Edited by
Wayne Fenior

POINT & CLICK ON BOLD LINKS

Blazin' Equipment

Cathx

The Cathx Ocean offers lights for the advanced dive explorer or underwater photographer. Boasting a very bright 1,250 lumen output in both models, the lights also have emergency S.O.S. flashing and strobe mode that will last 24 hours. The aluminum construction is sealed for life ensures integrity of the unit that charges through the body. Rated for a depth of up to 250 meters, the dual LED circuit provides redundancy. The smart battery recharge and discharge ensure a lifetime of use. Options include cam-band tank mount and Goodman handle. **Cathxocean.com**

Nova Scotia Semi-Dry

Scubapro's semi-dry concept combines the comfortable low profile fit and simplicity of a wetsuit with the technical features of a drysuit. Nova Scotia's versatility guarantees minimal water entry and maximum flexibility in challenging diving conditions. Constructed entirely of 6.5mm Everflex neoprene for extreme comfort, insulation and fit, the plush interior keeps you comfortable and warm. A heavy duty self-repairing dry zipper across the back shoulders keeps water out. A 3mm fold over collar and semi-dry neck seal combined with 6mm hood and 3mm face seals protect the diver from water entry. The suit has wrist and ankle 3mm double seals in ultra smooth Glideskin neoprene for additional dry protection. Finished with Silverskin-lined dry hood interior for comfort and warmth and knee reinforcements, this semi-dry suit provides a warm alternative for the diver not wanting a drysuit **Scubapro.com**

Retro fin

This new fin utilizes the same monoprene blend that was popular with its customers in the 90's. The EXP offers the best balance of power to work ratio, providing efficient finning in high flow and stiff currents along with the plenty of snap as a benefit. Being lightweight prevents legs from getting tired even after miles of finning. The blade fin is designed to work with a variety of kicks: including frog kick, modified flutter and power kicks. A stainless steel heel strap with pull tabs and a comfort heel pad round out the fins. Available in four standard sizes XS – XL. **DiveRite.com**

Neptune predator

Ocean Reef of Genova, Italy, continues to lead the innovation in underwater verbal communication for scuba divers. The Neptune Space Predator is the newest innovation in the Predator series of full-faced masks. With critical regulator parts made of Ergal (a lightweight aluminum compound used in aeronautics and other applications requiring high resistance), the Predator is designed for professional and high performance applications and comes with a lifetime warranty. Utilizing GSM DC (Global Submarine Messenger), the transceiver equips the diver with two-way communication to the surface or to other working divers, and is capable of operating on two frequencies. **Oceanreefgroup.com**

Thruster Dolphin

The Pegasus Thruster, already in use by military and port security personnel, has launched the Pegasus Dolphin for the consumer market. Competing at a price-point below other consumer models, the Dolphin is constructed of plastic versus anodized aluminum in the original Pegasus single unit and Hammerhead (two propeller dual unit configuration). Common features of all units is the unique tank mounted design, which allows the diver free usage of both hands. Also, all units employ a unique clutch drive train that prevents the Thruster and diver from damage if the propeller comes to an abrupt stop. The battery is expected to last 35-40 minutes in constant use. Divers can purchase additional batteries that can be changed at depth for extended dives. **Pegasusthruster.com**

NHeO3

A large icon driven dive computer VR NHeO3 Computer that covers all your gases from: air, to nitrox, trimix, open circuit and closed circuit rebreather. The unit also features infra-red transmission to your PC (no wet connectors). The multi-profile, multi-gas algorithm has full decompression look-ahead and the reliability that you have come to trust from VR Technology. You can also switch or add gasses underwater at any time, and the NHeO3 calculates your new profile. The combinations are unlimited! **TechnologyInDepth.com**

Scubapro EverTec

Constructed from a heavy duty tri-laminate (membrane) material, the suit is extremely durable, fast drying, yet, remains light weight. The telescopic torso has elastic suspenders and a crotch strap. Flex seal seams and a long diagonal front zip make for easy donning and flexibility. The neoprene socks can be worn alone, with neoprene boots, or the Fjord Rock Boots. Finished with SI-TECH valves, easy access thigh utility pockets, and an warm neck collar that protects the latex collar, the suit is perfect for the diver preparing for cold weather diving. **Scubapro.com**

Diablo

The Seac Diablo maximum volume BCD has sharp looks and functional features. With six 50mm stainless steel D-rings (plus two 25mm), three dump valves with pulls, removable weight integration pockets, and dual real weight pockets anchored on the tank. Constructed of polyurethane-coated 1000 denier nylon cordura, with a 420 D nylon inner bladder, makes this a high-end dive professional product. **SeacSub.com**

POINT & CLICK ON BOLD LINKS

Cool Shades

Protection, Polarization & Style

Text by Kelly LaClaire

Quality sunglasses are an important part of your dive gear in any tropical or sun-filled location, but how do you choose the right pair for you? This month *X-RAY MAG's* Kelly LaClaire takes a look at several styles and brands of ultra-functional (and ultra-cool) sunglasses, breaking down all the significant points to consider when purchasing your next pair of shades.

UV Protection

Most medical professionals will tell you —in fact, they will insist upon it—that you should only buy sunglasses offering 100 percent UV protection. But what exactly does that mean? The letters UV stand for ultra-violet light—the frequency of light that damages your skin and what you are trying to keep out of your eyes. Ultra-violet is broken down into three distinct types: UVA, UVB and UVC.

UVA is considered by some experts to be the most dangerous type of sun ray, as it penetrates much deeper into your skin than the others, and it is believed to contribute heavily to some types of skin cancer and cataracts (a clouding of the eye and vision).

UVB only penetrates the top layer of skin and is what helps gives you a suntan. But don't be mislead, UVB is still very dangerous, and severe over-exposure is linked to skin cancer and temporary blindness.

UVC is generally ignored, as our Earth's atmosphere absorbs most all of it coming from the sun. There is evidence, however, that ozone depletion is now allowing more and more UVC through, and brief exposure can cause sunburn of the skin and eyes. Any good pair of sunglasses will have UVC protection built in, but if you're concerned, ask a retail sales representative or check the company's website.

The absolute minimum protection that the American National Standards Institute (ANZI—the company that monitors standards and regulations for various manufacturers) requires of sunglass lenses is that it block out at least 95 percent UVA and 65 percent UVB. While this level of protection is acceptable, it is certainly not optimal.

What you want for yourself and your children—as their eyes are still developing—is 100 percent UVA and UVB protection. Most all sunglasses, even less expensive brands, will have this kind of ultra-violet guard built in, but you should always check the labels and lens stickers to be sure.

Occasionally you will find companies that advertise their lenses as having "UV 400" filters. This is a very fancy and grand way of saying that the sunglasses are 100 percent UVA and UVB. If you see this label, know

Suncloud

For anyone who has felt the wallet-squeezing affects of recent economic conditions around the globe, you may be looking for a trusted name brand that is slightly less expensive (without sacrificing quality) to take with you on your next scuba excursion to your favorite destination. Well, look no further. Each high-grade Suncloud model sells for US$50 and has every feature and high-end attribute you could ask for in a performance pair of sunglasses. The ATLAS (below), our personal favorite among the men's styles, has strikingly clear, optical quality polarized lenses made of impact and shatter resistant polycarbonate as well as supple and soft Grilamid TR90 frames housing rubberized nose and temple features for excellent fit and durability. The ATLAS is available in several lens tints, including the well-known Suncloud rose, and each pair comes with a lifetime warranty against defects. Highly recommended! For the ladies, one of Suncloud's most popular and elegant models has to be the VANNA (left). Beautiful lines and a slightly oversized frame offer stylish fashion and great sun protection in any condition and in any setting. Each pair is fully polarized and blocks 100 percent of UVA/UVB rays. Colors include black frame with rose lenses, tortoise frames with brown lenses or chocolate brown frame with brown lenses. As with any Suncloud, a lifetime warranty is extended. To see all of the styles in the ladies line, please visit **www.suncloudoptics.com**

Sunglasses

KIDS NEED SHADES TOO!
As boys and girls are growing and developing so are their eyes. For this reason is it critical that your children have good quality sunglasses too. Here are the key points to keep in mind when buying shades for kids.

- Be sure to buy only sunglasses that offer one-hundred percent UVA and UVB protection. Check the labels and tags before purchasing.
- Many sunglasses for toddlers and pre-teens have very light tinted lenses in fun colors. This is perfectly alright as these lenses generally offer just as much UV protection as dark lenses. Again, read the stickers and packaging to be sure.
- When fitting your child, make sure the sunglasses are not too tight. Parents tend to buy their kids sunglasses that won't fall off even in a wind tunnel but unfortunately this will give your little ones headaches and cause pain behind their ears or at their temples. Remember, children won't wear sunglasses that aren't comfy so you want a nice, soft fit. If you're worried about the glasses falling overboard, buy an inexpensive lanyard.

that you are covered, but don't let the hyperbole fool you into thinking they are somehow more protective because of the large number.

Polarized

Many divers, as they spend so much time on the water, are familiar with this type of lens, but here is a quick overview, if you are unsure. Polarized shades are made to block out light that reflects off certain surfaces— especially long, flat surfaces like snow, ice, windshields and, of course, lakes, rivers, etc. A normal, non-polarized sunglass allows light to enter the lens from any direction causing haze, but a polarized lens will deflect any light that hits a surface and bounces upward towards the eye. In doing so, virtually all glare is eliminated giving the wearer an ultra-clear, soothing field of vision and the ability to actually see down into bodies of water. Polarized lenses do not give extra eye protection as many people suppose (only UV filters do this) but they do offer certain advantages and a level of comfort most divers consider necessity.

For all their benefits, however, polarized sunglasses do have a few drawbacks that may need to be considered before you buy.

First, polarized shades can reduce the visibility of some liquid crystal (LCD) displays used in newer car or boat gauges, GPS and ATM screens as well as cell phone covers. Second, some wearers—only a rare few—have reported a "3-D effect" to their vision when wearing this kind of sunglass. If possible, be sure to try on sunglasses outside and not just inside the store when you are considering a purchase.

Blue-Light

New research suggests that a portion of the sun's rays, called High-Energy Visible (HEV) Radiation, or "blue-light," may increase your long-term risk of contracting macular degeneration. Macular degeneration occurs when the macula (the sensory membrane lining the back of the eye and responsible for the sharp, clear vision needed for driving) begins to deteriorate. Currently, this eye disease is the leading cause of blindness among Americans 65 and older, and while this research has not been proven conclusive, it may be wise to make sure your next pair of sunglasses have a blue-light filter built in—usually referred to as "blue-blocks."

Blue-blocks generally have brighter, amber tinted lenses that increase color contrast and let in more visible light that gives wearers a crisper, sharper view, which actually improves clarity of vision. Many high-end shades, such as Maui Jim and Serengeti, offer lenses with blue-light filters, giving consumers a sunglass that blocks out all UV and blue-light as well as being fully polarized. If you are recovering from macular degeneration surgery, or are worried about future eye problems, ask the salesman you are working with or check websites to find out which

SCHÄEDZ.COM/SUNHATS.AUSTRALIAFIRST.COM

Smith Optics

The TENET from Smith Optics brings the ultimate visual experience to the most discerning eyewear customer. First and foremost these shades are a commitment to optics, and the workmanship is second to none. When you try them on, you'll find each pair packed with every high end feature you could ask for including: ultra-lightweight, polarized glass lenses with superior visual clarity; scratch resistant and anti-reflective hydroleopphobic (oil hating) coatings that repel water and actively resist fingerprints and grease; a nearly indestructible grilamid TR90 (super durable nylon) frame with soft and supple temple and nose pads that actually increase their grip when wet (for less heart attacks when your glasses slip off your face and sink into the abyss); Italian stainless steel spring hinges for maximum comfort and less temple-pinch no matter the face shape or size and the ability to put prescription lenses in the frames. Add to that unique and striking logo plaques and beautifully rich color palette, and you have in the TENET a pair of sunglasses to truly covet.

An exceptionally crafted women's sunglass, the CAMEO boasts a handmade, acetate frame with gorgeous curves and stylized logo work. The gray tinted, polarized lens is made of the most scratch resistant optical plastic lens on the market today (CR39) and wraps perfectly around your eyes for outstanding coverage and maximum protection. Each pair gives 100 percent UVA/B protection and comes in three colors: black frame with gray lenses, Tortoise frame with pearl and a deep, gradient rose amber lenses tomer service sexy red with a they stand lens. Smith's cus- ucts, offering a is exceptional and on all sunglass- behind their prod- site for details. lifetime guarantee es -see their web- **www.smithoptics.com**

Sunglasses

models and brands offer a blue-light (HEV) lens.

Style

Now that we have all that techy jargon out of the way, let's get down to business and dive into what we all care about most—looking fantastic out on the water! The following shades are guaranteed to not only turn heads but also keep your eyes totally safe and your image even safer. ■

NAME BRAND VS GENERIC
— WHAT'S THE STORY?
Are high-priced sunglasses really better than inexpensive, generic sunglasses? Well, yes . . . and no. As far as overall eye-protection is concerned, it does not matter weather you paid five dollars or five-hundred dollars IF they both block out one-hundred percent of ultra-violet light. In fact, many generic sunglasses can be purchased that are not only fully UV protected but also fully polarized and offer very clear, optical quality lenses. The major difference comes in materials. The best name brand sunglasses – like the ones detailed in this article – use only the highest quality glass and plastics available for their lenses ensuring superior optics and unbeatable scratch resistance. They also use premium grade metals and plastics for the frames, hinges and screws giving maximum comfort and durability. Moreover, each of the shades outlined here come with a lifetime warranty and repair/replacement program you won't find with most inexpensive generics or smaller, lesser known brands. ■

DARKER IS BETTER — *A COMMON MISCONCEPTION*
Some people try to find the darkest sunglasses they can in the misguided belief that they give better eye protection. This in fact is not true. Ultra-violet light is invisible to the human eye and, while it may give you one heck of a sun burn, it cannot be seen. If your eyewear has a good UV coating, lenses with no tinting at all (like the ones on regular eyeglasses) are just as safe as those with pitch black lenses. In fact, some scientists have concluded that very dark sunglasses make the pupils of your eyes open wider than usual, allowing more harmful UV into your eyes. The darkness of the lens only keeps you from squinting but does not itself offer any eye protection. If your eyes are super sensitive use a sunglasses that has both polarized and blue-light filters added or try different tints (gray, green, amber, rose, etc) as some colors are more soothing to certain eyes than others. ■

Maui Jim

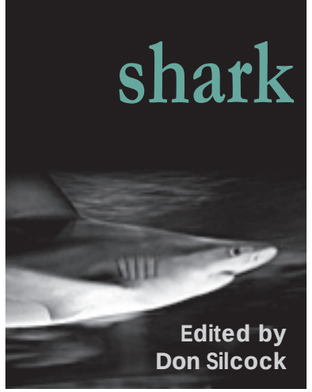
DAWN PATROL (far left), a new retro style introduced by Hawaiian favorite, Maui Jim is perfect for both men and women wanting outstanding eye protection coupled with old school fashion. Fitted with paper thin, polarized glass lenses, each pair is coated with waterproof and oleophobic treatments (that's a gnarly Greek word for oil-resistant) which shed water and snow as well as repel fingerprints and grease. High-grade nylon frames give long lasting durability for medium faces and can be fitted with almost any prescription lens type you need. The finer points include nickel-silver spring hinges for added comfort and non-slip, rubberized nose pads. Three lens tints are offered: neutral gray, bronze and the patented and unmatched, Maui rose. Don't be afraid to take these out on the sea as they are super coated with saltwater protectant.

The new ALOHA FRIDAY (left) style takes it cue from the classic Risky Business look of the early 1980's but has been radically updated and fully outfitted with every top-scale extra our new millennium has to offer. Each pair comes equipped with polarized glass lenses that actually boost color intensity surrounded by ultra high quality, lightweight acetate frames with a high-gloss finish that are specially treated to withstand saltwater and coastal conditions. Each pair comes with a custom case and cleaning cloth and can be fitter with prescription lenses if need. Colors available: gray fade, chocolate fade, tortoise. Interested in other classic styles? Log on to **www.mauijim.com**.

Costa Del Mar

Aggressive technology meets comfortable "forget-the're-on" fit with Costa Del Mar's uber-cool FISCH (far right) model. Taking their name from Chris Fischer, the legendary shark tagging angler from *National Geographic's Expedition Great White*, these sleek and stylish beauties feature a no-slip, rubberized lining along the entire length of frame interior giving the wearer one of the most comfortable sunglass fits ever designed for medium and large faces. In addition, this model is equipped with Costa's signature three-hole venting system to eliminate fogging and humidity buildup around the eye. Of course, each pair is polarized and offers 100 percent UVA/B protection and comes with extraordinarily clear, high-definition glass or shatter-poof polycarbonate lenses. Frame colors include tortoise, black or silver and each can be fitted with a myriad of lens tints.

Get acquainted with the newest unisex sunglass style in Costa Del Mar's already impressive outdoor line, the SKIMMER (above). This extremely lightweight, semi-frameless sunglass is meant for serious outdoor enthusiasts who know that lens color matters and need to switch with variable light conditions on a moment's notice. Each pair features interchangeable, polarized lenses that allows you to match the exact lens needed to the exact amount of sunlight, water color, glare intensity and fishing conditions you may be facing. Obviously, sunglasses of this caliber offer maximum UV protection and extreme clarity of vision as well as sporting frames that are nearly indestructible. The Skimmer comes in tortoise or black and a host of lens colors to choose from. For more information on styles, technology, warranties and retail locations visit **www.costadelmar.com**.



How to dive with the Grey Nurse Shark

Text and photos by Don Silcock

Large enough to get your complete and undivided attention is how American underwater photographer Marty Snyderman once summed up an encounter with the grey nurse shark (*Carcharias taurus*). Big and fierce-looking, with a set of prominent sharp teeth, the grey nurse moves through the water in a slow but determined manner, which creates a physically intimidating presence guaranteed to raise the blood pressure of the uninitiated observer.

My first such encounter was about 15 years ago at Flat Rock near Stradbroke Island in Moreton Bay, Queensland, Australia. I was diving the shark gutters on the northeast side of Flat Rock, where grey nurse sharks are known to gather from June to October each year. Although thoroughly briefed on what to expect and do prior to entering the water, I have to admit I was more than just a little concerned when I saw the first shark heading in my direction.

We had been told not to obstruct the shark's path in anyway and just stay calm while they swim past. Sure enough, the big female, almost three meters long, did exactly that... completely ignoring me!

Since that first encounter, I have been fortunate to spend a fair amount of time underwater with grey nurse sharks, and been so close that I could tell whether they had halitosis—bad breath. But I can honestly say that I have never once felt threatened or in any real danger.

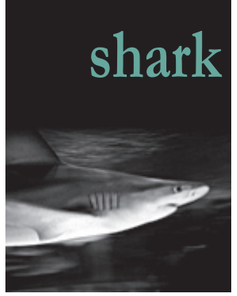
So, why is it that in just 40 years the grey nurse has gone from one of the most common sharks in Australia, to an endangered species, when it is not a dangerous shark?

A Bad Case of Mistaken Identity...

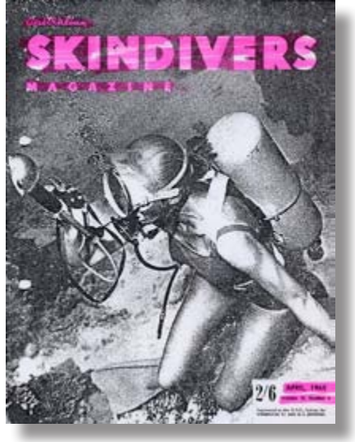
The early 1960s were a time of increasing prosperity for the "Lucky Country" and our urban population turned increasingly to the sea for sport and entertainment. Surfing, spearfishing and game fishing became increasingly popular, and the macho image of these water sports suited the times well.

Marine science was also in its infancy; very little was known about the inhabitants of our coastal waters. Sharks were generally considered to be very dangerous creatures and large sharks like the grey nurse were automatically assumed to be man-eaters. Just as Australian newspapers today automatically assign a shark attack to the great white, back in the 1960s, the grey nurse was the "usual suspect".

Catching one of these supposed man-eaters was considered a heroic act and



one guaranteed to draw a big crowd back on the beach when the dead shark was hoisted up for all to see.



SKINDIVERS MAGAZINE

MERRY MAKING 'MONGST MANY MAN-EATING MONSTERS

By Robbie Wood

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AROUND THE CLUBS:—

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THE MID-SOUTH UNDERWATER SKINDIVERS' CLUB

An old issue of *Skindivers* magazine from the 1960s features hunters showing off their catches of grey nurse sharks. The 60's were a time when the prevailing opinion of grey nurse sharks were that they were man-eaters

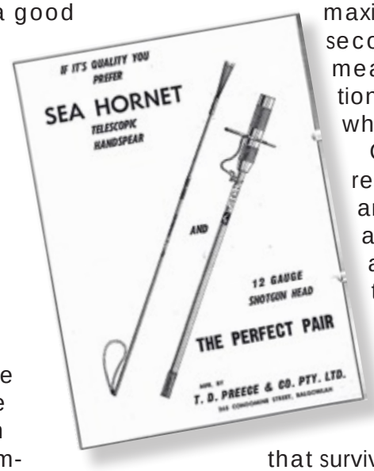
Grey nurses hunted

Although predominantly solitary in nature, grey nurse sharks congregate at certain times of the year as part of their mating patterns and these colonies added to the confusion because they were perceived as "shark infested" locations—particularly if they were anywhere near public beaches, such as with the one at Magic Point near Maroubra, just round the headland from Sydney's famous Bondi Beach.

Aggregating in such a predictable way meant that the grey nurse, compared to other large sharks, was relatively easy to catch or spear, and the sentiment of the times was, *the only good shark, was a dead one*.

The 1960s were really not a good time to be a grey nurse, as later in that decade saw the introduction of the explosive underwater powerhead, which tilted the odds well away from the grey nurse and in favor of the many spearfishermen using them, resulting in hundreds of sharks being killed.

The impact of this widespread slaughter was twofold. Initially, it decimated the grey nurse population on the east coast of Australia. But in the longer term, it had a compounding effect, because it takes between six to eight years for a juvenile grey nurse shark to reach sexual maturity, and once they start breeding the birth rate is a maximum of two pups every second year (see sidebar)—meaning that the population grows very slowly even when things are normal.



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Grey nurse sharks reach a maximum size of around 3.5 meters and are believed to live for about 25 years, hence the widespread killing of so many mature, and therefore, sexually active, sharks in the 60's and 70's meant that it doomed those that survived the carnage to potential extinction unless dramatic changes occurred.

It seems sadly ironic that what we now know as a quite docile shark could be hunted to the verge of extinction in such a way.

GREY NURSE SHARK BREEDING CYCLE

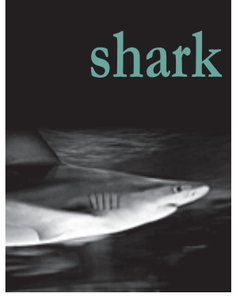
Grey nurse sharks breed slowly and are ovoviviparous, which means the embryos feed on a yolk sac in the mother's uterus until all the yolk is consumed, when they then turn on each other in what is known as "intra-uterine cannibalism". There are upto 15 embryos initially, but this Darwinian survival of the fittest process results in only one pup actually making it, meaning a maximum of two pups per litter—one from each of the mother's two uteri.

The pups are between 80 to 100cm in length when they are finally born, meaning they are quite small and relatively vulnerable to attack, further adding to the pressure on the overall grey nurse population.

The gestation period is believed to be nine to 12 months, and the overall reproductive cycle, about two years, because the mother rests for a year or so before mating again. ■

Turning the conservation tide

Perception, as they say, is reality, and to change the public's widely held belief that a large and dangerous-looking shark such as the grey nurse was, in fact, no danger to them at all, requires exceptional effort. To get politicians to do anything is even harder, but the latter is virtually impossible until the wheels start to turn on the former.



Video camera used for capturing shark patterns used to idenify individuals. It consists of a regular underwater video housing, but with a long flat bracket across its top and waterproof laser lights clamped to it on either side of the housing

Australian diving icons Ron and Valerie Taylor were amongst the first to realize that the grey nurse should actually be protected, rather than hunted, and they were able to both use their high public profiles and enlist an unusual ally to the cause.

Ron, a former world spearfishing champion, told me that when they first started spear fishing back in the late 1950's both he and Valerie were utterly convinced that the grey nurse was a man-eater. However, over time, as they moved more into scuba diving, they came to understand that the grey nurse was relatively harmless to humans, and by the mid 60's, were both actively campaigning for its protection.

Ron highlighted two key events that helped to turn the tide of opinion—the first being enlisting the help of Australian game fishing legend Peter Goadby, who added significant weight to the conservation argument by confirming that the grey nurse was not a game shark at all.

Game fishermen in the late 1960's were not known for their environmental or conservational predisposition, so having such a well-known personality as the late Peter Goadby on the side of the grey nurse was a huge coup.

The second event was the film Ron and Val made in 1973 called, *The Vanishing Grey Nurse*, which went to air as part of a series of thirteen 30-minute documentaries made for Australian TV called, *Taylor's Inner Space*. The film was the first to challenge the public's perception of the grey nurse and introduce the reality of the situation. It played a significant role in changing public opinion.

The fight to protect the grey nurse from extinction was helped by numerous other people, many of whom went to great lengths, and in 1984, a major breakthrough was achieved when the state government of New South Wales formerly declared the grey nurse as 'vulnerable' —making it the first protected shark in the world.

The lead of NSW was eventually followed in Queensland, Western Australia and Tasmania with fisheries legislation to protect the grey nurse, and then it was listing as 'critically endangered' under Commonwealth legislation. The highly-rated Swiss-based International Union for Conservation of Nature (IUCN) has also listed it as vulnerable, meaning the grey nurse faces a high risk of endangerment in the wild—one step down from high risk of extinction in the wild.

Sean Barker and Peter Simpson of Spot-A-Shark, which tracks grey nurse sharks

Spot-A-Shark

About three years ago on a day trip to a grey nurse aggregation site at Magic Point, I noticed a rather unusual looking video camera, consisting of a regular underwater video housing, but with a long flat bracket across its top and waterproof laser lights clamped to it on either side of the housing.

Curious, I introduced myself to its owner, Sean Barker, and asked what the

SPOT A SHARK

Sean Barker and Peter Simpson launched Spot A Shark in 2009, with the aim of building on the work done by Phil Bowman of Seal Rocks in the early 1990s with his Grey Nurse Shark Migration Project.

Bowman's project was focused on the use of non-invasive methods to better understand shark movements and population, and Spot A Shark builds on this by attempting to harness the large number of previously unrecorded underwater encounters between divers and grey nurse sharks to greatly enhance the size of the database. The basic concept being that many divers now carry a camera with them, so if the results of those encounters can be collated and entered into the existing database, a significant step forward may be possible with positively identifying the overall shark population and their migration patterns.

At the end of the day, the only way to ensure the long-term survival of the grey nurse is to get a full and proper understanding of their actual situation, so that programs can be put into place to ensure their survival.

Sean and Peter are enthusiastically committed to the Spot A Shark project, and the overall goal of grey nurse conservation, but are quick to point out the significant efforts of others in this field, such as Queensland-based marine scientist Carly Bansemer, Nick Otway and, of course, Phil Bowman.

Website: **www.spotashark.com**

GREY NURSE SPOT PATTERNS AND I3S

Exactly where the original concept of using the spot patterns came from, in the first place, is not completely clear, but there is no doubt that Australian dive instructor, Phil Bowman of Seal Rocks, made a major contribution when he incorporated the principle into the PADI specialty "Shark Diver" course he developed back in 1987.

I3S was first conceived in 2003 by Dutch marine scientists, Jurgen den Hartog and Renate Riejns, while in South Africa studying the impact of divers on the Ragged Tooth (Grey Nurse) Shark at Aliwal Shoal, 40km south of Durban. They were diving with Anna Mieke van Tienhoven, who had published the idea of using the spot patterns on the flanks of the shark as a kind of unique identity fingerprint, but was using manual comparison to do the analysis—something that got harder and more time consuming the more sharks she photographed.

What Hartog and Riejns did was develop the theory of using a software algorithm to compare spot patterns, based on the principle that the pattern on each shark is unique. The I3S software they developed stores the pattern as a "fingerprint file" and uses that to compare each additional image added to the database.

Although initially for use in identifying Grey Nurse Sharks, the I3S software has been used successfully with Whale Sharks identification, as they also have unique spot patterns, and a modified version has been used in the identification of Manta Rays. **www.reijns.com/i3s**

Grey nurse shark swimming in he cave at Magic Point off Queensland, Australia

contraption was for? It turned out that he was working on a project to identify sharks using something called I3S—Interactive Individual Identification System—for an honors degree in marine science.

I subsequently learned that I3S is a software program that works on the basic premise that the pattern of spots on the flanks of the grey nurses are unique, in the same way that fingerprints are with humans. Therefore, if sufficient images can be collected from the locations where grey nurse are known to congregate, then migration patterns can be identified.

While the spot pattern remains the same, the distance between the spots increases as the shark grows, so I3S also provides a way to determine the growth rate of a previously identified shark, if the dates it is spotted and photographed are known. The laser lights Sean was using were to introduce a known dimension into the image of the shark, so that the growth rate could be calculated.

Sean explained that his problem was getting enough images to build a decent database, and being a one-man band, meant it was virtually impossible to gather enough to really get his project moving. So, he had approached one of the diving publications in Australia seeking support for an advertisement requesting copies and dates of grey nurse shark images taken in eastern Australia.

The advert produced a strong response and led to Sean teaming up with another Sydney-based diver and self-confessed shark addict, Peter Simpson, who had been diving Magic Point regularly since 2000 and had collected lots of images that could be used for the project.

Together Sean and Peter developed the Spot-a-Shark website (see sidebar), which greatly increased the number of images in the database, and together, they have now positively identified over 430 sharks and nearly 25 migratory patterns.

The exact patterns of migration, aggregation and mating are still not fully understood

Face to face

An underwater encounter with any large creature is an exciting event, and the size and physical presence of the grey nurse shark makes interacting with them a truly memorable experience.

Most of my experience, and certainly all of my up close and personal, face-to-face contact, has been in the cave at Magic Point off from Maroubra in Sydney. Typically, you are not allowed to enter the cave because of the potential impact on the sharks, but in the process of getting the images for this article, I was allowed to spend a reasonable amount of time in there, after being extensively coached on what and what not to do.

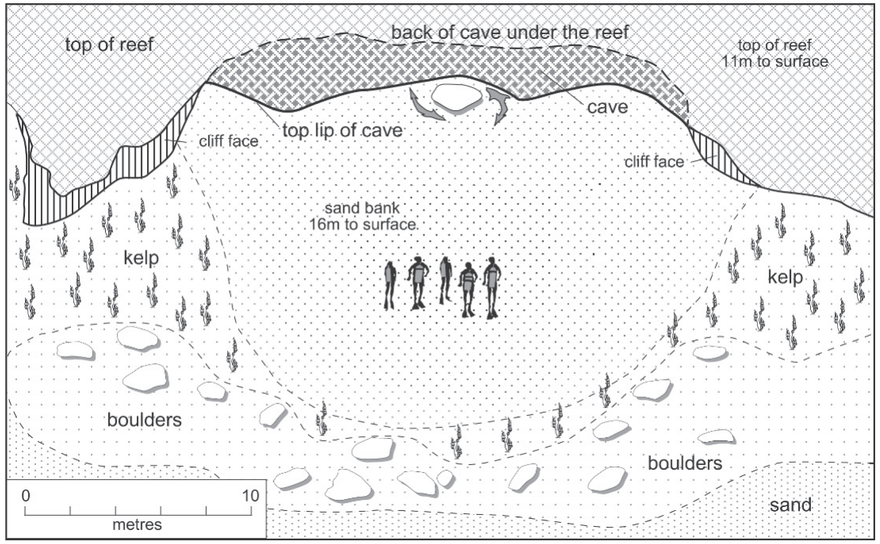
Sean Barker's and Peter Simpson's work with grey nurse sharks has shown that when they aggregate together at certain times of the year, they establish swimming patterns that keep them away from each other's "personal space". So the presence of a large creature like a diver—with the curtain of bubbles they create—can disturb that pattern, stress the sharks and possibly drive them away from the area.

So, in a confined area like the cave at Magic Point, multiple divers entering it is certain to impact the swimming pattern and is a really bad idea. A lone diver on the other hand, with a slow and cautious approach can enter the cave area successfully from either end, which minimizes the impact on the sharks and gives them plenty of time to adjust their swimming patterns.

Clear signs of stress are changes in breathing rate, indicated by gaping of their mouths, and the speed at which they flick their tails. The two are linked because an unstressed grey nurse will swim in a relaxed manner at a rate that provides enough oxygenated water passing through its mouth and over its gills. A stressed shark, on the other hand, has to move faster to increase the flow of water through the gills, and initially "gapes" its mouth to boost the oxygenation effect.

Sean believes that the stress threshold is around 24 tail flicks per minute, but the shark's overall "body language" is a sure sign that they are becoming stressed. If you observe that behavior, take it as your cue to back off and leave them alone—not that you are in any significant danger, but they are a big creature after all and so common sense should prevail.

The exact patterns of migration, aggregation and mating are still not fully understood, which is why the work of people like Sean and Peter is so important, but the basic fact is that, as divers, we are very luck to be able to see the grey nurse in its natural environment—particularly in light of its vulnerable status. So, we owe it to them to respect them for the magnificent creatures that they are. ■



turtle tales

Edited by
Bonnie McKenna

Plastic bags kill sea turtles

Around the world, as human communities continue to develop, consumption of plastic continues to rise. This waste is contaminating the ocean with billions of tons of plastic, which harms and kills approximately 100,000 sea turtles and other marine animals each year. Sea turtles are particularly at risk because they often mistake floating plastic bags for their favorite food, jellyfish. Always take a reusable grocery bag to the store. ■

Pacific Leatherbacks on their annual migration from California to Hawaii

Every summer into the fall, giant leather-back sea turtles gather off the coast of California, Oregon and Washington to feed on an abundance of jellyfish in the cold California Current, and most years, will swim out to warmer Hawaiian waters for the winter. After several years of feasting offshore of the United States, they make the long journey back to their natal nesting beaches in and around Indonesia to lay their eggs and propagate the next generation. These are the largest turtles on earth, growing to over six feet in length, weighing up to 2,000 lbs, and are able to reach depths of more than 3,000 feet below the ocean's surface. ■

SCOTT R. BENSON, NMFS SOUTHWEST FISHERIES SCIENCE CENTER

The oil and the turtles

The devastation of the oil spill from the Deepwater Horizon blowout has directly affected the critically endangered Kemp's Ridley turtles. Along the beaches of the Gulf of Mexico, only 8,000 females nested in 2009, and the adult males are thought to be even fewer. Most of the surviving juveniles inhabit the waters 20 to 30 miles from shore, feeding and growing in the same currents that collected the bulk of the oil. There are confirmed reports of Ridley's being burned alive in the pools of corralled, concentrated oil that BP burned off.

There is fear among biologists that the internal damage from hydrocarbons to the organs of the Ridley's could make them unable to reproduce.

Barbara Schroeder of the National Oceanic and Atmospheric Association thinks the spill is unlikely to spell the end of the Ridley, but it is definitely a setback to the turtle's recovery. "We are going to have to enhance our efforts to get the species back on the trajectory it was on, and we will need to re-look at the most significant human threats —bycatch from shrimp and other trawlers and gill nets, hook and line-fishing and boat strikes."

That the four million barrels of oil seem to be dissipating more quickly than expected does not mean the turtles are no longer affected. So, the crisis is not over; it is only the beginning. The biological consequences of this disaster will possibly be felt for years. ■

Turtles and Dugongs are at risk in Australia

The turtle and dugong capital of the world is the northern Great Barrier Reef and Torres Strait region report increased pressure under climate change and human fishing, hunting, pollution and onshore development.

"Depletion of turtle and dugongs increases their vulnerability to threats and their ability to cope with changes," said Dr Mariana Fuentes of the ARC Center of Excellence for Coral Reef Studies and James Cook University.

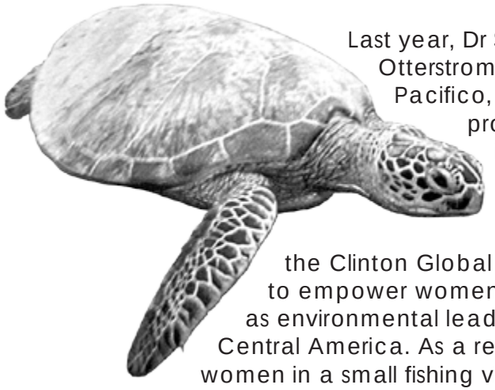
Fuentes said that turtles are especially vulnerable to the effects of these changes, which include decreases in hatching success and loss of nesting areas. Overheated beaches can cause a decrease in the turtle's reproductive output and significantly alter the sex ratio of hatchlings.

Fuentes research programs involve green and flatback turtles as well as dugongs in an effort to establish priorities for the management of marine megafauna to increase their resilience to climate change.

"Under the current conditions the nesting grounds are producing more females. With increasing temperatures, these turtles are at risk of stretching out the ratio, though we can't predict exactly when it will cause an unbalanced population," Fuentes said.

Sea turtles have survived large climatic changes during their evolutional history, but modern rates of change are much faster and are coupled with additional human pressures. It is unknown if the turtles can adapt to these changes. ■

Rural women in Nicaragua lead an effort to protect sea turtles



Last year, Dr Sarah Otterstrom of Paso Pacifico, a non-profit organization, made a commitment at the Clinton Global Initiative to empower women and girls as environmental leaders in Central America. As a result, the women in a small fishing village in Nicaragua are now protectors of nesting sea turtles. They earn money for every hatchling they help to enter the sea.

In rural Nicaragua, women must rely on informal employment to obtain cash. Women earn an average of US$30 per month through selling beads and sewing clothes. The ten women participating in the Paso Pacifico program now earn the same amount of money for protecting a single nest. The women earn 35 cents per hatchling and each nest has more than 100 eggs.

Rather than individually receive funds for each protected sea turtle they opted to pool the money and equally distribute it across the group.

"Nurturing baby sea turtles is very rewarding," said Carolina Coronado a turtle protector. "After a sea turtle nests at night, we carefully move the nests to a hatchery we have built and where we protect the nests from poachers and livestock. When the baby turtles hatch, we count them and feel fulfilled as we watch them crawl to the ocean." ■

Humble shrimper credited with ingenuity to save a species

Sinkey Boone, who died September 1, was born into a shrimp fishing family. Sinkey was more than a shrimp fisherman; he was also a welder, a net-maker, a purveyor of folk wisdom and an inventor.

One of his inventions has saved the lives of hundreds of thousands of sea turtles and brought the sea turtle and shrimp fishing communities together to better understand each other's motivations and needs.

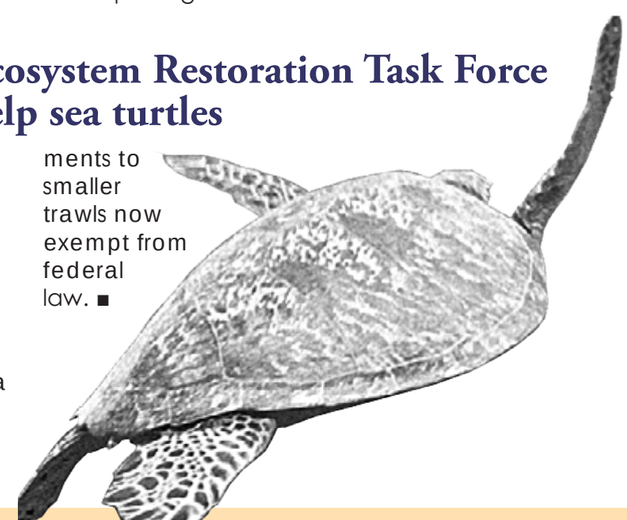
Boone is credited with inventing the turtle excluder device, better known as a TED. Originally called the "Georgia Jumper", it was a modification of Boone's earlier invention called the Jelly-ball excluder, a device used to keep jellyfish from clogging shrimp nets and damaging the catch.

Boone liked to call it a "trawling efficiency device" because it helped reduce unwanted catch of many species besides sea turtles, and he though it would make shrimpers more accepting of the device.

While Boone had an economic interest in the device, his concern for the sea turtles, the shrimpers and the oceans was his strongest motivation. He worked diligently to promote understanding among environmentalists, shrimpers and the public. His passing is a loss for the earth. ■

Report urges the Gulf Coast Ecosystem Restoration Task Force to reduce fishing pressure to help sea turtles

A new report recommends the Task Force implement changes in Gulf of Mexico fisheries as a necessary measure for recovery of endangered sea turtles harmed in the BP oil spill. Scientists have determined many of the sea turtles found dead during the BP oil spill perished in shrimp trawl nets not using Turtle Excluder Devices (TEDs), which are required by federal law but largely ignored in Louisiana. Sea turtle recovery, the report argues, will depend on more rigorous enforcement of TED laws throughout the Gulf and to extend TED requirements to smaller trawls now exempt from federal law. ■



The turtle lady with HEART

Text by Bonnie McKenna

Carol Allen has been fascinated by turtles since she was five years old when her brother brought home a little red-eared slider—a fresh water turtle.

"I was just enthralled by that turtle and the others that came to live at our home," said Allen.

In 1973, when Allen and her family moved to Houston, she learned about sea turtles in Texas after a visit to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in Galveston. There NOAA scientists were attempting to recover the decimated Kemp's Ridley turtle population by raising turtle hatchlings in buckets until they could fend for themselves.

Kemp's Ridley turtles are found in the Gulf of Mexico and the Atlantic Ocean. It is one of the most endangered turtle species, worldwide.

"In 1982, I organized a field trip for my daughter's class to see the turtles in Galveston. The kids were captivated by the turtle hatchlings. During that visit, we learned that the program's funding was being cut. The kids really wanted to do something to help the turtles, so we formed HEART (Help Endangered Animals Ridley Turtles). The kids wrote letters to President Reagan asking him to help the turtles. The story of the kids writing the president was picked up by the media and soon the program was funded for another ten years," Allen said.

After learning that HEART was a volunteer project, schools from across the nation became interested in joining the turtle project. Allen made sure each child that sent HEART a $4 donation, enough to feed a hatchling for a year, received a certificate of thanks. At that time, NOAA was releasing thousands of hatchlings into the gulf and thousands of turtles were being killed by trawl techniques used to catch shrimp. Although sea turtles were on the endangered species list and protected from being killed or captured by the Endangered Species Act, there was little enforcement of the law.

Sea turtle advocate, Carol Allen, with poster for the film, *The Heartbreak Turtle*

"We lost thousands of turtles because of shrimp trawls. Remember, a turtle is not a fish; it needs to breath. Of course, the shrimpers and fishing industry argued that their trawling techniques were harmless, but we could prove it was not harmless by the number of dead turtles being washed-up as the trawlers moved up and down the coast," said Allen.

After a lot of experimentation, the National Marine Fisheries Service developed the Turtle Extruder Device (TED)—a device that allows turtles to escape the trawl nets. A law now mandates that all shrimp trawlers have TEDs on their nets.

"The shrimpers fought us tooth and nail, and they really resented a homemaker telling them to change the way they fished," Allen said with a laugh. "We ended up having to sue the national Fisheries Service to get the TEDs on all the shrimpers. We won the case, but our work is never done."

As a result of the hard work done by Allen, the National Park Service Division of Sea Turtle Science at the Padre Island National Seashore in Texas and the hundreds of volunteers that generously give their time to protect the turtles, the population of the Kemp's Ridley is growing. During the 2009 nesting season, a record 195 nests were laid on the Texas coast.

Allen's latest project made a debut this October. It is the sequel and updated version of her film, *The Heartbreak Turtle*, which tells the story of the plight of the Kemp's Ridley turtle.

"The original film was made 30 years ago. The sequel will be about how far we have come with regards to the shrimpers, the TEDs and the turtle recovery plan," she said.

Allen is also actively trying to encourage Texas to declare the coast of Texas or at the very least, Padre Island, a critical habitat for the Kemp's Ridley sea turtle.

"And to think," Allen said, "This all started with a red-eared slider."

Allen continues her work to protect the Kemp's Ridley turtles through HEART and the Sea Turtle Restoration Project (STRP) which fights to protect endangered sea turtle populations worldwide. For additional information on Kemp's Ridley sea turtles, go to www.seatrutles.org or to learn more about Carole Allen, go to www.SaveTexasSeaTurtles.org. ■

Wild pigs and dogs pose a new but serious threat to leatherback nests

Populations of feral pigs and dogs, which live in the jungles behind the Leatherback nesting beaches in Papua New Guinea, have in the recent years expanded out of control. It is estimated that in 2009, 20 percent of healhy nests were destroyed by wild dogs and pigs. In 2010, that number may rise to 60 percent.

Along a 600km coastline in North Queensland, Australia 90 per cent of the turtle eggs have been destroyed.

The predation issue is serious on all turtle nesting beaches

Neither pigs or dogs are native to the Indonesian jungles but are domestic animals that have escaped from villages. The villagers let their "domestic" pigs wander in the jungles in hopes that they will get fatter faster. Due to lack of natural predators, these populations have since expanded to a point where they are now out of control and a threat to the existing ecosystems. A wild pig or a dog can annually produce two litters of up to 12 piglets or pups. Dogs are allowed to breed without any control.

25,000 hatchlings lost

In 2009, the dogs and pigs destroyed approximately 20 percent of the healthy leatherback nests above the tidal damage line. At approximately 100 eggs per nest, that loss approximates 25,000 hatchlings lost to feral pig and dog predation. The 2010 data indicates that 60 percent or more of the nests will be destroyed. This loss of hatchlings before the eggs can hatch can, if not curtailed, be more destructive to the species than the slaughter of the adults by the Asian long line boats, which continues to be a constant danger to species survival. The combination of nest destruction and at sea killings is the most serious combination of species elimination. Unfortunately, all who have knowledge of this impending disaster continue to stick their collective heads in the sand and do nothing, pretending that there is not a problem.

Why not just shoot them?

One may think an array of simple solutions may be at hand: Shoot the pigs and dogs; put a bounty on snouts; poison the critters; dig pig traps on the habitual pig trails and catch and destroy them. However, in those jungles for each "simple" solution there is opposition from environmentalists, local villagers, local government agencies and the Indonesian army and police. And while the bickering goes on, the pigs keep on reproducing, fattening themselves on rich leatherback eggs. Save Our Leatherbacks Operation (SOLO) has developed a simple, green and workable solution copied and modified from that used in Papua New Guinea.

Grids

We have initiated a trial effort on the beaches and instructed the villagers on ways to construct and set bamboo strip grids and place them over the center of a marked leatherback turtle nest. Provided they are anchored deep into the sand, a pig or a dog should be prevented from digging up the nest. The hatchlings can scamper under and over the grid to freedom and stumble to the seas. The grids are made from jungle bamboo, so there are no associated costs aside from labor. They can be reusable, post hatching for other new laid nests and into the next year.

Pilot project

Presently, this is a small test project. The villagers can construct the grids, place them over a nest and in so doing, obtain a "hands on" step toward the SOLO objective of helping them become self-sufficient in the husbanding of this critical environmental resource. The initial dozen of these grids were made for SOLO by the villagers we assist. If this test project is successful, SOLO will employ the village men to place and to relocate the grids and maintain the integrity of the hatching process.

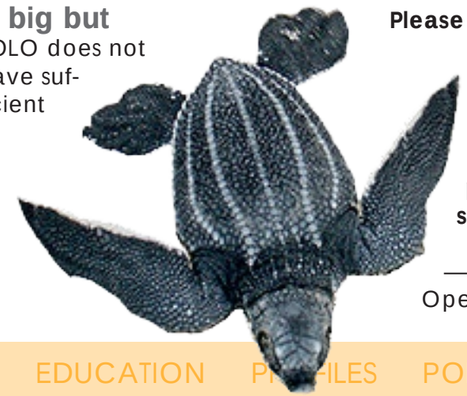
The ultimate solution, given that the feral animals cannot be killed, is to relocate all of the nests as rapidly as possible into sturdy korrals, which the pigs and dogs cannot access. We have also employed village women to be the protectors (like new babies) of the eggs and hatchlings. This will provide the village women with needed incomes. Trial efforts to pay the women on a per successful hatch out basis have been quite successful—different and exciting to the families—and give women jobs. Village guards will be placed on duty at night to either kill or drive away marauding animals and human poachers.

There *is* hope

SOLO is confident we can roll back the feral predation by employing the grids now and begin a 100 percent relocation effort in to 2011 nesting season. This is a straight forward application of village efforts to protect their natural assets (the leatherbacks) and to become gainfully employed in the process.

A big but

SOLO does not have sufficient funds to accomplish this. An additional US$65,000 is required for the 2011 nesting season. Subsequent seasons will cost less. The situation is now critical to the survival of the species but the challenge can still be met and the situation remedied if we act now.



Please contact us at:
info-saveourleatherbacks@earthlink.net

We need your help with donations and finding corporate or entertainment sponsors.

— Save Our Leatherbacks Operation

FILE PHOTO: ANDREY BIZYUKIN

As we are fast approaching midwinter in the northern hemisphere, not everyone is packing away their diving equipment for the season. However, if you enjoy scuba diving in cold water while air temperatures are below zero, there are a few prosecutions to take. For those of our readers enjoying the summer season in the southern hemisphere, don't forget that hypothermia can be a problem even in the tropics.

Low temperature diving environments

Text by Dr Carl Edmonds (adaption by Arnold Weisz)

Awareness and assessment of the environment in which you are diving is an important factor for safe diving. Low temperatur diving—less than 10°C or 50°F—demands that you adjust your equipment and your dive planning.

Cold water can disrupt the performance of both the diver and his equipment. Diving in cold water requires the insulating qualities of a thick wet suit or dry suit, with gloves, boots and a hood.

The wet suit, unfortunately, loses its efficiency when the insulating air layer is compressed with depth. The cooling effect of compressed air expanding in the regulator, added to the low temperature of the water, makes freezing of the regulator a significant problem. Modified regulators that reduce these occurrences are available but cannot be fully relied upon.

Ice diving

Diving under ice requires special equipment and know-how. It shares many of the hazards and precautions of cave diving but has the added complication of freezing conditions. Being trapped under ice can be an alarming experience for a diver with a frozen and therefore non-functioning regulator. Full reliance should not be placed in specialized "ice diving" regulators in which the water is replaced by oil, alcohol or air. These can also freeze especially on the surface, using octopus regulators and with over-breathing. Attention must also be paid to the exit procedure, as holes can ice over rapidly. Protection may also be needed for surface tenders, as they may be exposed to wind and much colder temperatures than the diver, who is only at 0°C or 32°F.

Deep diving

Neoprene diving suits compress the deeper you dive, and this reduces its insulating properties. Often this happens at the same time as the diver passes into colder deep water. Even in tropical and sub-tropical waters thermoclines can make water temperatures drop considerably. Dives deeper than 30 meters gives you the combination of less thermal protection from your suit and a lower water-temperature. For long and deeper dives, it is recommendable to use a semi-dry or drysuit. And also to wear a hood and gloves to minimize the amount of skin exposed to water. ■

Cold & Hypothermia

Text by Dr Carl Edmonds (adaption by Arnold Weisz)

Adapting to your surrounding environment is vital for all scuba divers. Using the correct protection will make your dives enjoyable and prevent medical difficulties. If you still get cold and maybe suffer from hypothermia, there are ways to deal with it.

A diver is usually immersed in water, which is considerably colder than the normal body temperature of 37°C (98.6°F). Unfortunately, water is particularly efficient at removing body heat, having a conduction capacity 25 times that of air and a specific heat—the amount of heat necessary to raise a given volume by a certain temperature—1,000 times that of air. Without insulation, a diver will lose body heat much faster in water than in air at the same temperature. This can cause hypothermia, a harmful drop in body temperature to below 35°C (95°F).

The body can reduce temperature loss by generating heat through metabolism, exercise and shivering, and by restricting blood flow to the skin. The rate of heat loss also depends on factors such as the temperature of the water, the thickness of body fat, presence a wetsuit or other insulation, and the posture of the diver.

FILE PHOTO: ANDREY BIZYUKIN

Clinical features

All divers will have experienced the early features of cold—numbness, blueness or pallor of the skin (especially in peripheral areas such as the fingers, toes and earlobes), clumsiness and shivering. If the body temperature falls by about 2°C (36°F), loss of co-ordination and uncontrollable shivering may impair the ability to swim and render the performance of finely coordinated movements (like manipulating equipment and assisting buddies) impossible.

After a body temperature drop of 3–4°C (37-39°F), the diver may become weak, apathetic, confused and helpless. Drowning is a real possibility at this stage. A body temperature less than about 30°C (86°F) results in unconsciousness. This may be confused with other causes of unconsciousness in divers. Often the diver appears to just lose consciousness without other obvious clinical manifestations.

A victim who is unconscious from severe hypothermia may have a very slow respiratory rate, and a barely detectable pulse, and may appear dead to the inexperienced observer. It is important to not assume the worst in this situation. He may even have fixed dilated pupils and still be resuscitated. Do not presume that he is dead, unless he is warm and dead.

Cold & Hyperthermia


FILE PHOTO: ARNOLD WEISZ

First aid

If required, the basic life support (BLS) first aid management principles take precedence. Removal from further danger is followed by assessment and treatment. It is recommended that expired air resuscitation (EAR) and external cardiac compression (ECC) be performed at half the normal rate in cases of hypothermia because body metabolism is slowed. However, unless the rescuer is confident that hypothermia is the sole cause of the victim's collapse, the usual resuscitation techniques and rates are probably indicated.

The diver must be handled gently. Both active and passive movements are to be avoided, as these tend to trigger serious or lethal cardiac arrhythmia's. While the patient is hypothermic, ensure that he remains horizontal, as the vertical position can cause death. Always clear the airway, check for any evidence of heartbeat or respiration, and begin resuscitation as necessary. The aim of management is to keep the victim alive, while returning the body temperature to normal. The usual methods of treating the diver include wind-proofing, insulation and active warming.

Treatment

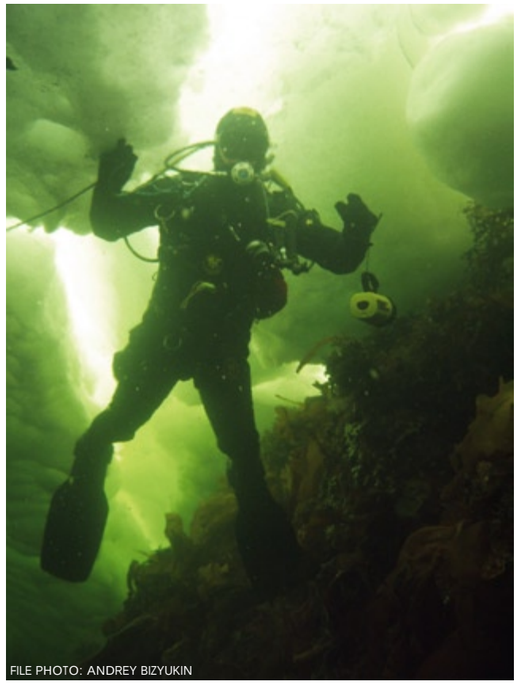
If medical or hospital facilities are available, many other treatments are more effective than the first-aid and warm water immersion regimes, mentioned below. The immersion treatment is probably only indicated for those victims who have sudden or severe hypothermia.

Wind-proofing is essential. Unless the diver is protected from the wind and the wet, he will continue to lose heat. Usually, it is best to dry the victim and clothe him, but under some exposed situations, it may be necessary to leave his wet suit on and cover it with other materials, to supply insulation. If a wet suit has to be removed, it is preferable to cut it off. Wet weather gear used alone, without a heat source, may help with insulation but may not be very effective, as they do not generate heat, and the victim's heat output is very slow.

Wrapping the diver in blankets, plastic (garbage bag), tarpaulin or even newspaper, may also help with insulation by reducing air flow over clothes, wet suit or skin. A reflective survival blanket over clothes and normal blankets may aid in wind-proofing and insulation. Facilities to warm a diver are usually limited at a dive site and improvisation may be required. Wrapping the victim in blankets with other divers may be one way of transferring body heat to a mildly hypothermic diver. Warm diver buddies, especially of the opposite sex, may be sought by some unscrupulous divers who only pretend to be hypothermic. The engine room of larger vessels is often warm enough to be of value in the management of hypothermia and engine cooling water may be a source of warm water in an emergency.

Stimulating drinks such as tea and coffee should also be avoided. Although alcohol produces a warm inner glow, it actually worsens hypothermia by increasing blood flow to the skin, accelerating heat loss. It should not be given to hypothermic patients. Warm water, glucose or electrolyte drinks may be given to fully conscious patients.

Re-warming is most simply achieved by immersing the victim in a warm bath at a temperature of 37–38°C (99-100°F). A warm shower is a less efficient alternative and certainly not with the patient standing. A pleasantly warm bath or shower is approximately the right temperature. Warm packs or hot water bottles over the axilla, groin and abdomen may help—but avoid scalding. It is possible that oxygen administration may be of value, especially if warmed or if used in a re-breathing system. The latter will reduce heat loss by re-breathing warm humidified gas. Massage, alcohol or stimulant drinks (coffee), heat packs direct onto the skin and exposure to intense sources of heat (such as radiators), are all best avoided.


FILE PHOTO: ANDREY BIZYUKIN

Prevention

Alcohol and other drugs may predispose one to hypothermia by dilating peripheral blood vessels and losing heat by conduction into the water. Diving in cold water is the most common cause, but even in tropical waters, loss of body temperature during a dive is likely if the diver is not effectively insulated. The most popular and convenient insulator is the wet suit. Air bubbles enclosed in synthetic rubber provide an insulating barrier between the diver and the water without the need for the suit to be waterproof—hence the term wetsuit. They are available in various thicknesses depending on the expected water temperature. Wetsuits have the disadvantage of compression of the air cells at depth, which reduces their insulation and causes inconvenient changes in buoyancy.

This problem is reduced in professional diving operations by the use of a drysuit, which uses air as the insulating material. Other variations include electrical, chemical or hot water warming procedures, or even an inflatable air pocket enclosed in a wetsuit. When immersed and in a survival situation, heat loss in an uninsulated person can be minimized by floating in the H.E.L.P position, a curled-up posture ("fetal" position) with the knees near the chest and the arms by the side, so covering the body areas that lose heat the most (axilla and groin). This can obviously be done only if the diver has a flotation aid. Huddling together with other survivors may be of value. Restriction of movement will also minimize heat loss. To reduce heat loss, it is best not to swim more than a short distance, as although swimming generates some metabolic heat, this is more than offset by heat lost into the water during movement.

Divers should abort dives once they start feeling cold, and should ensure adequate time on the surface, in a protected and warm environment, before returning to dive. Hours are needed to regain the deep core body temperature. Sweating is a good sign that hypothermia no longer is a problem. ■