Underwater Speleology

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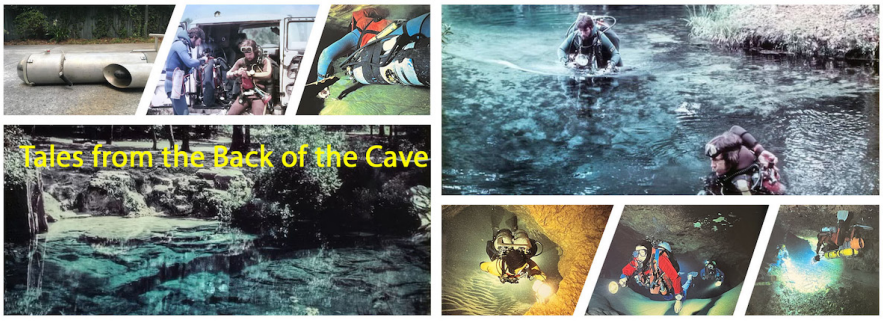
Volume 50, No. 2
Summer 2023

NSS-CDS 50th Year Anniversary
1973-2023

Thanks to our sponsors, speakers, volunteers, and membership for making the 2023 International Conference a resounding success!



Cover: Guy Bryant diving into Little River. © Sandra Koster.

Underwater Speleology

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features

columns

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a note from the chair

Greetings, fellow cave divers,

It was great to see so many of you at the May conference. The event was well attended and very successful. It feels as if we're getting back to functioning "normally"—whatever that means.

New Board of Directors installed. One important item of business was our annual members' meeting. The new Board of Directors took its place and elected officers. They include:

- Sam Leflore - Chair
- James Chandler - Vice Chair
- Gayle Hall - Treasurer
- Tim Waldo - Secretary
- Max Kuznetsov - Training Director
- Terry DeRouin - Program Director
- Mark Schroder - Program Director
- Renée Power - Director Emerita

You can see our mug shots to help you match names to the faces on page 11. Our emails are included, or you can use the links on the mast head. Let us hear from you about what's working or what is not and what you want to see from the NSS-CDS.

Thanks to the outgoing board. We owe a major vote of appreciation to our outgoing board members. Andy Pitkin has done a yeoman's job as Chair, keeping the board organized and moving our meetings forward. As Vice Chair, Charlie Roberson organized the accident analysis committee, which makes incident information available on the NSS-CDS website. Treasurer Renée Power, fearless leader of the Mighty Cavenger volunteer squad that feeds us at our conferences and sets up/breaks down the venue, has served the Board in several roles. Renée will remain on as Director Emerita, which will help with continuity. Sam Leflore, previously Board Secretary, moves over to Chair. Jamie Chandler, previously Program Director, is our new Vice Chair. Terry DeRouin remains on as Program Director.

by Sam Leflore

Conference. The 2023 NSS-CDS International Cave Diving conference was a hit. It netted more than $10,033, making it one of, if not the, most profitable conference we ever have had. We broke an attendance record with more than 270 confirmed present. This beat the previous conference record by about 25.

The vast majority of our profits came from the raffles, including the Grand Prize Fathom Gemini Rebreather. These profits will be invested in more shirts, apparel, and other merchandise for the online store and used to update and expand our training materials that will be available in an e-learning format.

Passings. We learned with sadness of Stan Waterman's recent death. Stan died on August 10 at the venerable age of 100. He was one of the first Americans to take up scuba diving after his Navy service in World War II. Winner of five Emmy awards, Stan was a prolific and legendary underwater cinematographer who brought the public an understanding of sharks and stingrays during an era in which these animals were sensationalized. Stan was a graduate of Dartmouth College, where he studied with the poet Robert Frost.

Closer to home, a cave diver perished at Jackson Blue over Memorial Day weekend. Ben Strelnick, 38, lost his life on May 26, 2023. No details are available beyond what has been published in the media. We wish his family and loved ones heartfelt condolences.

Volunteers. As always, there's work to do at CDS. The organization needs your skills and energy. For example, *Underwater Speleology* wants your stories and photos. We're also looking for an advertising manager to work with businesses, organizations, instructors, and others who'd like to advertise in the magazine. Do you have an idea for a project? Get in touch.

DEMA 2023. It's time to start thinking about the upcoming DEMA show in New Orleans, happening from November 14-17. NSS-CDS will have a booth and a strong presence.

Thanks for supporting the CDS with your membership, by coming to the events, and your good energy. I'm looking forward to working with you all.

— Sam

Hung on a Line

by JC Moger

After my scooter failed, I lost my dive buddy. Mike simply disappeared into the dark solitude of the Florida aquifer as I flashed my 100-watt dive light at him.* He didn't notice my flashing. His scooter—DPV for the sticklers—was a little faster, and he was going around a corner before I realized what was happening. The battery compartment of my scooter had flooded again. By the time I flashed, all I could see were his scuffed-up fins in the distance. Mike was halfway to our turnaround point on this particular dive in the Devil's Eye and Ear cave system (near High Springs, FL) before he realized I was missing. Of course, he turned around and came back for me. He always did.

Using hand signals, we agreed to ditch our modified scooters under a ledge and continue our dive under fin power until we reached "thirds." Then we would take a short rest, turn around, and retrieve our scooters on the way out. We would end our dive with a safety stop in the Devil's Ear spring resurgence. Everything went according to plan from that point—*almost* everything.

The cave narrows as you approach the exit and the water flow increases. It just spits you out. No big deal. The only challenge is stopping yourself before you rise above the depth of your required safety stop. The log where we sit to rest and offgas in the Devil's Ear is conveniently situated at about 25 ft. I arrived at the point in the tunnel where I could see the familiar root-beer colored daylight filtering in through the opening of the Devil's Ear. Floating effortlessly towards the light, I consoled myself with the fact that in about 30 more minutes we would climb out of the cold river and collapse on the grassy bank. I was sure that I would thaw out quickly. It was summertime, and you can't help but warm up in the Florida sunshine. All you have to do is get to it.

As the exit drew closer, I ran through the landing drill in my mind. I knew from experience that the water pressure blasting out of the Devil's Ear would try to shoot me past my safety stop. It was very important that I catch the log because we had stayed down longer than usual. According to my dive computer I had earned a decompression obligation of 25 minutes. Successful cave diving is mostly mind over matter, so I focused on my plan.

My dive was almost over. I concentrated on what I was going to do as the light drew nearer: I would stay near the top of the tunnel until just before I got pushed out, then rapidly dump all the air out of my BC, and head for the bottom of the Devil's Ear and the log, just like Mike showed me after the first three times I had tried it and missed. I was ready. I had both the oxygen and the safety bottles clipped off to my harness under one arm, the defective scooter fastened under the other, and the inflator/deflator of my BC in one hand and ready to deflate, so I could drop to the stop.

Mike Lyles prepares to dive Peacock Springs, early 1990s. Photo credit: JC Moger.

** This story recounts a dive that the author made in the mid 1990s, well before the era of HID and LED lights.*

The author and a dive buddy pose for a photo shoot at Ginnie Springs, FL, circa 1993. Photo credit: Bill Foote.

The current had pushed me from the center of the tunnel toward the left wall. It didn't matter: I was just about out.

Unexpectedly my forward motion stopped. "That shouldn't happen," I thought. For a few seconds my partially frozen brain was unable to process what was going on. Instinctively I tried to kick but found that I was only able to do so with one leg. My left leg had been immobilized by some unknown force. I tried to look over my shoulder behind me, but my tanks blocked the view.

I looked down and back and shined my dive light between my legs. I saw the problem. My left fin strap buckle was caught on the main guideline. It was almost funny. I had made it through an approximately 2000-foot-long cave dive complete with scooter failure and was now hung up on the main guideline 20 ft from the exit.

My first concern was for the guideline. I was worried that I was about to pull it out of the rock where it was anchored. If that were to happen, I would have to alert the park's dive shop to my misdeed so they could make arrangements to repair it. That would be embarrassing but it's an important safety protocol.

Once I saw that the line was simply being stretched but the iron-spike anchor nearest to my snag was holding, I thought about myself and how I was going to get free. "No big deal," I assumed. "All I have to do is reach back and unhook the line from my fin buckle."

Wrong! The force of the current pushing against me made it impossible to reach back that far. I was being stretched out horizontally by the flow. All of my gear was sliding up, making it hard to even bring my arms down to my sides—much less reach my left fin buckle. I tried again but I couldn't reach it. A quick check of my air supply revealed that I had almost a third of my gas left in the double tanks on my back and a full aluminum 80 cu ft spare tank under my arm, at least two hours of air at that depth.

There was plenty of air to work out the problem, but I knew there was no way I would make it two hours before hypothermia set in. I was diving in a 3/8" wetsuit, a thermal skin, and a hooded vest that day. I would have been a lot warmer in a dry suit but possibly less flexible. Still, having the proper thermal protection to handle a little extra bottom time was a lesson learned the hard way. My dive buddy learned to keep a better eye on his partner that day too.

Dan Lins and Carl Sutton prepare to dive Litlte River, FL ,early 1990s. Photo credit: JC Moger.

Remain calm. Get your breathing under control. Think. Work the problem. That's what my training dictated, so that's what I did. Calming myself wasn't too hard. I had had lots of practice dealing with complications by the time I earned the "full cave" rating from the NSS/CDS. However, when I was hung up in the cave and began to relax, the force of the current caught my free leg and pushed it up like a ballerina doing a high kick. That strained my already tired hamstring muscle, making it hurt like hell.

I tried morbid humor to distract me from the pain. I imagined the headline in the next High Springs Herald. It would probably say something like HIGHLY TRAINED DIVER DIES TWENTY FEET FROM CAVE EXIT.

After a brief underwater chuckle, I realized my dive buddy was probably becoming a little worried about me. I usually popped out of the cave right behind him. Mike would assume that I was having some minor issue with my gear and had stopped to fix it. He would also be calculating how much extra decompression time he would need if he had to come looking for me. "Time to calm down and logically evaluate my options," I told myself as I tried to keep my air consumption and heart rate low. I took a deep breath of dry, compressed air, unhooked the dive light, and shined it around the cavern.

Almost immediately I saw one survival option. The very first iron spike at the beginning of the main guideline was within my reach. I could use one of my two easily accessible line cutters and slice it in two, but that would be an extreme breach of protocol. What if there were other divers in the cave? I would save that option for when I was down to my last few pounds of air, assuming I didn't freeze to death first. I was beginning to shiver constantly at that point, and both hands had gone almost completely numb. I thought about giving up and just waiting there for some other diver that I could flash down and ask for help, but neither my ego nor stubbornness would allow it.

My mind flipped through every imaginary file it had made while in training to try to match some distant lesson with my current situation to get me off that damn line. It locked onto a story my former cavern instructor Dan Lins once told me

during a lunch break in between training dives. We had been talking about freak accidents while diving and how panic can kill you just as fast as the incident at hand by preventing clear thinking. I started the conversation by asking Dan what was the most scared he had ever been on a dive. "Probably that time I almost drowned in three feet of water with 50 people in my immediate vicinity," he said.

Dan went on to tell us about how he and four other divers were wading up a shallow river run to get to the main spring. He was at the rear of the group, which is why no one noticed what happened to him. He had been shuffling along the rocky river bottom, flippers in one hand, heavy double steel tanks strapped firmly to his back.

All of a sudden, he slipped on an algae-covered rock and went down. Unfortunately, he went under backwards and got pinned to the flat rock by the weight of his tanks like an upside-down turtle just beyond arm's reach of the surface. He unclipped his regulator from his dive harness and attempted to draw a breath. He didn't get one, because he hadn't bothered to open the main valves on his tanks yet. His air was turned off, which also meant that his BC wouldn't inflate, leaving him stuck on the bottom.

Dan tried but he could not reach any of the valves at the top of his twin 104s. The two tank valves as well as the crossover valve had been shut tightly for transport, and he had neglected to open them before he stepped into the spring run. He explained what first went through his brain (which was similar to what went through mine when I was caught). How embarrassing it would be for a highly trained, fully equipped diver to die almost within arm's reach of the surface while young mothers and little children frolicked in the shallows all around him!

Dan explained that his buddies probably didn't realize what had happened. "If they'd looked back and not seen me wading along, they'd probably have thought I went under to cool off or to test my regulator or something. I had to assume that no one was coming to help me anytime soon. And since I had gone down without a good lung full of air it meant that if I didn't self rescue very soon, I was going to die right there in the creek. So I summoned every bit of strength and reached up and back with one hand while pulling my pack down with the other. Somehow, by the grace of God, I was able to get two valves open a little bit. Once I caught my breath, I inflated my BC, popped up, and continued on to the dive."

Inspired by the memory of Dan's escape, I tried one last time to unsnag myself from the guide-line. Somehow after another superhuman effort I managed to hook two fingers under that pesky line and pull it off my fin strap buckle. I was free at last!

Within seconds I made it to the log, which had been just out of sight from my previous position inside the cave. When Mike saw me, he looked at his dive watch and then gave me the univer-sal What? sign, meaning, What the hell took you so long? A horizontal hook made with my index finger and a pulling motion told Mike I had been snagged by something. He proceeded to pull out his slate and began writing. The note said, "Was just about to go bk and look 4 U." I wrote on my slate,"Was hung on a line—need a DRINK," and handed it to him. He erased his slate and wrote, "ME TOO!"

The author loaded down and ready to hike to Catfish Hotel entrance at Manatee Springs, FL, early 1990s. Photo credit: JC Moger.

We finished our dive and surfaced as the afternoon sun was beginning to drop behind the trees and most of the people had already gone. We made a quick stop at the park's dive shop and reported that I had snagged the guideline. The dive shop attendants thanked us for mentioning it. They assured us that they check the main guideline on a regular basis and would take a look at it first thing in the morning.

Our day ended with our gear all neatly stowed away in the bed of Mike's pickup truck. We headed to the nearest bar in High Springs for a much-needed shot of rum with the evening sun setting behind us as we went.

Mike's and the author's dive kits and scooter. Photo credit: JC Moger.

Jon "JC" Moger is a former cave diver originally from Miami, FL. He earned a full-cave rating with the NSS-CDS in 1994. JC is a state-certified residential contractor and lives in Ocala with his fiancée and three dogs.

This article is dedicated to the memory of Gregory Michael "Mike" Lyles (1965-2023) and Dan Lins (1949-2018). Special thanks to Tom Hundley and Guy Bryant, who read drafts of the article and offered suggestions for improvement.

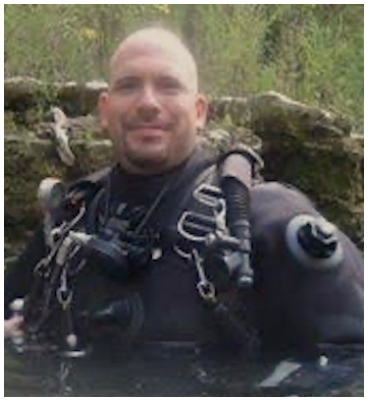
Gold Line Arrow Earrings for Sale:

1 pair 14k gold Wilson's Line Arrow earrings. The front of each earring has "NSS-CDS" in raised lettering and the back with "14k." These were official NSS-CDS custom jewelry pieces made in 2002 by Susan Gero dba Exploration Design Studio-XDS.

The total weight is 2 grams. The line arrows measure 5/8" x 3/4" and hang on 14k gold ear wires. $175. If interested please contact Judy Ormeroid at jaormeroid@gmail.com.

Susan received the 2012 NSS-CDS Outstanding Service Award. She passed away shortly thereafter.

NSS-CDS Board of Directors 2023-2024



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Deep, Dark, and Fluffy: Diving at School Sink

by Kathleen Seide

I remember being slightly intimidated the first time I had the opportunity to dive at School Sink.

I think most cave divers in North Florida have heard stories about this cave. I'd gathered that it's got dark walls and silty passages, that navigation can be confusing, and the cave tends toward having bad visibility. One of my buddies had been there without me in 2015, and she told me it was a spooky cave.

I was living in Gainesville at the time, so I didn't see a good reason to go out of my way to dive at School Sink. I mean, if I decided to drive two hours south, I'd probably be heading for Eagles' Nest instead.

When I moved south to St. Petersburg, FL, I jumped at the opportunity to dive at School Sink. It is one of the closest caves to my new home, so I figured it was worth trying out despite questionable conditions.

My first dive at School Sink was fairly simple. After dropping down the entry crack and being very careful not to disturb the huge pile of silt in the restriction at the bottom, we stayed on the main line. It runs through Tourist Trap and the Bear Room, then down Main Street. There are a few places on the gold line where divers need to be in single file to move through a minor restriction, but most areas are large enough for divers to swim freely, even with back-mounted doubles.

Tourist Trap is low and rocky. The ceiling is made of large slabs of stone built up in layers. A few months ago a boulder flaked off and fell onto the line. White crumbles are scattered for quite a distance from the spot, making me wonder how bad the silt out was when it happened!

Further in, the passage comes up through a restriction into the Bear Room where you hit about 30 ft again. I've had to pause my exits here for deco/safety stops once or twice. It's a large breakdown room where the black walls taper down into the distant silt on the floor.

We swam past a few obvious jumps to the right after the Bear Room and continued into Main Street for a short distance before turning the dive. We eventually exited by sliding up and out of the cave using the sidemount entrance. It's definitely sidemount, with a stone ceiling and one silty and wide section that requires some finesse. It pops you back up into the entry cavern.

Left: The author dives at School Sink using her sidemount CCR.

ACCESS POLICY

The system's extremely poor visibility and depths make School Sink a very advanced-level dive. All divers who elect to dive School Sink do so on a voluntary basis.

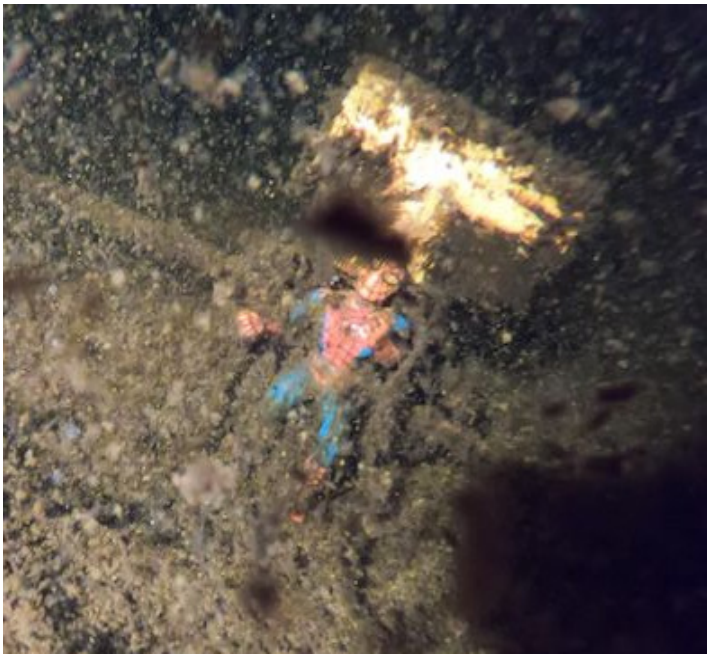
No training dives are allowed.

Commercial diving is not allowed.

No fees may be charged for access to the site by anyone, including authorized Observers.

Cave system access shall only be permitted within the framework of the School Sink Access Policy.

Any School Sink, Inc. Observer or Director may close the site and deny access to anyone at any time for any safety related reason.



Spiderman figurine on the Spiderman line in a brown blizzard. © Michael Gibby.

As we swam in, I was fascinated by the ”fur” that grows on the cave walls. It’s several inches thick in some places and reminded me of nothing so much as the fur of Snuffleupagus—a character from Sesame Street. It’s thick, brown, and so very fluffy. It gathers on everything, including the line, and is easily disturbed. On our way in, the visibility was pretty good even though the cave likes to eat up the light. Bubbles easily shake the fur loose from the ceiling, so that when you turn to exit with the flow it’s almost like swimming through a brown chunky blizzard.

I was so excited by our first dive I couldn’t wait to get back! (I know, I might be a little crazy).

On my second dive, I started to learn how dynamic this cave is. I expected similar conditions, meaning clear water and brown “fur” chunks in the water. It felt like a completely different cave!

School Sink is so close to the coast that tides have a huge effect on the cave. Depending on the aquifer pressure and whether the tide is high or low, water will flow or siphon through different passages. We swam in on the main line and jumped onto the Spider-Man line (named for the figurine marking it).

The room with the jump to Spider Man is a hub for a few different tunnels. I think of it as it the “washing machine room” because of the ways I’ve seen water swirling in different directions and down various tunnels through it. I’ve seen a river of salt water rushing along the floor as though it was a gorge, heading out of deep salt tunnel and back to the sea through Main Street!

I’ve seen haloclines before this, mostly in Mexico, but with the tidal flow stirring up the water column and two divers in front of me, my second dive at School Sink was a lot like looking through Vaseline. The passage is single file but not small. Even though I could tell where I was and where my buddies were and also keep track of the line, I didn’t really get to see the cave through the swirling of salt and fresh water mixing around us.

Further into the cave from the junction room, the main line dips down to about 120 ft deep. Those deeper sections of the cave tend to hold saltwater pockets. When the tide is coming in, salt water flows along the floor through this tunnel. There is often a distinct halocline that will bend your light in cool ways. I like to pop up into the domes in this section of the passage and enjoy the more clear visibility of the freshwater while looking down through the halocline.

The exit from School Sink looking up the entrance shaft to open water. © Michael Gibby.

If you are interested in diving at School Sink:

The best way I know to get information about diving at School Sink, to meet Observers, and to see current condition reports is to join the Facebook group called School Sink Observers. To dive at School Sink, you must dive have the appropriate certifications and experience (see sidebar), dive with a School Sink Observer, have dive accident insurance, and sign a waiver and medical form.

A word of caution: The cave system inside of School Sink can be treacherous, with strong currents, low visibility, and challenging navigational requirements. Divers must remain vigilant and follow strict safety protocols to ensure a safe and enjoyable dive. Divers must be accompanied by an Observer approved by the NSS-CDS on all dives.

Mr. Snuffleupagus

ELIGIBILITY TO DIVE at SCHOOL SINK

Divers may be granted access to dive School Sink under the following policies. All eligible divers shall:

- be "Full Cave Diver" certified.
- show proof of the Abe Davis Award or equivalent experience.
- be certified to use breathing gases appropriate for the dive's plan and depth.
- have DAN diving accident insurance or equivalent.
- sign a liability waiver on the day of diving.
- be accompanied on the dive by a School Sink Observer.
- be limited to dive teams of one observer and two guest divers.

Kathleen Seide started diving at the tender age of 10 while growing up in the Florida Keys. She took a cavern class in 2000 while living in Gainesville and fell in love with cave diving. She was fortunate to train with some amazing cave divers and has certifications for DPV, Sidemount, Trimix, and Rebreather as well as a Henry Nicholson Award. Kathleen has volunteered with Karst Underwater Research since 2001 and supports exploration at Weeki Wachee and Madison Blue Springs.

Revisiting Gas Matching

by Jim Wyatt

I have heard of some instances in which cave divers either do not know how to deal with turn pressures when teammates dive with dissimilar volume tanks. Or worse, they ignore the issue altogether.

While the probability of catastrophic failures at maximum penetration are relatively low, it is important to know how to prepare for this. We as cave divers must be ready not only to prevent failures but to also know how to deal with them when they occur. Risk management is paramount for us.

This article walks through the steps for setting turn pressures for teammates who dive dissimilar volume tanks.

Consider this scenario: Two buddies are diving with dissimilar volume tanks. One diver has double low-pressure 104s, and the other has double low-pressure 85s. Both sets are filled to 3600 psi. If both divers ignore the fact that their tanks are different volume, they will breathe unequal volumes of gas if they calculate their turn point based on 1/3 of their starting pressure and turn when that 1/3 has been used.

This scenario can and does occur when one diver is significantly larger and has a higher SAC rate than the other. These cave divers must ensure that they each calculate their turn around pressures based on ***volume*** used and not simply pressure used.

Calculate the baseline. Step one is to calculate how many cubic feet (ft^3) of gas is contained in each 100 psi of gas in the tanks. We call this the "baseline".

Formula: The baseline = (rated volume divided by rated pressure) X 2 X 100. (Multiplying times 2 is to account for two tanks, and multiplying times 100 puts the units in 100-psi increments rather than increments of one psi.)

So for LP 104s, the calculation is: (104/2640) X 2 X 100=7.8 ft^3 per 100 psi. This indicates that every 100 psi contained in a set of double low- pressure 104s contains 7.8 ft^3 of gas.

For the LP 85s, the baseline calculation is (85/2640) X 2 X 100 = 6.4 ft^3 per 100 psi. For every 100 psi contained in a set of double-low pressure 85s, there is 6.4 ft^3 of gas.

The baseline for LP 104s is 7.8 ft^3 per 100 psi, and the LP 85s' baseline is 6.4 ft^3 per 100 psi.

Turn pressure for smaller tanks. When calculating gas matching, the smaller volume/baseline tanks are the controlling tanks. The diver using the LP 85s can use 1/3 of the pressure for their turn volume/pressure.

So: 3600 - 1200 = 2400 psi, which is the turn pressure for the diver using LP 85s.

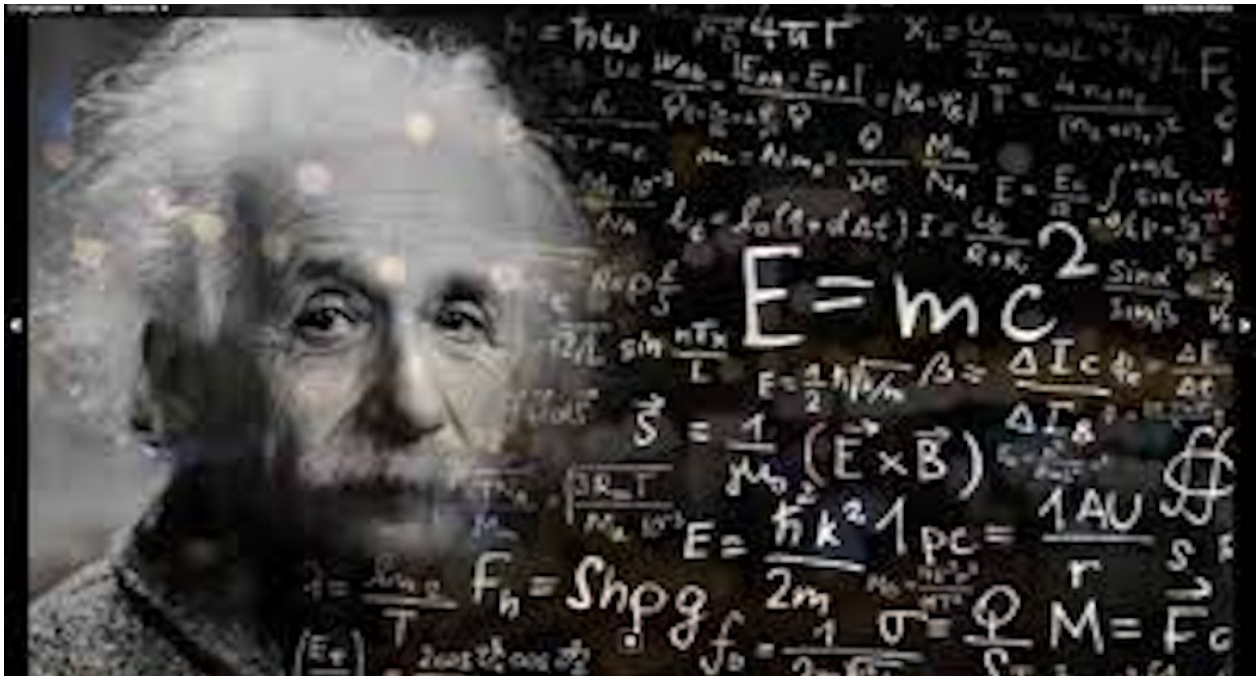
Usable volume for smaller tanks. That diver's usable volume of gas for penetration is calculated by: 12 X 6.4 = 76.8 ft^3. In other words, that diver can use a maximum of 76.8 ft^3 of gas before turning the dive.

Turn pressure for the larger tanks is calculated first based on volume, then converted to pressure. We know that the diver using LP 104s can use only a maximum of 76.8 ft^3 for penetration in order to match the controlling diver's maximum penetration volume. So we need to determine what pressure in the LP 104s equals 76.8 ft^3. This diver can then calculate their turn pressure and match the volume usage of the diver on LP 85s.

The formula to calculate the equivalent pressure is: (small tanks's usable volume / bigger tanks's baseline) X 100.

Therefore, (76.8 / 7.8) x 100 = 984 psi. This means that the diver using 104s can use 984 psi, for a turn pressure of 2616 psi (3600-984) = 2616 psi. Of course, this can be rounded to 2600 psi.

The proof is in the math. 9.84 X 7.8 = 76.8 ft^3, which proves that 984 psi in a set of double 104s equals 76.8 ft^3, which is the same turn volume as the diver on LP 85s.
In other words, the diver using LP 104s can use 9.84 hundreds (which is converted into units of 100 psi)



which is 9.84 X 7.8 = 76.8 ft^3.

Using the above example, let's look at the problem if these divers simply use 1/3 of their starting pressure to calculate when to turn their dive.

If the diver on 104s uses 2400 psi (3600-1200=2400) as the turn pressure, they will have used: 12 X 7.8 = 93 ft^3 of gas and will need 93 ft^3 of gas to exit the cave. The diver using LP 85s will need 76.8 ft^3 of gas to exit, assuming that diver turned at 2400 psi. (3600-1200=2400).

So a minimum total of 187 ft^3 of gas is needed by the diver using LP 104s to complete the dive for penetration and exit. This diver is beginning the dive with 280 ft^3 of gas (36 X 7.8=280). This diver would most likely need more gas than that due to the stress of dealing with the life-threatening situation during the exit.

Not enough emergency gas. A total of 76.8 + 93.6 = 170.4 ft^3 of gas will be needed to get both divers out. Is there enough?

The 104s failed at max penetration, and both divers must come out on the LP 85s.
Since the LP 85s are at 2400 psi at the LP 104s' failure point, the remaining gas volume in the LP 75s is: 24 X 6.4 = 153 ft^3. There is not enough gas remaining in the LP 85s for both divers to exit.

Using a constant simplifies the calculation. The issue then becomes how to do this arithmetic in the water after conducting S-drills. It is pretty simple in that we can use a constant between 104s and 85s.

The 1/3 for LP 85s was 1200 psi. The matching volume/usable gas turn pressure for the LP 104s was 984 psi. Round that number to 1000 psi.

Each time these two divers get in the water with these tanks:

- the LP 85s user sets their turn pressure by calculating 1/3 of their tank pressure.
- the LP 104s user sets their turn pressure the same way except after getting that number deducts 200 psi from their usable gas.

So: LP 85s at 3600: Turn pressure is 3600/3=1200 psi of usable gas. Turn pressure is 2400 psi.
LP 104s at 3600: Turn pressure is (3600/3=1200)-200 = 1000 psi of usable gas. Turn pressure is 2600 psi.

Proof: LP 85s: 12 X 6.4=76.8 ft3 of usable gas
LP 104s: 10 X 7.8=78 ft3 of usable gas

Jim Wyatt is an NSS-CDS cave instructor and also teaches other forms of technical diving. Jim has served as Training Director for the NSS-CDS's Board of Directors for two terms.

Looking at the entrance pool. © Michael Raymond.

Exploring Deep Lake Cave

by Michael A. Raymond and Ian Flom

After years of trying to push various mud holes with diminishing returns, we recently started exploring Minnesota's Deep Lake Cave. On the first dive, we already knew that this was the best cave dive in the state. This article tells the recent history of Minnesota cave diving.

Southeastern Minnesota is full of underground rivers. Along with western Wisconsin and northern Iowa, the area was spared from the glaciers that scraped away the upper Midwest's limestone. This is the "Driftless Area." The dives here are shallow. The deepest point we've found is only seven meters/23 feet. There are typically air bells every 30 feet. Some air bells don't permit leaving the water. Some allow getting out of the water and walking, crawling, or climbing to the next sump. In one cave, passing through seven sumps and one aid climb took us to the largest underground room we've seen in the state, with another aid climb up a 15-foot waterfall taking us to another half mile of underground river canyon.

We've worked on several caves over the years. Progress, and even access, all change with rain conditions. In one cave, the entrance is an overflow tunnel for the primary spring. Large rain storms back up the system and burst from the tunnel. This means that you might work for months digging out the sand and rock clogging the entrance, only to have a large storm push so much debris that it's as if you had never been there. Recently, after a storm refilled months of excavation in our best cave, we gave up in disgust and decided to look for other options.

Big Spring drains the fourth-largest drainage area in the state. Water from sinking streams and many sinkholes all head to Big Spring. The spring sits at the base of a 60-foot cliff in Forestville/Mystery Cave State Park. Mystery Cave is the longest mapped cave in the state at over 14 miles, but far from the spring and in a different drainage basin. Forestville is a long blind valley carved by Big Spring.

The problem with Big Spring is that it's actually quite tiny. The hole in the bottom of the spring has a very wide opening, but it's too thin for anyone but a naked free diver to enter. None of them are stupid enough to try. That leaves cavers looking for another way to enter. Fortunately, as with most major tiny Minnesota springs, there is an overflow passage around the corner that allows entry.

We had heard stories about the cave from the Minnesota Speleological Survey. Grotto members had said that during extreme drought conditions, water levels got low enough that they could enter. They'd travel about 1000 feet, sometimes ceiling breathing, to where they reached a small cliff over the next pool of water. They'd installed a piton and rappelled down, but couldn't travel much further because the water sumped soon after. They'd brought in someone new to cave diving who'd hauled his tanks to the back of the cave to try to push. He wasn't used to small tunnels and hadn't made it far. Another diver had made it to the next air bell, but was underweighted and didn't want to try surfacing in case he couldn't re-submerge.

We hadn't visited this cave because we didn't have the drought conditions we'd heard were needed. We'd heard you needed to go in the middle of the winter to get them. Frankly, we weren't keen on getting out of wet wetsuits in negative temperatures. Then we had an epiphany: we're sump divers, and we don't need low water to enter a cave.

We did our first dive in the overflow passage—"Deep Lake Cave"—in late October 2021. Forty feet inside

Porters carry our gear toward the cave. © Michael Raymond.

the cave, there's a small pool in the back of the room. Michael entered the water and set off to see where the small passage went. He didn't bring fins as he didn't want the hassle of using them if the passage was really tiny. After traveling 30 feet he popped into an air bell with a lot of breakdown blocking the way to the next tunnel. He crawled over the rocks, making clanking sounds with his tanks that the team could hear back at the start of the cave. This reminded him of stories by Jason and Chrissy Richards about "walrusing" over sand bars with their tanks on, and so the room was christened the Walrus Room.

Once he tumbled back into the water, Michael was able to pull and glide a good 600 or so feet until he reached the end of the sump series. Here he could walk up a banking into dry and tall passage. He believed the underwater passage he had come through was the best cave dive in the state. The passage was often two meters/6.5 feet high, three or more meters/10 feet wide, and had 20 or more feet of visibility. Michael was getting close to his turnaround time, so he tied off the line and returned to the team. Ian entered the water after Michael returned and had a similar experience.

We returned to the cave in May 2022 to work on the next obstacle. After the dry section at the end of the first sump, there was an old climbing anchor for rappelling into the next sump. The original explorers had installed it in the late 1990s, and it needed to be replaced. Once in the next sump, known as "Davy Jones' Locker," we'd be able to start exploring into virgin cave. Thus began Ian's long series of attempts to build a functioning dry tube.

When we arrived at the cave, we found water levels up several feet. We no longer had to crawl 40 feet to enter the water. The downside was that the water was now at the tightest part of the entrance, which made kitting up a challenge. Michael swam in front, with Ian some distance back in order to avoid bumping into each other in low visibility. Ian had our first attempt at a dry tube, with a battery powered rotary hammer inside.

One nice thing about the high water was that we could swim right over the breakdown in the Walrus Room. When Michael reached the end of the sump, he thought Ian was right behind him. After 20 minutes of waiting, he started back to see what had happened. While negotiating one line trap in one-foot visibility, he almost got turned around. In another, he lost the line, but was saved because the line had gotten wrapped around a fin.

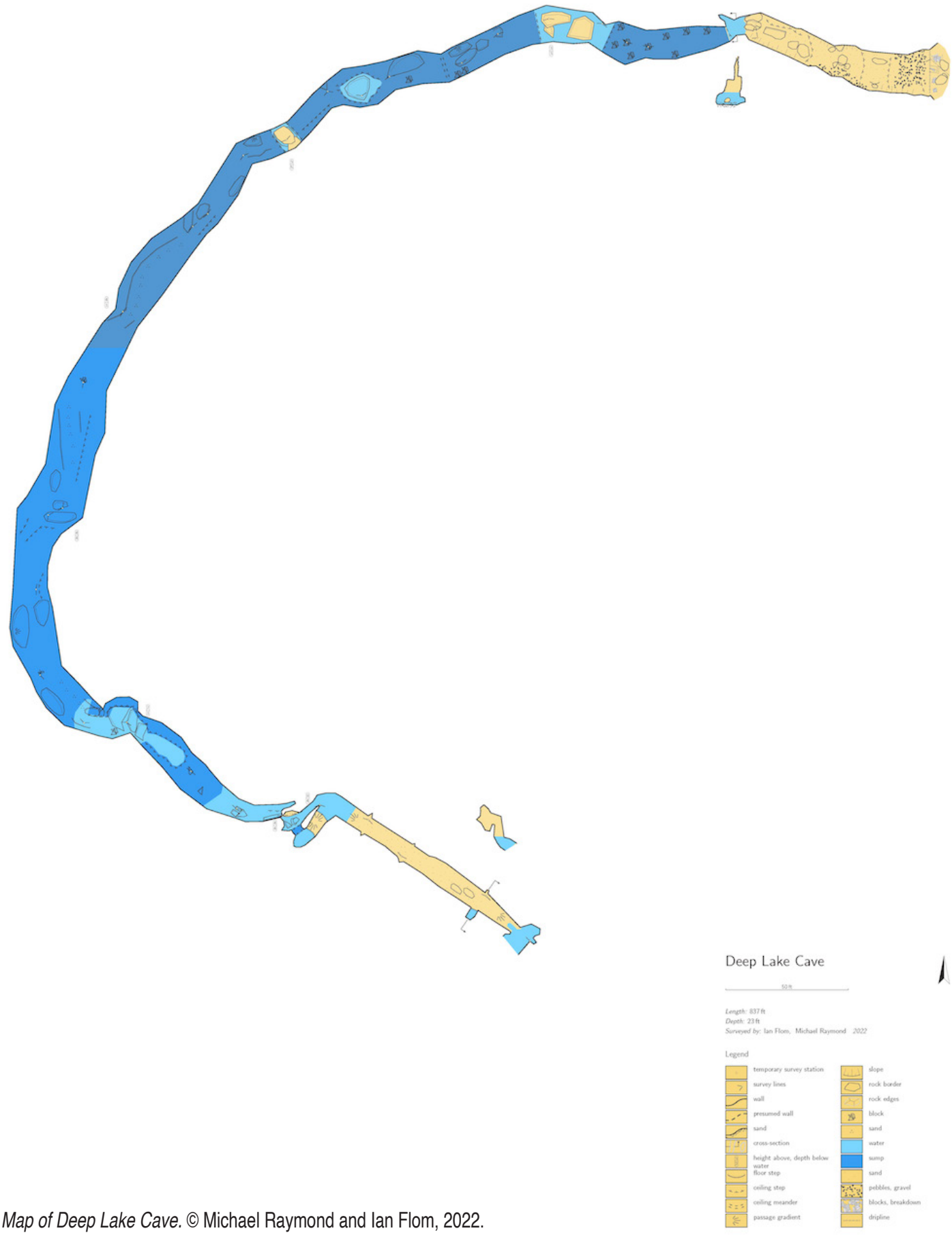
When Michael reached the cave entrance, he found Ian there. The dry tube had been much too buoyant. He had turned the dive rather than continue to struggle with it. We found that the tube had started to flood as well.

We returned two weeks later to work on improving the line and starting to survey. During our pre-dive check we had a second-stage regulator problem that took an hour to fix. We reduced our projects so we'd still hit our callout time. We installed arrows on the line for safety. We replaced short silt stakes with longer ones for better anchoring. When we both exited the sump on its far side, it marked Ian's first time traveling beyond a sump, which is a great moment for any diver. In the dry tunnel beyond, we made sure to examine all its exits so we'd know what gear to bring next time. Over the years, exploration has shown a pattern of overcoming one obstacle and going around the corner to hit another, which requires a completely different piece of caving equipment. We've learned to not turn around and head home, if we can help it, until we'd discovered what the next obstacle is. This ensures that we're ready the next trip.

September-October is one of the two best times for cave diving in Minnesota. The water is usually low, and you don't need to worry about being eaten by mosquitoes on the way to the cave. January-February is the other good period, with frozen ground eliminating the possibility of flash floods. We were able to schedule three contiguous weekends of work at Deep Lake in October.

During our first trip, the principal goal was to replace the dive line with something better. We replaced the unknotted #24 with knotted #36, and rerouted it to avoid line traps. Ian swam in front, laying the new line. Michael swam 30 seconds behind, reeling up the old line. We did this so that if something went wrong, Michael could follow Ian's line out of the cave. In periods of low visibility, we could easily see though how the 2019 Josh Bratchley incident had happened in Tennessee. During that, the two divers accidentally swapped positions, and Josh got trapped at the back of the cave without an exit line when his partner aborted early and swam out.

At the back of the dry passage, what we're calling the C tunnel, Michael dove through a short duck under into the next section. He found a tight dry canyon. After taking off his diving gear and chimneying up a section, he found the old climbing anchor and could look down into Davy Jones' Locker. The canyon belled out, and there was no safe way to climb down into, much less back up from, the next sump.



Map of Deep Lake Cave. © Michael Raymond and Ian Flom, 2022.

One of the porters entering the cave. © Michael Raymond.

There was another lead heading off from the C Tunnel. Ian helped push Michael up over a mud pile so he could slide down into a pool of water. From there he could see a small underwater tunnel which was likely a quick cut around back to the main sump (B Tunnel). Michael then had to get out of the pool and back over the slippery mud pile. Even after taking off all his equipment, getting out of the pool was very difficult and required several attempts. There was no way Ian could help from the other side. Michael eventually made it, but we were reminded to be very careful about things like that. Just like normal dry caving, it may be smart to bring 20-30 feet of webbing to use as a hand line.

We planned to go diving both days the next weekend. The next step was to replace the climbing anchor. We hadn't figured out a good dry tube system yet, and so Ian double dry bagged his rotary hammer. Our max depth was two meters, and so we figured this would be OK. When we reached the old anchor and started taking everything out of the bags, we found that they had flooded. The charge-level light on Ian's battery was stuck on, and it wouldn't power his drill. We moved on to our secondary tasks of checking another short side lead and surveying and sketching the C Tunnel. After we had finished, we got ready to swim out of the cave.

Ian's not-so-dry bag had been very buoyant on the swim in. Michael volunteered to swim the gear out. It was just as awkward as Ian had said. Even after dumping all the gas from his drysuit and wing, it was a lot of work to kick down and stay off the ceiling and move the bag along.

During the swim, Michael was working very hard. He could feel the gas in his CCR's loop heating up and possibly tasting different. He surfaced in one air bell to catch his breath and completely vent the CCR. Ian had been swimming in front of him and wondered why he hadn't caught up. He swam back to check on him, swam under the air bell not seeing Michael, got to the last place he'd seen Michael, and turned back around. We met back up at the Walrus Room.

This experience underscored the rule that if you are swimming a patient during a sump rescue, you are not allowed to be using a CCR unless you're using a DPV to tow the patient. You'll otherwise be doing so much work that there's a very high risk of over breathing your CCR.

We returned the following day to do the underwater survey of the B Tunnel. Ian led this effort. He ran into two issues along the way. With the swim being so shallow, his dive computer often exited dive mode and would not give him depths at the survey stations. With 48-degree F water, and survey being such a slow process, he was getting very cold towards the end and stopped getting passage dimensions to speed up the process.

We decided to cancel the third weekend of this project. Making forward progress required bolting, and without a suitable way to protect a drill, we were blocked. We do need to return to get underwater passage dimensions and the sketch. We're putting a lot of work into making or buying a proper dry tube. We've purchased a Nemo underwater rotary hammer to make getting bolting tools through the sump easier. We've got plenty of other projects where we'll need one.

Our exploration of Deep Lake Cave has been a great project so far. We haven't had to worry about months of work on a dig being erased. We've found about 1000 feet of passage so far, and there's every reason to expect many miles when we're done. Like all sump diving, it has put huge wear and tear on our equipment. We've had to adapt and make new gear. We appreciate Forestville/ Mystery Cave State Park putting their trust in us; the local dive shop – Scuba Center – for repairing sensitive dive gear plastered in mud; and our friends in the local grottoes for helping to lug gear. We're looking forward to making further progress in 2023.

Michael A. Raymond is an exploration cave diver who is writing a book about cave rescue. He is Underwater Speleology's Senior Editor.

Milestone Dives and Awards

by Gayle Hall, Treasurer, NSS-CDS 2023-24

Abe Davis Awards

Frank Stopa,03/20/2023
Shea Husband, 7/3/2023.

Frank Stopa made his Abe Davis dive on March 20, 2023, at Peacock Springs. He reflects:

My interest in cave diving started while doing my checkout dives at Ginnie Springs and Orange Grove in 2013. I was intrigued by the sidemount divers entering the crack at the bottom of Orange Grove Sink. Five months later I took my cavern training and have been hooked ever since.

I'd done a lot of diving during the pandemic, but traveling back to Florida's cave country for my first cave diving in almost three years was fantastic. I hadn't planned anything special for my 100th cave dive but was honored to share that experience in Peacock Springs with my friend Chris Loper. Chris and I have dived together for almost six years now and always seem to find interesting nooks and crannies to explore.

Sheck Exley Award:

Wayne Head 8/12/2023.

About his Sheck Exley dive, Wayne says:

My 1000th dive (at Jackson Blue) was kind of embarrassing. It went this way. On the previous dive I was solo and was doing a trim check because I had made some gear changes. I had placed my camera and video lights and was swimming back and forth. One of my video lights rolled and went down a crack, and I could not reach it. So as you can guess my next dive, number 1000 was a dive to retrieve the light. It was not exactly the dive I wanted to do. By the way, I did not get the light, it's still there!

NOTICE: Florida Springs Institute opens Executive Director Search

The Howard T. Odum Florida Springs Institute (FSI) is accepting applications for Executive Director. FSI's Director is responsible for achieving FSI's mission and goals, with a focus on providing springs science, education, and outreach. The Director should have the expertise, fundraising ability, vision, and passion to implement FSI goals and to sustain and improve the organization in the future. Specifically, the Director is responsible for developing and implementing scientific studies and monitoring programs; public education programs; and outreach to policy makers and community leaders. The Director is also responsible for achieving the organization's fundraising objectives and managing its overall financial affairs. The Director operates under the authority of the FSI Board of Directors and serves as a doer and leader, guiding the staff to ensure that FSI's mission and goals are achieved.

Applications will be accepted from August 1 - September 30th, 2023.

To learn more about the position and for instructions on how to submit your application, visit the website.

400 protest gas station planned over Chip's Hole

by Chris Brown

Facing intense community opposition, the Wakulla County Board of County Commissioners has postponed a land-use decision that would allow an out-of-state oil company to install and operate a large gas station and car wash atop Chip's Hole cave. This operation could leak petroleum into the aquifer below, polluting the springs and their drinking water, locals fear.

The commission refused to consider the proposed protections ordinance that residents had placed on the agenda with the help of one commissioner. No other commissioner would second a motion to hear the proposal, and the meeting broke into chaos. The refusal meant that here would be no formal discussion on the proposal. The only protections now in place are 30 years old and depend on an honor system for a user to report industrial pollution.

An interconnected system. The Woodville Karst Plain, of which Chip's Hole is a part, extends south from the edge of Tallahassee to the Gulf of Mexico. Its key geologic feature is a layer of unconsolidated sands that overlies a thick sequence of carbonate deposits. The karst plain extends under the Gulf of Mexico and has an area of over 700 square km. It features sinkholes, karst windows, sinking streams, and large springs, including seven of Florida's 27 first-magnitude springs.

Most of its drainage is below the surface through large open conduits developed in the Floridan Aquifer. The karst plain is the principal member in regional groundwater flow to the south. The aquifer is porous and permeable, meaning that chemicals that enter the water eventually migrate downstream. A number of dye studies bears this out. The system is one of the best-known and most-studied aquifers anywhere.

At issue is a comprehensive plan amendment requested by Southwest Georgia Oil. The company had purchased a seven-acre parcel of land at the intersection of US 319 and SR 267 in Crawfordville and wants to build a 16-pump gas station there. Doing so requires a zoning change from the current agriculture use designation to commercial use.

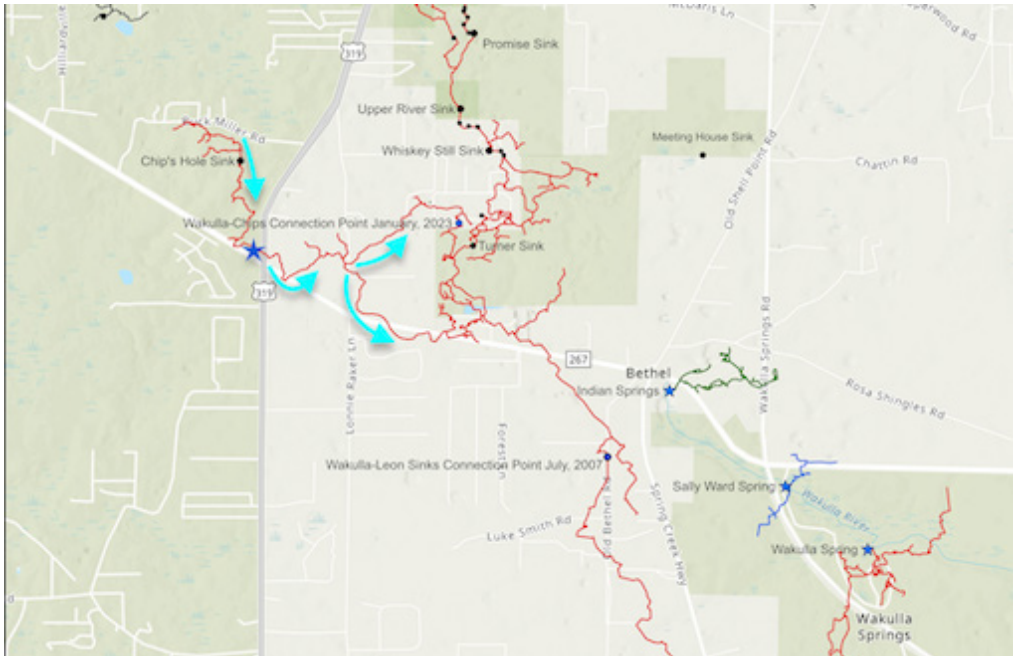
The site sits above Chip's Hole, which feeds into Wakulla Springs. The springs not only provide the area's drinking water, they are also a main source of local income thanks to the many visitors who flock to the crystal clear, cool waters bubbling from the earth.

Cave divers have been exploring Wakulla Springs since the mid 1950s. Divers from the Woodville Karst Plains Project (WKPP) have compiled an extensive survey of the system (exploration still is ongoing).

In January of 2023, WKPP divers connected a guideline that they had placed in Chip's Hole in 2016 to the enormous Wakulla System. This proved what divers and scientists had long suspected - that Chip's is part of the same system. WKPP researchers presented their findings about our unique hydrogeology to our community in April.

In limbo is where the situation stands. No one knows who's going to do what. Will a buyer materialize? Will the gasoline company play nicely and sell for a reasonable price? and what is a reasonable price, considering that the spring is our water and the goose that lays the golden egg? What does the commission really want to do? That's very hard to say.

Chip's Hole at the surface.



Water travels downstream as the blue arrows show (south-southeast) from Chip's Hole to Wakulla Springs. Transit time is 8 days. Map is courtesy of WKPP; used with permission.

Citizens' interests. More to the point, what do we the citizens want? Frankly, we do not want a gas station at all. If the commissioners give the go ahead, we would push for the following protections:

- setbacks that would situate the gas station away from the cave;
- stringent requirements for barriers, storage methods, and plans for emergency response; and
- a county wide environmental review of permitting processes for all development, commercial and residential.

The latter is not likely to happen and would be seen as "anti-business." In the long run, however, these measures are pro-business because they protect the springs, which are the area's economic engine. They draw tourism and support businesses such as hotels, restaurants, stores, and the state park. Moreover, how much business will the county attract if our drinking water is tainted with gasoline?

Update: As of press time, the gas station is "on hold." The Wakulla County Commissioners on September 5 voted unanimously to explore ways to protect the aquifer. One possible solution is that a conservation-based organization would purchase the land. The landowner, Southwest Georgia Oil, seems to be on board. Commissioner Ralph Thomas is optimistic that negotiations now underway could lead to a win-win situation

Thomas grew up near Chip's Hole. He favors creating a venue at which people could see the sinkhole and make the connection between conservation, drinking water, and the area's economy.

Meanwhile, Wakulla County is working toward strengthening a protective ordinance for the springs. The most recent ordinance has not been updated since the 1990s.

While we await the next meeting, please write to the Wakulla County Commissioners to express your concern.

Chris Brown began cave diving in 1989, was a member of the US Deep Caving Team's Wakulla 1 and Wakulla 2 Projects, and discovered five virgin cave systems in the Woodville Karst Plain. He is currently a retired filmmaker abiding in Sopchoppy (Wakulla County), FL.

An Unusual Geological Event at Gilchrist Blue Spring State Park, FL

by Bill Hawthorne and Bob Knight
Howard T. Odum Florida Springs Institute
High Springs Florida

Introduction

On Saturday, July 15, 2023, the normally clear blue water in Gilchrist Blue Spring suddenly (in a matter of minutes), turned brownish/green and murky (Figure 1). Staff from the Florida Springs Institute, the Suwannee River Water Management District, and the Florida Park Service took photographs, interviewed eye witnesses, and collected photographic and water data in an effort to understand the cause and consequences of the event.

Figure 1. Gilchrist Blue Spring during the turbidity event. © Florida Park Service.

Background

Gilchrist Blue Springs, situated in Gilchrist County, Florida, is a prominent second-magnitude artesian spring arising from the underlying Floridan Aquifer. The spring is one of four springs located in Ruth B. Kirby Gilchrist Blue Spring State Park (in order of average discharge – Blue, Naked, Little Blue, and Johnson springs). Average annual visitation is more than 200,000 visitors per year.

The aesthetic appeal of Gilchrist Blue stems from the extraordinary clarity of its waters, owing to the subterranean filtration of rain recharging to the limestone Floridan Aquifer. With an average daily discharge of approximately 42 cubic feet per second (cfs), Blue Spring sustains a stable temperature of approximately 72°F (22°C) year-round. The remaining springs in the park add an additional average flow of about 30 cfs to join Blue in the 1,100 foot spring run to the Santa Fe River.

Prior to this event, Blue Spring was fed from two main vents arising from the same cavern (Figure 2). There is little vegetation in the head spring area directly surrounding the vents, which is attributed to the large number of visitors to the spring, the high flow velocity around the vents, and the natural low dissolved oxygen of native groundwater. Exploration and mapping of the cavern and limestone conduits is limited.

The Event

On Saturday, July 15th, 2023, around 3 PM, the water of Gilchrist Blue Spring turned from clear blue to murky brown. Swimmers were immediately asked by park staff to exit the water. The water level in the headspring was observed to quickly drop about a foot and a half. Slowly, the water level rose to normal levels and over the course of about a day

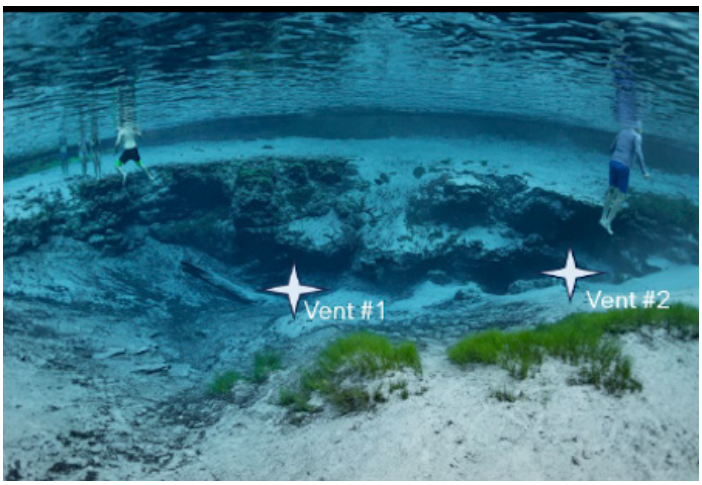


Figure 2. Gilchrist Blue headspring prior to the event. Light blue stars denote locations and names of vents. © Bill Hawthorne.

Figure 3. Gilchrist Blue Spring springs basin before and after the apparent sinkhole event. © Bill Hawthorne.

the water clarity returned to normal. Figure 3 shows comparison photos of the spring basin before and after the event.

Inferred Cause

The red arrows on Figure 4 illustrate the approximate location and direction of the aquatic landslide as delineated by lines of vegetative detritus. Based on evidence from photographs, the event was probably caused by the collapse of a cavern underneath the spring pool and adjacent to the main headspring vents (Figure 2).

This collapse likely triggered an underwater landslide, bringing mud and debris into vent #1. This assumed collapse likely increased the volume of the spring pool, resulting in a drop in water levels. Unconsolidated sediments and sand may have temporarily blocked the flow of both vents, also contributing to the reported drop in the water level and flow, before being blown free and the flow returning. In the photo, the large amount of mud and debris going into vent #1 almost entirely blocked the flow which appears to be exiting through vent #2.

Based on spring discharge measured two days after the event, spring flow appears to be unchanged. With the exception of turbidity, water temperature, dissolved oxygen, and specific conductance were relatively unchanged after the event, and water color and clarity returned to normal levels within 24 hours.

This event appears to have significantly affected the geomorphology of the Gilchrist Blue headspring. The majority of the flow is now exiting vent #2, and vent #1 has almost completely ceased flowing. And, compared to pre-event conditions, the volume of the spring pool appears to be considerably greater. There will likely be no long-term ecological effects at Gilchrist Blue Spring from the collapse as flow and clarity have since returned to pre-event levels.

Moving Forward

Karst collapses and sinkholes are natural throughout the Florida Karst Region but may be exacerbated by groundwater withdrawals and climatic events. A very hard rainstorm passed through the park just before the collapse occurred at Gilchrist Blue. Also, groundwater pumping within the Gilchrist Blue Springshed has increased markedly over the past 30 years, beyond the point of Significant Harm defined by the Florida's Minimum Flows and Levels regulatory program.

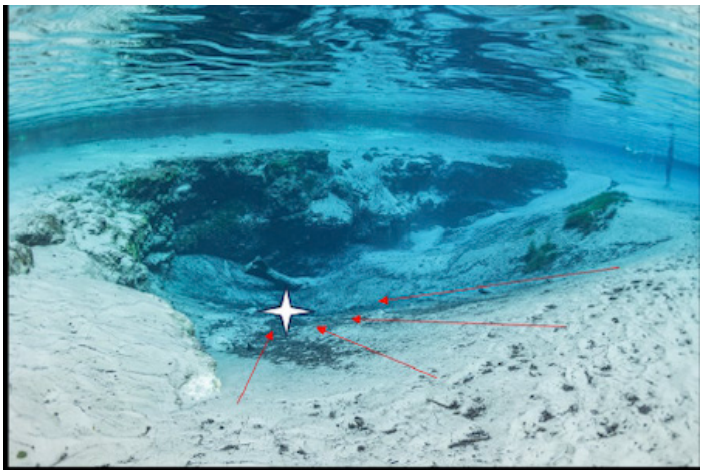


Figure 4. The white star denotes the inferred approximate location of the collapse. The red arrows denote inferred location and direction of landslide. © Bill Hawthorne.

The Florida Springs Institute plans to continue routine monitoring of flows and water quality at Gilchrist Blue and also to conduct a detailed bathymetry survey to set a quantitative baseline for comparison to any future events.

Bob Knight, PhD, is Executive Director and Bill Hawthorne is Aquatic Biologist at The Florida Springs Institute, High Springs, FL. Check out/sign up for the Institute's Newsletter here.

2023 NSS-CDS International Cave Diving Conference Lake City FL May 2023

All photos by Jozef Koppelman

MC extraordinaire Paul Heinerth keeps the action moving. Paul also discussed his recent cave-hopping trip to France.

Everyone enjoys hearing the"Tales from the Back of the Cave" by our panel of cave diving pioneers. From left to right: Paul Heinerth, Woody Jasper, Guy Bryant, Steve Forman, Larry Collins, Mike Poucher, and Lamar English shared their early adventures. Special THANKS to Bryan Buescher and Vickie Bashor for their vision in memorializing our history in Tales from the Back of the Cave.

Gareth Locke, author of Under Pressure, *shared findings from his work on using the human factors approach to accidents.*

Frauke Tillmans from DAN discussed cave diving injuries and high rebreather mortality vs. open circuit.

Jason Richards talked about exploring and mapping caves in the Hawai'ian Islands.

Bob Knight of the Florida Springs Institute discussed the changes he has seen during 50 years of monitoring the springs.

Lunch offered opportunities to catch up with friends, visit the sponsors' exhibits, or attend the annual membership meeting.

A Shout Out to the Cavengers

To the tireless Cavengers:

On behalf of the membership, the NSS-CDS Board of Directors and staff want to recognize and thank you for generously donating your time and your efforts for our annual conference.

Our events could not happen without you. You set up the hall, transport exhibits, arrange for food and beverages, meet and greet us at the door, feed us, and sell merchandise and raffle tickets. When the conference is over and people are slipping away to go diving or to dinner, you stick around and do the unsung work of cleaning up.

You are the organization's champions and its ambassadors. You all are amazing.

Jessica Bekaan

Terri Lynn Broome

Lynn Connelly

Steve Gatlin

Bonnie Helfrich Grieco

Gayle Hall

Jozef Koppelman

Sam Leflore

Dan McIntyre

Shane Paradis

Shannon Perry

Toni Pietrantonio

Renee Power

John Rutledge

Kenneth Schoen

Fred Stratton

Brandon Taylor

Brittany Underwood

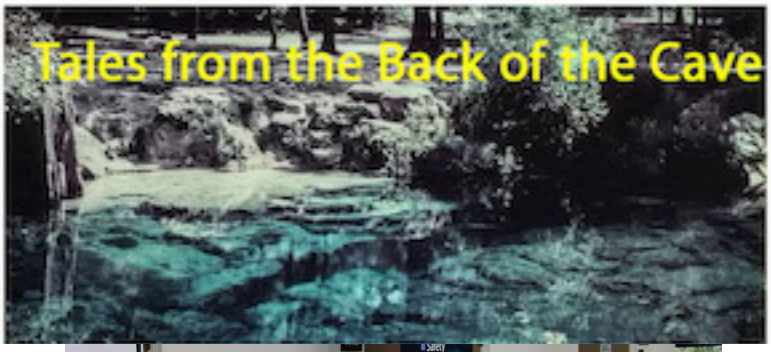
Joshua Underwood

Pam Wooten

Shelli Wright

Pioneers and Raconteurs

All photos by Jozef Koppelman



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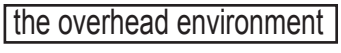
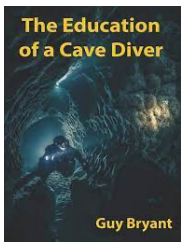
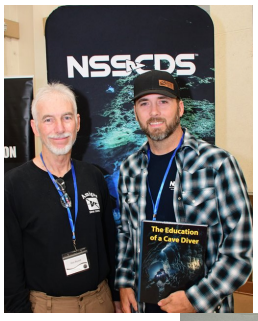
May 26-27, 2023





Thanks to our generous sponsors for donating prizes







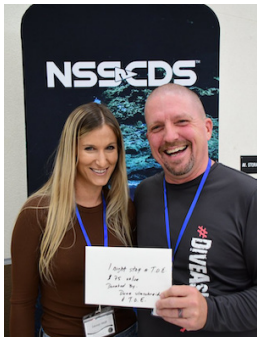












All photos by Jozef Koppelman

Good Times!

All photos by Jozef Koppelman

Cave Diving Section of the
National Speleological Society, Inc.
5200 NW 43rd Ave., Ste. 102-380
Gainesville, FL 32606

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