

Underwater Speleology

A full-page background image showing a diver in a dark underwater cave. The diver is wearing a wetsuit and a mask, and is holding a bright flashlight that illuminates the surrounding rocky environment. The water is dark blue, and there are bubbles rising from the diver's breathing apparatus. The overall atmosphere is mysterious and adventurous.

Journal of the Cave Diving Section of the National Speleological Society

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Decompression Wars**

*Volume 40 Number 1
January/February/March 2013*

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May 24-25



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Steve Lewis

Brett Hemphill

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**Underwater Speleology
Volume 40 Number 1
January/February/March 2013**

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Issue	Deadline
Jan/Feb/Mar	December 1st
April/May/June	March 1st
July/August/Sept	June 1st
Oct/Nov/Dec	September 1st

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For rates and ad sizes please go to www.nsscds.com

Underwater Speleology (UWS) is printed quarterly (four times yearly) by the NSS-CDS, 295 NW Commons Loop, Suite 115-317, Lake City, Florida 32055.

UWS is a membership benefit. Information on membership fees and registration can be found at www.nsscds.org.

Please send address changes to NSS-CDS, 295 NW Commons Loop, Suite 115-317, Lake City, Florida 32055.

Please submit letters and articles to UWS EDITOR, 295 NW Commons Loop, Suite 115-317, Lake City, Florida 32055.

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Editor's Notes

*And the Grinch, with his Grinch-feet ice cold in the snow,
stood puzzling and puzzling, how could it be so?
It came without ribbons. It came without tags.
It came without packages, boxes or bags.
And he puzzled and puzzled 'till his puzzler was sore.
Then the Grinch thought of something he hadn't before.
What if Christmas, he thought, doesn't come from a store?
What if Christmas, perhaps, means a little bit more?
~ Dr. Seuss*

2013 is the 40th Anniversary Year of the NSS-CDS. The UWS will focus on the rich history and tenants of the organization with articles offering education, conservation, exploration and safety.

Our on-line trivia contest for our last issue had no winner. Everyone missed the same answer! The answers are posted in this issue's on-line version along with a new game. We would like to thank Peter Lapin, <http://www.cavedivingphotos.com/>, for his generous donation of custom printed mugs as prizes for the contests and to Gene Page and Ben Martinez for their photos used last issue. Stop by the web site and see what is new in the NSS-CDS and visit the UWS web-version.

Save the Date! April 20, 2013 and join us for the Cathedral Work Day. Come out and help.

Whatever holiday you celebrate, please enjoy a safe, healthy and happy one.

Christmas is mine and I wish everyone all the joys of the season.

Merry Christmas and Happy New Year.



***“You can’t direct the wind, but you can adjust your sails”
~ German Proverb***

I am saddened to inform you that Susan Gero has passed away. Susan was a recipient of the NSS-CDS Outstanding Service Award. Her business, Exploration Design Studios (XDS), produced wonderful pieces of cave diving jewelry. She is deeply missed by the NSS-CDS and all who knew her.

There will be a Mini Workshop/Social at Marianna on Presidents Day weekend. It promises to be fun. I hope to see you there.

Work parties are being planned for Cathedral, Cow Springs and Mill Creek (Alachua). Dates and times will be announced on the NSS-CDS website.

We can all help with Cow Springs erosion mitigation. Are you diving Cow Springs? If so, the next time you go, please take a bag of cypress mulch and spread it on the path or in the parking lot where you suit up. It’s about two dollars a bag and is available at Wal-Mart, Lowes, Home Depot and other places. Your help will enhance our conservation efforts.

Merry Christmas and a Happy New Year!

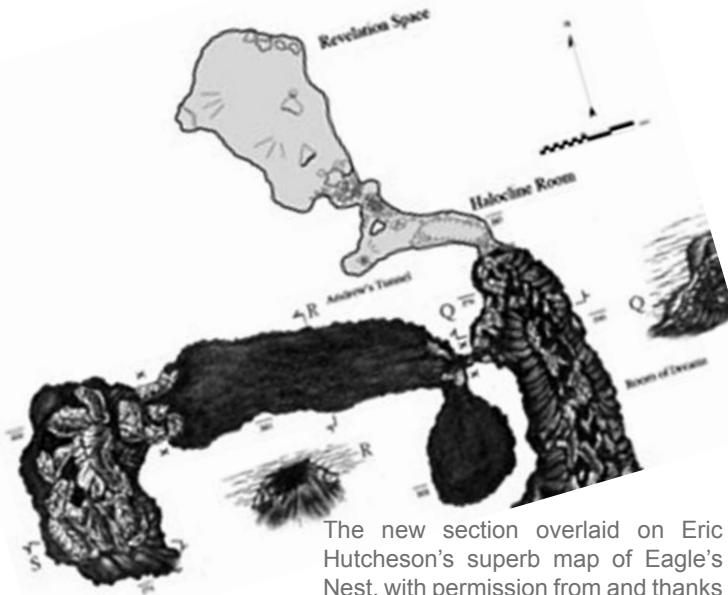
Dive safely,

Gene

REVALATION SPACE

A New Room In Downstream Eagle's Nest

By: Andrew Pitkin
NSS 39762



The new section overlaid on Eric Hutcheson's superb map of Eagle's Nest, with permission from and thanks to Eric for the use of part of his map.

It was in late July 2010 that I found myself scootering alone through the beautiful downstream passage of Eagle's Nest. Conditions were spectacular. Beyond the Pit, the water acquired a beautiful blue transparency and the muted ochre of the walls arching up to the high ceiling vault gave the passage the feel of a large medieval cathedral. At the end of the Room of Dreams, the central rock pile sloped down to a forbidding restriction where the old exploration line was tied off, decorated with numerous line arrows, including some historic ones made of triangular pieces of tape, the writing on them now sadly dissolved with decades of immersion. The low, wide gap in front was interrupted by irregular pieces of white rock covered with thick brown silt. Beyond, a steep, silty bank fell away beneath the sloping ceiling. Peering between the white rocks which guarded it like enormous, deformed shark's teeth, I carefully inspected the silt slope and ceiling beyond for any fragments of old line or marks indicating human intrusion. It would be impossible to go through there without some floor or ceiling contact, but this looked totally pristine. Clearly, nobody had been through in the recent past, if ever. It seemed difficult to believe. I tied into the end of the old line and pushed into a gap in the rocks that looked like it might just be passable. My expectation was that I would get held up and have to squirm backwards out of the hole and admit defeat.

Instead, to my surprise, with one small turn to the left, I was free and floating gently down the silt bank. As I descended ahead of my own silt cloud, it became obvious that there was a gap between the ceiling and silty floor at the bottom of the slope which was quite passable. A convenient projection on a rock at the base of the slope at 300 feet deep provided a perfect tie-off point and

I looked up into a low room, about 30 feet wide, which curved away to the left. On the right, the floor rose up to the ceiling. The left wall was steeper, guarded by large boulders that looked like they might conceal something, but that direction was south, not the way I wanted to go. About 120 feet beyond the restriction, the silt floor started rising up to a shallow rockpile. The other side of the pile sloped down under the roof and there was a hint of some dark space beyond. My compass indicated the room to be trending due west at this point, placing it to the north of and parallel to Andrew's Tunnel. It was the same depth, too, between 290 and 300 feet. If it continued, this passage might connect to it, forming a loop. Interesting perhaps, but not what I was hoping for. I tied off on top of the rockpile and turned around. The thought of having to get back out through that restriction was definitely curbing my enthusiasm. During my survey I made another interesting observation: here at nearly 300 feet of depth was a halocline like Larry Green had found in the Abyss. For some reason this so excited me that I lost my compass. Or perhaps it was the narcosis. Or the zero visibility from the silt I had stirred up in the restriction. As I ascended with the line in my hand towards the restriction, I was glad to be on my own because that made the silty conditions easier, but sad that I had no buddy to share my discovery with. With surprisingly little effort I negotiated the restriction and emerged into the clear water of the Room of Dreams.

I was not optimistic about the possibility of finding ongoing passage beyond the end of my line. It was going towards the west and starting to turn slightly southwards: if anything, I expected any significant section of undiscovered cave passage to be trending northwest, in the same direction

as the Room of Dreams. The other problem was the depth: at close to 300 feet it was significantly deeper than most of the passage in Eagle's Nest. On the drive home I thought about my next dive. I needed to look at the right-hand (north) wall, especially near the ceiling, in case I had missed anything. I planned to put more helium in my diluent; I was suspicious that the insidious perceptual narrowing that occurs with nitrogen narcosis was hindering my reading of the cave passage. And I wanted to have a second pair of eyes as well, despite the additional silting potential. On the drive home to Gainesville I had a phone call from Brett Hemphill who was excited about pushing a lead in a cave up in north Florida, near where I lived, and wanted to tell me all about it. I then told him that I'd been pushing a lead in a cave down in the Tampa area, near where he lived. When he heard where, he got even more excited. Plans were drawn up.

A week later I was back, and this time Brett was with me. Once again, visibility downstream was exceptional. Instead of 10/50 I was breathing 10/65 as the diluent in my CCR. Brett was not convinced he would be able to fit through the restriction without moving any rocks, so we decided that if he couldn't, he would wait in the Room of Dreams for me. I pushed through it, with a little more difficulty this time, and dropped down into the Halocline Room (as I had now named it in my head) to wait for him. There was a cloudy layer of silt from the week before sitting on top of the halocline, like I had seen many times in Mexico. Two or three long minutes went by and it became clear that Brett wasn't coming through, so I turned and swam farther into the hazy room, carefully examining the right-hand wall as I went. I noticed that as the room curved to the left, the right-hand wall became rockpile, and there was possibly an opening in the ceiling above it. I was still about 50 feet from the end of my line, but this seemed so much more promising than what I had seen when I turned my previous dive. I tied into the old line at a wrap and swam over to the boulder slope. It ascended at a steep angle with just enough clearance between it and the ceiling to get through without much contact. On the left side the space opened into an alcove; on the right was solid rock. A small plateau appeared with more breakdown ahead. Again there was just enough space between it and the ceiling. Above was nothing. Very black nothing. Empty space.

High above was a dark ceiling vault and the left wall faded away into blackness. To the right huge boulders crested the breakdown pile and concealed the right-hand wall. Ahead of me was black void. The floor consisted of sloping piles of rock fragments, some surprisingly large. One enormous boulder loomed out of the darkness ahead of me as I swam forward into the room, and mindful that Brett was still waiting for me on the other side of the restriction, I reluctantly tied off to it and started my outbound survey. The azimuths showed that the new room was trending

northwest, the same direction as the rest of the downstream passage. As I swam towards the T into the old line I could see that visibility in the Halocline Room had deteriorated considerably and by the time I reached the bottom of the slope and started to ascend towards the Room of Dreams restriction I was in touch contact with the line. My fingers felt a manmade object – my compass was sitting on top of the rock flake where I had dropped it on the previous dive. This time the restriction seemed much more difficult coming out. Visibility was unsurprisingly zero and it took some groping above my head to realize that I should have been further to the left with the line in my right hand. In the clear water at the ceiling of the Room of Dreams Brett was waiting patiently. 'OK?' he circled his light. I repeated it emphatically and we pointed the scooters towards the exit of this beautiful cave.

On our next dive the following week Brett went first through the restriction, moving some rocks as he went. As I swam out of the silt cloud and caught up with him at close to 300 feet I heard him chuckling into his mouthpiece, a sound I have become very used to hearing underwater. We took the right fork at the T and ascended into the new room, which I had decided by then to name 'Revelation Space' after a novel I had just finished reading. Still laughing to himself, Brett clipped on a strobe to the end of the line in the middle of the room to give us a reference as we swam around it looking for potential onward leads, aware that this was the first new cave passage to be discovered at Eagle's Nest in decades – who knew where it might lead? Both of us noted a breakdown slope leading off to the left (northwest) which appeared to be the only obvious possibility. Much of the perimeter of the room was lined with large boulders that might conceal an opening, but neither of us felt optimistic about looking behind them. The ceiling arched up high, 40-50 feet above the sloping floor of the room, but a quick scan with both of our lights showed no obvious openings. We turned and swam back towards the strobe pulsating in the darkness. This time Brett had a little difficulty with the restriction, so by the time he emerged, covered in silt, I had picked up the spare scooter and my stage and was doing laps around that end of the Room of Dreams.

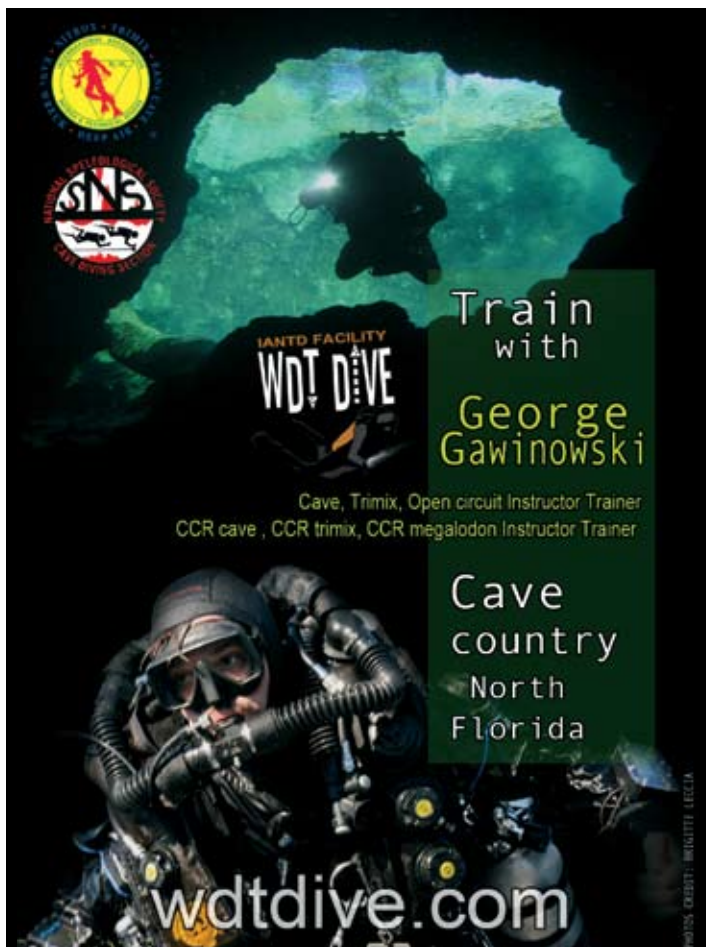
Like every cave explorer, I had fantasies that my discovery would lead to unending borehole passage, so we decided that we would bring scooters through the restriction and go for it in the lead we had dimly visualized at the bottom of the breakdown slope on the left of Revelation Space. Two weeks after our previous dive, with Brett hovering well above and behind me, I tied into the end of the line and scooted down into the black hole. All too soon the wall came down to meet the floor, leaving only a narrow chink of clear water passable only in a sidemount configuration; not so much of a problem as the precarious boulder slope

Continued on page 8

continued from page 7

above it which looked so unstable that any disturbance at its base could result in the opening there and any diver in it being obliterated by an avalanche of rocks. Daunting enough in any underwater cave, let alone being nearly 2000 feet from the entrance at 300 feet deep and on the far side of a major restriction already. With an inward shrug I decided that was that, and we decided to swim a circuit of the room clockwise to see if we had missed anything else. When we had skirted the room and were heading back towards the entrance I tied off and we surveyed the partial loop to get an accurate idea of the size of the room. This time our exit, even with scooters, was straightforward, and while we were completing our long decompression in the basin we met none other than Larry Green, there with one of his students. He was gracious enough to wait until we surfaced and then over dinner entertained us with some wonderful stories about previous dives in the Nest and elsewhere.

So what we found in the end was a nice room, which unfortunately does not lead on to thousands of feet of new downstream passage. Getting to it requires the right equipment, skills and experience, but it is well worth the effort. A visit to the Abyss room, at the end of Andrew's Tunnel, is technically easier and makes a great workup dive for this one.



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Skills, Tips & Techniques

By Jim Wyatt

Photo: Gene Page

READING THE CAVE

A few weeks ago I was diving in one of our local caves and got the inspiration for this article.

I was in a team of three cave divers poking around the cave and we crossed a group of three other cave divers headed into the cave.

These divers were in a room that was 20 feet high by 60 feet long by 50 feet wide and the bottom of that room was rock and clay. We watched as they swam across the bottom of the room and the third diver in the group stirred up the bottom with his fins, creating poor visibility that the flow was carrying out of the cave.

The visibility was reduced to 60 feet instead of 120 feet and the divers on their team continued into the cave without a clue that they were stirring up the bottom. No problem was created, and it was only my team that was impacted by the decrease in visibility.

What I would have liked to have told that team was “read the cave” and pick a smarter path. NSS-CDS cave diver training courses include a classroom topic on “reading the cave” as part of the “art” of cave diving.

If this group was “reading” the cave, they would have chosen a different path to go through that room. Team members could have stopped at the beginning of the room and looked at its configuration and made a smart decision where to position themselves while swimming through the room.

Had they made this analysis, they would have seen a route that would have given them handholds for an effective “pull and glide” technique and kept them twenty feet shallower, out of the main flow and off of the bottom.

Instead, what they got was a swim against the flow, close to the bottom, no place to pull and glide and twenty feet more depth.

When you are cave diving, I encourage you to stop, look

and decide where you should position yourself in the cave.

When you are driving your car, you look ahead to see road conditions and traffic patterns and then make a decision about which is the best lane of traffic to be in. Similarly, you should be able to evaluate the general configuration of the cave passage ahead of you and make decisions about your intended smart route based on that.

Obvious things such as “where to position yourself in order to be out of the flow” can be easily decided. There are places where a five foot difference in your position dictates whether or not you are fighting the flow or cruising against no or little flow. That same five foot difference can also make a difference in regards to silting the bottom or not.



Look for places to pull and glide if you are in a high flow cave by looking ten to fifteen feet ahead of you for handholds. Then, jump between these handholds as you negotiate your way down the passageway. If you do this successfully, your SAC rate will decrease dramatically

because you aren’t working so hard. You will have more fun and be less tired, not to mention build up less CO2.

Generally speaking, with all else being equal, you are better off up high, near the ceiling rather than down low by the floor. Your depth is less, you are less likely to stir up silt and frequently there is less flow if you are in a high flow cave.

I hope you will practice “reading” the cave on your next cave dive.

As always you can contact any NSS-CDS cave instructor and ask for their guidance on this and any other techniques. You can see a current listing of active NSS-CDS instructors at: <http://nsscds.org/instructorlist>.

40 Years: 1973-2013

Happy Anniversary NSS-CDS

Extracted from History of Cave Diving article by
Sheck Exley and updated by Forrest Wilson

The Cave Diving Section of the National Speleological Society was started by NSS cave divers in 1973 to focus on cave diving. It grew out of meetings in Missouri and Indiana in 1973 at the annual NSS convention. Sheck Exley was the first chairman, and Volume #1, Issue #1 of the journal later became *Underwater Speleology*. By 1976, the NSS-CDS was the largest cave diving organization in the world, a position that it has maintained continuously since that time.

Safety and training. NSS-CDS training directors Forrest Wilson, Wes Skiles, and Joe Prosser developed a program of cave and cavern certification that has produced more qualified cave and cavern divers than all the other organizations combined. The first group of crossover instructors was certified in 1979 and the first NSS-CDS instructor institute was held in Branford, FL in 1980. Many of the educational materials that we still use today were developed by the 1980s. Accident analysis results allowed identification of safety rules that greatly enhanced cave diving survival (published as *Basic Cave Diving: Blueprint for Survival*, Exley, 1979). Other publications included the *NSS Cave Diving Manual* (Exley and Fuller, eds., 1982), the *NSS-CDS Instructor's Training Manual* (Joe Prosser, ed, 1985, 1998), *Basic Underwater Cave Surveying* (John Burge, 1987), and the *NSS Cavern Diving Manual* (Zurick, Prosser, and HV Grey, 1988).

Cave maps, created by the section's explorers, were made available to members. Cave diver search and recovery, headed by Henry Nicholson, was made part of the curriculum and Tampa diver Dustin Clesi wrote an NSS-CDS specialty course on DPV use in caves. By mid-1982, 115 divers had received the Abe Davis Safe Cave Diving Award. Just seven years after the first instructor institute, the CDS had awarded 6089 certifications, yet the number of fatalities continued to drop from the all-time high of 26 in 1974 to less than five per year. This is a tribute to the NSS-CDS educational efforts.

By the early 1990's, NSS-CDS started a computer bulletin board to enable members to access to *Underwater Speleology* and shareware for nitrox and decompression. The *NSS-CDS Workbook* was published in 2002, and the Spanish language version, *Manuel Del Estudiante* in 2007.

The NSS-CDS developed a rebreather cave diving certification and sidemount course materials. The section's *Cave Diver's Manual* is now undergoing revisions and is due to be published in 2013.

Innovations and improvements. Cave divers have been at the forefront of equipment improvement, and CDS divers have led the way. NSS diver John Harper's long explorations done in the 1960's prompted him to use plastic jugs for buoyancy compensation, Sheck was the first to use tank staging during the Little River exploration and to survey caves accurately at Madison in 1970 and Woody Jasper and other explorers rigged their tanks on their sides when restrictions stopped their progress in back mount. Frank Martz started manufacturing the first dependable, bright underwater lights and guideline reels and Jamie Stone, and Jim Lockwood modified the Farallon MK 7 DPV by replacing its lead acid batteries with NiCad ones to extend burn time and range.

Safety concerns dictated other innovations. By 1968, Sheck Exley proposed the "Rule of Thirds" that we still use today. Following Bill Hurst's death at Peacock, Lewis Holtzendorff began using arrow-shaped duct tape markers, dubbed "Dorff markers", on the line to point to the nearest exit. These "Dorff markers" were used until Forrest Wilson developed the plastic line arrows that are widely used today. Forrest also created the first "jam proof" reel in 1977; three years after Dana Turner introduced the "L handle" design. The CDS also began to place "grim reaper" signs at the entrances to caves to warn untrained divers of the danger of entering a cave.

In 1987, Wes Skiles presented an article on the "Scientific Future of Cave Diving." Topics included surveying, cartography, dye tracing, water chemistries, photography, and biological/geological sampling. He emphasized the use of multiple staging and use of nitrox mixtures and discussed the new decompression habitats, which allowed divers to warm up, rehydrate, and eat in safety and relative comfort.

Exploration. Early survey and mapping of Florida's underwater caves marked the "golden age" of cave diving exploration. During the 1960's, NSS diver John Harper was the first American diver to regularly lead teams be-

yond the daylight zones. He and Joe Fuller set records for the world's first 1000 foot penetration in Hornsby Sink and doubled this distance for a world's record first traverse distance in December, 1962. John's teams discovered most of the submerged passage explored in this decade.

The next ten years, underwater cave passage expanded to approximately 200,000 feet and Sheck Exley was lucky enough to be the first to see most of this, together with dive partners Carl Fowler, Chuck Stevens, Charlie Sturdivant, Dutch Vande Noord, Court Smith, Lewis Holtzendorff, Dana Turner, David Fisk, Clark Pitcairn, Ken Hillier, Bob Goodman, Bill Walters, Dale Sweet, Mary Ellen Eckhoff, John Zumrick, and Paul DeLoach, among others. Florida's Peacock Springs Cave System was the world's longest known system at the end of the 1970's, having been surveyed by NSS-CDS members to 20,293 feet.

Significant cave-diving exploration was also pursued by NSS divers in other parts of the U.S. in the 1970's. The longest penetration in the U.S. outside Florida was 2200 feet, by Stephen Maegerlein at Hopper Spring, Indiana, though this was nearly equaled at the much deeper Roubidoux Spring, Missouri, by Frank Fogarty, Roger Miller, and Terry More. Cave diving was also used to connect dry caves, such as West Virginia's My Cave to Simmons-Mingo by Barney Burdiss, Forrest Wilson, and others in February 1979.

The 1980's saw cave exploration in Florida more than double, but it was no longer dominated by a relatively few divers. Most of the prominent Florida cave explorers of the 1970's were no longer active, though Paul DeLoach, Wes Skiles, Bill Main, Mary Ellen Eckhoff, John Zumrick, Clark Pitcairn, Paul Heinerth and Sheck Exley continued their efforts. They were joined in the early 1980's by cave divers like Woody Jasper, Lamar Hires, Bill Gavin, Tom Morris, Mark Leonard, Paul Smith, and Lamar English to name a few, and in the latter half of the decade by Larry Green, Bill Stone, Tara Tanaka, and Parker Turner, to name a few more.

NSS-CDS members Dennis Williams, Jill Yager, Gene Melton, and Mary Brooks explored and surveyed more than 30,000 feet of passage in Lucayan Caverns, Bahamas, surpassing Peacock as the world's longest known underwater cave. Perhaps even more significant, Jill discovered an entirely new class of animal in the cave, which she named remipedia. By the end of the decade, Lucayan was exceeded once more by Florida's gargantuan Cathedral/Falmouth System.

Many of the most difficult dives of the 1980's did not involve records, Jamie Stone and Sheck Exley's 1980 bottoming of Weeki Wachee Springs in the face of a so-called "impossible" current is one example and Woody Jasper, Tom Morris, Lamar Hires, Wes Skiles, and Paul

Smith used British sidemount technology to squeeze through many "impossible" restrictions to make such exciting discoveries as the 7000-foot-plus linking of Telford Springs to Irvine Slough (Luraville Spring), another.

NSS-CDS cave divers began exploration of Yucatán's underground rivers and cenotes. Sheck Exley began diving in Nacimiento del Rio Mante in the Sierra Madre Mountains of northern Mexico, and NSS-CDS member, Jim Coke and others, did the first surveys of Dos Ojos, Xel-Ha, Najaron and Mayan Blue cenotes.

IN 1996, The Northeast Sump Exploration Team (NEST) was founded by Joe Kaffl and became an official project of NSS in 1997.

NSS-CDS Properties. The NSS-CDS maintains ownership or stewardship of the following properties:

- 1993 - Alachua Sink donated to NSS and a management plan drafted, allowing cave access.
- 1994 - Sheck Exley bequeathed Cathedral Canyon Sink to NSS-CDS.
- 1997 - Cow springs purchased by the NSS-CDS
- 2004 - School Sink Wayne's World

The NSS-CDS Looks to the Future. The dives of 1980 seemed impossible as we struggled to make the first 2000-foot penetrations in 1970 and Cave divers are now making penetrations of over five miles long and nearly 900 feet deep. It is reasonable to assume that this progress will continue as NSS-CDS members lead the way with new safety equipment and procedures. Rebreathers make possible continuous immersions of more than 48 hours, even at considerable depths, and work continues on ever safer decompression tables, improved scooters and minisubs to increase the range of cave divers as well.

Through continued education, aimed at the recreational diver, by the NSS-CDS and other concerned agencies, we expect the number of untrained diver deaths to continue to decrease.

It is not unreasonable to expect the amount of known cave passage in Florida to double again in the next decade, as well as the number of divers to continue to increase. Cave conservation efforts will become increasingly important and one of the real challenges of the decade will be how to accomplish this. A larger still threat to the caves is the continued deterioration of water quality from pollution and water shortages due to increased population, industry, deforestation and ground-water-based irrigation.

While these problems are imposing, the NSS-CDS will continue to seek and support solutions to them. and NSS-CDS members will continue to be at the forefront of education, conservation and exploration of caves worldwide.

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Conservation Corner

By: Kelly Jessop

A Change In Terminology

It is amazing how much cave diving has evolved in every aspect of the sport. This becomes clear when reading the NACD publication from 1973 "Safe Cave Diving", edited and co-written by Tom Mount.

When referencing the section of the book addressing propulsion techniques, I encountered techniques that have been made obsolete with time. One such term is "shoveling", described as when "hands plunge down fingers first into silt... then pull alternating arms". Another outdated term is "finger walking", or "the scoop," where "one hand is cupped to scoop the silt, freeing the other hand to hold a light."

These techniques were born of an era when cave conservation wasn't a primary mission. In fact, that becomes noteworthy in another section of the same publication where eight reasons why a propulsion technique was chosen, and cave conservation wasn't included.

If the elimination of techniques such as shoveling and finger walking has occurred with the passage of time, then I propose we eliminate the term "pull and glide" in favor of "pull and pull". Pull and glide is a basic propulsion technique every cave student is introduced to, and we've become more astute by avoiding this technique in low flow cave systems. It retains favor in very high flow cave systems where normal swimming is impossible, but in such cases we are really "pulling and pulling" to move forward. In other situations where there is a glide component after pulling, then swimming could often be substituted instead of contact with the cave.

Perhaps the next time you are entering a very high flow cave system, and pulling yourself in while being careful to only touch previously worn rock, you'll notice the point when the current reduces and your body starts to glide. At this point, we leave "pull and pull", and just start swimming.



Introduction to Florida's Springs and The Howard T. Odum Florida Springs Institute

Robert L. Knight, Ph.D., Director

Florida is blessed with over 1,000 documented artesian springs. These springs historically discharged over 10 billion gallons per day of groundwater from the Floridan Aquifer System (FAS). The modern springs of Florida are likely no older than the beginning of the Pleistocene Epoch, about 2.6 million years ago when a long series of sea level fluctuations exposed and reflooded the carbonate Florida Platform. Following the last Ice Age, early humans in Florida left artifacts and cut marks on bones of extinct megafauna in sinkholes and caves. Clearly, groundwater levels were much



lower when these karst features were occupied. Most of those formerly dry caves are today's springs, illustrating how aquifer levels and spring flows drastically change

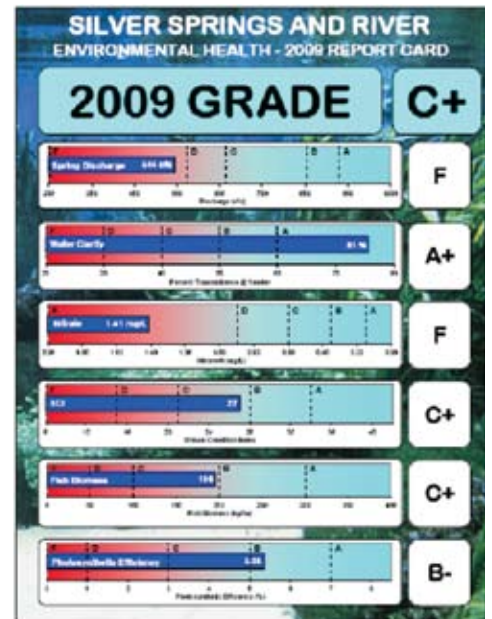
over geologic time. In the Holocene Epoch (last 12,000 years) ample and consistent rainfall returned to Florida, displacing saltwater and refilling the limestone aquifer with an abundance of freshwater. As aquifer levels rose above the edges of the existing sinkholes, they took life again as flowing springs, refilling ancient channels carved during much earlier times. Consistent and ample rainfall and groundwater recharge started the most recent recolonization by Florida's native springs' flora and fauna.

For the past 10,000 years or so, springs have been flowing in response to high and low aquifer levels resulting from wet periods and droughts. Before the 20th century, essentially all recharge to the FAS exited via springs and seeps. The freshwater portion of the FAS rests like a water-filled bubble on the underlying saltwater-filled aquifer and is bounded by saltwater along the east and west coastlines of peninsular Florida. When recharge was high, spring flow was high and visa versa. Limited written descriptions of spring flow before the early 20th Century, combined with the earliest spring flow data recorded by the U.S. Geological Survey in the

early 1900's, lead us to conclude that 100 years ago many of the largest springs had consistently high flows, during wet and dry years due to a super abundance of recharge to and storage in the FAS. By the 1940s there was growing evidence that spring flows were declining faster than could be explained by periodic droughts. By the 1980s it became evident at even the largest of springs in Florida (e.g., Silver, Rainbow, and Springs Creek) that spring flows were lower than ever previously measured. The obvious culprit was the exponential increase in groundwater withdrawals following the introduction of drilled wells and diesel and electric pumps.

By 1985, Silver Springs, once the mightiest spring in Florida and the U.S., and possibly in the world, was losing flow faster than neighboring Rainbow Springs. By 1998 Silver's annual average flow had dropped below Rainbow's annual average flow and has remained lower every year since. Both of these formerly beautiful springs are now suffering from greatly reduced average flows and more than 20- to 40-fold increases in nitrate nitrogen, principally as a result of agricultural and urban fertilizer uses. Both are undergoing a type of springs' eutrophication, the process that aquatic ecosystems go through in response to reduced flows and increased nutrients. Both of these springs are losing their adapted flora of tapegrass and eelgrass and both are being overrun by filamentous algae. Their entire biology is changing as their primary producers, the base of the food pyramid, shift

from an adapted and diverse assemblage of submerged aquatic vegetation, to a near monoculture of weedy algae species.



In spite of this man-made springs tragedy, the State of Florida stopped funding more than \$2 million focused on improving springs science, education, and restoration. The private, non-profit Florida Springs Institute stepped in to help fill this gap in support for springs science and restoration in May 2010. The Springs Institute was also founded to fulfill a dream of Dr. Howard T. Odum some 55 years before when he published his opus on the ecology of Silver Springs.

The first three-year plan for the Florida Springs Institute stresses the goals of providing good science and education needed to accelerate the State's sluggish efforts to restore springs. Within its first two years, the Florida Springs Institute finalized restoration plans for Wakulla Springs and for the dozens of springs along the Santa Fe River (www.floridaspringsinstitute.org).



The Springs Institute also initiated restoration plans/projects for Silver Springs, Rainbow Springs, Crystal River/Kings Bay, and Ichetucknee Springs. In the spring of 2011 the Florida Springs Institute organized and hosted the first Florida Springs Restoration Conference held at Otter Springs, attracting nearly 100 guests to hear from a dozen top scientists about

spring science and restoration efforts. With the end of state funding, four springs working groups were left high and dry. The Florida Springs Institute is helping to keep many of their programs moving forward, including establishment of the Silver Springs Alliance and the Wakulla Springs Alliance, two local advocacy groups focused on the wise management of those critical springs.

With the financial meltdown and loss of State funding, much of the springs monitoring in Florida was discontinued. The Springs Institute is continuing critical monitoring as funds and man-power allow. Last year the Institute continued collection of ecosystem-level data from Silver Springs and the Silver River to help extend the 60-year record of decline for this most famous of springs. The Institute also initiated a SPRINGS WATCH program where volunteers help collect routine data at Silver and Ichetucknee Springs not otherwise collected by State agencies. Water quality trend data are regularly posted on the Institute's website to allow the public to follow the health of their favorite springs.

The Howard T. Odum Florida Springs Institute is currently operating with limited private funds and donated time. While the absence of public funding places significant limitations on how much the Institute can accomplish, it has the advantage of allowing the Institute to take positions that are politically unpopular but absolutely critical for springs

restoration and protection. The best science is essential to make informed management decisions. The Florida Springs Institute strives to use the most reliable information in order to develop sound recommendations to share with public officials with regulatory power. The Institute cooperates with university and state/federal agency scientists to refine technical understanding of the Floridan Aquifer and its spring discharges. During 2012, the Florida Springs Institute plans to revive the Florida Springs Task Force to bring together public and private individuals to work together to accelerate springs restoration efforts.

The future of the Florida Springs Institute is as uncertain as the future of Florida's springs. There is no doubt that the State of Florida needs a prestigious center for springs research, education, and development of effective springs management and restoration guidelines. The combined direct and indirect value of Florida's springs on the State's economy is likely more than one billion dollars per year. More important than their dollar value is the fact that springs provide a direct view into the Floridan Aquifer System, which provides over 90% of the State's supply of freshwater, and is arguably the most important natural resource in Florida. Clean and abundant groundwater is the lifeblood for Florida's economy and natural environment. Due to weak enforcement of existing Florida law, our groundwater is no longer abundant or clean. The view into the aquifer is cloudy. The Florida Springs Institute is attempting to shine a bright light into that murky darkness so the public and their representatives will make the right decisions needed to restore our groundwater and springs.



Editors Note: This is the first in a series of articles highlighting several conservation groups active in protecting springs and caves we all enjoy.

The Loop

By Joe Citelli

Things of Concern To All Rebreather Divers and Open Circuit People, Too

Some time during the ninety days prior to the first day of December, March, June and September the relatively small group of regular UWS contributors all ponder the same thing: what to write about. The idea is to keep it relevant, interesting and informative. In the past I have opted for topics related to safety, technique, methodology and similar things. This quarter I have decided to change a bit and divide the column into two topics. The first is about a new CCR training proposal I have heard about. The second is akin to a rebreather diver visiting a Disney exhibit dedicated to rebreathers, or at least as close to it as possible without putting Mickey on a CCR.

If you are like me, you most likely have never heard of RESA, the Rebreather Education & Safety Association. Until now I never have, but, then again, I'm not in the dive industry so I have no reason to know who or what RESA is. Unfortunately, it is suddenly apparent that maybe I do have a need to know, and you, as a diver, might need to also. From their website, RESA's mission is to address:

"Issues such as requiring published minimum training standards.....so every rebreather student will have an expectation on what will be taught in the class. If sections are skipped, the student will know that they aren't being provided with a full program....." and to address "... sharing of information from training agencies to manufacturers and then to other training agencies..."

Now, these are most admirable goals and I wholeheartedly agree with them, and as long as staying within those parameters is their primary mission I support them. However, as with all things of good intent, there is always the temptation to stray from the original purpose or premise. I hope such is not the case here.

The typical progression of a rebreather diver is to first select a unit to purchase. At this stage he is most likely uneducated about rebreathers and his decisions are predicated on vicarious knowledge and experience gleaned from those around him. How effective and successful this process is depends upon what he is exposed to. At best, it is usually biased towards one, maybe two particular units because

those are the rebreathers he has seen. The next step is to arrange for training. Again, his decision is one based on minimal firsthand experience. Since he doesn't dive a rebreather, he can't possibly know who is and who is not a good instructor. This is, after all, a new skill, so it is unrealistic to expect the student to have any real and valid opinions, at least not before the course is completed. Once the student has logged a specified number of hours on his unit, he is eligible to take a course in normoxic trimix, and after logging a specified number of additional hours he can take full trimix. Then, of course, there are courses in CCR cave, expedition trimix, advanced wreck diving and so on. The list is exhausting, but it is good that training is available for those who want, need or require it.

It is that next to last word, "require," that troubles me. Currently you are only required to take these courses once. The certification you earn stays with you for life and carries over to any unit you might choose to buy or dive in the future, i.e. if you purchase and train on rebreather "A" and then decide to purchase rebreather "B" there is no need to retrain or take any new training other than taking a "crossover" course to learn the nuances of the new rebreather. You do not need to redo your mixed gas, cave or any other training because you are on a different unit.

Rumor has it there is a movement afoot to change that. It is my understanding that RESA or some of its members might be quietly supporting the notion that divers should have to be recertified on each unit for all levels of training, so for example, if you own "Rebreather A" and are certified through full trimix and you now want to buy "Rebreather B", you will have to retrain all of these skills on the new unit. If this is true, it seems that the dive industry is now embracing the nanny state mentality and is trying to hold your hand from cradle to grave, or, perhaps this is seen as a potential cash cow by some. I suspect it is a little of both but I truly hope my concerns are unwarranted.

For me, the real problem is that this is a complete dumbing down of standards and appears to be part of a trend that panders to people who have not progressed to a level where they are viable candidates for CCR training. A proposition such as this seeks to make the non-viable

candidate viable by micromanaging his dive training and experience. The problem is that no matter how much better the manufacturers build their mouse trap, it is still a mouse trap and no matter how well you train people, if they do not have the experience they will get caught in their own trap. When things go awry they will be less likely to prevail than someone with a deep well of experience to draw from. To survive in an otherwise hostile environment you need to possess skills that are honed and developed over a long period of time. You do not accomplish this by taking more courses. It only happens by repeating the skill over time. If you are trimix certified on one unit and need another course to use that training on a different unit I strongly suspect you are not at the level where you should be diving trimix in the first place.

Now, as much as I am a cynic, I suspect this concept might be well-intentioned by at least some of the players in the game, but I can't help but wonder how many of these folks are business men and women first and divers second? I can't imagine any experienced technical diver supporting the idea that he is incapable of transferring skills and theory from one unit to another without repeating the training. That said, non transferable, unit specific certifications are already part of PADI's rebreather program. I question the wisdom of applying the same business model used in the training of recreational divers to advanced technical diving applications. Technical diving already has stricter standards of training due to the fact that this level of diving, especially in caves, is not at all forgiving of mistakes or incompetence.

Should this come to fruition, the issue may arise that divers scheme to buy units in a secondary "black market" (which I suspect would develop) to avoid the training. I can also foresee people not buying new units and staying married to the unit they have rather than spending thousands of dollars on redundant training, or even dropping out of the sport altogether. Realistically speaking, how many of us that dive rebreathers actually do dives where there is a real need for one? I suspect the answer will be very few of us.

While the possibility exists that all of this is nothing more than rumor, I have learned over the years that within the genesis of every rumor there is always a shred of truth. Hopefully, divers will voice their opinions on this matter and the industry will hear them.

So now, on to the second topic of this month's column.

As discussed earlier, one of the big issues for the new rebreather diver "candidate" is in making an informed decision about which unit to buy. The typical candidate relies on vicarious experiences gained from friends and associates. While this is good, it is sub-optimal at best because it is limited to divers the candidate knows and his

immediate surroundings. If he is lucky enough to live in an area where there is a lot of diving activity his exposure will be greater than someone not so lucky.

Well, I just found a place that addresses just this issue. Imagine a spot where you can view, inspect and, under certain circumstances, even test drive any of these different rebreathers: Meg, rEvo, Optima, Titan, Prism II(Hollis), Poseidon, Kiss Classic, Kiss Sport, Kiss / Gem, Sentinel, and Evolution / Inspiration. As I said earlier, "Watch out Disney World!" A good friend of mine recently called to tell me about a showroom he is opening in Florida dedicated to displaying rebreathers. He told me that he ultimately intends to have a total of eighteen units on display so that new divers can come and see all of the units available, get unbiased answers to questions and make in-person comparisons of the various units. Needless to say, my ears perked up and the wheels started to turn. "Wouldn't it be great if I could inspect, dive and report on each one of those eighteen units?"

Well I can and will be.

In addition to any other topics for discussion, at least part of many future issues will be dedicated to reporting on each of these units. I'll be diving each one and giving unbiased reports on the units and my dive experience. I will develop criteria to address all of the key points one should consider to make an informed decision. Each report will be consistent in form and outline so readers can make valid comparisons between units. Hopefully, this will provide a useful service to those considering their first rebreather or those thinking about acquiring an additional rebreather. Until then I wish you all a happy and safe holiday season with good wishes for the new year.



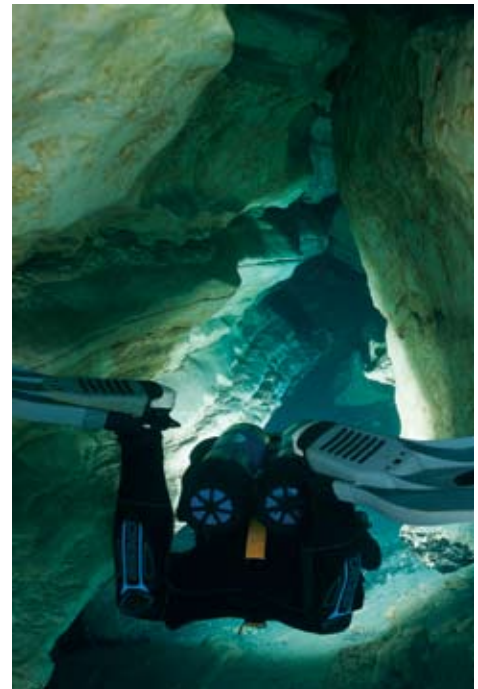
Visit With A Cave



Paradise Spring from the over-look deck.

It is truly amazing how many marvelous caves, caverns, and springs there are in Florida. It is also amazing how many are overlooked by some and how many people simply stay in when their favorite dive site is closed. So when the floods made diving many sites, even Ginnie Springs, impossible and the dive shops in the local area were vacant, we determined that we had to find something relatively local to dive. We ultimately decided to check out a place called Paradise Springs. While everyone was screaming about how all of the sites being flooded, we had this site to ourselves, save two dive teams leaving the property as we were getting suited up. Well known to many but often overlooked, it is actually a sinkhole with a large cavern and a small cave, worth visiting at least once or twice.

The system, is located on private property near Ocala, Florida and has developed into a commercial dive site. When you first arrive, you drive through a semi-residential area before finally arriving at the site. You must check-in at the owner's house and, if it is your first, visit watch a short video about the cavern after signing your waivers and paying admission. We should all be so lucky to have something like this in our backyard! There is a restroom/changing area near the sink with picnic tables and a small pavilion. A decent network of steps leads down to a deck just above the sink. While there is technically an upstream and downstream and mild flow is evident, collapse has sealed most of the areas through and into which water flows. A platform is almost directly below the entrance and the cavern slopes down at a gradual angle to a depth of around 100 FFW where there is a grim reaper



Jon swims through a small side passage with beautiful striations in the rock face.



Jon swimming towards the entrance to the cave located at about 90 feet.

Paradise Spring

Photographer: Kristi Bernot

Article: Jon Bernot

sign. This is where the cavern zone ends. Within the cavern zone, the ceiling is heavily embedded with fossilized life forms including coral, shark teeth, and many large sand dollars. The rock is soft limestone and in some areas is clearly striated with various layers of sediment.

The cavern zone of the site is several times larger than the Ginnie Springs Ballroom, and on the day we photographed the site, visibility was around 100 feet. Once past the grim reaper sign and cavern zone, the cave continues for around another 100 feet in linear distance and goes to a maximum depth of around 145 FFW with 150 FFW possible within the breakdown. This area is interesting to the more advanced cave diver, though it is reminiscent of lower Orange Grove, with breakdown, silt, and relatively confined spaces. A reel must be run from the sign to the bottom of the cave. There are also several nooks and offshoots within the cavern, all of which dead end fairly quickly, while still offering much to explore.



The sun streaming through the water in the cavern zone is truly an inspiring sight to behold.

For those looking to check out an easily accessible new site, or an instructor wanting to take a cavern class to something besides the Ginnie Ballroom, this is well worth the trip. It is also one of the very few sites that offers a true dive site for those divers only certified to the cavern level and looking for a larger site within their training limitations that has an overhead, while offering enough to see to fill out a longer dive or two. It is also a great alternative site to test new diving, photo, or video equipment as visibility appears to generally be quite good. Just don't forget the bug spray in the summer!



Hovering near wall of cavern.



Much of the rock is white and the bottom past the sign covered in a fine layer of clay silt. But this small swim through with a red hue made for nice contrast as Jon swam through.



Underground, Undersea: The Uses and Perceptions of Bahamian Blue Holes

Sarah Wise (Environmental Anthropologist, NMFS-NOAA)

Amelia Moore (Sociocultural Anthropologist, University of Miami)

Sometimes you go and it's black, black, black. Now, why is that? You all should know, you're scientists. Then you go and the water is clear. Beautiful. You can see the fish swimming. You might even chance a swim. [laughs] I don't know why it changes like that, just depends on the day, I guess. Maybe the rain.

Woman, 40, discussing Gobbler Hole, Andros, Bahamas

Introduction

This paper briefly introduces readers to Bahamian blue holes—aquatic caves and sink holes formed by the weathering of limestone rock over time—as socially significant geological features. The information presented here is based on selected findings from an ethnographic blue hole study conducted in The Bahamas in 2009, co-lead by Jessica Minnis (Associate Professor of Sociology, College of The Bahamas) and the authors of this piece.² The study focused on Andros Island, the largest and least populated island cluster in the Bahamian archipelago, and home to an exceptionally large number of blue holes. Some of the holes are marine, but many of the Androsian holes can be found inland amongst the pine forests and muddy flats that cover much of the island. Terrestrial blue holes are so extensive in Andros that some geologists

² This project benefited from a mixed-methods ethnographic approach, including participant observation, semi-structured interviews, participant mapping and other forms of conceptualizing and practicing place. The authors worked with students and faculty from the College of The Bahamas and the students performed most of the data collection and survey administration. Our team conducted a total of 52 completed surveys, approximately 50 percent of which were digitally voice recorded. Of the total 52 ethnographic interviews, 27 were men and 25 women. Ages ranged from 18-88.

claim the island has the greatest concentration of aquatic caves in the world. Andros is blue hole country.

Blue holes have diverse geological characteristics. They get their name from the deep blue color of ocean holes in contrast to the lighter blue of surrounding shallow waters. Only some terrestrial and marine holes fluctuate tidally and have extensive cave systems, while other blue holes offer evidence of long term climatic changes and associated sea level rise. Water circulation in blue holes is limited, resulting in highly stratified water levels, and because deeper levels are anoxic in some blue holes, conditions are ideal for fossil preservation. These aquatic caves offer clues to the rich natural and historical past of the Bahamas islands, and some have become significant attractions for tourists and exploration scientists.

Archeological evidence indicates Bahamian aquatic caves were used as burial sites for pre-Columbian Native Americans, and interviews with residents of Andros reveal that blue holes continue to be used as geographical and social landmarks in a myriad of ways: as fresh water sources, natural boundary markers, sites for waste disposal, resource extraction, recreation, hiding places, and as symbolic deterrents for socially unacceptable behavior. Bahamian blue holes have been woven into personal, community, and national narratives through practical experiences, shared stories, and involvement with scientific exploration expeditions. However, due to their unique chemical and geological conditions, blue holes are extremely vulnerable to threats such as human pollution and development pressures. Therefore, efforts have been made by Androsians and foreign investors to protect holes and cultivate tourism surrounding the cultural heritage and natural beauty of blue holes. In 2002 the Blue Hole National Park was created in collaboration

Research Findings

Residents of Andros Island are primarily rural, of modest means and of Afro-Caribbean descent. Our research team conducted in-depth semi-formal interviews with residents and found that the amount of knowledge and experience with aquatic caves varied tremendously. Many Androsians we interviewed made an initial distinction between inland blue holes (often simply referred to as blue holes or as specifically named holes, i.e. Gobbler Hole), and oceanic blue holes, more descriptively termed, “boiling holes” or “breathing holes,” because of tidal fluctuation within them. When asked about blue holes in general, some people only thought of terrestrial holes while others thought of ocean holes, depending on their own life experiences and point of reference. Other participants, often those with greater experience with blue holes, distinguished between fresh and salt water holes and various forms of tidal oceanic holes.

Uses

Nearly half of those interviewed (48%) currently used blue holes for purposes such as fishing and crabbing, but recreational uses such as swimming were more frequently reported. We also found a generational difference in how residents perceive and use aquatic caves. Androsians often described aquatic caves as dangerous, mysterious and sacred places with historical significance. The holes hold tales of mythical creatures, death, and otherworldliness. However, many older Androsians view blue holes as functional spaces. In some settlements, prior to roads and infrastructure, inland holes were communal sites for washing clothes, swimming, crabbing, and points of community recreation. Historically, people located farms near inland aquatic caves for convenient access to fresh water. Marine blue holes were often used for fishing by both men and women. As people’s lifestyles changed, so did the relevance of blue holes to their lives. Over time, as functionality diminished, residents’ perceptions of blue holes re-focused on their dangers. It is now less common for Androsians to utilize blue holes for practical purposes in their everyday lives. Fear narratives have also shifted to incorporate new hazards. New stories emerge involving contemporary threats such as pollution, scientific exploration, and drug trafficking.

Fear

Most people interviewed said that they were personally afraid of blue holes. Most commonly cited reasons were: the caves were unfamiliar, dark and deep; because parents had warned people to stay away from the holes as children; and because people have drowned or disappeared in them in recent memory. Mythical creatures were a common theme, most often mermaids. Some Androsians described seeing mermaids themselves, while many more

were told about them by their parents and grandparents. Interestingly, the Lusca², described as half shark and half octopus, was only mentioned during interviews with dive instructors and non-Bahamians involved in tourism. Androsians we spoke to did not mention the Lusca.

Nearly everyone interviewed recounted stories of residents who had died in a blue hole. Some had lost family members, while others knew of people in the adjacent settlements who had drowned in them. Often the bodies were never recovered. These deaths contribute to perceptions of blue holes as grim, dangerous and unpredictable. Some people also discussed Jacques Cousteau, remembering his visits to the area to dive in several blue holes. People also recounted stories of other researchers who visited Andros to explore blue holes.

Blue holes were thought to appeal to tourists and foreign researchers for many of the same reasons that they were thought to hold fantastical creatures: their idyllic beauty coupled with their unfathomable depth and unknowable contents. In a land where the ocean is a crystalline blue that often stretches as far as the eye can see, the brackish and dark impenetrable water of blue holes is an anomaly. Fishermen, who regale listeners with stories of shark and barracuda interactions, often refuse to swim in blue holes precisely because their waters are too dark to see possible threats. Concurrently, cave explorers and tourists travel to Andros precisely because of the unknown and dangerous qualities of the blue holes.

Conservation and Protection

Andros residents rely on individual wells and municipal water pumped from central well fields on the island for their household fresh water. Andros also provides the bulk of fresh water for the Bahamian capital, Nassau, which houses 75 percent of the nation’s population (approximately 275,000 people). Given the importance of Andros’ fresh water system, blue holes—particularly those with a fresh water lens—are prime indicators of groundwater quality. For these same reasons, blue holes are vulnerable to threats of pollution and salt water intrusion.

The idea of blue hole conservation was often met with confusion. More often than not, when we asked people about protecting blue holes, they were in favor of protecting people from blue holes. Many residents suggested placing warning signs and fences around blue holes so people could not fall in and so children would not go near them and drown. Those that did support some form of conservation for blue holes were often involved in the tourist industry. They wanted to keep the holes clean and undeveloped for tourism and possible future exploration.


² The Lusca is often mentioned in guidebooks about Andros and in other tourist literature as being a commonly held folk myth.

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Many people interviewed (69.2 %) had not heard of the Blue Hole National Park, (an inland segment of the Central Andros National Park); however, many people we spoke with (90%) were in favor of the idea of a national blue hole park. Some people advocated protecting blue holes because of the possibility of finding previously unknown and valuable objects. One Androsian, who identified himself as a blue hole diver, believed blue holes to be The Bahamas' most valuable resource because of their fresh water lens and tourism potential. Many people recommended that The Bahamas government, either in the form of the Ministry of Tourism, Environmental Health, or the National Trust, be involved in managing the blue holes in some way.

Conclusion

Blue holes are both feared as mysterious sites for potential drowning and useful as sites for tourist activities and scientific exploration. Many people our team interviewed made the distinction between the "Bahamian" or "native" respect and fear of holes and the "foreign," "white" or "guest" enjoyment of holes. These Androsians perceived blue holes as potentially valuable and therefore worthy of protection, but the source of their value is shifting. Historically, they were valuable as a practical source for useable fresh water, fish and crabs. More recently, blue holes have become a draw for tourists and foreign researchers who, it is hoped, might invest in the local economy. Many people we spoke with explicitly stated that they liked blue holes because they brought visitors to the area, and with visitors, it was hoped, comes money.

Blue hole divers and researchers who advocate for the creation of blue hole parks and protected areas should be aware of this shifting form of valuation and of the ways in which tourism and protection can affect access to holes for Androsians. Technically, blue holes cannot be privately owned under Bahamian law because they are bodies of water, but access to the holes is restricted in various ways. Historical Androsian informal restrictions were revealed through discussions of stories and memories. Many people identified community restrictions for children go-

ing in blue holes and adults hunting for crabs near blue holes as a matter of safety. They also identified more recent limited access to blue holes on private property due to fencing or the sense of trespassing. Access can also be restricted through feelings of unwelcomeness and unbelonging as blue holes become spaces for "foreign" and "white" visitors who have specialized "scientific" knowledge of the holes that does not resemble the experiential knowledge of residents.

While some advocates for blue hole preservation promote ecotourism as an obvious future purpose for these geological features, our team has been careful to make it clear that protection of blue holes should not mean the physical or symbolic removal of local people from the holes. The inclusion of Androsian residents in the future uses of blue holes must extend beyond co-opting their memories and stories as cultural narratives for the tourist industry. Androsians, even those not involved with tourism, must be allowed to become true partners in blue hole research and preservation. The future of blue hole country depends on it.

Acknowledgements

The authors would like to gratefully acknowledge our support from the Antiquities Monuments and Museum Corporation of The Bahamas, The College of The Bahamas, The Bahamas Environmental Research Center, The Andros Conservancy an Trust, and The Abess Center for Ecosystem Science and Policy at the University of Miami.



The team (left to right, top row): Rivean Riley, Tavarrie Smith, DelvanoMcIntosh, (bottom row) Professor Jessica Minnis, AlannahVellacott, Ester Minnis, Brooke Greene, Amelia Moore, Sarah Wise (Photo credit: Derek Forbes)

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OFF to the Side.....

By Rob Neto

Conservation and Sidemount

As a big proponent of cave conservation, this is a subject that is always held the utmost importance to me. As scuba divers in general, we all have the responsibility of preserving the underwater environment we are fortunate enough to experience. As cave divers, a major focus of our training is on buoyancy, control and trim. This makes us even more responsible in preserving the beauty and life we encounter in our underwater caves. We even see this responsibility echoed in the very familiar phrase which also happens to be the NSS-CDS motto:

Take nothing but pictures...
Leave nothing but bubbles...
Kill nothing but time.

Cave instructors should be emphasizing this mantra to all of their students, starting with cavern divers all the way through the specialty course divers, so this shouldn't be anything new to a cavern or cave diver. Unfortunately, this can sometimes be forgotten in the excitement of the dive or the awe of the sights we see in these beautiful underwater havens.

As sidemount cave divers we need to keep conservation at the forefront of our thoughts even more so. As a new sidemount diver, one's focus in diving changes slightly. There are no longer two 7 ¼ or 8 inch cylinders above us, on our backs, that can cause slight damage to the ceiling with the unintentional bump against it. Rather, those cylinders are along our sides and create the need for more awareness of the width of the passage and the proximity of the cave walls to us. Some passages may require us to turn sideways to get through them, a skill that was never necessary in backmount, thus not likely to have been taught in any cave class.

Many experienced sidemount cave divers will also tell you passages that used to not be passable in backmount, now look fairly large. It's all a matter of perspective. As a new sidemount cave diver you may be tempted to explore these once unobtainable locations. The key to doing this is to go slow and still maintain minimal to no contact with the cave walls, floor and ceiling. Learn the proper propul-

sion methods to help you get through the smaller passages, with conservation of the passage being one of the higher priorities. Just because it's a smaller passage and designated a sidemount passage, doesn't mean conservation should be disregarded.

Often times, just the presence of a diver and exhaust bubbles in a small passage means visibility will be dramatically decreased. In larger passages there is sufficient distance between the movements of divers and their fins that visibility should not be affected. However, in smaller passages, just the forward propulsion of a diver through the passage is enough to create undulations in the water that dislodge sediment that has settled on the floor, walls and ceiling. This can result in limited to no visibility to any diver not in the lead in a small passage. It will also cause limited to no visibility on the exit from that passage for all divers. If you can't see the passage, among other issues, it becomes more difficult to prevent damage to it. While I'm not promoting solo diving, some passages are better suited to solo diving as far as safety and conservation are concerned. If you're moving through a passage in which visibility has decreased so much you can't see your dive buddy and you can't have touch contact because of the limited space, then you are effectively diving solo. This likely wasn't a part of any of your basic overhead training courses, but is something that should be considered before you venture into that smaller passage.

So while diving sidemount in caves, specifically in smaller passages of caves, does allow us to venture into passages with minimal to no contact that we couldn't previously get into in a backmount configuration, there are new concerns that come with this that must be addressed. Conservation becomes a higher responsibility for a cave sidemount diver. Maintaining buoyancy control in a ten foot tall passage should be easy for any cavern or cave diver. Maintaining buoyancy control in a two foot tall passage must be second nature for a sidemount cave diver.

So go on and explore those small sidemount passages, but do so with conservation in mind as you should be doing with all of your diving.

*With This Ring.....
Falk and Dagmar
December 23, 2012*



Photographer: Gene Page

Falk and Dagmar Hoffman were married December 23, 2012 in an underwater ceremony in Ginnie Springs' Ballroom.



Falk is NSS-CDS Instructor #313 and lives near Hamburg, Germany.

The ceremony was performed by Jim Wyatt, a Florida Notary Public as well as NSS-CDS Safety Officer and Instructor. This is Jim's second underwater wedding.

The couple were joined by both German and American friends to share in their special day, with several attending the underwater nuptials as well as above water festivities.

May the happy couple have a lifetime of happiness, good viz and unbroken line.



Cave Diving Milestones

By Shirley Kasser

Hearing from divers as they celebrate important milestones in their cave diving careers is so much fun. The achievement is not only a milestone for the diver, but a way to highlight to the world that cave divers are diving often and diving safely.

Jim Marshall shared this great report on his special milestone:

I made my 100th cave dive since receiving my Full (Technical) Cave on May 19th, 2012. This dive occurred in Roubidoux Springs. This is the same system where I started my Intro instruction, and after finishing Intro and beginning Full Cave in FL systems, we returned to finish my Full Cave instruction in Roubidoux.

The visibility was about 15 feet and the water temperature was 58° F. And, while most days that involve diving are beautiful, this day was particularly nice with moderate temperatures and a bright blue sky. The dive was not a very long dive at only 32 minutes. Nor was it a very deep dive, as we only went to the ledge at 100 feet where we often do our first stops on deco dives here. It also wasn't a decompression dive, although I did use a stage for practice. There was no new equipment involved and my scooter stayed at home.

There were some important things about this dive that made it memorable to me. On this dive I dove with a newly minted Intro Diver. He had previously been in the cavern, but this was his first visit past the Grim Reaper Sign in Roubidoux. So, this was an opportunity to address my obligation to give back some of the time, knowledge and kinship that so many have provided me over the last few years. Also, it was requested that I run the reel, so he might observe and learn a good placement

path. Right after my secondary tie-in, I caught the line with my foot and paused while my new buddy moved it over my fin. This reminded me of the humility that goes with a beginning cave diver. I was able to experience the relaxation of a dive well within my capabilities without the task loading and complexity of new learning or aggressive dive plans. I realized some of the lowest air consumption rates I have ever had in a cave. And, while a couple of buddies and mentors have recently elected to take a hiatus from the sport, I was able to begin a new bond with another diver.

Like many cave divers, this specialty was not calling me as I got into diving. The initial appeal for me was the open ocean and the wrecks. While I have dove wrecks in salt and fresh water and continue to enjoy that skill growth, cave diving has taken a solid hold. I have been in 14 systems in 2 states so far. My freshwater dives outnumber my saltwater dives by 8:1. While I have recently been scooter trained, I am still in back mount, but have my harness and tanks to begin side mount. So, I will continue to need and seek guidance and mentoring; but as I begin to return the mentoring favor, I find a subtle satisfaction in the circumstances of my 100th safe cave dive.

Jim Marshall

Thank you, Jim, for taking the time to share your story, and thank you for being a great example for our sport.

What's your story? Email your milestone stories and photographs to me at abedavis@nsscds.org, or snail mail them to me at 1228 Gina Court, Apopka, FL 32703.

Shirley Kasser

Midwest Underground

By: Chris Hill



Bottom of the hill.
Photo: David Moore

THE CANNONBALL RUN

So u t h e a s t Missouri is the area I grew up in. Summers were spent skiing, tubing, camping and having a general good time hanging out

at Wappapello Lake. When we weren't there, my scuba diving friends and I were trekking all over southern Missouri in quest of clear water, of which Wappapello was NOT on the list, even though we always heard rumors of a large, clear cave system at the bottom of that lake. Fortunately, we never found it (since none of us even knew there was training for such things).

Fast forward about twenty years to a time that introduced me to cave diving. Long forgotten were rumors of a cave under Wappapello and I was focused on cave training and the overhead offerings on the other side of the state. As fate would steer me and as I progressed through trimix training, I learned that one of my checkout deep dives would be conducted at a place called Cannonball Cave at the bottom of none other than... you guessed it, Wappapello Lake. Déjà vu! Except now I was properly prepared to dive it and further appreciative that I didn't find it as an invincible, indestructible youth.

Diving Cannonball comes highly recommended, but finding it is quite the challenge. It's best to connect with someone who's been there. The first challenge is finding your way down the gravel roads leading to the proper area of the lake. A few maps and some decent directions and you're set... sort of. There are actually three methods of getting you and your gear to the proper spot on the water. You can drive the gravel roads, park in a small parking lot at the top of a high hill, and pack your gear down a very long STEEP hill. For those diving

backmount, there is even a bench halfway down the hill to stop and lean on to rest – it IS that bad! And that comes AFTER you can carry down your stages, scooters, etc. Ugh! A few trips up and down that hill in the summer and you'll be swearing you'll never do it again – but the dive is worth it. A second method is to drive down the road a bit farther to a boat ramp. If you have a small boat, you're set. Or you can scooter the roughly 500' to the spring location. Swimming is an option, although quite tiring. And yet a third option is to come from the opposite side of the lake via pontoon. There's a nice campground there where you can rent a boat, or you can hook up with the local dive shop some days (they keep their pontoon docked there). This is by far the easiest, most enjoyable method.

There's no place to check in and no fees to pay. If you can find it, you can dive it. No rules, so scooters are allowed and all levels of overhead certifications work, although there isn't a cavern zone and no visible natural light even at the entrance, so it is best to have training beyond cavern certification.

Once you're at the water's edge, you'll look out across the lake and wonder where down below the cave could



Aerial view of Cannonball area on Wappapello Lake. Aerial by Google Maps



The exit restriction. Photo: Chris Hill

be. It's down there somewhere, but it's not marked with anything. You just have to know. Those who dive it frequently know intuitively right where it is, but I've yet to find a way to describe how to find it accurately, and with near zero visibility lake water, visual searching is not an option. Although the first time I dove it we started at the lake shore and crawled along the bottom in the general direction the cave was supposed to be. Soon, at about 20' depth, we "fell" off an underwater cliff and landed at the bottom in 30' of water right in front of the cave entrance. While it was somewhat exciting, I don't recommend that method..

Other methods include dropping a boat anchor or just floating over the area where you think the entrance is, and simply descend and hope you're right. You descend about 30' to the bottom of the lake. The visibility in the lake is generally zero, meaning you can't read your gauges at all and by about 20' of depth there is no natural light. If you've judged correctly, you'll land in front of the



The Arch. Photo: Shannon Wallace

cave entrance, the water temp will noticeably change and the visibility will suddenly increase as well. Time to penetrate the entrance. Take your time as you enter and be watchful for the freshwater eels that are sometimes present. That may not be their proper name, but that's what they look like and what most people call them. The ones I've seen are less than 12" in length and green in color.

The entrance itself is reminiscent of the Lips at Ginnie, but with a gravel floor. It's a wide, horizontal crack just tall enough for backmount, and the flow can be strong at times. Just dig your hands in, put your feet on the ceiling, and work your way in for about 15', then the system opens up nicely. When the visibility is good, say around 50', the passage begins to look similar to Peacock in size and characteristics, with sculpted features and a silty floor,



The Bone Room. Photo: Chris Hill

but also has its share of uniqueness with multi-layered, multi-colored clay formations. Like most cave systems in Missouri, there's really only one main conduit. Cannonball is a bit unique in that it does have at least three nice jumps, which are smaller and silty, but large enough for backmount with careful technique. None are very long, with the longest probably being less than 200'.

As you proceed down the passage, you'll eventually come to a unique feature of Cannonball – the Arch. It's a very interesting formation located about 600' inbound. Continuing on at about 900' the gold line will head out over a large abyss called the Pit. An ominous feeling indeed. When the vis is less than about 30' or 40', you can't see the walls, ceiling, or floor, just the line heading out into oblivion. Soon you'll come to a vertical line heading straight down into that abyss. Until this point you've averaged about 50' in depth. Take the plunge down the vertical line and you can reach dept which will give you a good feel of the size of that huge hole. It's also fun to descend into the Pit and explore around on the vertical walls.

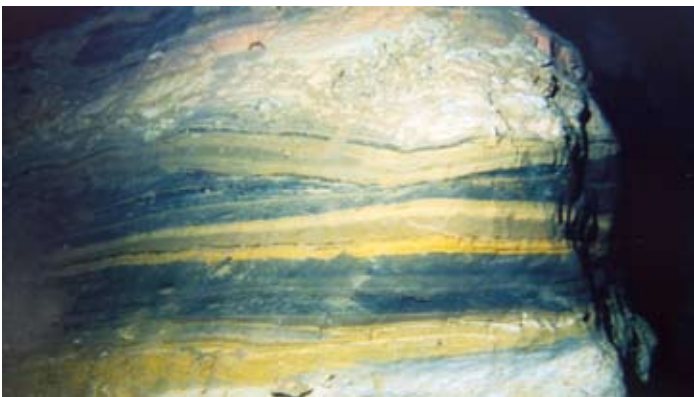


Side passage. Photo: Shannon Wallace

Back at the top of the Pit is where you'll find another jump. This leads to the Bone Room, so named because occasionally numerous dead fish have been found decaying in this area - a strange sight to behold with fuzzy carcasses all over the place. One that makes you ponder "why here?" This is my favorite side passage that leads to a small, delicately carved-out room at the end of the line. You gotta be a cave diver to love this kind of stuff – dead fish and wet rocks! This cave is a thing of beauty.

Here in the Midwest, we have four distinct seasons and our air temperatures fluctuate from over 100 degrees in summer to below zero in winter. This means that our lake water temperatures also vary from upper 80's to frozen. This makes diving Cannonball interesting at times. In the summer, you're dressing in hot air temps but preparing to dive cave temps in the 50's. Then for lengthy deco, you're hanging out in hot lake water. In the winter it's just the opposite. Just one more set of factors that make this dive unique and challenging.

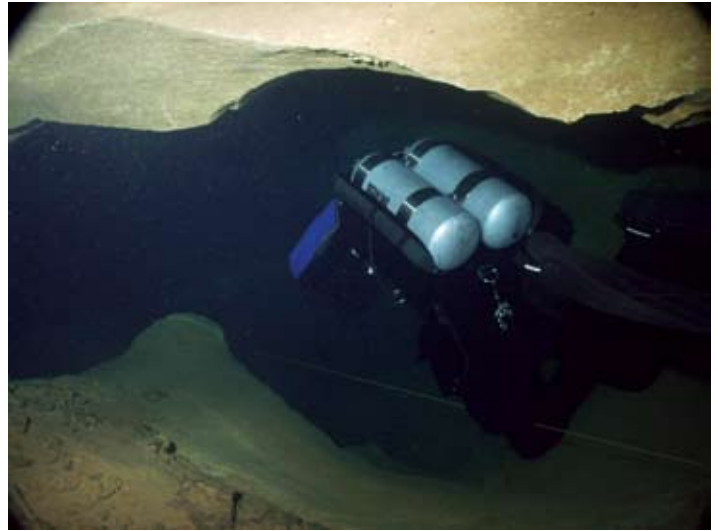
If you're ever in the area, I hope you get the chance to check out this awesome cave. Just post up on the various cave diving forums and you're sure to find someone willing



Clay formation. Photo: Doug Rorex

to take you there. Make sure to bring your camera and most of all...ENJOY!

Additional pictures of Cannonball can be viewed in the web version of the UWS at nsscds.org.



Side passage. Photo: Chris Hill

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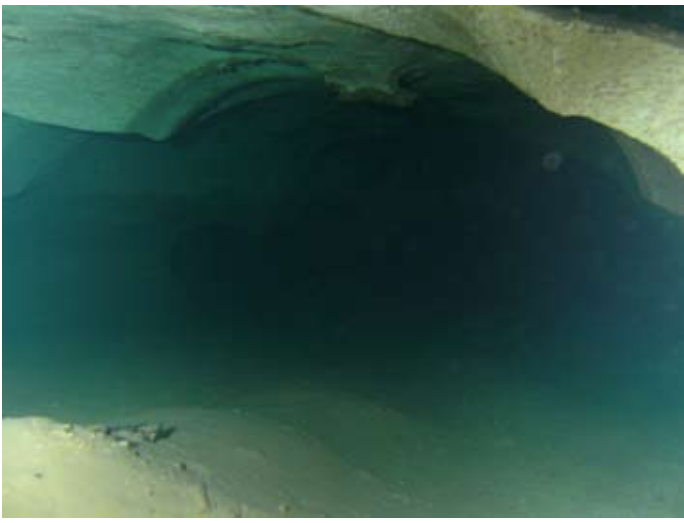
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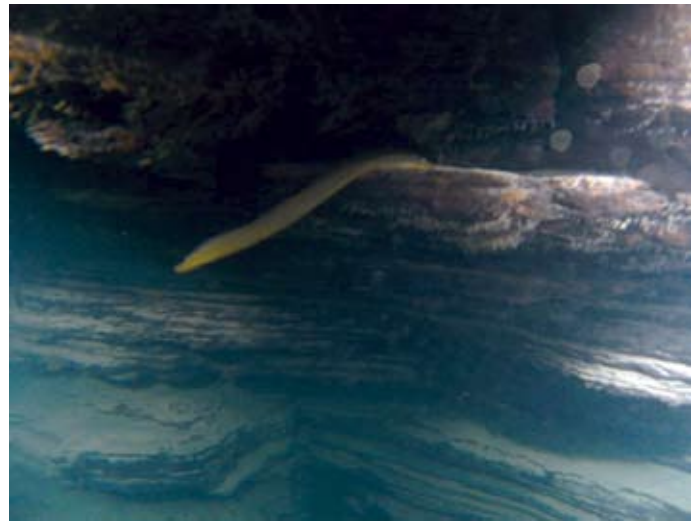
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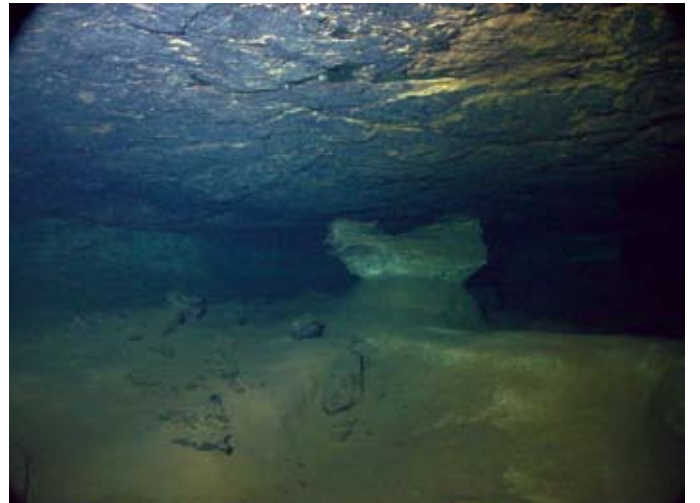
Side passage. Photo: Shannon Wallace



Fresh water eel. Photo: Shannon Wallace



Exit restriction. Photo: Chris Hill



Side passage. Photo: Chris Hill



Lake entry at the bottom of the hill. Photo: Shannon Wallace



Jump. Photo: Chris Hill

FROM THE BACK OF THE CAVE.....

A Little Cave Diving History

By: John Zumrick

The Decompression Wars

Cathedral was never a fun dive and decompression was uncomfortable. You pretty much had to hang with sixty or more feet of water underneath you, no lying on the bottom there, and you couldn't do much of anything to amuse yourself during the long decompression stops.

On one dive, Paul DeLoach and I were hanging there with blank minds trying to relax as best we could. Suddenly, I looked up and there was Sheck Exley holding a concrete block with some line tied to it. He then dropped the block and in an instant Paul started rocketing to the bottom. Sheck had tied the end to his foot. That kept us very awake during decompression afterward, because you didn't dare relax with Sheck around.

Sheck was always clowning around on decompression. His clowning got him into serious trouble with his buddies once at another location, and that is another story, the story of the "Decompression Wars".

A long time ago, in caves not so far away, there were decompression wars. As dive times increased, so did decompression times, and bored divers were looking for something to amuse themselves with during the long decos.

It was all started by Sheck; and it more or less ended with him too. He liked to covertly swim up on another diver and play a trick on them.

At first, the tricks were innocent, like snatching off a fin or two and swimming off. But then things escalated, leading to episodes like dropping cinder blocks attached to a diver or shutting off one's air or both. Things were getting very dicey.

On one particular dive, with five divers nicely spaced around a large pool relaxing, Sheck sneaked up on a diver and shut off their air. While another diver was turning back on his buddy's air, Sheck shut off that diver's air too. Things escalated to the point where all the other divers turned on Sheck, who finally chose to omit the last few minutes of his ten foot stop to avoid being drowned.

Although we all felt justified, as he started it, we also agreed that this practice was getting out of hand. So, we went to reading paperbacks during decompression and the decompression wars ended. Or so it seemed.

Later, Bill Stone, a well known dry caver, came to Sheck to learn to cave dive. He was an especially strong and aggressive dry caver and had heard the stories about the decompression wars. He tried to start one, but it didn't end well for him. In short order, he found himself without a facemask or fins, and with me on his back throttling his air. He surrendered, and that ended the last known incident of such activity, at least that I am aware of.

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The Learning Curve

CDS Training Program Adds Six New Instructors In 2012

By: **Bill Dunn**

As many know, the recent recession beginning in 2008 has hit the recreational dive industry very hard. Diver training in general, and cave diver training in particular, were not immune to this downturn in the economy. However, the CDS training program has never been about numbers of students. Our interest has been and will continue to be quality over quantity and to maintain a high level of cave diving performance from both the divers trained and our instructors.

The CDS training program has come back strong in 2012.. This year, it has been encouraging to realize that more and more students who have a real interest in caves and cave diving are seeking out the higher quality training CDS instructors provide. In addition to our instructors training more students than we have since 2008, we have also added six new CDS instructors in 2012. These six instructors have demonstrated that they provide the highest quality of cave diving instruction and that they have what it takes to be a part of the finest group of cave diving instructors anywhere. As Training Director, I am proud to welcome the following new instructors to the NSS-CDS training program:

Dr. Mel Clark – Cave Instructor #373

Mal Maloney – Cave Instructor # 374

Edd Sorenson – Cave instructor # 375

Jim McMichael – Basic Cave Instructor # 376

Andrey Chivilev – Cave Instructor # 377

Jon Bernot – Basic Cave Instructor # 378

*Photo Right : Bill Dunn, CDS Training Director
with new CDS Instructor Edd Sorenson*



*Photo Left: John Jones, CDS Training Committee
Member; New CDS Instructor Jon Bernot; Reggie
Ross, CDS Training Committee Member.*

CHAIN AT COW SPRINGS



Unauthorized access to the Cow Spring property has resulted in damage to the property and trash being left

behind. The NSS-CDS installed a chain across the opening of a dirt path used to trespass onto the property with ATVs and four-wheel vehicles. Unfortunately, persons unknown have moved the chain and a more permanent gate will need to be put in place.

Members are asked to report all unauthorized access and damage to the NSS-CDS.

UPCOMING WORKDAY AT CATHEDRAL SINK

Saturday, April 20th is the date for a CDS work day at Cathedral Sink, with clean up and minor repairs on the agenda. Volunteers are needed.

Please contact Tony Flaris at

secretary@nsscds.org

or Cheryl Doran at

uwseditor@nsscds.org

if you can help.

VOLUNTEERS NEEDED MARCH 31

Friends of O'Leno will host the 5th Annual Chili Cook-Off at O'Leno State Park on March 31, 2012.

The CDS needs a volunteer coordinator for this event, as well as volunteers to help man the booth which will provide information to the public on the CDS and safe cave diving during the day.

Please contact Forrest Wilson at vicechairman@nsscds.org if you can help.

EMAIL NOTIFICATIONS

The NSS-CDS is researching a program to send emails occasionally during the year with information that may be of interest or importance to the membership.

If you do not wish to receive these emails, or if your email needs to be updated, please contact us at replay@nsscds.org and let us know.

CART REPAIRED AT JUG HOLE

Special thanks to Don Six for donating the gear cart at Jug Hole in memory of Tim Owen.

And thanks to Forrest Wilson for replacing the broken wheel on the cart, keeping it available to everyone who dives there.



Please treat the cart with respect and don't overload it so that everyone can continue to use it.

Jug Hole will close to divers March 31st and re-open again October 1st .

EXPLORATION GRANTS AVAILABLE

The CDS parent organization, the NSS, has grants available for exploration which include underwater caves.

The NSS Sara Corrie Memorial Fund supports exploration in the United States http://www.caves.org/grants/nss_intl_exploration_home_page.htm and the NSS International Exploration Grants fund exploration internationally. http://www.caves.org/grants/nss_scorrie_home_page.htm

As members of the NSS-CDS you are eligible for these grants. For information visit these websites.

WHAT IS IT?



Can you guess these common cave diving items?

The first NSS-CDS member to name these items wins a prize.

Send your answers to:

uwseditor@nsscds.org





A-Branford

NAME THE SITE

How well do you know your caves? A prize will be awarded to the first CDS member to correctly identify these dive sites.

ANSWERS



B-Jackson Blue



C-Little River



D-Orange Grove



E-Peacock 1



**G
Cow**



F-Lafayette

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Marianna Winter Workshop

Saturday, February 23, 2013

Marianna, FL

Friday Night Social and Bonfire
February 22, 2013
at Cave Adventurers

Saturday Workshop

Registration

Speakers

Lunch

Clinics

to be held at Jackson Blue Spring

Sidemount

DPV

Rebreather

For more information and to register visit:

<http://nsscads.org/>