were unable to get themselves out.

31 July Bowden Cave, West Virginia stranded, inadequate equipment

At about 3:00 p.m., Sharon Wright (27), a counselor at nearby Valley Vista Christian Camp, entered the main entrance leading a group of six kids (ages 10 to 19) from the camp on a trip to the upper Bear Heaven Entrance. The cavers were equipped with flashlights and hardhats, carried a communal pack with food and water, and were dressed in jeans and T-shirts.

In several hours of strenuous caving covering more than a mile of cave passage, including hundreds of feet of wading through the stream passage, the group reached the bottom of a 20-foot pit leading up to the Bear Heaven Entrance. Wright had expected to find an old handline rigged there for them to use in climbing the pit. Unfortunately, the rope had been removed. The kids were wet and cold, and they did not have enough batteries for their lights to allow them to retrace their route back to the main entrance. They sat down to wait for rescue.

When the group had not returned to the camp by 9:00 p.m. the camp director drove to the cave and called for help after finding their cars at the entrance. Rescuers responded and organized a search of the cave. Parties were sent into each entrance, and the stranded group was soon located. Rescuers rigged a haul system and pulled them out of the cave by 6:30 a.m.

Chuck Hempel, "Bowden Cave July 1999," West Virginia Caver, v17n5, October 1999, p. 9.

Comments: Hempel notes that the group had been in the cave earlier in the week on a shorter trip. They had a map of the cave and some information about the route, but were not properly dressed or equipped for the trip. Several of the younger kids were very cold by the time they were rescued. Wright did not check for the presence of the handline at the exit before starting the trip, and did not bring enough batteries for the lights.

Hempel also notes that the camp had used cavers for help leading such trips the previous summer, and that Wright had been rescued from the maze section of the cave some years earlier after getting lost.

14 August B&G Sinkhole, Utah stranded on rope

Rodney Mulder, Doug Zeddis, Wesley Gurney, and Brent Hobbs were visiting the cave to evaluate it for possible future rescue operations. They rigged the pit and Zeddis descended. When he reached the end of the rope, he found that it was still about 40 feet above the floor. He switched to his ascenders to climb back up and get another rope, but soon ran into difficulty when his ascenders became clogged with mud and would not grip the rope. After struggling to clean and use the ascenders, he gave up and called up to the others for assistance. The others rigged a haul system and pulled him back up. Zeddis was covered in cold mud and was very chilled, but was otherwise unharmed.

Rodney Mulder, Incident report, 14 August 1999.

22 August Sotano del Aire, Mexico fatality, stranded, rockfall

Christy Quintana (26), Miguel Angel Blanco Rocio Medina, Cuauhtemoc Sanchez, Sergio Sanchez-Armass, and Alfredo Silva arrived at Sotano del Aire in the mid-afternoon after a two-hour hike. They cleared rocks around the lip and rigged a rope in the 764-foot entrance drop. Blanco, Quintana, Medina, and Sanchez descended, while Silva and Sanchez-Armass remained on the surface.

At about 10:30 p.m., Quintana and Blanco were climbing out when a large portion of the left side of the lip area of the entrance collapsed into the pit. Quintana was about 130 feet below the lip, with Blanco a short distance below her on the same rope just above a constriction in the pit at -180 feet. Quintana was struck on the head, shoulders, and back by several large rocks. Blanco was on a flowstone ramp that placed him off to one side of the pit, and was not hit. Several of the rocks came to rest on the flowstone slope just below him in an unstable position. He climbed up to Quintana and found that she had been severely injured. She had been hit in the neck and lower back, and her legs were paralyzed.

After doing his best to stabilize and comfort her, Blanco decided that the best course of action was to climb out, rig a haul system, and pull her up. He passed her on rope and climbed to the top, reaching the surface at about 11:30 p.m. The cavers then rigged a haul system using the caving equipment that they had available. They had no pulleys or

rescue equipment, and had to make do with a straight haul with no mechanical advantage. Three large rocks at the lip were in an unstable position after the collapse, and had to be secured before they could begin.

By about 2:30 a.m. Quintana was about 12 feet below the lip. Blanco rappelled down to help get her over the lip and found that she had died. They tried to pull her the rest of the way to the surface, but were unable to get her body over the lip. Sanchez-Armass then made the two-hour hike back to the vehicle and went for help. Medina and Sanchez remained stranded at the bottom of the entrance pit.

By 11:00 a.m. a rescue team had arrived at the cave. They first removed the loose rocks at the lip, and then continued with the recovery. At about 2:00 p.m. rescuers were finally able to descend to the constriction 180 feet down and clear the loose rocks that had come to rest on the flowstone slope at the constriction. A rescuer descended to take food and water to Medina and Sanchez, who had been waiting for over 16 hours, and tell them it was now safe to climb. They reached the surface at about 5:00 p.m.

1. *Joe Ivy, "Sotano del Aire," The Texas Caver, v44n5, September/October 1999, p. 80.*
2. *Claire Osborn, "Georgetown spelunker killed at Mexico cave," Austin American Statesman, 26 August 1999.*

Comments: Quintana was struck on the head and lower back by several large rocks which fell more than 100 feet, resulting in fractures of her cervical and lumbar vertebrae, paralysis in her legs, and probably internal injuries as well. Her position on rope and in a remote backcountry location meant that hours would pass before she could receive necessary medical treatment. In his report on the incident, Ivy states that her fellow cavers did everything they could do, but were faced with an impossible situation.

Ivy also observes that Quintana's immobility while on rope made her susceptible to harness-induced pathology, known to cavers and climbers as harness-hang syndrome and also known as compression avascularization/re-perfusion syndrome. When a caver is hanging immobile in a harness on rope due to some condition such as exhaustion, unconsciousness, or paralysis, a serious medical condition arises. The mechanics of the syndrome are not fully understood, but it is thought to be related to impairment of circulation, resulting in shock and leading to unconsciousness in 15 to 30 minutes, followed soon after by death. As Ivy observes, Quintana needed to be off rope, lying down, and treated for shock within 10-15 minutes after her injury.

It is not known whether Quintana succumbed to internal injuries or to harness-induced pathology, perhaps after losing consciousness due to those injuries. It is worth noting, however, that it is vitally important to get an injured or unconscious caver off rope as quickly as possible, preferably within 15 minutes. Lowering the caver to the bottom of the pit, or performing a pick-off and rappelling with her to the bottom might be possible when circumstances permit.

Cavers should develop and practice these skills in order to have another tool and another option in such a situation. Sometimes it might be better to get the patient back down to the bottom, keep her warm and stable, and wait for help. In this case, given Quintana's spinal and internal injuries and the broken and constricted nature of the drop, descending the pit

might also have been fatal. Further, there is no guarantee that she would not have expired due to internal bleeding, spinal trauma, or other causes once off rope. It seems likely, as Ivy asserts, that her injuries were simply not survivable, regardless of the course of action chosen.

28 August Scott Hollow Cave, West Virginia caver fall

Philip Henry (37), Kim Hedges, Kenny Hedges, and Clay Whittaker had spent several hours touring Scott Hollow Cave and were on their way out when they lost the route, climbing up rather than down at a junction. They soon realized their mistake, and determined that they needed to get down to the stream level below.

Kenny Hedges climbed down and encountered other cavers, who confirmed that the stream route was the correct one. Some of the others did not like the looks of the climb-down, and searched for another way down. Henry was about 30 feet above the stream near the ceiling of the passage when he spotted an opening in the breakdown that he thought might provide a way on. He climbed through the opening to get a better look, but as he popped through and tried to sit down, he began to slide uncontrollably in slick mud. He fell about ten feet down the canyon, striking a ledge during his fall, before he was able to stop himself by spreading his arms and legs against the walls.

He came to rest about 20 feet above the stream, wedged in a chimneying position. The others heard his fall, and started to come to his aid. In the process, a large rock was dislodged and fell down to the stream, narrowly missing Kenny Hedges. Hedges was able to climb up to Henry and help him to get into a stable position sitting on a small ledge.

Henry had fractured four of his ribs in the fall, and was in a lot of pain. After some rest and evaluation, Hedges was able to help Henry make his way down to the stream. There they met another group which happened to include Daryl Trusty, a paramedic. Trusty examined Henry, and they discussed whether to send for help or try to self-rescue. Henry felt that he could make it out, and that he would rather start moving toward the entrance than sit and wait several hours for help to arrive. They headed out, and Henry was able to make it out of the cave with minimal assistance. Trusty accompanied him to the hospital, where he was treated and released.

Philip Henry and Kim Hedges, Incident report, 15 September 2000.

Summer 1999 Dead Mans Cave, Texas near-drowning

R. D. Milhollin and Michael Cunningham were among a group of cavers exploring Dead Mans Cave, the resurgence for Cave Without A Name. The cave is very wet, with deep water and low airspace in some sections.

Cunningham, a novice caver, had borrowed a wetsuit and waterproof electric lights for the trip. Another caver in the group had not worn a wetsuit and became chilled. He left the

cave in the company of two other cavers. Milhollin and Cunningham were comfortable and decided to continue.

Much of the passage was in neck-deep water, and in some areas the cavers had to maneuver along channels in the low ceiling between formations and solution features, with occasional low-air-space sections and duck-unders. As Milhollin was leading through one of the low sections, he heard some unusual sounds behind him. When he turned and looked back, he saw that Cunningham was underwater, struggling to find a spot with enough airspace to breathe. He was caught under some remnant ceiling projections in a space too small to surface, and was thrashing in the water but not making any progress.

Milhollin took a deep breath and swam back into the low area to help. He was wearing a swim mask, and was able to see Cunningham and grab his arm. He swam back toward larger passage, pulling Cunningham with him, until they could both surface. Cunningham had been underwater for some time, and was in distress. Milhollin was also shaken by the close call.

After several minutes, the cavers regained their composure, and Cunningham decided he would like to continue. They soon reached the end of the passage, and then carefully made their way back through the low areas and exited the cave.

R. D. Milhollin, Incident report, 30 July 2000.

Comments: Milhollin reports that the incident occurred when Cunningham's helmet-mounted light snagged on the ceiling, tipping his head back and forcing him underwater as he moved through the low-air-space. He observes that tipping the head to one side can help prevent this from happening.

11 September Ellisons Cave, Georgia stranded in pit

Bill Baus, Steve Collins, and five other cavers descended 586-foot Fantastic Pit, went through the Glub-Glub Crawls, descended 34-foot Mark's Pit, and made their way to the bottom of the cave. On the way out, they split into two groups of three. Baus and two others remained behind for some photography while Collins and the rest went on to climb the big pit.

After finishing their photography, Baus and the second group reached the bottom of Fantastic Pit just as the last climber in the first group was reaching the top. As Baus and his two companions were changing out of their wetsuits and preparing for the climb, they heard a whooshing sound and a loud "whack!" Their changing area was in a dry alcove well away from the main shaft, so they could not see what had fallen. They called to the top to ask what had happened. The reply that came back was, "Off rope!" "What fell?" they asked. "Rope," was the response. Voice communication is somewhat difficult in the 600-foot shaft.

None of them had shoes on at the time, and it was several minutes before anyone was able to go check on the rope. When they did, they were chagrined to find that the rope was not on bottom. They could hear the cavers above departing, and yelled for help, but were not heard. Since they were

expected to need several hours to climb the pit, de-rig, exit the cave, and hike to camp, they knew they would not be missed for quite some time. Stranded, they bundled up with dry clothing and settled down to wait. It was 1:00 a.m.

At 8:40 a.m., they heard Steve Collins arrive at the top of the pit as he returned to check on them. They explained their problem, and Collins pulled the rope up, untangled it, and lowered it back down. The three cavers climbed out, and the group exited the cave at 12:30 p.m.

William Baus, Incident report, 15 September 2000.

Comments: The rope had become snagged on the pack of the last climber in the first group. When he reached the lip, it was dislodged and fell back into the pit. Unfortunately, it snarled during the fall, and the end was left hanging more than 200 feet above the bottom.

Baus offers several observations on the situation. First, since they knew there had been a problem with the rope, the first group should not have left the top of the pit until they had confirmation from the group on the bottom that everything was OK. Second, one of the cavers on the bottom should have pulled on shoes and gone to check on the rope sooner, instead of taking their time to finish gearing up.

Baus also notes that another group had been in the cave earlier in the day and used the same rope. If the same thing had happened to the last climber of that unrelated group, the results could have been serious, since the six cavers would have been stranded for several days before being missed.

In general, cavers should make it their practice to check on and resolve any problems in rigging that occur before leaving whenever there are others below them who will be depending on that rigging. This may require that someone re-descend to make sure the rope reaches bottom. It is our responsibility to leave a safe rig for those who follow us.

19 September Knox Cave, New York stuck

Nigel Dyson-Hudson was moving through the Gun Barrel on his way into the cave when his knee became stuck in the slot in the bottom of the passage. He was moving through the passage with his right side down, pushing with his right foot. After about ten feet, he stopped to rest, pushed his pack ahead, and then had to lean forward to pull it back when it slipped down into the slot. When he started to move forward, he realized that he was stuck. His two companions had gone ahead of him, and he was now blocking the passage, so no one could go for help, and no one was likely to come looking until someone noticed their cars in the parking area.

He told his fellow cavers what had happened, and set to work to try to free his leg. After about 15 minutes, he had worked himself into a stooping position but had not made much progress. Suddenly, as he rolled to the left his knee came free. He shouted to let the others know, and backed out of the passage.

Nigel Dyson-Hudson, Letter to the Editor, Northeastern Caver, March 2000.

Comments: Dyson-Hudson got stuck in the same place where Carrie Shaffer got stuck on 24 July. The Gun Barrel is a keyhole-shaped passage, and it is easy for any caver to get a knee or leg jammed in the slot. Cavers had filled the slot with mud from a nearby dig after the previous incident, but recent rains had apparently washed it out and re-set the trap. One of the other cavers had gone through on her back to avoid the slot.

19 September
unnamed pit, Lawrence County, Indiana
“caver” fall, intoxication

Paul (48) was drinking with friends and decided to explore a cave entrance near his home. The entrance was a 30-foot pit, and Paul had no rope or vertical gear. Nevertheless, he took a flashlight and attempted to descend the pit. He fell about 20 feet, bounced on the dirt slope at the bottom, and fell another ten feet. He was not wearing a helmet. His flashlight was destroyed on impact.

Paul's friends called for help, and EMS and cave rescuers soon responded. Rescuers descended and found Paul unharmed, except for minor bruises and abrasions. He was fitted with a seat harness and hauled out of the pit. Once on the surface, he refused medical treatment.

Jim Johnson, Incident report, Jim's Cave Rescue Page, php.indiana.edu/~jkjohnso/cr1999.html, undated.

Comments: Friends don't let friends cave drunk.

26 September
Tongue River Cave, Wyoming
caver fall

Rescuers spent about eight hours retrieving a man from Tongue River Cave after he was injured in a fall. He was reported to have fallen about 50 feet while climbing near a waterfall in the back of the cave. Rescuers were aided by members of the Tongue River High School football team, who carried in supplies and helped haul the litter.

1. *Larque Richter, Sheridan Press, 27 September 1999.*
2. *John Gookin, Incident report, 13 April 2000.*

Comments: The cave is notorious for such incidents. Similar incidents occurred there in October 1998, November 1999, and March and April 2000.

25 October
unspecified cave near Eagle Rock, Missouri
caver fall, climbing hand-over-hand

Dale Jetton (35) and his nephew Mark Scallorn (16) used a thin nylon rope to descend hand-over-hand to the bottom of the 25-foot entrance pit and went exploring. When they tried to leave, Jetton, who is diabetic and had recently had gall bladder surgery, was unable to grip the rope and climb out. He reportedly fell four times while trying, suffering various injuries to his head and back. Scallorn tried to get Jetton to give him the keys to his truck so he could go for help, but

Jetton refused. Scallorn later told reporters, “My uncle don't loan his truck to anyone, so I just ran.”

When rescuers arrived, they placed Jetton in a litter and pulled him up the drop and out of the cave. The extraction took several hours due to the tight entrance. Jetton was semi-conscious by the time he was out. He was taken to a hospital where he was treated for hypothermia, shock, head lacerations, and a broken vertebra.

Michelle Bradford, “Spelunker waits hours for rescue,” Arkansas Democrat Gazette, 27 October 1999, p. 1.

Comments: The hand-over-hand vertical technique claims another victim. Apparently, he was not wearing a helmet either. We offer no comment regarding the truck situation.

30 October
Guffey Cave, Alabama
rockfall, broken legs

A caver named Art was injured about 1,000 feet into the cave when a rock broke loose and rolled across his lower legs, causing a compound fracture of the tibia and fibula of one leg and a possible fracture of the other leg. Some of his fellow cavers exited and called for help. Rescuers responded, placing him in a litter and carrying him to the base of the 25-foot climb in the entrance room. There he was hauled up the climb and out of the cave, reaching the surface about four hours after the accident.

Randall Blackwood, “Rescue at Guffey Cave,” Huntsville Grotto News, v41n8, December 1999, p. 5.

31 October
Devils Pocket Cave, Alabama
rockfall, anchor failure, caver fall

Doug Strait, Paul Aughey, Joe Corrado, and Andy Porter entered the cave and descended a 71-foot pit. A crawl led to the top of another pit, an offset 37-foot drop broken by a ledge 12 feet down. They rigged their rope to a group of fluted projections on the side of a house-sized piece of breakdown. Strait descended first, climbing down the first 12 feet to the ledge and then rappelling 25 feet to the floor.

Porter rigged in and rappelled to the ledge and had just started down the remaining 25-foot drop when a large section of the boulder they had rigged to broke free and fell towards the drop. Aughey had just started to climb down to the ledge, and was able to jump out of the way as the slab broke into pieces and tumbled into the pit. As the rig point collapsed, Porter was dropped about 15 feet to the floor of the pit.

Hearing the sound of massive rockfall above, Porter dove into a crack in the wall as chunks of the slab rained down. Fortunately, the largest piece of the slab, a chunk about four feet long, three feet wide, and 18 inches thick, landed on the ledge and stayed there. Porter was unharmed, and Aughey rigged the drop so that he and Strait could climb out.

Andy Porter, Incident report, 1 November 1999.

Comments: The cavers examined the place where the slab had broken off from the boulder and found that it had separated along a concealed mud-filled fracture. There was no

evidence of the fracture on the surface of the slab prior to the incident.

Porter notes that this was the third time he has had rigging fail while on rope, and that he has witnessed three other rigging failures involving other people. Cavers are advised to always inspect rigging and anchors very closely and with a suspicious eye. Whenever possible, use a back-up anchor “just in case.” Even “house-sized boulders” must be carefully inspected. In this case, ironically, Porter was able to avoid being hit by rockfall only because there was no backup anchor to keep him suspended in the pit.

6 November Tongue River Cave, Wyoming caver fall

Robin Paulekas (18) was on a high-school field trip when she fell about ten feet onto boulders in the cave. The fall occurred at about 1:30 p.m. She received a deep laceration on her head, as well as possible back injuries. The authorities were notified, and she was retrieved from the cave by rescuers from the Sheridan Fire and Emergency service, the Dayton Volunteer Fire Department, and Sheridan Area Search and Rescue. She was taken to a hospital, where she was later reported to be in intensive care.

1. *Larque Richter*, Sheridan Press, 8 November 1999.
2. *John Gookin*, Incident report, 13 April 2000.

Comments: Similar incidents occurred at this cave in October 1998, September 1999, and March and April 2000.

7 November unspecified Monroe County cave, Illinois caver fall

Philip Moss was sketching as he and three companions surveyed in virgin passage in a secret project cave. Moss walked over to look at a small waterfall that was coming out of an undercut in the passage. He was straddling the passage with his feet on two different ledges when the ledge under his left foot broke. He braced himself with his arms and his right leg to keep from falling. When he did so, his right knee was bent unnaturally. He avoided the fall, but suffered a strain injury to his knee.

It was very painful at first, but the pain diminished and he felt he could continue the survey. He soon found that crawling was very painful, so they decided to leave the cave. He made it out without assistance. When he removed his wetsuit, he realized that the neoprene had been providing a lot of support for his knee, and that he had suffered a serious injury. He went to a doctor, and was given an immobilizing brace to wear for a month. His knee ligaments had been strained, but not torn.

Philip Moss, Incident report, 15 December 1999.

11 November J-4 Cave, Pennsylvania caver fall

A group of students from a college class was exploring in J-4 cave when one caver fell at the Step Across. He reportedly tried to keep both feet on a small sloping ledge rather than leaning out to the opposite wall for support. He lost his balance and fell to one side, landing about 12 feet below. He suffered compression fractures of his lower vertebrae in the impact.

The injured caver was able to crawl a short distance, but could not make his way out of the cave. His companions sent for help, and rescuers from the fire department and the cave rescue team soon arrived. The injured man was placed in a litter and carried out of the cave. The extrication took about four and a half hours.

1. *Rob Martin*, “Late Night rescue in J-4,” *Nittany Grotto News*, v46n2, January 2000, p. 42.
2. *Bryan Crowell*, Incident report, 8 September 2000.

13 November Clarksville Cave, New York stuck, inexperience

Members of the Syracuse University Outing Club were leading a trip in Clarksville Cave for a Boy Scout troop. At about 3:00 p.m., a 13-year-old, 140-pound scout named Matt became stuck in the lower slot of a passage called The Snake. He was wedged in an upright position with his chest and stomach compressed. When his companions were unable to free him, help was summoned.

Rescuers received the call at about 5:15 p.m. and reached the trapped scout at about 6:30 p.m. They placed slings under his feet and raised him up, then piled rocks under his feet for him to push against. Eventually he was able to squeeze up into the larger tube at the top of the passage and crawl out. He made his way out of the cave on his own, exiting at about 9:30 p.m.

Chuck Porter, “Northeast News: Bad Day for a Chubby Scout,” *Northeastern Caver*, December 1999, p. 107.

20 November Cave Mountain Cave, West Virginia caver fall

Ken Tayman (51) and seven other cavers from the Franklin County Grotto were about 15 minutes into the cave when they came to a climb-down to a lower level. As he started to descend, Tayman leaned over to put his hand on the rock where his foot was resting. His foot slipped, and his hand missed the rock and he fell several feet, striking the wall with his left knee and then his face. When he tried to stand, his left leg would not support him.

With some assistance, Tayman was able to climb back up into the room above, where his injuries were examined. He had suffered lacerations to his lower lip and forehead, and an apparent fracture of his left leg just below the knee. He was

unable to walk, but once his knee was immobilized he felt he might be able to crawl to the entrance with some help.

The cavers started out, and some members of the group were dispatched to retrieve a stretcher and get help. As they made their way out, they met another group coming in which happened to include two EMT's. They checked Tayman's condition and directed the construction of a rope litter, which was then used to carry Tayman the rest of the way to the entrance.

On the surface, they once again checked Tayman's condition while waiting for the stretcher to be carried up the hill. Once it arrived, Tayman was strapped in and carried down the steep trail to the parking area and then driven to a hospital for treatment.

1. *Anne Sheppard, "Trip report, Cave Mountain, November 20, 1999," DC Speleograph, V55n12, December 1999, p. 8, reprinted from the Cumberland Valley Caver, v8n1.*
2. *George Clappison, "Rescue from Cave Mountain," The Baltimore Grotto News, v31n10, January 2000, p. 87.*

Comments: Tayman had two fractures of his left tibia at and just below the knee joint. He received stitches for the lacerations on his face and an immobilizing brace for his leg.

4 December Luminary Pit, Tennessee stranded in pit

Paul Putman (mid 30's) became stranded at the bottom of the 150-foot entrance drop when his rope was damaged by a sharp edge at the lip of the pit. A friend on the surface went for help, and the cave rescue team was called to the scene. They padded the sharp edge, rigged a new rope, and lowered it into the pit. Putman was then able to climb out on his own.

Earl Pelfrey Jr., Incident report, 7 December 1999.

Comments: Pelfrey notes that the incident could have been avoided if Putman had used a rope pad. It is not clear why the friend was unable to pull up the rope, tie a loop to isolate the damaged spot, pad the lip with some clothing or a pack, and enable Putman to climb out.

11 December Fern Cave, Alabama caver fall

Chris Hudson and three other cavers entered the Johnson Entrance at about 11:00 a.m. and proceeded down the West Passage, a canyon passage with multiple levels that requires chimneying and traversing along a series of ledges. About 1,000 feet down the passage, they came to a place where the floor dropped away to a ledge about four feet below, followed by another four-foot drop to a lower level. As Hudson crossed over the gap, he lost his balance and fell, striking the ledge and falling to the lower level. When he hit the ledge, he broke his arm.

The others quickly climbed down to help. Hudson had sustained a closed fracture of the radius and a displaced ulna. They splinted his arm using a rappel rack and some accessory cord and fashioned a sling out of a spare polypro shirt. Once

that was arranged, Hudson was able to exit under his own power. He was then driven to a hospital for treatment of the injury.

1. *Chris Hudson, Incident report, 12 January 2000.*
2. *Chris Hudson, "A Not-So-Uneventful Trip Into Fern Cave," Huntsville Grotto Newsletter, v42n4, April 2000, p. 7.*

Comments: The cavers did a good job of improvising a splint and sling for Hudson's arm.

12 December Marshall Cave, Virginia caver fall

A 25-year old man was injured in the back of the cave, requiring an extensive rescue operation. He was reported to have back, hip, and leg injuries. Rescuers worked through the evening to haul him up three short drops and carry him out of the cave. No other details on the nature of the accident and the man's injuries were available.

Dan McConnell, "Marshall Cave Rescue," DC Speleograph, v55n12, December 1999, p. 12.

23 December Sistema Tepepa, Mexico caver fall, flood entrapment

Two teams from the Société Québécoise de Speleologie (SQS) entered the TP4-13 entrance on 23 December to continue the exploration and survey of an area about one kilometer from the entrance. One team set off to explore a gallery at -350 meters, while the other team, comprised of Alain Goupil (32) and fellow team members Bastien Michau (25) and Eric Hamel (21), set about exploring passages at the -300 meter level. They planned to rendezvous at 8:00 p.m. and exit the cave.

At about 4:30 p.m., Goupil was moving sideways along a high canyon using small ledges and projections when a stalagmite that he was using as a handhold broke off the wall, sending him falling to the floor about six meters below. He landed on his right side and suffered injuries to his hip, side, and lower back.

Hamel witnessed the fall and rushed to Goupil's aid, calling for Michau. Michau heard the call for help and ran toward the scene of the accident. In his haste, he tripped and injured his right ankle. When they regained their composure, the cavers assessed Goupil's injuries. He had pain in his right shoulder, right elbow, left heel, and right leg, had a sprained left thumb, had significant pain on the right side of his lower back in the L5 region, had pain in his right hip, and could not lift his right leg.

Michau was dispatched to try to locate the other team, but returned unsuccessful after an hour and a half. He then left for the surface, marking the route as he went. Hamel remained with Goupil, and did what he could to make him comfortable.

Michau exited the cave in a little over three hours and reached base camp at 9:45 p.m. in pouring rain. He informed the other two expedition members of the accident, and the group began assembling supplies and making plans for the

rescue operation. One caver went back into the cave alone to take a stretcher, some supplies, and a cave radio unit to the accident site. The other two went to the village of Tepepa in the middle of the night to ask for help, and then returned to the base camp where they established a base station site for the cave radio system. Communication with the accident site was established at about 5:15 a.m.

At 6:00 a.m. on 24 December, an expedition member left base camp and went to the nearest village with a working telephone, which was about two hours away. There she encountered a group of seven cavers on their way to join the expedition. They tried unsuccessfully to reach a number of cave rescue contacts and organizations in the USA and Mexico, before finally reaching Michel Cadieux of the SQS in Quebec. Cadieux alerted authorities and cave rescue groups, including the Canadian Embassy in Mexico City, the Mexican Red Cross, and the NCRC. Members of these groups coordinated their efforts and worked through the night and the next day to develop a response and get the necessary equipment and personnel to the cave.

Meanwhile, the caver who had carried the stretcher and supplies to the accident site went searching for the missing pair from the initial group. They had been stranded by flooding, and had spent the previous 18 hours on a ledge in the stream passage waiting for the flood to subside. Informed of the accident, they accompanied the others back to the bivouac site established for Goupil.

On the surface, a large-scale rescue response was building, and by 25 December rescuers, soldiers, government officials, and spectators had begun to arrive. Very few of the would-be rescuers had any caving experience, and even fewer had any experience in deep vertical caves and European-style rigging. A member of the SQS expedition entered the cave to take supplies to the in-cave camp, including a sleeping bag and mattress for Goupil.

Rescue operations were complicated by language and cultural issues, and by the lack of experienced cavers and appropriate equipment. On 26 December, a Red Cross physician was eventually escorted into the cave and down to the camp, where he examined Goupil and determined that he had no broken bones. He administered injections of anti-inflammatory and analgesic medications to help alleviate pain and swelling from the soft tissue injuries.

On 27 December, a group of SQS cavers arrived from Quebec. Other cavers had also arrived, and several teams entered the cave to begin rigging haul systems at the pits and to carry a stretcher to Goupil. Progress was slowed by lack of equipment and the inexperience of many of the rescuers with vertical caving. Two Red Cross rescuers got separated from the group and were lost for several hours. At about 8:30 p.m., rescuers began moving Goupil toward the entrance.

By 28 December, the rescuers were making progress toward the entrance, and Goupil had recovered enough to get out of the stretcher and walk through some easy sections on his own. He was still not able to climb the pits, however, and had to be hauled up.

Early on 29 December, Goupil was raised up two pits in the stretcher, and was then able to get out and squeeze through a narrow section on his own. He felt well enough to suggest that he could use his seat harness to be hauled up the next drop without the stretcher. The group received word that there were

no more fresh rescuers on the surface to come in, and that they would have to wait 24 hours before continuing. Rather than spend another night in the cave, Goupil convinced the cavers with him that he could continue without the stretcher. After a meal, four cavers helped him continue the ascent through the night and the next morning. They reached the surface at 1:00 p.m.

Goupil and Michau were taken to a hospital for treatment. Michau's ankle was found to be badly sprained, with torn ligaments. It was placed in a cast, and later required surgery. Goupil was treated for contusions and infected lacerations. Upon returning to Quebec, he was diagnosed with a dorsal sprain, a crushed vertebral disc, and torn muscles in his back.

Alain Goupil, "Rescue in the Sierra Negra," Canadian Caver, v30n2, June 2000, p. 6.

Comments: The six-day multi-national rescue effort was complicated beyond description. The interested reader will enjoy Goupil's account. Of particular note is the successful use of the Nicola Cave Radio system, developed in France and loaned to the SQS expedition. Once the base station was set up on the surface and a unit carried to the accident site, two-way voice communication was available on demand, helping to coordinate operations, simplify logistics, and dispel confusion and uncertainty. Effective communication is invaluable in serious cave rescue operations. Note that Michau was injured while rushing to his friend's aid. Remember that a rescuer's first responsibility is to himself, for his own safety. Try not to complicate things by getting yourself hurt, too.

27 December Boy Scout Cave, Florida stranded, hypothermia

Michael Sharrow (15) and Javarick Henderson (16) were exploring Boy Scout Cave with a group of six other boys and two counselors from nearby San Antonio Boys Village when Henderson became stuck at a hairpin curve in a small crawlway. Sharrow went to help him, but lost consciousness. Their companions were unable to get them out and called for help. Rescuers worked for more than two hours to squeeze into the passage and pull the boys out. Both were taken to a hospital and treated for hypothermia.

1. *Josh Zimmer, Barbara Behrendt, and Kathryn Wexler, "Two trapped boys rescued from cave," St. Petersburg Times, 28 December 1999, p. 1.*
2. *Paul Aughey, "Boys Trapped in a Cave in Florida," TAG-Net Digest 2012, 29 December 1999.*
3. *Jay Landt, "Additional info on 'Two trapped boys rescued from cave'," TAG-Net Digest 2018, 4 January 2000.*

Comments: Aughey reports that the cave temperature is 72 degrees Fahrenheit, and that it is a dry cave not known to have any problems with low oxygen or bad air. Landt reports that the two counselors were not in the cave with the boys because "they were too big." He also notes that a campfire was reportedly involved, but it is not clear whether they group built a fire in the cave or outside the entrance. Even outside, it could have been a problem if the cave was breathing in. It is not wise to build fires in or near caves.

2000 Accident and Incident Reports

1 January

Queen Blair Cave, Indiana

lost, stranded, intoxication, inexperience

A man and a woman (ages unknown) arrived at the parking area for King Blair and Queen Blair Caves around midnight on New Years Eve wanting to go caving. They spoke with a local resident, who noticed their obvious intoxication and advised them against going into the caves. They encountered another group headed for Queen Blair Cave and decided to tag along. A few hours later, the other party exited without the inebriated couple. When the neighbors noticed that their truck was still in the parking area at noon, they became concerned and decided to report the incident.

Cave rescue personnel conducted a search of Queen Blair Cave and soon found the two. They were out of water, almost out of light, and almost out of vodka. They had been drinking water from the cave, and had burned some of their clothing in an attempt to "stay warm." The fire had produced a large amount of smoke in the cave. Rescuers led the two spelunkers, from the cave.

Jim Johnson, Incident report, Jim's Cave Rescue Page, php.indiana.edu/~jkjohnso/cr2000.html, undated.

Comments: Johnson notes that the two were lucky not to have been asphyxiated by the smoke and fumes from their fire.

4 January

Onyx Cave, Arizona

caver fall, broken leg

Curt Sather (43), Janice Sather (41), Greg Denker (44), Lindy Denker (14), and Elske Cast (14) were exiting Onyx Cave after an otherwise uneventful tour when they arrived at the Up and Down Room near the entrance. They used a handline to descend about 16 feet down a muddy flowstone slope to the bottom of the room. Greg Denker, who had been to the cave many times before and was the most experienced caver in the group, spotted the others as they made the eight-foot climb up to a crawl leading to the entrance room. He warned them to be careful on the climb, since tired cavers sometimes slipped there, almost at the cave entrance.

After escorting the group through the crawl, Denker went back to retrieve the rope. He descended into the Up and Down Room, climbed the flowstone slope, and removed the rope. He then elected to make the Balcony Traverse around the top of the room rather than repeating the climbs. As he stepped across the top of the eight-foot climb, his foot slipped and he fell, breaking his tibia and fibula as well as some ankle bones.

The other cavers came to Denker's aid. Upon consideration of the nature of his injuries, they decided to call for help. Rescue personnel responded, and Denker was placed in a litter, hauled up the climb, and carried from the cave to a waiting ambulance.

Rebecca O'Sullivan, Incident report, 8 May 2003.

Comments: O'Sullivan notes that some cavers make the step-across without protection, while others use a spotter or rig the climb with a rope or ladder. A belay or some form of protection is advisable when you are at risk of falling more than a body-length.

9 January

Emisine Cave, Hawaii

cut by sharp rock

Rene Rogers (24) was in a survey party as with a group of cavers working in Emisine Cave when her arm brushed against a sharp piece of lava projecting up from the cave floor, resulting in a 1.2-inch-long laceration. Her surveying partner, Marc Ohms, applied direct pressure for several minutes and was able to slow the bleeding. He then fashioned a temporary bandage using a plastic bag and some duct tape. The pair then went to find another survey party which they knew had a first aid kit. Cindy Heazlit used the kit to clean and bandage the wound. The cavers then resumed their survey work, and exited as scheduled.

Marc Ohms, Incident report, 11 April 2000.

Comments: Duct tape once again proves to be the Caver's Friend. Carrying a basic first aid kit is always a good idea.

12 February

Cemetery Pit, Georgia

stranded on rope, sharing equipment

Jordan (male, last named unknown) was a member of a group of 13 cavers visiting Cemetery Pit when he became stranded on rope in the 153-foot entrance pit. Several members of the group, including Jordan, did not have their own vertical equipment, so some members of the group were sharing gear. Jordan was using a makeshift rig assembled from borrowed gear which did not fit him correctly.

Soon after he started climbing, Jordan began having difficulty with the unfamiliar system. First, the bungee cord on his foot ascender broke. Next, the chest harness loosened and dropped down to his waist. He was using a two-ascender ropewalker system and did not have a third ascender or quick-attach safety ascender to allow him to stop and rest comfortably or fix the problems. When he became exhausted from his struggles, he was stranded on rope mid-way up the pit and began calling for help. As his strength ebbed, he was in danger of becoming inverted in his harness.

A caver rappelled down on another rope and held Jordan upright while another caver lowered a replacement chest harness. Another of the cavers waiting at the top of the pit had two pulleys in his pack, which the cavers used to set up a 3:1 Z-rig haul system. They were then able to pull the exhausted caver out of the pit.

- 1. Don Hunter, Incident report, 13 February 2000.*
- 2. Lori Schultz, Incident report, 20 February 2000.*

Comments: Each caver should have his or her own set of vertical gear. Raising and lowering shared gear at a pit is not wise, especially in a deep pit with multiple ledges, such as Cemetery Pit.

Every vertical caver should carry a quick-attach safety ascender while on rope, and know how to use it to negotiate lips and re-belays, change-over between ascent and descent, or to provide security while addressing an equipment problem. This is, in fact, one of the defining characteristics of an experienced and competent vertical caver. Carrying a couple of pulleys along for emergencies is also a good idea. The Z-rig is a simple and effective haul system requiring minimal equipment. Competent vertical cavers know how to build and use it.

12 February
Indian Grave Point Cave, Tennessee
stranded in pit, descended hand-over-hand

A male caver named Brian (last name unknown) became stranded after descending a small pit in the cave hand-over-hand. His companions called for help and cave rescue teams were summoned. Brian was soon extracted from the pit, and was able to exit the cave with minimal assistance

Brian Krebs, Incident report, 1 March 2000.

Comments: Krebs notes that the caving party had minimal experience and lacked proper caving equipment.

12 February
Sloans Valley Cave, Kentucky
stuck in crevice

Neil Tunison (47) was in Sloans Valley Cave with a group of about 20 Boy Scouts and 15 adults when his leg became wedged in a crevice. When efforts to free him failed, members of the party left the cave to call for help. Rescuers tied a rope around his leg and used a crowbar to lift and extract it from the crevice. Tunison suffered a hyper-extended knee and some bruising, but was otherwise unharmed.

Cindi Andrews, "Engineer returns after caving mishap," Cincinnati Enquirer, 15 February 2000.

Comments: Some would say that there were far too many people on this trip. At least there were enough adults to supervise the kids. One wonders how many of them were experienced cavers.

16 February
Jennings Cave, Florida
stranded in pit, inadequate equipment

Chris Sullivan (12) went exploring in Jennings Cave on a Wednesday afternoon with several friends. Most of the others had been to the cave before, but Sullivan had not. The youths were equipped with flashlights and some rope, but lacked proper caving equipment and training.

The boys descended the 20-foot entrance pit hand-over-hand and spend about 90 minutes exploring the cave at the bottom. When they were ready to leave, Sullivan, who

reportedly weighed in excess of 200 pounds, found that he could not make the climb out. His friends went for help, and Sullivan was soon rescued by members of the fire department. He was tired and scared, but unharmed.

1. *Ken Peakman, Incident report, 23 March 2000.*
2. *Christopher Lloyd, "Boy, 12, rescued from cave after nearly four hours," Ocala Star-Banner, 18 February 2000.*

17 February
Rattling Cave, Tennessee
difficulty on rope

Eric Britzke (27), a graduate student conducting research on bats, visited Rattling Cave along with companion Steve Reis to conduct a census of the cave's Gray Bat colony. It was Britzke's first visit to the cave, which has a 133-foot entrance pit. Britzke had difficulty climbing back up the pit and became exhausted. Reis, a longtime caver who often assists researchers on such projects, went for help. By the time he returned, Britzke had recovered and managed to complete his ascent to the surface.

"Tired student manages to climb out of Cocke [County] cave," Knoxville News-Sentinel, 18 February 2000.

Comments: The nature of the difficulty was not explained. Cavers, including bat researchers, should practice and develop their vertical skills above ground before descending 133-foot pits. It's also a good idea to have a few more experienced cavers on hand to help out when novice cavers are in the group, especially when rope work is involved

26 February
Grassy Cove Saltpeter Cave, Tennessee
stranded in pit

Three teenage boys were rescued after becoming stranded in a pit in the cave. One of their companions went for help, and rescuers were called to the cave. The rescuers rigged the pit and hauled the boys out without incident. No other information was available.

Buddy Lane, Incident report, 1 March 2000.

2 March
Tongue River Cave, Wyoming
caver fall

James Haskell (25) injured his leg when he fell about 10 feet from a ledge near the Boulder Room while exploring in an area several thousand feet into the cave. He was reported to be in satisfactory condition after being carried out of the cave by emergency services personnel. The rescue took about nine hours. No other details were available.

1. *Larque Richter, Sheridan Press, 2 March 2000.*
2. *John Gookin, Incident report, 13 April 2000.*

Comments: Similar incidents occurred in the cave in October 1998, September and November 1999, and April 2000.

11 March
Cass Cave, West Virginia
flood entrapment

Kevin Psarianos, Bill Murray, Diane Reichert, Ralph Johnson, and Mike Shaw entered Cass Cave at about 11:30 a.m., expecting to be in the cave about 8 to 12 hours. The cave consists of an entrance stream passage, part of which is a crawl, followed by a vertical drop and lower passages. Rain was forecast for the area, but the group believed that flooding was not a problem at Cass.

When the group attempted to exit the cave at about 9:30 p.m., they found that the stream crawl leading to the entrance was flooded. They set up a bivouac, placed markers to monitor the water level and waited for the water to recede. Eventually, the flood subsided and they were able to get through the crawl. They were then stopped by a 10-foot climb near the entrance with high water flowing across it. Once again they settled down to wait.

When they missed their call-in time of 8:00 a.m. Sunday, a group conducting a nearby NCRC training class went to check on the overdue cavers. Finding their car still at the entrance and high water flowing into the cave, the rescuers mobilized for a search along with Cass Fire and Rescue. As rescuers entered the cave, they met one of the missing cavers, who had managed to get up the climb and make his way out of the cave. The rescuers entered the cave, hauled the remaining cavers up the 10-foot drop, and escorted them from the cave. The cavers were out by 1:30 p.m. on March 12.

1. *Kevin Psarianos, Incident report, 19 September 2000.*
2. *Kevin Psarianos, "Incident at Cass Cave," Greater Allentown Grotto Pack Rat Scat, n77, Spring 2000.*
3. *Kevin Psarianos, "Cass Cave Rescue," West Virginia Caver, v18n3, June 2000, p. 7.*

Comments: [by Kevin Psarianos] This was a good day to pick another cave. The cave does have some potential for flooding and a similar incident occurred once before. The entrance passage is fed by a reasonably large and steep drainage basin, making it subject to flash-flooding. Likewise the weather forecast that morning indicated rain with a possibility of heavy rain.

It was an experienced party that discussed flooding potential both before the trip and as they entered the cave. Yet they perceived the risks as acceptable and chose to continue. This was clearly a mistake, and a more conservative decision would have been appropriate.

On a positive note, the preset call-in and the group's actions once the problem presented itself resulted in no injuries.

15 March
J-4 Cave, Pennsylvania
caver fall

A female caver fell while climbing the Formation Climb and landed on her back. She was briefly unconscious, but soon recovered and felt that she was not seriously injured. Her companions rigged a haul line, gave her a seat harness, and pulled her to the top of the climb. She was then able to make

her way out of the cave. She was driven to a hospital, where she was examined and released. She suffered only bruises.

Doug Moore, "Cave Rescues," West Virginia Caver, v18n3, June 2000, p. 6.

16 March
Birds Drop, Virginia
fatality, caver fall, no safety at pit lip

Paul David Snowburg (41) of Fort Chiswell, Virginia, was killed when he fell down the 150-foot entrance shaft of Birds Drop. Snowburg was accompanied by two teenagers, and had previously visited another nearby cave. The entrance, which is surrounded by a fence, is a sink which drops about 20 feet to a large ledge, followed by a drop of about 140 feet to a large room. Snowburg reportedly tied a flashlight to a rope and was lowering it down the shaft when he fell in. He was killed instantly. His body was recovered by rescue personnel.

1. *Doug Moore, "Cave Rescues," West Virginia Caver, v18n3, June 2000, p. 6.*
2. *Paul Montgomery, Incident report, 17 March 2000.*

Comments: Apparently, Snowburg was not affiliated with any organized caving groups or experienced cavers, and was not aware of proper safety procedures. Persons working within a body-length of the edge of a drop should always be wearing a harness and be belayed or rigged in to a solidly anchored caving rope.

24 March
Doe Mountain Cave, Virginia
caver fall, dislocated shoulder

Steve Wells and Steve La Pera entered Doe Mountain Cave on Friday evening to push to the top of the Mega Dome. About 100 feet up the infeeder going to the dome, Wells slipped and fell backwards a few feet into a crevice, dislocating his shoulder.

The pair spent several hours trying to reduce or secure Wells' shoulder so that he could exit the cave, but were finally forced to give up. At about 5:00 a.m., La Pera started out of the cave to get help. At 8:00 a.m., he reached the home of Bill Balfour, who called in several other cavers, including two with EMT training, and formed an initial response team to start into the cave.

The rescue group entered at about 10:00 a.m. carrying food and medical supplies. They reached Wells just before noon, provided him with food and medication, and were able to reduce his dislocation. After that, Wells was able to make his way out of the cave. He reached the surface at about 6:00 p.m.

Bill Balfour, "Giles County, Virginia Caving Accident," West Virginia Caver, v18n3, June 2000, p. 7.

6 April
Tongue River Cave, Wyoming
caver fall

Heather Focht (16) was injured when she fell about ten feet as she was climbing down near a waterfall in Tongue

River Cave. She was exploring with six high-school friends when the accident occurred. Focht sustained head and back injuries in the fall. She stood up immediately after the fall, but then had to lie down due to pain in her back.

Two of her companions left the cave to call for help while the others applied first aid and tried to keep her warm while they waited for help. They cut strips of clothing to make bandages and stop the bleeding from her head wound. Fire and rescue personnel responded, placing Focht in a litter and carrying her from the cave. She was then taken to a hospital where she was reported to be in stable condition.

1. *Larque Richter, "Teens get crash course in first aid," Sheridan Press, 7 April 2000.*
2. *John Gookin, Incident report, 13 April 2000.*

Comments: Similar incidents occurred in the cave in October 1998, September and November 1999, and March 2000.

8 April

Grassy Cove Saltpeter Cave, Tennessee caver fall

Randall Reynolds (42) and four companions were exploring near the Falls area in the cave when he lost his footing and fell while attempting to help another member of the group. Reynolds fell about 15 feet and broke his ankle. Some of his companions left the cave and called 911. The cave rescue team responded, splinting Reynolds' ankle and placing him in a litter for the carry-out, which included a vertical haul up the Chasm drop.

1. *Earl Pelfrey, Incident report, 13 April 2000.*
2. *"Man hurt in fall rescued from Saltpeter Cave," Crossville Chronicle, 11 April 2000.*

Comments: The cave is heavily visited by untrained and poorly equipped "spelunkers" and has been the scene of many similar incidents.

9 April

Thunderhole, Alabama stranded in pit, inadequate equipment

James Davis (23) and Ryan Cooper (24) of Stevenson decided to descend the 90-foot wet entrance drop of Thunderhole by climbing down with the aid of a thin cotton rope. They had no caving experience and no proper equipment. The men tied knots in the rope and descended hand-over-hand, expecting to climb out in the same fashion. Cooper eventually managed to make the ascent, and went to summon help for the stranded Davis. Members of the Jackson County Rescue Squad responded, rappelling into the pit with proper equipment for the stranded spelunker.

1. *Chastity Brown, "2 rescued from cave," Scottsboro Sentinel, 12 April 2000.*
2. *"Man who couldn't climb rope rescued from cave," Huntsville Times, 10 April 2000.*

Comments: Thunderhole is a deep, wet, multi-drop cave system—a serious proposition for experienced and well-

equipped cavers. These men were neither. Aubert Hastings, of the Jackson County Rescue Squad, was quoted in the news accounts, saying, "It was just pure stupidity on any grown person to go into a situation like that. It's a wonder either of them made it out." Hastings also commented, "They had no lights, no caving experience. I wouldn't have tied a dog up with the rope they used. It was just a miracle that their rope didn't break." Hastings was reported to have given the men a lecture after their rescue.

18 April

Cueva Chorreadero, Mexico lost, stranded, hypothermia

Canadian Jean Pierre Paucherou and Mexican Victor Ballinas were found dehydrated and suffering from hypothermia after spending more than 60 hours stranded in Cueva Chorreadero. The two men had reportedly become lost, and had been the object of a 3-day search by rescuers. Ballinas was reported to have helped rescue 35 Mexican university students who also spent three days stranded in the cave in May of 1999 when they were trapped by flooding.

Associated Press, "Canadian rescued from Mexican cave," 19 April 2000.

22 April

Mammoth Cave, Kentucky caver fall, broken ankle

While working in the Historic Section of Mammoth Cave on a restoration and clean-up trip, Pam Saberton (52), lost her footing at a rough spot on the trail and fell, fracturing her ankle in three places. Two of her fellow cavers, who were EMTs, were able to provide first aid by splinting her ankle and treating her for shock while others in the party went for help and a stretcher. Park personnel and volunteers carried Saberton out of the cave and drove her to a hospital for treatment. The next morning she underwent surgery to repair the ankle.

Larry Reece, Incident report, 15 May 2000.

22 April

W-Road Cave, Tennessee stranded in pit, inadequate equipment

Courtney Keith (14), Brad Campbell (15), Zack Brown (16), and Derek Gamble (16) entered the cave at about 11:30 p.m. Saturday night. The group had been stopped on a previous visit by a 30-foot pit about 100 feet into the cave. This time they brought a rope and intended to continue their exploration.

Using seat harnesses tied from short pieces of rope, Gamble, Keith, and Campbell descended. Brown decided to wait at the top. After a look around, the three tried to climb out. Using knots and loops tied in the rope, Campbell was able to climb out. Keith and Gamble, however, were not able to make the climb. Brown and Campbell tried to pull their companions up, but the small passage hampered their efforts,

as did loose rock around the top of the pit. Eventually, they decided to go out and get help.

The cave rescue team was called at about 4:00 a.m. on Easter Sunday morning, and arrived at the cave about an hour later. Poor rock near the pit prevented the rescuers from setting additional anchors and rigging a haul system, so the knotted rope was replaced with a proper caving rope and a rescuer descended with extra climbing systems, showed the stranded pair how to don and use the equipment, and supervised as they climbed out on their own. The stranded cavers reached the surface at about 9:00 a.m.

Buddy Lane, Incident report, 28 April 2000.

Comments: The teenagers had no training or experience and lacked proper caving equipment including helmets, seat harnesses, rappel devices, and climbing systems. Two of the boys were wearing jeans and no shirts, in spite of the low temperatures. Three of the families of the kids reportedly knew of their plans, and allowed them to go.

29 April Climax Cave, Georgia histoplasmosis

Paul Aughey, Alan Cressler, David Cole, Doug Strait, Keith Henry, and Brent Aulenbach visited Climax Cave, planning to tour most of the known passages, including the south section of the cave, which is home to a large bat colony. They did not plan to traverse the area used by the bats.

When they reached the Dream Room, however, they discovered that the bats had relocated and taken up residence in that part of the cave, blocking their intended route. They found themselves in a hands-and-knees crawlway in 8 to 10 inches of fresh guano, with a strong odor of ammonia. All of the cavers found themselves sweating and breathing hard. Suspecting bad air, they decided to turn back after about 30 feet.

Retreating from the bat-filled passage, they left the southern section of the cave and spent the remainder of their time touring the northern portions without incident. About ten days after the trip, Strait, Cressler, and Aulenbach developed persistent coughs and fevers, and sought medical treatment for histoplasmosis. Aughey also reported symptoms including shortness of breath. All of the cavers recovered from the illness, and none required hospitalization

Paul Aughey, "Histo Alert!" Tag-Net Digest 2144, 11 May 2000.

Comments: Histoplasmosis has been contracted by cavers visiting Climax Cave on several previous occasions. In most cases, the affected cavers had visited the south section of the cave, which harbors a large bat colony. The cavers on this trip were aware of this, and did not intend to enter the bat roost area. That did not help them, however, when they encountered the bats in an unexpected location. One must consider the risk associated with visiting caves or passages known to harbor the *Histoplasma capsulatum* fungus.

30 April unspecified cave, Sevier County, Tennessee caver fall

The rescue of a person from a cave near Wears Valley by the Sevier County rescue squad on April 30 was reported in the Knoxville *News-Sentinel* on May 1. According to the report, a person had fallen 50 feet in a cave and was trapped. No other details were published.

"Wears Valley cave rescue try," Knoxville News-Sentinel, 1 May 2000.

13 May unnamed cave, Washington rockfall entrapment

Mike Fraley, Steve Sprague, Dave Hopf, and Larry McTigue were exploring a new cave they had recently discovered. As Fraley walked through a narrow section of passage, a 200 to 300 pound rock came loose from the wall and fell against him, landing in his lap and pinning him against a boulder. Fraley's companions quickly came to his aid and were able to lift the rock enough to let him slide out from under it. He escaped with torn coveralls and a deep bruise on his right leg caused by the weight of the boulder.

Mike Fraley, "Ridge walking, a pit, and a cave accident," Cascade Caver, September 2000, p. 31.

Comments: Fraley observes that he could not have lifted the rock and freed himself without assistance, and notes that this is a good example of why one should not cave solo.

20 May O-9 Well, Texas caver fall, broken ankle

Ken Kamon was the last person down a drop in the cave, and was moving quickly to catch up with the group when he realized he was off-route and about 30 feet above the other cavers. As he made his way down, he slipped, slid about ten feet, and then fell through a hole and down another 20 feet before coming to rest. He was briefly stunned by the fall, and found that he had injured his right ankle.

Kamon was able to make his way out of the cave, climbing pits of 40 and 90 feet using his left leg. Believing the ankle to be merely sprained, he did not seek medical treatment until nine days after the accident. A visit to the doctor revealed that he had in fact broken his leg in several places.

Ken Kamon, "What I learned from breaking my leg in O-9 Well Cave," The Hole News, Permian Basin Speleological Society, July 2000, p. 1.

Comments: Kamon notes that he was distracted and "spacing" before and during the trip, and that he had been preoccupied and not communicating with the other cavers regarding the route or his situation before the accident.

Spring Cueva Alfredo Jahn, Venezuela histoplasmosis

A large outbreak of histoplasmosis occurred when a group of 34 students and a teacher visited two chambers occupied by bats in Cueva Alfredo Jahn. Members of the group entered the cave for about 20 minutes each (on average) to make observations and collect soil and rock samples for a science project.

Twenty students, ranging in age from 15 to 18, and the teacher (39) became acutely ill after the trip. Symptoms appeared within 10-28 days (on average 14 days) of the trip, and included fever, coughing, headache, nausea, vomiting, rash, abdominal pain, chest pain, shortness of breath, and muscle pain.

Jaime R. Torres, "Histoplasmosis, Cave-Associated – Venezuela (Miranda)," www.promedmail.org, 10 July 2000.

Comments: The cave is reported to be the second longest in Venezuela, at 4,292 meters long and 67 meters deep. It is very popular with tourists and school groups. Two previous cases of histoplasmosis have been reported following visits to the cave during the previous two years.

27 June Fieldhouse Cave, West Virginia caver fall from ladder, no belay

Ed Lucas, Angela Lucas, and Dave Jewel left the 2000 NSS Convention to visit Fieldhouse Cave. As they prepared to enter the cave, another group of five cavers from the convention arrived, led by Bill Biggers. Lucas's group rigged a rope in the 17-foot entrance pit, which is followed by a short slope and another 10-foot drop.

The Lucas group rappelled in and went off to explore the cave. The Biggers group rigged the entrance with a cable ladder and a belay line and used the ladder to descend and enter the cave.

When the two groups began exiting the cave, Biggers found that he was unable to complete the ladder climb to the surface, apparently lacking the strength to pull himself over the lip at the top. He climbed back down, but became snagged when one of the speed lace hooks on his boots became caught in the cable ladder.

One of the members of his group tried to steady Biggers while another worked to free the snag. Biggers lost his grip and fell from the ladder, knocking one of the cavers against the wall and landing on top of the other. Fortunately, no one was injured by the fall. Lucas and companions then climbed out of the pit and belayed the other cavers as they climbed the ladder. Several needed help getting over the lip, but all eventually reached the surface safely.

Ed Lucas, Incident report, 15 November 2000.

Comments: Climbing a cable ladder is not as simple as one might think. It requires significant upper body strength—more than that required for prusikking—especially when climbing a free-hanging ladder or negotiating a difficult lip. A belay should always be used for cable ladder climbs and descents.

Biggers had no belay because he was the first to climb, and he had not rigged the belay so that it could be used from below for the first caver up. With proper rigging, the last climber down and the first climber up the ladder can also enjoy the security of a belay. Most US cavers favor the use of single rope techniques over ladders, even for short drops. If you're going to use cable ladders, learn to rig and use the "slingshot" bottom belay and the self-belay, as well as the standard belay.

1 July Big Springs Cave, West Virginia caver fall, dislocated shoulder

Jeff Lydic (44) was traversing a narrow canyon passage about seven feet above the floor when his foot slipped off a ledge. He fell about a foot or two before he was able to stop the fall with his right hand, but the impact resulted in dislocation of his right shoulder. His caving partners helped him climb down and assisted him as he made his way out of the cave. They were only about 40 feet from the entrance gate when the accident occurred. Lydic was then driven to an emergency center for treatment.

1. *Jeff Lydic, Incident report, 7 July 2000.*
2. *Scott Fee, Incident report, 5 July 2000.*
3. *Doug Moore, Incident report, 5 July 2000.*

4 July Greenville Saltpeter Cave, West Virginia caver fall

A woman (mid-40's) visiting the cave with a group from Appalachian Bible College slipped just inside the Saltpeter Entrance and fell, breaking her leg. She was only about 30 feet inside the cave and still in the twilight zone when the accident occurred. Local cavers and rescuers were called, and she was brought out without difficulty and taken to a hospital.

Bob Liebman, "Another Accident at Greenville Saltpeter," Monroe County Mudslide, v3n8, August/September 2000, p. 5.

Comments: Liebman reports that it had been raining all morning and that the entrance area was slippery due to the water.

5 August Nielsons Cave, Utah rockfall

Andrew Howe (31) was on rappel and clipped in to a bolt while passing a re-belay about 100 feet down in the entrance pit when he heard a warning call of "Rock!" from the cavers above. He was struck on the neck and shoulder by a baseball-sized rock, which then landed in his lap. He sustained bruises and abrasions, but no serious injury. After placing the rock on a nearby ledge, he continued his descent

Andrew Howe, Incident report, 8 August 2000.

Comments: Howe notes that loose rock is often a problem at this pit.

12 August
Clarks Cave, Virginia
caver fall, dislocated shoulder

Kristen McCombs (29), Toby Joy (29), and Mike Peery entered Clarks Cave at about 2:00 p.m., and were about one hour into the cave when Joy stepped down off of a rock and lost his footing. He attempted to catch himself with his right hand, but the force of the fall caused the posterior dislocation of his right shoulder. McCombs and Peery used some webbing to fashion a sling for Joy's arm with webbing. Once the injured arm had been immobilized, they assisted Joy in exiting the cave. The trip out took about three hours.

At the entrance, the webbing was replaced by a sling made from a knee pad and pack straps. The webbing was then used to attach Joy to Peery so that Peery could assist him up the steep slope to the cars. The ascent of the slope took another hour. Joy was then taken to the local hospital in Hot Springs where he was treated for the dislocation.

Kristen McCombs, Incident report, 8 September 2000.

Comments: The group showed good initiative and resourcefulness in executing a self-rescue. As a result, Joy reached the hospital much sooner than he probably would have if the group had sent for help and awaited its arrival. Joy had previously dislocated the shoulder while playing football 12 years earlier.

12 August
Wind-Ice Cave, Wyoming
stranded, inadequate equipment

Four men in their 20s were rescued from the cave after becoming stranded when they were unable to find the route through to the lower Wind Cave entrance during a pull-down trip through the cave. They entered the upper Ice Cave entrance at about noon on Saturday, and rappelled four drops to reach the middle section of the cave. When they reached a wet section which required wading through cold, waist-deep pools, they decided they were in over their heads and turned around.

The men made it back up two of the drops, but could not climb the longest drop in the cave—a 50-foot ice-covered pit. Stranded, they waited for rescue, which came late Sunday afternoon after they were reported overdue. Rescuers entered the cave and rigged the first two drops, finding the men waiting at the bottom. They were able to climb out on their own, but lacked crampons and required assistance through the ice-coated entrance passages in order to exit the cave.

Dina Mishev, "Team finds, rescues unprepared cavers," Jackson Hole News, 16 August 2000, p. 8A.

Comments: The cave has been the scene of several similar rescues in recent years. The middle section of the cave is complex, and cavers are advised to go in the company of someone familiar with the connection route.

15 August
talus cave at Pine Mountain, New Hampshire
stuck

Andrea Davis (15) was attending a church camp and was a member of a group of campers who set out on a caving trip at about 2:00 p.m. on Tuesday afternoon. The group was exploring several small talus caves near the base of Pine Mountain when Davis' left leg became wedged in a crevice. When her companions were unable to help her get free, they called for help.

Firefighters and other emergency services personnel spent the night drilling, chiseling, and chipping away at the granite in order to free Davis. She was finally released after about 12 hours in the cave. She suffered no injuries from her entrapment.

Lorna Colquhoun, "Her leg just wouldn't budge," Manchester Union-Leader, 17 August 2000.

19 August
Bat Cave, Kentucky
caver fall

While on a commercial tour of Bat Cave, a woman fell and sprained her ankle. One of the tour guides left the cave to get help, and encountered a group of Ezzo Grotto members at the entrance, where they were working on a project to remove an old gate from the cave. The grotto members, along with a group of Boy Scouts who were also engaged in clean-up and conservation work at the cave, carried the woman out of the cave, and her husband drove her to a hospital for treatment.

Cindy Duncan, "Ezzo Grotto Trip Report," West Virginia Caver, v18n6, December 2000.

August
Duffield Cave, Pennsylvania
stuck, hypothermia

A young female caver (age unknown) became stuck in a tight spot while on a youth group outing at the cave. Her friends were unable to free her, and alerted the landowner, who called 911. A large-scale response by police, fire, and other emergency services personnel resulted. Eventually, local cavers were called in as well. The girl was finally freed after about four hours by the removal of most of her clothing and a liberal application of cooking oil. She suffered mild hypothermia, but no injuries.

Douglas Moore, Incident report, 8 September 2000.

2 September
Gruta del Palmito, Mexico
caver fall, dislocated shoulder

Allan Cobb (37) was working in the cave as a part of a cave restoration project when he slipped and fell while walking down a slippery flowstone slope in the Cathedral Room. In trying to arrest his fall, he hyper-extended his arm and dislocated his right shoulder.

Because of distance from definitive medical care, an infield relocation of shoulder was attempted. After 45 minutes, the dislocation was reduced and his arm was immobilized in a sling. Cobb was then able to exit the cave. He was then driven to San Antonio, Texas for treatment.

1. *John Hickman, Incident report, 1 October 2000.*
2. *Allan Cobb, "Accident at Bustamante," Cave-Tex Digest 224, 5 September 2000.*
3. *Allan Cobb, Personal communication, 3 October 2000.*

7 September Sulfur Cave, Colorado hypoxia, bad air

Brian Bank (18) and three companions entered the cave by climbing down into the entrance from an adjacent railroad grade. The cave is well-marked with signs warning of dangerous gases within. When they began having trouble breathing, the group attempted to leave the cave, but Bank did not make it out.

His companions made two unsuccessful attempts to retrieve him before calling the fire department. Rescuers found Bank unconscious about 75-80 feet inside the cave. He was initially unresponsive, but revived after being given oxygen. He was then taken to a hospital for treatment.

Richard Rhinehart, "Briefly: News and Notes regarding Caves and Karst," Rocky Mountain Caving, v18n3, Summer 2001, p. 6.

Comments: Rhinehart notes that geologists believe that the cave contains a high concentration of carbon dioxide under certain conditions, and that the cave is rumored to have claimed the lives of at least two visitors.

16 September Great Saltpeter Cave, Kentucky struck by thrown cyalume stick

During a cavers' gathering at Great Saltpeter Cave, a group decided to tour the cave using cyalume light sticks rather than conventional caving lights. The cave has been used as a social gathering place for many decades and is a former show cave, with large easy passages and flat floors.

When the group reached the Big Room, some cavers were playing with their light sticks, swinging, twirling, and tossing them about the room. Stephanie Caldwell (32) was injured when she tossed her light stick into the air, missed her catch, and was struck in the eye. The next morning, she noticed that her eye had been bleeding, and applied antibiotic eye drops. She later sought medical treatment.

Sandy Rice, Incident report, 24 September 2000.

Comments: Playing catch in the dark cave environment is probably not a good idea.

30 September O-9 Well, Texas fatality, caver fall, belay system failed

Joe Ivy (35) and Tim Stich entered O-9 Well in the company of 16 fellow cavers. They descended the 127-foot entrance drop and five more pits to reach a large room with a high dome at the bottom of the cave, where they had been working on a bolt climb. Their goal was to reach an apparent infeeding passage visible about 165 feet off the floor. On their previous trip, the pair had left a fixed line for their return.

The climbers used a belay system comprised of a Kong Slyde shock-absorbing device anchored to two bolts and attached to a 9-millimeter static caving rope. They had used this arrangement on their previous trips, attaching themselves to the end of the 9-millimeter line with their climbing system ascenders after climbing the fixed line to their previous high point. The arrangement allowed the lead climber to self-belay as he worked, and had held two falls on the initial trip.

For belay anchors and fall protection, they employed a combination of fixed expansion bolts and a new device called a "removable bolt." The removable bolt is a spring-loaded camming device that is inserted into a standard expansion bolt hole, but can be removed and re-used during the climb. It is available in various sizes, including 1/4-inch and 3/8-inch versions. On a previous trip, Stich had fallen when a 1/4-inch removable bolt pulled out unexpectedly, so they had decided to use only the 3/8-inch size. Their normal practice was to alternate placing removable bolts and fixed expansion bolts, never placing two removable bolts in a row.

Ivy took his belay and bolting equipment and climbed to the top of the fixed line, where he set up his belay system. He attached himself to the 9-millimeter static line with the Croll ascender on his seat harness, and began working on the climb. He climbed about 20 feet before deciding to come down to take a break and eat while Stich took a turn.

Stich ascended the fixed line and then switched to the 9-millimeter rope, belaying himself in the same fashion as Ivy had. It was his practice to attach both of his ascenders to the belay line rather than just the Croll, as Ivy usually did. Continuing the climb, Stich placed bolts and moved up until he reached a point about 15 feet below the passage that was their destination. He did not have enough bolt hangers to complete the climb and had become tired, so he decided to go down. He set two bolts to anchor the fixed line and descended, removing hangers and carabiners from the bolts below.

On bottom, Stich gave the bolting equipment and hardware to Ivy, and informed him that the belay rope might not reach to the top of the climb. Ivy coiled an extra rope and attached it to his to his harness, then climbed up the fixed line. He soon disappeared from view. As Stich waited below, he could hear other cavers from the group approaching, and could see the dim glow of Ivy's headlamp far above.

After some time, Stich heard what sounded like a brief exclamation from Ivy, followed by a loud, resounding crash. Stich called up to Ivy, but heard no response. He could no longer see Ivy's light above him. One of the approaching cavers, Sarah Springer, heard Stich shouting and called out to him. Stich told her that they needed help, and Springer passed the word to others in the group, who started for the surface.

By this time, Stich could hear Ivy moaning somewhere above. He donned his climbing gear and started up the fixed line. He found Ivy wedged in a slot in the wall about 100 feet off the floor. He had apparently fallen somewhere between 40 and 60 feet, hit a steep, sloping ledge, and become wedged in a slot above a muddy ramp.

Stich climbed above the slot and then climbed down to reach Ivy. He immediately noticed that Ivy was not attached to any rope. Fearing that Ivy might come out of the slot and fall to the floor, Stich quickly tied a loop in the rope below himself and attached it to Ivy's harness. Ivy was conscious but clearly had serious injuries. He told Stich that he couldn't breathe, and that his arm hurt. Stich could not pull Ivy out of the slot, but was able to move him down the top of the muddy ramp below, where a small ledge allowed him to gain purchase while he tried to tend to Ivy.

It appeared that Ivy's difficulty breathing was being caused by his harness, which had ridden up around his chest. The harness was a butt-strap design of Ivy's own making, and did not have a strap between the legs to prevent it from riding up. When he was unable to remove or loosen the harness, Stich realized he had to get Ivy down as quickly as possible.

Unfortunately, the rope had become wedged in some chockstones as Stich had climbed down to reach Ivy. Not realizing the situation, Springer had gotten on rope below and was climbing up to assist. Stich called down to her and told her to get off the rope, but she was too high up, and did not know how to change to rappel. She climbed up to the slot, where Stich helped her get onto the ledge and attach herself to the rope above Ivy, who had lost consciousness, but was still breathing. They tried to pull him up out of the slot and onto the ledge, but were unsuccessful.

Stich pulled the rope down from the chockstones, got himself out of the slot and prepared to rappel to the floor with Ivy below him, attaching his cow's tail from his own harness to Ivy's. By this time it had become apparent that Ivy was no longer breathing. Stich maneuvered him out of the slot and rappelled to the bottom.

He was met there by Charley Savvas and Frank Delgado, who had come to help. Savvas had a knife, and they used it to cut Ivy's harness loose. They administered CPR, but could not revive him. More cavers arrived with a Sked litter and other rescue gear. Working late into the night, the cavers moved Ivy's body up four rope drops and through the cave to the bottom of the second drop before becoming exhausted. They left the cave at 3:00 a.m. to get some rest. A fresh team entered on the following day, and Ivy's body was recovered from the cave at about 4:00 p.m.

1. Peter Sprouse, "Accident Report on the Death of Joe Ivy in O-9 Well, September 30, 2000," www.texasropescue.com/library/09report.html.
2. Janet Jacobs, "Central Texas explorer dies after falling 40 feet in cave," *Austin American-Statesman*, 3 October 2000.
3. Heather Millican, "Man dies in cave," *San Angelo Standard-Times*, 2 October 2000.

Comments: The above summary is taken from a detailed report and analysis prepared by Peter Sprouse and others involved in the investigation of the accident. Following a description the events of the 30 September trip and an

extensive discussion of the climbing techniques and equipment used, the report offers some possible scenarios for the accident and the group's conclusions as to its causes.

No one knows exactly what happened at the top of the climb to cause Ivy's fall, but it is thought that he had placed one or possibly two anchors before falling. Whether the fall was precipitated by a removable bolt pulling out of its hole is unknown, but the earlier incident suggests that it is a good possibility. The muddy cave environment is known to interfere with the operation and security of spring-loaded camming devices of the type used in climbing.

When Ivy fell, his belay system suffered a severe shock load. As the system tried to absorb the load, his climbing harness was pulled up around his chest, where it later interfered with his breathing. When the energy of the fall exceeded the amount that the belay system could absorb, the Croll ascender stripped the sheath from the 9-millimeter rope and cut through the core. The belay rope was severed, and Ivy fell more than 40 feet. As he fell he struck the wall and landed in the slot, sustaining major injuries to his head, neck, back, arms, and internal organs.

Investigators believe that Ivy had moved the Slyde belay device up to the higher anchor close to the top of the climb. This meant that there was less rope between the belay anchor and the falling climber, increasing the severity of the shock load on the belay system. The use of 9-millimeter static caving rope as a belay line rather than the more typical 10-millimeter or 11-millimeter dynamic climbing rope also significantly reduced the system's ability to absorb the shock of the fall.

The use of a mechanical ascender to attach the lead climber to the belay line was also significant. Ascenders have been known to damage and even cut ropes under high static loads, and have been demonstrated to cut ropes when shock-loaded, as is the case in a lead fall. They should not be used as belay devices.

The conclusions from the published accident report are worth repeating:

"A mechanical ascender should never be used as a primary part of a belaying system, no matter how many subsequent devices are added to absorb the energy of falls. Dynamic rope of 10-millimeter or larger diameter should always be used for belaying leader climbs; static rope is unacceptable."

"RBs, if used at all, should be used with extreme caution, as they seem to perform poorly under the often wet/muddy conditions of a cave."

"The fact that some falls of lesser force had occurred before the accident led the climbers to feel that the belay system was adequate, however these falls were too few to actually validate the technique. Planning an ascender belay that was believed would 'only' result in the stripping of the rope sheath was poor judgment from the start. Joe's death was due to his own actions and the judgments he made in designing his belaying system. No piece of gear failed in a way that was not known to happen. The belaying system design was perilously flawed in that it did not allow for the force of a fall factor 2 fall. A belay system should be designed to handle the maximum fall possible, which is an FF2 fall. The good performance of the belaying system on gentler falls prior to the fatal fall helped foster a sense of complacency in the climbers. Overconfidence kept them from continually questioning their system and methods."

19 October Mammoth Cave, Kentucky lost, stranded

Richard Swerling (55) of Baltimore, Maryland, traveled to Fort Knox with his daughter to see his son-in-law graduate from boot camp. On Thursday, October 19th, he told his daughter that he was going to take a cave tour in the park and do some hiking on Friday and that he'd be back later the same day. When he failed to return that evening, his daughter reported him missing.

Rangers were notified by military police at Fort Knox and found Swerling's vehicle in the visitor center parking lot. They determined that he'd purchased a ticket for an 11 a.m. Grand Avenue cave tour and that he should have been out of the cave by 3:00 p.m. After confirming that he was not staying at the campground or hotel, rangers began searching all the trails in the headquarters area and a portion of the Green River. No sign of him was found.

While rangers brought in search dogs and continued their surface search, Swerling was found in the cave by members of the Saturday Grand Avenue tour group. He said that he'd fallen behind his tour group the day before while taking pictures; before he could catch up with them, the lights went out. Since he had no flashlight or other light source, he decided to remain at that location and wait for the next tour to come through. Swerling spent the next 24 hours in total blackness by himself, since only one Grand Avenue tour is scheduled each day.

Swerling said that the 54 degree cave temperature was not a problem because he had warm clothing on, but that he sang every song he knew in order to cope with the darkness and isolation.

Bob Piontek, Incident report, 25 October 2000.

3 December Snail Shell Cave, Tennessee stranded, hypothermia, inadequate equipment

Tony Jones (22), Joe Carpenter (24), and Kyle McDonald (23) entered the downstream section of Snail Shell Cave at about 2:00 p.m. on Sunday afternoon, wearing jeans and sweatshirts, and carrying inner tubes to use in crossing deep pools found in the cave. Each one was equipped with a life jacket, a paddle, a helmet, and a single light, with no back-up lights.

The trio made their way down a passage until they reached a 20-foot drop, where they rigged a knotted piece of inexpensive nylon cord. They tossed their inner tubes down the drop to a deep pool at the bottom, and then lowered themselves hand-over-hand.

The men paddled around and explored to the end of the passage, where they could not find any way onward. Paddling back to their rope, they quickly discovered that they were unable to climb back up the 20-foot drop. Eventually, Jones managed to haul himself up and went out to get help for the others.

Rescuers entered the cave at about 8:40 p.m. and reached the stranded men, who were sitting on a ledge out of the water, at about 9:00 p.m. The rescuers rigged a haul system and lowered climbing harness to the two men as they prepared to haul them up the pit. When the men were unable to figure out how to don the harnesses, a rescuer rappelled down to assist. The men were then quickly hauled up the drop and escorted from the cave. They were taken to a hospital, where one of the men was treated for hypothermia, fatigue, and dehydration.

1. *David Russell, Incident report, 8 December 2000.*
2. *Jessica Carter, "Cave rescue at Snail Shell: Emergency units find men hours after ordeal began," Murfreesboro Daily News Journal, 4 December 2000.*

9 December Pink Lime Pit, Utah stranded on rope

Jeremy Jackson, Ralph Powers, Megan Porter, and Jacob Snedecor, along with three other cavers, went to Pink Lime Pit to practice single rope techniques. Three of the cavers were new to vertical caving, one caver had not been on rope in some time, and the remaining three were experienced in rope work.

After making several adjustments to his climbing system, Jackson began his ascent. Apparently, the system was not configured or functioning properly, because he was unable to keep himself upright as he climbed. Jackson managed to climb only about 15 feet before becoming exhausted. He then found that he was unable to change over to rappel and get back down.

Since there were several ropes rigged in the pit, Ralph Powers got on another rope and climbed to try to help Jackson perform a change-over. Jackson was too exhausted to complete the maneuver, even with assistance, so Powers was forced to perform a pick-off. He attached a daisy-chain sling between his own harness and Jackson's, then changed over to rappel.

When they were unable to remove Jackson's ascenders from the rope, Powers decided to cut the slings with a knife. As he prepared to rappel, Powers discovered that he had forgotten to remove his safety ascender from above his rappel rack. He decided to cut that sling as well. Powers then rappelled to the floor with Jackson hanging below him.

Once on bottom, Jackson was allowed to rest and then fitted with Powers' double bungee climbing system. He was then able to climb out without further assistance.

Ralph Powers, Incident report, undated.

Comments: Powers observed that Jackson lacked a proper chest harness for his system, which caused him to waste energy trying to hold himself upright as he climbed. Powers also noted that he should have paid more attention to his own change-over while helping Jackson.

When performing a pick-off, skilled cavers do not find it necessary to cut themselves or the subject free. Using a knife around loaded ropes is not generally advisable, and should be a tactic of last resort.

2001 Accident and Incident Reports

31 January Sides Cave, Kentucky caver fall

Chris Groves, Brice Leech, and Joe Meiman entered Sides Cave at about 10:30 a.m. to retrieve dye receptors placed in the cave on an earlier trip. The cave begins as a 10-inch high belly-crawl over gravel and cobbles for about 50 feet, followed by almost 1,500 feet of low lands-and-knees water crawl. The crawl ends at a 30-foot deep pit known as Safety Dome, which is the first point of relative safety beyond the flood-prone crawlway. Water from the crawl cascades into the pit, which is intersected by a tall canyon leading to the rest of the cave.

One by one, the three cavers made their way across the pit, crawling along a large, thick ledge on the left side, and then climbing partway down to reach the passage below. Safely across, they continued into the cave to retrieve the dye receptors.

Shortly after 1:00 p.m. they were back at Safety Dome, ready to cross the pit and make their way through the long crawl to the entrance. Groves went first, while Leech and Meiman waited their turns. As Groves crossed the ledge at the top of the pit, it collapsed beneath him. Meiman heard a loud crash and looked up in time to see Groves fall over the waterfall and into the pit.

Meiman ran to the edge of the pit and yelled for Groves. Looking down, he saw Groves lying face down in a pool of water at the bottom of the pit. He quickly found a way down and raced to Groves, pulling him from the pool. Initially, Groves was not breathing, and water drained from his nose and mouth, but as soon as Meiman pulled him from the pool he started breathing and coughing. He was bleeding from a cut under his left eye. His helmet had remained on during the fall.

Meiman called up to Leech, who was waiting at the top, telling him that Groves was alive and that they would need help getting out of the pit. Neither of the men had been down the pit before, and they were not certain that it would be possible to climb back out without a rope. Meiman checked Groves for other obvious injuries found none. Groves was somewhat disoriented, but gradually came to understand where he was and what had happened. He reported that his right side and shoulder were hurting.

Leech remembered seeing a 15-foot piece of rope back in the cave earlier in the day, and went to retrieve it. He then climbed down the pit to help Meiman and Groves. They tied the rope to Groves' left arm, and Meiman climbed up to pull from above as Leech helped Groves climb out of the pit and chimney up into a larger side passage leading back into the cave. The process took over an hour.

Groves felt he could make the 1,500-foot water crawl out of the cave, but Leech and Meiman were concerned that he might run out of energy and wind up stranded in the cold water. In addition, there was still the matter of getting across the top of the pit. Meiman and Leech insisted that Groves needed to sit tight, stay warm, and wait for help. Groves was not convinced at first, but realized that they were right when

they pointed out that it had taken over an hour just to climb out of the pit and up to the room.

Meiman left for the entrance at 2:25 p.m., while Leech used trash bags and candles from a cache kept in the cave to make a heat tent to keep Groves comfortable. Meiman crossed the pit and made it through the long crawl in 25 minutes, reaching the surface at 2:50 p.m. His vehicle was parked nearby, and he used his radio to report the incident to the Park Service and request assistance.

Park personnel and volunteer cavers quickly assembled to mount a rescue operation. Working through the evening and into the night, rescuers brought Groves across the pit and through the crawl, reaching the surface at about 4:00 a.m. the next morning. He was taken to a hospital, where he was found to have rib and shoulder fractures, as well as cuts and bruises.

1. *Joe Meiman, "Narrative of Chris' Rescue,"* Cave Research Foundation Quarterly Newsletter, v29n2, May 2001.
2. *Chris Groves, "Another Perspective of the Sides Cave Adventure,"* Cave Research Foundation Quarterly Newsletter, v29n2, May 2001.
3. *Mitchell Plumlee and Margo Rivers, "Rescue down below,"* Bowling Green Daily News, 1 February 2001.
4. *Caroline Lynch, "Groves rescued from cave,"* Western Kentucky University College Height Herald, 2 February 2001.

10 February Nuttty Putty Cave, Utah stuck

Utah Cave Search and Rescue personnel were called at about 10:30 p.m. following a report that a young man and a young woman were trapped in the Birth Canal passage in Nuttty Putty Cave. Before rescuers could be dispatched, the couple was freed with assistance from others in the cave. No other details were available.

Rodney Mulder, Incident report, 10 February 2001.

11 February Kula Kai Caverns, Hawaii caver fall, dislocated shoulder

Rose Herrera (57) was in Kula Kai Caverns participating in a mock-rescue training exercise as part of a weekend Orientation to Cave Rescue Seminar. As part of the exercise, a group of cavers was working to move a patient in a litter through a 3-foot high passage. Herrera was one of two cavers guiding the litter using a tag-line attached to the front. As Herrera moved to adjust her position, a rock rolled out from beneath her foot and she lost her balance. As she rolled to the right, she put out her hand to catch herself. Another rock rolled beneath her hand and she fell, landing on her arm and shoulder. Her shoulder was dislocated in the fall.

Don Coons and Penelope Pooler were supervising the exercise and saw Herrera fall. They went to her immediately, along with Todd Vincent, another seminar participant who was an EMT. After Herrera's injury was assessed, Pooler was sent out of the cave to report the incident. Vincent remained with Herrera, which Coons went outside and got Rick Bennett, a wilderness medicine instructor.

Herrera was in severe pain, and reported that her fingers were numb. With her consent, Bennett was able to reduce the dislocation, which relieved most of her discomfort. Since they had a litter already available from the exercise, they decided it would be easiest to carry Herrera out. The trip to the surface took about 30 minutes. Herrera was driven to a hospital for treatment.

Penelope Pooler, Incident report, 13 March 2001.

24 February Rattling Cave, Tennessee caver fall, equipment failure

Raeme Prichett (34) and Michael Greene rigged the 133-foot entrance drop to Rattling Cave. Greene descended first, and waited at the bottom as Prichett prepared to descend. As she started down the drop, Prichett suddenly became detached from her rappel rack and fell down the pit. She landed on Greene and sustained injuries including multiple fractures and head trauma. Greene also received lesser injuries to his arm.

Greene climbed out of the pit and went for help. Rescuers responded, placed Prichett in a litter, and hauled her out of the pit. She was taken to the hospital for treatment and underwent a lengthy recovery.

"Woman injured after falling in cave," Knoxville News-Sentinel, 26 February 2001.

Comments: Prichett was using a single auto-locking carabiner to attach her rappel rack to her seat harness. The carabiner had a plastic locking sleeve, which reportedly broke, allowing the gate to open and the rack to become detached from her harness. Prichett is very fortunate to be alive.

One possible explanation is that the carabiner and the rappel rack were in the orientation that places the eye of the rack across the carabiner gate, allowing the loaded rack to act as a lever and break the gate or sleeve. This can happen as a caver crosses over a lip or ledge during descent.

Reports of similar carabiner failures were published in *World Mountaineering & Climbing 3/2000*, the Journal of the Union Internationale des Associations d'Alpinisme (UIAA). The publication is available from the UIAA web site at <http://journal.uiaa.ch/download/20003.pdf>.

Many cavers use two locking carabiners, with the gates opposite and opposed, to attach their rappel rack to the harness. Others prefer a maillon link similar to those used in seat harnesses. Either method would provide better security than a single carabiner. Auto-locking carabiners are not used by most cavers, as the locking mechanism is prone to malfunctions caused by the muddy, gritty cave environment.

In any event, it is always necessary to make sure that carabiner gates are closed and securely locked, that maillon gates are completely closed, and that the attachment link and rappel device remain in the proper orientation during use.

25 February Redman Cave, Arizona fatality, drowning, inadequate equipment

Aaron Standage (25) and William Ferrin entered Redman Cave and traveled through about 250 feet of passage before climbing down to a lower level passage filled with water. Hoping to get to more cave, they climbed through a 3-foot opening into the flooded passage and swam underwater for about ten feet before surfacing in an area with about six inches of airspace.

After some discussion, Ferrin decided to go back the way he had come. Standage apparently took a different route. Ferrin reached the main passage safely, but Standage failed to appear. As more time passed without any sign of his companion, Ferrin became concerned and decided to go for help.

Rescue workers reached the cave within an hour. Adam Shepard, a diver with the Sheriff's department, entered the passage using scuba gear and found Standage's body wedged in a crevice about 12 feet down the flooded passage. He had apparently drowned after losing his way. Shepard was able to free Standage's body from the passage, and rescuers carried him from the cave.

Jerry Thebado, "Caver dies during exploration near Young," Payson Roundup, 27 February 2001.

8 March Rattling Cave, Tennessee stranded in pit, exhaustion

John Baldwin and Roger Caldwell descended the 133-foot entrance shaft of Rattling Cave to photograph the pit. They climbed to a ledge and room about 40 feet below the lip of the pit and spent some time taking pictures before preparing to climb out. Baldwin then found that he was unable to make the climb to the surface.

Caldwell climbed out, went home to get a sleeping bag and provisions for Baldwin, and returned to the cave. Baldwin spent the night in the pit, but was still unable to climb out the next day. That afternoon, Caldwell decided that it was time to get some assistance. Rescue personnel responded and hauled Baldwin from the pit at about 7:15 p.m.

1. *Ray Snader, "Spelunker rescued from Rattlin [sic] Cave," Morristown Citizen-Tribune, 13 March 2001.*
2. *"Man plucked from cave," Knoxville News-Sentinel, 10 March 2001.*

Comments: No information was provided as to the vertical systems or methods used.

10 March Alexander Cave, Arkansas caver fall, cut by sharp rock

Reid Hampton (42) and Rodney Tennyson were on a photography trip in Alexander Cave. Hampton removed his glove to handle some photography equipment when he lost his footing and slipped. He put out his hand to avert a fall, and hit a sharp rock edge. He received a severe gash in the palm of his

hand. The cavers had a first aid kit, and were able to clean the wound and close it with surgical tape and a gauze pad. Hampton then donned his neoprene glove, which provided further protection. They were in a comfortable passage about a mile from the cave entrance, so they decided to take a break and have some hot coffee and soup and “let the adrenaline edge smooth off” before heading out.

Rodney Tennyson, Incident report, 17 March 2001.

Comments: As Tennyson notes, slips like this happen all the time in caving, which is why we wear gloves. When you take them off, be sure to use extra care and watch your footing.

17 March Nutty Putty Cave, Utah stuck

Ben Spencer (13) and a fellow Boy Scout were rescued after becoming stuck in the Birth Canal passage in Nutty Putty Cave. The passage has been the scene of a number of similar incidents. In this incident, Spencer became wedged in the passage and another boy was trapped behind him.

Cavers Ralph Powers and Jon Jasper stopped by the cave on the way home from a trip to another cave nearby and found a rescue in progress. Being familiar with the cave and passage from previous incidents, they were able to enter the cave and talk to the stranded youth as he struggled in the crawl. With advice and encouragement from Powers, the boy made it through, though he lost his pants in the process. The other boy was smaller, and made it through the tight passage without difficulty. The boys were reported to have been tired and dehydrated, but otherwise unharmed.

1. *“Tight Squeeze,” Provo Daily Herald, 19 March 2001.*
2. *Ralph Powers, Incident report, 20 March 2001.*

7 April Bowden Cave, West Virginia caver fall

A male caver (mid-30’s) suffered a dislocated shoulder when he slipped and fell from a climb in a room near the Bear Haven Entrance of Bowden Cave. He was able to reduce the dislocation himself, and was assisted from the cave by members of his party, two of whom had cave rescue training. According to the report, the man had injured the shoulder prior to the trip.

Greg Turner, Incident report, 9 April 2001.

27 April Blue Spring Cave, Tennessee dislocated shoulder

Bob Richards (48) entered Blue Spring Cave at about 11:00 a.m. with four other cavers for a photography trip. They were about 2,000 feet into the cave when Richards’ shoulder became dislocated as he reached out for a handhold while making a short climb. Richards was in pain, and was unable to move through the tight and narrow passages without

assistance. Several members of the party remained with him while others went to get help.

Rescuers soon arrived at the cave and made their way to Richards. Initial efforts to reduce the dislocation were unsuccessful, and a full-scale rescue effort was mobilized to carry Richards out of the cave. Eventually, however rescuers managed to reduce the dislocation. Richards’ arm was bandaged and secured, and he was able to make his way through the cave with assistance at tight spots, climbs, and other obstacles. He reached the surface at about 10:30 p.m.

1. *Tracey LeFevre, “Explorer rescued from White county cave,” Cookeville Herald-Citizen, 1 May 2001.*
2. *Buddy Lane, Incident report, 27 April 2001.*

3 May unnamed cave, Purgatory Chasm, Massachusetts stuck

Andrew Tower (13) was rescued unharmed after becoming stuck in a cave at Purgatory Chasm State Reservation. Tower was visiting the park with fellow students when he entered the cave. He was wearing only shorts and a tank top, and had no caving equipment. Jon Gosselin, an off-duty firefighter who had grown up in the area and was familiar with the caves, heard the call on his radio and went to the scene. Gosselin entered the cave and was able to get behind Tower and help him out of the cave. The boy suffered only minor cuts and bruises.

Franci Richardson and Doug Hanchett, “Firefighter rescues teen stuck in cave,” Boston Herald, 4 May 2001.

26 May Resumidero La Joya, Mexico caver fall, lost control on rappel

Martin Alvarado Ibarra (23) was an instructor with a group of 17 cavers visiting Sotano de la Joya, a 240-meter deep cave with rope drops of 5, 16, 8, 10, and 45 meters in depth. He was on rappel in the final 45-meter pit and had passed a rebelay about ten meters down when he lost control of his rappel and started to fall.

Alvarado Ibarra was using a Dressler descender with a shunt attached to his harness as a rappel safety. When he lost control he let go of the shunt, which grabbed the rope. The 1/2-inch webbing he had used to attach the shunt to his harness broke, and his uncontrolled descent continued. He fell about 25 meters down the offset shaft of the pit, striking the wall once before coming to rest at the bottom. An initial examination suggested that he had fractured his ankle, pelvis, and ribs, in addition to multiple contusions.

A large-scale rescue effort was mobilized to bring Alvarado Ibarra up the five drops and through more than 1,500 meters of passage to reach the surface. Cavers and emergency services personnel worked through the day and night on Sunday, and Alvarado Ibarra reached the surface at about 7:30 a.m. Monday morning.

1. *Juan Antonio Montaña Hirose, Incident report, 22 June 2001.*

2. *Ramón Espinasa-Pereña*, "Accident Report: Resumidero La Joya, Guerrero," AMCS Activities Newsletter 25, May 2002, pp 119-121.
3. *Erik Molino Minero Re*, "Una Visión Desde El Interior: Rescate en el Resumidero La Joya," *Asociación de Montañismo y Exploración de la Universidad Nacional Autónoma de México*, No. 64, 15 June 2001, www.montanismo.org.mx/espeleo/erm-004.htm.

Comments: The Dressler descender is a type of bobbin. It was not clear why Alvarado Ibarra lost control, but one report indicated that he may not have been using the extra control carabiner often used with such devices to add friction. The webbing used to attach the shunt to the harness was apparently not strong enough to withstand the force generated when the shunt engaged. Since a shunt is subjected to a shock load in such a situation, it should be rigged with dynamic rope of 10-millimeter or larger diameter, not webbing or static rope.

2 June unnamed pit, New Brunswick rockfall

Melissa Hendrickson (18), her father Eric, brother Kyle, and fellow caver Brian Altvater were checking out a number of small pits in the New Brunswick highlands when they came to a 30-foot deep sink with a deep pit at the bottom. They rigged a 120-foot rope and Melissa descended.

After spending some time on the bottom she prepared to climb back to the surface. As she was attaching her ascenders to the rope, she heard a sudden loud noise. A large slab had broken off the wall above, sending chunks of rock down the pit. Melissa dove under an overhang for protection as they rained down. A "truck-tire-sized" rock landed nearby, along with many smaller rocks.

Melissa waited until the rocks stopped falling and she had regained her composure, and then pulled on the rope while remaining under the overhang to make sure all was clear and that no more rocks were waiting to fall. She then cautiously climbed and chimneyed up to the surface.

1. *Eric Hendrickson*, *Incident report*, 12 October 2001.
2. *Melissa Hendrickson*, "Accidents Can Happen," *Northeastern Caver*, September 2001.

Comments: Hendrickson notes that she had checked for loose rocks in and around the pit prior to and during her descent. Rockfall is unpredictable, however, and she cautions that cavers must be alert to dangers beyond their control.

23 June Carpenter-Swago Cave, West Virginia stranded in pit

Dan Peden, Carl Pierce, and two other cavers arrived at the cave and rigged a 300-foot rope at the 145-foot entrance drop. The drop is broken into three parts: an initial 78-foot drop, a 15-foot middle drop, and a final 50-foot drop to the cave's lower level. All four cavers descended without incident.

Once in cave, the four began moving through horizontal trunk passage punctuated with unremarkable breakdown climbs. After traveling a short distance, however, one of the

cavers began experiencing extreme apprehension which, on a small climb, progressed to a serious panic attack. The group decided to terminate the trip.

At the entrance pit, Peden ascended first, assisted the shaken caver with the first climb, and then continued to the top. When attempts at encouraging the caver to climb the pit on her own proved unsuccessful, they decided that she would have to be hauled out. One of the other cavers climbed out to assist, while Pierce stayed to help the stranded caver.

A second rope and components for a 3:1 Z-rig haul system were retrieved from the vehicle and rigged to nearby trees. The two topside cavers hauled the shaken caver up the pit as Pierce ascended the primary rope beside her. Once on the surface, she recovered quickly.

Daniel Peden, *Incident report*, 5 November 2002.

Comments: Peden observes: "Without the availability of a simple haul system, outside assistance would have been necessary. An otherwise simple event would have been exaggerated into a rescue." It is a simple matter to set up a Z-rig using two pulleys and your basic ascending gear. Many cavers carry a pair of pulleys in their vertical kit for just such an emergency. A second rope is helpful, but not required.

June Earthquake 90 Cave, Tennessee fatality, fell or jumped into pit

Jeffrey Wayne Young (43) told his family that he was going on a week-long camping trip. When he did not return as expected, his family reported him missing. Two weeks later, a relative searching in the area around Young's home decided to look in the cave and found Young's dog, a Rottweiler named Spike, stranded in a hole just inside the entrance. Young had been known to visit the cave in the past.

The relative called authorities, who entered the cave and found Young's body at the bottom of a 70-foot pit about 500 feet into the cave. Cave rescuers were summoned to descend the pit and recover Young's body.

1. *Buddy Lane*, *Incident report*, 25 February 2002.
2. *Tracey LeFevre*, "Missing camper found dead in cave," *Cookeville Herald-Citizen*, 18 July 2001.

Comments: It is not known whether Young fell down the pit or whether he jumped. Evidence collected in the cave indicated that he had burned his shirt, along with property deeds and other papers for light as he made his way to the pit. He did not have caving equipment of any kind.

4 July unnamed Lancaster County cave, Pennsylvania fatality, rockfall entrapment, collapse

Sharn Cleland (24) and four other cavers from the York Grotto found a small entrance on the hillside. Feeling air flow at the entrance, Cleland crawled in to check the lead. He was about ten feet into the cave when a portion of the upper right wall of the passage collapsed onto him. He was pinned, lying on his back in a reclining position, by debris including a large

rock estimated to be about 18 inches thick and 30 inches in diameter.

Cleland's companions could not move the rock, and decided to call for help. A large-scale rescue response was mobilized, and workers experienced in collapse rescue were called in to assist. Efforts were complicated by the loose and unstable nature of the cave passage, which was formed almost entirely in loose breakdown.

Efforts to free Cleland continued through the night and through the next day. By 2:00 p.m., rescuers had removed most of the debris and were preparing to use hand chisels to attack the large rock pinning Cleland when the passage suddenly collapsed again. Rescuers were protected by sections of plastic pipe being used as shoring, but Cleland was not sheltered and was killed. Rescuers dug frantically for about 15 minutes to re-open the passage and reach Cleland, but were forced to abandon the attempt when they realized that he had been killed. They later used a backhoe to excavate the cave entrance until Cleland's body could be recovered.

1. "Spelunker dies in cave collapse," *Greenburg Tribune-Review*, 6 July 2001.
2. "Man trapped in Lancaster County cave," *Associated Press*, 5 July 2001.
3. "24-hour attempt to save man trapped in Mount Joy Twp. cave fails," *Lancaster Intelligencer-Journal*, 6 July 2001.
4. "Cave collapses during rescue," *Associated Press*, 5 July 2001.

15 July Pettijohns Cave, Georgia caver fall, climbing hand-over-hand

Cathy Stikes (17) was using a handline as she attempted to climb up to an upper passage in the cave. The line was knotted with loops to make it easier to grab. Stikes had inserted her hand and wrist through one of the loops, and was about 15 feet up when she slipped and fell. She lost her grip and fell about six feet to a ledge, then fell an additional nine feet. She sustained contusions to her legs and hips, but was otherwise uninjured. After a rest, she was helped up the climb and out of the cave by the other members of the group, one of whom was an EMT.

Mike McDaniel, Incident report, 12 December 2001.

Comments: McDaniel notes that Stikes was tired and frightened as she made the climb. She should have been belayed. Handlines, even with loops to grab, often provide a false sense of security in the wet and muddy cave environment. Further, some cavers make matters worse by using small diameter rope or accessory cord, which is even more difficult to grip than regular caving or climbing rope. Many cavers find that they are not able to pull themselves up or hold themselves when a slip occurs. Add a little mud and some fatigue from a day's caving and you have the potential for a serious accident. If you know you will be doing climbs with exposure greater than a body length, you should consider carrying and using a belay.

15 July Road Cut Cave, Kentucky caver fall

Tyler Bransetter (15) and his friend Brandon Lee (16) were camping out near Great Onyx Crystal Cave when they decided to take their flashlights and do some late-night caving. The boys had been caving before, but had no proper caving equipment or training. As Bransetter crawled across a ledge at the top of a pit, he used a formation as a handhold. The formation broke off, and he fell 25 feet to the bottom. He struck his head as he fell and was briefly unconscious, but sustained only cuts and bruises in the fall.

Lee saw his friend fall and tried to reach him, but could not find a way down the pit. He dropped another flashlight down to his friend and then went out to get help. Emergency services personnel were notified at about midnight, and dispatched rescuers to the cave. Bransetter was hauled up the drop and brought out of the cave at about 9:00 a.m. the next morning. He was taken to a hospital where he was treated and released.

1. Gina Kinslow, "Glasgow teen rescued from cave after nearly eight-hour entrapment, flown to Louisville hospital," *Glasgow Daily Times*, 16 July 2001.
2. Gina Kinslow, "Glasgow teen ready to go caving again despite Monday fall," *Glasgow Daily Times*, 17 July 2001.
3. Joshua Hammon, "Glasgow teen-ager rescued from cave," *Lexington Herald-Leader*, 17 July 2001.

Comments: Bransetter had been working as a tour guide at Great Onyx Crystal Cave for about two months. He was reportedly eager to get back to work and to go caving again.

28 July Bowden Cave, West Virginia flood entrapment

A group of two adult cavers and five Boy Scouts entered the Main Entrance of Bowden Cave in the late morning, planning to tour portions of the cave and exit via the Third Entrance. They made their way through the Main Passage and up the Water Course and explored the area beyond. They had some difficulty finding the route to the Third Entrance and decided to go back the way they had come.

When they reached the crawlway before the Water Course, however, they found that it had only three or four inches of airspace. Heavy rains on the surface had flooded the cave. While the leaders had checked the Elkins area forecast earlier in the week, they did not do so on the day of the trip.

The cavers had driven from Maryland and were staying at a local campground. They had left a note describing their plans in their vehicle, but had not told anyone when they expected to be out of the cave. The campground owner noticed that the group did not return on Saturday night. When they failed to return on Sunday, he became concerned. He knew that they were caving in Randolph County and called authorities there. They in turn called the Elkins fire department. Suspecting that Bowden Cave was the most likely destination for the group, firemen drove to the entrance where they found the group's vehicle.

The first rescuers entered the cave on Sunday evening just after nightfall. One team made its way through the Main Passage and fought its way upstream through the Water Course to the beginning of the crawl. The water was still too high, and they were unable to get through the crawl.

Another team entered the Third Entrance and soon found the stranded cavers. They had removed most of their wet clothing and managed to stay relatively warm using space blankets. Rescuers led them out the Third Entrance. Despite their 39-hour stay in the cave, only one scout required treatment for hypothermia at the hospital.

George Dasher, "Bowden Cave Rescue," West Virginia Caver, v19n5, October 2001, p. 23.

Comments: One of the rules of caving, as well as Scouting, is to "Be Prepared." The trip leaders should have let someone know their plans. They should also have made sure they had a map or guide to help them find their way to the Third Entrance. Most importantly, they should have checked the local weather forecast on the day of the trip. Given the chance of rain and the nature of the cave passage, a different trip plan or a different cave would have been in order. Fortunately, they did have the space blankets.

28 July

Pettijohns Cave, Georgia exhaustion, hypothermia, poor judgment

While eating dinner Friday evening, members of a church group on a two-week adventure-challenge trip decided that they had not been sufficiently challenged during the week and that a midnight caving trip would be in order. A group of 16 entered Pettijohns Cave around midnight. The cavers were equipped with helmets and lights, but had little previous caving experience.

As the group made its way into the cave, one member, a 17-year-old male, complained that he was cold. He was dressed in cotton clothing and tennis shoes. The group visited the Bridge Room, a trip which requires getting wet and muddy coming and going. Along the way, another group member became cold and was re-warmed with a makeshift heat tent. As they made their way out, the 17-year old who had complained earlier became cold and fatigued, and could not continue. One of the two group members who knew the route through the cave left to get help while the other remained with the group.

Rescuers were called to the cave early Saturday morning and sent in an initial response team carrying, medical supplies, a fleece suit, food, and thermoses of hot tea. They found the youth suffering from moderate hypothermia, but still able to move and speak. His wet clothes were removed and he was dressed in the fleece suit, then provided with hot tea and food.

Rescuers encouraged the young man to talk and move around, and after a while he was able to start moving toward the entrance. He was carefully escorted out of the cave, where he was met by an ambulance and taken to a hospital for examination. All members of the party were out of the cave by 10:00 a.m.

Diane Cousineau, Incident report, 28 July 2001.

Comments: One must question the wisdom of the group's leaders in deciding to take them on a strenuous caving trip after midnight, when they had been up all day and had been engaged in outdoor activities all week. Starting a caving trip already tired is not a good idea. Further, they ignored warning signs as members of the group became cold, and continued into the cave. Finally, they were not adequately dressed and prepared for the cave conditions.

1 September

Cass Cave, West Virginia stranded in pit, sharing equipment

Four rock-climbers entered the cave and rigged the 160-foot Belay Loft drop, using a dynamic climbing rope. They were poorly equipped, with some members of the party lacking helmets, and only a single set of Jumars for ascending. After spending some time exploring, they returned to the base of the pit and prepared to climb out.

The first person to climb reached the top of the pit without incident. He placed the Jumars in a bag and attempted to lower them to the others below, but the bag landed on a ledge. When he pulled up the rope to try again, the Jumars apparently fell out of the bag and were lost. With no other options, the man left the cave to call for help.

A rescue group was mobilized from cavers attending the Old Timers Reunion nearby. Entering the cave, the rescuers re-rigged the pit with a static caving rope and hauled the stranded climbers out of the pit.

George Dasher, "OTR 2001 Rescues," West Virginia Caver, v19n5, October 2001, p. 2.

Comments: The dynamic rope was reported to have suffered severe damage due to abrasion at the lip. It was probably fortunate for the climbers that they were not able to climb, since it might have been cut while in use. Sharing vertical gear by passing it up or down the rope is a bad idea.

1 September

Lost Creek Siphon, Montana equipment problem

Jay Kennedy (41) was climbing out of the entrance pit when the Croll ascender attached to the seat harness in his Frog climbing system suddenly disengaged from the rope. The ascender came off rope as he stood up and pulled the rope downward through the ascender.

Kennedy had drilled a hole through the cam lock of his "new style" Croll and threaded a loop of parachute cord through the hole to make it easier to open the cam while wearing wetsuit gloves. The cord caught on a projection on the wall as he stood up, pulling the cam open. Kennedy was able to reattach the ascender and complete the climb without incident.

Jay Kennedy, Incident report, 16 October 2001.

Comments: Kennedy removed the cord after the incident. It is generally not a good idea to make modifications like this to carefully designed hardware.

1 September My Cave, West Virginia stranded in pit

A group of cavers attending the nearby Old Timers Reunion entered the Elk River entrance of My Cave, intending to rappel the 70-foot Outhouse Drop and exit via the Dry Branch Entrance. They descended the pit without incident, but were unable to find the route to the other entrance. Eventually, they made their way back to the bottom of the pit. Some of the cavers climbed back up the very muddy pit, but two members of the group were unable to make the climb.

Two of the cavers left the cave and called for help. A group of cavers from the Reunion came to the cave, located the stranded cavers, and led them out the other entrance.

George Dasher, "OTR 2001 Rescues," West Virginia Caver, v19n5, October 2001, p. 24.

Comments: It was not clear from the reports exactly why the stranded cavers were unable to climb back up the pit. When making a through-trip, cavers should be prepared for the possibility that they might have to climb back out.

9 September John Browns Cave, West Virginia lost, stranded, inadequate equipment

Philip Olmert (36) and his 8-year-old son Skylor entered the cave on Sunday afternoon, equipped with helmets and headlamps and wearing shorts and t-shirts. They expected to return home that day. They made their way through about 2,000 feet of passage before deciding to head out as one of the headlamps began to dim. On the way out they lost their way and wound up in an upper passage. They did not have any extra batteries. They were reported missing when they failed to return home as expected.

Olmert's car was soon located near the entrance to the cave, and a group of searchers composed of local cavers and a ranger from nearby Harpers Ferry National Park entered the cave at about 10:00 a.m. Monday morning. They soon found the stranded cavers and led them from the cave. They were chilled, but unharmed by the experience.

1. *Larry Johnson, Incident report, 24 September 2001.*
2. *George Dasher, "John Browns Cave Rescue," West Virginia Caver, v19n6, December 2001, p. 5.*

Comments: The cave was a popular one until its closure some years earlier. The entrance is on private property, but the passages run underneath the park land.

15 September unspecified pit cave, Indiana caver fall, stranded, no safety at pit lip

John Powell rigged his rope in the entrance of a new 40-foot pit that he and his two companions planned to descend and explore. Even though he was working at the edge of the pit, Powell was not wearing a harness and was not clipped in to the rope. As he leaned over to look down the drop, he slipped on the mossy rock at the lip and fell in. He was able to

grab the rope as he fell, and gripped it as tightly as he could to try to slow the fall. He succeeded, but incurred severe rope burns to both hands as a result. It took about 90 minutes for Powell to get back out of the pit with the help of his companions.

John Powell, Incident report, 5 October 2001.

Comments: It is standard practice to be rigged in or on belay whenever you are within a body-length of the edge of a pit, or whenever a slip might result in a fall down the drop. Powell was fortunate to have been able to grab the rope. A 40-foot fall can easily be fatal.

3 October Pinnacles Cave, Nevada exhaustion, stranded in pit, sharing equipment

Gareth Smith (38), Eric Smith (40), and two other men entered Pinnacles Cave at about 12:30 p.m. None of the men had much caving experience, and they lacked proper caving equipment. None had helmets, and they had only two seat harnesses and a small amount of vertical equipment between them. They rigged the 120-foot entrance shaft with a 200-foot rope, which they tied to a rock near the entrance using a series of overhand knots.

One of the men decided to remain on the surface while the others explored the cave. The first and most experienced caver rappelled to a ledge about 70 feet down the pit and got off rope. The others pulled up his harness and rappel equipment and the second man used it to rappel to the ledge. The process was repeated for the third man, and then used again to descend the remaining 50 feet from the ledge to the bottom of the pit.

The men spent several hours exploring the passages below, and returned to the entrance shaft at about 5:00 p.m. Using three Gibbs ascenders rigged with accessory cord for foot loops and a seat harness attachment, the first man climbed to the 50-foot ledge, then lowered the ascending gear back down for the next man. One of the men became very fatigued during his climb.

Once all three cavers had reached the ledge, the strongest caver ascended to the surface without difficulty. Once again, he lowered the ascending gear to his companions waiting below. This time, however, the second man was only able to climb a few feet before becoming exhausted. The third caver helped him climb back down to the ledge and get off rope. They decided that they could not make it out without help. The two men on the surface left and called authorities. Rescuers responded, and rigged a haul system to bring the men to the surface. They were mildly hypothermic, but otherwise uninjured.

Steven Ross, Incident report, 8 October 2001.

6 October Lost Creek Siphon, Montana caver fall

Jay Kennedy (41) and two other cavers were on a mapping trip in Lost Creek Siphon. As Kennedy was standing near the edge of Chockstone Drop, about 300 feet below the surface, the floor suddenly fell away beneath him. As the rubble

collapsed, Kennedy's left leg sank in up to his groin. Fortunately, Kennedy was clipped into a traverse line at the pit with his cow's tail. He extricated himself from the hole and warned the others of the danger.

Jay Kennedy, incident report, 6 October 2001.

Comments: The floor was composed of large cobbles and decaying wood, trapped behind large boulders. The cave is a wet alpine cave, and is subject to frequent flooding and the resulting rearrangement of its contents. Kennedy notes that the incident reinforces the need for care in the exploration of dynamic alpine karst systems. Such caution is appropriate to caves of all types, where loose rock and unstable flooring are often encountered. Being clipped into the safety line probably saved Kennedy from serious injury.

6 October Skunk Cave, Iowa stuck in crevice

Andy Wernimont (16), his father Phil, and two other teenage boys entered Skunk Cave at about 10:00 a.m. equipped only with flashlights. They had been exploring the cave for about an hour when Andy slipped and became wedged in a crevice about 250 feet from the entrance. He was in a small, narrow passage, and his father could not reach him well enough to pull him out. When their efforts to free Andy failed, the others left the cave to call for help.

Rescuers from a local fire department arrived at the cave at about 1:30 p.m. Cavers from the Iowa Grotto had also been called, and soon began arriving at the cave. Throughout the afternoon, the rescuers worked with little success to free Andy from the crevice. They placed boards beneath him to prevent him from slipping deeper, but were unable to move him forward or backward through the passage.

After about 12 hours of struggle, rescuers were becoming concerned that Andy was losing strength and could succumb to hypothermia. John Ackerman, a caver who had been recruited for the effort during the night, spent some time reassuring Andy and considering the situation. Since the efforts to that point had proved unsuccessful, he felt that a new approach was needed.

Andy was covered with blankets, hot water bottles, and other rescue paraphernalia, which obscured Ackerman's view of the passage. This material was removed, and Ackerman carefully studied the shape of the crevice and Andy's position. He decided that if Andy could be lowered further into the crevice, it would be possible to pull him forward, then up and out of the passage.

Andy was fearful of going deeper into the crevice, but Ackerman was able to convince him to give it a try. He held Andy's wrist with one hand and grabbed the board with the other. Another rescuer also grabbed the board from below. As the men slid the board out from under him, Andy slipped deeper and Ackerman pulled him forward. In a matter of minutes, Andy was out of the crevice and able to move. He was eager to be out, and was quickly escorted from the cave.

1. *David Gerboth, "Skunk Cave Rescue – 10-6-2001," Incident report, 16 October 2001.*

2. *Warren Netherton, "Skunk Cave Rescue," Iowa Caver, v37n5, September-October 2001, p. 71.*

7 October Gage Caverns, New York stuck in crevice

Edward Galbavy, Kevin Shaw, Shioku Kudo, Adam Dobson, and J. J. Brattingham entered the cave at about 11:00 a.m. and explored the dry side of the cave including part of the Balls Down Crawl, returning to the Amphitheater at about 1:00 p.m. The group was exploring some small passages off the Amphitheater when Kudo became wedged in a crevice, lying on her side with her legs extended into a horizontal crack at a 90-degree angle to her torso. Shaw and Galbavy tried to help her, but were unsuccessful. Shaw then left the cave and called for help.

Rescuers soon began arriving, and worked through the afternoon and into the evening in unsuccessful attempts to free Kudo. Little progress was made until Joe Armstrong and Ken Fortuin entered the cave at about 7:20 p.m. and began drilling, excavating, and removing rock from the passage.

Working together, Armstrong and Fortuin managed to remove enough rocks to allow Kudo to slide out of the crevice shortly after 9:00 p.m. She was wrapped in blankets and allowed to recover for a while before being escorted from the cave. She reached the surface at about 10:20 p.m.

Thom Engel, "Rescue at Gage Caverns," Northeastern Caver, December 2001.

Comments: Engel notes that there was some confusion during the early stages of the rescue operation regarding just how long Kudo had been stuck in the cave, and feels that the full-scale rescue should have been initiated sooner. He notes that in the cold environment of Northeastern caves such as Gage Caverns, an immobile caver can quickly develop hypothermia. He recommends that cavers call for help in such situations if they cannot free a trapped companion within about 15 minutes. Fortunately, the situation ended well in spite of any miscues in the early stages.

20 October Bowden Cave, West Virginia fatality, heart attack in cave

A group of 19 people from Hocking College in Nelsonville, Ohio, entered Bowden Cave. They divided into two groups, one of which went through the Main Passage and started up the Water Course. As they made their way upstream, one member of the party, a 23-year-old male who reportedly weighed about 250 pounds, asked to stop and rest. He did not complain of any pain.

The group continued, stopping several times along the passage. At about 3:15 p.m., the group was stopped about halfway up the Water Course when the man suddenly lost consciousness and fell between two instructors. Members of the group administered CPR for about 30 minutes, but the man could not be revived.

Members of the group left the cave to summon help. The Elkins Fire Department and the Randolph County EMS

responded, as well as a number of cavers, and the man's body was brought to the surface at 5:15 pm. He was believed to have suffered a heart attack.

George Dasher, "Rockin' Chair," West Virginia Caver, v19n6, December 2001, p. 11.

October unspecified cave, Kentucky rockfall entrapment

Shelly Wolf and two other cavers were working on a digging lead located in a small room at the end of a short crawl off the bottom of a 13-foot deep hole. Wolf and another caver were filling buckets with rocks and mud from the dig so that the third caver could pull the debris from the hole. After about three hours, the group decided to take a break, and Wolf started back out of the room.

As she started into the crawl, she noticed what appeared to be a loose rock in the ceiling. Not wanting it to fall on her, she reached up to pull it down and put it aside. The rock turned out to be much larger than Wolf expected, and fell onto her legs, pinning them in the crawl. She called out to her companion, who came quickly and tried to help her move the rock. Before they could do so, however more mud and rock from the wall collapsed onto Wolf, burying her legs and leaving only her arms free.

Realizing that they needed tools and assistance, the other cavers went to get help. Rescuers responded, and spent 4 to 5 hours digging until Wolf could be pulled out of the crawl. She was mildly hypothermic, but was able to walk out of the cave with a little assistance.

Shelly Wolf, "Stuck!", CaveDiggers.com, 28 October 2001.

2 December Lost Creek Siphon, Montana difficulty on rope, frostbite

While climbing out of the entrance pit, Jay Kennedy (41) began having difficulty with his Frog system when his Petzl ascenders began slipping on the ice-covered rope. He attached an additional ascender and continued his climb, stopping frequently to clear ice from the ascender cams. Abrasive action by the rope and the ice wore a hole in the 4-millimeter thick neoprene of Kennedy's left glove. In spite of his attempts to re-warm his hand during the climb, Kennedy suffered frostbite on his middle finger. It was about four weeks before he regained full sensation in the affected digit.

Jay Kennedy, Incident report, 11 January 2002.

Comments: Kennedy notes that he usually carried a spare pair of gloves, but had neglected to do so on this trip.

3 December Lechuguilla Cave, New Mexico twisted ankle

On the third day of the December 2001 Lechuguilla expedition, Bryan Douty was injured when he twisted his ankle near the Chandelier Graveyard. He was able to hobble

back to camp, where he spent most of the next day recovering. After a day of rest he was able to resume participation in the exploration and survey, and later exited the cave without further difficulty.

Richard Rhinehart, "Briefly – News and Notes Regarding Caves and Karst," Rocky Mountain Caving, v19n1, Winter 2002, p. 11.

15 December Tumbling Rock Cave, Alabama fatality, heart attack in cave

Dr. John Miller (55), Dr. Tamara Hughes (32) and another caver were several thousand feet back in Tumbling Rock Cave when Miller reported experiencing chest pains. Miller felt that he could make it out if they moved slowly, and the group started for the entrance, taking frequent rests as they went. As they were making their way up a breakdown slope, Miller told the others he was blacking out, slid about 15-20 feet down the slope, and struck his head at the bottom. Hughes, who is also a physician, started CPR and sent the other caver to get help. Hughes administered CPR by herself for about 30 minutes, and then continued for more than an hour after rescuers began to arrive. Miller, however, could not be revived. Rescuers carried his body from the cave, reaching the surface at about 8:00 p.m.

1. *David Brewer, "Georgia man dies in Jackson cave," Huntsville Times, 16 December 2001.*
2. *Tamara Hughes, Incident report, 18 December 2001.*

21 December Sistema Purificacion, Tamaulipas, Mexico caver fall, broken leg

Terri Treacy, Pat Shaw, and Laura Rosales were surveying in the Chimichanga Tube, about 900 meters from Camp I. They began with a side passage that was reached by a short climb. Treacy was about halfway up the climb when a handhold that she was using broke off. She fell, striking the floor of the main passage and landing in a small tube in the floor.

Treacy knew immediately that she had seriously injured her ankle. She climbed out of the tube and removed her boot to assess the damage. They had traveled to the survey site in the company of a larger group of cavers, so Shaw and Rosales went to get help. They were unable to locate the others in the confusing maze of tubes and passages, and soon returned.

Treacy's ankle was swollen and painful, but she felt that she could make it back to camp with a little help. They fashioned a splint using a vinyl survey book bag padded with a shirt and tied with bandannas, then taped with adhesive tape from their first aid kit.

Treacy took some aspirin to help with the pain and swelling, and started her long crawl to camp. A 14-meter drop along the way presented an obstacle, but Shaw and Rosales each had a length of tubular webbing in their packs. With Rosales belaying her and Shaw spotting from below, Treacy climbed down the first 10 meters of the drop. Rosales then rigged the webbing to allow her to rappel the remaining few meters.

After a rest and some more aspirin for Treacy, they continued. Unfortunately, they missed a turn and spent some time off-route before realizing their mistake. As they approached the next obstacle, another climb-down at Jump Rock, they encountered the other cavers from their original party. With the extra help, Treacy made it down the climb and finally reached Camp I after more than eight hours of crawling and scooting.

Treacy took some stronger pain medication available at the Camp and spent the night resting. The next morning, she started out of the cave accompanied by several of the other cavers. She felt weak and nauseous at first, possibly due to the pain medication, but soon felt able to travel, often leaning on waist-high rocks and swinging her injured leg forward. The trip to the entrance took about an hour and a half. The 30-

meter rappel from the entrance went without incident, and her companions helped her through the boulder-filled arroyo to reach a waiting vehicle.

Treacy was then driven to a hospital in Brownsville, Texas, where she learned that she had broken her tibia and fibula just above the ankle, and the surgery would be required. She opted for a temporary splint and a trip home to Illinois. She arrived on Christmas Eve, and had surgery on her leg three days later.

Terri Treacy, "The Long Crawl," AMCS Activities Newsletter 25, May 2002, pp. 101-103.

Comments: Treacy demonstrated a great deal of strength and fortitude in what was undoubtedly a grueling ordeal.

1999 Cave Diving Incidents

10 February 1999

Wakulla Springs, Florida

lost consciousness, incorrect gas mixture

Jason Richards, Mark Long, Jason Moseley, and Annette Long, divers working with the National Geographic film crew for the expedition, entered the spring in the late afternoon for a planned 10-minute dive to set up lights at -100 feet. Along with their primary gas bottles, the divers carried bottles of pure oxygen which they intended to place on a ledge at -20 feet for use during decompression.

Richards carried back-mounted double tanks filled with a gas mixture intended for use at his working depth. Although the gas mixture was breathable at the surface, he chose to breathe from the oxygen bottle initially, intending to switch to the doubles when he dropped the oxygen off at -20 feet. He apparently forgot to make the switch, and breathed oxygen to a depth of at least 50 feet.

About eight minutes into the dive, Richards lost consciousness, became inverted, and descended to the bottom. Mark Long saw Richards in trouble, and alerted the other two divers. They were able to get Richards to the surface within one minute of the incident. Other expedition personnel were on the surface nearby, and helped pull Richards from the water. He suffered from spasms and vomiting, but appeared to be recovering.

Richards was taken to the hospital where he was placed in a hyperbaric chamber as a precautionary measure, and then given a CT scan and chest X-ray to check for embolism or aspiration. He was hospitalized overnight for observation, and released the next day.

1. *Daily Updates, Wakulla 2 Expedition web site, www.usdct.org, 10 February 1999.*
2. *Barbara am Ende, "Wakulla 2 – Building the first Fully 3D Cave Map," NSS News, v58n9, September 2000, p. 260.*

Comments: Pure oxygen is toxic to the central nervous system at depth. Divers use it in shallow water at the final decompression stage to shorten decompression time. Following the incident, the diving protocols were reviewed, and all divers were required to lower their oxygen bottles to the -20 feet decompression location using a tether.

15 February 1999

Wakulla Springs, Florida

fatality, lost consciousness, cause unknown

According to the expedition report, diver Henry Kendall (72) bypassed both written and electronic safety checklists for his closed circuit rebreather diving equipment and entered the water without the oxygen supply connected to the rebreather. The report states that Kendall ignored the rebreather system's audible and visual warning indicators, and had entered the water without his diving partner. It further states that Kendall lost consciousness in less than two meters of water and drowned. The expedition report also states that the coroner's report indicated that Kendall had some physiological problems before the dive which were believed to have led to his disregard of the safety protocols.

A press release issued by the expedition on 18 February 1999, however, states that information received by the expedition from the Medical Examiner's office indicated that Kendall had died from natural causes, and that his death had no relationship to either his pre-dive procedures or his equipment.

1. *Barbara am Ende, "Wakulla 2 – Building the First Fully 3D Cave Map," NSS News, v58n9, September 2000, p. 270.*
2. *Daily Updates, Wakulla 2 Expedition web site, www.usdct.org, 18 February 1999.*

Comments: It was not clear from the reports whether Kendall suffered a heart attack or other illness, or whether he lost consciousness due to lack of oxygen.

18 April 1999
Jackson Blue Spring, Florida
fatality, siltation, out of air

Steven Michael Wixon (33) and two partners were diving in Jackson Blue Spring, and were about 3,000 feet back in the cave when the passage became obscured by silt in the water. They turned the dive and headed out, but Wixon somehow became separated from the others. His partners searched for him until they ran low on air and were forced to exit.

Associated Press, "Huntsville Man Dies Cave Diving in Florida," Huntsville Times, 19 April 1999.

26 April 1999
Diepolder Spring, Florida
fatality, incorrect gas mixture, lost consciousness

Guido Gaudenzi (29) and fellow divers Simone Roncoli and Sandra Derksen entered the cave and descended 190 feet along a passage leading to a large room. They were diving on mixed gases, with oxygen bottles for the final decompression stage on their return. Rather than leaving his oxygen bottle at the -20 feet decompression location, Gaudenzi carried his with him.

When they finished exploring the chamber, they began their ascent to the surface. At the -120 feet decompression stop, Gaudenzi apparently switched mouthpieces and breathed from the oxygen bottle. He immediately went into convulsions and lost consciousness, dropping his mouthpiece. Derksen and Roncoli tried to save him, but were unsuccessful.

Graham Brink, "Mistake costs diver his life," St. Petersburg Times, 28 April 1999.

Comments: As noted above for the 10 February Wakulla Springs incident, pure oxygen is toxic at depths greater than 66 feet. Many divers secure their oxygen tanks at the -20 foot level to avoid mistakes. Gaudenzi was an experienced diver, and reportedly had been a cave diver for four years.

24 June 1999
Thunderhole, Florida
lost, stranded

A diver was rescued after being stranded in a small room in the cave for almost six hours. She was an experienced and certified cave diver, but had not been to Thunderhole before. The permanent dive line started about 12 feet below the surface. She entered the water opposite the dive line, and wound up in a small room that is difficult to get out of wearing full diving equipment. Visibility was about 1-foot from the surface down to a depth of about 30 feet due to an algae bloom, and she did not realize that she was entering the cave at the wrong spot until she was trapped.

Her dive partner had gone first, taking the correct route, and was waiting for her at a decompression stop at -30 feet. When she did not arrive, he surfaced to check on her. Finding

that she was not at the surface, he thought she might have passed him in the poor visibility, so he went back down and searched along the main dive line in the cave. When he did not find her, he surfaced and called for help.

The trapped diver attempted a line search, but her diving reel jammed. She lost her knife trying to free the reel. She then settled on the ceiling and created an air pocket at -8 feet. She breathed from her tanks, and then breathed her exhaled air in the pocket. She could hear vehicles on the surface, and banged on the ceiling to attract attention. A recovery diver entered the water and heard the banging. He was able to locate her in about ten minutes and bring her to the surface.

Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 27 June 1999.

17 October 1999
Madison Blue Spring, Florida
two fatalities, lost guideline, stranded, out of air

Richard Siaba and Kevin Lynn, both experienced and certified cave divers, died in Madison Blue Spring when they apparently lost their guideline and were unable to find the route out of the cave. They were found just beyond a constriction in the passage called the Half Hitch, about 850 feet into the cave. When found by recovery divers, their main guideline was reportedly broken, and one of the divers was tangled in the line. They had deployed safety reels of line, apparently searching for the main line or the way out. Apparently they were unable to recover the main line or find the route, and ran out of air.

Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 19 October 1999.

20 November 1999
Forty Fathom Grotto, Florida
fatality, unknown problem at depth, rapid ascent, decompression sickness

Vincent James Skaff (32) and partner Daniel Patterson entered the water and descended to -190 feet, intending to follow a diagonal line down to -215 feet. Witnesses reported that Patterson "suddenly shot to the surface without decompressing," and developed decompression sickness. Patterson was taken to a hospital for treatment and later released.

When Skaff failed to surface, recovery divers were called. He was found wedged under a ledge at -156 feet with his buoyancy compensator fully inflated. His equipment was functional and his depth gauge showed a maximum depth of 237 feet.

1. *Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 22 November 1999.*
2. *"Tennessee diver who died in underwater cave is identified," Naples Daily News, 23 November 1999.*

2000 Cave Diving Incidents

6 March 2000

Little River Spring, Florida fatality, siltation, exceeded training

Michael Hickey (27) and his dive partner entered Little River Spring equipped with double tanks and dive propulsion vehicles. They dropped oxygen bottles for decompression in the cavern zone and then proceeded deeper into the cave, using their vehicles to travel approximately 2,250 feet back into the cave system. At that point, Hickey reportedly dropped his scooter and silted out the passage. The two divers became separated. Hickey's partner found his way out, but Hickey did not. Rescue attempts were unsuccessful due to the heavy silt conditions.

Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 6.

Comments: Bozanic reports that both divers were diving beyond their level of training and certification. They held the Intro-Cave Diving certification, which does not include the use of double tanks and dive propulsion vehicles. He also notes that it had been a year since either had been in Little River, and neither had been diving at all for six months.

11 March 2000 Cenote Dos Ojos, Mexico decompression sickness

While exploring a newly discovered chamber, Jill and Paul Heinerth were forced to end their dive on March 10 at a depth of 95 meters when Jill had trouble with her left sinus. They dove again on following day, and were able to continue their exploration, turning the dive after a maximum depth of 107 meters.

During their ascent, they divers were decompressing at a depth of about 18 meters when Jill Heinerth noticed that the garments under her dry suit had started to pinch and feel uncomfortably snug. Adjustments to the suit did not relieve the discomfort. At six meters depth, the divers entered a dry tank for their two-hour final decompression stage. Getting her 55-pound rebreather system into the tank and adjusting the tight suit required some exertion.

After reaching the surface, Heinerth spent some time resting before climbing the ladder out of the cenote. As she climbed, she felt "extremely fatigued" and realized that she was suffering from decompression sickness. She spent the evening resting and breathing from a tank containing a 70% oxygen mixture.

The next morning, she still felt the effects and decided to go back into the water and repeat the final stages of decompression. Using her rebreather, she spent about two hours at a depth of 13 meters. By noon she was feeling much better. The following day she hiked out from camp and went to a hyperbaric facility at Playa del Carmen, where she underwent three treatments.

Jill Heinerth, "An Incident at The Pit," AMCS Newsletter 24, June 2001, p. 86.

Comments: Heinerth felt that the incident was caused by a combination of factors: diving deep on two consecutive days; physical exertion before, during, and after the dive; and the tightness from the suit. She writes that she felt "swept up in the expedition fever" and may have been "doing too much, too quickly." Heinerth further notes that she was initially hesitant to admit that she had made a mistake, feeling that she would be criticized, but feels that it is important for divers to share their experiences so that others can learn from them.

29 May 2000

Little River Spring, Florida fatality, inadequate equipment, out of air

Stephen John Turner (42) drowned while on a solo dive in Little River Spring. He had not told anyone that he would be diving. He was found the next day in the Florida Room, about 1,100 feet from the cave entrance. When recovered, his single air tank contained 150 psi. He had two lights, both of which were found with their switches in the "on" position, burned out. He was about ten feet from the permanent guide line.

1. *Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 6.*
2. *"Diver found dead in cave," Gainesville Sun, 31 May 2000.*

Comments: Bozanic notes that Turner had no cave or cavern diving training or certification. He apparently failed to follow the "Rule of Thirds" for air management, and carried only two light sources, neither of which was adequate for use as a primary cave diving light. He passed by an explicit warning sign at the base of the cavern zone, but apparently disregarded its advice.

26 June 2000

Poza de Juan Claro, Cuba four fatalities, inadequate equipment, no line

Jorge Luis (36), Lin Enrique (31), Israel Garcia (32), and Roberto Lagart (33) entered Poza de Juan Claro, a reversing blue hole cave in Cuba. All were certified open water divers, but none had cave diving training or certification. All were using single 80-cubic-foot cylinders. One diver carried two lights, and the others each had one. The cave has a permanent guide line that begins well inside the entrance. The divers did not lay their own line from the entrance to that line. One diver had a dive computer, which indicated a maximum depth of 35 feet. The only place in the cave where that depth can be reached is a small, restricted, silty side tunnel. All four divers were found with their tanks empty.

Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 6.

Comments: Bozanic observes that the divers violated several basic safety rules: they failed to run a continuous guide line from the surface; they failed to carry three lights each; and they apparently failed to reserve two-thirds of their air for

their exit. One diver was found to have a potentially fatal cranial fracture, which may have occurred during the final moments of the dive after he had run out of air.

13 July 2000
Cenote Sabak Ha, Mexico
fatality, apparent heart attack

Rafael Mendiburu (55), an experienced and certified cave diver, died of an apparent heart attack while diving in Cenote Sabak Ha. He was exploring the cave with another diver, planning to spend 15 minutes at a depth of -180 feet using open circuit trimix gas. The pair left oxygen cylinders at -20 feet for decompression, descended to -150 feet on air, then switched to the mixed gas cylinders before descending to their planned depth.

After five minutes at -180 feet, Mendiburu signaled to his partner that he wanted to turn the dive. The divers ascended to -150 feet and switched back to air, then continued toward the surface. At -140 feet, Mendiburu was having difficulty breathing from his regulator. He switched regulators, but continued to have difficulty. His partner tested the regulator, which seemed to be operating properly. The partner swam rapidly to a decompression stop at -90 feet, while Mendiburu held onto his harness. During this time Mendiburu was clutching at his chest with his other hand.

At -75 feet, Mendiburu released his grip and floated away from his partner. He was located a few minutes later on the ceiling at -40 feet, unresponsive and with his regulator out of his mouth. His partner freed him from the ledge and released him to float to the surface. Ascending to -20 feet, he did two minutes decompression before going to the surface to drag Mendiburu to shore. He called for the surface support team to attend to Mendiburu, who was unresponsive and not breathing, and descended to complete his decompression. Mendiburu could not be resuscitated.

Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 7.

Comments: An autopsy found that Mendiburu had suffered a major heart attack, as well as a cerebral air embolism. Bozanic notes that the event appears to have been caused by a heart attack while at depth. No cave diving rules were broken. Mendiburu was the President of one of Mexico's leading cave diving organizations, Exploradores Subaquaticos.

17 September 2000
unnamed well in Goss Canyon, California
fatality, breathed bad air in gas pocket

Paul Hayden (38) and his brother entered the cavern at about 11:00 a.m. through an abandoned well shaft, crawling about 50 feet through the tunnel and then 30 feet down a slope to reach a water-filled room. Hayden anchored a rope at the edge of the water for use as a guideline, and prepared to begin his dive. He told his brother that he had two hours of air, and to get help if he did not return within that time. When he did not respond to tugs on the rope, his brother went for help, calling authorities at about 1:20 p.m.

Hayden's body was recovered from a 4-foot diameter tunnel immediately below a gas pocket. A videotape recovered from his camera indicated that Hayden had poked his head into the gas pocket and removed his regulator from his mouth. The camera then recorded a fall to the bottom and no further movement. Hayden's body was recovered with 2,500 psi in his air cylinder. Hayden was an experienced open-water diver and a member of an elite Air Force rescue team, but had no cave diving training or certification.

1. *Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 7.*
2. *Andrew Blankstein, Los Angeles Times, 18 September 2000.*
3. *"Air Force Diver Drowns in Cave," Fire Rescue Magazine, November 2000, p. 53.*

Comments: Bozanic notes that while Hayden violated several classic rules of cave diving safety (exceeding his training and certification, and lacking a proper guideline and cave diving lights), the videotape indicates that the fatality was caused by breathing gas from an "air" pocket that was either too low in oxygen or contained some other gas in a level sufficient to cause immediate loss of consciousness. He observes that the incident underscores the potential hazards of breathing from air pockets in caves.

2 November 2000
Ceita Core, Brazil
fatality, deep diving on air

Gustavo Sallum (21) was lost when he failed to return from a solo dive to -60 meters on air. Two other divers were also in the cave exploring a side tunnel, and Sallum was expected to rejoin them at the exit following his dive. When he did not return, the other divers attempted to locate him, but were forced to call their dive due to depth and air supply constraints.

Sallum was later recovered from a depth of 105 meters. When found, he had 1,600 psi of air in his tanks and his equipment was all operational. His regulator was out of his mouth, his fists were clenched, and the permanent dive line was tangled around his neck. He had apparently been alert and functioning at -80 meters, because he had negotiated a restriction in the passage at that depth in order to continue. Sallum was certified as an NSS-CDS Full Cave Diver.

1. *Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 7.*
2. *"Analise do acidente ocorrido em Bonito na caverna Ceita Core," www.scubadu.com.br/acidenteembonito.htm, undated.*

Comments: Bozanic notes that the cause of most cave fatalities of experienced cave divers has been diving to excess depth on air. He observes that the clenched fists, air remaining in the cylinders, and regulator out of the mouth all indicate either a convulsion or unconsciousness at depth, possibly due to oxygen toxicity, deep water blackout, or other factors.

23 November 2000
Vortex Spring, Florida
fatality, cause unknown

A male diver (age approximately 70) died during a dive in Vortex Spring. He was reportedly in shallow water, and had

2,850 psi of air in his double tanks when recovered. It was not clear whether he was in the spring pool or in the overhead environment of the cavern when he died.

Jeffrey Bozanic, "Cave Diving Fatalities in 2000," Underwater Speleology, v28n2, 2001, p. 7.

2001 Cave Diving Incidents

18 February 2001
Royal Springs, Florida
two fatalities, no guideline, out of air

Mark Granger (19) and William Ridenour (34) entered Royal Springs at about 4:30 p.m. Both held certifications for open water diving, but neither had any training or certification for cave or cavern diving. Granger had just received his open water diving certification that morning. The men came to the spring in the company of their diving instructor and another diver, planning to spend some time exploring the spring pool while the instructor retrieved a concrete anchor from the pool.

The instructor and his partner made one dive and retrieved the anchor. Each team then took a flashlight and prepared to dive, intending to explore the spring pool. As they descended, the instructor's partner had trouble equalizing, so the instructor stayed with him. By the time they got down, Ridenour and Granger had entered the cave, and visibility in the cavern zone was zero.

The instructor found the entrance to the cave and had his partner stay there while he swam a short distance inside to try to find the other divers. When he was unsuccessful, he and his partner surfaced, and the partner was sent to call for help. The instructor returned to the cave entrance where he waited, flashing his light and banging rocks in the hope that Ridenour and Granger would hear or see the signals and make their way out. He kept signaling for about 45 minutes until rescue divers arrived to relieve him.

The rescue diver tied off a line and searched the cavern zone (still in zero visibility) and about 40 feet into the cave. He then tied off his reel and left it for the two missing divers to exit on if they should find it. Additional cave divers entered the water at about 6:30 p.m. and searched the first 300 feet of passage in the cave, but did not find the missing pair. Due to the poor visibility, elapsed time, and concerns for the safety of the rescue divers, rescue efforts were suspended until the next day.

When the search was resumed the next morning, the recovery divers found indications that Ridenour and Granger had entered a small side tunnel about 350 feet into the cave, accessible only with side-mount gear. When the tunnel was searched, Granger's body was found about 500 feet into the cave, with Ridenour about 50 feet beyond, at the end of the small tunnel. Their air cylinders were empty. Recovery divers brought both men to the surface.

1. *Gordon Jackson, "Two die in Suwannee cave dive," Jacksonville Florida Times-Union, 20 February 2001.*

2. *Gordon Jackson, "Diver says pair knew risks," Jacksonville Florida Times-Union, 23 February 2001.*
3. *Cindy Swirko, "Two cave divers are found dead in area springs," Gainesville Sun, 21 February 2001.*
4. *Accident Report, International Underwater Cave Rescue and Recovery, Underwater Speleology, v28n3, 2001, p. 4.*

Comments: The incident report notes that the two men violated several basic safety rules. They were untrained in cave diving, and were diving beyond their training and certification. They did not run a continuous guideline from open water, and did not reserve adequate air for emergencies. They had only one light between them.

26 February 2001
Cenote Escondido (Mayan Blue), Mexico
fatality, left guideline, out of air

Ron Fraga (46) drowned after running out of air when he apparently was unable to find his way out of the cave during a solo dive. He had completed an earlier dive of the A-Tunnel and the parallel Death Arrow Passage with his wife Nancy, and decided to make a second dive solo with a fresh set of tanks. His stated intention was to dive the A-Tunnel until he reached his 2/3 air mark and then exit. Fraga started his dive at 2:18 p.m. When he had not returned two hours later, his wife became concerned and went for help.

Rescue divers were called, and arrived at the cave at about 5:30 p.m. After agreeing on a plan of action, they entered the cave, following Fraga's primary line along the A-Tunnel. They encountered an abnormal amount of cloudy water, which was attributable to two earlier dives in the A-Tunnel that day.

About 1,100 feet into the cave and 21 minutes into the dive, they spotted Fraga's body. He was about 70 feet from the main Gold Line in an area where several offshoot lines separate from the main line. His double tanks were empty. He was lying on top of one of the offshoot lines, facing toward the Gold Line. The water was clear. There was no temporary jump line connecting to the main line.

The divers followed the offshoot line 250 feet down the passage to a room where it looped back to join the A-Tunnel. There was also no temporary jump line at that location.

1. *Incident report, International Underwater Cave Rescue and Recovery, 27 February 2001.*
2. *"Cave Diving Accident at Cenote Mayan Blue," www.scubadu.com.br/accidente_em_tulum.htm.*

Comments: The incident report notes that no one can be sure what happened, but it appears that Fraga became

disoriented and could not find his way out. He had failed to maintain a continuous guideline to the surface, and was not fully equipped for a solo dive. Fraga was a certified cave diver, having completed his certification four years earlier, and had logged 125 cave dives.

26 February 2001

Clarksville Cave, New York

fatality, stuck, inexperience, out of air

Robert Svensson (23), Jonathan Allison (23), Joseph Baj (24), and Michael Chu (22) entered via the Ward Entrance at about 7:00 p.m. planning to clear rocks and debris from the entrance to the sump passage in the Lake Room leading to Pauley's Avenue. All were experienced in dry caving, but none had any training or certification in cave diving. Allison and Baj had been certified in open water diving less than a year earlier, and Svensson had not yet completed his open-water certification. Chu was not a diver. Svensson had reportedly completed two sump dives at another location.

The group carried their diving equipment through about 1,000 feet of dry passage to the Lake Room, where a 10-foot deep pool hides the 3-foot wide, 16-inch high opening to Pauley's Avenue. Svensson, Allison, and Baj each used knife straps and a waist belt to fashion a thigh attachment system for a pony air bottle, regulator, octopus, and console. Other than masks, wetsuits and a single 4-AA flashlight strapped to the forearm, no other diving equipment was used.

The three divers took turns in the pool clearing debris from the passage opening. There is little flow in the sump, and the water was soon full of suspended silt, with zero visibility. Allison went down several times, and Svensson and Baj each made two trips into the pool. Allison had 400 psi showing on his tank (1/7 full) and Baj had 1700 psi (3/5 full) on his. Svensson had 1200 psi (1/3 full) remaining, and decided to make one more dive.

Svensson was down for several minutes when his bubbles stopped coming to the surface. The others were not alarmed at first, figuring that he had gone into the passage and that the bubbles were being captured there. When several more minutes passed with no sign of activity, they became concerned. Allison went into the water and searched for Svensson, feeling around until his tank was empty and he had to surface. Baj then entered the pool and also searched for several minutes, but could not find Svensson.

Chu left the cave to call for help, while Allison took Baj's tank and continued to search. This time he was able to find Svensson's feet in the entrance to the passage. He was able to move Svensson about a foot, but could not get him out. After two more attempts to get Svensson out, Allison's air supply was again exhausted. He made several more free dives, trying to pull Svensson out of the passage, before determining that the situation was hopeless.

Fire department and cave rescue personnel soon arrived, and called in trained cave divers to assist. Svensson was jammed in the tight passage, and his body was not recovered until three days later, after pumps were used to lower the pool and expose the entrance of the passage. Rescuers were then able to free his body and bring him out of the cave.

It was not clear how Svensson became trapped, but from the position of his body it appeared to rescuers that he became stuck when he tried to back out of the tight passage. This could have been due to rocks or obstructions shifting in the passage, or it could be that he was unable to maneuver his body around the bends and turns or past the overhang at the entrance to the passage. Unfortunately, he did not have enough air to allow him much time to deal with the situation.

1. *Mike Martuscello, "Clarksville Cave Dive Accident Profile," Northeastern Caver, v32n1, March 2001, p. 11.*
2. *Mike Martuscello, "Clarksville Cave, NY Death Accident Profile," Underwater Speleology, v28n2, 2001, p. 19.*
3. *Jake Kowalski and Jill Bryce, "College student dies in cave: Divers attempt to recover body," Schenectady Daily Gazette, 28 February 2001, p. A1.*
4. *Bruce A. Scruton, "Divers enter cave to recover body," Albany Times Union, 27 February 2001.*
5. *Bruce A. Scruton, "Diver's body trapped in cave," Albany Times Union, 28 February 2001.*
6. *Bruce A. Scruton, "Diver's body pulled from cave," Albany Times Union, 1 March 2001.*

Comments: Martuscello notes that "virtually every cave diving rule was broken on this dive." The divers were exceeding their training and certification. They did not run a continuous guideline from the surface. Svensson had only one light source, and did not follow the standard cave diving rule of thirds for air management. Martuscello further notes that the rule of thirds is not considered to be conservative enough for Northeastern sump diving, where a rule of sixths is often used, and that Svensson's air level indicated that it was time to exit the water, not begin a dive.

The incident report notes that the choice of equipment was not entirely unusual for the circumstances, explaining that the very restrictive, cold, and zero-visibility passages require one to use very specialized methods to safely dive such sumps. The goal is to get through the water-filled portion and into dry passage safely, and weights, buoyancy compensators, fins, etc. are sometimes considered luxuries. Svensson did not have the necessary training to safely use the techniques and equipment he was using or to dive safely in the environment where he died.

1 March 2001

Andros Blue Hole, Bahamas

fatality, cause unknown

A diver entered the Blue Hole wearing double 85-cubic-foot back-mounted tanks. When he failed to return in a reasonable time, the captain of the diving vessel alerted authorities. A recovery diver was dispatched to the scene, where a guideline was found leading into passage at a depth of 260 feet. The end of the line appeared to be frayed. A search of the immediate area failed to locate the diver.

Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 2 March 2001.

5 May 2001
Emerald Sink, Florida
fatality, inexperience, lost, out of air

Jason Burns (23) was diving with a group of friends and was about 300 to 400 feet into the cave when the divers turned out their lights to see how dark it would become. When they turned the lights back on, Burns' dive partner saw a light ahead of him and thought it was Burns. When the group reached the entrance, they realized Burns was missing and re-entered the cave to search for him. When they were unsuccessful, they left the cave to call for help. They encountered a group of divers from the Woodville Karst Plain Project at the entrance. The WKPP divers made two attempts to locate Burns. His body was found the next morning, about 1,000 feet into the cave, lying on the main guide line. He had run out of air.

1. *Rosanne Dunkelberger, "Body of missing diver found," Tallahassee Democrat, 7 May 2001.*
2. *Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 7 May 2001.*

Comments: Burns was certified as an open-water diver, but neither he nor any of his companions were cave or cavern certified.

7 May 2001
Devils Ear Spring, Florida
fatality, out of air

Steve Berman (40) failed to return from a solo mapping and exploration dive to a remote section of Devils Ear at Ginnie Springs. Recovery divers found his body about 3,500 feet into the cave at a depth of 100 feet. He had apparently run out of air.

Berman was found next to his guideline, with all his lights and equipment in working order, but with his air tank empty. His dive propulsion vehicle was about 125 feet away, in the direction of the entrance. A stage bottle of air was clipped to the scooter. Another stage bottle was found clipped to the main guideline about 2,300 feet into the cave.

1. *Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 10 May 2001.*
2. *Ed Dady, "For the Bermeister," Underwater Speleology, v28n4, 2001, p. 4.*
3. *Kathy Ciotola, "Prominent cave diver found dead in Gilchrist," Gainesville Sun, 9 May 2001.*
4. *Mike Branom, "Cave Divers Get Thrills, Dangers," Associated Press, 5 August 2001.*

Comments: Berman was a cave diving instructor with over 13-years of cave diving experience and more than two thousand cave dives in his log, including hundreds at Ginnie Springs and Devils Ear. He had all the right equipment, carried three diving lights, maintained a continuous guideline, and had all the training and experience in the world. He chose to dive solo, as many cave divers do, so no one knows what happened. Something went wrong, and he didn't make it back.

23 June 2001
Ginnie Springs, Florida
fatality, inadequate equipment, intoxication

Christopher Hill (23) and two friends decided to go swimming in the spring sometime after 11:00 p.m. Hill wore a mask and fins, and carried a handheld flashlight. When his friends got tired and left the water, Hill stayed in. The friends became concerned and called for help when Hill failed to surface and they could no longer see his flashlight. A diver was summoned to search the spring. Hill's body was found in 35 feet of water at the mouth of the cave. Witnesses told police that he had been drinking prior to the incident.

1. *Gordon Jackson, Another drowns at Florida cave site," Jacksonville Times-Union, 25 June 2001.*
2. *Karen Voyles, Graduate student dies in springs dive," Gainesville Sun, 26 June 2001.*
3. *Thomas B. Pfankuch, Underwater caves carry enormous risk to divers," Jacksonville Times-Union, 2 July 2001.*

5 August 2001
Great Blue Hole, Belize
fatality, cause unknown

Dr. Rueben Delgado (43) and his two sons were diving with a group exploring the Great Blue Hole at Lighthouse Reef. All the divers in the group were accounted for at -130 feet and again at -80 feet during the ascent. At about -25 feet, one of Dr. Delgado's sons noticed that he was missing and notified one of the dive masters. The dive master began an immediate search, and was joined minutes later by other divers from the dive boat. Their search was unsuccessful, as were later searches using a mini-submarine. The Great Blue Hole is over 400 feet deep.

1. *Press Release, Ramon's Village Resort, 6 August 2001.*
2. *"Miami Physician Dies in Blue Hole Diving Accident," Belize First, www.belizefirst.com/current.html, 8 August 2001.*

26 October 2001
Jackson Blue Spring, Florida
fatality, cause unknown

Jonathan Gol (46) had completed a dive in the cavern zone and was decompressing at -20 feet when he lost consciousness. He was quickly pulled from the water, but could not be revived. He had used compressed air during the active portion of his dive, and switched to another bottle for decompression. Later examination of the decompression bottle suggested that it might have been filled with 100% helium rather than oxygen. The valve had come loose, however, and the bottle was empty and had apparently become contaminated with air before it was tested, so no definitive answer could be determined. There was some concern that Gol might have had a problem related to a serious illness he had suffered several weeks earlier. An autopsy reportedly found no indication of physical problems that might explain the incident.

Incident report, International Underwater Cave Rescue and Recovery, www.iucrr.org, 2 November 2001.

1999-2001 Caving-related Incidents

23 June 1999

Lost Creek Cave, Tennessee murder victim left in cave

The body of Fredrick A. Mooney (38) was found by police in Lost Creek Cave on September 30, 1999. He had been reported missing by his mother, Mary Remley, on June 25. Police had been investigating his disappearance since June, and went to the cave based on information obtained earlier in the week.

Mooney, who was reported to be mentally disabled, was thought by police to have been beaten to death at a nearby establishment known locally as "The House of the Rising Sun." It is the home of Patricia Lewis, who was described as a fortune teller. Remley and Lewis were charged with murder and concealing a body, along with Lewis' 16-year old son, Kenneth Lewis, and a man named Greg Barnes.

Police said that they believed that the four had become angry at Mooney and decided to kill him and hide his body in the cave. He was believed to have been killed about two days before he was reported missing.

1. *Tracey LeFevre, "Four held in White County slaying," Cookeville Citizen-Herald, 2 October 1999.*
2. *Knight Stevender, "Police: Mom, pals beat disabled son to death," Nashville Tennessean, 2 October 1999.*

10 August 1999

unspecified cave, Ohio hiding from meteor in cave

Lloyd Albright (47), a computer programmer at the Kennedy Space Center, was found hiding in a cave in southeastern Ohio by deputies checking on a report of an unfamiliar car. Albright had been camping in the cave awaiting the impact of a large meteor he expected to strike the Earth at 4:00 a.m. on August 11.

When deputies checked Albright's car and found 16 guns and ammunition, they decided to search the surrounding woods. They found him in the cave, where he had been since at least August 8. He had been drinking water that dripped from the ceiling and was using a pool to keep his food cold.

According to Noble County Sheriff Landon Smith, "He very sincerely thought that there was a meteor that was going to hit the Atlantic Ocean and cause a tidal wave 200 feet high. It was going to go up the coast, take Florida for sure and there would be water all over Georgia." Albright was charged with disorderly conduct and released after posting bond. Deputies escorted him to the interstate and told him to head home.

Associated Press, "Man found in cave, fearing meteor," Cincinnati Enquirer, 18 August 1999.

Comments: Albright explained that the meteor strike would be caused by fragments from Comet Lee, and that it would occur within the next nine years. NASA said that the closest Comet Lee would come to Earth would be about 77 million miles in late September. The guns turned out to be legal.

4 March 2000

Garnet mine near Orogrande, New Mexico fatality, fell down mine shaft

An 18-year-old male was killed when he fell into an unstable entrance shaft in an abandoned mine near Orogrande. Local cave rescue personnel were called to help locate and retrieve the body. Due to continuing collapse of the shaft entrance, they entered the mine via an alternate shaft and followed a connecting tunnel to reach the body, which was then placed in a litter and removed from the mine.

Bob Rogers, "Body Recovery from Garnet Mine near Orogrande," Southwestern Cavers, v38n3, May-June 2000.

11 March 2000

Canteen Springs Cave, Utah snowmobile fell into cave

A woman riding an Arctic Cat snowmobile was traversing the hillside above the cave when she drove into the breather shaft above the entrance. She was thrown from the machine, which then fell down the shaft and into the cave.

Rodney Mulder, Incident report, 12 March 2000.

Comments: This is the second reported incident of a snowmobile being driven into a cave or pit entrance. See *American Caving Accidents, NSS News* December 1997 Part 2, page 438, for a report on a similar incident in Idaho in 1995.

19 March 2000

Let's All Pray to Jesus Cave, British Columbia rockfall, caver fall

David Ward (17), Sherell Ward (16), Chen-Hua Lee (16), Coop Carter (15), and Angel Anderson (17) were members of a church camp group hiking and ridgewalking along the north side of the Chilliwack River Valley opposite Slesse Mountain seeking caves or abandoned mines. They found a 6-foot deep breathing sinkhole and decided to dig it open. Several in the party were in the bottom of the sink when it began to collapse.

The diggers scrambled to the surface as the rocks shifted and fell, dropping the bottom of the sink more than ten feet in a few seconds. David Ward lost his left boot, received cuts on his foot, and lost his pack as the sink collapsed. Sherell Ward received cuts and injuries to her right hand from moving rocks. Lee suffered bruises to his lower body and lost his pack as well.

J. A. Clardy, Incident report, 31 March 2000.

Comments: None of the teenagers had any prior caving experience.

15 June 2000**Lechuguilla Cave, New Mexico
fell while hiking to cave, broken leg**

Bill Bentley (40) and five companions were hiking to Lechuguilla Cave in Carlsbad Caverns National Park when Bentley slipped on some loose rocks at a steeply sloping section of the trail and fell, fracturing his right fibula just above the ankle.

The group had an NPS radio with them, and called to notify park personnel. Using a makeshift crutch, Bentley was able to walk about 1/2 mile back down the trail until he was met by emergency personnel, who used a wheeled litter to help him back to the parking area. He was then taken to a hospital for treatment.

Bill Bentley, Incident report, 8 September 2000.

9 July 2000**Steeles Cave, West Virginia
rescued calf stranded in cave**

Ed Saugstad, Harry Fair, and Phil Murray were surveying in Steeles Cave on a Sunday afternoon when they encountered a calf that had apparently been stranded in the cave for several days after falling down the entrance sinkhole. They left the cave to notify the landowner, and returned with some rope, webbing, and a tractor.

After persuading the calf to return to the entrance area, they fashioned a makeshift harness and used the rope and tractor to haul the calf to the surface. The victim emerged and wobbled away, leaving the rescuers with a pile of soiled caving gear as a token of appreciation.

Ed Saugstad, "Rescue in Steele's Cave; or, Another Bum Steer," Monroe County Mudslide, v3n8, August/September 2000, p. 5.

12 August 2000**Rippled Cave, California
attacked by wasps while on rope**

Allen Hutchison was attacked and stung approximately seven times by wasps while on rope at the entrance of Rippled Cave. He was a member of a group which had rigged a simple rebelay course on a short cliff over the cave entrance, seeking to practice their vertical technique. Hutchison was in the process of passing the rebelay when he accidentally kicked a crack in the wall, which turned out to contain a nest of wasps. As the insects swarmed, Hutchison quickly switched to rappel and descended.

The group had a first aid kit containing some Benadryl, which Hutchison took to help reduce the pain and swelling. After half an hour, another caver tried climbing the rope, but also received several stings. The group then de-rigged their rope and left the area.

Cindy Heazlit, Incident report, 14 October 2000.

Comments: Heazlit notes that she had the Benadryl in her first aid kit as a result of past incidents of a similar nature.

14 October 2000**Buckners Cave, Indiana
fell into entrance, intoxication**

While visiting Buckners Cave with three companions, an intoxicated man fell approximately 11 feet into the cave entrance and was knocked unconscious. He was not wearing a helmet, and suffered a serious head injury in the fall. One of his companions went for help, and encountered caver Jeff Partlowe at the parking area. Partlowe used his amateur radio to call Chris Gilbert, who was on his way to meet Partlowe at the cave. While Partlowe went to locate the injured man, Gilbert asked another Ham operator to call emergency services.

When Partlowe found the victim, he was being carried down the trail by his hands and feet by the other members of his party. Partlowe told them that help was on the way, and convinced them to put the man down and wait. Gilbert arrived at the parking area at the same time as the first EMS vehicle, and led rescue workers to the injured man, who was about 100 yards down the trail. The man was placed in a litter and carried to the parking area, where a waiting ambulance took him to the hospital. He underwent surgery for his head injury, and was reported to have recovered.

1. *Chris Gilbert, Incident report, 12 January 2001.*
2. *Bruce Bowman, Incident report, 19 October 2000.*

10 November 2000**unnamed cave, Hawaii
swept into cave entrance, drowned**

A Wyoming man drowned after being swept into a small cave while swimming with friends in Kaukauai Stream, near Hana. The man reportedly lost his footing and was swept into the entrance of the cave, which was described as being "filled with 14 feet of water." His body was retrieved by firefighters using scuba equipment.

Associated Press, "Man drowns in stream cave," 12 November 2000.

12 November 2000**unspecified cave, Alabama
kidnapping victim left in cave**

A woman who was kidnapped, assaulted, and left unconscious in a cave in Blount County was found when she awakened and called 911 on her cell phone. Using information from their newly activated Enhanced 911 system, dispatchers were able to determine the location of the cell tower which handled the call, and notified the Blount County Fire Department to search caves in the area nearby. The signal strength of the call indicated that the woman was not far from the tower, and rescuers, who were familiar with the area, located the woman about 27 minutes after her call was received. She was taken to a hospital for treatment.

Associated Press, "Call from cave to 911 brought quick rescue," 13 November 2000.

**15 November 2000
Spitting Cave, Hawaii
fatality, jumped onto rocks outside cave**

A 20-year-old man was killed when he jumped from a 50-foot high ocean cliff at an area called "Spitting Cave." He reportedly misjudged his leap and struck his head on the rocks. A helicopter was used to rescue the man, who was taken to Queen's Medical Center, where he died.

Associated Press, "Leap claims life of 20-year-old man," 16 November 2000.

**18 November 2000
Indian Cave, Tennessee
illegal drug overdose in cave**

One person was hospitalized due to an overdose of LSD and Ecstasy, and 22 others were arrested on drug charges at a party held in Indian Cave in Grainger County. A crowd of more than 800 people reportedly attended the "Rave in the Cave" party, which was advertised on the Internet. The party's organizers had leased the cave from its owner for the event. Police set up a roadblock near the cave after complaints by local residents who were alarmed at the growing crowd. The police also issued approximately 150 traffic citations.

J. J. Stambaugh, "Neighbors not raving about dance party," Knoxville News-Sentinel, 21 November 2000.

**14 February 2001
Emisine Cave, Hawaii
caver fall, cut by sharp rock**

Cindy Heazlit (43) was carrying a 45-pound backpack while hiking to the entrance of Emisine with a group of cavers who planned to camp in the cave. It had been raining heavily

for several days before the trip, and the footing was very slippery as she made her way slowly across a lava field.

As she crossed over a lava dome, she slipped and slid down the side. She put out her hand to stop the fall and grabbed a piece of broken lava, which sliced deeply into the palm and thumb of her right hand. She was almost to the cave, so she waited until she could get inside and out of the rain to treat the wound.

Heazlit irrigated the wound with bottled water, applied antibiotic ointment from the first aid kit, closed the laceration with steri-strips and a Tegaderm patch, and wrapped her hand with gauze topped off with a layer of duct tape. She was able to continue the three-day expedition, but later developed a persistent infection in her hand which required a course of antibiotics.

Cindy Heazlit, Incident report, 26 February 2001.

Comments: Heazlit recommends wearing heavy gloves when hiking in wet lava, and notes that the fact that the group had well-stocked first aid kits allowed her to continue with the expedition.

**24 April 2001
unspecified lava tube, Hawaii
fatality, fell into entrance, stuck head-down**

A 47-year old woman died when firefighters were unable to rescue her after she fell and became stuck head-down in a 2-foot wide, 15-foot deep lava tube opening. The woman had been searching for her lost puppies, and found them in the tube. In the process of trying to extricate them, she fell and became stuck. No other information was available.

1. "Woman dies trying to save her puppies," Honolulu Star-Bulletin, 26 April 2001.
2. *Cindy Heazlit, Incident report, 30 January 2003.*



Moving the litter in Pettijohns Cave, Georgia. Photograph by Jeff Burns, Copyright © 2003.

The National Cave Rescue Commission

The National Cave Rescue Commission (NCRC) is a volunteer group developed to train cave rescue personnel throughout the United States. It is part of the NSS, located within the Department of the Administrative Vice-President.

The NCRC does not perform cave rescues. It organizes, develops, and provides training in cave rescue techniques, maintains lists of cave rescue trained persons, and can help locate rescue resources in times of need. Most NCRC-trained cavers do participate in rescues, but not as part of the NCRC. They work as members of their local rescue squads, civil defense units, or cave rescue groups.

The NCRC also works to:

- Maintain good working relationships with other rescue-oriented individuals, organizations, government agencies, and sources of specialized equipment and services (*e.g.*, the Air Force Rescue Coordination Center and Center for Mine Safety and Health Administration).
- Maintain current files of possibly useful equipment (*e.g.* underground communications equipment, cave-oriented medical kits) or services which can be obtained through the above sources.
- Acquire and maintain a limited supply of certain equipment such as special rescue litters and vertical rescue gear in key locations throughout the country.
- Increase the number and proficiency of cave rescuers across the U.S., by sponsoring training sessions and seminars, and by encouraging other caving, rescue, or EMS organizations to sponsor such educational programs.
- Encourage international cooperation by developing contacts with cave rescuers and rescue agencies in other countries, by preplanning with these groups where US involvement is anticipated, and by inviting participation of cave rescuers from other countries in NCRC seminars.

Organization

The NCRC is led by a Board of Regional Coordinators. The Board includes a National Coordinator, Training Coordinator, Medical Coordinator, and Diving Coordinator (each of whom coordinates resources and activities at a national level), and Regional Coordinators for each of ten regions in the United States and its territories. Board members

are nominated by cavers and cave rescue personnel, and appointed by the NSS Board of Governors. The NCRC depends on many volunteers without official positions whose special knowledge, talents, or contacts make the network more effective.

Training

The NCRC sponsors a week-long Cave Rescue Operations and Management Seminar each year that is held in various locations around the US. The seminar serves as a "boot camp" of cave rescue and involves three levels of training. Cave rescue is constantly evolving, and the most up-to-date techniques are presented each year. In addition to the annual national week-long seminar, the NCRC regions sponsor regional week-long seminars, regional modular seminars (taught over a series of weekends), courses in small-group and self-rescue techniques, and weekend cave rescue orientation courses.

NCRC seminars consist of extensive classroom and field work designed to maximize the learning experience. The cave rescue programs provide studies in underground environments, vertical rescue, mechanical advantage systems, extrication techniques, basic medical principles, communications, and management of cave rescue operations. Emphasis is placed on practical skills and techniques, with realistic exercises in a variety of cave environments.

The seminars provide basic and advanced material for students who typically include cavers, emergency services personnel, and emergency managers. During the eight days of a seminar, students receive about 100 hours of instruction, and are "on the move" from early morning well into the evening. The NCRC uses and teaches the Incident Command System (ICS) used by fire departments, rescue squads, and other emergency agencies and services.

Course Listings and Contact Information

Information on NCRC operation, activities, and training, including contact information for NCRC Coordinators, is published each year in the NSS Members Manual, and is also available on the NCRC web site at www.caves.org/io/ncrc. Upcoming seminars are announced on the web site and in the *NSS News*.

National Cave Rescue Commission Course Listings and Contact Information:
www.caves.org/io/ncrc

Report accidents and incidents via the Internet at **www.caves.org/pub/aca**

or mail reports and information to:

**American Caving Accidents
National Speleological Society
2813 Cave Avenue
Huntsville, Alabama 35810-4431**