NSS NEWS

VOLUME 82
ISSUE 05

MAY
2024

AMERICAN CAVING ACCIDENTS



NSS NEWS

AMERICAN CAVING ACCIDENTS EDITION

National Speleological Society Headquarters

6001 Pulaski Pike NW, Huntsville, AL 35810
(256) 852-1300
email: nss@caves.org; website: https://caves.org/
Please contact the office for address changes or back issues.

NSS EXECUTIVE COMMITTEE

President
Kristine Ebrey
South Pittsburg, TN
(423) 991-3034
president@caves.org

Operations VP
Maureen Handler
Sewanee, TN
(423) 605-5569
ovp@caves.org

Administrative VP
Emily P. Davis
Tennessee
(912) 655-0781
avp@caves.org

Secretary/Treasurer
David Oase
Tucson, AZ
s-t@caves.org

Executive VP
Scott Engel
Knoxville, TN
(225) 281-3914
evp@caves.org

Managing Editor

Joel Despain
nssnews@caves.org

Production Editor

Adam Weaver
nssnews@caves.org

Please include "NSS News" in your subject line when e-mailing news content, to help sort it out from spam. Thanks!
Questions about submitting features and photos? Please see the style and submission guidelines on the NSS website:
https://caves.org/nss-news-submission-guidelines/

DEPARTMENT EDITORS

American Caving Accidents
Adia Sovie
aca@caves.org

Spelean Spotlight
April Gocha
april.sandy.gocha@gmail.com

Conservation
Val Hildreth-Werker
conservation@caves.org

Underground Update
Ian Reuter
ianreuter@aol.com



West Virginia, wild and wonderful "this was my take on the classic view from the top of suicide falls into the big room of Cass Cave. Tom Spotloe is visible several times, firing a no. 50 clear flashbulb in a 14" reflector. Cassandra Moseley is seen somewhere in the breakdown taking photos with her phone. We took this photo on a permitted trip. the waterfall was so cold around my feet that my knees were numb by the time we were done." - Ryan Maurer

CALENDAR OF EVENTS

May 17 to 19, 2024
Spring MAR Field Meet at McClure Bean Soup Festival and Fairgrounds, McClure, Pennsylvania.
Sponsored by the Bald Eagle Grotto. Website at:
https://baldeaglegrotto.weebly.com/spring-mar-2024.html

June 2 to 8, 2024
National Park Service Cave Week. National parks in the US and Canada and NASA are participating

June 6, 2024
International Day of Caves and the Subterranean World

July 1 to 5, 2024
NSS Convention in Sewanee, TN.
https://caves.org/convention/2024-nsss-convention/

August 9 to 11, 2024
60th Annual Hodag Hunt at Prairie Island Campground, 1120 Prairie Island Road, Winona, Minnesota. Sponsored by the Wisconsin Speleological Society. Website at https://wisconsincaves.org

Aug. 29 to Sept. 2, 2024
The 73rd annual Old Timers Reunion, themed caves, cavers and caving will be held in Dailey, West Virginia. Website at: https://www.otr.org

Sept. 9 to 14, 2024
26th International Conference on Subterranean Biology & 6th International Symposium on Anchialine Ecosystems in Cagliari, Sardinia, Italy. Early registration rate ends April 30, abstracts are due May 31.
https://www.abcdarkworld.com/icsb-conference/

Sept. 29 to Oct. 3, 2024
International Show Caves Association Conference at Mulu National Park, Malaysia

Nov. 7 to 10, 2024
Karst Waters Institute & West Virginia Cave Conservancy are sponsoring the 4th Appalachian Karst Symposium in Lewisburg at the WV School of Osteopathic Medicine's Roland P. Sharp Alumni Center. Registration includes entry to annual WVCC Banquet on Saturday. Additional information: https://karstwaters.org/conferences/appalachian-karst-symposium-2024/ Questions? email appkarst2024@karstwaters.org

October 6 to 10, 2025
National Cave and Karst Management Symposium in Ely, Nevada, and hosted by the Western Cave Conservancy. This is the nation's top forum for promoting, advancing and sharing concepts in the effective management of cave and karst resources. See:
https://ely2025.nckms.org/

January 21 to 25, 2025
85th Anniversary of the Speleological Society of Cuba, International Congress. At Playa Los Bajos Gibara, Holguín, Cuba. See more details at:
https://www.fealc.org/index.html

July 20 to 27, 2025
19th International Congress of Speleology in Belo Horizonte, Minas Gerais, Brazil

VOLUME 82, NUMBER 05 - MAY 2024

THE 2021-2022 AMERICAN CAVING ACCIDENTS

American Caving Accident Reports
2021 and 2022

American Caving Accidents, Editor
Adia Sovie
Lexington, Kentucky
aca@caves.org

American Caving Accidents, Review Committee:
Andy Armstrong
Richard Breisch
George Dasher
Yvonne Droms
Mark Minton
Stephen Mosberg
Rene Ohms
Sarah Richards
Christian Stenner

Webmaster: Brian Dickey

Maps on page 29 by Rene Ohms

additional research and analysis by Kimberly Lughart and Anmar Mirza

ADDITIONAL CONTENT:

- THE PRESIDENT'S COLUMN-----4
- SOCIETY NEWS----------7
- BOOK REVIEW----------21
- SPELEAN SPOTLIGHT----------30
- 2024 CONVENTION UPDATE----32
- ERGOR RUBREK----------34
- CLASSIFIED ADS----------35

BACK COVER

Training exercise, moving the stretcher in a cave, Alberta.
Photo Christian Stenner



THE PRESIDENT'S COLUMN

BY KRISTINE EBREY

Well, folks, as we have promised, the time has come for the NSS to hire an executive director (ED). At the last Board of Governors (BOG) meeting, we approved the final draft of the NSS BOG manual and the restructuring plan. I will go through step by step what this means for you as a member. I am going to keep this high level, but have included links to the documents for further research if you want to learn more. Also, the vote was unanimous, so any of the BOG members can chat about this transition if further clarification is needed. Members can also reach us at BOG@caves.org. The restructuring proposal that was approved can be found here: https://caves.org/wp-content/uploads/2024/03/NSS-Restructuring-Proposal_2024-2-7.pdf

We have chatted with our membership about this change for more than two years. We had a couple of town hall meetings; BOG members spoke at several grotto meetings, and we conducted a session at last year's convention. I have personally mentioned it 983 times (ish) and at every opportunity, including the president columns. We created a document that has been published on our website for almost a year now. This document reviews the decision process and proposal for hiring an executive director. Take a look at: https://caves.org/uncategorized/the-case-for-an-nss-executive-director/

I have personally been very supportive of this effort. It was not a goal when I first ran for NSS director, nor was the NSS in a place either financially or mentally for such a transition. We had much bigger issues than; our rapidly declining membership, along with general discord and low morale for the NSS leadership. We put our energy and efforts exactly where it needed to be at that moment, our membership. What I saw in that period though, as our BOG worked very hard to turn things around, was that it was a major drain on our volunteers. It truly is a thankless job and, in that period, of very tough conversations and cruel criticism, it took its toll. We lost a lot of great folks from burnout. When I became secretary-treasurer, and became engrossed in our finances, one thing became clear to me. The NSS will not sink because of bankruptcy, the NSS will sink because of the loss of volunteers to run the operations and organization.

Based on that realization, it became imperative to me to start looking closely at the organization, and to seriously consider what the future would look like. It was a very clear path, the NSS needed an ED, as it could not flourish under voluntary labor alone. When I became president, I promised I would be the last president of the NSS. This will be one of the last president's columns, because the president position, along with the other officer positions, except for the secretary-treasurer, will be retired on July 1, 2024.

The amount of research and preparation that our BOG members, bylaws committee and members of our ad hoc Executive Director Committee performed is exhaustive. In this extensive research, we learned that having an executive committee and ED would be problematic in operational structure and command. I agreed, as I couldn't envision a structure that had two figureheads. That would be confusing when interacting with members and navigating responsibilities. We also realized that we would have to modify our entire BOG manual to handle the new operational structure that was being proposed. Some may remember that we dedicated the entire BOG meeting last convention to review every single act and bylaw for this major overhaul. Now, all the pieces are in place, and we have set the date. We will hire a professional headhunter firm to search, vet and recommend candidates for the ED position. We will be working with this firm to finalize the job description and requirements (including salary and location) in the next couple of weeks, so the search can begin. An interim ED will be installed if we are still in the hiring process on July 1, 2024, so our restructuring plan will not be affected if the process takes longer.

While the search for the ED is commencing, the BOG will begin our internal transition. We created an ad hoc transition committee. This committee will work to fill the new department head positions with the assistance of the officers. We will also assist the officers on communicating with the committees and divisions on the structural changes. We anticipate the committees are untouched except for who they report to. Where previously it would have been an officer, now it is a department head.

The nominating committee responsibilities have been expanded this year. They will finalize the current director election and will be tasked with finding candidates for the appointed director positions. The new structure allows the BOG to appoint one director every year, three directors will continue to be elected by the membership. This was a critical change, as our Board is moving into a strategic role in the NSS. We need to be able to appoint professionals with the skill sets required for our future endeavors. The BOG will vote on the appointed director(s) each year from the candidates provided by the nominating committee. I do urge members to review the restructuring proposal for details on this process if you are interested in a deep dive into this new structure.

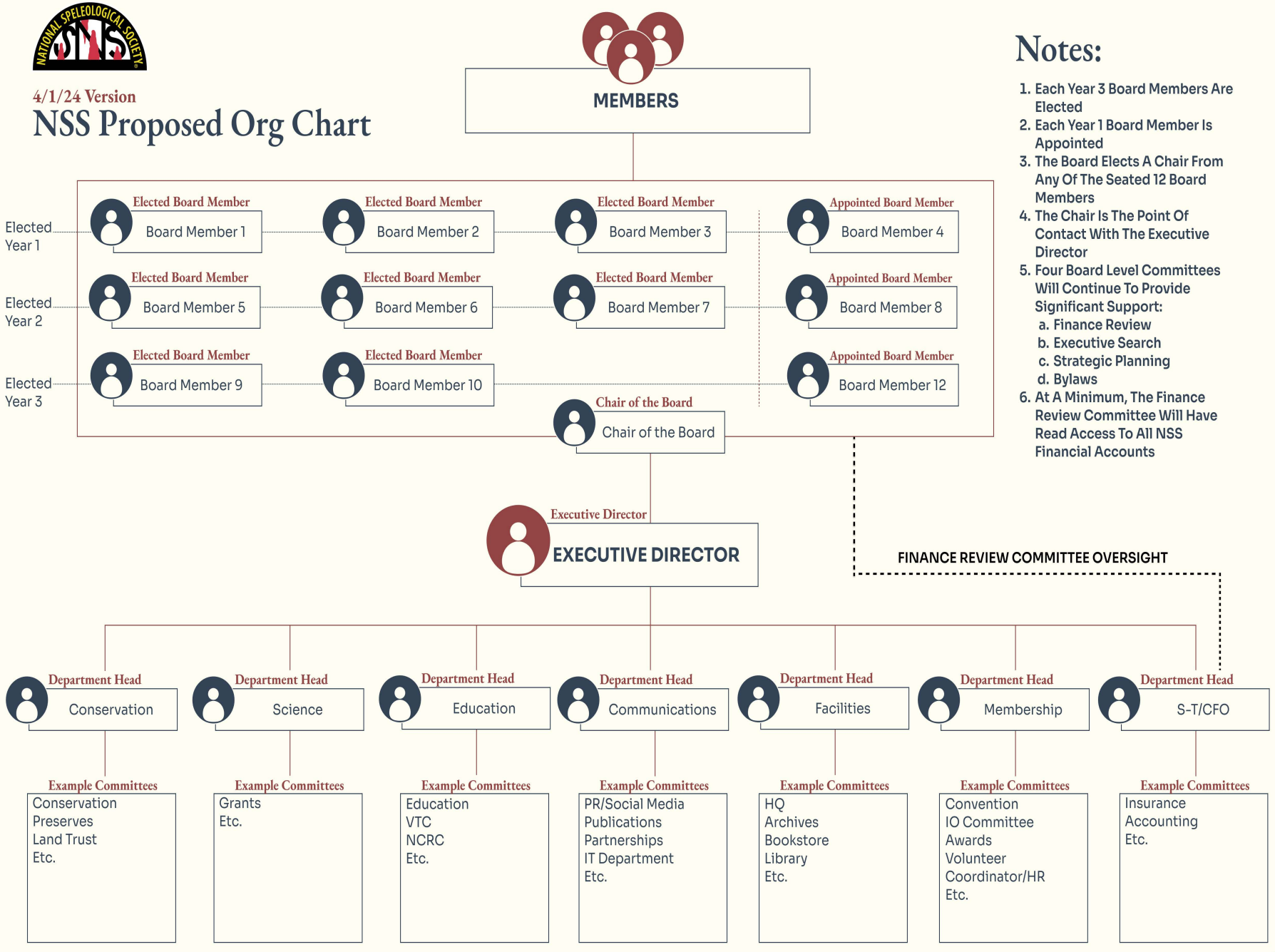
This year's convention will be similar in structure as the past. The exception is that the officers will no longer be officers, although we will assume our historic roles one last time. I will still be around for the opening ceremony, I will take kiddos caving, and I will be presenting the last of the President Appreciation Awards at the banquet. We will not be in the BOG meetings as we are no longer part of the governing body of the NSS.

That torch will be officially handed to the directors and the soon-to-be ED on the first day of the convention. I am humbled to be part of this transition and so very proud to have served the membership for the last several years. It truly has been an honor and an experience that I will always cherish.

Many, many years ago, I was talked into not giving up on the NSS. It was the best decision I ever made. Thank you, Julie, and a heartfelt thank you to every volunteer I have served with. And, of course, I would be remiss if I didn't give a huge shoutout to my canoe partner through all of this. The NSS couldn't be in this position without you. Thank you, Pete Johnson. And last but not least, thank you to the members for bearing with us during this transition and supporting the largest cave organization in the world and your community, the NSS!

4/1/24 Version

NSS Proposed Org Chart



Notes:

1. Each Year 3 Board Members Are Elected
2. Each Year 1 Board Member Is Appointed
3. The Board Elects A Chair From Any Of The Seated 12 Board Members
4. The Chair Is The Point Of Contact With The Executive Director
5. Four Board Level Committees Will Continue To Provide Significant Support:
   a. Finance Review
   b. Executive Search
   c. Strategic Planning
   d. Bylaws
6. At A Minimum, The Finance Review Committee Will Have Read Access To All NSS Financial Accounts

4

SOCIETY NEWS

Cave Ballads

Submissions for the 2024 Cave Ballads competition are due June 1st. Official submission guidelines are found on our caves.org website at https://caves.org/salons/cave-ballad-submissions/. Please take a look at it. There is a fee of $10 per submission, which we always hope will cover the cost of making and mailing you a professional CD as a thank-you announcement of the year's winners. And if enough cavers participate, it will. If you need advice or have questions, I am here for you. Roland Vinyard, Cave Ballad Chair: 518-673-3212, balladsalon@caves.org. Mailing: Roland Vinyard, 597 State Highway 162, Sprakers NY 12166.

More Cave Archaeology

Exciting discoveries in cave archaeology seem to continue at a rapid pace. The oldest painted art in South America was revealed in a cave in Patagonia nia in southern Argentina earlier this year. Huemal 1 Cave has paintings 8,200 years old. Earlier estimates had hypothesized that the paintings were a few thousand years old. The paintings are red with varied shapes and parallel lines. The site is arid, possibly helping to preserve the faint paintings, but also likely making life for original inhabitants of the area more difficult.

Teeth from a man in what is now Ireland who died 4,000 years ago were found in a limestone cave. The teeth have revealed important information for human dental health through the genetic material left behind by mouth-dwelling microbes, including those that cause decay. The genes showed a diverse set of microbes, on at least one of the teeth, in comparison to the dominance of a much simpler genome and range of microbes found in our mouths today.

How NSS Youth Group Liaison Committees Work

Each region of the NSS should have a Youth Group Liaison Committee with a Regional Coordinator. The coordinator helps youth groups and organizations with program development and to find resources related to caves and caving for their programs. It is hoped that regional coordinators generally know the needs of their grottos and the needs of area youth groups and should share those needs to the rest of the committee. Regional coordinators are usually people who are active in youth programs and who are passionate about sharing their love of caving with kids. While regional coordinators fulfill a leadership role across multiple grottos and states, that does not mean they cannot take kids caving. But, they would do so as a member of their grotto, the NSS or another organization.

2024 - 2025
Charles W. Maus Fellowships
in Karst Studies

Doctorate Fellowship	$20,000
Master's Fellowship	$10,000
Undergraduate Scholarship	$6,000

Cave Conservancy Foundation

A broad range of karst and cave
related research is considered for funding.
All applications due June 1, 2024.

Information on how to apply for graduate fellowship
and undergraduate scholarships may be found at
www.caveconservancyfoundation.org

804 - 798 - 3432

EDITOR'S NOTE FOR THE 2021 AND 2022 AMERICAN CAVING ACCIDENTS

BY DR. ADIA R. SOVIE, NSS 69077

Since I joined the NSS in 2018, I have read every new issue of the American Caving Accidents (ACA) cover to cover; doing so made me a better and safer caver. The day the ACA arrives at our house, my entire family devours the publication. We discuss each incident over dinner, evaluating how we can change our habits to avoid similar situations or talking over how to evaluate risks when making decisions. The goal of the ACA is to collect incident reports, provide comments, analyses, and editorials, so readers can learn from the experiences of others and become safer cavers.

For the past decade Bonny Armstrong has served as the volunteer editor for the ACA, she worked tirelessly to provide the best reporting and analysis of cave accidents and I can only dream of adequately filling her shoes. Please join me in thanking Bonny for her time and dedication to the most important publication the NSS produces!

Over the course of several phone calls and emails, Bonny brought me up to speed (warp speed) on what goes into publishing the ACA. Bonny shared that the hardest part of the job is getting people to submit accident reports. Cavers may not report incidents due to fear of embarrassment, lack of time, concern that the incident is not noteworthy, or because they assume someone else will report the incident. My main goal as editor is to help break down the stigma of being involved in or reporting an accident. I will take anonymized reports, and I encourage everyone to share their authentic experiences with the community. As a fellowship of cavers, if we want to foster a community of safety, we must maintain a supportive and compassionate dialogue about caving accidents.

Making a report to the ACA is quick and easy! You can submit a form at https://caves.org/american-caving-accidents/submit-report/ or email me at aca@caves.org. I am even happy to set up a phone call to take your report. All submissions are edited for clarity – so don't worry about crafting the most riveting narrative, that is my job. Most caving-related incidents are worthy of reporting. Close calls, incidents where there was high probability for injury, but none occurred, are particularly helpful to highlight how to "break the chain" of errors that ultimately lead to accidents. Finally, please do not assume that someone else will report an incident, receiving incident reports from multiple sources can deepen our understanding of an event by viewing the scene from multiple perspectives.

As I take over the reins of the ACA, I will remain focused on the mission of the NSS, specifically as it applies to protecting caves and promoting responsible cave exploration. Bonny set a standard of excellence in her time as editor that I can only hope to emulate. You will notice, however, that I do have my own voice and the style and focus of this issue may differ from previous installments. Please reach out to me at aca@caves.org with constructive comments, questions, and concerns. I am eager to learn and improve the ACA!



Cave rescue stretcher movement training practice above ground, Canmore, Alberta. Photo Christian Stenner

AMERICAN CAVING ACCIDENTS REPORTING TYPES

DESCRIPTION OF INCIDENT RESULTS AND TYPES

American Caving Accidents (ACA) is a special publication of the National Speleological Society (NSS). Since 1967, ACA has served as the journal of record for caving accidents in North America. The purpose of collecting and reporting caving accidents and incidents is to help cavers educate themselves on the hazards of caving based by assessing real-life incidents. These incidents, when reported accurately and in detail, help readers become safer cavers by learning through others' experiences.

Reports are collected through submissions from individuals involved in the incident or rescue, or by those who otherwise have some credible knowledge of the event. Caving incidents brought to the attention of ACA by media reports are verified for accuracy by contacting parties involved when possible.

As with previous issues, this report is divided into regular caving and cave diving accidents. These categories are further classified by incident result or outcome, and incident type (causes and contributing factors). The NSS Cave Diving Accident Analysis Committee and Comité Regional de Espeleobuceo, Ecología y Regulación (CREER) conduct detailed, technical, and systematic analysis of cave diving accidents in North America. These reports are reproductions edited for brevity and a general audience. Please visit https://nsscds.org/accident-analysis/ for links to detailed analysis and technical reports.

Some incidents are placed in a separate category called "caving-related." These include incidents in which a person needed rescuing from a cave that they did not intend to enter, incidents that occur on the way to or from a cave, incidents involving animals needing rescue from a cave or other unusual circumstances. Because these incidents did not occur during normal caving activities but required caving gear, cave-rescue techniques or cavers to affect a rescue, they are considered caving-related. Caving-related incidents are not included in the statistics.

Description of Incident Results

Fatalities – Fatalities from caving are relatively uncommon and average about three per year. Although fatalities tend to occur with inexperienced, ill-equipped persons, experienced cavers are not exempt.

Injury vs. No Injury – An injury is physical damage or harm inflicted on a person, usually by an external force. Examples include wounds, fractures, contusions, burns, smoke inhalation, and frostbite. Heart trouble, allergic reactions, migraines, and other conditions are not considered injuries and are categorized as a medical issue incident type.

Aid vs. No Aid – For the purposes of this publication, aid is considered rendered in the following cases: if one or more persons needed the help of others outside of those in their caving party to exit the cave, if outside or additional assistance was requested (even if not used), or if an ambulance or Life Flight was used to transport the patient to a medical facility.

Description of Incident Types

Acetylene-related – Acetylene-related incidents were more common in the 1960s and 1970s than during the last few decades. No acetylene-related incidents have been reported since 1996, probably because LED lights are now favored among the majority of cavers.

Bad Air – The presence of bad air in caves can be caused by biological decomposition, poor air exchange, carbon monoxide from fires, blasting fumes or chemicals being washed into the cave.

Caver Fall – Caver falls continue to constitute a large proportion of caving accidents. For simplicity, any fall by any person in a cave, regardless of their experience, is considered a caver fall.

Difficulty on Rope or Ladder – The category of difficulty on rope or ladder was added to ACA in 1994 to encompass a variety of problems that may prevent a caver from ascending or descending a rope or ladder.

Drowning – Drowning is often listed as the cause of cave diving fatalities since the triggering event is often difficult to identify. In non-scuba incidents, drowning may occur from attempting to freedive into an underwater cave, swimming in underground lakes or rivers, or being swept away by water.

Equipment Problem – This catch-all category includes problems such as rigging, light and rope failures, and the misuse or lack of equipment.

Exhaustion – Exhaustion is likely a contributing factor to many caving accidents and is probably underrepresented in caving accident statistics.

Flooding – Unexpected, rising water can lead to long-term entrapment underground, hypothermia and possibly drowning. A good understanding of cave hydrology and the local weather forecast are necessary skills for safe caving.

Hypothermia – Hypothermia is often a secondary result in caving incidents resulting from a caver being stuck, injured or stranded in a cave. Hypothermia is especially dangerous not only because of the physiological aspects, but because it impairs judgment, which can lead to mistakes and other accidents.

Medical Issue – Some incidents that occur underground cannot be contributed directly to the caving activity. Chronic or acute medical conditions may present suddenly such as cardiovascular events, migraines, allergic reactions, etc
Lost – Getting lost underground can happen to experienced and beginning cavers. Strategies to avoid becoming lost include: Go with someone who knows the cave, take a cave map (and know how to read it) and pay attention to landmarks. Always let someone know where you are going and when to expect your return. If you are overdue, a rescue can be quickly organized.

Lost Control on Rappel – This incident-type category was added in 2011 to cover incidents of persons losing control while on rappel. In previous issues, these incidents were listed under Caver Falls or Difficulty on Rope. While most out-of-control rappels also result in a caver fall, the contributing factor or cause is very different than those typical for caver falls.

Rockfall – Shifting or falling rocks, either from natural causes or human disturbance, can result in entrapment, injury or even death. Pay extra attention near the top and bottom of pits.

Stuck – Stuck refers to the physical entrapment of a person, which prevents them from moving from their position. Being stuck is a serious situation as it can lead to hypothermia and possibly crush syndrome.

Trapped or Stranded – This category describes any incident in which the caver or cavers are prevented from exiting the cave.

Other – This catch-all category includes incidents that don't quite fit in other categories. Examples include twisting an ankle or pulling a muscle during normal caving movement, missing a callout time, surface objects falling into a pit, vandalism of rigged entrance ropes, and entrapment of a finger between two objects.

Cave Conservancy Foundation

The Cave Conservancy Foundation has funded karst scientific research as well as conservation and education projects since 1995. Grant requests of $1,000 or less may be submitted at any time. Applications for major grant requests must be submitted by March 1 and October 1, respectively, for consideration at the spring and fall Board meetings.

Information on how to apply for grants may be found at www.caveconservancyfoundation.org

804 - 798 - 3432

CAVING ACCIDENT AND INCIDENT STATISTICS

Result of Incident

Result	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
Fatality	5	3	1	0	4	2	5	0	8	1	6	1	1	3	0	2	1	3	3	4	3	4	1	4	6	5	5	1	2	1	4	4	4
Injury and Aid	4	3	2	3	6	4	9	11	10	6	5	5	8	10	11	10	6	16	6	10	15	11	16	18	16	17	22	19	17	16	22	14	14
Aid, No Injury	5	5	2	6	1	7	11	6	15	2	9	13	9	8	12	8	18	17	6	21	15	20	20	23	20	28	33	26	17	16	13	13	18
Injury, No Aid	6	1	4	2	2	5	8	5	6	5	6	5	5	6	4	12	13	17	18	10	15	14	14	10	12	10	4	11	9	10	4	2	8
No Injury, No Aid	0	2	4	0	2	2	8	6	1	6	8	4	6	4	7	15	14	14	25	19	16	12	21	9	12	16	3	20	12	11	4	8	3
Total	20	14	13	11	15	20	41	28	40	20	34	28	29	31	34	47	52	67	58	64	64	61	72	64	66	76	67	77	57	54	47	41	47

Incident Type

Type	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
Caver Fall	4	3	4	2	6	4	8	9	9	9	5	6	7	9	10	6	12	25	19	25	14	20	19	22	22	22	19	20	15	21	27	15	20
Trapped/Stranded	2	1	0	3	2	3	5	2	4	2	5	4	5	8	3	4	6	5	2	6	2	6	0	8	6	6	1	13	18	19	13	10	17
Difficulty on Rope	1	4	2	0	1	0	6	5	1	2	3	3	5	2	2	7	7	10	4	1	1	0	0	0	0	0	3	11	4	6	5	1	4
Rockfall	4	2	1	0	1	4	2	1	6	2	3	6	0	0	2	11	8	7	10	11	17	7	11	11	12	16	11	12	10	5	5	2	4
Lost	0	1	0	2	0	3	4	5	6	0	1	2	1	1	3	1	3	5	4	7	4	3	9	4	3	2	5	12	7	4	5	3	3
Flooding	0	0	1	0	0	0	0	1	3	0	1	1	3	1	3	6	2	0	3	0	3	3	4	2	2	1	3	1	4	5	2	1	4
Hypothermia	1	1	0	0	0	0	1	0	3	0	2	0	0	0	1	1	0	0	0	1	2	0	5	0	2	4	0	3	6	6	2	2	2
Illness/Medical Issue	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	1	3	1	1	0	0	2	3	2	1	0	3	3	0	1	1	8	0
Exhaustion	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	2	1	0	0	1	1	3	0	2	4	2	4	1	4	1	1	2
Drowning	0	1	0	0	2	0	3	0	0	0	0	0	0	0	0	1	0	2	0	1	2	0	2	2	2	2	0	0	0	1	0	0	1
Stuck	1	1	0	2	0	1	1	0	1	1	1	1	0	1	0	1	3	2	0	3	1	0	1	1	3	5	5	2	1	2	0	1	5
Bad Air	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	3	2	1	1	1	2	1	1	2	2	1	0	1	0
Acetylene-related	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	3	0	0	1	3	0	1	1	0	0	0	1	3	1	1	0	0	0
Equipment Problem	0	1	3	0	2	2	2	4	6	3	3	2	3	2	4	1	4	6	4	11	15	14	20	15	15	16	8	11	4	4	2	2	0
Lost Control on Rappel	1	0	2	1	1	0	1	0	0	1	2	1	0	3	0	1	0	0	1	2	0	1	1	2	2	0	1	1	0	2	3	0	0
Other	2	0	0	1	0	1	4	0	0	0	3	2	4	4	3	2	1	3	7	2	4	8	6	8	4	5	4	6	6	3	2	3	2
Caving-related Incidents	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0	0	0	0	0	2	1	0	2	0	1	1	5	2

Cave Diving Incidents

Result	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
Fatality	4	0	0	2	0	4	1	8	9	2	1	4	2	5	2	0	2	3	7	7	5	9	4	8	2	5	6	8	6	2	2	0	5
Injury and Aid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Aid, no Injury	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	1
Injury, no Aid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
No Injury, No Aid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	1	2	1	1	0	5	1	0	1	0	0	0	0	0
Total	4	0	0	2	0	4	1	8	9	2	1	4	3	5	3	0	2	3	10	9	7	10	5	8	8	7	6	9	7	2	2	1	7

CAVING ACCIDENT AND INCIDENT STATISTICS 2000-2022

Result of Incident

Result	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
Fatality	2	5	2	6	3	0	4	1	4	3	5	3	2	2	2	4	5	6	3	2	1	2	0
Injury and Aid	20	11	15	9	7	8	15	9	9	9	8	9	5	6	8	5	14	5	9	4	2	4	1
Aid, No Injury	15	13	8	14	12	8	12	9	7	5	7	6	10	10	6	8	10	8	11	4	4	3	5
Injury, No Aid	3	6	6	6	0	10	4	7	2	2	7	6	9	5	9	8	9	11	4	6	3	4	4
No Injury, No Aid	1	2	4	5	1	1	1	1	3	3	2	3	1	2	5	12	5	6	5	8	2	6	6
Total	41	37	35	40	23	27	36	27	25	22	29	27	27	25	30	37	43	36	32	24	12	19	16

Incident Type

Type	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
Caver Fall	17	14	20	14	5	10	12	11	11	10	13	8	8	10	10	10	13	13	7	9	3	7	4
Trapped/Stranded	4	9	10	15	6	5	7	4	3	3	4	2	3	5	5	2	6	5	0	3	0	1	1
Difficulty on Rope	3	1	5	5	1	2	2	2	2	1	2	4	1	2	0	4	3	2	1	3	2	3	1
Rockfall	2	3	3	5	3	7	4	4	3	1	1	1	3	1	3	0	3	1	0	2	2	0	3
Lost	3	1	1	5	4	2	3	4	2	0	1	2	1	1	1	0	2	1	4	1	1	1	2
Flooding	1	1	0	6	1	0	1	0	0	1	0	0	1	0	1	0	3	0	3	0	1	1	0
Hypothermia	3	1	1	3	0	1	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	2	0
Illness/Medical Issue	2	2	2	1	2	2	0	0	1	0	1	2	2	2	1	3	0	2	2	1	0	1	0
Exhaustion	3	1	2	1	0	0	2	0	1	0	1	0	0	1	0	1	2	1	0	0	0	0	0
Drowning	0	1	0	3	1	0	1	1	1	1	0	1	0	0	2	1	0	3	1	0	1	0	0
Stuck	3	5	0	1	6	3	2	0	2	2	3	1	5	0	2	1	0	0	3	0	1	0	1
Bad Air	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1
Acetylene-related	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Problem	0	3	2	0	0	0	4	4	2	1	1	0	0	1	3	6	1	2	2	2	0	1	1
Lost Control on Rappel	0	1	0	2	1	1	0	0	0	1	1	3	1	1	0	0	1	0	1	0	1	0	0
Other	3	3	2	1	1	2	1	0	3	1	2	3	2	1	2	8	5	6	6	3	0	2	2
Caving-related Incidents	11	2	9	4	20	9	8	4	6	3	15	9	13	11	7	4	4	3	6	8	5	5	3

Cave Diving Incidents

Result	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
Fatality	7	9	3	5	6	2	1	5	7	2	1	5	7	6	0	5	6	1	4	3	1	1	4
Injury and Aid	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Aid, no Injury	0	0	1	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	1	0	0	0
Injury, no Aid	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
No Injury, No Aid	0	0	0	0	0	1	0	0	1	2	0	0	0	0	1	0	0	1	1	0	0	0	0
Total	8	9	4	5	7	4	2	5	8	4	1	5	11	8	2	5	6	2	5	4	1	1	5

2018/2019 - AMERICAN CAVING ACCIDENTS ADDITIONAL REPORTS

7 March 2018
Fern Cave, Alabama
equipment problem, no injury, no aid

Reilly Blackwell (20), Phillip Moneyhun (22), Eric Hahn (22), Pete Gioia (20), Andrew Schoenewolf (21), Nathan Kearney (19), Meredith Blanco (19) and Peter Morisey were on a VPI Cave Club spring break trip to Fern Cave. The team borrowed a 700-foot rope from a friend and intended to drop the 404-foot Surprise Pit in Fern Cave. The rope stayed in the bag all the way from Blacksburg, Virginia to Alabama and all the way up the mountain. When the team unpacked the rope, they realized mice or rats chewed the rope in several places. The team carefully inspected the rope for core damage and tied alpine butterflies in all damaged spots. The rope reached the bottom with three knot passes.

1. Reilly Blackwell, Incident Report, 18 January 2022

Comments: Ensure that rope and vertical gear storage areas are rodent-proofed and free of harmful chemicals. Rope bags are an excellent tool, but they hide what is inside. They must be emptied to inspect the rope. Gear inspection is vital, and is obviously more valuable before, rather than after a trip. Considering that, how many of us have an established habit of rigorous pre-trip rope and gear inspection before leaving for a cave trip?

16 March 2019
Sititzer Cave, Pennsylvania
other, no injury, no aid

Jake Lee (19) nearly fell 20 feet when attempting to descend a foot ladder into Sititzer Cave. Lee was on a trip with 8 mixed-experience cavers. The entrance to the cave requires a vertical descent of about 25 feet through a metal culvert, and local practice is to use a cable ladder to descend. When Lee, a novice caver, stepped down a rung of the ladder near the top, his stationary foot slipped, leaving him hanging by his hands. Lee attempted to regain purchase with his feet, but was unable to. He called for assistance from Derek Von Nieda (22), an experienced caver who remained on top to supervise the climb. Luckily, Lee had not progressed far, and Von Nieda was able to grab the top of Lee's coveralls. Von Nieda was able to help pull Lee to the lip of the culvert, where a second caver was able to help haul Lee all the way out. The entire incident lasted approximately 20 seconds and Lee was able to collect himself, remount the ladder, and complete the climb without further incident.

1. Derek Von Nieda, Incident Report, 15 June 2021

Comments: It is general best practice to belay climbers on vertical cable ladders. This relatively minor incident serves as a good reminder to assess both the likelihood and consequence of accidents when analyzing risk.

24 March 2019
McAlisterville Cave, Pennsylvania
caver fall, no injury, no aid

Alec Matheus (20), a novice caver, was traveling with a group of mixed-experience cavers when he fell about 8 feet. The group was traveling through a section that required climbing down from a ledge that dropped into a smaller room. The most experienced member of the team, Caver 1, climbed down first and waited to spot the rest of the party. As Matheus was down climbing, his foot slipped and he fell backwards, headfirst. Caver 1 was able to catch Matheus and prevent a major injury. The rest of the novice cavers did not attempt the climb-down; instead, the group continued caving through an easier section.

1. Alec Matheus, Incident Report, 24 February 2021

Comments: Efforts such as this, to partner-assist or "spot" each other on short climbs, often help to prevent accidents.

18 April 2019
Elysium Cave, Oaxaca, Mexico
caver fall, injury, no aid
rockfall, no injury, no aid

Georgia Schneider (24), Elliot Stahl, (29), Reilly Blackwell (21), Tristan Stahl, (27), Rolland Moore and Tiffany Nardico (30) were on a day trip in Elysium Cave when Schneider fell and injured her ankle. Elysium is mostly large horizontal boreholes with a few short, rigged drops. The incident took place in a large passage located approximately three hours from the entrance and 800 feet deep. Schneider began descending a 13-foot climb when a handhold dislodged, causing her to fall to the bottom of the drop.

Schneider had injured her ankle, bruised her tailbone, scraped her face, and significantly dented the back of her helmet. Blackwell and Elliot promptly climbed down to where Schneider had fallen and assessed her condition. Despite Schneider being able to sit up on her own, Blackwell and Elliot were cautious about moving her due to the potential for a spinal injury. Schneider communicated that she did not have pain in her spine and had full movement and sensation. Following the incident, Schneider ate some food and water and made the decision to proceed with a self-rescue. Schneider's ankle was not able to bear weight, so the team used climbing tape to wrap her ankle and improvised a splint. Meanwhile, Elliot went to retrieve the rest of the team to assist in helping Schneider exit.

Blackwell and Tristan assisted Schneider through a series of free climbs and breakdown maneuvers. Despite her injured ankle, Schneider successfully ascended all the ropes in the cave, using a Pantin foot ascender on her unaffected leg for support. Prior to ascending the ropes, Elliot took the lead and carried the necessary equipment to construct a haul system in case it became necessary during the rescue operation. Throughout the eight-hour rescue, Blackwell maintained regular check-ins with Schneider, ensuring that she consumed food and water and responded to questions

to confirm consciousness and orientation.

Initially, the group had avoided using a lower angle route to exit the cave due to concerns about its stability. However, considering Schneider's injury and after rigging and descending it, the route appeared to be stable and secure. This path consisted of a lengthy slope that led to an approximately 15-foot drop. Blackwell ascended the vertical pitch, connected to a traverse line rigged on the slope, and called off rope. As she climbed approximately 30 feet up the slope, the rocks beneath her feet began to roll. Blackwell shouted for Elliot to get off the rope, while struggling to contain the movement of the rocks. After receiving confirmation from Elliot, Tristan, and Schneider that they were clear of the danger zone, Blackwell released her grip on the rocks. As a result, about six large rocks tumbled down the slope, crashing into the entrance pit. Two of these rocks unexpectedly penetrated a seemingly solid wall composed of boulders and entered the adjoining room where Moore and Nardico were ascending, narrowly missing Nardico. Blackwell thoroughly cleared the remaining section of the slope. By the time everyone was out, the trip had been roughly 16 hours long.

1. Reilly Blackwell, Incident Report, 18 January 2022.

Comments: Cavers are encouraged to learn about wilderness medicine protocols by taking a Wilderness First Responder (WFR) or Wilderness First Aid (WFA) course. Checking for spinal pain and sensation in the limbs are parts of a "Focused Spinal Assessment." This technique, taught in WFR courses, provides guidance on whether to move a patient that may have injured their spine.

2021 - AMERICAN CAVING ACCIDENT REPORTS

2 January 2021
Hoopers Well, Alabama
caver stranded, no injury, aid

A caver attempting to ascend out of Hoopers Well became exhausted and required rescue. Caver one and two (~30) were using 90-foot Hoopers Well for vertical practice. They rappelled to the bottom with no problems; however, they encountered difficulties during their ascent. Caver one ascended without issue, but Caver two felt unbalanced in their gear, became exhausted after climbing approximately 30 feet and could not continue. Initial attempts at self-rescue proved unsuccessful, but Caver two did manage to reach a ledge approximately 50 feet from the top of the pit. This ledge alleviated some pressure on the harness and mitigated the risk of suspension trauma. Caver one exited the cave and called 911. Huntsville Fire and Rescue (HFR) responded and set up a haul system to extricate the caver. The successful extrication was completed within 20 minutes of the arrival of the HFR Technical Rescue Team.

1. Kimberly Lughart, Incident Report, 16 January 2021.

Comments: Vertical caving requires technical expertise, physical fitness, and equipment that is adjusted to the climber. When possible, cavers should consider setting up contingencies when rigging, allowing for a caver to be lowered as part of the anchor is a fast and easy solution if a caver has trouble on rope.

31 January 2021
South Pittsburg Pit, Tennessee
fatality, caver fall

A caver experienced a medical emergency while descending South Pittsburg Pit, resulting in an approximately 130-foot uncontrolled rappel. South Pittsburg is a 165-foot open-air pit with a break-over lip. The subject was with five other cavers, who indicated they did not observe any abnormal activity at the lip or in the first 30 feet of the rappel that would have caused the subject to lose consciousness. The Chattanooga-Hamilton County Rescue Service (CHCRS) responded and provided advanced airway interventions, performed cardio-pulmonary resuscitation (CPR), and applied an automated external defibrillator (AED), but were unable to revive the patient. The subject's helmet sustained damage from the fall, while the remainder of his gear was in serviceable condition with no noticeable deformities. An after-action report indicated the incident appears to have been the result of the caver experiencing a medical emergency, losing consciousness, and releasing control of their rappel device with no indication of mishap, improper operation of gear, or equipment malfunction.

1. Brian Krebs, Assistant Chief, Chattanooga Hamilton County Rescue, email communication 18 October 2023.

Comments: Medical emergencies are not predictable, and there are many factors that may cause someone to lose control on rappel. Cavers should evaluate the pros and cons of devices and methods that "auto stop" such as a stop bobbin or opportunities to belay and be aware of potential risks and inefficiencies.

13 February 2021
Peppersauce Cave, Arizona
caver fall, injury, aid

A 64-year-old woman slipped while climbing a ladder in Peppersauce Cave, a popular wild cave near Tucson, Arizona, suffering serious injuries. The woman was traveling with a group of Boy Scouts who went swimming in the lake at the back of the cave. The lake is about 10 minutes into the cave, past a series of constrictions. The woman fell while climbing a ladder in the lake room, resulting in an 11-foot fall onto the cave floor. Two lifeguards from the group assessed her and helped the woman climb the ladder to exit the lake room. The woman complained that she was having a hard time breathing and moving her leg. A member of the group exited the cave and called 911. When fire department first responders (not trained in cave rescue) encountered the patient, they conducted an initial assessment and found potential spinal and lung injuries. They provided immediate care, including a cervical collar and fentanyl, and used a SKED (a lightweight rescue stretcher) for extraction. At the cave entrance, the patient was met by the sheriff and volunteer cave rescuers. The patient was transported to the hospital, via ambulance and helicopter, where she was

diagnosed with a fractured leg, broken scapula, tension pneumothorax (air collecting in the chest cavity leading to a collapsed lung) and a spinal fracture.

1. Sarah Truebe, Incident Report, 28 February 2021.

Comments: Peppersauce is commonly visited by non-caver members of the public who may not be familiar with safe climbing practices. Climbing ladders underground without a belay can be dangerous, the last issue of the ACA reported a similar accident in Peppersauce. There appears to be opportunities for cavers, local grottos and cave rescue organizations to work with land managers to find safer alternatives for rigging this cave for public access.

27 February 2021
unspecified cave, location withheld
difficulty on rope, no injury, no aid

Michael Raymond was introducing a group of 8 novice cavers to single rope technique, when a participant encountered difficulty on rope. The group rappelled about 15 feet into a cave and planned to ascend back out using a frog system. The new cavers shared three harnesses and a single complete vertical kit, passing a Croll back and forth as people got on and off rope. Raymond stationed experienced vertical cavers at the top and bottom of the rope to assist with moving gear, checking equipment, and getting people on and off rope. One novice caver struggled to ascend the 15 feet out of the cave. Raymond, at the top of the rope, noted the caver was moving very slowly and the way the Croll, cowstails, etc. were attached to the maillon looked sloppy. Towards the top of the rope the caver's Croll came off the rope, they dropped suddenly, and ended up hanging from their hand ascender. Raymond attempted to talk the caver through reattaching their Croll, but they could not reopen the gate. Ultimately, Raymond pulled the caver up by their torso and onto the ledge. The caver was shaken but bounced back quickly.

1. Michael Raymond, Incident Report, 27 February 2021.

Comments: This group was prepared for the potential for participants to struggle on rope and carried a rescue kit consisting of pulleys, carabiners and rope grabs. However, on reflection, Raymond noted he could have rigged the pit with a releasable Munter hitch "contingency rigging," which would have allowed him to lower anyone in trouble. He should have also had a full set of ascending gear for each harness, so gear was not getting swapped around. Finally, novice cavers should receive instruction on how to operate vertical equipment, including how to open the gates on the Croll and hand ascender.

7 March 2021
Sistema Cheve, Oaxaca, Mexico
caver fall, injury, aid

Max Koether (29) injured his back while participating in a multiday expedition beyond Camp Five in Sistema Cheve. At the eastern end of the Northwest Passage, Koether was on the last move of a 13-foot climb when his foot slipped on a hold. On a previous move, the sole of his rubber boot had ripped off, revealing the steel base that had no grip. In addition, he was carrying a bag in one hand while the other hand was on a poor, sloping handhold, putting him off balance. He fell backward and landed flat on his back, injuring his spine. He continued surveying with his team but was in pain, and experienced trouble bending over throughout the expedition. Three days later, Koether stood up and struck his back on the ceiling, hitting the same vertebrae he had injured before. Koether fell over and was unable to stand due to the pain in his back. After resting for 30 minutes, Koether was able to slowly walk and crawl to Camp 3 with the assistance of teammates, David Tirado and Claudio Cruz Garcia. From Camp 3, they were able to rest and make a radio call for assistance. Dr. Darnes Nagny and other cavers responded, bringing pain medication and new boots. After an evaluation, Dr. Nagny approved Koether to start moving toward the surface. Over the course of the next few days, he progressed to the upper camps and then to the surface under his own power. He remained at the project camp and recovered for two weeks on the surface before going on additional cave trips. Koether sought medical care when he returned to Canada, but scans were inconclusive. His doctors suspect he suffered a small fracture in a vertebra.

1. Max Koether, "Three Months in the Mexico Underground: Canadians at Cheve 2021," The Canadian Caver, Vol. 91
2. Max Koether, email communication, 25 January 2024

Comment: The general rule of having three solid points of contact while climbing could help prevent a similar fall. Climbing a slope with bags of equipment in hand can be challenging to do safely. The emergency response speaks to a well-organized expedition, which has the people and resources to communicate, provide spare equipment and knowledgeable responders to make an incident in a deep cave less challenging. Often in expedition caving, it will make more sense to initially transport a compromised caver to an underground camp rather than immediately to the surface.

Finally, it is important to carefully evaluate your own fitness and competency when caving, especially in remote areas. Koether caved for several days after the initial fall, experiencing severe back pain throughout, increasing the likelihood of aggravating the injury or suffering another. Cavers who are ambulatory and able to assist in their own rescue tend to exit faster and receive definitive care sooner, with less damage to the cave. Therefore, it is prudent when recovering from a seemingly minor or moderate injury suffered in cave to take rest days or travel back to the surface rather than risk further injury and subsequently losing mobility.

15 April 2021
unnamed lava tube, Hawaii
caving related, injury, no aid

During a hike to a known volcanic cave entrance, a hiker stepped into a lava tube opening hidden by vegetation. As a result, they fell and their left foot became entangled in vegetation, causing a significant strain or ligament tear. The hiker managed to make it back to their vehicle with the assistance of companions. After two weeks, the swelling and pain had largely subsided.

Comments: Volcanic areas often have numerous "skylights" into lava tubes, some of which are hidden by vege-

tation. Thin ceilings can also collapse under the weight of a person. Hikers should exercise additional caution in these areas.

1. Peter Bosted, email communication, 1 May 2021

8 May 2021
unspecified cave, Tennessee
stuck on rope, no injury, no aid

A caver became stuck on rope while on a visit to a 160-foot, open-air pit, requiring assistance. Caver one, who served as the trip leader and possessed the most vertical experience among the group, descended into the pit first, followed by two other cavers. The cavers planned to drop the pit and ascend using frog systems. Caver two, a moderately experienced caver who had sustained a deep tissue bruise on their knee a week prior to the trip, rappelled last.

After rappelling over the lip of the pit, Caver two started to feel nervous due to the heights and decided to abort the descent. Caver two entered a hard-lock and attempted a changeover. Caver two had recently replaced their typical maillon with a 90-degree twist maillon to connect their D-link to the rappel rack. This substitution increased the length of the descending gear. After placing their hand ascender onto the rope, Caver two inadvertently allowed the rope to slip through their descender, causing the ascender tether to tension. This tension prevented the ascender from being removed or repositioned. Due to nervousness arising from exposure, the increased length of the descender and the condition of their knee, Caver two encountered difficulties placing their Croll onto the rope.

Caver two had a handheld radio and communicated directly with Caver one, who talked them through solutions. After approximately 15 to 20 minutes of effort, Caver two had exhausted all readily available solutions to move up or down. Both of Caver two's legs had fallen asleep, and they were unable to move the leg with the knee injury. In response, Caver one retrieved a basic haul kit (prusiks, carabiners, a foot loop, and pulleys) and ascended the rope. Upon reaching Caver two, Caver one promptly employed a leg lift to assist in restoring sensation and mobility to the legs. Caver one connected their cowstail to Caver two's D-link via a screw-lock carabiner. Caver one then passed Caver two on rope to be in a better position to assist and to remove tension in the rope below the Caver two's rack. Caver two's rack was successfully unweighted and removed from the rope, and Caver two was able to attach their Croll to the rope. When Caver one attempted to disconnect their cowstail from Caver two's D-link, the screw locking feature was stuck. Despite Caver one's efforts to unscrew the carabiner, they were unable to do so. Caver one and Caver two were now stuck together. After considering alternatives, both parties decided to ascend the remaining 30 feet together.

Upon reaching the surface, Caver one carefully removed Caver two's D-link carabiner and associated cowstail from the D-link to separate from Caver two. Caver two had been on rope for around 45 minutes but did not report any other loss of sensation in their extremities after Caver one provided the leg lift. Shortly after removing the carabiner from the D-link, the Petzl AM'D screw link could be moved without force. Finally, Caver one returned to the base of the pit and monitored the ascent of the other cavers.

1. Identity withheld, email communication, 6 December 2021

Comments: Within a vertical set-up, any equipment change carries potential for consequences that cascade through the system. In this case, a slightly different maillon defeated a changeover. It is notable that American cavers will often have a European (frog) system of ascending, but will also modify the system with a rack or other descender. This modification has system consequences, just like any other, that need to be understood and evaluated by anyone attempting a modification. Caver 2 had further modified their ascending system by adding a locking carabiner between their cowstail and D-ring. Presumably this was added for detachability, but this feature did not function during the rescue. Adding hard connectors in this location is not recommended because it adds failure/inspection points into the system and reduces gear management efficiency.

Any gear changes should ideally be made in a controlled practice environment, where different ramifications of the change can be discovered and understood in a safe manner. It is desirable to learn different changeover methods, and how to solve problems independently with different or missing gear. Cavers should be trained and proficient enough to solve common problems independently before rappelling and descending in an uncontrolled environment. Caver 2's issue could likely have been solved by stepping up using a foot ascender, an integral piece of the frog system. If Caver 2 was not wearing one, then this incident itself is an example of a consequence of modifying an existing system. Cavers should be familiar with the arborist's foot lock (a technique where the rope is wrapped around the foot, locking it in place, so you can step up) as a readily available "step up" technique when a foot ascender is not available. Finally, screw gates may be difficult to unlock when loaded, possible solutions include wrapping a bit of cord or placing a maillon around the sleeve to increase leverage on it (Figure 1).

Caver 1 performed several actions worth noting. As the trip leader of lesser-experienced cavers, they provided a radio link between Cavers 1 and 2, greatly aiding communication during critical moments. On arriving at the stuck caver, Caver 1 provided relief by lifting the patient's legs. This is good practice when it is possible. Working through options, Caver 1 was able to help solve Caver 2's issues through teamwork. Care was taken to provide redundant points of contact for the patient during steps where gear was removed from the rope and during the climb to the surface.



Figure 1. Examples of using a chord (left) or a mallion (right) to increase leverage and open a screw-locking carabiner

May 28, 2021
unspecified cave, Kentucky
difficulty on rope, no injury, no aid

A caver became exhausted while ascending out of a 140-foot pit in Kentucky. The caver was using a frog system that was not tuned for them, a rock-climbing harness, and lacked experience with frog systems in general. The caver struggled to ascend ~70 feet and became exhausted. The other four cavers on the team were able to set up a 3:1 haul system and pull the subject out the remaining 70 feet to the surface.

1. Timothy Miller, Incident Report, 15 June 2021

5 June 2021
Rumbling Falls Cave, Tennessee
equipment problem, no injury, no aid

Philip Rykwalder was short roped while rappelling into the 200-foot Stupendous Pit in Rumbling Falls Cave. Rykwalder was attempting a through-trip of Rumbling Falls Cave with five others. The team planned to rig the pit as a pull-down with a carabiner block. The team had borrowed what they thought was a 400-foot 9mm rope for the drop, and another team member carried the rope in their bag. At the top of the drop, Rykwalder measured out and lowered 200 feet of rope, intending for it to be the rappel side. He left the remainder of the rope inside the bag above the carabiner block. While Rykwalder was securing the carabiner block, the owner of the rope had Rykwalder switch the rappel and pull-down sides (the reasoning is not clear) and descend on the section of the rope that had been in the bag. Rykwalder rappelled while letting rope out of the bag. After 30 feet, he unexpectedly felt the knot at the end of the rope with his brake hand. There was only about two feet of slack before the end-of-the-rope knot, making it difficult for him to lock off his bobbin. He decided to maintain his braking position and use his left hand to rig his hand ascender. Once he was able to secure his hand ascender, he was able to step up, attach his Croll and climb back out. The group realized they had brought a 230-foot rope instead of a 400-foot rope and decided to continue their trip by rigging the drop without the pull down and returning later to retrieve the rope.

Comments: Always tie stopper knots at the end of a rappel rope – the stopper knot saved Rykwalder's life. When packing ropes into a bag, it is best practice to ensure both end knots are visible. Rappelling out of a bag should be avoided, the rope should be fully flaked out and inspected to ensure the rope is not damaged, is the correct length for the drop, and the stopper knots are tied before use.

1. Corey Ellis, "Trip Report: Rumbling Falls Cave," Nashville Grotto Trip Reports, 5 June 2021.
2. Philip Rykwalder, email communication, 5 January 2024

3 July 2021
Sharps Cave, Virginia
caver lost, no injury, aid

A father and daughter required rescue after getting lost while returning from the waterfall in Sharps Cave. Two juveniles (10 and 16) called 911 at 11:30 pm on July 3 to report that their father, Arlen (40), and sister, Lexi (19), had entered Sharps Cave at 3:00 pm and were now overdue. The Shavers Fork Fire Rescue team responded and attempted to search the cave but did not locate the subjects. The state police were able to contact Jennifer Boyle of the Eastern Region NCRC, who alerted additional cave rescue personnel and left to search the cave with her husband and two children. Boyle and her group entered the cave around 1:30 a.m. and performed a hasty search. The reporting juveniles informed rescuers that the missing cavers were attempting to reach a waterfall in the cave. While Boyle was experienced in cave rescue, she was not familiar with the cave and exited at 3:30 am without having found the waterfall. After calling for more resources, Boyle ran a communication line into the Entrance Room and searched the passages nearby. By 8:30 am on July 4, approximately 40 cave rescuers were in route, including members from the Blacksburg Volunteer Rescue Service. Around 10:00 am, Christopher Spence and Mystik Miller formed a team to search Catfish Hall, an area that had not yet been searched. Spence and Miller located the lost party, unharmed but cold and eager to exit the cave. The pair was ill-prepared with no helmets, adequate warm clothes or appropriate lights. Spence and Miller shared food, water, warm clothes and proper lights with the pair before helping them out of the cave. Despite their ordeal, the lost pair was still eager to learn about caving, and Miller invited them to cave with her and the Greenbrier Grotto.

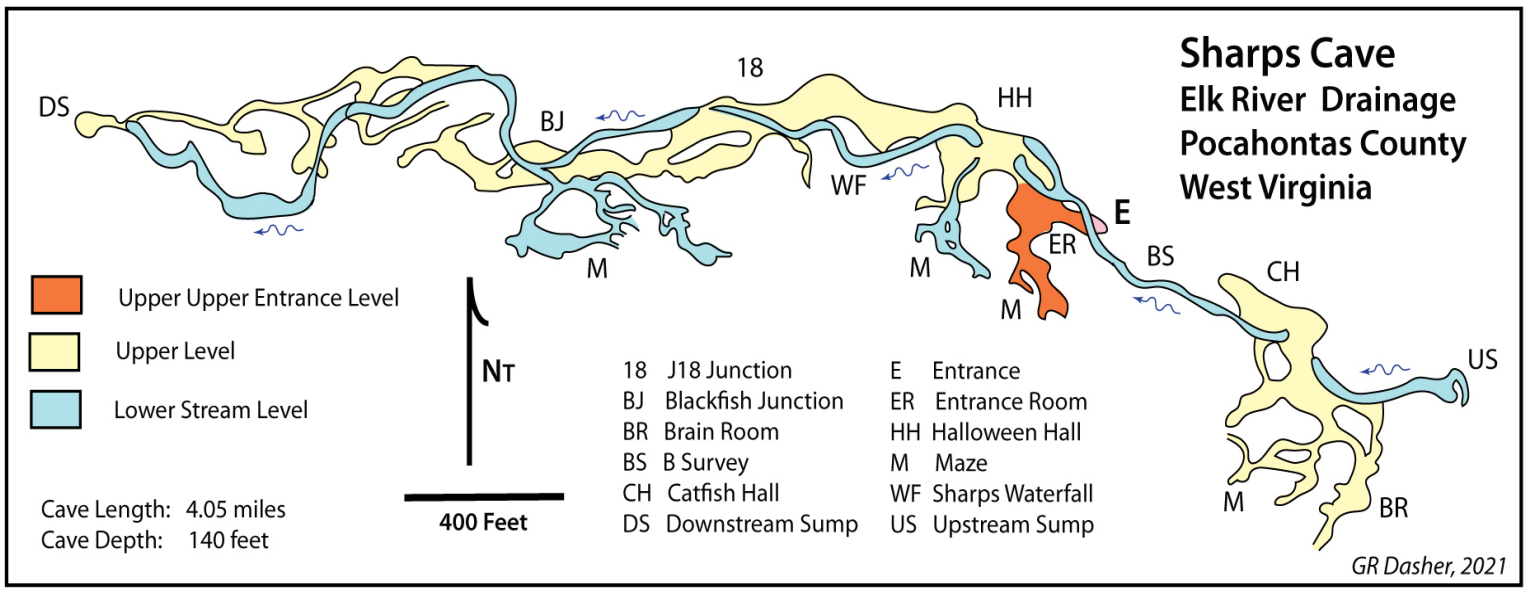


Figure 2. Map of Sharps Cave including location of cave entrance (E), waterfall (WF), and lost cavers (CH).

1. Mystik Miller, "Sharps Cave Rescue," The West Virginia Caver, August 2021 Vol 39:4
2. Bru Randall, After Action Report, Eastern Region NCRC. July 3, 2021.

Comments: This incident highlights the use of a surface watch and callout by non-affiliated novice cavers. It is also notable that the patients were invited to continue their caving journey by joining the NSS-affiliated cavers that rescued them. The after-action report indicated the authority having jurisdiction had outdated contact information for the Eastern Region NCRC, delaying caver response time. Maintaining relationships between cave rescue groups and local emergency response agencies can ensure that appropriate resources are mobilized quickly.

24 July 2021
Sarah Furnace Cave, Pennsylvania
hypothermia, no injury, no aid

During a survey trip in Sarah Furnace Cave, Chris Hill and another individual experienced symptoms of hypothermia. The pair had ventured into a section of narrow passageways approximately 1,500 feet from the entrance. The lead contained three inches of standing water and was approximately 2 feet wide and 1.5 to 2.5 feet tall. The cave was cold, with air and water temperature approximately 51 °F. The sketcher wore a wetsuit and multiple layers of cave gear. Hill, on point, wore three layers on top and two layers on the bottom made of polypropylene, along with blue jeans and cotton coveralls.

The duo spent an hour and a half surveying the cave, during which they felt the cold but found it tolerable. However, when they reached a dry area and exposed themselves to moving air, Hill began to shiver. The shivering started mildly but quickly intensified. Both cavers, now thoroughly wet and tired, decided to conclude the survey. Weakness and a lack of coordination made navigating back to the cave entrance challenging. It took about ten minutes to recover once they were out of the cave in 85 °F heat.

1. Chris Hill, email communication, 2 August 2021

Comments: "Cotton kills" is an important adage to remember – cotton loses insulating ability when wet and can draw heat away from the body, even when worn with polypropylene base layers. Cotton prevents polypropylene from wicking moisture away from the body and can contribute to heat loss. It is not mentioned in the report, but if a cold caver is able to ingest some water and calories, they will often feel much better in about 20 minutes. This could help to alleviate the difficulty navigating during the exit that the author alludes to in the narrative.

7 August 2021
Mystery Cave, Minnesota
caver fall, injury, no aid

After completing a work project, a caver was exploring an undeveloped section of Mystery Cave when they slipped on muddy breakdown. The caver suffered a broken ulna, but was able to leave the cave under their own power with limited assistance from others in their group. Fatigue and lack of attention to the mud-covered breakdown may have contributed to the accident.

1. Steve Porter, Incident Report, 21 September 2021

Comments: Statistically, accidents happen when we let our guard down. Complacency is more likely in ordinary passage than the more challenging parts of a cave.

14 August 2021
Camps Gulf Cave, Tennessee
caving related, injury, no aid

After visiting Hemlock Falls, a group of hikers visited Camps Gulf Cave. The group was exploring the large entrance in natural light when a group member slipped and cut their palm on a rock. The group had a first aid kit and bandaged the wound before hiking to their vehicles. At their vehicles, the group encountered a caver who had recently returned from the cave and remarked they believed the injury "might need a stitch or two." The group appeared to self-transport to medical aid.

1. Alan Hatcher, Incident Report, 15 August 2021

19 September 2021
Links Cave, Virginia
other, injury, no aid

Alex Faunce (30) injured their back while traversing a canyon in Links Cave with an unnamed caver (19). Faunce was helping the caver navigate an obstacle by having the caver step on their back. The caver misplaced their foot and stepped on the back of Faunce's neck, exacerbating existing neck pain.

1. Alex Faunce, Incident Report, September 26, 2021

Comments: "Human footholds" can be a useful tool for cavers in certain situations. In each instance, their convenience should be evaluated against potential risks to both cavers. Cavers should understand body mechanics and how to provide a stable anchor to avoid injury.

26 September 2021
Bisaro Anima, British Columbia, Canada
illness/medical issue, no injury, no aid

Colin Massey (42) began to exhibit symptoms of COVID-19 on day two of a nine-day underground camp expedition. He was with a team of three other cavers at Camp One (1,050 feet deep) when he started to complain of fever, lethargy, brain fog, loss of sense of smell and was alternately burning up or too cold. Only able to move short distances and feverish, he stayed in camp and was in and out of his sleeping bag trying to manage the fever. Due to the nature of the camp, there was no way to isolate him from the other team members. Each day Massey tested his endurance by retrieving water for the camp, a five-minute trek, and was exhausted after each trip. His team members notified another expedition team at Camp Two of the issue during a planned rendezvous. They requested that other teams who were going to stay at an intermediate camp (Camp 0.5) leave the cave early to make room for Massey's team, allowing Massey to exit the cave over two days.

By day five, Massey reported feeling better and was ready to exit the cave and assist with hauling gear from Camp One to Camp 0.5. The way out included ascending a 100-foot rope. After the climb, team leader Christian Stenner noticed Massey was dragging his pack through the water by its tether instead of carrying it and asked if he was OK. Massey explained that he felt he was in a brain fog and had ascended the 100-foot pitch with his hand ascender not connected to its cowstail. At the top there was a short traverse line, and he had disconnected his Croll, realizing then that he was no longer connected to any rigging, and had then muscled his way on the traverse line over to solid ground. Stenner decided to help Massey return to Camp One, checking his equipment before each pitch.

Massey reported slight improvements in his fever over the next two days while he stayed at Camp One. On the eighth day the team began to exit the cave, ensuring Massey was checked before each technical obstacle, spotting each unprotected slope, and carrying Massey's personal cave pack. They carried some small party rescue supplies and reached Camp 0.5 without incident. Massey exited the cave on the ninth day and was feeling better.

1. Christian Stenner, personal communication, 18 November 2023

Comment: The pandemic is the context for this incident, but it could mirror any medical issue experienced by a caver while deep in a cave. Transparency with how a caver is feeling, and their condition, allows the team to provide support. Team members should keep a close watch on anyone reporting feeling ill in a cave, to prevent safety mishaps that could lead to even worse situations. In this case, supplies were available at camp for an extended period that allowed the subject to partially recover before attempting an exit, but that might not always be the case. Having shelter-in-place supplies, basic medications for stomach issues, diarrhea, or known medical issues that a team member has can help a person's condition improve enough to move better and safer under their own power. When the patient is moving under their own power, proper observation and support is key. Seeing the patient drag his pack was the impetus to learn of other more serious lapses in technique. Good teamwork and organization helped with the outcome.

3 October 2021
Bisaro Anima, British Columbia, Canada
other, injury, no aid

While moving through the cave during a 9-day expedition, Christian Stenner (41) aggravated both his wrists, starting on the first day while descending to Camp One (1,050 feet deep) with his team. As the expedition continued, he lost range of motion and experienced increasing pain. Stenner took pain medication and splinted his wrist using athletic tape. Stenner was leading the group with Colin Massey (see previous report) and assisted his exit on days eight and nine. After returning home, Stenner was diagnosed with two sprained wrists, one of which required a brace for three weeks and physiotherapy.

1. Christian Stenner, personal communication, 18 November 2023

Comment: Certain movements in caving can cause strains, sprains and muscle fatigue, especially if continued for an extended period. Two previous ACA reports have documented similar injuries with the same subject. A pattern was apparent, and preventative measures including a light wrist brace and strengthening exercises have improved in preventing the subject's tendency for this injury.

October 23, 2021
Tumbling Rock Cave, Alabama
Caver fall, injury, aid

A male caver in his mid-twenties injured his shoulder in a fall, approximately one mile into Tumbling Rock Cave, just past the Suicide Passage. The Scottsboro-Jackson County Rescue Squad responded and alerted the Huntsville Cave Rescue Unit, which provided additional personnel. A SKED was hauled into the cave; however, after an initial assessment, the responding medic determined the patient could walk out with assistance. The patient exited the cave approximately seven hours after the accident.

1. WAFF 48 Digital Staff, "Person rescued from Tumbling Rock Cave after seven hours," WAFF 48, 25 October 2021
2. Kimberly Lughart, email communication, 5 January 2024

Comment: It is nearly always preferable for an injured caver to self-evacuate to the extent possible. A litter evacuation may be necessary or faster through some portions of a cave, but riding in a litter can be dangerous and should not be the first option.

21 November 2021
Bayano Cave, Panama
fatalities, flooding

Heavy rain triggered sudden flooding in an area popular with tourists on the shores of Lake Bayano, about 30 miles east of Panama City. The flooding surprised 16 tourists exploring Cueva Bayano, including 11 Panamanians, a Canadian, and four Venezuelans. Rescuers recovered 13 participants quickly after the flood, but three people – two tourists and a cave guide – did not survive.

1. CNN Español Staff, "3 people die in cave flooding during excursion in Panama," CNN Español, November 22, 2021

23 November 2021
Ellison's Cave, Georgia
caver fall, injury, no aid

Andy Kalber (45) and two other experienced cavers were exploring Ellison's Cave when Kabler fell and injured his foot and elbow. The group had decided to attempt a 15-foot stemming canyon climb with uncertain footing. Having originally decided not to attempt it, Kalber opted to try it after watching his younger companions complete the climb. Once his feet were approximately 7 feet off the ground, Kalber lost a foothold and fell to the bottom of the climb. He raked his left tricep and elbow across the wall while falling and landed on uneven rocks, injuring his left foot.
Kalber decided to self-rescue and started toward the exit while his companions continued their survey. Kalber completed a tight, muddy crawl, bouldered over breakdown,

and navigated a handline-assisted climb before arriving at the final 120-foot vertical ascent out of the cave. Fortunately, the ascending foot loop sat just under his heel that was not injured in the fall. Finally, Kalber had to hike out in a creek bed and over two miles to reach his vehicle. Kabler followed up with his chiropractor, who performed an X-ray and determined the foot was not fractured, but had suffered a deep bruise.

Submitters comments: "I learned two valuable lessons… First, I am going to be better at mitigating risk in the future, especially when I'm deep underground. That climb I followed … was an unnecessary risk. My ego drove me up that climb, and I paid for it. I regret putting my fellow cavers in that position by getting myself hurt. As soon as you go underground with a group, they are your team and each of you depends on the other. I will not put my teammates in that position again if I can help it. Even though I completely self-rescued, it was a good smack in the face and a humbling experience. Second, I've been caving in old OCR shoes (sneakers). They have great traction and drain water well, but have little sole or ankle protection. As I washed gear off today, I threw them in the trash. From now on, I will wear boots with greater sole and ankle protection."

1. Andy Kalber, Incident Report, 6 December 2021

4 December 2021
Rat's Nest Cave, Alberta, Canada
hypothermia, aid

A caver (13) fell into the sump of Rat's Nest Cave and suffered symptoms of hypothermia, including loss of motor function. A group of six cavers, five adults and a teenager, were doing a recreational trip to the low point (Ranger Way Sump) of Rat's Nest Cave. The teen slipped on the muddy, sloping approach to the sump, and fell into the water (about 40 °F). The slope was too steep and slippery for the teen to self-rescue. Tammera Kostya and Elissa-Shaye Clark used a handline and made a human ladder with their bodies, which the teen was able to use to get out of the water.

Once back on solid ground, the teen was given a warm sweater and jacket but kept their wet cave suit on as no other spare clothing was available. The patient's companions started a small party rescue to assist them back up Ranger Way, a muddy, angled, crawling climb. About halfway up the low-point passage, the patient was struggling to move forward and needed more assistance. Kostya set up a body harness and attached the 40-foot rope that was used as the handline above the sump. Cavers on either side pulled or pushed the patient from behind. During the ascent from the low point, the group stopped two to three times to give food and water to help the patient keep moving. During the ascent, two group members attempted to exit to call for help; however, they were unfamiliar with the cave, uncertain of the way back and decided to return and stay with the group.

By the time the group reached the junction that led back to the entrance, the patient was exhausted. The group exchanged the patient's boots, socks, and cave suit, applied an emergency blanket, and used cave bags to keep the patient off the floor. The group also placed warming packs on the patient's feet, upper body, and hands. The group decided to split up and Kostya went to the entrance to call for a rescue. Kostya met another group of cavers, asked for assistance, and exited the cave to call for help. Cave rescue personnel, provincial park rescue and Alberta Health Services ambulance responded. After initiating the callout, Kostya retrieved a hypothermia kit stashed in the cave and returned to the patient.

In the meantime, the group with the patient was able to continue moving toward the entrance. Kostya met them with the hypothermia kit including a stove with hot chocolate, a mat, and an emergency blanket. These supplies were critical in giving the patient enough energy to move past the final squeeze and 50-foot pitch to the entrance. The cave rescue group used a counterweight raise to haul the patient up to the entrance. Katie Graham assisted with the haul and arranged for warm clothing to be brought to the surface, as temperatures were well below freezing. The group hiked down the mountain under their own power, over seven hours after the fall. The patient and other members of the group were checked by the ambulance crew; there were no injuries.

1. Alberta/British Columbia Cave Rescue Service, Incident Report, 4 Jan 2022

Comment: Cold water immersion can lead to the rapid onset of hypothermia, a potentially fatal lowering of the body's core temperature. Symptoms of hypothermia include the four "-umbles": Stumbles – loss of control over movement, mumbles – slurred or slow speech, fumbles – clumsiness or lack of coordination (a possible contributor to secondary accidents), and grumbles – change in behavior or attitude. For a patient that is capable of movement, vigorous exercise, dry clothes, fluids, and food are the best rewarming methods.

After-action report comments from the team members noted that great teamwork was an essential element of the positive outcome, from the quick response to rescue the patient from the water to the effort to move them up and out of the cave. Having heat packs, spare clothing, blankets, and a dedicated hypothermia kit available was also beneficial. Some rescuers provided their dry clothes to the patient, replacing them with the patient's wet clothing. This should be a last-resort solution, as it increases the possibility of the rescuers also suffering hypothermia and requiring assistance.

29 December 2021
Minnehaha Falls, Minnesota
caver fall, injury, aid

A woman slipped and fell, seriously injuring her ankle, while in a closed cave behind the frozen Minnehaha Falls. The fire department responded to a 911 call at 5:59 pm. A rescue crew descended into the cave, splinted the subject's ankle, placed her in a rescue basket, and hauled her out. The Minneapolis Fire Department notes that it responds to several calls every year due to people who are hurt or stuck in illegal areas of Minnehaha Falls.

1. Melissa Turtinen, "Fire crews rescue injured woman from cave behind frozen Minnehaha Falls," Bring Me the News, 30 December 2021

CAVING RELATED ACCIDENT REPORTS

6 January 2021
unnamed sinkhole, Florida
caving related, no injury, aid

A man and woman drove their car 40 feet into a sinkhole while driving off-road on private property around 8:00 pm. The sinkhole was filled with water, but both people were able to exit the vehicle. The man was able to climb out of the sinkhole and walk to a nearby gas station to call for help. The woman was trapped in the sinkhole for approximately 11 hours until rescue crews could reach her. The fire crew used a harness-and-rope system to lift the woman out of the sinkhole. Neither individual sustained injury in the incident. Approximately four months prior, two people riding all-terrain vehicles were rescued from the same hole. The landowner has posted no trespassing signs and barricaded the sinkhole using large boulders and ropes.

1. Emily Mavrakis, "Woman spends 11 hours in High Springs sinkhole," The Gainesville Sun, 7 January 2021

13 September 2021
Lucky Dog Pit, Indiana
caving related, no injury, aid

A group of cavers from the St. Josephs Valley Grotto, consisting of Shannon Phipps, Josh Edwards, Samantha Phipps, Sean Cunningham, Neil Higginbotham, Yvonne Wilcox, Josiah Meert, Preston Miller, Travis Draime, Ashley Draime, Beth Acosta, Tay Heinke and John "Sam" Hawkins were hiking at Dewey Hickman Nature Preserve near Corydon, Indiana. During their hike, they discovered an emaciated dog stuck at the bottom of a 30-foot pit. There was a broken collar on a ledge halfway down the pit – hitting the ledge may have arrested the dog's fall. Additionally, an empty turtle shell at the bottom may have provided some water for the dog.

The group tried to call for help, but no other cavers were available. The group returned to their campsite to gather a dog harness with a D-ring, a rope, helmets, and food and water for the dog. They then free-climbed the pit to reach the dog. The dog cooperated and allowed them to put on the harness. They attached a rope to the harness and safely pulled the dog to the surface without any resistance.

The group posted a "found dog" report on a local Facebook page for lost and found animals. A kind neighbor offered to care for the dog temporarily and later took him to the Harrison County Animal Shelter. A veterinarian provided treatment for the dog's dehydration, malnutrition and minor injuries. By Tuesday, the dog, whose real name is Hawkeye, was happily reunited with its family and is now on the path to recovery.

1. Shannon Phipps, Incident Report, 13 September 2021

Comments: What can we say? It is a cave-eat-dog world out there.

7 October 2021
unnamed cave, New Jersey
other, no injury, no aid

An elderly dog named Liza fell 20 feet into an 18-inch-wide crevice on Gertrude's Nose Trail in Minnewaska State Park Preserve. The dog was off leash at the time of the accident, and park rangers were unable to reach the dog. After several days of attempting to rescue the dog the New Jersey Initial Response Team (NJIRT) responded and their smallest member, Jessica Van Ord (31) was able to fit past the initial constriction and see the dog. Liza was still out of reach, through another constriction with a 4-foot drop.

The Ulster County SPCA and a volunteer from Minnewaska State Park maintenance built a makeshift 10-foot catch pole. They used the pole in conjunction with a hot dog zip-tied to a second pole to distract the dog. The catch pole snare rope was extended to 15 feet so NJIRT member Kevin Mulligan (33) could tighten the catch loop once Jessica had the poles in position. Liza was successfully maneuvered out of the lower section of the crevice with the catch pole, and Jessica and Mulligan were able to load her into a large cave pack that was hauled to the surface by Mark Dickey (39) and park rangers. Liza was reunited with her 83-year-old companion unharmed, despite her 20-foot fall and five days trapped underground. Unfortunately, during the hike out, one of the rescuers experienced chest pain that required a carry-out and further treatment.

1. Jessica Van Ord, email communication, 30 March 2023

30 December 2021
unnamed cave, West Virginia
other, no injury, aid

Two dogs were rescued by the West Virginia Natural Resources Police after they chased a bear into a cave. The dogs were being used to hunt when they fell into the cave on a property owned by Governor Jim Justice. Rescuers rappelled 70 feet into the cave, where they encountered the bear on a ledge about 15 feet above the cave floor. After a few moments, the bear jumped off the ledge and entered another branch of the cave. The rescuers were then able to reach the dogs, attach harnesses and hoist them to the surface. One dog suffered an eye injury and the other a broken pelvis, although they both should recover.

1. Jeff Morris, "Dogs rescued after chasing bear and falling into cave, W. Va Natural Resources Police say," WCHS Fox 18, 7, January 2022

2021 CAVE DIVING ACCIDENT REPORTS

21 January 2021
Devil's Eye Cave System, Florida
fatality, cave diving

Thomas Brian Ellis (59) drowned while executing a solo survey and mapping trip of the Devil's Eye Cave System. Ellis's wife contacted Ginnie Springs when he was about 24 hours overdue. Ginnie Springs workers located Ellis's truck in the cave parking lot and notified the International Underwater Cave Rescue and Recovery (IUCRR) team and the Gilchrist County Sheriff's Office (GCSO). The recovery team interviewed Ellis's friends and determined he was diving solo and had entered the water around noon on January 20. Two IUCRR dive teams entered the cave, the first at 10:00 am on January 21. The second dive team discovered Ellis's body 5,800 feet into the dive and close to a guideline, where he apparently lost consciousness while attempting to cross a gap. Ellis's gear was in place and both bailout cylinders were full. Ellis's dive computer indicated his oxygen cylinder contained 2,500 psi of oxygen. One of the IUCCR divers observed the slider shut-off valve on the victim's oxygen feed was closed, cutting off oxygen to the system, and the victim's PO2 sensors read 0.00. Likely, the slider shut-off valve on the oxygen feed accidentally closed while the victim navigated a rock-to-rock restriction. Unaware, Ellis continued to dive until the remaining oxygen in the loop ran out.

Analysis from NSS Cave Diving Section Accident Analysis Committee:

Dive with a buddy. Though solo diving is not an uncommon practice within the cave diving community, due to the redundancy of equipment carried on a dive an additional set of eyes and brain can often detect an anomaly before it becomes a problem or, if a problem does develop, they may be able to help correct it. Also, the victim only had a primary Petrel handset displaying his PO2, i.e., partial pressure for oxygen. He did not have a secondary heads-up display in his line of sight that may have alerted him that his PO2 was falling, allowing him time to take appropriate action. This is particularly important when the dive is focused on a specific task, such as mapping or exploring, where task loading can distract from regular PO2 monitoring. Finally, in-line slider shutoff valves carry the potential risk of being inadvertently shut off, as likely occurred in this case. This possibility should be strongly considered before deciding to use an in-line shutoff valve on the CCR oxygen feed.

1. National Speleological Society Cave Diving Section Accident Analysis Committee Report, "Cave Diving Fatality Ginnie Springs"

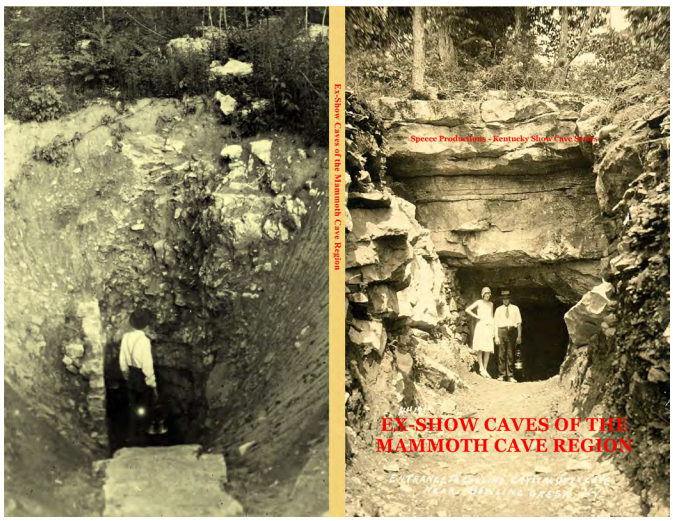
BOOK REVIEW: EX-SHOW CAVES OF THE MAMMOTH CAVE REGION

BY GARY K SOULE

A historically fascinating, 130-page long, soft-cover book on the many former commercial show caves of the Mammoth Cave region of Kentucky has been produced. It was researched and written by noted cave historian, Jack Speece of Pennsylvania. Bob Thompson, another respected cave historian from Ohio, compiled a series of Jack's shorter booklets into a single book and published it. Due to a very limited press run, it is best to order directly online.

If you like commercial caves and their history, as I do, it is a must have book. It consists of some 120 often rare, historical photos on 29 different cave operations that once existed in the area. Even more impressive, it has 21 maps of the caves, and lists all the former names for each, a total of 88. And 103 references are listed in the back. It is a dandy reference book that avoids the past confusion of which cave is which. The introduction to the book talks about previous show cave lists made by a number of cavers, and even includes a nice quote by Jack Speece on the "Kentucky Cave Wars." One hundred and fourteen different booklets, from all 50 US states, that are part of Jack's Spelean History Booklet Series, are listed with the various authors. Another list shows 56 different booklets that made up the Kentucky Show Cave Series by developed by Speece Productions.

In doing my own research, years ago, I found the Mammoth Cave region to be the most highly concentrated area of ex-show caves in the US, not even counting the eight show caves that are currently open in the region. After I initially showed Jack some of these caves, he readily took on the massive task of documenting them and made a number of subsequent trips to the area. Other well-known cavers stepped forward and worked with him in various capacities. They include John M. Benton, Catherine H. Bishop, George B. Corrie, Ronald D. Doyle, Steven L. Gentry, Angelo I. George, Larry R. McCarty, William L. Napper, Stanley D. Sides, Gordon L. Smith, Joel M. Snyder, Dean H. Snyder, Gary K. Soule, Jack H. Speece, Robert H. Thompson and Norman L. Warnell. It was a truly group effort to once and for all document these many small cave operations. If it were not for the combined efforts of all these cavers, a book like this would be impossible to produce. But before all this old cave history is lost forever, it had to be done. I think you will find the result very interesting.



2022 - AMERICAN CAVING ACCIDENT REPORTS

2 February 2022
Missed Opportunity Cave, Texas
caver fall, injury, no aid

Mio Kitano fell 12 feet while exploring the entrance of Missed Opportunity Cave, breaking several ribs and suffering a laceration to her arm, which required stitches. Kitano left Chapa campground at Hill Country State Natural Area with Justin Davis and Crystal Grafft, with the intention of digging on Blind Ambition cave. Grafft and Kitano accidentally entered the coordinates for Missed Opportunity into their GPS units due to a miscommunication. Davis hauled the digging tools while Grafft and Kitano navigated using their GPS. The group arrived at the GPS point they believed to be horizontal Blind Ambition Cave, but they were at Missed Opportunity Cave. While some group members unloaded gear and started to pull out snacks and caving gear, Grafft and Kitano peeked down the entrance hole. It appeared to be a vertical passage that seemed climbable. The group did not have vertical gear and instead rigged a handline to a nearby tree. Kitano decided to head into the cave for a quick assessment before grabbing snacks. As Kitano was down climbing, either a foothold broke or her foot slipped, causing her to fall about 12 feet to the bottom of the approximately 17-foot-deep entrance. Kitano did a quick self-assessment and observed a 3-inch-long laceration on her arm with exposed subcutaneous tissue and muscle and possible broken ribs. Kitano, a surgeon, recognized the potential for serious internal injuries and the need to get out of the cave as soon as possible.

Grafft called the project leader from a radio that the team had brought and informed him that Kitano had been injured. Davis used a pulley and the handline to create a haul system. Kitano tied the rope around her waist as a backup and painfully started to climb out of the cave. Davis talked her through the climb and monitored the system to make sure her movement was secure. Grafft held the opposite line of the rope on the surface and pulled tension as Kitano climbed. Once out of the cave, Davis applied butterfly bandages to Kitano's arm and Kitano believed that emergency transport was not needed, but that a ride to the parking lot would be helpful. They relayed a message to a park ranger, who responded to the cave. After hiking down the trail, arriving at Chapa campground without running into the park ranger, the group realized they were not at the cave they thought they were. Grafft drove Kitano to the ER in Kitano's car. She had one displaced rib fracture and one segmental rib fracture, with her rib broken in two places. She also sustained a bad cut on her right arm with an exposed muscle, which required suturing.

1. Mio Kitano, email communication, 28 October 2022

Comments: Rib fractures, while often painful, are typically not urgently dangerous. However, they have the potential to evolve into serious medical situations, including the potential for a pneumothorax (collapsed lung). It is difficult to identify injuries to the chest wall in cave, so any patient experiencing rib/side pain should be carefully observed for breathing problems in case there is a need to increase the urgency of the rescue.

12 February 2022
unnamed cave, Texas
trapped, no injury, aid

John Young (30s) and Marvin Miller (58) were exploring a newly discovered cave when Young became trapped in a constriction. The cave had a 10-foot down-climb that led to a belly crawl with several tight fissures leading to a larger room. Young navigated a 4-foot-deep fissure that led to a small room at the edge of a larger pit. When he attempted to climb back through the tight slot, he was unable to do so. Young was unable to find enough purchase with his feet to push himself up through the shaft. Miller left the cave to retrieve a hammer, chisel, handline, rope and gear. After attempting to enlarge the shaft himself, Miller left the cave again to call for help and technical digging equipment. Kurt Menking, Bennett Lee, Greg Mosier, Joe Ranzau, Angela Young, Lisa Miller, Matt Salz and Comal County EMS, Fire and Rescue (provided surface support) all responded to the incident. The crew enlarged the shaft and Young was able to pile rocks up under his feet, allowing him to push through the lower part of the fissure and escape. Young was trapped for approximately six hours.

1. Marvin Miller, Incident Report, 12 February 2022

Comments: Assess your ability to move up a shaft before committing to it. If it is uncertain, don't commit.

19 February 2022
Crystal Cave, Kentucky
caver fall, injury, aid

An experienced caver slipped and fell off an eight-foot ledge, dislocating their shoulder, while participating in a Cave Research Foundation survey of Crystal Cave. Two teams (six cavers total) were about three hours into the cave, past a series of straddle canyons, chimneys and long crawls when the accident occurred around 8:20 pm. Half of the survey team left the cave immediately to call for assistance and mark the route for rescuers. They exited the cave around midnight and contacted the National Park Service. While waiting for a larger rescue effort, the cavers remaining with the injured caver started a small party assisted rescue (SPAR). They placed the injured caver's arm in a sling, offered pain medication, and started to help the injured caver out. The first group of rescuers reached the team at 2 am with additional supplies and food. At 4 am, a second team, consisting of a paramedic and a caver with limited use of their arm, reached the injured caver. The paramedic was able to provide fentanyl and create a better sling. The caver with limited use of their arm was able to demonstrate to the injured caver how to navigate obstacles. With help from additional team members, local cavers and National Park Service personnel, the injured caver reached the surface at 9:30 am, more than 12 hours after the injury occurred.

1. Michael Raymond, Incident Report, 25 July 2022

Comments: Rescue exists on a spectrum. A single incident can contain both SPAR and callout rescue efforts. In many cases employing both is the most efficient use of resources.

27 February 2022
Fern Cave, Alabama
equipment problem, no injury, no aid

Riley (30) and Anna Pearce (29) were with a group of four other cavers when they encountered an equipment problem while ascending out of the 404-foot Surprise Pit. The entire group rappelled to the bottom with no issues, despite the entrance waterfall being at high flow. To expedite exiting the cave, they decided to tandem climb, with Riley leading. Both cavers were using ropewalker systems. About 150 to 200 feet into the climb, Pearce heard a loud noise above her, she looked up and saw that Riley's right foot ascender was not attached to the rope. Riley was able to reattach to the rope and climb another 50 feet before his foot detached from the rope again. Pearce climbed up to Riley to discuss the problem and realized the fabric loops on his foot straps had broken. Riley first attempted to use an upper ascender and frog out. After a few attempts to ascend, both cavers realized the solution was not going to work and was exhausting Riley. Having rarely used a ropewalker, Pearce was also carrying a full frog system, including a Pantin. Riley used Pearce's Pantin to take the place of his foot ascender. Despite having the Pantin pop off a few times, the duo was able to complete the climb.

1. Anna Pearce, Incident Report, 4 March 2022

Comment: Knowing how to improvise equipment safely and trouble shoot issues on rope are invaluable vertical caving skills.

28 February 2022
Coves Cave, Barbados
lost/stranded, no injury, aid

Sheadon Padmore (17) got lost while exploring Coves Cave with friends. The Barbados Fire Service, Defense Force, and Police engaged in a five-hour rescue. High water levels in the cave complicated the rescue effort, but Padmore reached the surface unharmed. Padmore had explored the cave more than ten times prior to the incident, and said he was not afraid because: "I know my friends would not have left me down there."

1. Barbados Today staff, "Boy rescued from cave unharmed," Barbados Today, 28 February 2022

2 March 2022
Lookout Mountain, Tennessee
lost/stranded, no injury, aid

Gabriel Vaughn (21) and Robby Dobos (23) got lost while trespassing in a cave in Lookout Mountain. Vaughn and Dobos left to explore the cave on Monday, and their family called the Chattanooga Fire Department when they failed to return by Tuesday. Members of the Chattanooga-Hamilton County Rescue Service responded and searched the cave. The rescue team discovered the pair unharmed in the farthest known areas of the cave around 3:45 am Wednesday morning. They had passed a 600-foot, wet, low airspace crawl without wetsuits or appropriate clothing. The resulting mild hypothermia and disorientation may have contributed to them losing their way and seeking shelter. Rescuers provided warm clothes, food, and guided the pair the two miles out of the multi-level cave. The rescue effort halted Norfolk Southern trains for several hours, resulting in significant delays throughout their system. The pair may face criminal trespassing charges.

1. News Channel 9 Staff, "Cavers lost under Lookout Mountain now safe, facing trespassing charges," News Channel 9, 1 March 2022

18 May 2022
Big Blowhole, California
flooding, no injury, aid

A man taking photos was stranded inside a sinkhole below Sunset Cliffs in Ocean Beach, California. The sinkhole is approximately 60 feet below the cliff line and accessible only at low tide. The man entered the sea cave during low tide at approximately 7:13 am, when tides were at a low, −1.67 feet. According to a first responder, the photographer went inside "to photograph tide pools … and didn't realize that the tide was rising and became trapped." A lifeguard was sent in on a Jet Ski, but the photographer did not want to go into the water and damage his camera equipment. The San Diego Fire-Rescue Department deployed their specialist cliff rescue unit and Rescue 44 truck to enact the rescue. A crane custom-mounted onto the rear of the Rescue 44 truck lowered a cliff-rescue specialist into the cave. The first responder strapped the photographer to himself in a harness, and the crane extricated them from the sinkhole. The day of the rescue, the high tide rose to 4.77 feet.

1. Mike Madriaga, "The May 18 Sunset Cliffs sink hole rescue," The San Diego Reader, 31 May 2022

22 May 2022
unspecified cave, Kentucky
rockfall, injury, no aid

Stephanie Suen (33) injured her spine when she was struck by a falling rock while surveying a seldom visited project cave. Suen was with Cody Kisner, Dustin Kisner, Beau Gergel, Vincent Guberti and Phillip Sullivan. The team's objective was to complete a profile sketch and investigate a lead 30 feet from the bottom of the cave. The team rappelled the 165-foot vertical pit to enter the cave and rigged another 30-foot pitch to enter the lead. The lead was a horizontal passage with a canyon, and Suen was walking back from a station when the accident occurred. An approximately 20-inch by 15-inch by 10-inch rock (150 to 300 lbs.) fell from the ceiling and hit Suen's upper back, knocking her to the ground.

Guberti and Gergel responded immediately and conducted an initial spinal assessment prior to moving Suen to a more stable location. Sullivan had EMT training and conducted a medical assessment, while other team members exited the cave to get supplies for a small party assisted rescue (SPAR) and call for help. The team had several pulleys, carabiners, and ascenders available as a SPAR kit. Team members aided Suen down the 30-foot drop to the bottom of the cave. The team then used a climbing counterweight for the main 165-foot pit. They built a 3:1 system to help with the edge transition. A team member acted as the counterweight climber to get Suen up the 165-foot pit while Guberti served as the coordinator and edge attendant. Kisner operated the 3:1 for pulling Suen over the lip. Kisner drove Suen to the hospital where CT scans determined she had fractures on her T4 and T5 spinous process along with injuries to her left ankle and left ribs.

Guberti stayed at the cave and rerigged the rope so that Sullivan and Gergel could ascend. Sullivan climbed out of the pit with no issue. As Gergel was climbing out of the cave, a second rockfall began and several rocks deflected off his gel, uninjured, completed his climb out of the cave.

Figure 3. Injuries sustained by Stephanie Suen after a rockfall incident. Photo credit Stephanie Suen



1. Stephanie Suen, email communication, 25 June 2023

Comments: Responders should carefully consider the risks and benefits of moving a patient with a potential spinal injury. Moving a patient with a compromised spine may cause paralysis. As mentioned in another incident in this report, courses such as Wilderness First Responder teach methods including the focused spinal assessment that can aid in deciding whether to move a patient. The injured caver had returned from an NCRC SPAR course the week prior to this incident and had brought the right equipment to build a haul system. Three people on the team had been through Orientation to Cave Rescue with the NCRC Central Region, and one was a member of the Spéléo Secours Français Haute-Savoie SSF74. One of the teammates had EMT training, and one had WFA training. The group was well-equipped with the right skill sets to do medical evaluations and execute the small party assisted rescue that was chosen.

4 June 2022
Peppersauce Cave, Arizona
other, injury, no aid

The Southern Arizona Rescue Association was conducting a cave rescue awareness training in Peppersauce Cave when a 31-year-old female participant tripped and aggravated a previously injured ankle. The cave rescue team assessed the caver, and she decided she could crawl 100 feet out of the cave with occasional assistance. The caver went to urgent care and the training continued.

1. Sarah Truebe, Incident Report, 4 June 2022

30 June 2022
Shady Valley Mill Cave, Missouri
bad air, no injury, no aid

Dan Lamping (42) and Joe Sikorski (47) encountered bad air while they were surveying Shady Valley Mill Cave. The cave is a hands-and-knees stream crawl that floods in heavy rain. The pair decided to take advantage of the fact that the area had not seen much rain in the previous few weeks to attempt a survey trip. The water level in the creek was slightly lower than on previous winter mapping trips but was still flowing. Lamping and Sikorski did not notice anything different about the cave, no noticeable change in airflow, or rotting vegetation in the stream. The pair traveled approximately 1,000 feet to the end of the survey in wetsuits. When they arrived at the survey start point and were getting their kits together, Sikorski attempted to ignite a lighter. The lighter would flicker but not light, alerting Sikorski to the possibility of bad air. Once Sikorski mentioned the possible bad air to Lamping, they both realized they were feeling dizzy and lightheaded.

They decided to leave and began packing their things, not recognizing the situation was an emergency. Once they stood up and began to move toward the cave entrance, they realized how difficult it was to breathe. The pair began to panic as the air did not improve as they moved through the cave and past several constrictions. Lamping recalls struggling with deciding to move as quickly as possible to get fresh air, or to move slowly and control his breathing. Once they reached the surface, they calmed down but still struggled to breathe. Sikorski experienced feeling a heavy weight in the back of his head near his neck/spine and his chest felt restricted, while Lamping experienced a burning sensation in his sinus cavity and back of the throat. The pair suffered no lasting health consequences but felt off for the rest of the day. Lamping suspects the bad air could have been a result of a buildup of lawn care chemicals running into the suburban sinkhole. Alternatively, the cave is possibly sumped upstream and chemicals and CO2 could have settled in the system during summer when colder sinking air cannot push bad air out of the system.

1. Dan Lamping, Incident Report, 4 July 2022

Comment: The lighter trick is an unreliable indicator of high CO2 levels. Failing to light is a good warning sign, but even if it lights, the atmosphere of the cave may be dangerous for other reasons such as low O2 or other chemicals. At the first signs of difficulty breathing, cavers should immediately exit the cave as judgement can be impaired.
August 2022

29 August 2022
unspecified cave, New York
difficulty on rope, no injury, no aid

A caver relatively new to vertical caving had trouble on rope when they encountered a damaged section of rope. The caver was with a group (25 to 30) of experienced cav-

ers and some new to ropework who entered a newly discovered cave to dig and set a deviation on the entrance drop to prevent rope rub. The entrance includes an initial drop, a short traverse, and a continuing drop into the main room, totaling around 80 vertical feet. When exiting the cave, a caver relatively new to ropework ascended the rope first. Nearing the newly set deviation, the caver noticed that one to two inches of the core of the rope was exposed in the center of the deviation. The caver had a frog system with a second hand ascender as a third point of attachment. As they neared the deviation and exposed core, they did not properly communicate the issue to the rest of the group. Instead, the caver panicked and continued ascending through the damaged section with their hand and chest ascenders, ignoring the use of their second hand ascender. Once they cleared the damaged section, the caver calmed down and described the issue to the rest of the group.

The caver continued ascending to the traverse and called "off rope." However, they continued to ascend from the traverse without again calling "on rope" and dropped a large rock. At this time, one of the cavers below had started to free-climb a wall of the cave to get past the damaged section of the rope. The rock did not strike the lower caver. The inexperienced caver returned to the surface and retrieved a spare rope from a nearby vehicle. They then dropped the rope to the traverse area, where the more experienced caver rigged the rope such that the rest of the party could ascend to the traverse with the new rope, and then switch onto the old rope. All cavers exited without injury.

1. Scott Conway, email communication, 3 July 2023

Comment: In a larger group with multiple experienced cavers, it can be beneficial for a leader to ascend first to check for rub points and inspect the rigging, while a co-leader remains at the bottom to supervise inexperienced cavers getting on rope. Also, it is important to reiterate to newer cavers that "off rope" means more than just "the rope is free" it means "the rope is free, I have inspected the rigging, I am out of the rockfall zone, and I cannot cause rockfall into a climber's danger zone."

September 2022
White Rabbit Cave, British Columbia, Canada
rockfall, no injury, no aid

Kirk Safford narrowly missed injuring his eye while digging on a lead. On an exploration project in White Rabbit Cave and toward the end of the multiday expedition, Vlad Paulik was digging in a passage and accumulating substantial spoil while Kirk Safford was below. Safford looked up when he thought the spoil was stable, and a small rock fell and hit him in the eye socket. The rock hit between his nose and upper and lower eye orbital bones, so by luck it bridged the eye, barely contacting the eyeball.

1. Kirk Safford, "Fresh Rabbit," The Canadian Caver, Vol. 92

Comment: Even when cavers are being careful, and it seems safe to be in a rockfall zone underneath another caver, there is always the possibility of unintentional rockfall. In the case of digging in passage above others, cavers create additional rock, sediment and dust piles that can be dislodged. Staying out of rockfall zones and circumventing the desire to look up and watch is important, as even small dust particles can cause eye injuries. In this case, luck prevailed and a serious eye injury was avoided.

20 September 2022
Mount Meager Cave, British Columbia, Canada
rockfall, no injury, no aid

Scott Linn was struck on the head by a large block of rock or ice while he was supporting cavers exploring a glaciovolcanic area. Linn was on an expedition with a large team of cavers and researchers exploring the only known glaciovolcanic cave in Canada at Job Glacier, Mount Meager Volcanic Complex. The volcano emits substantial amounts of hydrogen sulfide and volcanic heat from beneath the glacier, which has caused the cave passage to melt through the ice. Common during the expedition were melting ice blocks falling from the ceiling due to the heat interacting with the cave. Thick steam and volcanic gas also obscured the high ceiling and potential hazards. Linn was on a support team close to the entrance as backup, safety and rigging support for cavers deeper in the system. During this process a rock or ice block melted out, fell from the ceiling, and struck Linn in the head, hitting his helmet. He was protected by his helmet and was not injured. He exited the cave without assistance.

1. Christian Stenner, "Glaciovolocanic Cave at Mount Meager and the Mount Meager Volcano Project," The Canadian Caver, Vol. 93

Comment: The visibility likely obscured hazards in the ceiling such as hanging seracs or loose material that was prone to melting out. Without being able to see the ceiling, it was not known where icefall was occurring, which makes it difficult to avoid. Limiting exposure to hazards by reducing the time one is exposed is a mitigation to unknowns such as this but cannot fully prevent an occurrence.

7 October 2022
Mystic Cave, South Dakota
caver stuck, no injury, aid

A caver got stuck in a lead for 18 hours while surveying a cave on private property in South Dakota. The caver was exploring a tight lead beyond a dig at the end of the cave, 40 minutes from the entrance with two other cavers. The caver was able to fit through a tight spot, an S-turn with two successive 90-degree bends approximately 9–10 inches high. At 6 ft 2 inches, the caver took his helmet and boots off to get around the bends.

After the tight spot, the cave ramped steeply into a small room where the caver could turn around and attempt to exit the lead. The caver came down the slope headfirst and tried to pass through the S-turn, but was unable to get their legs around the corners. Unable to back up the slope to reach the small room, and incapable of moving forward, the caver was stuck lying on their stomach in the tight passage. The caver's teammates attempted to free them by pulling on their arms, but were unsuccessful and left to call for help.

Local cavers from the Paha Sapa Grotto with NCRC training (including one instructor), and Custer County Search and Rescue responded. Rescuers brought digging tools, field phones and communications wire, food, water, warm clothing, heat packs, and webbing to the site. Using a hammer drill, rescuers widened the passage over the course of several hours and made multiple attempts to free the caver by having them push with their legs while rescuers pulled on their arms using a length of webbing. Between each attempt, rescuers used a drill to remove portions of the cave wall that were preventing progress. The caver was finally freed from the tight spot at 5:45 am on October 8. The caver

spent 18 hours unable to move more than two feet backward or forward in the constriction throughout the rescue. After resting and eating, the caver was able to exit the cave under their own power. Access to the patient was extremely difficult; even the very smallest rescuers were only able to reach the top of his head and one of his hands throughout the rescue. Rescuers were able to provide the patient sips of water through a straw, energy gels, and small bites of food with great difficulty. The patient's location also made passage enlargement very challenging and slow.

Comments: Cavers are encouraged not to attempt going through a tight squeeze when there is doubt that they will be able to get back out. It was fortunate that the caver was able to find a place to turn around on the far side so that they could attempt to exit head-first. This allowed rescuers to provide the caver with food, water and comfort. Stuck cavers are in danger of developing hypothermia as they are in contact with the cave, losing heat through conduction, and unable to move enough to warm themselves. The rescue was hampered by the extremely tight environment, which limited the number of cavers who were able to access the patient or operate the drill. The patient was extremely helpful during the rescue, remained calm, and was surprisingly not hypothermic.

25 October 2022
Grand Canyon Caverns, Arizona
other, no injury, aid

An elevator malfunction trapped five tourists in a show cave for more than 24 hours. The elevator broke down on a Sunday evening when visitors went to leave the cave. Most of the tour group was able to walk up 21 flights of stairs to exit, but five were unable or unwilling to do so. The stranded tourists were provided accommodation in a small hotel and restaurant within the cave. Attempts to repair the elevator were unsuccessful, and the Peach Springs Fire Department used a rope rescue system to haul each person out of the elevator shaft on Monday evening. None of the tourists were injured in the incident.

1. Amy Simonson and Rebekah Riess, "Tourists stranded underground at Arizona's Grand Canyon. Cavers are back on surface," CNN Travel, 26 October 2022

13 December 2022
Links Cave, Virginia
caver fall, no injury, no aid

Three cavers (21 to 22) were doing a sport trip in Links Cave when one of them fell about 10 feet onto their back. The group was taking an alternative canyoning route back up to the Milk Jug that included a climb. While the first caver was attempting the climb, the other two cavers were joking around. One of their comments made the climbing caver laugh so hard they lost their footing and fell 10 feet onto their back. The caver remained still for a few moments, did a full body assessment, found no major injuries, and decided they could exit the cave under their own power. The caver had bruised their elbow and the next morning their neck was sore. The accident could have been much worse, as the falling caver's head passed within a few inches of a rock outcrop. Hitting this outcrop, even with a helmet on, could have caused serious, potentially fatal, spinal injuries.

1. John Sykes Richardson, Incident Report, 18 April 2023

17 December 2022
Helms Deep Cave, Tennessee
caver fall, injury, no aid

Bill Steele (74), Jim Smith (68), Diana Tomchick (62), Joel Bennett (~70) and Dave Pharr (~68) were participating in a survey trip when Steele fell and injured his right leg. The team was 1 ½ hours into a planned 16-hour trip to survey Helms Deep Cave when the accident occurred. Steele slipped while stoop-walking on mud, landing hard with his right leg bent beneath him. Steele heard a pop, which he thought may have been his knee. Bennett, a chiropractor, performed an initial assessment of Steele's injury and suspected a knee injury. Bennett lent Steele his trekking pole to use as a crutch, and Pharr accompanied Steele to the entrance while the rest of the team continued to survey. At the entrance, Pharr spotted Steele on the entrance climb, and Steele slowly climbed out. Steele hobbled ¼ mile to camp and got into his sleeping bag. Once back home in Texas, Steele visited his primary care physician and an orthopedic surgeon. After a series of X-rays and an MRI, Steele was diagnosed with a spiral fracture of his right fibula, ankle, and a torn ligament. While surgery was not required, Steele wore an orthopedic boot for seven weeks.

1. Bill Steele, email communication, 18 May 2023

CAVING RELATED ACCIDENT REPORTS

7 March 2022
unnamed cave, Tennessee
fatality, caving related, no aid

The remains of a 51-year-old man were found by two teenage boys in a cave near Jere Court in Pleasant View. The boys found a pair of shoes and a femur outside of the cave and discovered torn clothes, a prison release card, a credit card, and the rest of the torso within the cave. No additional details are available, and it is unclear if the man died in the cave.

1. Lucas Wright, "Human remains found in Cheatham County cave identified by authorities," WKRN, 9 March 2022

2022 CAVE DIVING ACCIDENT REPORTS

23 April 2022
Cenote Odyssey, Quintana Roo, Mexico
fatality, cave diving

A 32-year-old Russian male drowned while diving at Cenote Odyssey in Sistema Ox Bel Ha. The man was a certified full cave, stage cave and diver propulsion vehicle (DPV) cave diver. He had been active in training, diving and surveying in the area and had dived the cave where the accident occurred many times. On the day of the incident, he was solo diving and attempting to continue the cave survey. He was diving four aluminum, 80 cubic feet tanks filled with 32% nitrox and a DPV. He was using side-mounted gear with two stage tanks. The subject entered the water around 10:00 am on Saturday morning and did not return. Neighbors at the cenote became worried by the early evening and contacted another local diver who raised the alarm in the community, with divers from Playa Del Carmen, Puerto Aventuras and Tulum responding. The first search team entered the water at 2:57 am Sunday; the team planned to retrace the steps of the missing diver, but they had no information on his planned dive. After some searching, the missing diver was found deceased at 700 feet penetration, 7 minutes "trigger time" from the Cenote Odyssey. The diver had done two jumps from the entrance. The jumps were installed using safe diving practices and protocols. The team exited the cave, and a larger recovery effort was organized to remove the subject and his equipment from the cave the next morning. The recovery operation went smoothly, and the diver and his equipment were surfaced by 1:30 pm Sunday.

The exact cause and manner of this accident is unclear. The subject was found face down, helmet and mask on his face, with both tanks attached to his body. Both tanks were empty with their valves fully open. The subject was located next to where he had attached his stage tanks to the line. One stage tank had the valve fully open; the tank was empty, and the hose and regulator were stowed on the tank. Next to the tank the second stage tank was clipped to the line, valve closed, tank pressurized and with 170 bar/2500 psi inside; the hose and regulator were stowed on the tank. The DVP was also clipped to the line and functioning. The diver was within arm's length of the tanks and DPV. The diver had a survey slate in his pouch and a wrist slate with many sheets of information. He had been working and resurveying lines around the location of the dropped stages and DPV. On the surface, the recovery team checked the diver's equipment; there were no signs of equipment malfunction on any of the regulators, hoses, or O-rings.

1. Gustavo Buenrostro and Martin Gaspar Ramirez, Comité Regional de Espeleobuceo, Ecología y Regulación (CREER).

14 May 2022
Manatee Springs, Florida
fatality, cave diving

A man drowned at Friedman's Sink, part of the Manatee Springs Cave System, on a recreational dive. The man was part of a team composed of two father and son pairs; all four divers possessed Introduction to Cave Diving certification and had 100 dives at that level. The team planned to traverse from Friedman's Sink to Catfish Hotel. They had no experience with the system but had viewed a video of the planned dive prior to attempting it. The divers entered the water at 11:17 am and followed the guideline to Catfish hotel, noting the up line to Sue Sink on the way. When they arrived at the end of the guideline, the divers could not see daylight and became disoriented. Confusing the exit to Catfish with the Manatee head spring, the divers decided to return to Sue Sink, the nearest known exit. Swimming against the flow of water, the divers traveled back to Sue Sink, occasionally pulling hand over hand with heads down to make progress. The first father and son pair (divers one and two) made it to the up line to Sue Sink. Diver two looked back to the other pair (divers three and four), signaling "okay" and receiving an "okay" signal back, before safely ascending and exiting with diver one at 12:05 pm. Diver two called 911 when he realized divers three and four did not exit at Sue Sink. Divers three and four missed the up line to Sue Sink and continued to Friedman's Sink. When Diver three reached the uphill before the up line to Friedman's, he looked back and saw Diver four's light. Thinking Diver four was with him, he ascended and exited Friedman's Sink at 12:20 pm with 1,500 psi in one tank and 0 in the other. Diver four did not exit, and his computer recorded his last movements at 12:17 pm.

Law enforcement notified two members of the International Underwater Cave Rescue and Recovery (IUCRR). In the meantime, a team of qualified cave divers attempted a rescue by entering Catfish Hotel and swimming upstream to Friedman's Sink. The team located Diver four's camera and light system on the cave floor, approximately 100 feet downstream of Friedman's Sink. The IUCRR team, after a briefing from surviving team members, entered the system and located the victim in a dome in the vicinity of where the rescue team found the camera. The victim's two oxygen cylinders were empty at the time of recovery.

Analysis and Comments: Introduction to Cave Diving students are taught that traverses and siphons are beyond the limits of their training. Cave divers in general are taught to never attempt a blind or unproven traverse, particularly into a siphon. Moreover, at Friedman's, Manatee Springs State Park requires divers to be full cave trained and to dive with someone who has entered there before.

1. NSS-CDS Accident Analysis Committee, "Accident Analysis Committee Report Cave Diving Fatality Manatee Springs State Park"

1 June 2022
Buford Springs, Florida
fatality, cave diving

Two divers drowned while exploring Buford Sink at the Chassahowitzka Wildlife Park. Two teenagers who were visiting the spring to swim chatted with the divers and observed them enter that water at approximately 11:00 am. The teens saw the divers resurface after their first dive and overheard them discussing if they had adequate gas for a second dive. The two divers re-submerged at approximately 11:45 am and 12:00 pm. Shortly thereafter, the teens saw one of the divers floating face down on the surface. The teens swam over and attempted to pull the diver toward the dock, but were unable to remove the diver from the water. Once they realized the diver was not breathing, they notified law enforcement. The International Underwater Cave Rescue and Recovery (IUCRR) responded and arrived at around 2:15 pm. The second diver was found deceased near

the permanent cave line at 137 feet. Both divers had little to no air left in their tanks. It is unclear what triggered the accident, as both divers' equipment was functioning and had no obvious defects. No information is available on the divers' training and abilities, but it is assumed they exceeded the limits of their training. The cavern area in Buford Sink extends beyond the recreational limit of 130 feet, and the divers may have misunderstood their remaining gas reserves. The divers' 53-foot3 and 72-foot3 cylinders were smaller than the "standard" 80-foot3 cylinders. SPGs only read pressure, thus the divers may not have realized how low their gas supply was before starting the second dive.

1. "Buford Sink Dual Fatality," Divers Alert Network (DAN)

14 October 2022
Roaring River Cave, Missouri
fatality, cave diving

Eric Hahn (27) drowned while placing equipment for a survey of Roaring River Cave. Hahn was placing stage bottles at 130 and 190 feet with a partner (diver three) and acting as a safety diver for a deeper team (divers one and two). Hahn entered the water at 11:12 am. At 11:24 am, a diver on the deeper team interacted with him at the 190 tie off and did not note any problems. At 11:25 am, Hahn bumped into diver three hard and began to swim upwards rapidly. Diver three followed Hahn to render aid and was able to catch him when he hit a ceiling at 165 feet. Hahn was struggling with his loop, and Diver three attempted to help him by grabbing onto his bailout regulator. Hahn pulled the breathing loop out of his mouth and failed to close it. As the loop came out of his mouth and diver three inserted the bailout regulator and purged it, Hahn began to convulse. Diver three attempted to get Hahn into the rescue position, but struggled to hold the convulsing diver and regulator, sinking to the bottom of the cave at 204 feet Diver three attempted to assist until it was too dangerous to continue (limited visibility, loss of guideline, and overexertion). Diver one left to get help. Diver three encountered a member of the deeper team (diver two) on a decompression stop, higher in the cave. Diver two attempted to aid Hahn, but encountered low visibility, distance from the guideline and a PO2 spike that forced him to ascend. Diver three continued to exit the cave and encountered another member of the team (Diver four), who ascended to the surface and alerted the surface manager and authorities. Diver three attempted to descend to assist in the rescue but met Diver two who told him there was nothing they could do to render further assistance, and they needed to ascend. At 11:35 am, Diver four descended to 58 feet and observed Diver three without Hahn and informed the surface manager the mission was now a recovery. The surface manager instructed all team members not to attempt the recovery alone, to complete their decompression stops and wait for the Missouri Highway Patrol technical diver to arrive. The recovery began at 4:00 pm, with two teams entering the water. Hahn was located at 200 feet, with his loop open and out of his mouth. His two cylinders still had gas in them, and he had his bailout regulator in his mouth with a slight free flow. His rebreather appeared to be intact and functional, aside from the loop being open.

Expert analysis suggests Hahn did not understand his diluent and bailout tanks and violated the maximum operating depth of the gas. Hahn was adding a considerable amount of oxygen to his breathing loop, potentially contributing to high PO2 at depth and an oxygen toxicity seizure. In addition, he may have been impaired by nitrogen narcosis, due to the lack of helium in his diluent. This may have impaired his judgement and slowed his response to elevated PO2.

Comments from CDS: It is unknown if Hahn had any underlying health conditions that contributed to this incident. No such health conditions were disclosed on his medical disclosure form, but underlying medical conditions and/or medications to treat such conditions could have made him more prone to a hyperoxic seizure despite only having been above a PO2 of 1.6 for several minutes. While it is uncommon for someone to have an oxygen seizure with such a short exposure to breathing a hyperoxic mix, individual diver susceptibility is extremely variable. As such, divers should be conservative in planning their oxygen exposure.

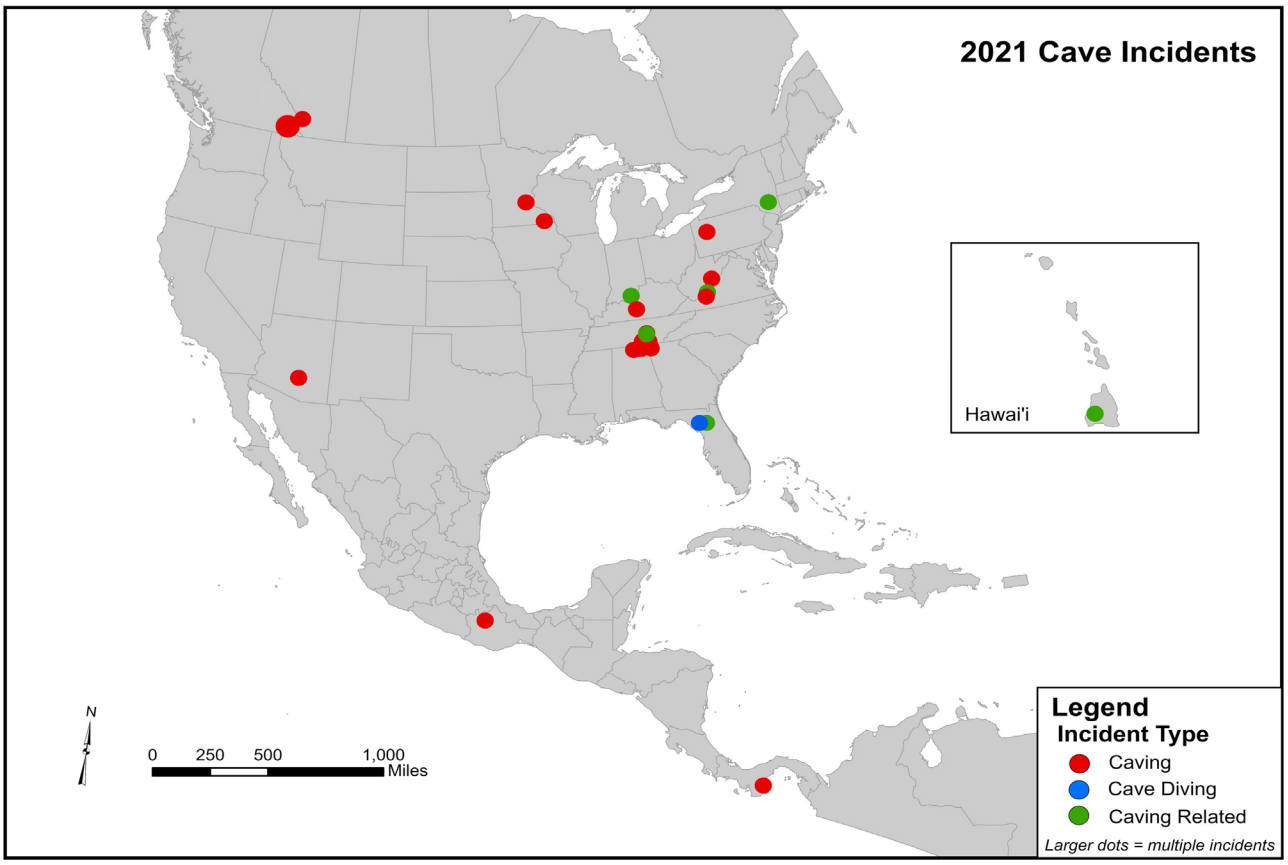
1. Roaring River Dive Team and NSS-CDS Accident Analysis Committee, "Accident Analysis Committee Report Cave Diving Fatality Roaring River State Park"

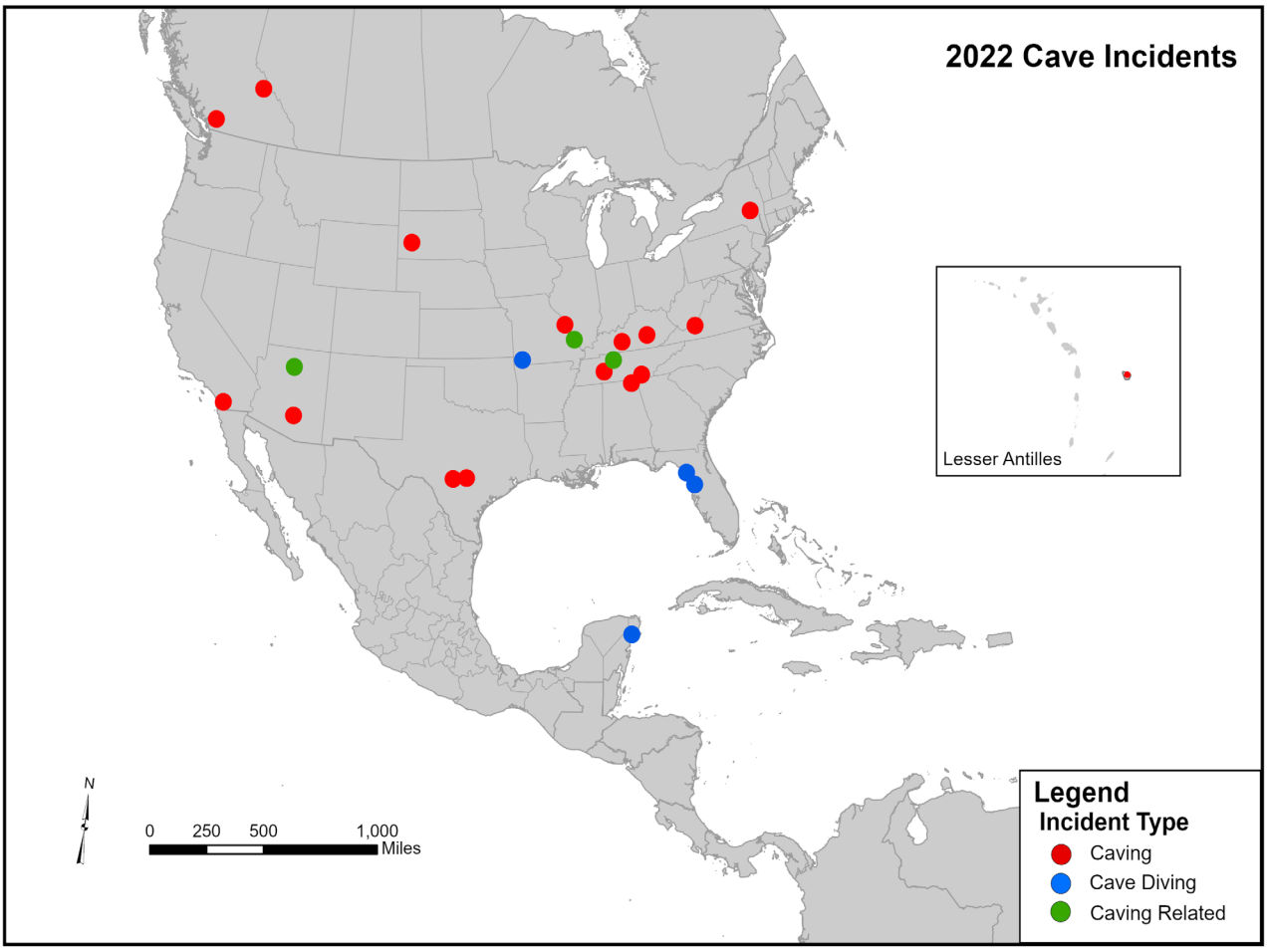
August 23, 2022
Hole in the Wall, British Columbia, Canada
decompression Illness, Injury, No Aid

Jason Richards completed an exploration dive to about 440 feet, breaking the depth record in Canada's deepest underwater cave. Having been to 440 feet and in the water for over two hours, Richards completed a series of decompression stops while he ascended to the surface. After surfacing, Richards experienced pain and discomfort, symptoms of decompression sickness. Richards was initially treated with rest and 100% oxygen, but when his symptoms did not improve, Richards was rushed to the hyperbaric chamber in Vancouver, Canada for treatment. Richards remained in the hyperbaric chamber for several days and eventually made a full recovery.

1. Peter Norris, "Deep, Deeper, Deepest? A Return to Hole in the Wall," The Canadian Caver, Vol. 92




2021 Cave Incidents
Hawai'i
N
0 250 500 1,000
Miles
Legend
Incident Type
Caving
Cave Diving
Caving Related
Larger dots = multiple incidents


2022 Cave Incidents
Lesser Antilles
N
0 250 500 1,000
Miles
Legend
Incident Type
Caving
Cave Diving
Caving Related

SPELEAN SPOTLIGHT

OF SCOTT HOUSE

BY APRIL GOCHA



How did you first get interested in caving?

Scott: In college, I was interested in science generally. I was working with an archaeology group, but that turned out to be less than satisfying because the professional archaeologists didn't want to hear from amateurs, even if they knew a great deal. I've always been a map freak, ever since I was a little kid. So one day there was an event at the university where different organizations had displays to try to interest students, and I knew people in the local student grotto. Caves were neat and all, but they had a map of Crevice Cave. By today's standards it was a fairly crude map, but it was a real map, and I was in awe. I asked who made the map, thinking it was the geologic survey or something like that — but it was just some guy the cavers knew. I was astonished that ordinary humans can make a map of a part of the earth that had not already been described. It was not comprehendible to me. I was hooked on the geography. I still remember my first serious cave trip in December 1973 to Crevice Cave, the longest in Missouri. I thought I was going to die, it was such a rugged trip. As a caver described it, the cave is like a pinball machine, and you're the ball. You came out with bruises all over your body, and I've been a subject of such abuse ever since.

Do you know how many caves you have mapped?

Scott: I actually don't know exactly, but it's well over 1,000. There are something like 900 caves in Missouri that I've mapped and drawn up, and then many more that I've helped with. In California, I've mapped 150 caves in Lava Beds National Monument, and I've mapped parts of caves in Arkansas and in Kentucky as well. Those are just numbers, but what's more important to me is whether they were good and complete jobs. It's better to map one cave right than to make 50 crappy cave maps. But I don't keep a firm count. It's like life: It's not how many things you did, but did you enjoy it? Did you do it well? Did you do it with people you like? What did you do with the end product? Those are all more important barometers to me. You could map a cave, but if you're somewhere where nothing is published and nothing happens with the map, what is the value? I'm very product-driven.

What are some of your favorite mapping projects you have worked on?

Scott: There are all kinds of considerations, so it's really hard to pick. If I didn't enjoy it, I wouldn't be doing it! The sum total of all the work we've done in the Ozark National Scenic Riverways in Missouri is a body of work that I'm very happy with. It's not a cave system, but a set of caves that you learn so much about. I've also been very involved with Mammoth Cave in the past. The whole system is very complex and interesting, so focusing on one little chunk at a time is important. And mapping Lava Beds in California has been fascinating because I'm just astonished there are more than 100 unmapped caves out there. Before I had been in a lava tube, I thought they weren't really caves. But then I visited one and realized not only are they caves, but they are really fascinating. You map one, and it connects to something else and just keeps going. Now we've mapped miles in 150 caves, and we're having a good time. So I want to finish that project because we're finishing out a geographic entity.

You wrote the Missouri Cave Database — can you tell us more about that project?

Scott: The database started out with the Missouri Speleological Survey, gathering information on Missouri caves for a long time. Eventually, in partnership with Missouri Geologic Survey, they created a printout of the information back when things weren't yet interactive. But eventually databases could get into your hands, like the early Apple II database. It was fascinating because you can put in attributes and find things. For example, you could identify what is the highest cave in a particular county that is also in a specific geologic formation. That opened up a world to me because this was a way of sorting information. It grew from there, and eventually we took old data from the Geologic Survey and passed it over to the Missouri Speleological Survey itself, with an operative database written in FileMaker Pro. We've grown that database and transformed it from a flat file into a fully relational database with numerous branches. It's now a huge success.

What we've been able to do with the database is incorporate lots of information from various sources—information on caves from the National Park Service, Missouri National Forest, Department of Conservation, and state parks. The information is all in one place, so it is literally a state cave database rather than just a cavers' database. We share the data for agencies to use, so we maintain data for the National Park Service. They have a version with their caves in it, while at the same time the Missouri Department of Transportation has a version for environmental review purposes. There's not a highway project in Missouri that that does not refer to the database. Because if you're considering building a project, it's simpler to avoid a cave than to do mitigation.

The database contains not just caves, but also records of fauna tied to the caves. For example, a record could include sighting of a big brown bat or 23 cave salamanders in a cave at this spot on this day by this person. The database contains over 45,000 records on caves in Missouri, so we're able to answer questions that nobody else can answer. For example, when the northern long-eared bat Myotis septentrionalis was being considered listed as endangered, nobody was tracking how many there were in the state. But we had tracked these data in the database and were able to provide that information.

What's your favorite cave?

Scott: The Ozarks in Missouri is my favorite caving place. My favorite cave in the world is Round Spring Cave in the

Ozark National Scenic Riverways. It's a 6,000-foot-long tour cave, and it's beautiful. They take interpretive tours into it, along a gravel trail built mostly in the 1930s to 1950s by private landowners. It's a great educational cave, so you can take a geology or biology class into the cave and always have something interesting to show. You can access pretty much the whole cave without making much of an impact on the cave. Every time I'm in there, without fail I see something new that I've never seen before.

What is your favorite cave map?

Scott: The Carlsbad main corridor is the one I like the most because, by so many people's standards, it was fairly undoable. On my first trip in the cave, as we were walking down the main corridor, somebody said, "Wouldn't you hate to try to survey this?" I thought that I wouldn't mind surveying it at all, so that's what happened. I started surveying the main corridor. It was such a challenge because it's so big and linear. How can you show a profile when it's a ceiling line and a floor line? And what do you do when there are 200 feet between them? But you just take it bit by bit, piece by piece. I decided to draw wall detail from what I saw going down the passage. I went up and down the tour trail and would stand there, look at the wall, and try to draw what I saw. That's more art than mapping, but I tried to put texture into the map. It wasn't easy to do because I'm used to drawing two-dimensionally, but I'm very pleased because my map ends up showing the nature of the cave.

Can you tell us about your experience with the National Geographic Society Institute?

Scott: I was a sixth grade teacher, and one day a flyer arrived at my school looking for candidates for the National Geographic Society Institute. The principal of my school said the opportunity was tailor-made for me because of my leadership activities and because I was a geography freak. I applied and got it in 1988. Out of 16 states that year, each sent four people, so I was one of four from Missouri. We spent a month in Washington, DC, subsidized by the National Geographic Society. We went to National Geographic every day and worked on geography education. While I was there, I met another teacher from North Carolina. While everybody else was out at night, we would go to the Natural History Museum or the American Museum of History until they would close and kick us out. We got married a year later, and we're still together. She's my biggest supporter.

What's your favorite piece of caving equipment?

Scott: I'm not romantic about caving equipment. I have like 50 carbide lamps that are pretty cool. But I've got this old Silver Ranger compass that I've had since around 1976, and it still works. Most people have no clue how to read a compass and don't know how to use one in the field. They can't find their way from point A to point B given a map and a compass, since they rely on GPS. So I think my favorite piece of equipment is an old Silver Ranger compass.

What do you like to do when you're not caving?

Scott: I'm also a Civil War historian and reenactor. My little niche in the world of reenacting is being an engineer who prepares battlefield maps of the reenactments. I take a reenactment site and map it by using aerial photos and scaling it. You make it look like it was really done in the 1860s, with fonts and lettering. It's so much easier than drawing a cave map!

What's next on your caving horizon?

Scott: I've got my hands full and my calendar full. I have a big mapping trip in the Mark Twain National Forest coming up. We've got the best situation in caving — we have a camping spot reserved for us, with food paid for through a co-op agreement with the Forest Service. We'll go map and monitor caves and write up final reports. It could not be better. I'm also headed out to Lava Beds in California in early May for 10 days, and I'm taking along a couple of newer people. In southern Missouri, we have probably 400 caves on Forest Service land that remain to be mapped. It's something like 1.5 million acres, so there's a lot out there to do.

I've been caving for a long time, and I've done a lot of things. But the most important thing I'm doing right now is handing over responsibilities to younger generations of cavers. We're so fortunate in Missouri that there have been generations of go-getters who are really outstanding. There are many, but I'll mention Dan Lamping, who is president of the Missouri Speleological Survey now, and he's my deputy in the Cave Research Foundation Ozarks Operation, which I head. And then there's Kayla Sapkota, who is now president of the Cave Research Foundation. Both of them were on their first mapping trips with me. Andrea Croskrey also did her first mapping trip with me as well.

The problem with too many people who are in leadership positions is that folks want to stay in control forever—my big goal in caving right now is to get rid of all those things and hand over responsibilities including mapping projects to somebody who's capable of taking them over. Still being a teacher, there is no greater honor to me than when somebody who you've helped goes on and does something more than you have. That's very powerful to me.

We are blessed with a lot of really great cavers right now in Missouri, mapping and studying caves. It's a great generational thing that we're growing all these new cavers who are adding material to the database. It's working out wonderfully, so it makes me very happy.



In Mammoth Cave by Kirsten Alvey

CAVES, CAVING AND OTHER OUTDOOR ACTIVITIES AT THE 2024 **NSS CONVENTION**

BY MARTHA BRYANT AND MAUREEN HANDLER

The NSS Convention is different things to different people. One of the things many people want is an opportunity to go caving. Our goal with this 2024 Convention in Sewanee is to provide attendees with opportunities to get underground and out enjoying nature hiking, biking local trails or paddling on local rivers and creeks.

The Tennessee Alabama and Georgia (TAG) region offers everything from beginner cave trips to advanced horizontal trips to pits and vertical through-trips in wet, multi-drop caves. We have small caves and large caves, tight crawls and boreholes, dry caves and wet caves, multi-drop caves that you climb out of and pull-down vertical through trip caves. Whatever you desire, it is available within an hour drive of the convention site.

At the convention, we will have a cave information booth with opportunities for both led trips and self-led trips. Don't forget the pre-convention and post-convention camps to expand your caving opportunities.

Pre-Convention Camp

The pre-convention camp will be hosted by the Huntsville Grotto at the NSS Headquarters in Huntsville, Alabama, June 26 to 29. Indoor and outdoor camping will be available. There is no camping fee, but there is a $5 per day charge for showers payable to the NSS. Everyone must sign in at the NSS office and sign a waiver to camp. There will be horizontal and vertical, and guided and self-led trips. Advisors will be available to help with the logistics of self-led trips.

On July 26, everyone is invited to attend the Huntsville Grotto meeting at the headquarters. The grotto will also host a potluck dinner on Friday, June 28. RSVP to:

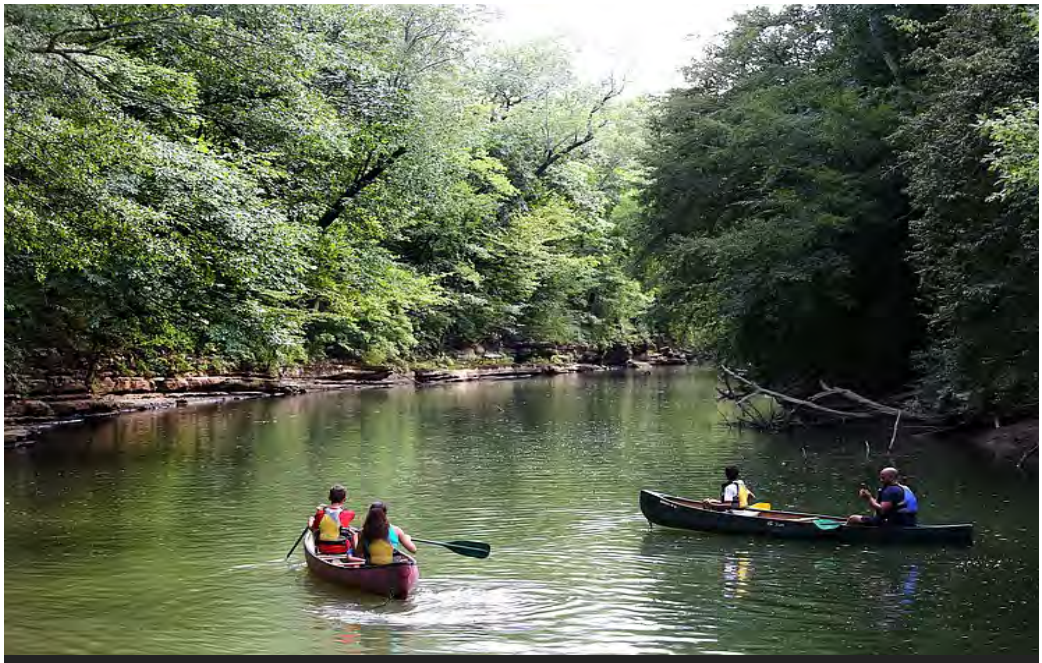
Huntsvillegrotto@gmail.com

Post Convention Camp

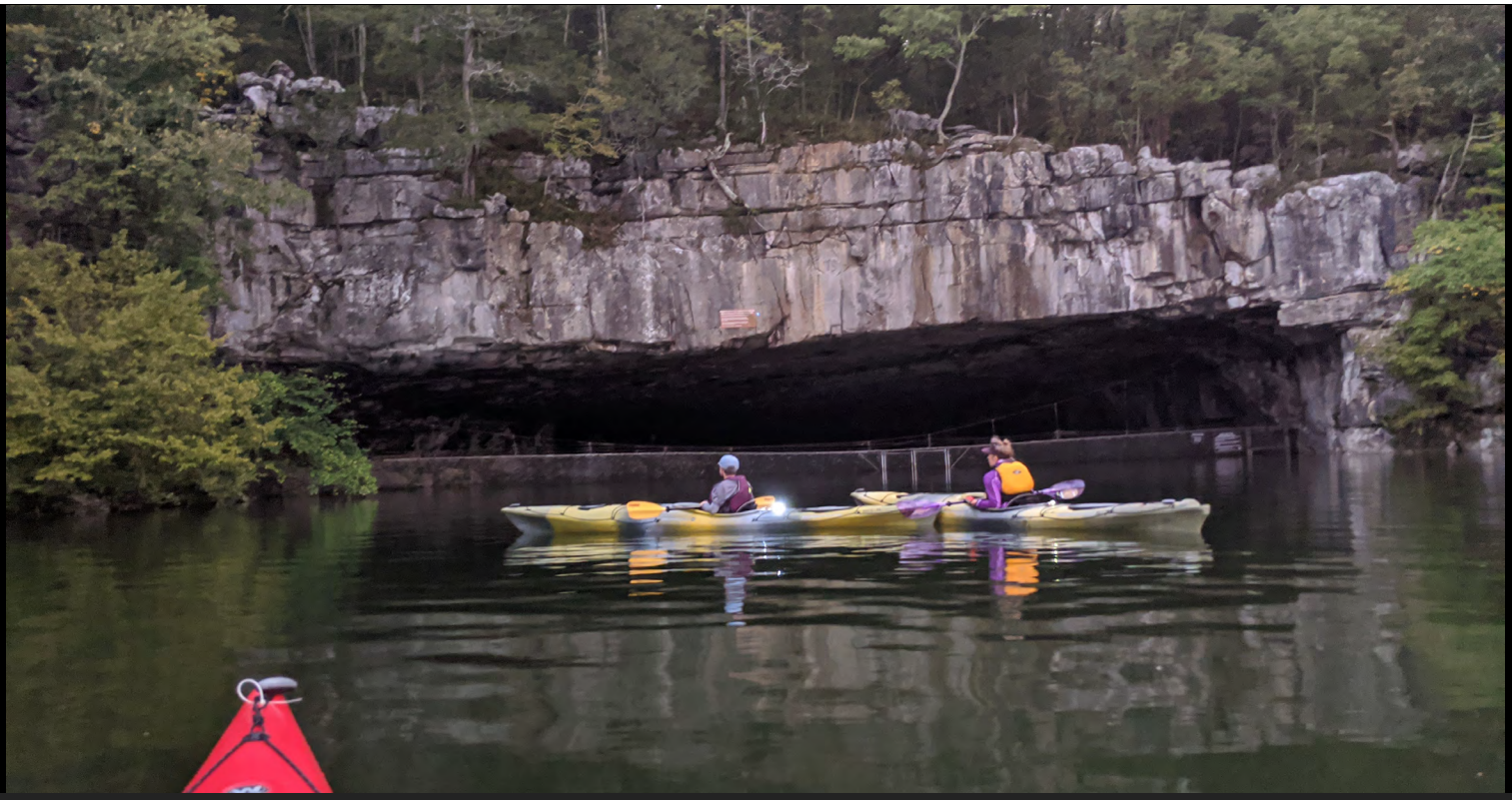
The post convention camp will be held at Cavers Paradise, just a short distance from the convention site. It will begin on Saturday morning July 6 and will run until people are ready to leave. Amenities at the campground include a bathhouse with hot showers and flush toilets. The campground also has a wood-fired sauna and hot tub available for your enjoyment. Members of the Sewanee Mountain Grotto and other area grottos will be leading some trips and assisting you to plan your own self-led trips. A couple of paddle trips will be scheduled to see the evening bat flight at Nickajack Cave on Nickajack Lake, which is a short drive from Cavers Paradise. There is a $five per person, per night camping fee. No RSVP is needed, just show up after convention. Cavers Paradise is on Google Maps, and it will take you right to the campground.

Other activities

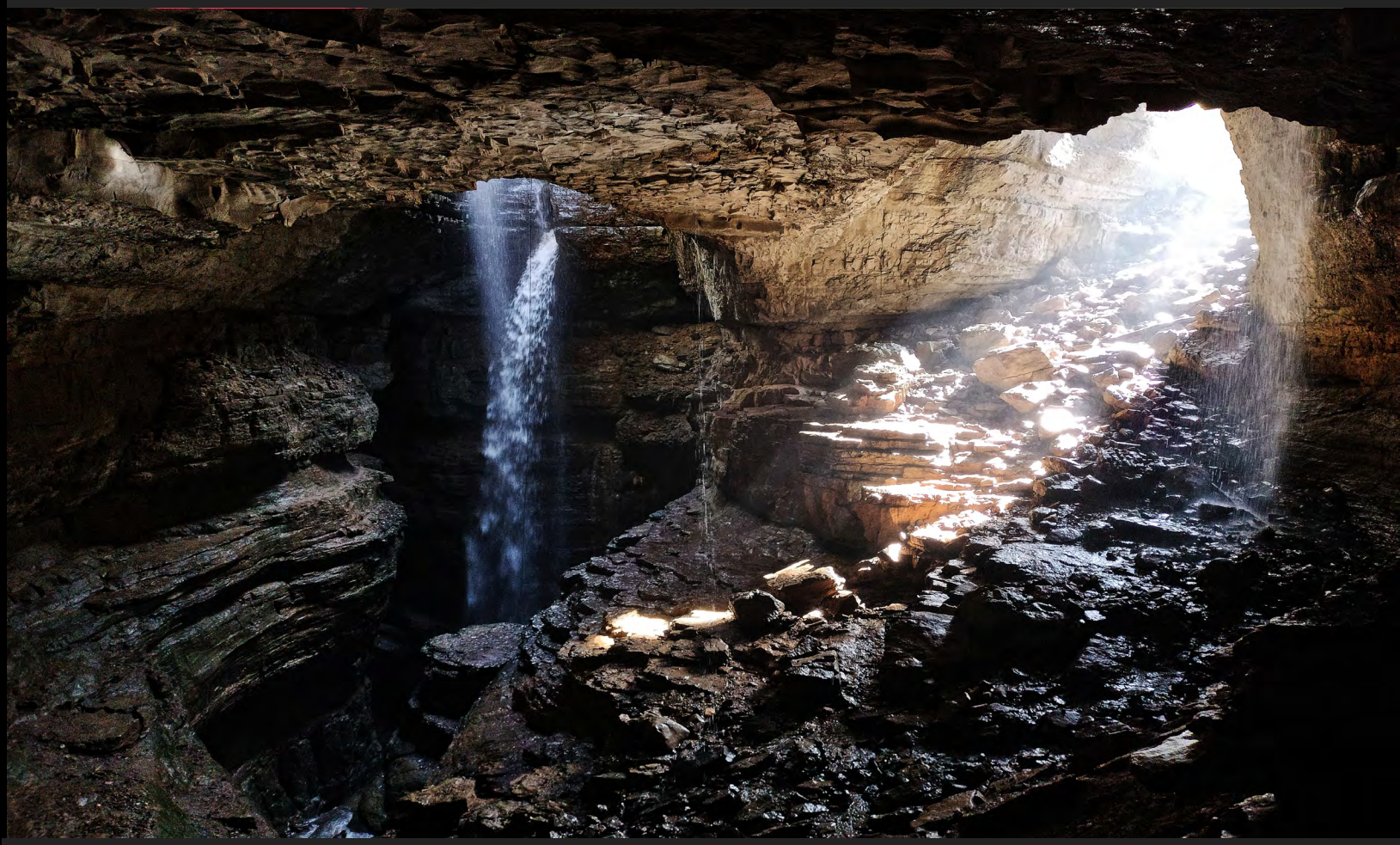
If you need a break from caving, other fun activities are available. There are hiking trails on the nearby campus of the University of the South. Also, there are several Tennessee state parks in the area. The Fiery Gizzard Trail at South Cumberland State Park is one of the best in the area. The Stone Door and Savage Gulf wilderness area is nearby as well. Waterfalls and waterfall hikes abound on the Cumberland Plateau, so bring your hiking boots!. Miles of mountain bike trails are available on the Saint Andrews campus, where convention is being held. A paved bike trail runs from the campus to the business districts of both Sewanee and Monteagle, so bring your bike! For the paddle enthusiasts, the Elk, Duck and Sequatchie rivers and Battle Creek are all nearby, so bring your boat! Boat rentals are available on the Elk and the Duck. And a local bat flight can be viewed at the Maple View area on Nickajack Lake by boat or from the observation deck.



THE ELK RIVER IS JUST ONE OF SEVERAL NEARBY RIVERS THAT OFFER BOATING OPPORTUNITIES FOR ATTENDEES AT THE 2024 NSS CONVENTION.
PHOTO PROVIDED BY THE CONVENTION STAFF



Nickajack Cave allows for the unique opportunity of watching a bat flight from a canoe or boat and is located just a few miles from the site of the NSS Convention. photo provided by the convention staff



Stephens Gap is a TAG classic and will be available for caving trips during the NSS Convention in July in Sewanee, Tennessee. photo provided by the convention staff

ERGOR'S AMBER ROOM MYSTERY

BY ERGOR RUBRECK

The fate of the Amber Room is an enduring mystery. Peter the Great constructed the Catherine Palace near St. Petersburg in Russia in the mid-18th Century. He was given the gift of six tons of amber in 1716 to constrict an ornate room in the palace. The Amber Room was a 590 square foot chamber adorned with gold leaf and many kilograms of precious amber. The glittering space was called the eighth Wonder of the World.

Amber is produced when sap oozes from a conifer tree and is then fossilized. In its viscous liquid state, it trapped small insects, such as bees and ants and also lizards, feathers and leaves. The bugs remain encased as the yellow, orange and brown amber that eventually cured and hardened. Jewelry is crafted from amber and is highly desirable because it is light weight compared to other semiprecious stones and is warm to the touch. The Amber Room was created by craftsmen working four years inlaying amber and gold into the walls.

Alas, the Amber Room disappeared during WW II. It was reported that the Russians disassembled it and stored it in a basement in 1941 to protect it from the invading Nazis. One account claimed the Amber Room was destroyed in 1944; another rumor claimed the Nazis shipped the dismantled Amber Room to an underground limestone mine as part of their systematic looting of European art treasures. For practical purposes, the priceless Amber Room no longer exists. After the war, a drive to duplicate the Amber Room was commenced in 1979 and finally finished in 2003. Was the new amber room as fine as the original? It is a controversial issue.

Meanwhile, in a rural hospital eight kilometers from St. Petersburg, an aged Russian speleologist lay gasping for breath on his deathbed. A former Cossack, Hugo Buzzov, uttered "Amber Room...sister Anistasia..." His last words made no sense, but when I read the account of his demise in a Russian speleological journal, I connected two and two.

Jim White, the cowboy who discovered Carlsbad Caverns in 1903, had a grand niece, Anistasia Buzzov. Around 1946 she had lived in Carlsbad, New Mexico. She had received a large shipment of heavy boxes and disappeared shortly thereafter.

I journeyed to New Mexico to see if I could pick up the trail. The scorching sun blasted like a 115º blowtorch the day I arrived. I located Caliente Cartage, a local trucking company, and asked the ancient owner, Pedro Caliente, if he remembered Ms Buzzov. "You bet your sweet ass...she stiffed me out of $435 back in '46 or '47. Had us pick up a bunch of heavy crates at Railway Express and haul 'em out to Carlsbad Caverns National Park," he said. Pedro Caliente was still angry and could remember the bitter details. "We unloaded at the far end of the parking lot around dusk. They was a gang of roustabouts there, but I didn't stick around."

In the Paloma Bar in Carlsbad, I found a few patrons nursing beers. "Anybody here know anything about a bunch of heavy boxes delivered to Carlsbad Caverns in the late 40s?" I really did not expect anyone to remember an event so many years ago.

A customer in a ten-gallon hat turned from his stool, "My pap did. He passed in '88. But he used to tell of the day he and his three brothers made a thousand bucks apiece." He said they never worked so hard in their lives. They had a key to the cave gate, and they hauled the boxes down to Carlsbad Cavern's Big Room. They spent all night gluing the contents of the crates to the stalactites, stalagmites and flowstone columns. Pap said, "It was real purty stuff, gold pieces, thousands of golden yellow and orange plastic pieces." But when they got done and switched on the lights, they couldn't see any of it because it was the same color as all the formations.

The Amber Room mystery was solved! The evidence was in plain sight. I'd just drive out to the Caverns and verify it for myself. I followed the winding road to Carlsbad Caverns National Park. As I drove, I reconstructed the sequence of events in my mind. Hugo, the Cossack, had located the looted dismantled Amber Room in a Russian cave. For safekeeping, he shipped the boxes to his sister in the US and told her to hide the contents in plain sight. He sent her enough money to cover expenses, plus pay her way out of town. Hugo may never have figured the end game, but I was well on the way to recovering the priceless world-renowned Amber Room.

I bought a cave ticket. Our tour descended the zig-zag cave trail, and a little later we arrived in the Big Room. I was nearly blinded by the vastness of the underground room, 8.2 acres (3.3 hectares) of orange and cream, tan and ochre-colored speleothems of every size and shape, rank after rank. Where was the Amber Room?

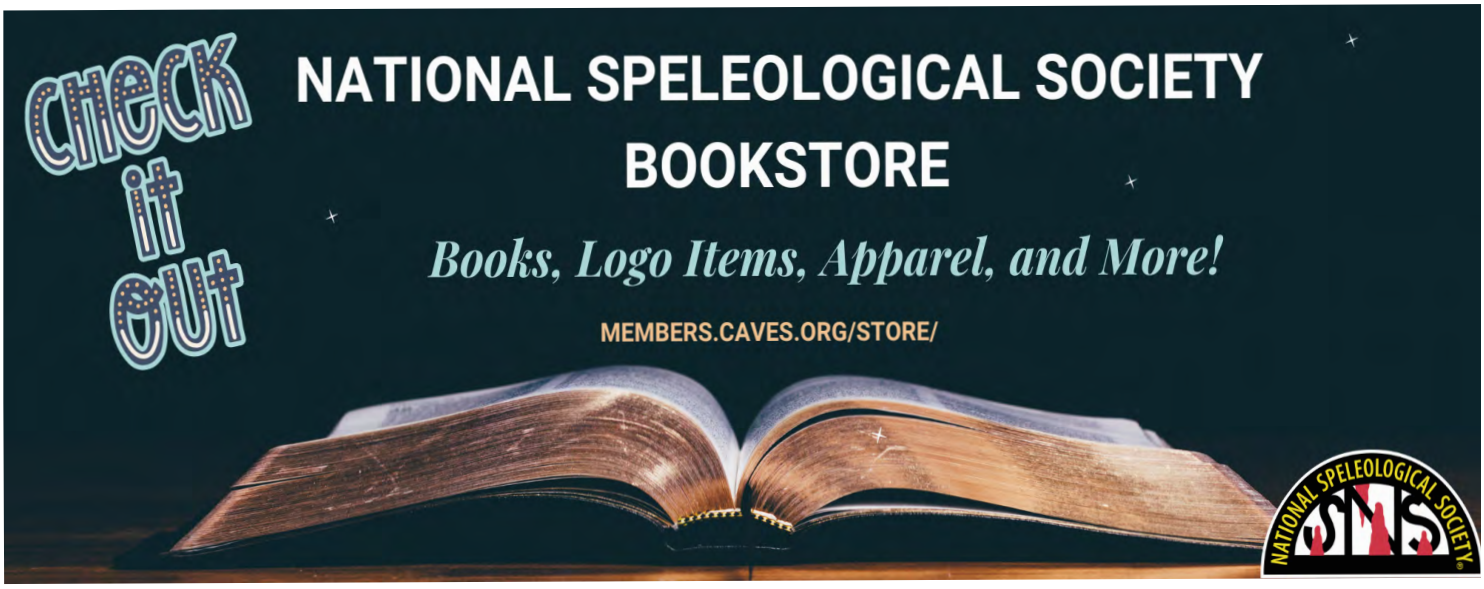
It was hidden in plain sight. Same color. There was absolutely nothing to give away the location of the dismantled parts of the Amber Room. They blended in! I moved sideways off the trail to take a closer look. "Sir, return to the trail! Departure from the trail is punishable by a $10,000 fine," said the cave guide. She pointed to her badge. I stammered that I was just doing speleological research...in the name of science. "I won't warn you again!" she said, "Ranger'll be here in two minutes flat." I thought I saw a bug on the edge of a column. But in my haste to get back on the trail I couldn't be sure.

The Eastern Region Cave Rescue Team (ERCRT) is being developed as a well organized, trained and equipped, all volunteer, 501(c)(3) organization. The region contains more than 7,000 caves in six states.

To be operational, we need insurance, equipment, an alerting app and much more. We are hard at work on it and would greatly appreciate your donation. Please see our website for more information and to donate by credit card or PayPal:

https://www.easterncaverescue.org/home

Thank You!



CLASSIFIEDS

SPELEOBOOKS.COM 518 295 7978. Cave and bat gifts, books, clothing and jewelry. Prompt personal service since 1973.

West Virginia Cave Books
www.WVASS.org

If your Grotto or Region is looking for great caves to explore in the Virginia area - look no further! RASS Grotto can offer a complimentary place to camp in Bath County, VA - where more than 100 caves are located within an hour's drive. We support cave conservation and education. Some COVID restrictions still apply. Contact Richie Ellison at rellison1120@gmail.com

The Richmond Area Speleological Society (RASS) supports cave conservation, education and research by offering grants to assist projects aligned with these goals. To receive a grant request application please email us at rass-grants-committee@googlegroups.com. Applications reviewed quarterly.

New WV Cave Books: Bulletin 20, Caves & Karst of the Culverson Creek Basin, WV by Lucas, Balfour, and Dasher. 336 pages, 364 caves, 208 photos, 80 maps. Color copy on USB drive. $35 postpaid;.Bulletin 21 Caves and Karst of Mercer & Summers Counties, WV by Schaer and Dasher. 186 pages, 226 caves, 131 photos, 62 maps. $25 postpaid.
WVASS, 13 Sleepy Creek Rd, Barrackville, Hurricane, WV 25526 andrew.schaer@frontier.com

Ennis Cave Arkansas Coffee Table Book. I am in the process of writing a high quality, large, hard copy picture book that will be ~250 pages in length and contain ~400 photos. The book is titled Ennis Cave - The History, Biology, Speleogenesis, and Passageways that will go to print June 1, 2023 and should be available in time for the Holidays. Looking to gauge interest so I know how many copies to print. Book will sell for between $80 and $120 depending on the quantity I have printed. This will basically cover the printing costs.
Email Randal.rose@jacobs.com if you would like to reserve one – no money down required.

IItems for sale in Nashville at the time of the Tennessee NSS convention: Mosaic/National Geographic/ convention patch collection/etc. Details at ejhackerman@gmail.com

Final Frontier Sports, is the cave gear dealer of the Western US, and the only Scurion retailer in North America. Explore www.finalfrontiersports.com today! Now selling vertical gear and helmets too!

AD RATES: Based on the number of lines your ad takes up. It is a flat rate of $3 per line. As a guide, a line holds 43-45 characters + spaces at our font and size. 10% discount for runs of 3 months or more. Payment must precede publication, but copy should be e-mailed to the editors: nssnews@caves.org

Copy should be received one month prior to publication date (e.g., by May 1 for a June issue). Make checks payable to the National Speleological Society and send to: Att: NSS News Advertising, 6001 Pulaski Pike NW, Huntsville, AL 35810.



May 2024