



# E-SLATE

## American Academy of Underwater Sciences (AAUS)

### EDITORIAL NOTE – February 2013

Welcome to the February E-Slate. In this issue we call for abstracts for the 2013 AAUS/EDSP International Science Diving Symposium, announce several open internships and scholarships, call for AAUS BOD nominations and several award nominations and highlight another organizational member. Submit an electronic version of your poster from 2012 poster night and we will highlight your program in the coming months! We encourage you to participate in the online forum. There is a new website option to notify you when new topics are posted. We welcome news, announcements, job postings, and images of underwater work at [aaus@disl.org](mailto:aaus@disl.org). Current and past issues of the E-Slate are available at [www.aaus.org](http://www.aaus.org).

### Taking a Deep Look at Tools for Scuba Divers

By Kit Eaton

In the middle of winter there can be few more spine-chilling thoughts than the idea of slipping into the ocean for a dip. But at least one group of people are attracted to the idea of year-round: scuba divers.

While high technology and water don't mix well as a rule, the smartphone and tablet revolution has expanded to diving. Divers now have many apps to help them plan, execute and even train for their dives.

For beginners who need to pass certification tests before they can dive freely, the Scuba Exam app (a restricted-feature version is free on [iOS](#) and on [Android](#)) is an ideal helper. Novice divers will enjoy its short history of diving, back to early diving-bell experiments by Guglielmo de Lorena in 1531. It also has a dictionary of diving terms and expressions, and you'll get more terms with the app's full version on [iOS](#) and [Android](#) (\$4 each). But the app's main feature is a practice quiz about best diving practices, with plenty of questions to prepare you for your diving qualification test. The app is not pretty to look at, nor is it very sophisticated. But the simplicity of its straightforward design will be useful to help you refresh your knowledge in your spare moments.

For seasoned divers, apps can help you log dives; you can enter data on your smartphone while every detail about the dive is fresh in your memory. The [\\$12 iOS app](#) Dive Log offers one of the most comprehensive diving logs. A quick tap on the "+" button takes users to a prompt to either enter a new dive in an empty template, or use the last dive's log

as a template. The interface for entering dive data is intuitive — twirling dials to set dive depth, for example, or choosing from a prepopulated list of dive types (like "fun" or "wreck"). It can even sync with dive logs on your computer, show you your overall diving statistics and keep track of your diving buddies' details. The one criticism is that the app is so complex that it's easy to get a little lost in its menus.

Diving Dude ([free on iOS](#)) offers a similar experience, and even has a few social networking features. You can, for example, see your buddies' recent dive experiences in detail.

It's more cheerfully designed than Dive Log, relying more on icons to simplify logging dive details like water visibility or weather. But the app feels slow to respond in some places, and you have to scroll down to the "save" button to save data, a step that is easy to forget.

The free Android app Dive Log offers a [basic, text-based interface](#). But it doesn't skimp on functionality. Like the iOS app of the same name, it lets you log detailed dive data. Divers who like to keep precise track of their experiences may even prefer it to the iOS alternative.

To help with compressed air calculations, iDive Nitrox ([\\$2 on iOS](#)) is a simple no-frills app. On its single screen, you enter your planned depth and other details, by using sliders or typing in figures. The app immediately gives data like the best blend of nitrogen and oxygen to use. The free Nitrox Calculator app for [Android](#) is similar in function. These apps also caution you that they are not meant to replace your own calculations; they're best used to double-check yourself.

Knowledge of tides and currents is critical to divers, and many apps promise to help. For worldwide tides, Marine Tides Planner ([free on iOS](#)) has a long list of global ports, and delivers tide predictions with clear charts and numerical tables. The map interface for selecting locations is confusing, but you can mark locations as favorites. You'll probably tap most often on those favorites and rarely have to worry about the map. The app is free for basic tide predictions, but for more precise tidal calculations there's an in-app purchase option. The app is free, though it does require you to pay for extras to make calculations accurate for tidal predictions.

A free Android app, Tides & Currents, does an equally fine job of [predicting tides](#) in the near future. This app has a slightly confusing alphabetical list of locations, but you can configure it to report ports nearest to your location. It has a basic interface and the tidal data display is clear and uncluttered.

*Published in The New York Times  
January 9, 2013*

### **Florida University Takes Over Undersea Lab**

*By Jennifer Kay*

A South Florida university is taking over a Florida Keys underwater research laboratory that had been set to close because of federal budget cuts, officials said Tuesday. Florida International University has received a grant to maintain Aquarius Reef Base for the National Oceanic and Atmospheric Administration in 2013. The Miami-area school also will develop a business model to fund future operations at the lab.

NOAA owns the pressurized lab that sits about 60 feet below the ocean's surface a few miles off Key Largo. The 43-foot-long metal tube - it looks like a mobile home encrusted with coral - allows scientists to live and work underwater for days at a time without coming up for air.

Aquarius was the last government-funded underwater lab until President Barack Obama's administration cut its \$3 million annual funding. It had been scheduled to shut down at the end of 2012 unless private funding could be secured. The new business model would aim to broaden financial support for the lab's operations to include other scientific institutions and private donations, instead of relying only on the federal government, said FIU biology professor Jim Fourqurean, who will oversee operations at Aquarius.

Marine scientists made what they thought would be their last dive to Aquarius in July. For two decades, year-round research at Aquarius allowed scientists to compile a continuous stream of data from one coral reef in a region where those fragile ocean ecosystems have rapidly declined. Scientists largely blame climate change and man-made stresses for that decline.

The unique long-term data collected at Aquarius is invaluable, Fourqurean said. "The work is partly site-specific at Conch Reef, but that work also allows us to interpret what we've learned and apply it up and down the Florida Keys and elsewhere in the world," he said. "Keeping it for the value of the accumulated knowledge is an important thing."

Scientists staying at Aquarius are dubbed "aquanauts," and since 2001 their ranks have included NASA astronauts training for space missions. Astronauts last trained at

Aquarius in June on a mission that simulated a visit to an asteroid. NASA does not have plans for any training at Aquarius this year, said a spokesman for the space agency's Office of Human Exploration and Operations.

The advanced diving techniques that allow the aquanauts to stay at Aquarius also have been adapted for offshore drilling operations, and one former underwater lab has become an undersea hotel off Key Largo. But Aquarius appeared to be the only government-funded underwater research station left.

The University of North Carolina Wilmington ran the lab for NOAA from 1991 until last year. The existing Aquarius team will become FIU employees.

*Published FL State Wire (AP)  
January 15, 2013*

## **NEWS/ANNOUNCEMENTS**

### **AAUS/ESDP 2013 Curaçao Joint International Scientific Diving Symposium**

Call for Abstracts: The American Academy of Underwater Sciences and the European Scientific Diving Panel Symposium Committee are now accepting abstracts for the *Curaçao Joint International Scientific Diving Symposium*, October 23-27, 2013. Electronic submission of 300-word abstracts are accepted at [aaus@disl.org](mailto:aaus@disl.org) until April 15. Subject line must include "AAUS symposium abstract" followed by lead author's last name. Topics range broadly in the marine sciences from marine conservation, ecology and biodiversity to methods and techniques of underwater research and diving safety. Authors will be notified of abstract acceptance for oral or poster presentation by May 01. Authors expressly accept the obligation of submitting an 800 to 1200-word extended abstract, or full manuscript at the authors' discretion, by July 01 for publication in the 2013 Symposium Proceedings. Editorial and review comments will be forwarded to authors for their consideration with a final submission return date of August 31. For queries please contact Dr. Michael A. Lang ([mlang@oceanfdn.org](mailto:mlang@oceanfdn.org)) or Dr. Martin D.J. Sayer ([martin.sayer@sams.ac.uk](mailto:martin.sayer@sams.ac.uk)).

### **AAUS Diving Reciprocity with NOAA**

AAUS diving reciprocity with NOAA is renewed through December 31, 2013 for employees of current, active AAUS organizational member programs who are covered by their institutions for costs associated with any injuries that may occur while participating in diving operations under NOAA auspices. Such coverage includes, but is not limited to: emergency transportation, hyperbaric or other medical treatment, hospitalization, and compensation for lost wages

associated with extended absence due to work-related medical emergencies. Reciprocity is based solely on the performance of scientific diving tasks as outlined in 29 CFR 1910.401 Subpart T. AAUS scientific divers must present to the NOAA Divemaster a signed letter of reciprocity from their DSO verifying workers compensation coverage and must have completed three dives within 90 days of project start-up. In addition to the current AAUS medical standards, chest X-ray (CXR), spirometry, and complete blood count (CBC) must also be done. Please address any additional queries to Douglas R. Schleiger, Acting Manager, NOAA Diving Program, 7600 Sand Point Way NE, Seattle, WA 98115-0070; (206) 526.6476.

### **AAUS 2013 BOD MEMBERS**

The AAUS Board of Directors welcomes new members elected director, Chris Rigaud (The University of Maine) and appointed director, Finance Committee Chair, Elliott Jessup (California Academy of Sciences). Thank you for your willingness to serve the Academy!

### **AAUS BOD Call for Nominations**

The 2013 AAUS Nominating Committee is seeking individuals to run for two executive officer positions; President-Elect and Secretary, and a Director-at-Large on the AAUS Board of Directors.

Commencing on January 01, 2014, the President-Elect will serve a two year term, automatically succeeding the President at the end of his/her term for a two-year term as President. The Secretary will serve a two-year term. Duties and responsibilities are detailed in the AAUS Bylaws available for reference at <http://aaus.org/bylaws>. The Director-at-Large position involves a three-year term. Duties and committee responsibilities will be assigned by the President.

Qualified candidates must be voting members in good standing with the Academy.

Please submit nominations to one of three nominating committee members:

Christian McDonald, Chair ([cmcdonald@ucsd.edu](mailto:cmcdonald@ucsd.edu))

Steve Sellers ([Steven.Sellers@nps.gov](mailto:Steven.Sellers@nps.gov))

Dave Pence ([dpence@hawaii.edu](mailto:dpence@hawaii.edu))

The nominating committee will present a list of nominees and candidate bios to the Board of Directors on March 31, 2013. Candidates will be asked to submit responses to several questions to be provided to the AAUS membership as part of the election process. An electronic poll will open on May 01 and close June 30, 2013.

### **AAUS/OM Standards Manuals Update**

All OMs need to update their manuals with the new medical standards and upload them to the AAUS website. Include

the date of the revision in the file name. Due to issues with the transfer of information to the new website many manuals did not switch over, and no manual is listed as current unless it was uploaded after December 03, 2012. The deadline for uploading updated manuals is March 15, 2013.

### **AAUS Spring BOD Meeting**

The spring AAUS Board of Directors meeting will be held in La Jolla, California. The BOD will meet February 23-24, 2013

### **2013 Organizational Member Dues**

2013 OM dues are now due. Please check your profile at [www.aaus.org](http://www.aaus.org) to be sure all of the information is correct.

### **Call for Papers**

*Marine Technology Society Journal - Technologies and Techniques for 21<sup>st</sup> Century Wet Diving (Nov/Dec issue)*

Special Issue Guest Editor: Michael Lombardi, Ocean Opportunity Inc. and Lombardi Undersea Resource Center

Issue Description and Topics Sought: While humans have pursued intervention of the ocean for centuries, the 20th century in particular gave rise to unprecedented accessibility. The advent of scuba in the 1950s allowed any person with an inquisitive mind to visit the underwater world. This sole pursuit of setting foot in *ocean incognita*—an unknown ocean—has since opened countless opportunities in industry, academia, for defense strategies, and for recreation and entertainment. This special issue of *MTS Journal* will focus on the current state of diving technologies and techniques crossing all industry sectors, emphasizing current advancements, limitations, and newly exposed opportunities. Paper priorities will be given to topics including closed-circuit rebreathers, underwater habitation, decompression theory and modeling, training standards, undersea intervention techniques, new methods for diver-based scientific and commercial data gathering, and carrying out complex tasks in extreme environments.

Information for submitting manuscripts can be found at [https://www.mtsociety.org/author\\_info](https://www.mtsociety.org/author_info). or potential authors can contact [michael@lombardiundersea.com](mailto:michael@lombardiundersea.com)

### **AAUS Member Statistics Submission**

It is time for submission of organizational member (OM) 2012 scientific diving statistics to the AAUS database. Please begin compiling these numbers now! Even if your OM is using the web based dive log system, you must still print out a summary report, review it for accuracy and submit it to the website below. OMs admitted in 2012 are not required to submit stats for 2012 but if you have them for the full year and would like to submit contact Cheryl Thacker ([cthacker@ehs.ufl.edu](mailto:cthacker@ehs.ufl.edu)) or Mike Dardeau

([mdardeau@disl.org](mailto:mdardeau@disl.org)). Forms for your 2012 summary submissions are available at [http://stats.diveaaus.org/User\\_Login.asp](http://stats.diveaaus.org/User_Login.asp). Statistics are considered late as of April 01. The statistics committee will work with OMs to overcome any technical issues but if the submitted materials are not complete by July 01, the lapse will be turned over to the Standards Committee for action. A link to the site and data collection criteria is available at [http://aaus.org/statistics\\_committee](http://aaus.org/statistics_committee).

### Website Update

Members can now opt to be notified via email when new topics are posted to the online forum. You can find it in your member profile just above the Member Qualification section. Please login and select this option to become an active part of the online conversation!

## AWARDS

### DEMA - Reaching Out Awards

DEMA is honored to request nominations for the 2013 DEMA Reaching Out Award, asking the Diving Industry to submit the names and qualifying information of those Industry professionals who have made a significant contribution to the sport of scuba diving. Deadline to submit nomination forms is 5:00 p.m. Pacific Time on Friday, April 19, 2013. Learn more about submitting an application at <http://www.dema.org/displaycommon.cfm?an=1&subarticlenbr=754>

### 2013 Conrad Limbaugh Award Nominations

Nominations are now open for the 2013 Conrad Limbaugh Memorial Award for Scientific Diving Leadership. This award is presented annually to an individual who has made a significant contribution in diving safety and diving leadership on behalf of the scientific diving community. It is open to any past or present member of AAUS. Nominations are sought from the AAUS general membership, and selected candidates are voted for by the AAUS general membership. Current BOD members are not eligible during their term of office.

Please complete the online submission form at [www.aaus.org](http://www.aaus.org) or submit the names and contact information for nominees, along with a one-paragraph justification, to John Heine, AAUS Awards Committee, by email to: [jheine@ucsd.edu](mailto:jheine@ucsd.edu) Nominations close March 31, 2013.

## STUDENT OPPORTUNITIES

### HMSC 2013 Scholarships

The Hatfield Marine Science Center is pleased to announce 2013 opportunities for various scholarships to assist students in research and other scholarly endeavors. These scholarships and awards are the result of generous financial

gifts from donors to the HMSC over many years. Please refer to the HMSC website for detailed information, including application requirements, for each award <http://hmsc.oregonstate.edu/awards.html>

### REEF Internship

Reef Environmental Education Foundation (REEF) is now accepting applications for the Summer 2013 Marine Conservation Internship. The internship is designed to provide in-depth experience in marine conservation and non-profit management. The program is geared to college-age individuals (Juniors, Seniors, recent graduates & graduate students). Through the internship you'll gain experience in community outreach/ education programs and field work including lionfish handling/collection and fish identification. There will also be ample opportunities to scuba dive and volunteer with other marine conservation and non-profit organizations. The internship is based out of Key Largo, Florida. Applications are due by March 15. Visit <http://www.reef.org/about/internships/application> for more information on the internship and how to apply.

## UPCOMING EVENTS

### 2013 Scientific Dive Course – FHL

The University of Washington (UW) Friday Harbor Laboratories (FHL) will conduct its annual short intensive scientific dive course from August 12 through August 25th, 2013. This is a two-week non-credit workshop designed to provide the basic requirements for becoming certified as a scientific diver according to AAUS standards. It includes First Aid/CPR/Oxygen for SCUBA emergencies training and Rescue diver certification. Students will learn some basic techniques used by scientists conducting subtidal research at FHL and will gain experience in data collection underwater. The San Juan Islands are a challenging and species-rich dive destination.

Course fees will include: room & board at FHL, DAN and PADI certification cards, and Rescue training e-learning materials. This course is open to scientists and students at any level of study who meet the requirements for AAUS certification: a minimum of 20 logged dives and medical clearance. It is ideal for undergraduates and graduate students who have achieved an advanced level of recreational diving and aim to pursue subtidal research in the near future. Students must provide all their own gear (except for SCUBA cylinders) appropriate for cold water and meeting UW diving safety regulations.

For more information, please see the FHL website: <http://depts.washington.edu/fhl/studentSummer2013.html#SumB-xx> or contact the FHL Dive Officer Pema Kitaeff directly at [pema@uw.edu](mailto:pema@uw.edu) or 206-543-0876. Application deadline is April 15, 2013.

### 2013 Maritime Archaeology Field School

Saint Mary's College of California (SMC) and the University of Rhode Island will be offering a joint Field School in Maritime Archaeology in Bermuda during July 2013. This annual field school has been conducted in cooperation with the Bermuda

Maritime Museum since 1999. The field school is a research-based learning experience that exposes students to a variety of activities



including archival research, artifact conservation, archaeological survey, and underwater excavation and documentation of historic shipwrecks. The field school will be conducted from July 15 to August 8, 2013. Training leading to AAUS qualification as a Scientific Diver-in-Training will be provided in advance of departure for Bermuda. Classroom work focused on maritime history and maritime archaeological field methods will comprise week one of the field school. Underwater research and documentation of 16th and 17th century shipwrecks will be conducted in Bermuda during the remaining weeks. For additional information and requirements, please contact [jallan@stmarys-ca.edu](mailto:jallan@stmarys-ca.edu), [rodmath@mail.uri.edu](mailto:rodmath@mail.uri.edu), or the SMC DSO at [ses13@saintmarys-ca.edu](mailto:ses13@saintmarys-ca.edu).

### DAN Diving and Hyperbaric Medicine Course

The 73<sup>rd</sup> DAN Diving and Hyperbaric Medicine Course will be held May 04-11, 2013 at Anse Chastanet on St. Lucia. This six-day course is designed primarily for physicians. Emergency medical personnel, paramedics, nurses and professionals with interest in diving medicine will also find the course valuable. The program is jointly sponsored by DAN and Wilderness Medical Society for continuing medical education credit. The faculty includes: Dr. Neal Pollock (course director), Dr. Simon Mitchell, Dr. Matias Nochetto and Dr. Debbie Pestell. The program is jointly sponsored by DAN and Wilderness Medical Society for continuing medical education credit. Contact DAN Education at [919-684-2948](tel:919-684-2948); 800-496-446-2671 [cme@dan.org](mailto:cme@dan.org).

### CCSDA 4th Annual Science Diving Symposium

Coastal Carolina Scientific Diving Association will hold its 4<sup>th</sup> annual science diving symposium on Friday, February 22, 2013, hosted by the North Carolina Aquarium at Pine Knoll Shores. The Scientific Diver Symposium is held annually in Carteret County, NC and is open to all scientific divers, scientists, and educators who work in or around Carteret County and contribute to expanding knowledge of

marine and estuarine environments. Symposium goals are: to allow scientific divers to meet and exchange information with other divers on methods, techniques, and research that requires the use of SCUBA as a tool, to share knowledge of safer and more efficient diving and research methods, and to educate non-diving scientists and educators about ways SCUBA and divers might enhance their success. Submit your abstract to [ccsda.info@gmail.com](mailto:ccsda.info@gmail.com) by February 15, 2013. For more information, visit <http://ccsda.blogspot.com>.

## JOB ANNOUNCEMENTS

### Dive Safety Officer

*Texas A&M Corpus Christi*

The dive safety officer (DSO) will serve as working diver, lead diver, dive supervisor, and/or mission coordinator during air, mixed gas, decompression, and/or saturation research diving operations involving a variety of diving technologies as appropriate for the organization. See the full job posting and application instructions at [www.aaus.org/job\\_board](http://www.aaus.org/job_board).

### Dive Technician

*California Science Center*

The Dive Programs Technician possesses a current Scientific Diver certification and will assist the Dive Safety Officer (DSO) developing, implementing, and maintaining the Science Center's Dive Safety and Volunteer Diver training programs. See the full job posting at [www.aaus.org/job\\_board](http://www.aaus.org/job_board). To apply, send cover letter, resume and salary history to the HR Dept. (213-744-2673 fax or [HR@cscmail.org](mailto:HR@cscmail.org) email), or mail to the California Science Center Foundation, HR Dept, 700 Exposition Park Dr., Los Angeles, CA 90037. No phone calls please.

## OM PROGRAM HIGHLIGHT

### California Department of Fish and Wildlife

[www.dfg.ca.gov/marine/fir/divingsafety](http://www.dfg.ca.gov/marine/fir/divingsafety)



The Diving Safety Program (DSP) provides oversight of compressed gas diving activities conducted by the California Department of Fish and Wildlife. The DSP oversees dive planning, supports ongoing projects, and provides training for 70 active divers. The DSP is administered by the Marine Region and has been an AAUS Organizational Member since 2000.

## Program History

### Early Diving

In 1939 commercial hard-hat divers were hired to conduct abalone surveys in central CA. Department staff also received training, and later that year made their first research dives (Bonnot 1940). Use of “heavy gear” by Department staff continued until the introduction of scuba in the 1950s (Cox 1962).



Glen Bickford, DFG biologist, aboard *RV Mollusk*, ca. 1940. A former commercial abalone diver, Glen conducted abalone surveys along the central CA coast and taught other DFG staff to dive.

### Early Scuba Training

With assistance from the U.S. Navy and Conrad Limbaugh of the Scripps Institution of Oceanography, DFW held its first scuba training in 1958. Among the first users of this new research tool were members of the southern California Sportfish Investigation Unit.

### Early Safety Program

By 1960 a diving safety manual was in place and the first DFG scuba certification school was held at Avalon, Catalina Island in 1962. The Department Diving Safety Board was organized shortly thereafter.

### Dive Safety Board

The Diving Safety Board (DSB) provides consultation and guidance to the Diving Safety Officer and helps guide a dive program with an excellent safety record. DSB members serve as technical and policy advisors and several Board members take an active role in diver training and safety programs.

- Allen Dekelboum, M. D. Medical Advisor, Board Member
- Spencer Gilbert, Warden, Board Member
- Peter Haaker, Senior Biologist, Ret., Board Member
- Sonke Mastrup, Exec. Director, FGC Diving Safety Manager, Board Member
- Jonathan Nelson, Staff Environmental Scientist, Board Member
- David Osorio, Environmental Scientist, Diving Safety Officer, Board Member
- Ian Taniguchi, Senior Environmental Scientist, Board Chair

- John Ugoretz, Ecologist, U.S. Navy, Board Member
- Mark Windham, Lt., Ret.; Training. Officer, Board Member

### Projects

The Department’s 70 divers, scientific aides, environmental scientists, law enforcement staff, engineers, and select volunteers, are based in more than 15 locations and are engaged in diving projects in the ocean, rivers, lakes and reservoirs statewide. Many diving projects are collaborative efforts involving divers from other AAUS Organizational Members and Federal agency dive programs.



DFW field offices and dive sites. Sites represent generalized locations of active diving projects 2011-2012.

### Program Statistics

Scientific and Training dive activity is reported to the Academy annually. On average, open circuit mode is used for 90% of dives, and closed-circuit rebreather for 10%. Approximately 15% of open circuit dives utilize nitrox as breathing gas.



Environmental Scientist Kai Lampson scans a RFID-tagged pink abalone (*H. corrugata*). Small scale movement patterns and aggregation habits inform abalone restoration efforts on select southern CA reefs

### Training and Education

Since the 1960s more than 300 divers have been trained by the DSP. Divers must qualify annually at recertification workshops where they undergo swim testing, refresh emergency responder skills, and perform check-out dives. Program divers must complete at least 20 dives annually. Specialty training offered by the DSP includes:

- Altitude
- Blackwater
- Fill Station Operator
- Rebreather (100% O<sub>2</sub>)
- Staged Deco, <190 fsw
- Swiftwater
- Tended / Tethered
- Full Face Mask
- Dry Suit
- Nitrox



Recertification workshops are an integral part of DSP training and serve, in part, to maintain emergency responder skills. They are also a venue for introducing new diving techniques, demonstrating diving proficiency, and evaluating dive gear for compliance. They also provide an opportunity for interdisciplinary safety training.



### **Management Applications**

Diving projects provide data that inform fishery management (e.g. recruitment, density, size frequency). Staff also conducts regular monitoring, sampling, and other tasks mandated by several statutes, management plans, etc.

### *Research and Monitoring*

- Nearshore Fishery Management Plan
- Marine Life Protection Act
- Marine Life Management Act- Essential Fisheries Information
- Abalone Research and Management Plan
- ESA Endangered & Threatened Spp Recovery Plans, abalone
- Spiny lobster FMP, in prep.
- Pacific Herring Supplemental Environmental Document
- Market Squid FMP
- USFWS Southern Sea Otter Recovery Plan (DFG responsible party)
- National Pollutant Discharge Elimination System permit compliance
- US Army Corps of Engineers MOU
- DFG Fish Rescue Policy (in prep.);
- ESA
- CA state peace officer duties

### *Habitat Protection and Pollution*

- DFG Invasive Species Program
- FGC Section 6021;
- CALFED Stage 1 Implementation Action
- OSPR Sea Otter Oil Spill Contingency Plan
- State Water Resources Control Board/ DFG Interagency Agreement
- AB 982, State Water Resources Board SWAMP
- OSPRA; Gov Code 8670
- FGC Sections 5980, 6020, and 6100

### *Compliance with Laws and Regs, Public Safety*

- California Code of Regulations, Title 14
- Fish and Game Code;
- NMFS regulations (x-deputized)
- CA state peace officer duties

## **DIVING PHYSIOLOGY PUBLICATIONS**

### **Edmonds C. A forensic diving medicine examination of a highly publicised scuba diving fatality. *Diving Hyperb Med.* 2012 Dec; 42(4): 224-30.**

A high-profile diving death occurred in 2003 at the site of the wreck of the SS Yongala off the Queensland coast. The victim's buddy, her husband, was accused of her murder and found guilty of manslaughter in an Australian court. A detailed analysis of all the evidence concerning this fatality suggests alternative medical reasons for her death. The value of decompression computers in determining the diving details and of CT scans in clarifying autopsy findings is demonstrated. The victim was medically, physically and psychologically unfit to undertake the fatal dive. She was inexperienced and inadequately supervised. She was over-weighted and exposed for the first time to difficult currents. The analysis of the dive demonstrates how important it is to consider the interaction of all factors and to not make deductions from individual items of information. It also highlights the importance of early liaison between expert divers, technicians, diving clinicians and pathologists, if inappropriate conclusions are to be avoided.

### **Held HE, Pendergast DR. Relative effects of submersion and increased pressure on respiratory mechanics, work, and energy cost of breathing. *J Appl Physiol.* 2013 Jan 10. [Epub ahead of print]**

Submersion and increased pressure (depth) characterize the diving environment and may independently increase demand on the respiratory system. To quantify changes in respiratory mechanics, this study employed a unique protocol and techniques to measure, in a hyperbaric chamber, inspiratory and expiratory alveolar pressures ( $P_{AI}$  and  $P_{AE}$ , interrupter technique), inspiratory and expiratory resistance in the airways ( $R_{awI}$  and  $R_{awE}$ , esophageal balloon technique), nitric oxide elimination ( $V_{NO}$ , thought to correlate with  $R_{aw}$ ), inspiratory and expiratory mechanical power of breathing ((I) and (E)), and the total energy cost of ventilation. Eight healthy adult males underwent experiments at 1 atmosphere absolute (ATA),

2.7ATA, and 4.6ATA both dry and fully submersed. Subjects rested, cycled an ergometer at 100W, and rested while voluntarily matching their ventilation to their own exercise hyperpnea (ISEV). During ISEV, increased  $\text{VO}_2$  (above rest values) resulted from increased  $V_E$ .  $R_{awI}$  decreased with submersion (mean 43% rest, 20% exercise) but increased from 1ATA to 4.6ATA (19% rest, 75% exercise), as did  $R_{awE}$ : 53% decrease with submersion (rest), 10% (exercise); 9% increase from 1 to 4.6ATA (rest), 66% (exercise).  $V_{NO}$  did not correlate with  $R_{aw}$ . Depth increased (I) during rest (40%) and exercise (20%). (E) was largely unchanged. These results suggest that the diving environment affects ventilatory mechanics primarily by increasing airway resistance, secondary to increased gas density. This necessitates increased alveolar pressure and increases the work and energy cost of breathing as the diver descends. These findings can inform physician assessment of diver fitness and the pulmonary risks of hyperbaric oxygen therapy (HBOT).

**Jendle J, Adolfsson P, Ornhagen H. Swedish recommendations on recreational diving and diabetes mellitus. *Diving Hyperb Med.* 2012 Dec; 42(4): 231-3.**

Divers from many countries travel to explore various diving sites worldwide. In 2005, the Divers Alert Network (DAN) wrote guidelines for recreational diving and diabetes mellitus, but there is no up-to-date consensus or adoption of international guidelines on diabetes and diving. There are also large differences between the regulations in different countries. This is potentially both a medical and an insurance problem for a diver with diabetes. We present the current Swedish recommendations for recreational divers with Type 1 diabetes mellitus.

**Löfdahl P, Andersson D, Bennett M. Nitrogen narcosis and emotional processing during compressed air breathing. *Aviat Space Environ Med.* 2013 Jan; 84(1): 17-21.**

**BACKGROUND:** Previous studies on nitrogen narcosis have focused on how it affects behavior, performance, and cognitive function. However, little is known about the effects of nitrogen narcosis on the emotional processing of external stimuli. **METHOD:** We presented 20 volunteers with images from the International Affective Picture System (IAPS) and categorized as unpleasant, neutral, or pleasant, while sitting in a hyperbaric chamber at the surface (101.3kPa) and at 39 m equivalent depth (496.4 kPa). The participants rated the images along three affective dimensions: valence (intrinsic attractiveness or aversiveness of a stimuli), arousal, and dominance. **RESULTS:** In the valence dimension there was no significant effect of increased pressure or interaction between increased pressure and image category. There was a significant interaction between image category and the pressure at which the images were viewed in the arousal dimension. The mean arousal rating score for unpleasant

stimuli was 0.5 point (on a 9-point scale) lower at hyperbaric conditions and equal arousal rating score for neutral stimuli in general. **DISCUSSION:** The absence of any effect of pressure in the valence dimension suggests that divers have no impairment in their ability to determine the pleasantness or unpleasantness of different stimuli. Furthermore, this study suggests that the effects of nitrogen narcosis on the emotional processing of external stimuli are primarily evident in the arousal dimension. Although differences in arousal ratings were relatively small in magnitude, even a small alteration in emotional response to external stimuli might be important in the context of deep diving.

**St Leger Dowse M, Cridge C, Shaw S, Smerdon G. Alcohol and UK recreational divers: consumption and attitudes. *Diving Hyperb Med.* 2012 Dec; 42(4): 201-7.**

**INTRODUCTION:** Scuba diving demands information processing, recall, reasoning, decision making and the ability to take control of situations under different scenarios. Anecdotal evidence suggests that some divers consume alcohol to excess around the time of a dive. This study investigates alcohol consumption and attitudes to alcohol in United Kingdom (UK) recreational divers. **METHODS:** A questionnaire addressing diving demographics, general health, type and frequency of alcohol consumption, and attitudes to drinking alcohol around the time of diving was available for anonymous completion online between September 2010 and January 2011. **RESULTS:** Records from 818 divers were analysed. Older divers were more likely to exceed the weekly alcohol units recommended by the UK government compared to younger divers ( $P < 0.001$ ), but binge drinking was associated with younger divers ( $P = 0.014$ ). Diving when considering themselves unfit to drive a car was reported by 151 (18.5%) respondents and 187 (22.9%) had witnessed a diving incident which they felt was attributable to alcohol. Only 313 (38.3%) respondents reported a responsible attitude to alcohol by their dive clubs both under normal circumstances and whilst on a dive trip. **CONCLUSION:** Some divers undertook diving activities when potentially over the legal limit to drive a car and demonstrated a possible lack of understanding of the effects of alcohol beyond dehydration. Divers considered club attitudes to drinking and diving to be less responsible when on a diving trip. Some divers took a more responsible attitude to alcohol consumption having witnessed a diving incident which was potentially related to alcohol.

The mission of the American Academy of Underwater Sciences is to facilitate the development of safe and productive scientific divers through education, research, advocacy, and the advancement of standards for scientific diving practices, certifications, & operations.

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