



PS Diver Monthly 99

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INTRO TO SONAR

By Mark Atherton

Arthritis and Scuba
Diving

Fractures, Surgery and
Acute Conditions

Herniated Disc Disease

1-10-1 Rule
For Cold Water
Survival

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NEWS & EVENTS

CONTINUING ED.

Greetings

In this issue we present another aspect of technology for your dive team. In years past we introduced ROV technology that led to some crossover into sonar but we never had the same technical background or available expertise with sonar to offer educational articles. This issue offers the FIRST of a series of articles on sonar technologies by Mark Atherton. Mark and I met at the Underwater Intervention in New Orleans years ago and he was instrumental in getting [Kongsberg Mesotech](http://www.kongsbergmesotech.com) to join our Sponsor family. Mark is the author of *Echoes and Images, The Encyclopedia of Side-Scan and Scanning Sonar Operations* (<http://www.echoesandimages.com>) and has agreed to write a series of progressive articles on sonar technology for PSDiver Monthly.

It is my belief that the Homeland Security monies that were offered after the 9/11 attacks helped facilitate the introduction of new and advanced technologies into our field and discipline of diving.

This introduction led to a number of teams recognizing a need and application of those technologies then applied for and received grants and equipment. Most of the teams who applied and received it likely never had a budget for the equipment and would not have been able to obtain it without the assistance of those Homeland Security Grant monies.

At the same time, our discipline of diving became more and more evident to a larger audience and businesses saw a potential market for product and services. Perhaps the potential for sales and service was artificially enhanced by the large numbers that were given via Homeland Security.

Those companies who existed before 9/11 and supported us either had already recognized and respected us or the service we provided, and worked to support us within their own system. Some of the companies who "discovered" us

after 9/11 have already come and gone and were likely there for the profit potential and moved on when they discovered how difficult it is to sell to municipalities or when Homeland Security monies became more difficult to obtain. We can find no flaw in that, profit is what keeps companies alive, pays the bills, provides jobs etc.

Grant money is drying up rapidly and it is getting harder and harder to obtain the kind of financial assistance that was available in the years immediately following the 9/11 attacks in 2001. Personally I do not see that changing much over the next decade; maybe the next two.

What HAS happened though is we have become recognized as a genre specific diver discipline. Companies are now recognizing that we exist, have different needs in both training and equipment and know the difficulties we face in funding. Because our numbers are as large as they are, we DO represent a very viable potential market for particular businesses. Those who have managed to break into our world have been able to modify certain products that make them more useful or safer for us to use. Consider what the dry suit companies have done over just the last 10 years. Material has improved, seals are better and more user friendly and cost has come down in some instances. [Some companies are even manufacturing a PSD dry suit that is designed in both form and function for US.](#)

Dry suits used to be thought of for just cold water diving and occasionally were referenced for use in polluted water. Being stubborn, most of us considered our wet suits capable of doing cold water diving and we did not worry about polluted water unless we were asked to dive in a cess pool and THEN we would say, "Not without a dry suit". Until recently, we still considered diving with a dry suit and FFM one of the safest ways we could dive and be protected. We were wrong. Something as simple as the exclusion of part of the equipment that was really necessary was not touted until just a few years back. We have to ADD a dry hood to the dry

suit and FFM in order to truly protect a diver. Even then, there is a potential for exposure.

The technologies that we encounter and can adapt to our discipline of diving are amazing. There is a [device that will allow you to see through zero visibility water](#). It can be handheld with a heads-up display or used on an ROV without splashing a diver. They are not cheap but are far less than what I value MY life or ANY of my dive team member's lives.

Imagine the ability to drop in a [piece of equipment that will use sonar and map an entire area](#) before splashing a single diver. Imagine the opportunity to use different types of sonar equipment in combination with an [ROV with the ability to grasp an object and return it to the surface](#). How much risk is there to our divers if they never have to get in the water?

Unfortunately we can imagine all we want because the reality is that equipment, while available, is probably not within the financial range of the vast majority of dive teams.

But with time and innovation, I am confident these types of equipment will eventually find their way into our trucks and become some of our standard and primary tools.

These types of technology have existed for many years. Some have been applied to search and recovery almost since their inception but only as a side note to their main business. In today's world, specialty products that fit and meet our needs are being developed and brought to market.

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We will always need our divers regardless of the tools we have available. It will be up to us to continue to learn, to train, to adapt and to build and support our diving discipline.

WE have managed to make great strides in the last couple of years towards this goal. Though slow, the newly founded Water Response Training Council should become a catalyst for change and help us as a whole to become recognized and respected as a distinct discipline of diving.



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NEW SPONSOR!

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Each year I try to find new sponsors for the magazine. Believe it or not I am selective. There are some companies who are not a fit or do not understand what we do and just want to access our subscribers. While I have to have funds to run the magazine, I do my best to make sure we fit our sponsors as much as they fit with us. With that in mind, welcome [Gary Haddon and G-Dive](#) to our Sponsor family.

It is cold out. Stay warm and DIVE SAFE!

Mark Phillips

**Editor / Publisher
PSDiver Monthly**

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Special to PSDiver

Intro to SONAR

PSDiver Monthly MINI Series of Sonar Articles

By Mark W Atherton ©

Your team has taken possession of side-scan sonar and its delivery included two days of manufacturer training.

"The instructor was GREAT but there were seven trainees trying to learn the system and the amount of information imparted to us in that short time was - overwhelming! That was two months ago; we've just received a call a boat has been found overturned and two people are reported missing. The local news is covering this incident and because we have this new side-scan sonar, we're reportedly the 'search experts!' The reality is we're still learning how to hook it all up and turn it on!"

As a sonar instructor, I've heard this scenario too many times.

Over the next year, PSDiver Monthly is publishing a series of articles on sonar operations and will cover topics **not** in the instrument's Operator Manual – information and "tricks of the trade" to get your sonar up and running, your search done right and better prepare you to complete sonar data interpretation.

This first article focuses on what the operator needs to know *before* launching the sonar – acoustic basics.

Quick History:

The two primary types of acoustic equipment used for underwater search operations are side-scan and scanning sonar (the latter also referred to as *radial* or *mechanically scanned*). Side-scan, commercially available since the early 1970s, is the "wide-area" search tool but the ability to resolve a body-like target wasn't consistently possible until higher frequency systems (500kHz and higher) entered the market in the mid-1980s. Scanning sonar appeared in 1983 and with an initial frequency of 675 kHz, its applicability for body search was immediately recognized.

Is there one "best" system to have? Side-scan and scanning sonar are amazing but different tools – each with very specific operational strengths and weaknesses.

Fact: Both instruments need to be in the SAR team toolbox!

SONAR (as defined by the Merriam's Webster Dictionary):

SO-NAR \ˈsō-när\ *n* [**s**ound **n**avigation **r**anging] (1945) : a method or device for detecting and locating objects especially underwater by means of sound waves sent out to be reflected by the objects ; *also* : a device for detecting the presence of a vessel (as a submarine) by the sound it emits in water.

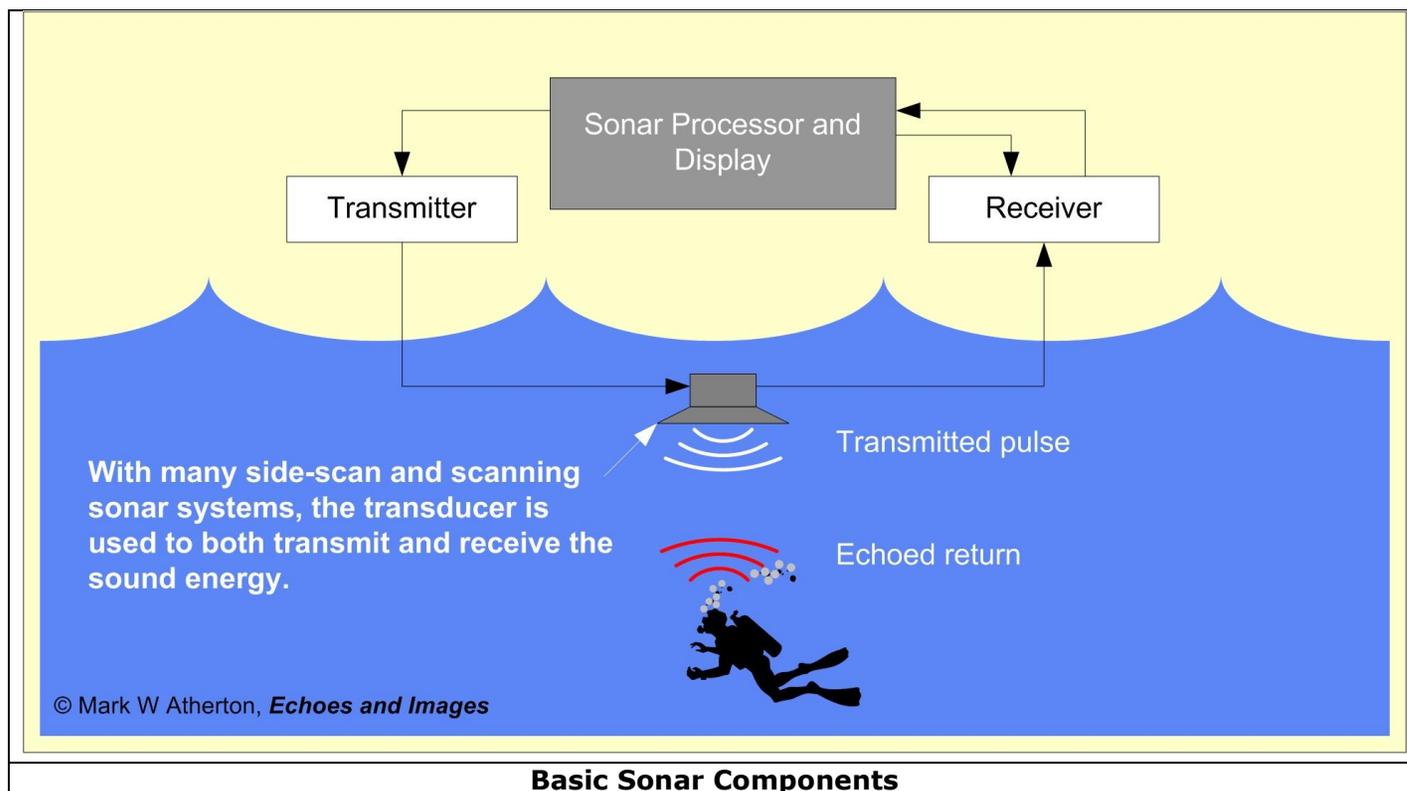
Interestingly enough, there are references that Ted Hunt, Director of the Harvard Underwater Sound Laboratory in 1942, coined the word SONAR. During research for the book *Echoes and Images, The Encyclopedia of Side-Scan and Scanning Sonar Operations*, another reference stated Hunt initially referred to this technology as SODAR – similar to the acronym RADAR (Radio Detection and

Ranging). Director Hunt has long passed; it is unfortunate the acronym change will likely remain a mystery.

Sonar and Sound Concepts:

Sound waves (sound energy) travel very efficiently through water, whereas radiation in the frequencies of light and radio waves quickly attenuate.

The ocean is inundated with a host of acoustic energy - wind and breaking waves, the sonic communication of whales, noise of amorous shrimp - all are sounds that occur naturally. In the sonar world, the trick is to discriminate a particular sound, or pattern of sounds, from within this aquatic cacophony. Man-made acoustic energy tends to be more structured, and follows distinctive and often deliberate patterns with respect to repetition and frequency. Side-scan and its scanning



counterpart are *active sonars* (where the instrument transmits acoustic energy and listens for its echoed return). From this point forward, consider that all sound concepts refer to both instruments unless otherwise noted.

Author's note: Most sonar books present frequency, attenuation, sound propagation etc using mathematical equations. This is great if you're an engineer or have a background in oceanography or physics.

In the SAR community, we receive a sonar system (through an equipment acquisition, grant, fundraiser or donation) and are expected to make it operate - often with very little training. Explanations that follow present sonar concepts into words so you, the sonar operator, understand how their derivation and the context they apply in the acoustic vocabulary. And... even more important, how they affect target detection.

When a sonar pings, electrical energy converts to mechanical energy within the transducer causing it to oscillate (vibrate). The water molecules on the face of the transducer vibrate at the same frequency and pass this energy to the next molecule, and the next molecule... Think of it as a line of closely separated billiard balls. Striking the end ball causes the energy to transfer between them. The sound pulse continues its travel through the water until it collides with an object/target that has a different *speed of sound*. The sonar's sound energy reflects off the object/target and the level (amplitude) of its echoed return to the sonar is electronically measured, normalized (its amplitude adjusted and equalized for its distance travelled) and then plotted (assuming the returning echo is loud enough for the sonar to detect). These sonar targets/objects can either be stationary or moving and positioned on the seabed, in the water column or at the water/air interface.

In most cases, the echo is then displayed as an image with the stronger returns brighter than low-level ones.

The acoustic energy travels through the water column at a speed determined by three variables:

- **water temperature**
- **salinity**
- **pressure**

Of these three, temperature has the greatest influence, followed by salinity and pressure respectively.

The sonar operator needs to remember that the speed of sound increases when the water gets warmer, the salinity gets higher and the depth (pressure) increases.

List of Speed of Sound Values for 66' (20m) Depth

Values rounded to nearest whole number

| Temperature | Salinity PPT | Depth | Speed of Sound |
|-------------|-----------------|-----------|--------------------------|
| 64°F (18°C) | 0 (fresh water) | 66' (20m) | 4839'/sec (1475m/sec) |
| 64°F (18°C) | 20 (brackish) | 66' (20m) | 4917'/sec (1499m/sec) |
| 64°F (18°C) | 35 (ocean) | 66' (20m) | 4973'/sec (1516m/sec) |
| | | | |
| 59°F (10°C) | 0 (fresh water) | 66' (20m) | 4744'/sec (1446m/sec) |
| 59°F (10°C) | 20 (brackish) | 66' (20m) | 4826'/sec (1471m/sec) |
| 59°F (10°C) | 35 (ocean) | 66' (20m) | 4888'/sec (1490m/sec) |
| | | | |
| 39°F (4°C) | 0 (fresh water) | 66' (20m) | 4662'/sec (1421m/sec) |
| 39°F (4°C) | 20 (brackish) | 66' (20m) | 4747'/sec (1447m/sec) |
| 39°F (4°C) | 35 (ocean) | 66' (20m) | 4813'/sec (1467m/sec) |
| | | | |
| 34°C (1°F) | 0 (fresh water) | 66' (20m) | 4616'/sec (1407m/sec) |
| 34°C (1°F) | 20 (brackish) | 66' (20m) | 4701'/sec (1433m/sec) |
| 34°C (1°F) | 35 (ocean) | 66' (20m) | 4767'/sec (1453m/sec) |

Why is this important to know? When the wrong speed of sound is used, the measured distance between objects (or from the sonar to an object) is not correct. Most

sonar manufacturers allow the operator to input a speed of sound value in the sonar software *and* have a default setting somewhere between 1475-1500m/sec (4839'-4921'/sec) which covers a "typical" range of water conditions. When a different speed of sound is applied, every 15m/sec (49'/sec) difference from the correct value introduces a 1% error (approximate) to a distance measurement. This is not a huge amount, but it needs consideration when the question of sonar "accuracy" rears its interesting head.

If there are no targets, the energy continues unimpeded until it simply fades away.

The cause of this *attenuation* is due to the sound wave spreading over a larger area the farther it travels, and the friction (heat) that results as the water molecules collide due to the moving sound energy wave front. It is somewhat analogous to rubbing one's hands together. Rubbing them faster creates more heat. In the world of underwater acoustics, higher frequencies attenuate faster than lower frequencies and, therefore, higher frequencies have less range.

Author's note: While writing this article, I vacillated on whether or not to include information on the speed of sound. A couple of percent of range error isn't that "big a deal" for SAR operations. However, most sonar programs allow the operator to make measurements, overlay them on the sonar image and then save that information to a file. Again, for SAR applications, this speed of sound error doesn't become a problem until some lawyer has you on the stand in court and pops the question about the accuracy of the sonar measurement.

Entering the speed of sound value into the sonar program is manufacturer specific. If you can't find it in the Operator's Manual or Help Menu, contact the sonar manufacturer and ask if it is adjustable, whether the program allows the operator to enter the sound variables and calculate the speed and/or what value they use for the default setting. Also inquire if the recorded sound speed can be changed during sonar data file playback.

With the Kongsberg MS 1000 the variables can be entered or a known value used, and the default is 4839'/sec (1475m/sec).

Target reflectivity is a complex relationship of these *primary* components:

- **composition (in particular, its surface layer)**
- **sonar frequency (its wavelength)**
- **size, thickness and shape**
- **incident angle at which the wave front strikes**
- **acoustic roughness**

Acoustically speaking, *hard* targets reflect better than *soft* ones, but hard and soft must be viewed not with respect to their physical density, but to their *acoustic density*. When the in-water speed of sound is substantially different from the target, it is referred to as a "hard" target.

The speed of sound in air is approximately five times slower than in water. Even though the physical density of air is considerably less than water, the speed difference between the two makes air bubbles an excellent reflector. Other targets with faster speed of sound have similar

responses. Steel, with a speed of sound of approximately 4,500m (14,764') per second (three times faster than in-water) generally makes an excellent reflector. Steel has both significant physical and acoustic density, but it is the notable difference in the steel's speed of sound versus water that makes it an acoustically hard target. Consider a body, composed of mostly water, a soft target versus a metal gun safe that is a hard target.

Frequency comes into the target reflectivity equation primarily because of its wavelength (calculated by dividing the sonar frequency by the frequency).

When the speed of sound changes rapidly between the water and target, a sharp echo results (generally in spatial terms of less than a wavelength). However, when the change occurs gradually (over distances greater than a wavelength), there are complicated interactions between the wave front that is penetrating the medium and the reflected echoes. These occur in materials like fat, rubber, certain types of water-saturated wood, soft

Hertz = cycles/sec (Hz)
kilohertz = 1,000 cycles/sec (kHz)
Megahertz = 1,000,000 cycles/sec (MHz)

675kHz

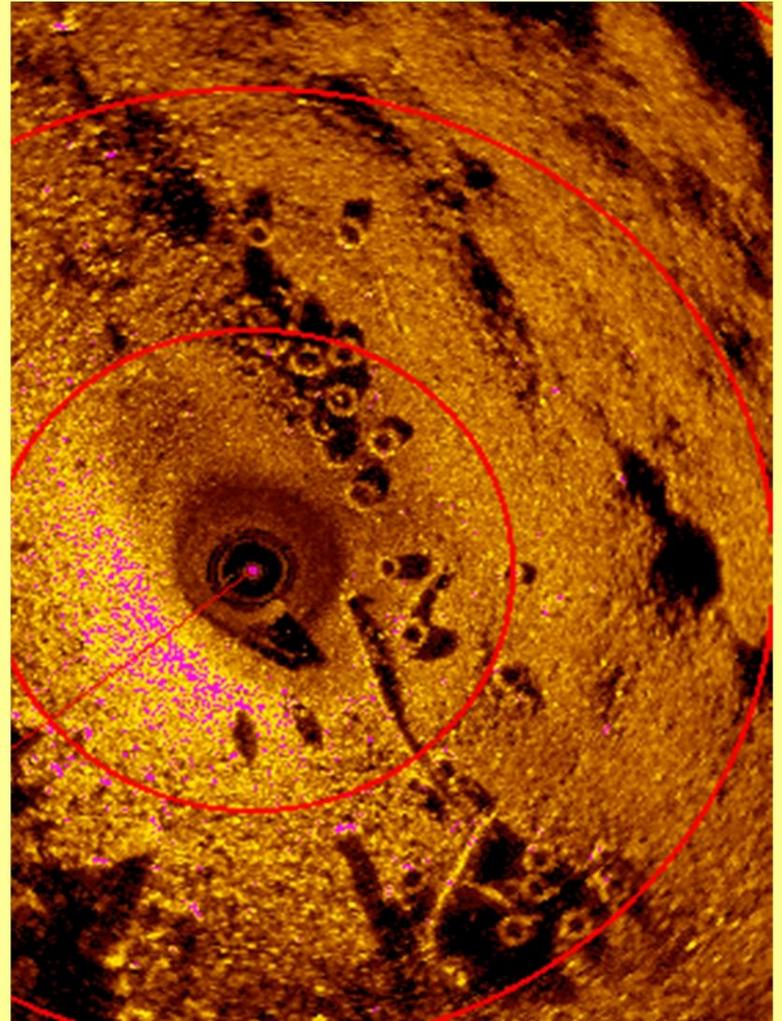
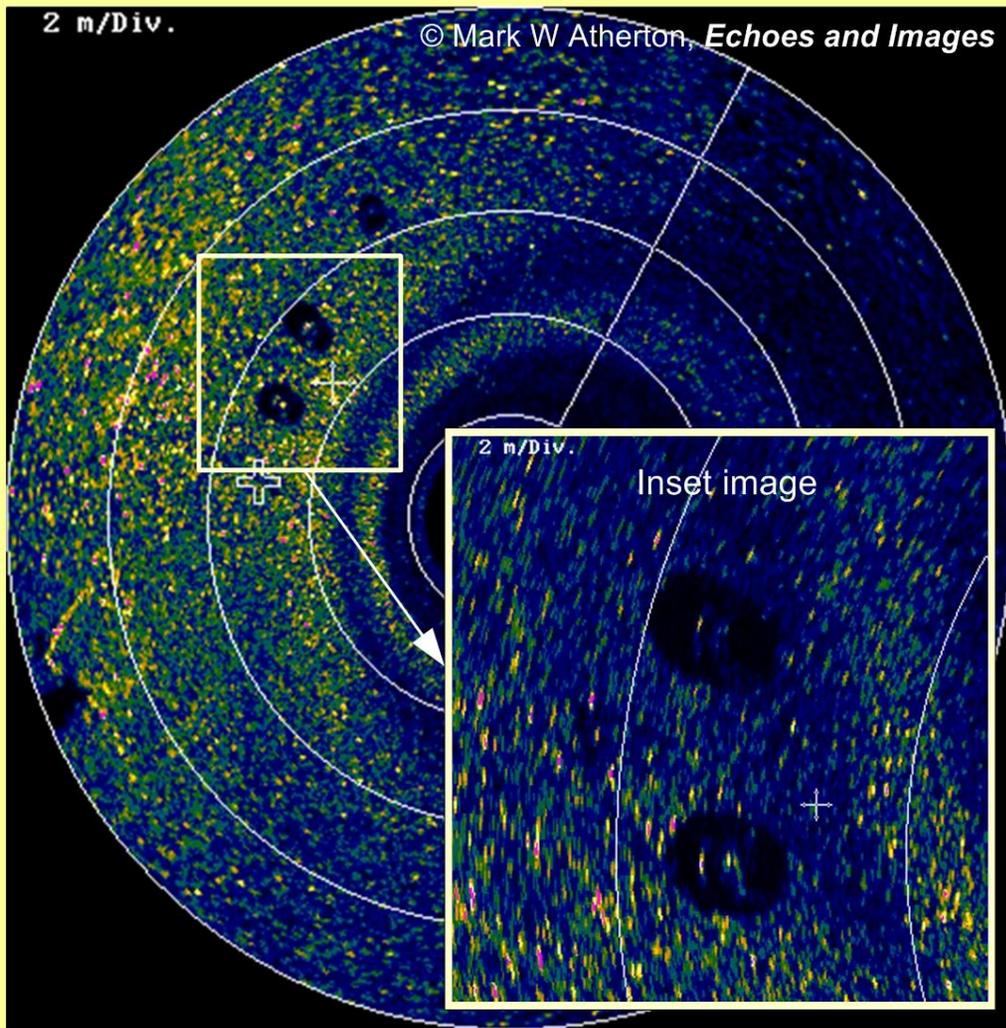
| <i>Propagation velocity (in-water speed of sound)</i> | <i>Wavelength</i> |
|---|-------------------|
| 1,550m/sec (5,085.3'/sec) | 2.29mm (.001141") |
| 1,475m/sec (4,839.2'/sec) | 2.19mm (.000862") |
| 1,405m/sec (4,609.6'/sec) | 2.08mm (.000818") |

Wavelength = Speed of Sound/Frequency

Frequency and Wavelength

© Mark W. Atherton

unconsolidated sediment, etc. In these cases, the reflected signal can be extremely weak and remain undetected by the sonar. Most people reading this article are divers who, at some time, have dropped to bottom and felt soft ooze on top of a more substantial sediment layer. Is the top of the soft muck "bottom" or is it the harder consolidate material beneath? Sonar has the



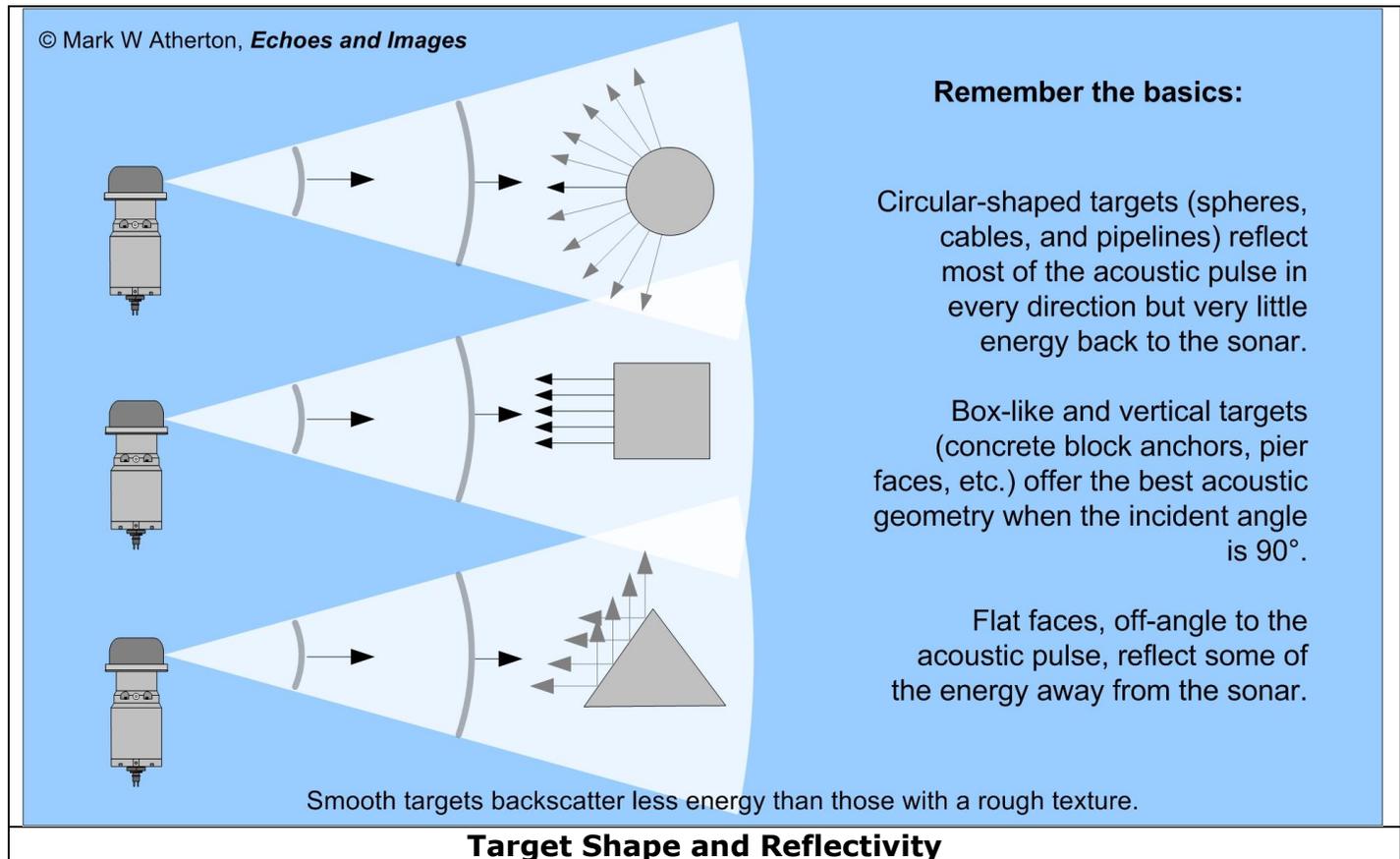
Two car tires weighted with bricks (shown in the inset image) were placed on the seabed and used as sonar targets. The rubber has completely attenuated the 675kHz signal. Barnacles, mussels and other marine growth have covered the tires in the right image making them very definitive targets at the same frequency.

Left image courtesy Max Muntener, *Kongsberg Mesotech Ltd.*

Targets that Absorb Sound

same problem figuring out the real bottom! It all depends on the frequency (its wavelength), and the acoustic reflectivity of the material if the muck or the harder sediment is detected.

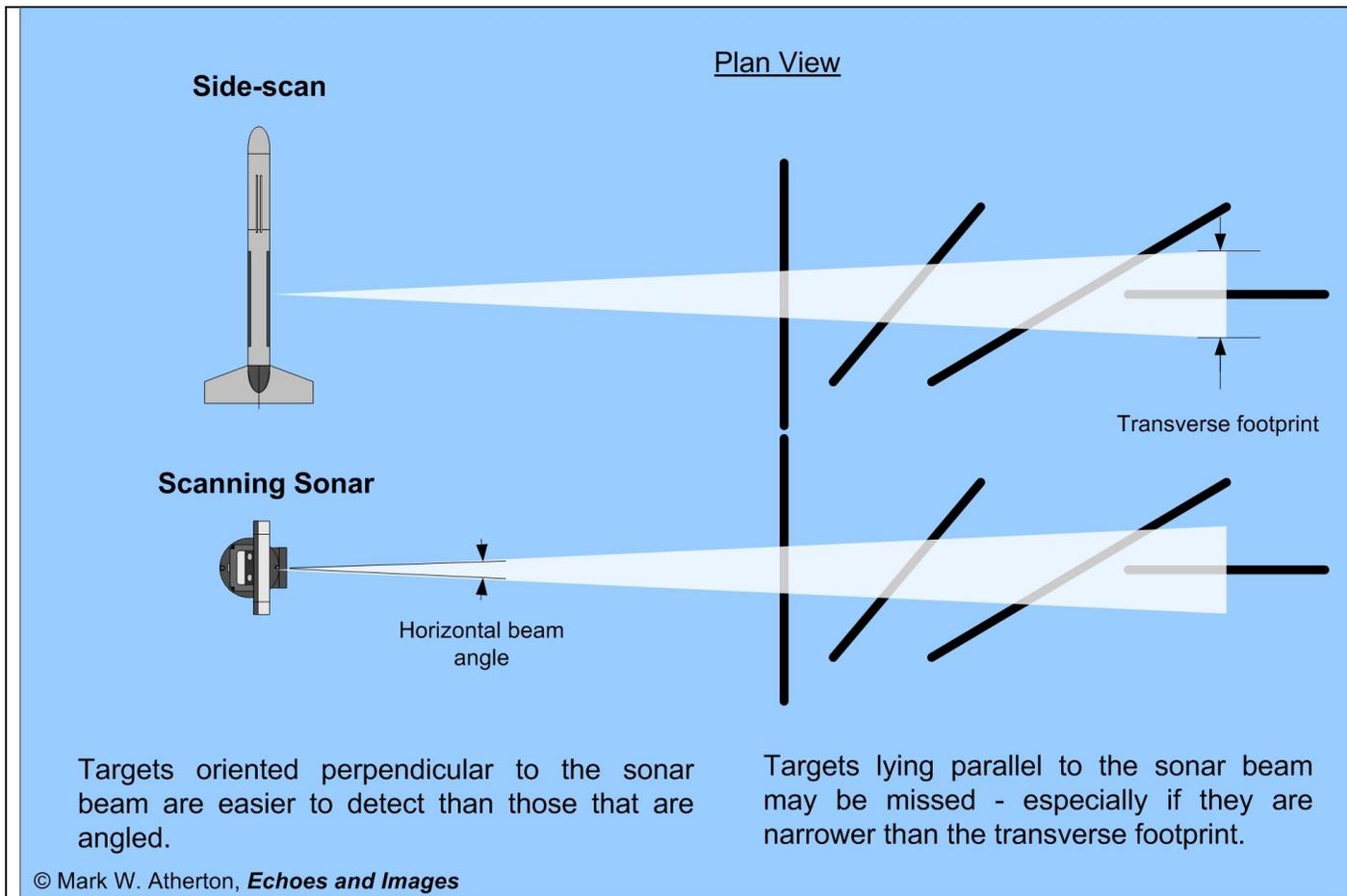
Also consider the thickness of a target as the reflective boundary must be sustained for at least a few wavelengths. Since the speed of sound is a variable, the sonar wavelength changes with the sound speed. This may affect target detection as it relates to *acoustic roughness*. Acoustic roughness is a term to describe the texture of a target's surface and is generally described as having a texture that is equal to or greater than half ($\frac{1}{2}$) a wavelength of the sonar's transmitting frequency. An easy analogy is to shine a flashlight on a mirrored surface at a low grazing angle; in this example, most of the light reflects away. Coat the same mirror in dust and less light reflects and makes it easier for the one holding the flashlight to see the mirror's surface.



Targets that Absorb Sound

Sound absorbing properties of certain materials are the reason why military submarines (designed to be covert) are covered with a rubber like anechoic coating. This covering is specifically designed to attenuate the lower frequencies used by long-range submarine detection sonars.

"Tricks of the Trade" are included to provide common sense tips for sonar set up, system operation, handling the equipment and data interpretation. Gleaned from spending thousands of hours in the field, every "trick" is the result of seeing what works, making mistakes or observing others doing so.



Incident Angle and Target Orientation

Target size, shape, and the incident angle of the acoustic beam to the target must be considered. Larger targets are generally easier to detect than smaller ones, and

Tricks of the trade:

Learn how to tie a bowline, a bowline on a bight, clove hitch, timber hitch, rolling hitch and a trucker's knot. Having mastered those, learn how to splice an eye in the end of a rope. It's easy to quickly secure something when the right knot is used.

the beam (especially a target with low reflectivity), it is more difficult to locate. This is arguable, but the sonar operator always needs to consider the size of the beam, its incident angle to, and the reflectivity characteristic of the target.

This first article lays the foundation for the next where components of sonar system are examined and the practical aspect of the system design – in particular the

multifaceted angular targets tend to be more visible than round or curved ones. As the acoustic ping travels through the water column, it spreads proportionally to its horizontal and vertical beam angle components. Knowing the beam angle of the transducer and sonar range it is easy to calculate the size of the acoustic footprint on any plane.

Combine that information with an understanding of a target's size and reflectivity characteristics and it is possible to approximate its maximum target detection range (to be discussed in Article 2).

In practical terms, when the target is smaller than

sonar's beam angle - is applied to search operations, and more importantly - to target detection!

Tricks of the trade:

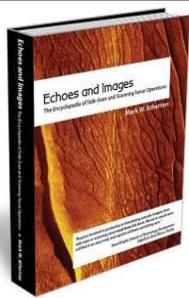
Lead acid "car batteries" are often used to run DC voltage-powered sonars. Avoid powering a sonar from the vessel's batteries as the motor's battery charging system may introduce noise onto the sonar data.

Place the batteries in a plastic bin before charging and keep a box of baking soda handy to neutralize the battery acid if it bubbles over. When using paper towels to wipe up battery acid, immediately place them into a plastic bag and *wash your hands*.

Always charge lead acid batteries in a well-ventilated area.

If anything metal falls and shorts out a battery it is very liable to explode. Exposed battery terminals need to be covered; an inverted plastic box container works well for this purpose. It only takes one battery blowing up to realize the importance of this simple 'trick of the trade.'

Mark W. Atherton is the Special Projects Manager for *Kongsberg Mesotech Ltd.* and has been involved in underwater imaging, commercial diving and underwater search and survey operations since 1974. He is the author of *Echoes and Images, The Encyclopedia of Side-Scan and Scanning Sonar Operations*. <http://www.echoesandimages.com>



Mark Atherton's

Echoes and Images, The Encyclopedia of Side-Scan and Scanning Sonar Operations is the how-to guide for side-scan and scanning sonar operations.

For more information or to purchase your own copy, go to <http://echoesandimages.com/>

NEWS

Divers, hovercraft, excavator join search for missing student

<http://www.sackvilletribunepost.com/News/2012-12-02/article-3132026/Divers-hovercraft-excavator-join-search-for-missing-student/1>

December 2, 2012 Scott Doherty

Police continued to look for missing Mount Allison student Christopher Metallic today but wrapped up their search late in the afternoon with no new information. Members of the local RCMP and

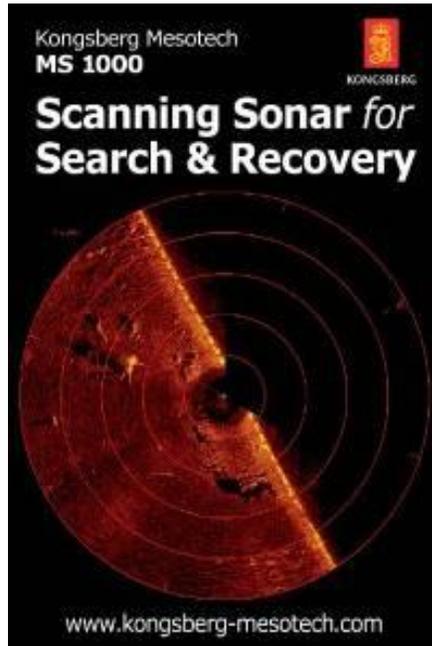


A member of the RCMP dive unit searches a section of the Tantramar River in Upper Sackville near where footwear worn by missing Mount Allison student Christopher Metallic was found earlier in the week. DOHERTY PHOTO

Tri-County Search and Rescue were joined by the Mounties' dive unit, Moncton Fire Department hovercraft and members of the Sackville Fire Department in today's search.

For the past two days, search efforts have been focused on an area in Upper Sackville near the Tantramar River where footwear worn by Metallic was found earlier in the week.

Searchers in survival suits used saws to cut up the ice covering the river earlier today, allowing divers to conduct their search. Progress was slow, however, and it became necessary to bring in an excavator to clear away the ice. The hovercraft was called in to search along the river and in areas of the surrounding marsh not accessible by foot.



Officials say the search will resume Monday morning.

Meanwhile, members of the Mount Allison and Sackville communities came together today to stage a concert (<http://www.facebook.com/events/436108209782050/?context=create>) aimed at raising funds to increase the \$2,000 reward being offered by Metallic's family for information on his whereabouts.

A Facebook page (<http://www.facebook.com/BringChrisMetallicHome?fref=ts>) has also been set up to help coordinate and share information on the efforts to locate Metallic, and to collect donations.

Anyone with any information on Metallic's whereabouts is asked to contact the RCMP at 1-888-506-RCMP (7267) or N.B. Crime Stoppers online at www.crimenb.ca or 1-800-222-TIPS (8477).

Man Dies After Being Discovered In Submerged Car

<http://www2.nbc4i.com/news/2012/dec/02/man-found-car-submerged-nearly-1-hour-ar-1261498/>
December 02, 2012 By: L.P. Evans

COLUMBUS, Ohio --One man is dead after his car is discovered in a retention pond on the city's north side Sunday night.

According to police, a passerby reported seeing a partially submerged vehicle in a pond at the intersection of Snouffer Road and Bent Tree Blvd at about 10:13 p.m. Sunday.

The man called for help and then jumped in the pond to check to see if anyone was in the car, but he was unable to break into the vehicle. Fire department divers and boats responded to the scene of the submerged vehicle. Crews pulled the vehicle from the water, at which time they found 32-year-old Trevor Connor inside.

Connor was transported to Riverside Methodist Hospital where he was later pronounced dead at 12: 01 a.m. Monday.

Fire officials tell **NBC4** the vehicle was in water as deep as 10 to 12 feet, and it was about 20 feet from the shoreline. Connor had been in



the water for 45 to 55 minutes.

According to a release from Columbus police, Connor was driving a 2002 Subaru northbound on Lakebrook Blvd. He apparently attempted to turn westbound onto Bent Tree Blvd. when he lost control of his vehicle, sliding off the right side of the roadway and into the pond.

The crash remains under investigation by the Columbus police accident investigation unit.

County relies on dive team

Divers recover evidence, bodies after drowning

<http://www.press-citizen.com/article/20121202/NEWS01/312020034/County-relies-dive-team>

Dec 2, 2012 Written by Lee Hermiston Iowa City Press-Citizen

Johnson County is home to the Iowa River, Coralville Lake, Lake Macbride, and scores of creeks, streams and ponds.

Sometimes police evidence is lost in those bodies of water or drownings occur. In those instances, local authorities

have had to rely on dive teams from neighboring jurisdictions that are trained to recover evidence or bodies from the water.

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becoming less reliable, Johnson County has reinstated its own Metro Dive Team.

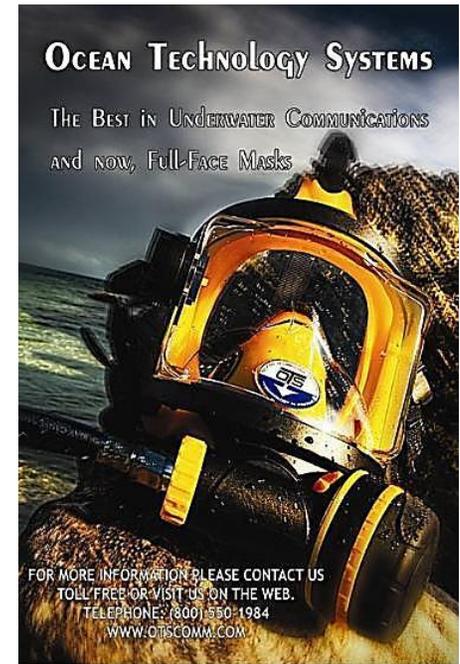
"It was kind of a resurrection of a team we had back in the '70s and '80s and through the '90s," said Dave Wilson, director of Johnson County Emergency Management and a former dive team member.

Wilson said he is serving as the business manager for the new team and is not diving.

Wilson said that over the years, members of the original Johnson County Metro Dive Team retired or moved on to other opportunities. By the early 2000s, the team was all but dissolved. Johnson County spent the next decade relying on the Linn County Dive Team, but now Linn County is facing the same issues that Johnson County was a decade ago.

"They're in the same boat as us," Wilson said. "They're down to four guys."

With that in mind, emergency management formed the Metro Dive Team in July with members from area police and fire departments and a few civilians. All of the members are, at minimum, recreational divers. The



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civilians are a master diver and a master diving instructor, Wilson said.

All of the members have received additional training to be certified in Emergency Diver Response and will continue to receive additional training in the future.

Wilson said the team will be deployed to recover evidence and bodies after drowning. It also will be used for rescues.

University of Iowa

Department of Public Safety Lt. Joe Lang is among the team's eight members. Lang has been scuba diving since 1988 and jumped at the opportunity to join the team. "

It's a lot more technical," Lang said, comparing search and recovery diving to recreational diving. "We learn a lot more on how to rescue and how to respond to emergency situations."

The team already has been deployed once for evidence recovery, and Wilson said Linn County authorities have asked if they can borrow the team should a situation arise.

The team is funded by \$25,000 from Johnson County Emergency Management and a Emergency Management Performance matching grant. Wilson said the initial investment was needed to restart the team from scratch.

That meant new diving gear as well as training, Wilson said.

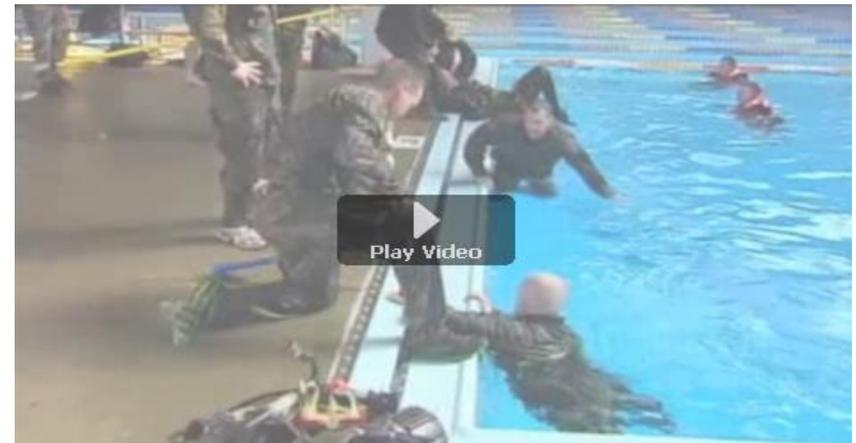
"We had a need and we minimized that need," Wilson said. "It's really become apparent ... we had to do something ourselves."

SWAT Team Members Dive into Water Training

http://tristatehomepage.com/fulltext-news?nxd_id=567542

December 5, 2012 By: Chris Veech

VIDEO ON SITE



The Evansville SWAT Team dive into training with some help from the Evansville Fire Department. Earlier this morning, EFD Dive Rescue trainers jumped into the Lloyd Pool to assist swat member in a hands-on training exercise.

SWAT members were in full gear as they learned how to keep themselves safe while rescuing others. Fire Captain Dan Brown says it's important for rescuers in this community.

"We have a lot of water here," said Captain Brown. "First on the scene isn't necessarily going to be a firefighter in a dive suit."

About 25 SWAT members took part in the training.

Empty Car Found Sinking into White Rock Lake

<http://www.nbcdfw.com/news/local/Car-Found-Sinking-into-White-Rock-Lake-182375641.html>

Dec 6, 2012

Dallas Fire Rescue and Dallas police responded to call of a car sinking into White Rock Lake shortly after 9 a.m. Thursday.

Rescuers rowed out to the car in a small boat to see if it was occupied and attempt a rescue.

Firefighters could be seen using pike poles to break the car's windows as it slipped under the water, but officials said rescuers were not able to absolutely determine whether anyone was inside the car.



A dive team from the Dallas Police Department was then called to the scene. Officers were then able to determine that the car was not occupied.

Officials with the fire department said they weren't sure if the 911 caller saw the car go into the lake or if the caller simply spotted the car in the lake. How the car ended up in the lake remains a mystery.

The car is located about 50 feet off the shoreline near the 3800-block of W. Lawther Drive

Buffalo Grove Rescue Divers Practice in Pond

Dive team members from the Buffalo Grove Fire Department held a training last week in a local pond.

<http://buffalogrove.patch.com/articles/buffalo-grove-rescue-divers-practice-in-pond>

December 7, 2012 By Cristel Mohrman





Did you notice a dive team at [Green Lake Park](#) last week? There was no emergency situation; instead, dive team members from the [Buffalo Grove Fire Department](#) as well as the Long Grove Fire Protection District and the Lincolnshire-Riverwoods Fire Protection District, along with other members of their departments acting as shore-line crews, conducted their annual training Nov. 28 in the pond.

The area departments trained together because it is difficult for any one department to have the resources necessary when divers are needed. It was also a chance for new firefighters to be instructed on how to assist the divers as shore personnel. *Submitted by the Buffalo Grove Fire Department*

Weirton denies request for scuba gear

<http://www.heraldstaronline.com/page/content.detail/id/581049/Weirton-denies-request-for-scuba-gear.html?nav=5010>

December 11, 2012 By LINDA HARRIS - Staff writer , The Herald-Star



TEAM RECOGNIZED – Madonna High School’s football team was recognized at Monday’s Weirton Council meeting for accomplishments on the gridiron during the 2012 football season. Weirton Mayor George Kondik, center, read a statement honoring the team for its efforts. The Blue Dons lost to Wahama, 43-42, in overtime in the state Class A title matchup. - Linda Harris

WEIRTON - City Council nixed the purchase of scuba gear for the fire department at Monday's meeting, saying the money could be better used in other ways.

The measure was defeated by a 3-2 vote, with Ward 7 Councilman Terry Weigel and Ward 2's Chuck Wright casting the only votes in favor of the expenditure. Ward 6 Councilman David Dalrymple and Ward 1 Councilman Ronnie Jones were not at the meeting.

Wright defended the proposal, pointing out no one had expressed opposition to the purchase when they discussed it with department heads at a budget workshop.

"If everybody was opposed to it at the time, they should have killed it at the budget workshop instead of going through (the bid process) and then shooting it down," Wright said, adding he didn't dispute council's right to vote against the measure, "but I thought we had an agreement" coming out of the workshop.

Weigel said the gear would cost roughly \$15,000 and was "the last piece of the puzzle (for them) to do rescues all year round." He questioned whether it makes sense to stop short when the city already has invested so much.

"Do you go the last \$15,000 so you can do it year-round when you've already invested nearly \$200,000?" he asked.

"I don't have a vote, but if I did I would vote for it,"

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Mayor George Kondik interjected. "Are we going to be in the (water rescue) business or not?"

Ward 3 Councilman

Fred Marsh pointed out years ago his was one of two votes against the purchase of the rescue boat.

"You were one, I was the other," he told Ward 4's George Ash.

Ash, meanwhile, also questioned the slow pace of emergency repairs to the foundation of a home in his ward, complaining that neighbors were upset that nothing had been done with the dirt excavated from the property, turned into a muddy mess by recent rains, and asking Chief Code Official Rod Rosnick what can be done to expedite the process.

"There ought to be some way to stop this," Ash said.

Rosnick, though, told Ash the property owner had contracted with an individual, not a company, for the foundation repairs, consequently the work was progressing slowly. Rosnick said he is monitoring the situation closely, but pointed out building permits currently allow property owners to take up to a year to finish a specific project; until and unless that's changed, the city's options are limited.

"It's our permits, when you purchase one you have a year (to finish the work)," Rosnick said, though adding, "I'm pushing him daily" to get done.

Kondik acknowledged it was a problem, saying the foundation of the home in question had collapsed. "All the dirt's (been excavated), but it's just sitting there," he said. "The project has not been completed."

In other business, Weirton Heights resident Stephen Gill presented council with a petition noting opposition to Department of Highway plans to create a large water retention pond North 18 Street and North 20 Street to capture and retain water runoff from the Pennsylvania Avenue widening project.

The petitioners said stagnant water can cause mosquito infestation as well as unpleasant odors and would create an unsafe environment for children and decrease property values. They asked council to embrace other, environmentally sound options for disposing of the runoff.



After acknowledging the efforts of the Madonna football team, which fell in the Class A title game to Wahama, 43-42 in overtime, and the



individuals who helped make the recent "Weirton Cares" storm relief effort successful, the meeting was interrupted by a 30-minute executive session. When they reconvened, City Solicitor Vince Guerra said they'd discussed

"reorganization of a couple departments within the city and possible resolution of a potential lawsuit."

Gurrera didn't elaborate, but City Manager Valerie Means said council's decision later in the meeting to pass first reading of an ordinance creating a new position, that of municipal court/legal analyst, was part of the discussion. The ordinance would establish a new minimum salary of \$25,509.71 and a maximum salary of \$27,704.46 for the new position, she said.

A grope in the dark, and a weapon is found

<http://www.canberratimes.com.au/act-news/a-grope-in-the-dark-and-a-weapon-is-found-20121210-2b64q.html>

December 11, 2012 Christopher Knaus

It was a most unbelievable moment of chance - a knife plucked almost instantly from the vast, murky waters of Lake Burley Griffin - that would help ACT police divers

play a part in bringing down the notorious Bega schoolgirl murderers.

It was October 1997, and Leslie Camilleri and his companion Lindsay Beckett had just finished the truly monstrous abduction, rape and murder of Bega teenagers Lauren Barry, 14, and Nichole Collins, 16.

The girls had been taken from their campsite at White Rock, near Bega, and subjected to 12 hours of repeated rape and torture, driven through remote areas of NSW and Victoria, before ultimately being stabbed to death at Fiddlers Green Creek in Victoria.

Yet it was their trip through Canberra in the aftermath of the killings that would, in part, help lead to the killers' downfall.

The pair stopped at Theodore Lookout on the Monaro Highway, burning their blood-soaked clothing and the ropes and gags used in the crime. They then drove into Canberra and threw the murder weapons from the Commonwealth Avenue Bridge into the waters of Lake Burley Griffin.

During the ensuing investigation into the girls' disappearance, the territory's police received a tip-off from NSW investigators indicating that the knives may have been dumped in the lake.

It was a daunting prospect for the city's police dive team, with the search described by senior water operations officers as "needle in a haystack stuff".

The lake is incredibly difficult to search, even for submerged objects larger than a knife. Visibility is terrible, sediment and mud is easily stirred, and in those days the divers often had to search by feel. To make matters worse, divers had little idea where to look, which side or section of the bridge the weapons were thrown from, or how far they'd been carried by the waters.

Yet luck was upon them.

The very first diver to touch the water returned to the surface in next to no time. In the first minutes of his search, the diver's hand fell upon one of the knives used in the horrific crimes.

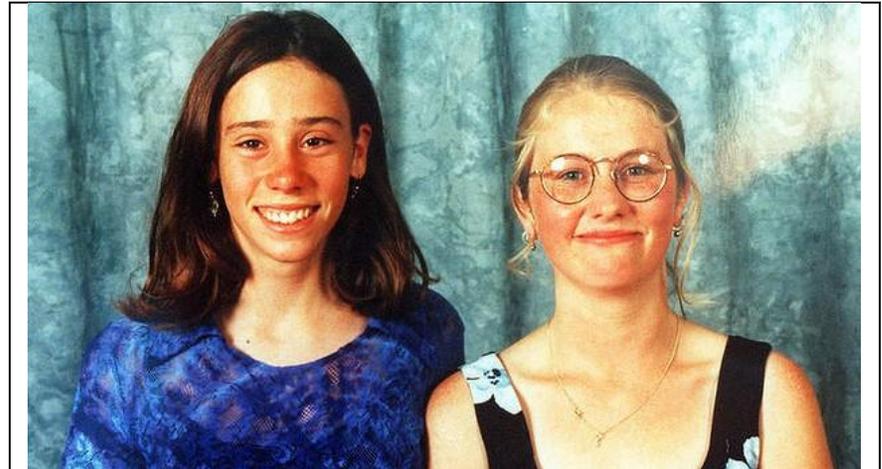
The knife would ultimately prove to be crucial evidence in the trials of Camilleri and Beckett, partly helping to convict both, and to sentences of life imprisonment. The find would help ACT police cement a role in solving what is still widely considered one of Australia's most shocking murder cases.

Divers recover body of miner in slurry dam collapse

<http://wvgazette.com/News/201212140154>

December 14, 2012 By [Staff reports](#)

LUMBERPORT, W.Va. -- Diving crews on Friday recovered the body of a coal miner who died Nov. 30 in the collapse of an embankment at a CONSOL Energy coal-slurry impoundment in Harrison County.



Victims Lauren Barry and Nichole Collins. Photo: Wayne Venables



Company spokeswoman Lynn Seay identified the miner as Markel J. Koon, 58, of Shinnston. He had been a CONSOL employee for nearly 38 years. His body was being transported to the state Medical Examiner's

Office in Charleston for an autopsy.

Koon's body was recovered at 4:40 p.m. Friday by dive teams that used a large pipe to isolate their path through the impoundment's murky water and coal waste to the bulldozer.

CONSOL had located the body on Monday inside the dozer cab, after more than a week of searching for the bulldozer following the Nov. 30 collapse of a smaller "saddle dike" at the Nolan Run site.

Koon was swept into the impoundment shortly after noon on Nov. 30, when the saddle dike's embankment collapsed. CONSOL was building the dike -- constructed of coarse coal refuse piled on top of finer coal slurry -- as part of a plan to expand the impoundment so it can continue as a disposal site for waste from the nearby Robinson Run Mine's preparation plant.

Ready to rescue

<http://www.pressdemocrat.com/article/20121216/ARTICLES/212161001?tc=ar>

December 16, 2012 By DEREK MOORE THE PRESS DEMOCRAT

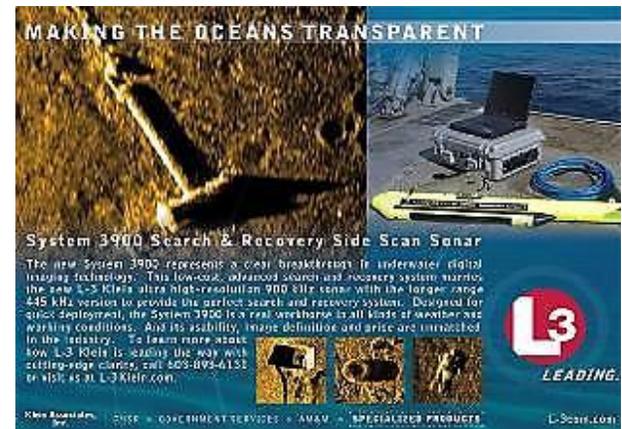
San Antonio volunteer firefighters now equipped to respond to emergencies on Petaluma River, other waterways

Ron Pomi has seen a lot of good ideas come and go in 47 years with the San Antonio Volunteer Fire Department, which serves an unincorporated area of Sonoma County south of Petaluma.

When volunteer firefighters Jason Zajonc and Matt Mattei approached Pomi last year with the idea to form a water rescue team in the department, the chief told them to work up a plan so that he could see "what it looks like." He couldn't be prouder of what they came up with.

"They did a great job," he said.

Thanks to the two firefighters' efforts, the San Antonio department is now equipped to respond to emergencies on the Petaluma River and other waterways in Sonoma and Marin counties.



As a former All-American swimmer in college, Zajonc is perfectly suited to lead the team. Mattei, who is a volunteer fire captain with San Antonio, also is a San Francisco police officer. Both men live in Petaluma.

"We do it because we love it," Zajonc, a technology consultant, said of volunteering.

San Antonio was formed in 1966 by local ranchers after a wildland fire swept through the Petaluma Valley. The department responds to fires, crashes, medical calls and other emergencies in a 20-mile area that includes a stretch of the Petaluma River.

Zajonc said he and Mattei saw a need for a water rescue team after the Petaluma Fire Department lost theirs to a spate of retirements.

The pair raised \$30,000, mostly in contributions from the Sonoma County Fire and Emergency Services Department and Fireman's Fund of Novato. The money paid for a 14-foot Zodiac boat, trailer, suits and other equipment.

The team's 10 members underwent three days of training in Sacramento to hone their skills in swift-water rescue. That's in addition to their regular duties as volunteer firefighters. The work, while



demanding, draws people from a diversity of backgrounds, including auto mechanics, police officers and white-collar professionals.

Pomi said people often ask him why he's done it for so long without being paid. "It's just a way of life for me," he said. "I enjoy being around the young firefighters and watching them grow."

Zajonc said it can be a thankless task sometimes to get roused out of bed in the dead of night to help someone in need.

But he loves it, and "you become really close with the people you work with," he said.

To learn more about becoming a volunteer firefighter, contact Sonoma County Fire at 565-1152. For more information about San Antonio Fire, visit <http://savfd.com/>.

Water rescue: the plan to reduce travel time and save lives

<http://www.wect.com/story/20331032/water-rescue-the-plan-to-reduce-travel-time-and-save-lives>
Dec 12, 2012 By: Craig Reck **VIDEO ON SITE**



NEW HANOVER COUNTY, NC (WECT) – State and local agencies in New Hanover County have a plan to increase the chances of saving lives in water rescue situations.

The old plan would have boaters and beach goers alike rushed to one of a few places around the county, like the Coast Guard station in Wrightsville Beach. What used to be a few will soon be many. Warren Lee, Director of Emergency Management, said it was time for responding agencies to consider more options.

"There were probably some things that we could all do to improve a patient's chances of survival," said Lee.

He added that those chances drop when traffic is heavy on the water during the summer months. More than a dozen additional transfer locations are expected to alleviate any concerns with congestion.

"We've had some on Masonboro Island where the response has been delayed because of the sheer volume of traffic," he said.



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Injury Prevention Coordinator of Trauma Services at New Hanover Regional Medical Center Tina D'Amico Poole said there is nothing with the current response plan, other than a responsibility to improve it if possible.

"We just want to make sure we're always giving our patients the best care, and our community the best care, we can," she said.

The effort is not only about emergency agencies. Lee said the more you know about the new pick-up spots the better chance you have of saving someone's life.

"If you're transporting someone by your own private boat then you can deliver them there," Lee said. "We can have EMS en route and have the time between pickup and delivery be much shorter."

The locations stretch up the Cape Fear River and down the Atlantic coast, but they are not finalized just yet. Lee said the plans should be ready before the summer season, so everyone can expect more information in the following months.

Agencies involved include the Coast Guard, North Carolina Marine Patrol, NC Wildlife Resource Commission, New

Hanover Regional EMS, New Hanover County Emergency Management and both Wilmington and New Hanover County fire departments.

Car submerged at Fishermans Beach

<http://www.dailytelegraph.com.au/news/car-submerged-at-fishermans-beach/story-e6freuy9-1226539576867>

12/18/2012 *The Manly Daily News Limited Network*



Going... Picture: Doug Cliff Source: News Limited

A CAR that can't swim and isn't wearing a life jacket is in deep water off the boat ramp at Fishermans Beach.

The white sedan, believed to be a Lexus, was totally submerged by 8.45am - and the tide is rising, [The Manly Daily](#) reports.

Northern Beaches duty officer Insp Graeme Pickering said the driver of the car, a [Curl Curl](#) man, drove down the ramp at 12.30am today to be closer to the water.



Going... Picture: Annika Enderborg

He said that when the driver applied the brake at the foot of the boat ramp, the car failed to stop and slid into the water.

The driver couldn't open the door of his car and had to climb out the window.



Gone. Picture: Annika Enderborg

Insp Pickering said that when the police arrived, the car was completely submerged but the headlights were still on.

He said police divers were on their way to [Collaroy](#). After the divers place a hook around the car, it will be towed ashore.

Third rescue this year at Peasley Cross flood hotspot

http://www.sthelensstar.co.uk/news/10115589.Third_rescue_this_year_at_flood_blackspot/

A MAN became the third motorist to be rescued by firefighters this year at a notorious flood spot beneath a bridge.

As rain battered the town on Monday (December 17), flood waters rose again quickly on Peasley Cross Lane.



Floods at Peasley Cross earlier this year.

Firefighters were called at about 5.38pm after a 44-year-old driver became stuck as he attempted to travel through deep water.

Watch manager Mike Costello from St Helens Community Fire Station explained: "The water was about two and a half to three feet deep and was up to about door level on the car.

"The car was in a section of the road that dips under the bridge. Because this section of the road dips, it appears to be flat. Four firefighters in water rescue suits pushed the car out.

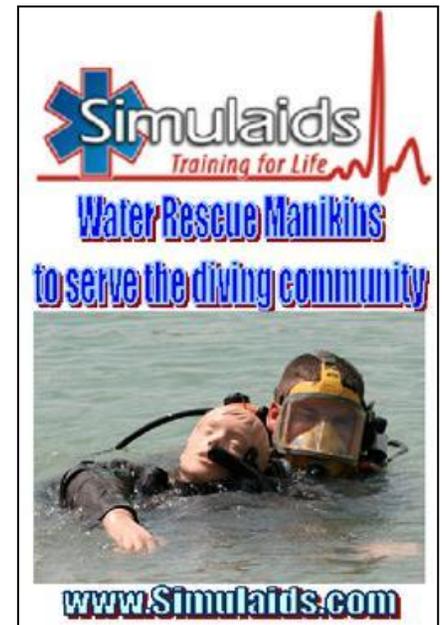
"Road users should drive to the conditions and we also advise drivers not to enter flood water as you do not know the depth of it."

The man was unharmed as he was brought to safety.

It is an all too familiar pattern on a stretch of road that has claimed unsuspecting motorists for 50 years.

In September an 70-year-old man and 60-year-old woman had to be pushed to safety after their car cut out in 3ft of water.

And in August teaching assistant Joanne McKenna had to be rescued after she too misjudged the depth of the



water and was left stranded, with water lapping at her car windows. The car, a Citroen, was a write off

Firefighters rescue horse from Spokane swimming pool

<http://www.komonews.com/news/offbeat/Firefighters-rescue-horse-from-Spokane-swimming-pool--184049531.html>

Dec 18, 2012 By KXLY Web Staff



SPOKANE, Wash. -- A group of Spokane Valley firefighters were called in to do a water rescue Tuesday morning after a 15-year-old mare stumbled into a swimming pool Monday night.

Around 9 a.m. firefighters responded to a home in the 17000 block of E. Montgomery Ave. where the horse, Missy, had found her way into the pool. Strong winds had blown down a section of a fence in the backyard of a home on Montgomery, allowing the horse to wander into

the yard and into the pool.

The pool had been winterized and covered, and when she tore through the liner, the water in the pool drained out. If that hadn't been the case Missy might've drowned or died from hypothermia.

The owners, finding Missy in their pool, called 9-1-1 and firefighters, upon arrival, came up with a plan to build steps for her to climb out of the pool. Once the steps were completed Missy climbed out with only minor injuries.

EFD recruits are a little wet behind the ears

<http://www.14news.com/story/20328341/efd-recruits-are-a-little-wet-behind-the-ears>

Dec 19, 2012 Sean Edmondson * Nicole Niziolek

VANSVILLE, IN (WFIE) - Fire recruits took a dip at the newly renovated Lloyd pool Wednesday morning as part of their water rescue training and as 14 News found out, Evansville fire fighters do water rescues more than you may think.

One by one the seven recruits jumped into the water.

"We're practicing rescuing people. Being able



to reach them from the side of a bank," said Clayton Knight, Boonville firefighter.



Some of them, like Knight are from Boonville. This is the first time firefighters from other cities are participating in the training.

"We have a dive team, on our department so it could help us with our dive team," said Knight.

For Evansville firefighters, this is an important part of training.

"There's a lot of water rescue that happens in Evansville. I would say the Evansville Fire Department makes a water run at least once a month," said Captain Chad Jordan, EFD.

These recruits learn basic water rescue techniques, and perhaps most interesting part of the training is when they jump in with their turn out gear.

Firefighters say that at first the gear can help you float.

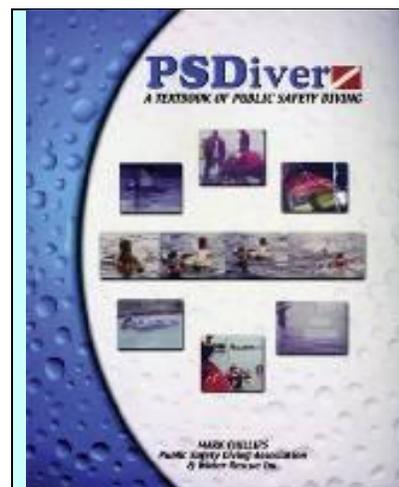
"What ends up happening is it gets water logged, it gets heavier, it gets cumbersome to move and you get tired very quickly," said Cpt Jordan. "We want our recruits to see that being in the water with your fire gear is not something you want to do," he said.

How did these recruits do? Feelings were mixed.

"It's very surprising. There's a lot of weight on you when you get in there. You don't think that it would exert you that much," said Kerry Postlewaite.

"It actually feels a lot lighter, because the air traps underneath and you feel lighter," said Knight.

Three of the recruits in Wednesday's class were from Boonville. The rest were Evansville Fire Department recruits.



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Firefighters rescue dummy

<http://sammamishreview.com/2012/12/19/firefighters-rescue-dummy>
December 19, 2012 By Michele Mihalovich

Eastside Fire & Rescue firefighters had good reason Dec. 7 to call the man dangling upside down from a rope over the swollen Snoqualmie River a dummy.

He celebrated Washington's new law that allows recreational use of marijuana by making a homemade bungee cord, tied it to the suspension bridge over the river at Tolt-MacDonald Park in Carnation, and jumped. But he apparently hadn't thought about how he was going to get back on the bridge after the jump. And there he dangled.

But in all fairness to the man waiting for firefighters to rescue him, he literally was a dummy, a mannequin used for training exercises.

EFR Lieutenant Ben Hudson, stationed in Carnation, served as lead instructor for the three-day firefighters' drills.

He came up with the above rescue scenario, but the training the firefighters practiced that day could have worked for many situations, like an 8-year-old kid trapped on a rope swing over a body of water, he said.

Hudson said firefighters often train for "low-frequency but high-risk" situations.

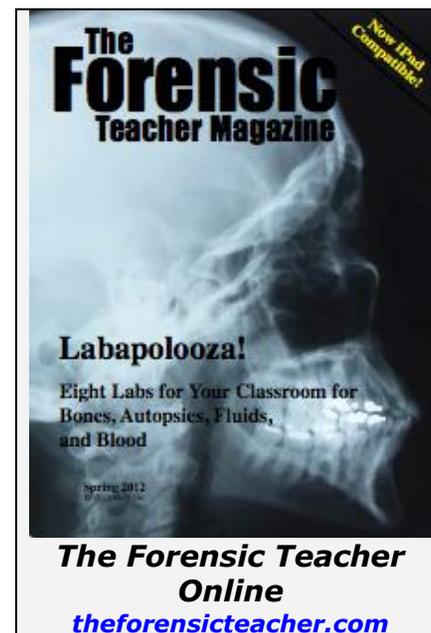
"Those situations don't happen often, but we have to be ready for when they do," he said.

For three days, firefighters conducted rescue

training exercises that included swift-water rescue using a new motor boat and an inflatable raft, trench-collapse training, confined space training and rope training.

The finale of the three-day training familiarized firefighters with ropes used in rescue situations, lowering down to a victim, securing the victim with a harness and rescuing the victim from a dangerous situation.

Thirteen firefighters showed up for the Dec. 7 rope training drill, but Paul McCall, stationed in downtown Issaquah, was selected to rescue the dummy.



Turns out, this wasn't the first time McCall has been lowered high above a body of water. Years ago, his fellow firefighters lowered him over the Snoqualmie Falls to rescue a trapped hiker.

The quarterly training sessions are great refresher courses, he said.

Plus, it familiarizes them with the equipment and builds camaraderie and trust with the

other firefighters, he said.

You'd be hard pressed to find a firefighter who doesn't love his or her job, McCall said.

Oakland County Sheriff's Dive Team Trains at Highland Pool

<http://whitelake.patch.com/articles/oakland-county-sheriffs-dive-team-trains-at-highland-pool#photo-12638981>

December 20, 2012 By [Brooke Tajer](#)

The Oakland County Sheriff's Office dive team held their monthly training Wednesday at Milford High School in Highland.

Divers with the Oakland County Sheriff's Department gathered at Milford High School Pools and Fitness, Wednesday, to train on an obstacle course, practice with their sonar equipment and work on their fitness.

The group, which includes Highland Substation Sgt. Matt Snyder, meets once a month to train.

"We like to try and get in some training on the ice around this time of the year, but it's been so warm," Snyder said. "So, the guys here at Milford were nice enough to let us come in and use their facilities."

Snyder said their busiest season is in the summer, but they will get calls in the winter for animals, cars and snowmobiles that fall through the ice.

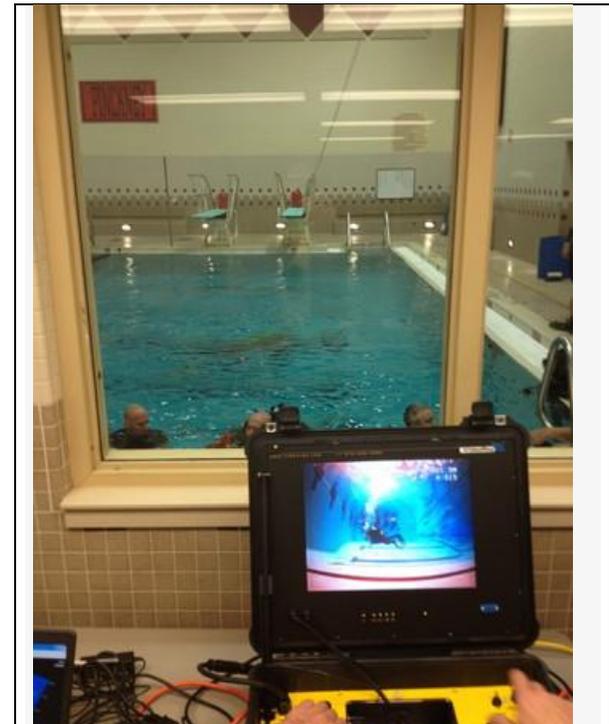
"You don't really now what the situation is going to be until you get on the scene, so we try to train for a little of everything," Snyder said.

During Wednesday's training, the divers put on their gear and blacked out their masks to simulate low visibility in a lake. They then had to complete an obstacle course set up in the pool with the blacked out masks on.

"It creates some anxiety, and trains you for those types of situations where there might be little to no visibility during a rescue or recovery," Snyder said.

There are 12 divers, according to Snyder, who carry their gear with them at all times, even when off duty, just in case they are needed.

"We live all over Oakland County so we can get to pretty much any lake where we're needed within 10 minutes," he said. "We train for all sorts of circumstances and any police or fire department in the county can give us a call."



The specially trained deputies use the ROV in the pool at Milford High School while I member of the Oakland County Sheriff's dive team attempts to complete an obstacle course set up in the pool. Credit Rick Hamill

Just recently, divers were called in by White Lake Police to help with a case where a [man jumped into Cedar Island Lake](#) while fleeing from police. "It's great to be able to provide the types of services and support that we have to the area," Snyder said. Oakland County has 450 named lakes, and several more ponds, rivers and small unnamed lakes.



This ROV is used by the Oakland County Sheriff's Office marine division to locate items in deep bodies of water. Credit Rick Hamill

On Wednesday, the divers worked with a special piece of equipment, the ROV. This ROV (remote operated vehicle) has a 500 ft. line, and it gets dropped into the water to help locate items using sonar. It also has a camera and a mechanical arm that allows it to pick up items. The ROV is controlled by a trained specialist and is used to help divers locate items at the bottom of lakes.

"The divers only train and focus on diving, so it's pretty cool when we can bring in the high-tech equipment and see how it all works," Snyder said.

Expedition Winds Up In The Drink

<http://www.sloatsburgvillage.com/2012/12/22/expedition-winds-up-in-the-drink/>
22 December 2012 by Editor

Winter Solstice morning Friday brought an odd warm rain that created flash flood warnings and fast water throughout Rockland County. The Sloatsburg Volunteer Fire Department was out in the early downpour responding to a call on Sterling Mine Road that turned out to be a false alarm. Just as the trucks arrived back at the village station, at approximately 8:30 a.m., the department got another emergency call regarding a partially submerged vehicle adrift in the Ramapo River.



According to LoHud writer Maresa Nicosia, a call came through reporting that a car was seen in the river near Orange Turnpike, under the New York State Thruway, at the border between the villages of Hillburn and Suffern.



The SFD's dive rescue team responded to the call along with the Hillburn Fire Department. After fast-flowing swollen river water had snapped the rescue line the SFD ran to the vehicle, Mahwah Co. 1 and Stony Point Wayne Hose Company #1 swift water rescue and dive teams were called in as well. Both agencies have marine apparatus to deal with in-water rescue.

With a back seat window down, responders initially thought the vehicle's driver might be trapped inside. After exploring with a flat-bottom fan boat, it was determined that the SUV had been abandoned.

Just after the SFD completed its rescue effort, the vehicle began to float in the current and was swept nearly 100 feet downriver before sinking out of sight.

Information about the vehicle was sketchy in the first hours of the emergency response, but Suffern Police Chief Clarke Osborn later reported that

the blue 2005 Ford Expedition was registered to a Mahwah, N.J., woman whose identity has been kept confidential.

The whole debacle of the Expedition ending up in the drink appeared to be rooted in a borrowed car and a four wheeling joyride on mucky trails that went way wrong.

According to a report by Jessica Mazzola of the MahwahPatch, Mahwah Co. 1 Assistant Fire Chief said that dirt roadways behind the Sharp Electronics building complex were flooded by the Ramapo River. The SUV appeared to have gotten stuck on one of these roads. But how it made its way into the middle of the Ramapo River is still a mystery.

Sloatsburg fire fighter Pete Akey said that the area is a popular recreational spot. "A lot of guys go down there to four wheel," Akey said, recalling that the SFD responded to a call last year in the same area, when a four wheeler in a Jeep Grand Cherokee became stuck in the mud on the back trails. The SFD, along the the Suffern Fire Department, ended up hauling out both the driver and vehicle.

To date, the whole incident is being filed under off-road misadventure. There were no reported injuries and no charges have been filed, although, according to LoHud writer Mareesa Nicosia, who first reported on the incident, "Department of Environmental Conservation officers were contacted and could file charges because of rules about vehicles driving in waterways." Photos courtesy of [MahwahPatch](#).

Dive team nears goal Money, training for N-M rescuers comes together

<http://www.postcrescent.com/article/20121224/APC0101/312240257/Money-training-N-M-rescuers-comes-together?odyssey=mod%7Cnewswell%7Ctext%7CAPC-News%7Cs>

Dec 24, 2012

NEENAH

— A lack of solid ice last winter and so far this season has left the newly created Neenah-Menasha Fire Rescue dive team with



Fire Chief Al Auxier

limitations on its rescue capabilities.

The team of 15 firefighters stands ready to respond to open-water rescues on the northern end of Winnebago County but still need additional ice dive training to provide a full complement of services, Fire Chief Al Auxier said.

In September 2011, community officials authorized the dive team. Within four months, \$65,000 was raised from private sources. Full training and start-up costs total \$90,000. Fundraising is about \$3,000 to \$4,000 short of goal with two events planned in January.

The private fundraising is being done by the department with help from family and friends of the late Bruce

Peterson. The 58-year-old drowned Feb. 19, 2011, when his truck broke through the ice in 16 feet of water on the north end of Lake Winnebago.

Both the Winnebago County Sheriff's Department and the Oshkosh Fire Department have dive teams, but the Neenah-Menasha team was proposed to reduce travel delays to water and ice emergencies on the north end of the county. Sheriff's department divers found Peterson, but he had been under water for at least 30 minutes and resuscitation efforts failed.

"We seem to have a fair amount of ice situations on the northern end of the county compared to the rest of the county," Auxier said. "The effort is to be able to get quick response to people who could use (help) in an immediate situation."

Assistant Fire Chief Mike Sipin, the dive team leader, said 15 members are spread over three shifts.

Glendale Firefighters Rescue Man From L.A. River

<http://montrose.patch.com/articles/glendale-firefighters-rescue-man-from-la-river#video-4126498>

December 25, 2012 By City News Service **VIDEO ON SITE**



Firefighters pull the man out in an inflatable boat and medics take him to hospital for evaluation.



A man clinging for hours to a clump of bushes in the rain-swollen Los Angeles River was safely rescued by Glendale firefighters early Monday.

"The water was moving swiftly down the river. It was very cold and deep," Glendale Fire Department's Brandy Villanueva told *City News Service*.

"He had been on solid ground in the channel at some point, but that ground became an island, then disappeared because of heavy rain flooding the riverbed," Villanueva said.

Glendale firefighters received the call at about 5 a.m. and were assisted by fire units from Los Angeles and Alhambra, including swift water rescue personnel, Villanueva said.

Firefighters stretched catcher devices below bridges crossing the river at Victory Boulevard, Colorado Boulevard, and Los Feliz Boulevard on the northeast corner of Griffith Park, then launched an inflatable boat shortly after 7 a.m., according to Villanueva.

Firefighters aboard the craft plucked the man to safety minutes later, she said.

"They deployed a ladder over the water to act as a pulley device to safely guide the boat back to the east bank of the river," Villanueva said.

Firefighters at the scene said the man, whose age and identity are not yet known, showed no apparent injuries. He was transported to a nearby hospital for evaluation.

Boston Officer Earns Commendation For Water Rescue

<http://www.wbur.org/2012/12/25/boston-officer-water-rescue>
December 25, 2012 By The Associated Press

BOSTON – A police officer has been honored for heroism after jumping into the frigid waters of Boston Harbor to rescue a woman.



M&J Engineering
12520 Kirkham Ct #1
San Diego CA 92064
United States
Phone 1.858.748.9442
Fax 1.858.679.1632

Officer Edward Norton received a commendation on Monday from Boston Police Commissioner Ed Davis and a proclamation from the mayor.

Norton plunged into the 40-degree waters of the Fort Point Channel on Friday to rescue the woman, who was screaming and clinging to a floating dock. Police say the woman either fell or jumped.

Norton, weighed down by his bulletproof vest, took 42 seconds to reach the unidentified woman and held her head above water until firefighters arrived to help. The 11-year veteran, who was treated for hypothermia and lost his wedding ring during the rescue, said he never had time to think.

Davis called it a "remarkable show of heroism."

Kemah Boardwalk evacuated while police investigate bomb scare; divers found harmless device

<http://www.therepublic.com/view/story/6f8479e80c5e43f1877c2bab50793f67/TX--Kemah-Boardwalk-Bomb-Scare>

December 27, 2012 Associated Press

KEMAH, Texas — A harmless device spotted in the water off a Southeast Texas marina led to the area being evacuated for several hours.

The device was spotted late Wednesday off the Kemah Boardwalk, southeast of Houston on Galveston Bay. Kemah emergency management coordinator Bill Kerber says the device looked to some like a bomb.

The boardwalk was emptied while police divers investigated. Divers found what appeared to be a device

once used for military training. It appears to have been lost from an old salvage yard.

Kerber says the device will be scrapped.

Indiana couple rescued after car plunges into icy lake

[HTTP://WWW.EXAMINER.COM/ARTICLE/INDIANA-COUPLE-RESCUED-AFTER-CAR-PLUNGES-INTO-ICY-LAKE](http://www.examiner.com/article/indiana-couple-rescued-after-car-plunges-into-icy-lake)

DECEMBER 27, 2012 BY: TERESA TANOOS



Indy snowstorm sends car with two people into icy lake in Fishers Credits: Cartera Media

Two people in Indiana were rescued Thursday after their car went into the lake at 116th and Hoosier Road, according to Fishers Police and Fire officials, who say the vehicle lost control and went into the water.

Thanks to three bystanders who went into the water to rescue the car's occupants, they got out safely, although some of the rescuers and the occupants were taken to local hospitals. The lake the car went into is an old

quarry, and divers from the Fishers Police and Fire Department who were working on retrieving the car from the water said they believe it landed in an area between 60 to 80 feet deep.

Police are investigating if road conditions were a factor, as some of the roads surrounding the lake are snow covered after Wednesday's winter storm.

Saugus firefighters honored for lifesaving efforts

<http://www.wickedlocal.com/saugus/news/x1926902961/Saugus-firefighters-honored-for-lifesaving-efforts#axzz2GUL7azKw>

Dec 28, 2012 **By Dom Nicastro GateHouse News Service**

Saugus -Two Saugus firefighters. Two jumps into frigid waters on cold fall nights. Each with the mission of saving lives.

Fire Capt. Thomas Nolan and Lt. James Hughes risked personal injury — and perhaps a lot worse — in order to attempt to pull citizens out of murky waters during two separate incidents last year.

And for their efforts, they have been awarded as Massachusetts "Firefighters of the Year" along with dozens of other state firefighters. State officials on Dec. 18 at Mechanics Hall in Worcester honored Nolan and Hughes and firefighters from 14 other Massachusetts communities for their heroic acts of bravery during the 23rd annual "Firefighter of the Year" Awards ceremony.

"It was quite the honor to get the award," said Lt. Hughes, an 18-year lieutenant in Saugus and a firefighter here for more than 25 years. "It was a bigger ceremony than I anticipated. I was among groups of people who

went above and beyond. I was only a small figure there. There were some pretty good rescues. Whatever I did pales in comparison to what they did."

State officials and their fellow Saugus firefighters certainly felt Hughes and Nolan deserved to stand among the state's best.

Hughes landed himself in the hospital for his efforts the early morning hours of Dec. 5, 2011, when he swam into the Saugus River and tried to pull a woman out of a submerged vehicle near the Fox Hill Bridge, which straddles the Lynn/Saugus line.

And Nolan the night of Nov. 18, 2011, though off-duty, heard a call of a person reporting that she heard a person screaming for help coming from the water in the vicinity of Lobstermen's Landing on Ballard Street.

Upon arrival, Nolan immediately jumped into freezing water. He grabbed the man, pulled his head above the water, and furiously kicked as he held the man until more assistance came.

"They both really did a great job," said Saugus Fire Chief Donald McQuaid.

A life saved

According to reports, the Saugus Fire Department Nov. 18, 2011, received the telephone call from the woman who reported hearing screams.

Nolan, who lives in the neighborhood, was off-duty and traveling along Ballard Street returning home from shopping. He heard fire alarm dispatch apparatus for a person in the water, pulled into Lobstermen's Landing and met the woman who reported the screaming had stopped.

In dark and poor visibility conditions, Nolan proceeded down the gangway to the floats and saw two legs hanging over a rope. The person was upside down under the water.

Nolan immediately jumped into the freezing water. He grabbed the man and pulled his head above the water. His face had some obvious trauma that may have occurred when it struck the float or the boat that was tied up nearby. The man made some gurgling sounds.

"Captain Nolan furiously kicked his feet as he struggled to keep the man's head above the freezing water," the report says.

A police officer climbed onto the boat to assist in getting the man out of the water, who was then transported for treatment.

"Without the unselfish actions of Captain Nolan the man would not have survived," according to the report written by former Fire Chief James Blanchard. "He was alone and submerged upside down in frigid water out of sight of anyone."

Nolan, a close to 20-year veteran of the 44-member department, once served in the Fire Prevention Division. He already received the distinguished Thomas Linskey Award and was presented the Medal of Valor by Gov. Deval Patrick for the rescue of a handicapped woman trapped on the third floor of a burning apartment building. Nolan's father Thomas A. Nolan was a Saugus

firefighter for 32 years and served as chief from 1964 to 1981.

"He saved this guy's life; there's no doubt about that," McQuaid said. "That guy would have died if it wasn't for him. There was great personal risk. It was freezing, and there's nothing like cold water. He just was unbelievable. He's very dedicated to his job. There was just no way he wasn't going to respond. Through his whole career, he's always responded. He's always gone above and beyond."



Any time you have an opportunity represent the department and the town of Saugus, it's always an honor," Nolan said. "Many people were responsible for the positive outcome that evening, I accepted the award on the behalf of Linda Meyers, the lady who made the 911 call and stood by in the cold, Saugus police officer John Nagleri, the on-duty fire group that evening under the command of Capt. Steve Johnson, the 911 dispatchers who handled the call with calm

and professionalism, and the dedicated paramedics from Cataldo Ambulance"

Brave efforts in Saugus River

On Dec. 5, 2011, at 1 a.m., a 911 call initiated a response to the Fox Hill Bridge over the Saugus River. A Mercedes Benz sport utility had crashed through the bridge guardrail and plunged into the Saugus River, about 15 feet below the bridge deck, according to fire reports. At high tide, the river was about 12 to 18 feet deep.

When Lynn and Saugus fire engines arrived, Lynn police officers were already in the water attempting to gain access through the drivers' door and had begun to extricate a man in the car. The driver was in cardiac arrest and transported to the hospital.

On the scene, Saugus Fire Lt. Hughes and Lynn firefighter David Hathaway made several dives to break into the vehicle without success. Using a forcible entry tool, they broke through the sunroof and located the second victim.

Realizing they could not fit the victim through the sunroof, Hughes surfaced, took another breath and dove down reaching into sunroof of the car and guided the victim toward to driver's

Water Recovery Operations
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March 15/16/17, 2013

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This course is free to residents of North Carolina.

Non-resident must pay a fee of \$65.

For more information, and to pre-register please contact Jim Caroline Russell- Owen at RCC ESTC, 336.633.4165 or email jrowen@randolph.edu.

<http://ncarems.org/forum/showthread.php?tid=70>

side. Simultaneously, Hathaway then braced his feet against the outside of the vehicle and forced the female out of the car. The firefighters then pulled the unconscious victim to the shoreline.

Although emergency treatment was administered and the victim was transferred to Salem Hospital, she was later pronounced dead. The driver later recovered and was criminally charged because of the accident.

"The rescue actions that occurred at the incident, reflects the dedication and ability of firefighters and police officers of three different agencies to work as a single unit in an emergency situation," the report reads.

Hughes, 48, who lives with his wife and son, called the efforts of each fire and police department "tremendous."

"I just happened to be one of the ones to go in the water," Hughes said. "Everybody did a good job. Taking a look back after a year, it was pretty amazing to see a group of people come together focused on one thing. It didn't work out in one sense, but we gave it the best shot we had."

McQuaid said the water was very cold, and the rescue efforts unfolded in a place that's particularly dangerous with moving currents.

"He wound up with hypothermia and injured his foot," McQuaid said of Hughes. "When you dive into that murky cold water on a freezing December night, it's really dangerous. He did a really good job at risk to his own life. It was an unbelievable thing. He's another one of those guys that would be doing this. He's always been dedicated and is a great firefighter and all-around family man."

In all, Gov. Deval Patrick and Public Safety Secretary Mary Elizabeth Heffernan presented 31 awards on Dec. 18.

"Firefighting is one of the most honorable professions," Heffernan said. "Day in and day out, firefighters answer the call without regard to their personal safety. I want to recognize their bravery and sacrifice, and thank them for always going above and beyond to keep us safe."

Passerby plunges into icy water to rescue motorist in Windsor

<http://www.coloradoan.com/article/20121228/NEWS/312280030/Passerby-plunges-into-icy-water-rescue-motorist-Windsor>

Dec 28, 2012

A passing motorist jumped into frigid water Thursday evening to rescue a woman after her car slid, upside down, into an ice-covered pond in Windsor.

Initial reports from Windsor-Severance Fire Rescue said the Kodak/Carestream employee saw a tire sticking out



A passing motorist jumped into this frozen lake in Windsor on Thursday evening to help pull a woman from this car after she slid into the icy water. Photo courtesy Todd Vess/Windsor Severance Fire Re

from the broken ice at the pond near the company campus, pulled over and jumped into the water to help pull the Evans woman, 22-year-old Kimberly Garcia, from the car.

Windsor Police Chief John Michaels said the man, a Fort Collins resident, called him Friday morning to clarify that the woman was already out of the car but still in the water by the time he plunged into the icy pond to pull her to safety.

Though the Coloradoan knows his identity, the man told Chief Michaels he'd like to remain anonymous. Neither Garcia, nor the man who rescued her, have returned calls for comment.

The crash happened around 5 p.m., just after the sun set and roads across Northern Colorado turned slippery.

Todd Vess, WSFR spokesman, said by the time the man arrived at the crash scene, the passenger compartment was completely under water.

Hospital staff Friday morning said Garcia was treated in the emergency department Thursday night but was no longer a patient.

Bystanders Rescue People After Car Plunges Into Lake

http://www.wbiw.com/state/archives/2012/12/bystanders_rescue_people_after.php

December 28, 2012

(FISHERS) - Bystanders helped rescue people from a lake after a car plunged into the water.

RTV6 reports that the Fishers Fire Department said a car went off the road and into a lake at 116th Street and Hoosier Road, with two passengers inside.

Carrie Mattingly, 43, of McCordsville was driving, and her 5-year-old daughter was a passenger in the 2010 Honda Pilot.

Mattingly told emergency crews that she was trying to change lanes on a slushy 116th Street when she lost control of the car, left the roadway, crashed through a fence and entered the water.

Eastbound 116th Street was closed while emergency crews responded to the scene and divers worked to remove the vehicle from the water.

Both occupants of the vehicle made it to shore safely, with the help of the three to four bystanders who dove in to assist, including Jeffrey Oliver of Westfield, Chad Basey of McCordsville and Randy Jones of Indianapolis.

The vehicle's occupants and the people who retrieved them from the water were all sent to the hospital to be checked out.

Divers reported that the car settled 50 feet away from the shore and about 10 to 15 feet under water in the lake, which used to be a quarry.

Arizona Teens Rescued From Tree After Icy Lake Cracks

http://www.huffingtonpost.com/2013/01/03/arizona-teens-rescued-from-dead-tree-after-icy-lake-cracks_n_2404093.html?cid=main-grid10%7Chtmlws-main-bb%7Cd15%7Csec1_Ink3%26pLid%3D252723

01/03/2013 By Sarah Medina

Two Arizona teens were finally rescued Wednesday after spending two terrifying hours clinging to a dead tree while an icy lake began to crack around them.



According to Fox News, a third teen -- who had stayed on the bank of Fool Hollow Lake in eastern Ariz. -- called for help while the other two clung for their lives to the tree.

Show Low Fire District Capt. Brent Mix told CBS that both teens -- who remain unidentified -- were taken to a hospital for treatment of mild hypothermia after being rescued.

It was a mere 27 degrees when the third teen called for help and 22 degrees by the time the rescue was completed, reported azdailysun.com

In order to reach the trapped teens, a firefighter in a protective suit had to crawl across the lake with a rope. He then used the rope to pull over a boat carrying two other firefighters.

The teens got into the boat and it was pulled back to shore, Mix explained to CBS.

"Their hands and feet got pretty cold," he added. "It was dark by the time we got them to shore."

Kirk Webb, a spokesman for the Lakeside Fire District, warned about the dangers of walking onto a seemingly frozen lake.

"It can be particularly dangerous to try to walk on ice on Arizona lakes because temperatures usually don't get cold enough for the ice to freeze solidly," he told azdailysun.com.

"Every once in a while we have kids trying to see how far out they can go," Mix added to CBS. "That was pretty foolish. There was probably an inch of ice in the middle of the lake."

FOUND ON THE WEB

Giesbrecht "Submersion Improved Emergency Response"- NDPA Symposium 2012

by [National Drowning Prevention Alliance](http://NationalDrowningPreventionAlliance.com)
May 01, 2012

Improved Emergency Response to Reduce Vehicle Submersion Drowning

Operation ALIVE
Automobile submersion: Lessons In Vehicle Escape
University of Manitoba, Canada

Gordon Giesbrecht, PhD
Gerren McDonald, MSc
University of Manitoba

NDPA
National Drowning Prevention Alliance

[FREE SLIDE PRESENTATION](#)

FOUND ON THE WEB

DR. POPSICLE AND THE RULE OF 1-10-1

http://www.scancrit.com/2012/06/06/dr-popsicle-rule-1-10-1/?goback=%2Egde_755527_member_200293628

Posted on June 6, 2012 by K

We love this guy. Dr Gordon Giesbrecht. Professor at the university of Manitoba. He studies human physiology and our responses to extreme environments. He has done some groundbreaking work in cold-stress physiology and prehospital care in hypothermia. He is one the leading authorities on cold water immersion after having conducted hundreds of studies. He also formulated the **1-10-1 rule**.

The 1-10-1 rule

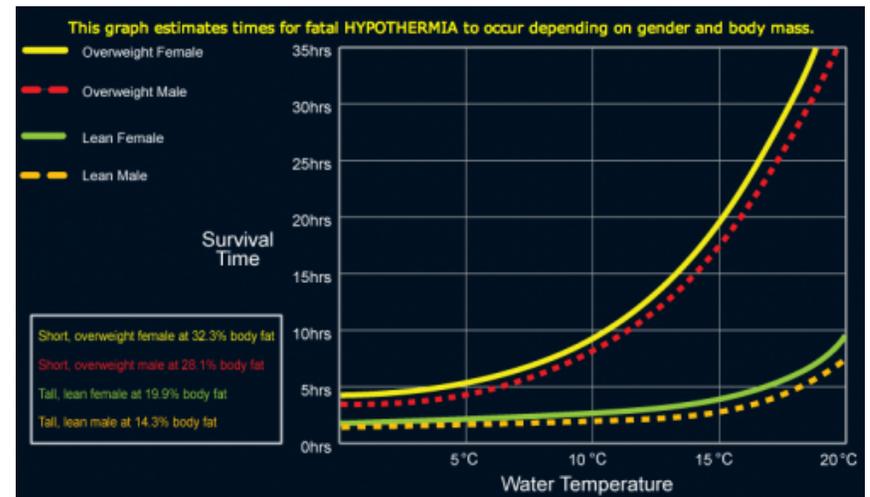
Dr [Gordon Giesbrecht's](#) 1-10-1 rule describes the three phases of immersion in cold water. It is based on his studies of hundreds of volunteers including *himself*. The 1-10-1 stands for the approximate time each phase lasts in ice water

1 – The Cold Shock response is the first thing that happens after cold water immersion. An initial involuntary deep gasp followed by massive hyperventilation that can be up to a 1000% greater than normal breathing. If the airway is below the waterline at this time, the subject risks drowning. It will last for about *one minute*.

10 - Cold incapacitation. The victim loses effective use of his fingers, arms and legs. It happens during *ten critical minutes*. This is where swim failure occurs. If the victim isn't wearing a lifejacket he will drown.

1 - Hypothermia. If a patients survives the cold shock response and somehow is able to stay afloat with the help of a life jacket, in a lifeboat or reaches dry land then hypothermia is next. In a worst case scenario the victim could succumb to hypothermia within *one hour*.

Found this graph on the homepage of Dr. Giesbrechts [Cold Water Boot Camp](#). Apparently Canadians fall through the ice all the time in spring-time, so they have organised training camps to deal with it.



The above graph shows approximate times to fatal hypothermia plotted against water temperature. It also shows why it sometimes pays to be fat.

Dr Popsicle

Here is why they call him Dr. Popsicle. It is also why I think he is brilliant. He walks, skis, snowmobiles and what have you into icy cold water to demonstrate various survival techniques.

Below he demonstrates the 1-10-1 rule.



http://www.youtube.com/watch?v=ysnKtuUTt8k&feature=player_embedded

IMPORTANT! FOUND ON THE WEB

The University of Maryland Scientific Diving Program has updated their medical forms. These are or should be the same or similar to what your team uses.

To download the file, go to:

http://www.des.umd.edu/risk_comm/diving/forms/medical.pdf

Part of the document DIFFERS from an ANNUAL Medical to: CLINICIAN'S STATEMENT: Diver IS medically qualified to dive for:

2 years (over age 60)

3 years (age 40-59)

5 years (under age 40)

EVENTS*



<http://lifesaving.com/>

2013 Ice Rescue Training

Lifesaving Resources, LLC will be conducting a series of 3 **Ice Rescue Technician Courses:**

- * January 26
- * February 09
- * March 09

An **International Ice Rescue Train-the-Trainer Academy** will be conducted **February 21 - 24** at the **Portland Jetport Hilton Portland, Maine.**

An **International Water Rescue Train-the-Trainer Academy** will be conducted **June 6 - 9, 2013** at the **Portland Hilton Garden Inn Portland, Maine**

January 15-17, 2013 Underwater Intervention 2013
<http://www.underwaterintervention.com/>
New Orleans, LA

February 5, 2013 - February 7, 2013 ACSR 2013 Conference

The Association for Crime Scene Reconstruction (ACSR) began in 1991 with a group of professionals in Oklahoma and Texas who investigated crime scenes and performed forensic analyses and comparisons on evidence from crime scenes. These professionals saw a need for an organization that would encompass an understanding of the whole crime scene and the necessity of reconstructing that scene in order to better understand the elements of the crime and to recognize and preserve evidence.

College Park, GA

www.acsr.org/conference

[Subsea Tieback 2013](#)

March 5-7

San Antonio, TX, USA

March 13th-15th 2013 - 2013 NDPA Symposium

[Click HERE to download the AGENDA !](#)

[Click HERE to Download the Symposium BROCHURE](#)

This year the Symposium is jam packed with a wide variety of breakout sessions, demos on the beach and in the pool, fun activities and lots of networking opportunities!

18 March to 20 March 2013

Scuba Fest 2013

Hosted by the Ohio Council of Skin and Scuba Divers (ocssdi), this event promises to provide a weekend of fun, social gathering, underwater photography competition, exhibits, presentations and Saturday night banquet with keynote speaker. **Plus** psi visual inspection workshops, travel seminars, door prizes, silent auction, and more!

March 23, 2013

Western NC Death Investigation Symposium

Winston-Salem, NC

kfritz@wakehealth.edu agurley@wakehealth.edu

April 26-28, 2013

Be A Diver Adventure Sports Festival

Fort Lauderdale, Florida

May 20-24, 2013 Underwater Investigation Workshop.

http://www.chaminade.edu/grad/si/underwater_forensic_investigation.php

Chaminade University, Honolulu, Hawaii

Jun 8, 2013 - Jun 9, 2013

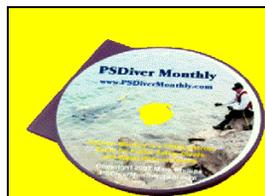
SCUBA SHOW 2013 - Long Beach Events Calendar : Long Beach ...

November 6-9, 2013

DEMA Show 2013

Orlando, Florida

**If you have an event to share, email the information to PSDiverMonthly@aol.com
Subject Line - EVENTS**



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Diving Medicine Online

Ernest Campbell, MD, FACS

Comprehensive information about diving and undersea medicine for the non-medical diver, the non-diving physician and the specialist

Arthritis and Scuba Diving

Risk Factors for Arthritis

Age and sex are two of the most important risk factors for the rheumatic diseases. Most of the major joint conditions show a remarkable sex difference in incidence; eg, systemic lupus erythematosus (SLE) occurs primarily in women, whereas ankylosing spondylitis (Spine) is both more frequent and more severe in males. The reasons for this are unclear. Divers of all ages will need to be aware of the few but important relationships to this widespread condition.

The musculoskeletal system does not "wear out"; it thrives on usage and, unlike most mechanical systems, "lasts a lifetime." The underwater 'weightlessness' lends itself nicely toward allowing this great sport of scuba to be enjoyed by many people who would otherwise not be able to participate in athletics. However, like gender, age very strongly affects the incidence, expression, and impact of musculoskeletal diseases. Some conditions only occur in childhood; others, like SLE and ankylosing spondylitis, usually start in young adults, while polymyalgia rheumatica and giant cell arteritis rarely begin in those less than 55 yr. Rheumatoid

arthritis (RA), SLE, gout, and other major inflammatory rheumatic diseases are expressed differently if they begin in older patients. With minimal assistance with entrances and exits, the arthritic diver can usually manage a moderately difficult dive with ease.

Diagnosis and Assessment Important to the Diver

Rheumatology is mainly a clinical specialty, still depending more on the skills of history-taking and examination than on special investigations. There are 2 main aspects to diagnosis: (1) differentiating the type of rheumatic disorder present and (2) assessing its impact on daily life. Diagnosis is based largely on pattern recognition --the chronology, distribution, and associated features of the disorder. The assessment of pain, disability, and handicap is often more difficult, involving investigation of patients' functional abilities, as well as their hopes, fears, needs, and aspirations. This assessment requires careful documentation in prospective divers for comparison in the case of a possible bout with decompression sickness. Most musculoskeletal disorders cause chronic pain and disability without having a great effect on life expectancy; the prevalence is therefore highest in older people. Some arthritic divers have described significant relief from pain at depth.

Treatment

A few types of arthritis are treatable with specific therapy (eg, gout can be completely controlled with drugs, or Lyme disease can be treated with antibiotics), but there are no "magic bullets" for most chronic rheumatic disorders. Management principles are often similar, regardless of diagnosis, and may depend more on the patient's age and circumstances, the balance of disease processes (eg, amount of inflammation), and the outcome (severity of pain and handicap) than on the specific disease. Most arthritic divers will want to know about the

effect of diving on the drugs they are taking; such as, aspirin, NSAIDs, steroids, and the numerous other medications in use for secondary (fallback) treatment of certain arthritic illnesses (gold, Cyclosporin, Immuran, etc).

Occupational therapists participate early, helping patients adjust to the situation and teaching ways to protect joints from excess stress; later, they assist in managing physical handicap, providing aids, appliances, and further education. Scuba diving can be an important part of the therapists armamentarium. Physical therapy is useful for prevention as well as for treatment, since keeping physically fit and active helps prevent musculoskeletal pain and morbidity; and, in early disease, the maintenance of muscle strength and a full range of joint motion will help prevent subsequent disability. Physiotherapy also plays a central role in rehabilitation and pain management.

Drug therapy

Disease suppression can be achieved with hypouricemic drugs for gout, corticosteroids and immunosuppressive agents for immunologic and inflammatory diseases, and a range of miscellaneous slow-acting antirheumatic drugs for RA and the arthropathies associated with spondylitis. Specific agents are also available for many bone conditions, eg, Paget's disease. The recent development of more effective and sophisticated drug therapy for RA has been significant. Gold injections were first used in the 1930s, but we now have many similar agents, including penicillamine, hydroxychloroquine, and sulfasalazine, some of which are also active in other forms of arthritis. None of these drugs alter consciousness and therefore are not dangerous to the diver. Some blunt the immune response, however, and divers need to be aware of the

increased possibility of infection in polluted and sea water.

Surgery

Surgery has become important in rheumatic disease management. Synovectomy, tendon repairs, decompression, and other procedures are sometimes warranted in early inflammatory disease. In late destructive disease of any type, joint replacement, and less commonly an arthrodesis, can be performed. Joint prostheses from metal or silicone pose no problem to the diver in that they are not air containing and thus are not effected by changes in pressure.

Clinical Approach to Arthritis as related to Diving

A complete history and physical examination are important because joint symptoms may be part of a systemic disease. Laboratory and x-ray data are usually of only supplementary help. Even mildly inflammatory or noninflammatory arthritis may be the first indication of SLE, hypertrophic pulmonary osteoarthropathy due to bronchogenic carcinoma, or a metabolic disease such as hemochromatosis. Conditions easily misinterpreted as arthritis by the patient include phlebitis, arteriosclerosis obliterans, cellulitis, edema, neuropathy, vascular compression syndromes, the stiffness of Parkinson's disease, periarticular stress fractures, myositis, and fibromyositis. Add to this the joint pains associated with "bends" or decompression illness, and you have the possibility of confusion in diagnosis. Dysbaric osteonecrosis affecting the joint cartilage can easily be mistaken for an arthritic joint.

Prominent tenderness of bones adjacent to joints and joint effusions occur in sickle cell disease and hypertrophic pulmonary osteoarthropathy. Both sickle cell disease and pulmonary osteoarthropathy pose

dangers to the diver--scuba diving being capable of causing a sickle cell crisis through hypoxia, and pulmonary disease of the extent to cause arthropathy being adverse to diving due to the possibility of barotrauma.

Physical Examination of the Musculoskeletal System

Changes from previously recorded physical findings are important in differentiating pre-existing arthritis from suspected decompression sickness. A sequence of inspection, palpation, and determination of the range of motion of each involved joint area is followed. In most cases, this determines the presence of joint disease and establishes whether the joint, the adjacent structures, or both are involved. Involved joints should be compared with their uninvolved opposites or with those of the examiner. Information is recorded objectively and quantitatively; eg, by using a numbered grading system and by measuring the range of motion in degrees.

Joint motion, generally painful in joint disease, may not be painful in periarticular, bone, or soft tissue disease. Swelling is an important finding. All swollen joints should be palpated. The examiner should then "ballotte" the joint to (1) elicit the presence of fluid; (2) differentiate between simple effusion, synovial thickening, and capsule or bony enlargement; and (3) determine whether the swelling is confined to the joint or is periarticular; (4) apply pressure to check for the relief seen in DCS.

The foot and ankle: The prospective diver should test his weightbearing ability with full equipment and weight belt. Inability to handle the weight should not preclude diving, however, since suiting up can be done while sitting on the dive platform. Since weight-bearing may elucidate certain abnormalities, part of the examination

should be performed with the patient standing. Since finning is such a vital part of safe diving, disorders of the foot and ankle might be adverse to diving.

The knee: Such gross deformities as swelling (eg, popliteal cysts), quadriceps muscle atrophy, and joint instability may be more obvious when the patient stands and walks, particularly with scuba gear. With the patient supine, careful palpation of the knee, especially noting the presence of joint fluid, synovial thickening, and local tenderness, helps detect arthritis.

The hip: A limp is common in patients with significant hip arthritis. It may be due to pain, shortening of the leg, flexion contracture, or muscle weakness. Loss of internal rotation, flexion, extension, or abduction can usually be demonstrated. Aseptic necrosis of the hip from barotrauma is a definite part of the differential diagnosis of hip pain.

The vertebral column: Cervical and lumbar motion should be measured. Inability to reverse the normal lumbar lordosis on flexion occurs in degenerative arthritis. Limited lumbar flexion is characteristic of ankylosing spondylitis. Neck motion can be limited either by degenerative arthritis or by ankylosing spondylitis. This can become a problem in the diver with the tank position abutting the head. The effect of movement on pain should be noted. Localized bone pain suggests such disorders as osteomyelitis, leukemia, primary or metastatic cancer, compression fracture, or herniated disk. Chest expansion should be measured, as it is typically impaired in ankylosing spondylitis. This is often associated with pulmonary emphysema, particularly dangerous to the diver. Disk disease can be aggravated by the extra weight of scuba gear causing nerve root compression and

confusion as to the possibility of spinal decompression illness.

Diagnostic Studies

X-rays are most important in the initial evaluation of relatively localized unexplained complaints to detect possible primary or metastatic tumors, osteomyelitis, bone infarctions, periarticular calcifications, or other changes in deep structures that may escape physical examination. Erosions, cysts, and joint space narrowing can be seen in more chronic RA, gout, and osteoarthritis (OA). X-rays also are especially useful in examination of the spine. CT scans, MRI, and tomograms can help define puzzling lesions. These offer excellent baselines for future reference to the diving physician.

Other studies useful in selected patients include needle or surgical synovial biopsy, ultrasound, arthroscopy, arthrography, bone and marrow scans, electromyography, nerve conduction times, thermography, and muscle or bone biopsy.

The importance of a good physical examination of the arthritic diver has been spot-lighted as vital for differentiation of the many signs and symptoms of decompression sickness that can mimic arthritis and nerve compression. Weight-bearing has been discussed, as well as the difficulties specific to such illnesses as sickle cell disease and pulmonary osteoarthropathy.

Sjogren's Syndrome

A chronic, systemic inflammatory disorder of unknown etiology, characterized by dryness of the mouth, eyes, and other mucous membranes and often associated with rheumatic disorders sharing certain autoimmune features

(eg, RA, scleroderma, and SLE) and in which lymphocyte infiltration into affected tissues is seen. The syndrome is more common than SLE (systemic lupus erythematosus) but less common than RA (rheumatoid arthritis). The effects of pressure are unknown. **The condition causes keratoconjunctivitis and dry mouth, both conditions possibly inimical to the diver.**

The diver with Sjogren's Syndrome should be in good physical conditioning, be in remission from the acute processes of the disease, be capable of physically managing his/her entry, exit, scuba gear and be capable of assisting a buddy with a diving problem. They should be taking no medication that would alter their ability to function or make decisions.

Pathophysiology, Symptoms, and Signs

In some, SS affects only the eyes or mouth (primary SS; sicca complex; sicca syndrome); in others, there is an associated generalized collagen-vascular disease (secondary SS).

Ocular symptoms occur when atrophy of the secretory epithelium of the lacrimal glands causes desiccation of the cornea and conjunctiva (keratoconjunctivitis sicca. In advanced cases, the cornea is severely damaged and epithelial strands hang from the corneal surface (keratitis filiformis). This would be adverse to diving.

One third of SS patients develop enlarged parotid glands that are usually firm, smooth, fluctuating in size, and mildly tender. Chronic

salivary gland enlargement is rarely painful. When salivary glands atrophy, saliva diminishes, and the resulting extreme dryness of the mouth and lips (xerostomia) inhibits chewing and swallowing and promotes tooth decay and calculi formation in the salivary ducts. Taste and smell faculties may be lost. This may reduce the diver's ability to manage the mouthpiece of the regulator or snorkel.

Drying out may also develop in the skin and in mucous membranes of the nose, throat, larynx, bronchi, vulva, and vagina. Alopecia may occur. Dryness of the respiratory tract often leads to lung infections and sometimes to fatal pneumonia. Associated mucous membrane problems could lead to difficulties equalizing the middle ears or pulmonary barotrauma.

Joint Replacement

Knee or Hip Replacement

There should be no diving limitations or restrictions placed on diving with a knee or hip replacement, or any other metallic inserts or implants. The effects of pressure are not any specific danger for implants which do not contain compressible gases. Gas laws (Boyle's and

Henry's) don't effect an implanted solid; the supposition that there is an increased chance of gas bubble formation in scar tissue or areas of deranged blood supply has no firm basis in man or animal studies.

Main limitations would be purely those imposed by



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rehabilitation from surgery, i.e., ability to walk around with heavy gear prior to entry and climb ladders (or shore) for exits. All wounds should be completely healed and the diver should have been released by the surgeon for full weight-bearing activities. Physical conditioning should have been accomplished.

One should be able to dive the usual limits of sport diving without any restrictions.

Diving After Knee or Hip Reconstruction

Much depends on the original cause of disability. Generally, the guidelines for the new diver are much more stringent than for an experienced diver who is returning from an injury. The sport diver should have no problem as long as there is good range of motion and the diver is able to bear weight.

To become a commercial diver, the candidate must have excellent mobility and dexterity and must be in a robust physical condition in order to meet the demands of the proposed work. For personal safety and that of others, all joints must have a normal full range of mobility.

The knee and hip are especially susceptible to dysbaric osteonecrosis and this must be kept in mind with the injury. Differentiating between residual x-ray findings and osteonecrosis may be difficult.

As far as commercial diving is concerned, it all depends on the examiner and the medical guidelines of the company and the type of work. Baseline radiologic studies are required and clearance by the orthopedic surgeon, that will go a long way to persuading the company doctors to allow return to work.

Fractures, Surgery and Acute Conditions

General Considerations

Disqualification of divers with musculoskeletal injuries, surgery and inflammations should be considered during the period of an incompletely healed fracture, sprain, ligamentous injury or inflammatory process for several reasons;

- the loss of mobility and dexterity with a cast.
- the possible alteration in the uptake of inert gas at the site of injury resulting in delayed healing and inability to climb into boats.
- other aspects of diving requiring mobility and strength.
- the possibility of wound infection from marine organisms.
- the possibility of reinjury to a fracture resulting in non-union, or disruption of a surgical repair.

Divers with acute bone or joint injury or inflammations should not return to diving until:

- the injury has healed and there is a full range of motion and strength.
- residual pain should not be present to impair the diver's ability to perform in emergencies.
- in addition, there should be no pain patterns that could be confused with a decompression accident.
- they have the OK to return to diving from their physician.

Consideration should be given to the particular arrangements of diving gear, straps and equipment and what effect this will have on weight-bearing and the possibility of further injury to other underlying structures.

Diving After a Fracture

Healed fractures generally are thought not to impose any restrictions on diving. Generally, a fracture should be properly healed in 4-6 weeks barring complications. However, there is the theoretical caveat that there is an increased risk of bubble formation in regions of bone where there has been some disruption of blood supply - leaving an increased or decreased vascularity. There have been no studies to prove or disprove these cautionaries, however.

There are a couple of other factors that you might consider:

1. There is significant pressure applied to the arms and legs in exiting the water climbing back into boats from weight-bearing from the heavy scuba gear. You might want to arrange with the divemaster for assistance in donning and removing your gear in the water.
2. There is significant loss of muscle strength and sometimes actual muscle atrophy with a fracture and disuse.

Finally - you should discuss this with your orthopedist for any comment that he/she might have regarding your return to diving in 5 weeks.

Diving With a Cast

Moisture weakens plaster and damp padding next to the skin can cause irritation. Use two layers of plastic or purchase waterproof shields to keep your splint or cast dry while you shower or bathe.

Waterproof cast construction uses a waterproof cast liner made of Gore-Tex (W. L. Gore and Associates, Inc, Flagstaff, Arizona) to replace the traditional stockinette

and cast padding. The Gore-Tex liner repels water and permits evaporation, allowing bathing, swimming, sweating, and hydrotherapy without any special drying of the cast or skin. The liner material is available in rolls of 2-, 3-, and 4-in. width and is applied directly to the patient's skin. Fiberglass casting tape is then wrapped around the waterproof liner.

<http://www.physsportsmed.com/issues/1997/09sep/seles.htm>

It is the theoretical possibility that there might be an increased risk of bubbling in a fracture site due to the altered blood supply. If this were the case, you might find decreased healing of your fracture after diving. Consequently, it would be wise to heed the advice of your physician before diving at all with an incompletely healed fracture.

In addition, you will encounter logistical difficulties in gearing up, water entry and exit and locomotion in the water that could be risky to you and others on the dive boat.

Carpal Tunnel Surgery

You should be able to return to diving after complete healing of your incisions and satisfactory rehabilitation as determined by your operating surgeon. We cannot give you specific time intervals as this differs widely between individuals and is highly variable.

Healed nerve and tendon release operations generally are thought not to impose any restrictions on diving.

However, there is the theoretical caveat that there might be an increased risk of bubble formation in regions of surgery where there has been some disruption of blood

supply - leaving an increased or decreased vascularity. There have been no studies to prove or disprove these cautionaries, however.

Careful recording of neurological deficits should be accomplished before diving.

Rib Fractures

Rib fractures can be very painful, decrease respiratory excursions and if severe, can cause lung puncture with the resultant pneumothorax. A diver is also possibly placed at risk for increased decompression effects at the fracture site with slowed healing of the fracture. Best advice is not to dive during the period of healing (four to six weeks).

Rib braces and ACE bandages are the only effective treatment. In rare cases of fractures in severely traumatized people with markedly reduced respiratory reserve - nerve blocks can be done for pain relief and improved respiration.

Herniated Disc Disease

Diving With Unoperated Disc Disease

Diving with un-operated herniated disc disease is thought by some authorities to constitute a contra-indication to scuba diving. However, post surgical and healed vertebral fusions generally are thought not to impose any restrictions on diving. In addition, there is the theoretical caveat that there is an increased risk of bubble formation in regions of bone where there has been some disruption of blood supply - leaving an increased or decreased vascularity. There have been no studies to prove or disprove these cautionaries, however.

Cervical disc problems causing radicular neuropathy should not dive until this has been surgically repaired. It would be our feeling that if you dive, you should discuss this with your surgeon in terms of weight-bearing, climbing and the hyperextended neck position that is required with scuba diving.

You would be wise to have a neurological examination carefully recorded and with you on your dives for comparison reference in case of a decompression accident.

Lumbar herniated discs without protrusion can and do dive - however, there is a definite risk of acute herniation with the lifting activity and strain of getting back into the boat. Acute herniation can mimic a decompression accident.

Return to Diving Post-surgical

There are no set guidelines that govern the return to diving after disc surgery. This will depend to a great extent on the type of surgery, presence or absence of complications, whether or not a fusion has been done and if there have been any complicating factors, such as a wound infection or residual symptoms.

Generally, a person may return to diving in three months with the OK of the operating surgeon.

There is an absolute contraindication to diving after disc surgery that has failed and results in spinal stenosis. If there is major residua or deficit after the surgery--one probably should not dive. There is a relative contra-indication to diving after having a herniated disc repaired below L1-2 and a repaired cervical disc from the anterior approach--both should wait at least 3 months and then dive only if there are no residua.

There are those who theorize that the possibility of Neurological DCS would be more likely with bubble formation at the site of the disruption of the vasculature in the operative area. No man studies bear this out. Some feel that back surgery and previous DCS of the spine are possibly predisposing factors in the formation of spinal DCS. (Caroline Fife, MD).

Fred Bove, MD ("Diving Medicine"--Bove and Davis) feels that there is clear evidence that minimizing bubble formation is essential for safe diving and to avoid long-term damage to the central nervous system. This goal can be achieved by conservative diving that reduces the total exposure to nitrogen under pressure.

Retrospective studies of diving accidents have indicated that the threshold depth is arbitrarily 86 feet. If you have had successful surgery without residua (neurological findings) you can dive (sport, not commercial).

Compression Fractures

People with compression fractures with nerve root or spinal deficit residua, even if episodic, should not dive until the problem is repaired by spinal fixation. Symptoms of numbness and pain are mimicked by decompression sickness and pose problems in differentiation after a dive. The chances of even more scar tissue developing postoperatively are great. Weight bearing and donning gear on the surface can be real problems to the affected diver, even though it is stated that once in the water they are more comfortable due to the loss of gravity effects. DAN feels that diving should be postponed until the back is surgically stabilized. With significant symptoms, it wouldn't take much to become paraplegic--and then the diver would be in a jam. Ironically, if the diver were paraplegic and stable--then we could make some

arrangement for him to dive --but that's certainly not what we want!

Spondylolisthesis

A diver has to carry his equipment on land (boat) and be able to perform hard physical work on occasions. Weight-bearing with grade 3 spondylolisthesis can certainly lead to nerve root compression, resulting in severe pain, paralysis and loss of function. In addition to causing its own difficulties, this can mask neurological symptoms caused by decompression illness. Until surgically repaired, significant spondylolisthesis would be disqualifying; a three month post operative period should be allowed and no diving at all if there are significant residua.

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Continuing Education

PSDM-CE-99

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- 1) The speed of sound in air is approximately _____ times slower than in water.
 - a. One
 - b. Two
 - c. Three
 - d. Four
 - e. Five
- 2) Divers who have arthritis should seek physical examination prior to taking classes.
 - a. True
 - b. False
- 3) The acronym SONAR stands for:
 - b. Sound Navigation Assisted Rescue
 - c. Send and Receive Another Resource
 - d. Search or Navigation Radar
 - e. Sound Navigation Ranging
- 4) Sonar signals are only reflected and not absorbed.
 - a. True
 - b. False
- 5) The speed of sound underwater increases with:
 - a. Frequency
 - b. Waves
 - c. Power
 - d. Pressure
- 6) Connecting Sonar to a boat's battery may _____.
 - a. Run down the battery
 - b. Stop the radio from working
 - c. Stops the boat's motor from running
 - d. May cause interference to the sonar.
 - e. Any of the above
- 7) The speed of sound is faster:
 - a. Underwater
 - b. Above Water
 - c. Stays the same
 - d. In wind or currents
- 8) It is ok to drive your vehicle in water no deeper than 8 inches.
 - a. True
 - b. False
- 9) Cold water immersion can cause _____.
 - a. Ice to form in the blood system
 - b. Frequent urges to urinate
 - c. Hypothermia
 - d. Any or all of the above
- 10) Firefighter turnout protective suits will float indefinitely in water because of the insulating material.
 - a. True
 - b. False

11) Divers who have experienced joint injury or affliction should monitor the joint by having periodic checkups.

- a. True
- b. False

12) Hell is exothermic

- a. True
- b. False
- c. I did not read the article
- d. It is really endothermic
- e. A or C

TEAM DISCUSSION

1. *Discuss with your team how you train your sonar operator(s).*
2. *Discuss with your team the characteristics of your sonar including the limitations.*
3. *Discuss with your team the surrounding agency sonar capabilities and if NOT known, find out.*
4. *Discuss with your team the differences in sonar units and how they may affect a search.*
5. *Discuss with your team how you view firefighter turnout gear and water related response (non-fire).*
6. AS A TEAM – discuss your ability to respond to water related emergencies. Consider the training you did in 2012 and how it, if it, improved your teams' capabilities or response.
7. AS A TEAM – PREPLAN your training for 2013 and concentrate on weak areas.

If you would like to be part of our Continuing Education Team and help us with this section contact Mark at PSDiverMonthly@aol.com – Subject Line: Continuing Ed.

IMPORTANT NUMBERS:

Chemical spill information can be obtained by calling 1-800-424-9300.

DAN Medical Information Line at 1-919-684-2948
DAN operates a 24-hour emergency hotline (1-919-684-9111) to help divers in need of medical emergency assistance for diving or non-diving incidents

Centers for Disease Control and Prevention
1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636)
cdcinfo@cdc.gov

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Humor in Action ...

The following is an actual question given on a University of Arizona chemistry midterm, and an actual answer turned in by a student.

The answer by one student was so 'profound' that the professor shared it with colleagues, via the Internet, which is, of course, why we now have the pleasure of enjoying it as well:

Bonus Question: Is Hell exothermic (gives off heat) or endothermic (absorbs heat)?

Most of the students wrote proofs of their beliefs using Boyle's Law (gas cools when it expands and heats when it is compressed) or some variant.

One student, however, wrote the following: First, we need to know how the mass of Hell is changing in time. So we need to know the rate at which souls are moving into Hell and the rate at which they are leaving, which is unlikely. I think that we can safely assume that once a soul gets to Hell, it will not leave. Therefore, no souls are leaving. As for how many souls are entering Hell, let's look at the different religions that exist in the world today.

Most of these religions state that if you are not a member of their religion, you will go to Hell. Since there is more than one of these religions and since people do not belong to more than one religion, we can project that all souls go to Hell. With birth and death rates as they are, we can expect the number of souls in Hell to increase exponentially. Now, we look at the rate of change of the volume in Hell

