

Underwater Speleology

Journal of the Cave Diving Section of the National Speleological Society



INSIDE THIS ISSUE:

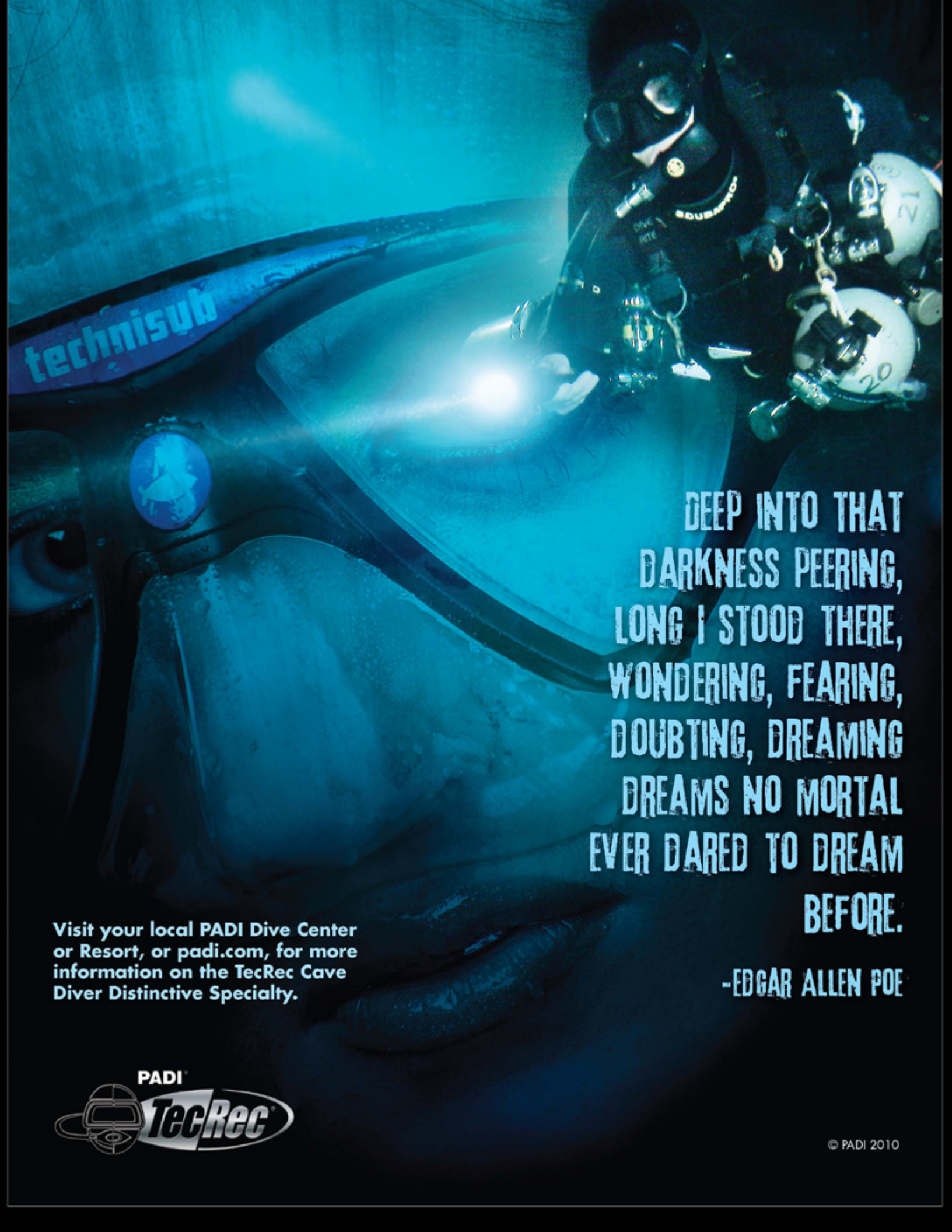
Visit With A Cave: Jug Hole

Bringing the Gold Home

**Expedition:
Dominican Republic**

**Winter Workshop at Hart
Springs**

*Volume 38 Number 4
October/November/December 2011*



DEEP INTO THAT
DARKNESS PEERING,
LONG I STOOD THERE,
WONDERING, FEARING,
DOUBTING, DREAMING
DREAMS NO MORTAL
EVER DARED TO DREAM
BEFORE.

-EDGAR ALLEN POE

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contents

Featured Articles

Bringing the Gold Home By Mat Bull	6
Expedition: Dominican Republic By Mark Wenner.....	10
Visit With a Cave: Jug Hole By James Killion and Richard Dreher.....	20
The Buoyancy of a Flooded Dry-Suit, Archimedes Law and Dolphins' Bubbles By Doron Nof.....	25

Columns

From The Chairman By Gene Melton.....	4
The Loop By Joe Citelli.....	16
Milestones By Shirley Kasser.....	23
Conservation Corner By Kelly Jessop.....	30
Skill, Tips & Techniques By Jim Wyatt.....	31
News Reel	33

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from the Chairman

gene melton



“Two things are infinite: the universe and human stupidity; and I’m not sure about the universe.” - Albert Einstein

On every dive, as in life, there are choices. We train so that we make the best choice for survival in the event of problems. In life, social rules have a bearing on the choices we make. If you choose to disobey the rules, then you have to live with the consequences. The consequences may include loss of status and respect. Choose wisely.

The registration process conversion to the NSS is nearly complete. The online registration is working but there are still issues with the NSS website. Currently there is no paper registration for CDS members on the NSS website. The paper registration form can be downloaded from the CDS website: http://www.nsscds.org/test/drupal/files/forms/join_cds.pdf Online registration is located on the NSS website: <http://caves.org/info/membertypes.shtml> Select either Join or Renewing. The CDS registration part is about three quarters of the way down the page. Hopefully the NSS webmaster will provide clearer information, making it easier for prospective or current CDS members to identify the registration process. There are still some membership expiration date issues being resolved. By the time you read this there will be a updated link to check your membership status on the CDS website. Your name and membership expiration date will be listed. The single date will apply to both the NSS and CDS. Please verify that your expiration date is correct.

We are moving forward, sharing a social in October and hosting a Hart Springs Social in January of next year. The Hart Springs Social will be offering dives (guided) for people who have not achieved their Abe Davis yet. More people will be able to enjoy this spring and see why they should work towards their Abe Davis. If you are planning on diving at Hart, be sure your DAN insurance is current. They will not let you dive if it is not.

There is a Vertical Rope Clinic on Oct.29th focusing on single rope training, using ropes to get into caves with vertical entrances or pits. See the News Reel on page 30 for more information. Anyone with vertical equipment/training is welcome to come and help. See you there.

Volunteers have stepped up in the last year to help out and more are needed to keep us moving forward.

We have a Chairman, Robert (Bobby) Franklin for the 2012 Workshop which will be held at Live Oak High School. The theme is ‘What If...’.

James Garrett is our new webmaster. He is in the process of updating the CDS website with more information. The website is changing to a new host which provides 20 times the storage space for less money. Expect changes which we hope you will like.

Cooler weather will mean more divers going cave diving. Introduce yourself to someone you don’t know.

The Midwest Workshop will be history by the time you read this. I will report in the next Chairman’s Column.

I have nothing new to report on the pending litigation other than depositions will be taken over the next few months.

Dive safely,

Gene

Reading isn't good for a ballplayer. Not good for his eyes. If my eyes went bad even a little bit I couldn't hit home runs. So I gave up reading. ~Babe Ruth

Gotta love the Sultan of Swing. With the baseball season winding down and much of the northern hemisphere beginning to hunker in for the cold winter months, minds turn to the warm water caves.

I on the other hand am planning my month long excursion north to dive New Jersey wrecks. Blasphemy coming from a cave diving editor, I know, but it is where my diving story began.

And while we huddle in the boat cabin warming up, I will field questions from my fellow divers. "Are there any lobsters in those caves?" "Any fish?" "Is there anything to see besides wet rocks?" Are we seeing a common notion forming here?

I have things to tell them, pictures to show and stories to tell. Syphons and silt, chimneys and cracks, troglobites and alligators, speleotherms and fossils, warm water, thermoclines and haloclines, riding the flow like a roller coaster or being spit out of a cave like a pea shooter into the crystal clear water. Wonders and wonderous.



Jackson Paul

And speaking of wonders..... our advertising manager, Justin DeMone has been busy. His new little diver, Jackson Paul was born on August 14th. And Mike and Sandy Poucher added their future back mounter, Ethan Charles on August 18th. Congratulations!



Ethan Charles

And finally, with the holiday season fast approaching.....whatever holiday you might celebrate, may it be wonderous. Mine is Christmas and so I wish everyone the best this holiday has to offer...a Merry Christmas and Happy Healthy New Year.

Dive Safe,

Cheryl

Bringing the Gold Home

By Mat Bull



Gold line and signs for the project

All Photographs by Mat Bull

The Leon Sinks-Wakulla Springs cave system has long been one of those caves that most divers hear about, but never get a chance to enjoy themselves.

One of the biggest reasons for this is the inaccessibility of most of the system. A lot of the sinks, as well as Wakulla Spring, are on Edward Ball Wakulla Spring State Park property; and they do not allow the public to simply dive them on leisurely terms, with Emerald Sink being the exception (after many hoops are jumped and criteria are met). Much of the system and its sinks are located on private property, which can be difficult to obtain access to due to the lasting stigma of diver deaths (many of them OW) in the past; as well as tainted diver-landowner relations. For years, one of the last truly open stretches of sinks in this cave system (the Leon Sinks cave system side) were available and open to the public via National Forest Lands. Federal grounds had previously only denied diver access to the Leon Sinks Geological Park (Big Dismal, Little Dismal, etc.), but had no such rulings on the rest of its lands. Getting to these sinks could be a chore, as the nearest parking access was around a mile away - a bit of a haul when you're toting a hundred pounds of gear.

Enter the Wakulla County Dive Club (<http://www.wakullacountydiveclub.com>). The WCDC has been working on accessing and improving access to dive

sites in Wakulla County, as well as other sites in the immediate area. Through the club, access can be made into federal lands much closer to the stretch of sinks between Promise Sink and Woods Sink via an adjacent, private land owner. A walk of a few hundred feet is far more reasonable to a fun day of diving than a mile plus trek through mostly unimproved and ill maintained trail and service road. WCDC has installed gold line, generously donated by the NSS-CDS and NACD, as well as cave safety signs at several area caves such as Harvey's Sink and Gopher Sink, both located on private property. They have built stairs at Guy Revell Sink and have cleared trails and improved sink access at the Leon Sinks as well.

The WCDC had long planned to install gold line to replace the aging and stained survey line that spanned from Promise to Clear Cut Sink. This section of cave is relatively shallow and well within recreational limits. The cave, for the most part, is very black and so was the line. Keeping an eye on the guideline could be quite tricky - especially while staying away from the fragile, pitch black walls which would swallow your light and crumble at any mistaken contact. Favorable dive conditions in the Leon Sink area are intermittent at best; due to the many sinkholes that allow surface waters to enter the system, as well as flood waters from nearby creeks. A couple weeks worth of diving this system usually follows several months of non-divable conditions. The windows are short; you can count of dark water coming shortly after conditions improve enough to dive.

While the WCDC had a few hundred meters of gold line, it was difficult to



Old survey line removed from caves



Assembling gear for a dive

2011 changed those short dive windows. This year, in particular, conditions have been more favorable than flooded; something unheard of in this area over the last decade. It was decided that this was the time to get this project finished up. The gold line and signs had already been donated to the WCDC by the NSS-CDS and NACD, along with gold line donated by Gregg Stanton (Safety Officer for area caves) and John Kimberl. The club had a huge head start on replacing the survey line along these shallow sinks and ended up just shy of our goal at Clear Cut Sink. Luckily the NSS-CDS donated another 200 meters of line to finish the project, as well as another sign. Gregg Stanton also donated the breathing gas for all working dives during this project from his dive shop, Wakulla Dive Center. We typically did two working dives a week during the project in teams of two and three in order to run the new gold line and clean up the old survey line. The end result proved worthwhile; the gold line stands out against the dark walls compared to the tattered old survey line that had previously run through the system and will prove to be much more robust to flooding and the flow that comes along with it.

This a beautiful section of cave with several thousand feet of passage in depths shallower than 110 feet and averaging just half that mark. There is something in this cave for everyone. It's adorned with huge goethite formations and black mineral line walls in the shallowest sections; as it gets deeper, huge wakulla power cave takes hold of you and the cave brightens up with pure white scalloped walls. There are sections of swiss cheese

get a window long enough to familiarize divers in the system and get the project underway. The drought carrying through 2010 -



scraggly limestone and a few jumps and circuits available for even more exploration potential. Life is very prevalent here; huge cave crawfish and an assortment of other troglotic life can be observed. The ever present catfish silt up the bottom on occasion as well as the less common American Eel. The basins provide a home for the normal fresh water fish like bass, bream, and crappie; as well as glass shrimp and various amphibians and reptiles. Even a naked hippy can be observed on not-so-rare occasions, for better or worse (usually the latter).

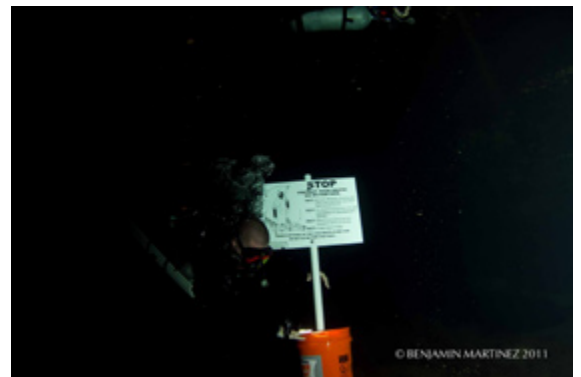
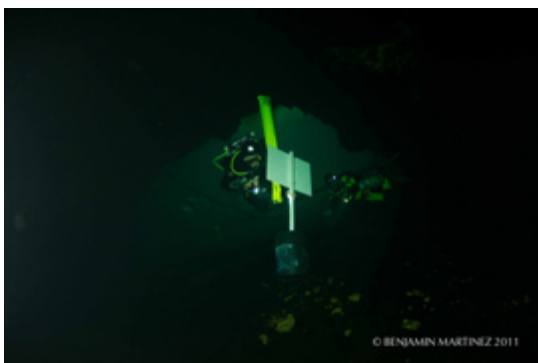
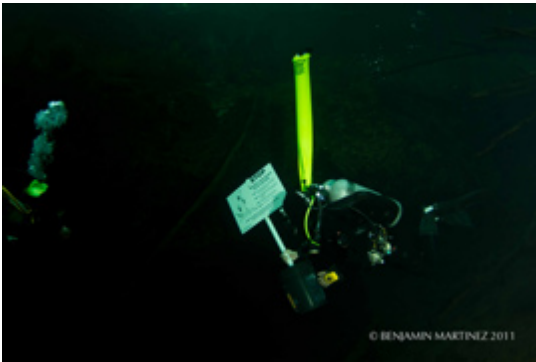
A continuous line now runs from the upstream side of Promise Sink, starting in OW, and runs through Go Between, Fern, and Cream, then skirting the cavern zone of Woods. On through Trench, skirting the cavern zone of Venture and up the chimney of Clear Cut where the line runs back into OW and is tied off to the dilapidated dive platform in the basin. There are signs on the upstream and downstream sides of Cream Sink, where the most functional set of steps can be found. Steps at Go Between and Woods have rotted and broken away; and the steps at Promise are fairly rotted and shouldn't be trusted to hold too much weight.

Unfortunately, despite the water conditions, safety considerations and the cave itself being the best it could potentially be within the last several years; the US Forest Service has posted "No Scuba Diving" signage at this stretch of sinks. Policy has changed in order to protect liability. The Wakulla County Dive Club is looking into what it will take to get this Federal property reopened to recreational diving. When the time comes, we hope to have the NSS-CDS provide more advice and assistance from the experience they have garnered in land-owner relations over the years.

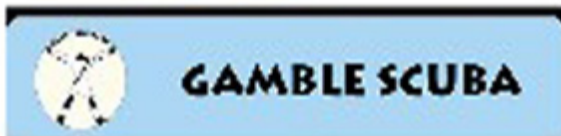
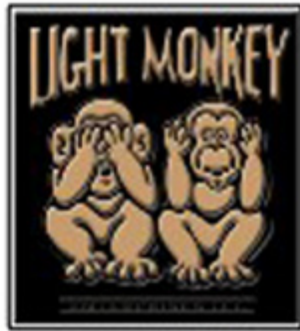
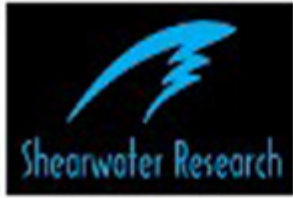


Steps not to be trusted

More Pictures From the Field



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Expedition: Dominican Republic

By Mark Wenner



Dos Amigos

Photograph: Thomas Riffaud

How many times in your life have you received an offer to take an unforgettable journey into the far reaches of the earth to make new discoveries? A trip to the moon would have been no more interesting or exciting to us than this excursion, as we slowly descended our rope into a super huge sink hole, known only to the locals, deep in the jungle. Or when we repeatedly swapped out regulators to penetrate a mile of newly discovered underwater passage so intense and beautiful, it could change your life forever.

I've been blessed with good fortune since 1993, which seemed to be the official start of my sump diving and dry cave education. Marbry Hardin called and invited me to come along and help on the first Windy River Cave push, and this experience started a long list of opportunities. All you have to do is be willing to show up, trip after trip, year after year, take the abuse and learn what you can from the masters. That's all I did, and here I am.

It was late in June, 2010 when I received an email from Forrest Wilson, which featured a video clip forwarded from Philip Lehman, our Dominican Republic Speleological Society (DRSS) contact. I proceeded to hit the “play” button and was immediately spellbound by a helicopter’s shadow circling a huge water filled sinkhole cut deep into the terrain below. “Man I wonder what Forrest has up his sleeve now?”

Having just returned from a trip to the Yucatan, the offer to go explore the Dominican was still more than I could refuse. My wife tried to talk some sense into me, but as she spoke, my blank stare indicated “cave fever”. Forrest, our world traveler who just returned from diving Abaco and was scheduled to leave for Australia later in the summer, was obviously rigged for fun. The stage was being set for another trip, but the flip side of that was the need to ignore life’s responsibilities!

In researching the Dominican Republic, part of the Greater Antilles archipelago, one will discover that the island is shared with Haiti, covering 18,704 miles, with a population of an estimated 10 million people. With French and Haitian interludes, the Spanish spoken there is a bit difficult to understand. The economy is largely made up of sugar cane production and advances in telecommunications. Music is of high importance, with merengue being the national song and dance and baseball it’s sport.

There was a need for sump divers having dry caving and climbing experience for this project and our goals were specifically; to take on the series of sink holes that Philip had located from the air, to dive and continue exploration work the DRSS is now maintaining, and to continue survey. With our working time frame of seven days, logic will tell you there’s too much to do in such a short period of time.

It is one thing to prepare for cave diving in another country, but it’s quite another to pack bags for dry caving, climbing, survey work and cave diving. The gear kept hitting the floor and I looked over at my pack as it began to grow. 70 meters of rope, thousands of feet of knotted line, helmets, cave boots, harnesses and climbing hardware. I’m not sure how we managed to get 4 bags over there, and keep under the airline weight restrictions. Wheels on my dive bag would have certainly helped!

August 27th - I arrived at Forrest’s home at 10pm, having pushed myself to the wall in an attempt to close business in Nashville before leaving. In an effort to eliminate weight and duplicate thinking, we moved a few things around to even out the load. Picture us standing in the driveway, in the dark, on a bathroom scale, with our LED headlamps illuminating the scales’ display. By the time we got to bed, it was obvious our morning wakeup call at 4am was going to hurt.



DRSS dive Team: Mark Wenner, Philip Lehman, Forrest Wilson, Cristian Pittaro Photograph: Thomas Riffaud

August 28th – 4am and no coffee at Wilson’s house! I’ll have to make it to the airport, somehow. We shuffled through the airport, hoping to find a crazy enough porter to except our fully loaded bags. Luckily, there were no delays and we landed in Santa Domingo on time. Philip Lehman and Thomas Riffaud greeted us in a sporty, 4-wheel drive truck that we quickly and completely packed

with gear and we proceeded to hit the road running.

Our destination was a quiet ocean front town called Bayahibe, where our hotel by the same name is located. We stopped in La Romana, to exchange money, have dinner and to meet up with Cristian Pittaro, who would complete the “DRSS Dive Team”. Six solid days of nonstop, whirl wind caving! I was bone tired, and expressing the need for a day to unwind, and was voted out, instantly!

August 29th – It’s amazing what a little sleep did for us to refresh our attitude, and excitement was truly in the air. The hotel was very comfortable as a staging point for our efforts, with a breakfast area on a second story patio looking out over the ocean, sun beaming in on our seating. The team was once more briefed on the day’s plans, and after finishing our food, it was time to roll, the



Forrest at Sink #1t
Photograph: Thomas Riffaud

waiting was finally over and the trip had truly begun.

Forrest and Cristian were driving in one vehicle, and I rode with Philip and Thomas. We left town, turning onto road after road, and soon found ourselves driving off road through huge, healthy looking sugar cane fields. 50 pesos would get you some sugar cane to chew, and I figured I needed anything I could get. The scenery was beautifully remote and the characters and shacks, (which were homes) we'd pass reflected ultimate simplicity. As the road ended we had reached the first destination, a farm which seemed to be a gathering place for the local farmers of that region. As we poured out of the vehicles, throngs of people, most of them sporting rather nice looking machetes, immediately surrounded us. I would have brought my own, had I known, but customs had enough trouble with our lights and batteries. I could only liken this "trust me" moment, to watching Tarzan movies when I was a kid, and meeting the entire village, in one intense minute.

Philip, Thomas and Cristian had been to this farm, and similar others, before and knew the drill well. I listened, but did not understand the conversation with it's interesting blend of French and Spanish. "Oui" instead of "si" was the response to our requests for help, so I knew the rental of horses and sherpas was well underway. 10 horses and 20 sherpas seemed to be a bit of overkill, but everyone seemed really curious about what we were up to.

It was now time to make the long and rather arduous 4.5K ride to the sink hole location. Philip, who had recently had knee surgery, was going to stay behind in camp and entertain those who also remained. The path we took was well worn, rugged, hot and a bit overwhelming; but we managed to shoot video and still photos of our journey

while our porters would smack the rear end of the slowest horse with a branch or the flat of their machete with a crack. Laughter permeated most of every moment.

Before long, we found ourselves at that very location we had seen in the original aerial video footage. We dismounted our horses and followed the lead weed whacker to the edge of the sink and peered out over at a huge sight. The goal now would be to find a good location to rig our rope, drop down into the pit and have a go at pushing the lead. As we discussed various approaches we might take, I heard one of the locals tell Cristian that all the large leaf plants at the bottom of the sink were poisonous! I looked at Forrest. "What?"

Forrest made quick work of securing the rope and had all his gear on in typical quick fashion; and his rappel found him busting smoothly through the first couple branches of the tree line, delicately pushing a hole in the drop area. Then came the two 40 cu/ft aluminum tanks and me following, dropping into the water next to Forrest. "No problem man". The water was warm, tinted tranquil green, and begging for exploration.

Forrest was lead diver on this sink. He reeled out and made quick work of it; popping in and out of various areas in the wall face, looking for a good entrance, while I tried looking for any water movement. Finally, he disappeared for more than a minute and I concentrated on running the video camera, accidentally dropping my still camera in the water while trying to save the video camera. "OK that camera's history".

I'd see exhaust bubbles from time to time, but no diver, so I knew he was getting as much out of the dive as possible; considering what it took to reach this place! He surfaced with the look of disappointment that I've seen a few times



Drop point
Photograph: Mark Wenner

over the years. Progress seemed to wall off in massive amounts of breakdown everywhere he went. "Let's call it....."

We sent the tanks up the line first, then I ascended, then Forrest. I had noticed how the branches of the trees were heavily lined with small hornet nests, which were agitated by the rope work, and tried to usher Forrest through the tree canopy with no real success as he suffered two stings during his return climb. We were safe and sound, and still having more fun that you can imagine.

The return trip to camp was a mix of relief, and frustration for us all. The help and support we received from Cristian, Thomas and the porters was invaluable and we would have been lost without it. Knowing the vegetation, animals and the jungle is critical in these situations, and this was a strong reminder of our dependence on "a team" effort.

Once we returned, the negotiations for payment began. It was very interesting and the personalities and quips were flying. Obviously, Philip knew how to stand his ground with any situation. His eyes were focused and his tongue sharp. We were going to return the next day and continue our efforts in the same general area, needing the same type of service from the locals. Philip said he could "buy his own horse" for these prices and the discussion continued for a while until they reached an agreement. We had a long drive to the hotel ahead of us, so it was time to get back on the road.

August 30th – The warning of an approaching hurricane greeted us this morning, as the palm trees and atmosphere told you all you needed to know. It looked as though the storm was going to brush the Dominican's northern coast, headed for Cuba. We'd take our chances on being able to duplicate our previous day while looking for the other sinkholes, but the window of opportunity was already closing.

We were using fewer people to help us today and some of the horses were replaced with donkeys. We were familiar with the ride, but it seemed a bit longer with stiff muscles from the day before! We were making more transitions

through farmers gated pig and cattle corals, with our porters negotiated with each property owner, opening our approach to each sinkhole. Cristian was looking for a specific sinkhole, and when we arrived, we once again peered down into a huge sinkhole with standing water at its' base. This one was deeper and larger than the day before, and seemed a bit ominous. Looking out over the sink into the sun, one of the helpers said something to Thomas and Cristian and Cristian interpreted. "Bees!" Either way, I was willing to rappel, but Forrest had already called the dive. Obviously, there was good reason to move quickly to other sinkholes with the approaching storm.

As we circled around and started back to the farm, the bottom let out of the rain clouds, typical of tropical a storm as it descended on us. The drenching felt like relief as we cooled down instantly. Once again, we settled up with our support and hurried back on muddy roads, to our base camp at Hotel Bayahibe.



*Thomas Riffaud on camera
Photograph: Forrest Wilson*

Aug. 31st – This was our day to relax a bit after reaching our limits on day 1 and 2. The decision is made to dive La Jeringa and Padre Nuestro, two nearby water filled caves in the Del Este National Park. The water in these caves is harvested for local drinking water by nicely maintained pump stations located inside the park. Forrest and I dove La Jeringa, with Christian leading, and were instantly impressed by how effortlessly he moved

through the system with his harness well rigged for this type of cave. I surfaced calling it "Velcro Cave", as it snagged most everything I was wearing.

They are both beautiful caves and worthy of a dive!

September 1st – El Toro - Our second day of pleasure diving was had at El Toro. Please go to the DRSS website and look at the photos, they will say more to you than I can here. Luckily we had the DRSS team showing us around, and this particular cave was amazing. As we suited up for the dive, a herd of long horned cattle walked through our camp and disrupted all progress. There's no way to explain it other than, "El Toro!"

Cont. page 26



Mark Wenner exiting El Toro
Photograph: Thomas Riffaud

We hopped over a barbed wire fence with our help carrying eleven 80 cu/ft aluminum tanks. Thomas was going to lead us in through the caves initial thick halocline layer, then past a white out condition caused by a rock formation we had to swim under, and onto clear water before continuing on to find a lead the DRSS had seen on earlier dives. Waving good bye, and with perfect form, he disappeared, leaving us in an abyss. This cave was huge, and the breakdown was unlike anything I had ever seen. I was instantly in a daze. No one was really leading on this dive and we would return swimming side by side, occasionally looking at each other in amazement. After reaching the 5000 foot marker, the cave just kept going, and so did the line. At this point, I'm sure Forrest was thinking what I was, "These DRSS guys are diving like madmen, and running tons of well placed line."

I reached turn pressure in my last remaining bottle and slow motioned the turn with my finger. We had reached the two hour point in the dive, with the same time and distance remaining to surface. On exiting the system, the degree of what we had done was starting to settle in. We surfaced without incident, sharing our two mile wide smiles with the crew.

Thank you guys!

September 2nd – Cristian wanted to survey an area at the end of a cave named El Chicho, also part of the Padre Nuestro National Park where we dove on August 31st. We didn't need a good excuse to get wet and headed to the park after breakfast. Thomas was taking video footage, Cristian ran a knotted line out ahead of us, I was "on book" and Forrest was on vacation! 10 stations later, we were ready for another relaxing lunch in Bayahibe.

September 3rd – This was to be our last journey to the farm encampment location with the sinkholes. There was a dry cave close to our departure point, and our efforts today were going to focus on seeing what was at the bottom of that. As we climbed down, we came onto large piles of pottery shards, artifacts and rum bottles; which were promptly collected and given to the DRSS team to hand over to the local authorities. This cave lead was to be my dive and I climbed into the water, with mask in hand, and looked around a bit, making my way to the rear of another dome room filled with thousands of bats. The guano was deep and finding anything there was useless. "Did it go?" Forrest said with a smile. I returned with a volley of laughter. "No go in Rum Cave...., let's get out of here".

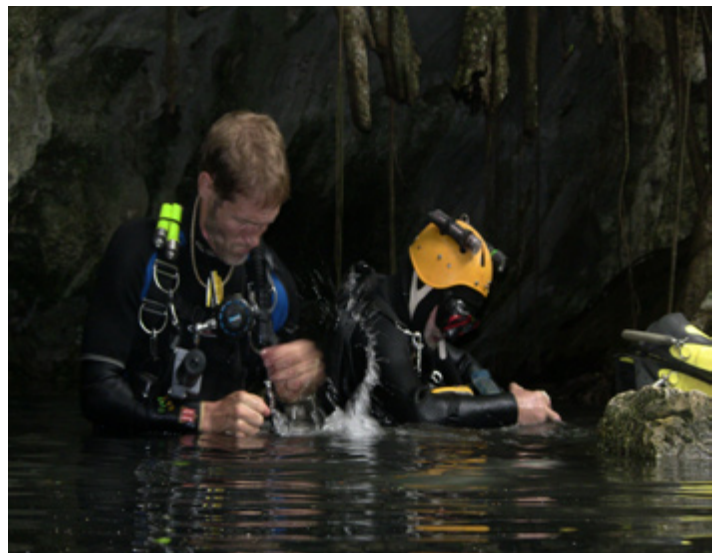
We sat at dinner on the beach that night, laughing and joking about all the great times we had during our stay, As they suggested a return trip to do more of the same, they looked at us oddly as we invited them visit us....to explore muddy, cold, low visibility caves, which seem to be our specialty.

How can we possibly thank these great guys, Philip, Thomas and Cristian for sharing some of their special places with us and allowing us to be the first ones down in their "super sinkhole".

Rumor has it Cuba is next!

Note: I would like to thank the people who took me beyond my certifications, and opened the doors to experience.

Mark Wenner



Padre Nuestro
Photograph: Thomas Riffaud

A Few More Shots From the Field



*Forrest on Rope
Photograph: Thomas Riffaud*



*This was tough work
Photograph: Thomas Riffaud*



*Mark Wenner on rope
Photograph: Thomas Riffaud*



*Photograph: Mark Wenner
Caribbean Sunset*

The Loop

By Joe Citelli

Cave Diving and CCR's: A Different Perspective On ppO₂'s

Disclaimer: The opinions expressed in this article are solely those of the author and are not necessarily those of the CDS or any other training agency.

Most CCR (Closed Circuit Rebreather) instruction teaches the student to use a setpoint ppO₂ of 1.2 or 1.3 for the bottom, or working portion of a dive, and to raise it during decompression or safety stops. For those not familiar with CCR terminology, a setpoint is the level of partial pressure of oxygen (ppO₂) the rebreather unit is set to maintain throughout the dive. This article will question that mantra and offer an opinion that differs from conventional thought on this.

The concept of diving a high ppO₂ stems from the premise that higher ppO₂'s lessen decompression obligations. This is an indisputable fact that has been proven over the years; so, using a high setpoint sounds like a good idea, right? Well, maybe not so.

Everything Good Comes With A Price

Pulmonary oxygen toxicity (the Lorrain Smith effect) and ocular oxygen toxicity (hyperoxic myopia) become real issues when diving CCRs. Courtesy of CCR's gas extending capabilities, formerly unheard of bottom times have become possible. Because ppO₂'s remain constant throughout the dive, (and never drop on ascent as they do on open circuit), the resulting decrease in nitrogen absorption (exposure) and increase in oxygen exposure makes it necessary to consider pulmonary and ocular toxicity issues. When diving open circuit most divers only concern themselves with CNS (Central Nervous System) toxicity (Paul Bert effect) and ignore the tracking of OTU's (Oxygen Tolerance Units, the standard used for tracking pulmonary oxygen toxicity) unless diving nonstop for long periods of time. Even then, rather than track OTU's, most divers would

simply wait until they felt the beginnings of a cough or chest pain upon inhalation and then take a day off from diving to recuperate.

Pulmonary oxygen toxicity occurs when high percent of oxygen mixtures are breathed for long periods of time. Oxygen, a lung irritant when in high concentrations, ultimately produces a nasty cough and painful breathing. Often victims will instinctively begin taking shallow breaths to avoid the pain.

Prolonged exposure to high oxygen concentrations causes oxidative damage to cell membranes, the collapse of some alveoli in the lungs and sometimes, seizures. Any irritation or collapse of the alveoli will inhibit gas exchange in the lungs and possibly compromise decompression efficiency. Additionally, collapsed alveoli can provide a transpulmonary shunt and allow arterializations of venous gas emboli (bubbles), perhaps even more readily than a PFO* can. This means inert gas bypasses the lung filtering mechanism and returns unfiltered to the heart. This phenomenon and was first demonstrated in high altitude pilots in the 1950's who were breathing pure oxygen for hours at a time.¹

Ocular oxygen toxicity or hyperoxic myopia has been known to occur in both closed circuit rebreather divers with prolonged exposures and those undergoing repeated hyperbaric oxygen therapies. Note the following abstract²:

Butler FK Jr, White E, Twa M

Naval Special Warfare Command, Detachment Pensacola, Florida, USA.

Abstract

A myopic shift occurred in a closed-circuit mixed-gas scuba diver using a 1.3 atm abs constant partial pressure of oxygen in a nitrogen-oxygen mix. This change was noticed after approximately 18 days of diving with a mean dive time of 4.04 h each day. The observed myopic shift was due to hyperoxic myopia, one sign of lenticular oxygen toxicity, and resolved over a 1 mo. period after diving was completed. On a subsequent drive trip, a myopic shift was found in both the index diver as well as two other divers breathing the same gasmix on similar profiles. Diving communities should be aware of the risk of both lenticular and pulmonary oxygen toxicity when conducting intensive diving at oxygen partial pressures in the 1.3-1.6 atm abs range.

While the above is an extreme case and the ailment is usually reversible, anything affecting ones eyesight is not to be taken lightly. It has been documented in the hyperbaric treatment literature that this myopic shift (nearsightedness) does not always resolve itself.

Oxygen Metabolism and Production of Free Radicals (Toxic Metabolites)

At ambient partial pressures, most of inspired oxygen is reduced to water, but a small percentage of it becomes toxic metabolites or “free radicals”. These are the same free radicals we hear about when health foods, supplements and vitamins are promoted. While a part of the living condition, they are not a good part of it and we should try to avoid doing things which cause their creation. (Free radicals have a high affinity for the electrons of surrounding molecules and cause oxidative damage to them which may ultimately lead to cellular damage or even cancers.) Fortunately, our bodies have built in defense systems to deal with free radicals when at normal partial pressures. However, when breathing high ppO₂'s the body's defense systems can become overwhelmed by the increased numbers of O₂ generated free radicals and lead to cellular injury. Free radicals can also cause breaks in DNA and disrupt enzyme systems designed for the repair or replication of DNA.

In laymen's terms, none of this can be a good thing and while I am not suggesting that a high ppO₂ for a given dive will cause you problems, I might compare it to smoking one cigarette. It won't kill you but smoking cigarettes at regular intervals over a long period of time will probably do some damage to you. Why chance it?

PPO₂ and Calibration

One of the first skills a new rebreather diver learns is how to calibrate his unit. Calibration means that the rebreather is electronically adjusted to accurately interpret its oxygen sensors. An oxygen sensor is nothing more than a fuel cell that emits an electric current in a linear fashion when in the presence of oxygen. Some units will use a single point calibration while others use a dual point calibration, dual meaning that the unit is calibrated using data from cell output when in ambient air and when in pure or high FO₂ (fraction of oxygen) gas rather than using only one gas. Over time, oxygen sensors (cells) burn their fuel and emit progressively lower voltages even though they are measuring the same gas, hence the need for calibration. Sensors can also become current limited, a condition in which the sensor has consumed itself such that it can emit voltages only to a given point, no matter how high the partial pressure of oxygen. The danger here is that a current limited sensor will continue to display a voltage or ppO₂ indicative of an oxygen percentage lower than it actually is, increasing the diver's risk of hyperoxia (a ppO₂ considered too high and potentially toxic).

Once calibrated, the unit can be reasonably relied upon to give accurate readings within the parameters of its calibration. If you calibrated your unit properly and you flush (flood) your breathing loop on the surface with pure O₂ and get a ppO₂ of 1.0 (the partial pressure of pure oxygen at one ATA – Atmosphere Absolute or 14.7 psi) you know for certain that its sensors will display accurate values up to a ppO₂ of 1.0. Any ppO₂ display beyond 1.0 is a mathematical extrapolation calculated by using the sensors emitted millivolts in pure oxygen and multiplying that number by the percentage increase in pressure from depth. In other words, a ppO₂ of 1.0 on the surface should become a ppO₂ of 2.0 at a depth of 33 feet or two ATA.

Are You A Gambler? (Sometimes Being A Cynic Helps Keep You Alive)

This method of calibration (on the surface at ambient pressure – 1 ATA - only) does not and cannot account for current limited sensors. If a given sensor is reading 1.01 or higher, that display is an extrapolated calculation, in other words, a mathematical guess at your breathing gas mixture. This surface calibration limitation is one of the reasons three sensors and voting logic circuits are incorporated into the design of eCCR's (electronic CCR).

Continued on page 14

Continued from page 13

A voting logic circuit is one which compares the readings of the three sensors, and if there is a discrepancy it chooses the average of the two sensors closest to each other. In theory this is fine, but it does not preclude the possibility of two incorrect sensors voting out the one correct sensor and your displayed 1.3 ppO₂, in reality, being much higher or lower. Of course, none of this is to suggest that an error such as this is common place. It is not, but it does happen and is believed to have caused fatalities in the past. As we all know, errors which rarely occur are far more dangerous than those which are common place because you don't expect them.

Armed with this knowledge one must question the wisdom of planning to dive a rebreather outside its parameters of calibration. When diving a ppO₂ of 1.0 or less you know for sure your unit's cells were properly calibrated to that number. The probability of multiple cells significantly failing within their range of calibration for a given dive is at worst minimal. More importantly, such a failure is much easier to spot. It also precludes the possibility of calibrating a cell that is current limited for its intended use because as we already stated, a cell might be calibrated to 1.0 and be current limited at 1.01.

It's All About The Odds Or Lucky 13

Consider a dive for 60 minutes at 100 feet using a setpoint of 1.3 and reconsider that same dive using a setpoint of 1.0, both dives using air as a diluent (the gas with which the unit mixes oxygen to obtain the desired ppO₂). A setpoint

of 1.0 yields a runtime of 88 minutes while a setpoint of 1.3 yields a runtime of 75 minutes. For a net difference of 13 minutes, considering that if even half of all the previously stated is true and accurate, thirteen minutes is a small price to pay to swing the odds in your favor. One of the reasons we dive a rebreather is to minimize, if not remove, the time constraint open circuit diving imposes upon us. Why not use that feature to its fullest advantage and minimize any added risk a rebreather may impose courtesy of its nature?

* *Patent Foramen Ovale - a defect in the septum (wall) between the two upper (atrial) chambers of the heart. Specifically, an incomplete closure of the atrial septum that results in the creation of a flap or a valve-like opening in the atrial septal wall.*

1. Bennett PB, Michaelson R, Moon R, Butler FK, eds: *Best Practice Guidelines for Prevention and Effective Treatment of Decompression Illness. DCS - AGE Workshop Proceedings; Part 1; 2010*

2. *The Journal of The Undersea and Hyperbaric Medical Society, Inc. 1999 Spring; 26(1):41-5*

The author would like to thank the following Medical Professionals whose input was invaluable in the writing of this article:

Kelly Harrington, Pharm. D., Richard Walker III, MD and Gene Hobbs, CHT of The Rubicon Foundation, home of the Rubicon Research Repository

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Cave Entrance

Blue Hole, also known as Jug Hole, is a beautiful sidemount cave located in Ichetucknee Springs State Park, open to certified cave divers from October through March. The cave itself is relatively small (550 feet of penetration); however, it boasts some of the most beautiful passage in North Central Florida.

The dive begins with a 40-foot descent from open water, into the cavern entrance. On sunny days, light rays dance through the water creating a fantastic visual experience in the entrance chamber.



Entrance Chamber

The cave begins at the end of the light zone in the Blue Room and immediately presents divers with the first of two sidemount restrictions. Just beyond the horizontal bedding plane the cave opens into a large room (the Gray Room) with a sand and clay floor. Next, the cave passage funnels into a tight area with sand that sparkles in the light, hence the name Diamond Sand Restriction.

Beyond this point, the cave remains relatively large until the line and the cave terminate.



Horizontal Bedding Plane

Jug Hole

Photos by James Killion
Text by Richard Dreher

The walls and ceiling are mostly black in color and the floor transitions between clay and sand. There is moderate to heavy water flow throughout the system.

Jug Hole has one jump that leads to an impossibly small bedding plane. The line disappears through a tiny opening which marks the end of the road for most cave divers. The Loft Room is located on the main line just beyond the jump and is a personal favorite. Atop the large clay hill in the middle of the room, close inspection reveals hundreds of tiny bones from catfish that fell prey to the hungry resident eel.

Jug Hole is a truly magical place that deserves the utmost respect. Dangling gear, improper trim and poor buoyancy can lead to irreversible damage. Be sure that your skills are up to speed and your configuration is clean before venturing into this system.



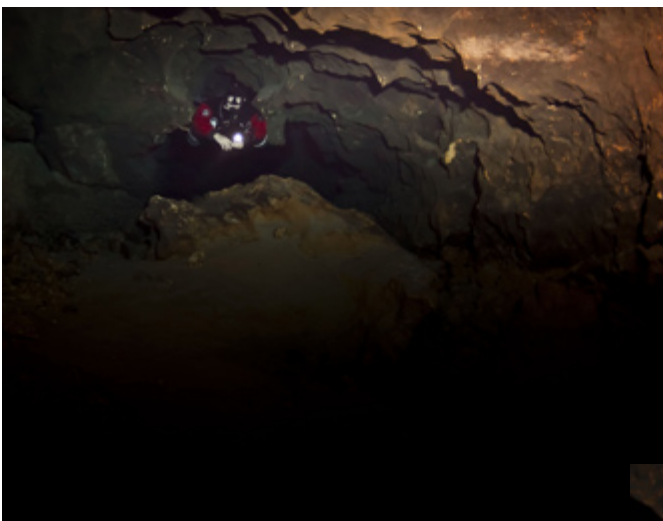
Blue Room



Line And Cave Terminate



Cave Passage



All Photos by James Killion

Right: Diamond Sand Restriction

Cave Diving Milestones

By Shirley Kasser

Sandy Robinson recently achieved a safe cave diving milestone, making cave dive number 100 at an old favorite, Wes Skiles Peacock Springs State Park. Way to go, Sandy!

Ever since I received my cave certification, I have had two goals. One was to make my 100th cave dive. I'm not sure that there is anything magical about this number. It is not much different than 99 or 101 but nonetheless it was a goal to achieve and would get me in the water. Orange Grove at Wes Skiles Peacock Springs State Park has always been my favorite cavern since I first dove it in the early 80s. So when I found out about the Grand Traverse, it naturally was added to my list of goals.

I had never thought about combining these two goals until I saw Mark Schroder at a cave dive social and he told me his 100th dive was the Grand Traverse. I think Mark had selected this dive since it would be one to remember. After my return home, I started thinking about my conversation with Mark. I called my two dive partners, John Knight and Bill Taylor, and we made plans.

Most of our dives at WSPSSP have been in Peacock 1 usually to the Peanut Restriction, to Olsen Sink, and to various jumps and passages in between. We had not made any dives in Orange Grove since an intro dive on a single 95, and that was to about 500 feet or so. Having limited experience in Orange Grove and since I am a bit of an air hog, I was not sure if I would have enough gas so we decided to use a stage for the set up dive and the final dive.

We swam down the Peanut Tunnel, dropped our stages just beyond the Crossover Tunnel and then continued to the end of the Peanut Line. We ran a jump to the Challenge gold line and started the swim to Challenge. We had never been in this section of the cave, and it seemed different from the Peacock sections to which we were accustomed. But we enjoyed the new cave. It was a nice feeling to see the arrows reverse and be able to count down the distance to Challenge every 100 feet. I guess we were about 50 feet away when we saw the glow of light indicating our goal. I was a little worried about getting to Challenge on 1/3s but we made it with air to spare. I ran a line to connect the gap between the two gold lines at Challenge Sink, and then we surfaced for a few minutes to relax. Challenge Sink was a pretty cool sink and bigger than I thought it would be but I can understand how its name was derived. We toasted our break with a bottle of water that I carried in my dry suit pocket for the occasion. We then turned and headed back to P1.

After the obligatory lunch at the Luraville Country Store, we drove back to Orange Grove for cave dive 100. We were sure we could make it but my air consumption tends to be higher in a first time cave. I would be seeing most of this cave for the first time but so was the cave leading to Challenge Sink. I enjoyed Orange Grove cave and its features. At some point, I checked my air and realized we would make it to Challenge Sink on thirds. As with the first dive, it was nice to look at the line arrows pointing towards Challenge Sink halfway through the dive and then the glow of light radiating from the shaft of the sink. Because of time constraints, we had decided before the dive to skip a surface stop at Challenge. An hour and forty-six minutes after starting, we surfaced at Peacock 1.

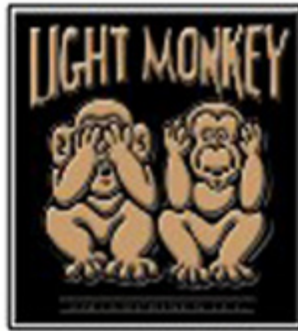
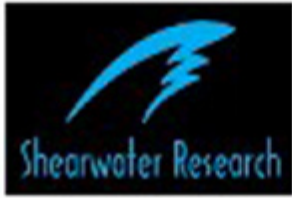
Mark was right; this was a dive(s) to remember. We made two dives totaling about 3 ½ hours and saw about 1900 feet of new cave. Now I am looking forward to more dives in Orange Grove and also to cave dive number 500.

Congratulations, Sandy! Thank you for the great report.

What's your story? Email your milestone stories and photographs to me at abedavis@nsscds.org, or snail mail them to me at 2612 Grassy Point Dr, #110, Lake Mary, FL 32746.

Shirley Kasser

Thank You to Our Workshop Sponsors



The Buoyancy of a Flooded Dry-Suit, Archimedes Law and Dolphins' Bubbles

By: Doron Nof

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Using a simple “barrel” model we address the question of how much buoyancy is lost when a drysuit is flooded. We show that, contrary to common ideas, this question does not have a straightforward answer though, in many relevant cases, a suit will not lose more than 30% of its buoyancy.

The dry-suit flooding issue is often discussed in various online forums. Most of the statements made on those public forums are, at the very least, misleading, contradictory, and most times just dead wrong. Examples are: water suspended in water (i.e., a flooded drysuit) does not add any weight to the diver, or “the weight of any water in the suit is nil, until you try and leave the water”. These statements imply that suits do not lose any buoyancy due to flooding. One also finds statements that drysuits become excessively heavy due to tears. The loss of buoyancy is often mistakenly attributed to Archimedes law, which states that the buoyancy of a submerged object is equal to the weight of the fluid that is displaced. Of course, some comments made in those public forums are correct (e.g., a suit cannot lose more buoyancy that it originally had). Still, most statements do not seem to distinguish between scooters, which are not pressurized and have no net buoyancy, and suits, which are pressurized and have a lot of net buoyancy. It is perhaps not surprising that the various forums are full of confusing information—this is because the problem of buoyancy loss in a drysuit is not a trivial one.

We show here that the buoyancy of a flooded suit depends on three aspects:

- (i) The location of the tear. By this we mean the upper part of the suit that faces upward, (i.e., toward the surface) or the lower part of the suit that faces downward.
- (ii) The depth where the tear occurs.
- (iii) Whether the ventilation valve is open or closed.

We shall show that, counter-intuitively, the greater the depth, the less water that penetrates into the suit. After illustrating these issues one by one using the conceptual barrel model (Fig. 1) and the pressures acting on it, we will point out that Archimedes law cannot always be applied to buoyancy issues associated with flooded suits. We do so using a conceptual barrel situated near a flat bottom and the recently observed “dolphin bubbles,” which, peculiarly, even though they contained air, do not rise to the surface. The article involves some simple mathematical equations included for those who may wish to examine the conclusions in a controlled laboratory setup. The typical reader who may not be interested in those aspects can skip those equations.

Barrel model

Consider a conceptual barrel held fixed at mid-depth by a rigid mechanism whose details are not important for the present discussion (Fig. 1). The top of the barrel is situated a distance D away from the free surface, its radius is R , and its length is $2H$. In analogy to a drysuit, the gas/air inside the barrel is pressurized so that its pressure \hat{P} is equal to the mean hydrostatic pressure acting on the barrel from the outside, $r_w g(D + H)$, where r_w is the water density and g is the gravitational acceleration. Here, the pressure in the barrel is uniform but the outside hydrostatic pressure increases linearly with depth. Under such conditions, the inside of the upper half of the barrel is subject to a pressure greater than the mean outside pressure whereas the lower half is subject to a pressure lower than the mean outside pressure. This point is a key to understanding the buoyancy issue.

Due to these pressures differences, a hole punctured in the upper half of the barrel, will cause air to escape from the

barrel whereas a hole punctured in the lower part of the barrel will cause water to rush in. We shall take these two issues one by one. Before doing so, however, we note that the buoyancy of the barrel is the difference between the downward (integrated) pressure acting on top of the barrel, pR^2r_wgD , and the upward integrated pressure acting on the bottom of the barrel from below, $pR^2r_wg(D + 2H)$. The difference between the two gives the buoyancy in terms of the weight of the displaced water, $2pR^2r_wgH$, in agreement with Archimedes law.

(a) Hole in the bottom

Here, as mentioned, the water pressure outside the barrel is greater than the pressure inside so, in this case, water will rush into the barrel further compressing its gas until the pressure inside the barrel (P) equals the pressure exerted on it by the water penetrated from below. Taking the unknown length of the remaining air-filled fraction of the barrel to be L , this condition is,

$$r_wg(D + H)(2H / L) = r_wg(D + L),$$

where we have applied the linear compressibility law to the air inside the barrel. This is a quadratic equation for the unknown L . Denoting $a = L / 2H$ and $b = D / 2H$, its solution is,

$$a = \frac{1}{2} \left[-b + \sqrt{b^2 + 4b + 2} \right],$$

where the negative root was rejected because $a \geq 0$. Two interesting limits are immediately noted. First, when the top of the barrel is right at the surface ($b = 0$), then $a = 1 / \sqrt{2}$, implying that only ~ 30% of the barrel can get filled with water. This is the maximum amount of water that can penetrate into the barrel. Second, at great depth ($b \rightarrow \infty$, i.e., the depth D is much greater than the barrel height $2H$) $a = 0$, implying that no water penetrates into the barrel! For in-between depths, the barrel will be filled with an amount between zero and 30%. So, at the most, the barrel buoyancy loss is 30% and so will be the maximal loss of a drysuit buoyancy when the hole occurs on the bottom and the ventilation valve is closed. In the hole on top case, the pressure inside the barrel is greater than the surrounding water pressure so the air/gas will quickly escape and the barrel will lose most of its buoyancy.

Archimedes and dolphin bubbles

It is important to realize that Archimedes “law” is merely a statement related to an integration of the pressure forces acting on the submerged subject. In reality, it is the pressure, not the “law”, that the water senses and, in some cases, the “law” is just not valid. The simplest way to see this is to again consider our conceptual barrel model. Suppose that you think of some relatively small barrel in the laboratory submerged in a glass container with a very smooth and flat bottom. Suppose further that the barrel also has a smooth glass bottom, and that the weight of the water that it displaces when it is submerged (i.e., its buoyancy per Archimedes) is Q . The barrel will normally float because its weight is smaller than Q . When held in mid-depth it will have a tendency to rise, again because Q is larger than its own weight.

However, when the barrel is carefully placed vertically near the bottom making sure that there is no water between the smooth tank bottom and the smooth barrel bottom, the barrel will stay put and will not float even though its Archimedes buoyancy Q is still larger than its weight (Fig. 2, situation A). This is because there is no water under the barrel implying that there is no vertical pressure from below and, hence, no buoyancy at all. While this experiment has been repeated in the laboratory numerous times, it is easier said than done because any disturbances in the room will cause water to get in between the barrel and the bottom of the tank, causing the barrel to float. At best, the barrel will stay along the bottom for a while, until a disturbance occurs causes it to float to the top (Fig. 2, situation B). Nevertheless, it does show that the law is not universally valid.

A similar case where Archimedes law fails is that of dolphin bubbles. Recently, dolphins held in captivity developed a technique to form ring-like bubbles that do not rise to the surface even though Archimedes law says that, like all familiar bubbles, they should. (For a fascinating clip see <http://www.youtube.com/watch?v=TMcf7SNUb-Q&feature=related>. Kenyon (2011) recently suggested that the reason that the bubbles do not rise is, again, the distribution of pressure around them. He cleverly argues that the dolphins have learned to pressurize the bubbles in a manner that matches the outside hydrostatic pressure.

Summary

It is suggested that divers whose drysuits have flooded should attempt to keep the ventilation valve in the completely closed position and should anticipate that their suits will be flooded more and more as they approach the surface. This additional flooding is not necessarily because the suits had more time to get filled with water (which should happen in a matter of minutes or less) but rather because the surrounding pressure has decreased. When a suit is allowed to be continuously ventilated in the usual manner in order to adjust to the new lower depths, the pressure inside the suit is never large enough to arrest the penetration of water into it. Tightening the valve allows the establishment of an additional arresting pressure but it requires more water within the suit (and, hence, less buoyancy). Water penetration and buoyancy loss will be maximal near the surface where approximately 30% of the suit will be filled with water (assuming that the tear occurred in the lower part of the suit).

Finally, a clear distinction needs to be made between scooters, which are not pressurized and have no net buoyancy (and, hence, can indeed become excessively heavy) to suits, which are pressurized and have a lot of net buoyancy and, hence, are very unlikely to lose all of their lift. In a similar fashion to the two given examples (barrel on the bottom and dolphin bubbles), Archimedes law cannot be applied to water entering the suit without considering the pressure distribution within the suit.

Appendix: How fast will the water rush in or the air rush out?

This can be estimated using the so-called Bernoulli principle whereby the speed is equal to the square root of twice the pressure causing the motion divided by the density. For the hole in the bottom case, the speed of the water rushing in when the barrel is partially filled is,

$$W = \sqrt{2g(2H - L)} .$$

Taking the barrel dimensions to be similar to that of a diver (ignoring the diver's volume inside the suit), we use $R = 15$ cm (half a foot), and $2H = 1.8$ m (six feet) to get a vertical speed of about 3.6 m/s (approximately 10 feet per second). Further assuming that the hole diameter is 3 cm (roughly an inch), we find that one third of the barrel will be filled in about one minute (50 seconds to be more precise).

When a hole occurs on the top, the excess pressure causing the air to escape so the speed is,

$$W = \sqrt{2gH r_w / r_A} ,$$

where we have taken into account that air (whose density is r_A), rather than water, escapes the barrel. As expected, this gives an enormous (theoretical) speed of 120 m/s implying that the entire barrel will be emptied in less than a second. To be more accurate, we really need to discuss here the problem of air rushing out and water rushing in to replace its space at the same time but this is a considerably more complicated problem, which is unnecessary for the purpose of our discussion. It is sufficient to say here that the whole process will take less than a minute or so.

Acknowledgments: This project was indirectly supported by Florida State University through my nine-months academic appointment. My general scientific work on physical oceanography and climate is supported by NSF grants #OCE-0752225, #ARC-0902835 and the Binational Science Foundation (#2006296).

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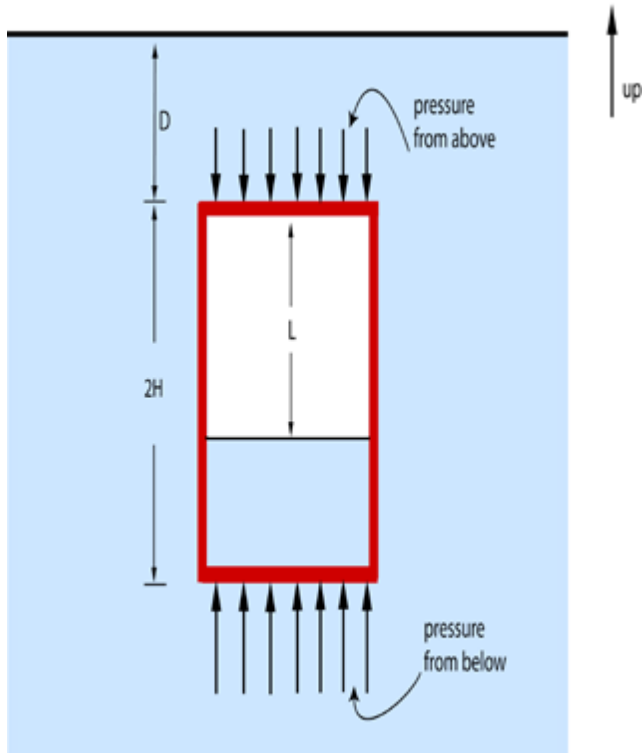


Fig. 1. The conceptual barrel model. The buoyant barrel has a radius R and height $2H$; it is initially filled with gas/air and is artificially held underwater in a fixed position. This holding is done through some mechanical means (not shown) whose details are not important for our present discussion. The top of the barrel is situated a distance D below the free surface of the water. The barrel is sealed and, in analogy to a drysuit, is initially pressurized so that its air/gas pressure matches the mean pressure exerted on the barrel by the water outside, $r_w g(H + D)$. At some later point in time, a hole is punctured on the bottom of the barrel. Water then rushes in to fill the barrel up to a distance L away from the top of the barrel, i.e., until the new compressed gas/air pressure inside matches the pressure of the water below, $r_w g(D + L)$. Aside from the puncture on the bottom, the barrel is completely sealed in analogy with a torn dry suit whose exhaust valve has been completely closed after the tear occurred.

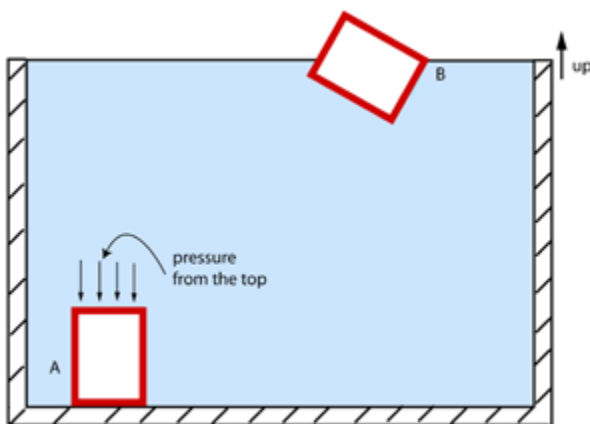


Fig. 2. An example where Archimedes law is violated. In situation A, a buoyant barrel with a perfectly flat bottom (say, glass) is placed near the bottom of a container that also has a perfectly flat bottom. No water can get under the barrel so the barrel does not float even though it displaces more water than its own weight (see text). However, once water does get under the barrel, the barrel does float (situation B).

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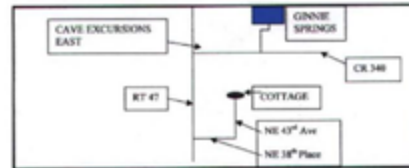
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Duck Weed
Photographer: Glen Wentworth

Cave Diving and Plant Infestation

How many times has this happened to you? You've been told about a great cave diving site that has excellent visibility, only to find the surface covered in a green carpet of oat meal looking material. You are traveling by boat to a cave diving location, only you have to pull the motor up every 100 feet because the prop is getting choked with a subsurface plant. These plants are considered

invasive species, and as cave divers our awareness can reduce the propagation of this problem.

In the first illustration, duck weed is being described. Duck weed is the smallest flowering plant that, in some cases, lacks stems, leaves and roots. It grows very rapidly in still or slow moving water. It can have a harmful effect when it blocks sunlight from reaching plants in the water that produce oxygen. With this depletion of oxygen, fish living in the basin can die off.

The last example is describing hydrilla. Hydrilla is a rapidly growing submerged aquatic plant that is native to Africa, but was brought to America in the 1960s as an aquarium plant that experienced wide spread growth in the southern states. Hydrilla can cause harm by shading out other native submerged plant species causing their elimination.

Why should we as cave divers be concerned and want to take action? These species don't really cause us any direct harm other than hydrilla entangling the fin of a diver or duck weed getting into regulators and keeping an exhaust valve open. Most importantly, invasion of these species can reduce an aesthetic value of a site and, in the case of state parks, reduce visitors that want to see springs in their glory. As has been noted, both of these plant species are rapidly growing; and in the case of hydrilla, only a few fragments are needed for infestation of a site. We should be careful before entering a each cave diving site that our gear has been cleaned of any residual plant particles from the previous dive site. If you look at the use requirements of a few state parks and waterways, they insist you complete this process. Let's be good land stewards and take action against this problem.



Hydrilla
Photographer: Mat Bull

Skills, Tips & Techniques

By Jim Wyatt

Fostering Positive Landowner Relations



No
Cave Diving
Allowed

Each of the cave diver courses taught by NSS-CDS instructors has a section on positive landowner relations whereby we discuss the ins and outs of maintaining our ability to easily access and dive in the caves we so enjoy.

Most cave divers are sensitive to this issue and strive to maintain good relations with the landowners in a variety of ways. Some of the things we need to always do when we are guests at dive sites, whether paying or not are:

- Not to leave trash at the dive site.
- Keep noise levels down.
- Respect and obey the rules landowners ask us to adhere to.
- Park in designated parking places only.
- No sneak diving.
- Not taking anyone diving who is not certified for the dive planned.
- Respect the hours of operation and be off of the land at or before posted closing time.
- Display passes and other documentation as prescribed by the landowner.
- Not altering lines, signs or markers unless authorized to do so.
- Being cognizant of conservation both in and outside of the cave.

Please think about how you are conducting yourself at the various parks and dive sites and foster good landowner relations.

I have seen cave divers leave garbage and trash at dive sites, catheters are a dead giveaway when they are lying on the ground. There is no doubt that a cave diver left this trash. Many sites have trash cans, use them. If no trash cans are provided you should carry your trash out of the area.

Telford is a prime example of losing access to a cave system due to negative landowner relations. There were several issues involved in us losing access and garbage left lying around was certainly one of the issues. While I do not think cave divers were responsible for this garbage, the negative effect of this impacted everyone who used the spring for recreational purposes.

On several occasions I have heard of certified full cave divers taking basic cave divers on full cave dives where they conducted multiple jumps off of the main line, traverses and/or entering springs/sinks that only fully certified cave divers are allowed to enter. Most landowners set their rules to match the diver standards of the NSS-CDS. When full cave divers take basic cave divers on dives beyond their training they are violating the trust of the landowner.

Landowners expect us to conduct ourselves within the diver training standards set down by the NSS-CDS. If we conduct dives that are out of the range of these standards the landowners may feel threatened by lawsuits. We can then expect them to make new policies regarding access to their land which may further restrict or completely deny us access to the land they own, which makes it much more difficult to dive the caves their property surrounds. In some cases it then becomes impossible to dive without trespassing.

On one internet forum I read a post where a cave diver was giving advice how to “break the rules” of one park so as to be able to dive beyond their certification level without being caught! This too jeopardizes our access if landowners see us trying to figure out how to break their rules rather than showing that we will respect and live by their rules.

The park rangers at Peacock Springs State Park have told me stories of how they had to wait extra time for cave divers to exit the park when the hours of operation are clearly posted at the entrance. These same rangers have told me stories of cave divers making solo dives

in direct violation of park policy. Park managers are not happy to see cave divers behave in this manner. This is a case where one or two cave divers can jeopardize cave diving for all of us. It is also a case that makes the cave diving community look bad.

Some private and state parks have established volunteer line committees whose responsibility it is to maintain the lines and signs. I know of a few occasions where cave divers have taken it upon themselves to change the routing of lines contrary to the landowners’ policy. Whenever you see problems with the routing of lines perhaps the best approach is to contact the NSS-CDS safety committee member responsible for that cave and make suggestions, or if the park has a line committee contact members of that line committee instead of unilaterally taking it upon yourself to re-route lines. The NSS-CDS safety committee members can be found at <http://www.nsscds.org/safety.html>.

One policy of the NSS-CDS safety committee is that we do not re-route lines when replacing them. Committee members have agreed that replacing worn lines is a different animal altogether from re-routing lines. Sometimes lines may need re-routing to enhance safety, however we feel that many cave divers need to be consulted and reach agreement upon re-routing lines prior to unilaterally re-routing a line. The NSS-CDS safety committee always gets permission and approval from landowners before even replacing worn lines. This type liaison simply fosters good relations with the owners.

Obviously if you run across a line that is about to part or is chafed badly it is all of our responsibility to make at least a temporary repair and then report it to have a permanent repair be made.

I have discussed landowner relations with several “Landowners” in the North Central Florida area, on both private and public lands. One common theme I hear from these people is that the cave diving community desperately needs to police itself.

When you see someone doing things like leaving trash around or fostering divers to dive beyond their training, or any of the other things that may jeopardize positive landowner relations call that person off to the side and point out what they are doing and perhaps save access to the cave!!



2012 CDS Workshop

The 2012 CDS Workshop will be held May 25-27, 2012 at the Suwannee High School, 1314 Pine Avenue Southwest, Live Oak, FL.

This years chairman, Bobby Franklin, requests anyone interested in speaking at the workshop or volunteering for the workshop to please contact him at robert.franklin67@gmail.com.

A Field Guide to the Critters of Florida's Springs.

Author Sandy Poucher has released a new book available through the National Speleological Society, **A Field Guide to the Critters of Florida's Springs**.

For more information and to purchase the book visit the NSS Book Store at <http://nssbookstore.org/index.php?mode=store&submode=showitem&itemnumber=07-1126-2631>

Vertical Ropes Social
Where: Wes Skiles Peacock Springs State Park
When: October 29, 2011 @ 9:00am

Join your fellow divers and learn or practice some vertical rope work. There will be a class for using ropes to get into caves with vertical entrances, or pits inside.

Gear will be provided if you do not have your own. Please bring your own helmet and harness if you own them.

There will be food and a group discussion (risk awareness/close calls) in the evening at the REACT tent by Cave Excursions.

To sign up and for more event information please email Riana Treanor at fldivegirl@windstream.net.

This event is sponsored jointly by the NSS-CDS, NFSA and REACT.

Hart Springs Winter Workshop

January 14-16. Guided dives to Hart Springs . An Abe Davis will not be required for guided dives.

Partial list of subjects:

- Nitrates and nitrite loading in the aquifer.
- Slideshow and narration on water sampling
- Manatee springs extention and mapping
- Slideshow of some restoration of Hart Springs
- Offshore caves in the Gulf: Mega Dome, Black Diamond and Glory Hole
- Story telling open to all: ie connection of Harper Tunnel to Florida Room, rescue at Cow, screaming diver at Hart.

Contact Rick Robinson at: directoratlarge2@nssscds.org.

CALENDAR of EVENTS

October

29 - Ropes Social

November

December

31 - New Years Eve

December 1 Submission date for UWS Magazine
Volume 39 No. 1

Send submissions to cccheryld@aol.com



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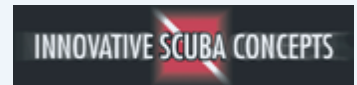


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