# UNDERCURRENTS

Newsletter of the Bluegrass Dive Club / www.bluegrassdiveclub.com

November 2012 Volume 42, Number 11


## November's Club Meeting

**Date:** Tuesday, November 13th
**Time:** 7:30-PM (business)
Social at 7
**Location:** The Racquet Club
3900 Crosby Rd.
**Program:** The Elections

## President's Message

*By Tracey Combs*

Hello fellow divers. Our next meeting is Tuesday, November 13th at the Racquet Club. Everyone is welcome, members as well as those who may be interested in joining the club.

We will be holding Elections in November at our regular meeting. In December there will not be a regular meeting, we will be having our Annual Christmas Party for all members. The Party will be hosted by Mark and Stella Kidd at their lovely home on **Saturday, December 15th at 7:30 pm**. It is a potluck dinner so bring a dish that you can share with 10-12. BGDC will supply the ham, rolls, and soft drinks. All members are welcome. Please refer to the Upcoming Events page on the website for the address and directions.

Be sure to visit the website for information on upcoming 2013 and 2014 scheduled trips. As always, if you have ideas or locations that you would like to suggest, please contact the Dive Committee Chairman, Doug Geddes.

Now that the temperatures have dropped, I am looking forward to our next dive trip more than ever.

## The Editor's Notes

*By John Geddes*

This month pics are some more from Roatan by Doug Geddes, these are above water because it's hard to take pics underwater of the Eat and Dive Club…

## 2012 BGDC Officer's

| | |
|---|---|
| Tracey Combs, President | 621-4066 |
| Corrine Mulberry, Vice President | 913-0892 |
| Kris Harn, Secretary | 278-4246 |
| Dan Miller, Treasurer | 948-5133 |
| Doug Geddes, Trip Director | 224-3197 |
| Rick Stephan, Safety Info Dir. | 223-3719 |
| Mike McCann, Webmaster | 255-3937 |
| John Geddes, Newsletter Editor | 223-7926 |

# Vice President's Report

*By Corrine Mulberry*

**Program**: The Annual Election of Officers for the BGDC for 2013 will occur during the November meeting.

If you have diving information that you would like to present at a future Club meeting (past or potential dive trip, etc.), I would love to hear from you. Please contact me so that I can put on the calendar. 913-0892 or scubagirl07@insightbb.com

**Election of Officers for BGDG (2013):** Voting for 2013 Elected Officers for the Bluegrass Dive Club will occur during the November meeting. The Nominating Committee (Corrine Mulberry (Chair), Charlie Denham, Tamara Williams and Rebecca Singer) developed a slate of proposed nominees for elected Board positions which was presented to the BGDC Board during the Board's October meeting. The slate of nominees is as follows:

- President – Tracey Combs
- Vice President – Corrine Mulberry
- Secretary – Kris Harn
- Treasurer – Dan Miller
- Trip Director – Doug Geddes
- Safety Information Director – Rick Stephan
- Newsletter Editor – John Geddes
- Webmaster – Mike McCann

Nominations will also be taken from the floor at the November meeting.

Club members in good standing and eighteen years or older are entitled to one vote.

**Visitors and New Members**: We gave a hearty welcome to **Rachel Templar** who attended her first BGDC meeting last month. Rachel lives in Mt. Sterling (recently bought a farm there) and works in marketing for A&W Restaurants. She heard about the club through her dentist, Krisy Carty – thanks Krisy! Rachel is a dive instructor and has over 400 dives under her belt. We appreciated having Rachel at the meeting and hope to see her again soon.

We have 4 new members that joined the Club during October: **Dennis & Becky Johnson** and **Pat & Eveanna Barry**. Both couples are friends with Doug and Maryanne Geddes and have recently signed up for the Grand Cayman trip in early 2013. I'll provide a more detailed and interesting welcome in the next newsletter after I have had a chance to chat with them and gather up some intriguing scoop! ;-)

We are so glad to have you! Welcome!!

See ya on the 13th!

# Trip Director's Report

*By Doug Geddes*

GRAND CAYMAN 2013

We had a flurry after the Roatan trip and added 13 persons to this trip. We can still take more, but the time is growing short for you to sign up. I have added some more rooms to take the overflow so far, so I you want to go, sign up ASAP. I have to release the extra rooms at the drop of a hat if they call needing them. Go to the website and check it out. Oh, by the way, they have built a new restaurant and bar on site so we don't have to go off site to eat, even though I am sure we will some. We are having a small issue with single people in a quad. Go look at the website for the resort and you will see they have queen beds in each room. For singles this could create a problem, but they do have pull down beds in the living room. Either way, we will work it out.


TRUK 2014

This is our next scheduled trip and it is overbooked, but if you want you can still put your name on the waiting list. You never know if one or two will open up. We are in the process of getting pricing for the Yap side trip the week before this one. Once I get that I will get it out to everyone to look at. Air travel will be available in February, so we will be able to get a true cost of the whole package, but be ready for some high air to Truk at the moment.

FUTURE TRIPS

We are still working on some future trips for next year. One is the Grand Turk trip. I will have some numbers for persons to look at, but it is looking like it is going to cost around $2000+ for this one including air..I will see what kind of response I get at the meeting to determine if we have the numbers to pursue it? The mystery trip was a big hit last year and will continue for next year. We will be considering anyplace that gives us the best deal. We might even look at a couple of live aboards? Yes, Dale Hollow will also be on the list for July of next year. Corrine is stepping aside for a year or so, so I need someone to take it on for us. If you have an interest, let me know.

# From the Treasurer

*By Dan Miller*

**2012 Membership Dues**

Student (High School or College ID).. $10.00
Single & Family (1 diver) ..... 30.00
Family (2 or more divers)..... 40.00

**Renewal:** Please send payment to the address listed below, please make sure there is a correct indication of your mailing address, phone number and it is very important to indicate an email address.

**Contact / Mail to:** Bluegrass Dive Club c/o
Dan Miller
824 Gunpower Drive
Lexington, KY 40509

**New Members:** Visit the website to fill out an on-line form or to access a Microsoft Word printable form. CLICK HERE.

# From The Secretary

*By Kris Harn*

SEPTEMBER 18, 2012
BOARD MEETING

Meeting called to order at 7:39 pm. Agenda approved. Board members in attendance are Dan, Kris, Doug, John, & Mike. Dan gave Treasurer's report. Motion passed to send payment on Truk/Yap. John needs newsletter articles by Sept. 20th. Doug reviewed trips. There will be a Dive committee meeting after Roatan. Date needs to be set for Christmas party. Meeting adjourned at 8:59 pm.

OCTOBER 9, 2012
REGULAR MEETING

Meeting started at 7:32 pm. 15 people in attendance. Guest in Attendance is Rachel Templar from Mt Sterling. Dan gave Treasurer's report. John Stated that October newsletter is out. Rick went over his newsletter article on gas laws. Doug told about lion fish hunting in Roatan. It was announced that Dive committee meeting will be on the 3rd Tuesday. Corrine drew door prizes. Meeting ended with DVD on Roatan.

# Safety Corner

*By Rick Stephan*

**Note**: *This article is important for several reasons. First, establishing good buoyancy control will reduce effort expended diving, accidental barotraumas from sinking or rising too quickly, and air consumption. Second, it keeps you off the reef, saving the coral from you crushing it. Third, it allows you the ability to enjoy the dive experience more – you can see more things when you're relaxed and floating effortlessly, rather than messing with your gear, adding and releasing air to get you neutral. It's always been one of my greatest joys in diving - to be weightless and just relaxing underwater.*

*It's not enough to just know these techniques; you should practice them until they are second nature to you underwater. Controlling your buoyancy will make you a safer diver, and as we all know…*

*Remember, safe diving is fun!*

## *The Ups and Downs of Buoyancy Control*

**By John Lippmann**
**Executive Director**

**DAN S.E. Asia-Pacific**

Most of us probably gained our first insights into buoyancy control as children while learning to swim. At some stage, swimmers realize that if they take a deep breath and hold it, they will probably float. Exhaling deeply causes them to sink.

By controlling your breathing, you learned to control your buoyancy. You also discovered that flapping your arms and legs in a reasonably orderly manner propels you in various directions.

Neutral buoyancy is the seemingly weightless state between floating and sinking. Most of us are approximately neutrally buoyant in our "birthday suit" or swimsuit. However, people with generous deposits of fat tend to be positively buoyant and float, while the more muscularly endowed may be negatively buoyant, and may sink. Dive students soon discover that wearing a wetsuit and various other diving adornments alters their natural buoyancy. They find they must add weight to achieve neutral buoyancy at, or near, the surface.


Controlling your buoyancy is one of the most important skills you'll master. Buoyancy control improves your safety, reduces fatigue and enhances the enjoyment of diving. It also enables you to avoid destroying delicate portions of the underwater environment.

Diving incident reports often cite overweighting and/or poor buoyancy control as a contributory factor to, or a factor associated with, accidents or near accidents. For example, in a study of 100 diving fatalities that occurred in Australia and New Zealand between 1980 to 1987, 45 percent of the victims were believed to have been overweighted, with 40 percent being more than 4.5 pounds/2 kilograms negatively buoyant on the surface.

Another Australian study, which included 533 diving incidents, reported that 57 incidents were associated with buoyancy compensation devices (BCDs), and 27 with weight belts or weights. Many of the BCD incidents

# Safety Corner Cont.

were due to diver error, and indicated that the divers didn't thoroughly understand the function of that important piece of equipment. In addition, of the 57 incidents, 21 (37 percent) involved harm to the diver. All these harmful incidents, with three exceptions, were associated with rapid ascents and its consequences.

Despite the importance of buoyancy control to diver safety there is very often inadequate time devoted to realistically practicing and refining buoyancy control skills during a basic diving course. Students are often anxious during their early dives and tend to breath more rapidly, causing them to float Many dive instructors add extra weight to students during training dives to keep them on the bottom where they are easier to control. Unless those instructors establish the correct weighting at the end of the course -- something that is easily overlooked in the scurry of events -- many students may leave their dive course and begin their dive careers believing they require more weight than they really do. This is a cause for concern since some accident reports have indicated that the first 20 or so dives carry a substantial risk for the novice.

One method you can use to achieve neutral buoyancy at the surface is to weight yourself so you are suspended vertically in the water with the top of your head just touching the surface with a fully deflated BCD while holding a normal breath. Inhaling deeply should cause you to rise while exhaling should cause you to sink.

There is some debate about whether divers should weight themselves to be neutrally buoyant at the surface or in shallow water. Divers who are neutrally buoyant at the surface may be significantly positively buoyant in shallow water towards the end of the dive when their cylinders are nearly empty and are, therefore, lighter. The amount of positive buoyancy depends largely on the type and thickness of exposure suit and the type and size of cylinder used. This positive buoyancy may make it difficult to maintain your desired safety stop or decompression stop depth at the end of the dive. You can minimize positive buoyancy at the stop by adjusting for neutral buoyancy with a near-empty tank, rather than a full one.

I prefer to adjust my weights so that I am neutrally buoyant at about 15 feet/5 meters with approximately 1320 psi/40 bar of air in my cylinder. This enables me to carry a little less lead, facilitates good depth control at the safety stop and allows me to be slightly positively buoyant on the surface. Exhaling deeply is usually sufficient to descend at the start of the dive. However, some divers may need to duck-dive the first couple of meters.

**Equipment**

Wetsuits are made from neoprene, impregnated with tiny air bubbles. When divers descend, these air bubbles are compressed and lose buoyancy. Wetsuits that provide 11 pounds/5 kilograms of buoyancy at the surface will only provide about 2.5 kg of buoyancy at 33 feet/10 meters where the ambient pressure is two atmospheres (ata). At an ambient pressure of five ata, which occurs at 130 feet/40 meters, its buoyancy will be reduced to about one kilogram. In addition to wetsuit compression, the gas spaces within a diver's body compress at depth, further reducing your buoyancy.

# Safety Corner Cont.

You need to compensate for this loss of buoyancy as you descend. Some experts have claimed that divers can increase or decrease their buoyancy by a differential of 4-5 pounds/2-2.5 kilograms simply by exercising adequate breath control. Another report claims that a group of male divers were able to vary their buoyancy by 8.5-15 pounds/3.9-6.8 kilograms by inhaling and exhaling maximally. The corresponding range for females in the study is 6.3-9.6 pounds/2.9-4.4 kilograms. However, divers shouldn't inhale and exhale maximally during a dive since it can cause over-expansion or collapse of alveoli and small airways.

Although breath control should play an important role in the fine-tuning of buoyancy, BCDs are the major tool used to compensate for wetsuit compression. Before the introduction of BCDs, some divers used to take off weights at various depths, reclaiming them during ascent. Others would blow air into their wetsuit sleeves, lifting their arm to release air, as required. Others would use lift bags of various descriptions, while others began to use inflatable life jackets (some probably inadvertently donated by airlines). Eventually, the "horsecollar" BCD was introduced, along with various designs including the jacket, ADV-style, the Travel BCDs, "wings" and others.

Consider a diver who is wearing a 7 mm full wetsuit with attached hood who requires 22 pounds/10 kilograms of weight to be neutrally buoyant on the surface. If we assume that the wetsuit is providing the 22 pounds/10 kilograms of lift at the surface, then, at 130 feet/40 meters, the wetsuit will only provide 4.4 pounds/2 kilograms of lift (one fifth of the surface lift). This means that, ignoring all other factors, the diver will be 17.6 pounds/8 kilograms negatively buoyant at 130 feet/40 meters unless air has been added to the BCD to regain neutral buoyancy.

It is desirable to add air to the BCD during the descent, especially on a deeper dive, since it helps to control the descent and enables the diver to quickly trim off to neutral buoyancy on arrival at the target depth. At times, divers neglect to add air to their BCDs at depth and, occasionally, the consequences are serious.

Researchers conducted a series of experiments to determine the time required to inflate a BCD at various depths. The BCD had an internal volume of approximately 18 liters (i.e. around 40 pounds/18 kilograms lift) and the "reserve" pressure in the cylinder was 35 atm. The tests showed that it required about 57 seconds to inflate the BCD at 100 feet/30 meters using the power inflator. It was not possible to completely inflate the BCD at 100 feet if the diver continued to breathe from the regulator during the inflation since the air supply ran out before the BCD was fully inflated. These results were supported by subsequent, more extensive tests conducted at the Royal Australian Navy School of Underwater Medicine.

The results of both series of tests indicate that divers, who have not attained neutral buoyancy at depth by adding air to their BCDs when there was plenty of air in their tanks, may not have sufficient air left to enable them to regain neutral buoyancy for the ascent. They may have to work hard and, therefore, use up a lot of air in order to ascend. At times, especially if divers are overweighted, they might have great difficulty ascending without ditching their weights.

# Safety Corner Cont.

This situation was tragically demonstrated in Australia some years ago. An inexperienced diver dived to 138 feet/42 meters on a wreck. After he failed to surface, searchers located his body on the seabed. Despite almost 35 atm of air remaining in the victim's cylinder, the search divers were unable to raise his body by inflating his BCD. However, when they release his weight-belt, the diver's body rapidly ascended to the surface.

Later examination revealed that the victim was substantially overweighted on the surface. With the loss of buoyancy from wetsuit compression at 138 feet/42 meters, it would have been extremely difficult for the diver to ascend from the bottom without adding a lot of air to his BCD, something he apparently had not done. He may not have been able to inflate his BCD while breathing on his regulator. When investigators tested his BCD later, it took 45 seconds to fully inflate at that depth with 35 atm in the cylinder. To ascend, the victim probably should have dropped his weight-belt. Had he done so, he might have survived.

An interesting study that reviewed the outcome of 37 diving accidents in Tobermory, Canada, indicated that 22 of the 25 divers who made it to the surface survived without permanent injury (despite some suffering from arterial gas embolism and/or near drowning, and some requiring resuscitation). On the other hand, all 12 of the divers who had to be recovered from underwater died.

**How much lift do you need?**

It is essential that divers wear BCDs with sufficient lift to enable them to maintain neutral buoyancy at the depths to which they dive. The ability to maintain neutral buoyancy at any stage during a dive enables a diver to consume less air and conserve energy, which becomes even more important during a deeper dive. Divers who must exert themselves to maintain position will use more air and may be at an increased risk of an air emergency or decompression illness. Some experts, however, disagree on the amount of lift divers need.

To achieve the most effective lift, divers need to displace water close to their center of mass. Only the portion of the BCD remaining underwater provides lift. Air trapped above the surface in the BCD doesn't provide extra floatation. So, larger volume BCDs will not necessarily provide more surface lift. It depends on the design of the BCD.

Some divers prefer minimal surface lift, desiring only to have their head supported out of the water. Since the human head weighs somewhere in the vicinity of 10 pounds/5 kg, theoretically a similar amount of lift would be required to support a diver's head (only) out of the water, provided the diver was weighted for neutral buoyancy at the surface. Other divers, especially those who often dive in choppy seas, prefer to have significantly more surface lift at their disposal.

The amount of lift required underwater depends mainly on your exposure suit, the depth of the dive and the amount of weight you wear. The larger the volume of the BCD, the greater the lift capacity and the greater the potential for an uncontrolled and rapid ascent. Larger volume BCDs allow greater air expansion during ascent. Unless you vent the expanding air adequately, your ascent rate will increase, especially as you near the surface. Very rapid and dangerous ascent rates can occur.

# Safety Corner Cont.

A study at the University of California demonstrated these excessive ascent rates. Divers wearing full ocean gear, which included 7 mm wetsuits, were weighted for neutral buoyancy and then positioned horizontally at a depth of 9.4 feet/2.85 meters, holding onto a weighted box. After their BCDs were fully inflated, the divers let go and ascended to the surface. Their position changed from horizontal to vertical on the way up. The BCDs tested had lifts of 11.2-54.8 pounds/5.1-24.9 kilograms.

Average ascent rates varied from 68 feet per minute (fpm)/20.6 meters per minute (mpm) with the smallest BCD, to 168 fpm/50.9 mpm with the largest. The maximum ascent rate generally occurred in the last meter or so, and reached a frightening 254.8 fpm/77.2 mpm with the largest BCD. This is certainly much faster than the generally recommended ascent rates.

**Practicing Buoyancy**

Obviously, divers need to learn how to use their BCDs safely in order to avoid becoming Polaris missiles. However, the incident reports cited earlier indicate that many divers don't seem to take the time to acquire the necessary skills.

If you find yourself in an uncontrolled buoyant ascent, you should immediately try to vent air from your BCD. If this is not possible, you can slow your ascent rate by extending your arms and legs and arching your back in a "spread eagle" posture while angling the fins to create the maximum drag. You should also exhalation forcefully to avoid pulmonary barotrauma.

You can practice buoyancy control by setting a shotline with marks at various levels between about 33 feet/10 meters and the surface. Then ascend or descend to a particular mark, adding or releasing air from your BCD to achieve neutral buoyancy at that level. The next step is to try and maintain that depth by regulating the rate and depth of your breathing, within safe and comfortable limits. Keep your BCD inflate/deflate mechanism readily accessible in case you need to make a quick adjustment. After maintaining the depth level at one mark for several minutes, move to another level and repeat the procedure. Practicing this and various other buoyancy exercises should improve your buoyancy control.

**Features**

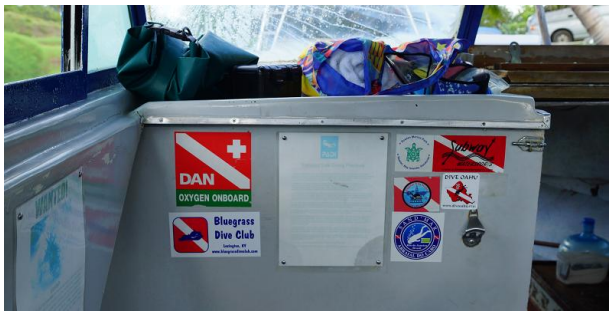
Most modern BCDs incorporate two methods of inflation; oral and power inflation. Power inflation is the preferred method and you should use it whenever possible. Only use the oral inflation if the power inflator malfunctions or to inflate your BCD on the surface if your air supply is exhausted. Power inflator buttons can sometimes jam open. Unless you disconnect the feed hose quickly or continuously dump air from your BCD, you will be rapidly launched towards the surface.

BCDs should have two dump valves. Many have both valves incorporated in the corrugated hose. Occasionally, divers are unable to locate the hose when they need to dump air resulting in a premature visit to the surface. BCDs designed with one of the dump valves independent of the corrugated hose overcome this potential problem.

## Safety Corner Cont.

Some BCDs are quite streamlined, while others have a relatively bulky design. Bulky BCDs create extra drag in the water and may increase the effort of diving.

In the past, many BCDs provided the additional benefit of being able to turn and support an unconscious diver face-up on the surface. This has obvious advantages for the unfortunate diver who ends up in that position, since it's much healthier to breathe air than water. Unfortunately, many modern BCDs no longer provide this benefit.




Another feature that deserves consideration is color. Although a black BCD looks positively sexy, it is not particularly visible to a distant boat operator, especially in overcast conditions and choppy seas. High visibility colors towards the top of a BCD may help locate a diver on the surface and so reduce the Valium intake of the boat operator.

It is also useful to have a pocket to keep various items in.

In summary, the following are features that deserve consideration when purchasing a BC:

- Comfortable, good fit. Should fit reasonably snugly and should not restrict breathing or lift away from the wearer's body when inflated. Many models are adjustable.
- Adequate surface lift.
- Adequate compensation for wetsuit compression at depth.
- Robust bag that is not too bulky (to avoid drag).
- Fittings that are positioned to be readily accessible, easily operated, hardy and reliable.
- Oral and power inflator mechanisms.
- Two dump valves (preferably one independent of corrugated hose).
- Visibility.
- Support of unconscious diver on surface.

## *Bluegrass Dive Club 2012 Calendar*

**November**

13, Tuesday Dive Club Meeting (Elections)

27, Tuesday Board Meeting

**December**

15, Saturday Club Christmas Party