UNDERCURRENTS

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

November 2017 Volume 47, Number 11

November Club Meeting

Date:	Tuesday, November 14th
Time:	7:30-PM (business) Social at 7
Location:	The Racquet Club 3900 Crosby Rd.
Program:	Elections

President's Message

By Tracey Combs

It is ELECTION time again. If anyone is interested in joining the Board, please contact John Geddes or Charlie Denham as soon as possible. You can also nominate a willing participant or yourself at the meeting prior to the election. We have a couple of spots to fill on the Board, so if you have been considering joining, now is a GREAT time. Elections will be held Tuesday, November 14, 2017.

The Trip Committee will be getting together very soon to add some additional dive trips to our schedule. If you have a suggestion or a bucket list location, please share your ideas. We are always interested in your recommendations. Please contact me or let a member of the Trip Committee know what locations interest you.

Our annual Christmas Party will be held Saturday, December 9, 2017 at 6:00 pm at Mark & Stella Kidd's home. The club will provide ham, rolls, and soft drinks, anything else is BYOB. Please bring a dish to share with 10-12. The address and directions are on the website. Mark your Calendar!

Our next meeting will be Tuesday, November 14 at 7:30 pm at the Racquet Club. Guests are always welcome. I hope to see you there!!

The Editor's Notes

By Steve Gahafer

The cold weather has finally set in so it is time to start thinking about the fast approaching holidays and dreaming of what dive adventures await us next year and years to come.

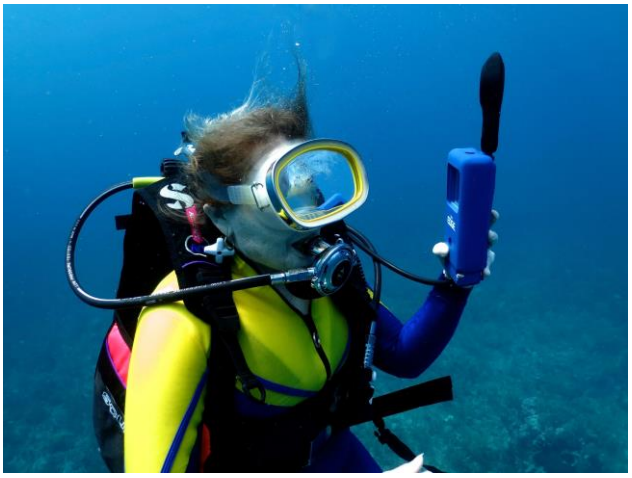
We have our annual elections being held at our upcoming November meeting. The slate is in John's article but by all means if you or you know someone that wants to serve on the board it is not too late. They can be put on the slate at the meeting.

We have our annual Christmas Party coming up December 9th at 6:00 PM at Mark and Stella Kidd's house. I hope to see everyone there.

A big shout out to Noel for sharing his pictures form Belize for this month's newsletter.

2016 BGDC Officer's

Tracey Combs, President	621-4066
John Geddes, Vice President	223-7926
Mike Sullivan, Secretary	327-8906
Dan Miller, Treasurer	948-5133
Doug Geddes, Trip Director	621-3178
Rick Stephan, Safety Info Dir.	223-3719
Kim Hudson, Webmaster	614-937-1955
	Khudson4974@yahoo.com
Steve Gahafer, Newsletter Editor	229-9408
	sagahafer@gmail.com



Carol Call going old school

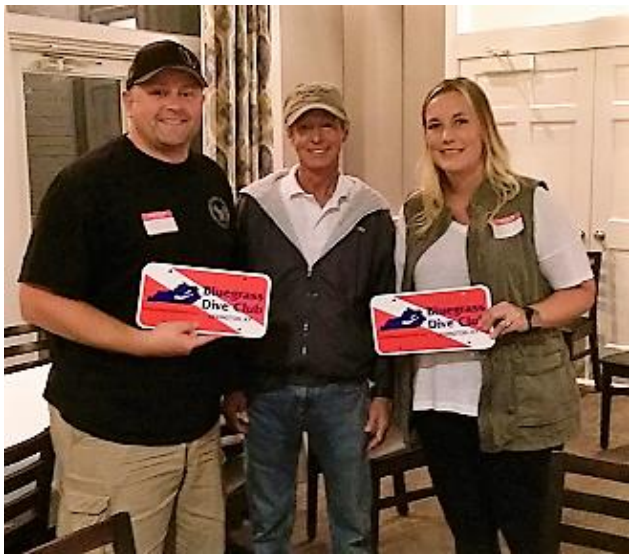
Vice President's Report

By John Geddes

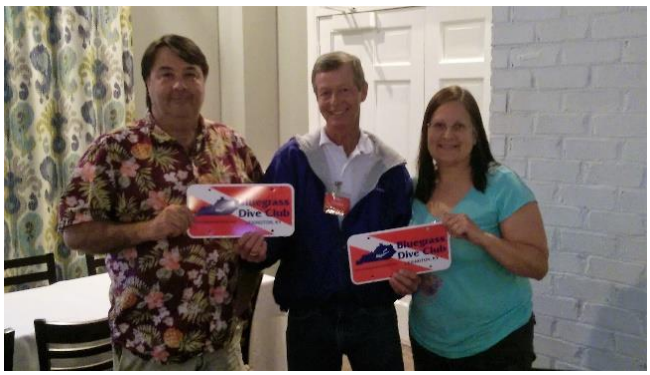
Congratulations to Alex with the Speedway gift certificate and Jennifer on the Chick-fil-A certificate.

Something else on my mind -

Ok, its time to apologize (again) for having the wrong names with the pics, so here they are with the right name to the right face.



Arron and Jennifer



Jerry and Janet

November is election month for the club and we will not have a program, but we will have Door Prizes!!

If you would like to serve on the Board, we have a slate for all offices, but nominees will be taken from the floor election night. The Board approved slate of nominees is as follows:

President - Tracey Combs

Vice President – Mike Sullivan

Secretary - Kris Harn

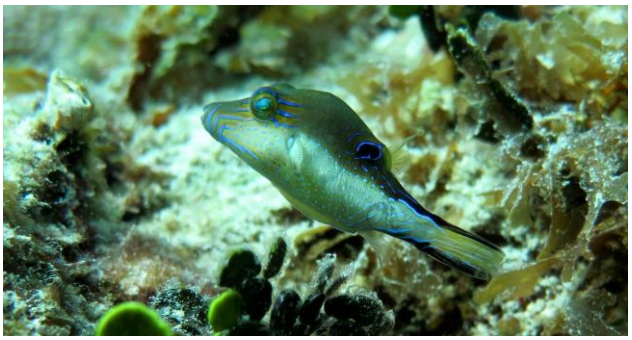
Treasurer - Dan Miller

Trip Director - Steve Gahafer

Safety Information Director - Rick Stephan

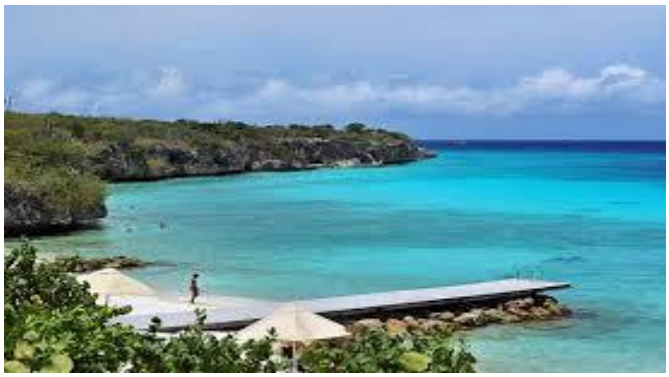
Newsletter Editor - John Geddes

Webmaster - Alex Fassas



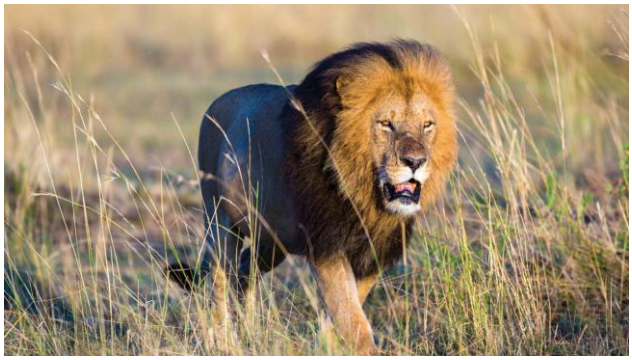
Trip Director's Report

By Doug Geddes



CURACAO 2018

Another great trip being offered by the dive club to one of the best looking islands in the Caribbean. This should be a great check out dive for the upcoming Africa trip for those that haven't been in the water for a while. This trip is now up on our website at Curacao 2018. Check it out. It is a great place for non-divers also, so bring some friends to paradise.



AFRICA DIVE & SAFARI 2018

This trip is going full steam ahead. Several people have already purchased air so if you still need to do that we can give you some suggestions. If someone finds a great fare,

please share it with us, so others might join you, but you need to make sure it works with the times we need to arrive in Africa. I will try and get that info out to you. **We still have a room or so reserved, but if they call we will have to give it up, so if you are on the fence, please consider grabbing it before it is gone.** Check the website Africa 2018

Most the crew……

From the Treasurer

By Dan Miller

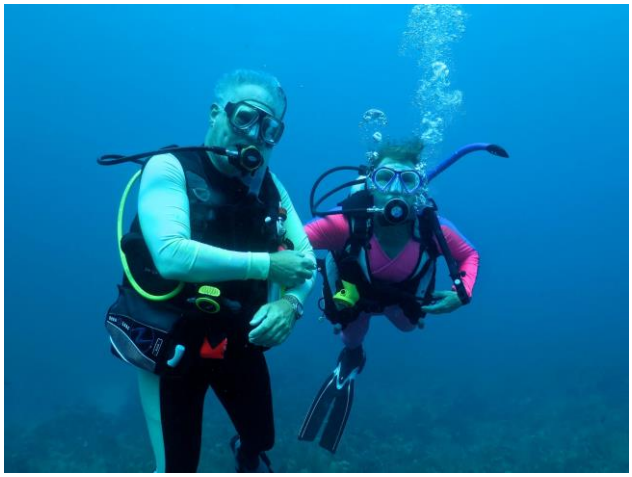
2017 Membership Dues

Student (High School or College ID)....$10.00
Single & Family (1 diver) 30.00
Family (non-divers) 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.



Alex and Katherine

From The Secretary

By Mike Sullivan

General Meeting Minutes
Tuesday, October 10, 2017

A General membership meeting was held on October 10, 2017 at the Racquet Club on 3900 Crosby Road. A presentation was made by Noel Hall of a DVD on the Club trip to Belize in 2017. The Club Christmas Party will be held on December 9th at Mark and Stella Kidd's house. Please bring a dish to serve 12 people. The Club will furnish the meat and sodas. The board will meet on October 24th at the Beaumont Public Library at 3080 Fieldstone Way at 7:30 PM.

Don't forget the Club Elections in November and we are looking for a Trip Director.

Board of Directors Meeting Minutes
Tuesday, October 24, 2017

A Board meeting was held on October 24, 2017 at the Beaumont Branch Public Library. A reminder that the final payment for the Curacao trip is due December 1, 2017. A reminder that the Africa trip final payment is due February 15, 2018. The November program will be the election of Board Officers. The board will meet on November 28th at the Beaumont Branch Public Library on Fieldstone Way at 7:30 PM. Refund checks from the Belize trip are going out to the 20 people that made the trip. Two rooms are still available for the February trip to Curacao. The Club Christmas party will be December 9, 2017 at the home of Stella and Mark Kidd at 6:00 PM.

Complete Meeting Minutes

Safety Corner

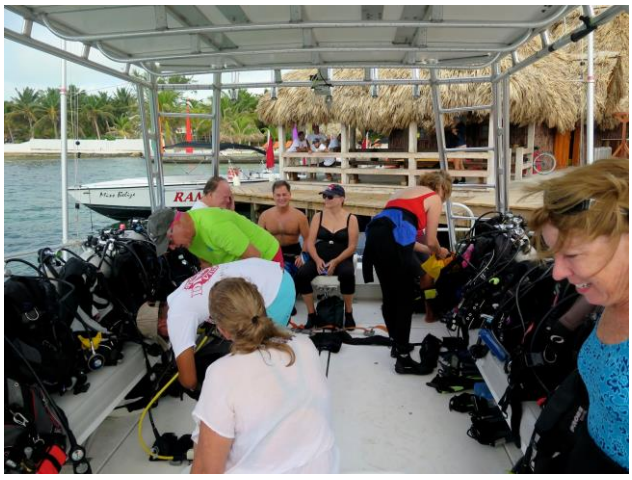
By Rick Stephan

Remember, safe diving is fun!

***Note**: Recent events for some BGDC members encouraged my thoughts about what to share with this month's column. I remember very well purchasing a brand new, fancy gadget called the EDGE (fondly called 'the brick') in the 1980's. Several dive buddies did as well, and we were amazed at the information we were able to glean from the blocky, pixilated display. I do know that I always carried a copy of the dive tables with me underwater, figuring that the new gadget would fail at some time, and my well-being would be dependent on my ability to convert my RNT from remembering my dives into a diver classification on the tables.*

Switch forward 30+ years and I'm guessing no one has a copy of the dive tables in their BCD pocket. (Do they even teach the tables in beginning Open Water classes anymore?) But, have you even thought about what goes on behind the scenes at the computer manufacturer in determining the algorithms? This article gives a little perspective on this. I know all too well that computers of any kind are fallible, and while we hope they are very conservative, please do your best to stay away from the limits of no decomp. Keep up to date on your computer – if there are recalls, updates, or problems uncovered, and make sure your computer is maintained well.

Thanks for reading, and as always, remember - safe diving is fun!



The crew heading out from Ramone's

Validation of Dive Computers

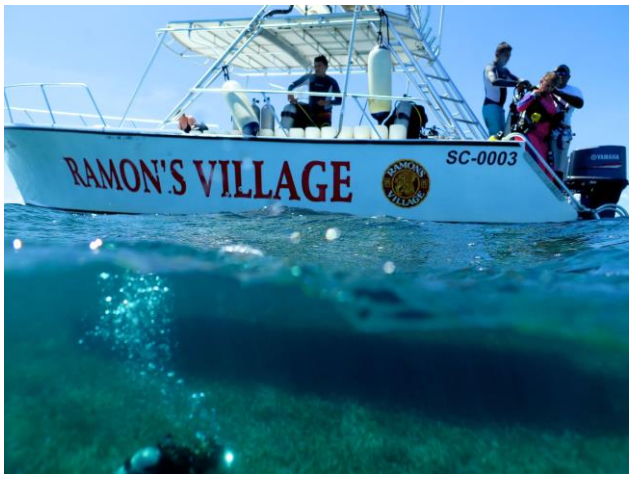
By Michael A. Lang, D.Phil.

An ORCA Industries EDGE among a variety of modern-day dive computers

Dive computers have evolved rapidly since the first modern, diver-carried electronic dive computer (ORCA Industries' EDGE) became commercially available in 1983. The emergence of dive computers prompted questions about their safety, evaluation procedures and guidelines for use. Because little data existed on repetitive diving, there were concerns about computers' ability to manage multiple deep dives.

Today, dive computers' ability to monitor decompression status and ascent rate in real time is well established. And computers allow increased flexibility: They permit dives of unlimited complexity while providing guidelines for limiting decompression stress. Because of this improved flexibility, dive-computer guidance is generally expected to present a greater risk of decompression sickness (DCS) than the use of a dive table based on the same decompression algorithm.

The computer's calculations use the actual depth of the dive rather than being rounded to the next deeper depth, and repetitive dives are based on the entirety of the underlying decompression model (i.e., all tissue compartments are considered). Most dive tables use only one of the decompression model's tissue compartments to calculate repetitive dive allowances, which adds a margin of safety. With dive computers, there is also the potential for electrical or mechanical failure and user error. However, based on reviews of the available databases of dive injuries, dive computers appear to have acceptable safety records regardless of the algorithm they use.



Validation

Dive-computer validation consists of several steps, which include: 1) verification of a clear and unambiguous information interface, consideration of ergonomics and rigorous leak testing; 2) a procedure for testing the decompression model and algorithms (as in decompression-table testing); 3) confirmation of the computer's function in simulations; and 4) field testing.

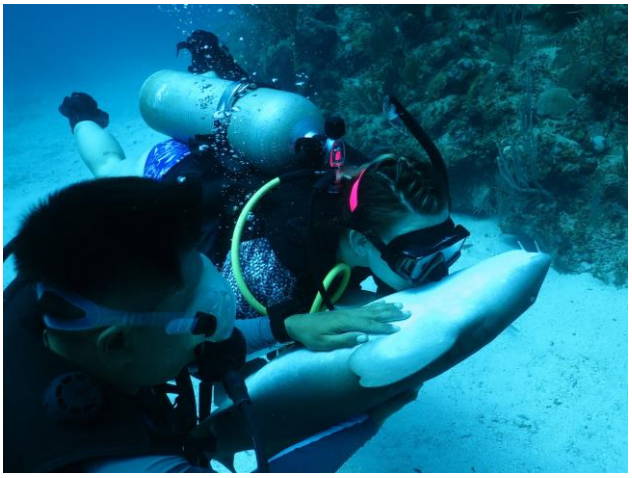
The testing of dive computers using human subjects has been very limited; that means most of the support for computers' use has resulted from their operational success. But operational safety does not translate to decompression-algorithm safety since most real-world dives do not push the algorithms to their limits. The simplest way to understand the operational benefits a particular dive computer truly offers is to simulate dives using the computer's software and then analyze the generated profiles using validated dive tables. If the results are very similar, the risk of DCS should be roughly equivalent.

There is a lack of information on how different models compute decompression, and this is sometimes perceived as a lack of verifiable safety. The problem is an absence of standards specific to dive computers that allow assessment of their functional safety. Applied to

a dive computer as a safety-critical system, such standards would mean the device performs according to requirements and that in case of failure, no harm would occur. There is a need for a consolidated dive-computer safety standard that uses the essential safety and health requirements of CE Marking Directives (a set of widely accepted European product conformity standards).

Applicability of Dive-Computer Algorithms

Dive-computer models employ more conservative versions of dive tables; they achieve this primarily by reducing the tolerated levels of supersaturation. While it's obvious that using a decompression model outside of its validated range carries risk, even using one within its validated range does not guarantee safety. A multilevel dive computed as an extension of the multicompartment theory (which was validated using square dives) cannot be assumed to follow the same rules.



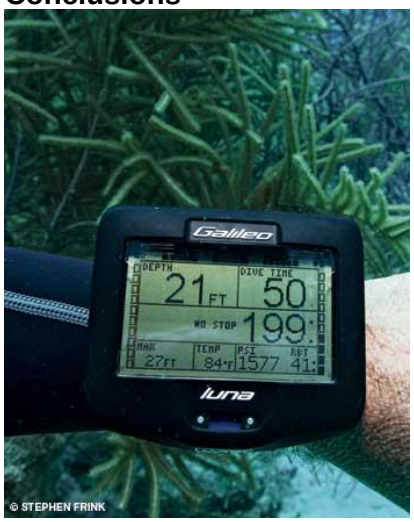
Kristin found a new friend

There is little agreement among various computers with regard to repetitive dives with short surface intervals (one hour or less). While a relatively standard Haldanean implementation is at the core of most dive computers, different mathematical manipulations are employed to account for residual nitrogen. This indicates that the true impact of residual nitrogen is not fully understood.

To manage the risk of DCS, dives are conducted according to decompression schedules that have parameters that account for depth, time and breathing gas. These schedules are derived from algorithms that aim to limit bubble formation by slowing decompression, typically by interrupting ascent with decompression stops to allow time for washout of inert gas from tissues. Many decompression models use DCS as a measurable endpoint, but it's not generally practical to commit time and money to the large number of dives necessary for this type of validation, nor is it particularly ethical to provoke DCS.

Venous gas emboli (VGE) nearly always accompany DCS, although their presence does not have a direct relationship with clinical symptoms. However, VGE are an accepted indicator of the level of decompression stress that a diver has been subjected to and can thus be used as a tool to help in the validation process.

Conclusions

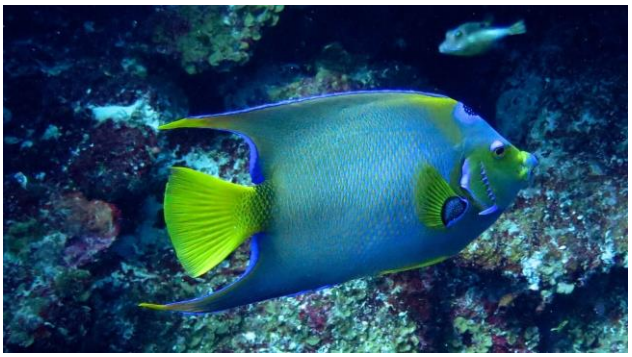


Clarity of information and comfort are important aspects of dive-computer validation.

Twenty-nine years of operational experience with dive computers has demonstrated that their advantages over tables outweigh their disadvantages. The primary issue with computers remains their mechanism of accounting for repetitive dives. The significant variability among dive computers means selection criteria should be established to meet

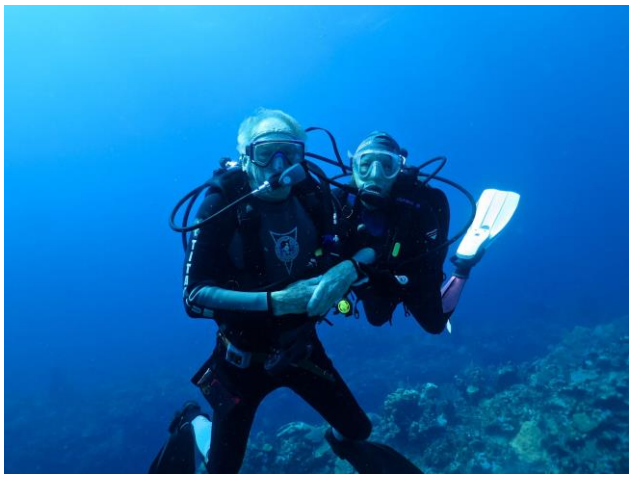
the specific needs of particular dive communities. An important element of this approach is the creation of a community-specific universe of "safe" dive profiles for which the computer is effective. This can be accomplished through the use of a dive-computer monitoring program. Traditionally, the limits of decompression models were established using trials with human subjects, but this is not likely to occur in dive-computer validation because of the time and expense involved as well as the infinite combination of dive computers and settings.

At present, DCS is the measurable negative outcome. There is a need to specify an acceptable level of DCS risk and a method for measuring that risk. A defined window of applicability for each computer is also needed. A dive computer should have the support of a dive planner, and the computer's functionality and safety must be verified and documented. To understand "what's in the box," documentation of designers' logic and equations is needed.



There is no evidence that multilevel dives with dive computers are more risky than square dives when they follow the same algorithm. The risk of DCS in no-decompression recreational and scientific diving is no greater now than when tables were prevalent. This is largely because dive computers are not pushed to the limits of their decompression models or algorithms.

Dive-computer validation should include specification of training standards for divers who use the computer, thorough assessment to ensure the computer meets all requirements for validation and monitoring of the computer's operational performance.



Charlie and Corrine

Carol making a new friend

Bluegrass Dive Club 2017-2018 Calendar

- October 10 General Meeting
- October 24 Board Meeting

- November 14 General Meeting
- November 28 Board Meeting

- December 9th **Christmas Party**

- January 9 General Meeting
- January 25 Board Meeting

- February 13 General Meeting
- **February 10-17** Curacao
- February 22 Board Meeting

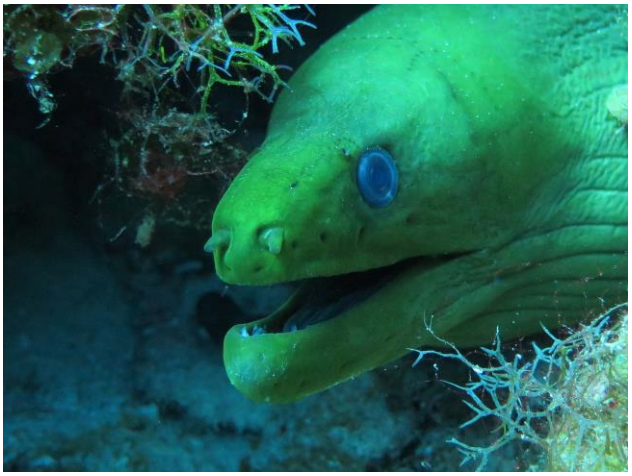
- March 13 General Meeting
- March 29 Board Meeting

- April 10 General Meeting
- April 26 Board Meeting

- May 8 General Meeting
- May 31 Board Meeting

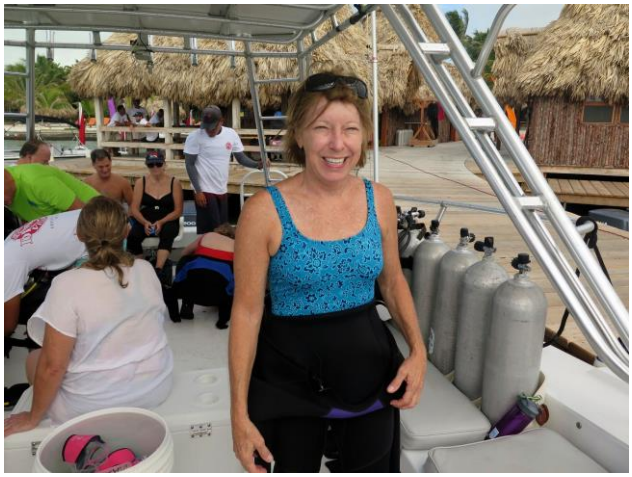
- June 12 General Meeting
- **June 10-23** Africa
- June Board Meeting

- July 10 General Meeting
- July 26 Board Meeting



Dive Committee Members

Doug Geddes – Chairman	621-3178
Tracey Combs	621-4066
Ralph Covington	621-3862
Mike Sullivan	266-4516
Ed Sullivan	C@Meeting
John Geddes	223-7926



Corrine waiting to head out for the day……