PNW DIVER MAGAZINE

September/October 2015

Featuring:

Jared Jensen
Steve Taylor
Jim McGauhey

and more..

Cover photo by Jared Jensen

Canon Rebel T2i, 100mm macro, f/22, 100mm, 1/200, ISO200

The Pacific NorthWest Diver Magazine is published bi-monthly and is a publication of the Pacific Northwest Underwater Photographic Society (PNWUPS), which is an organization formed to encourage interest and participation in underwater photography. The organization's central goals are: to provide an environment where photographers can help other photographers improve their skill; to promote Pacific Northwest underwater photographers; and to share the beauty of our underwater environment with the non-diving public. If you have an idea for a story or would like to present an article for consideration, please contact the editor/publisher.

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Canon Rebel T2I, 100mm macro, f/14, 1/200, ISO200

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Features

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As I began to put together this issue of the magazine, we got news that Lynne Flaherty went missing off the coast of Washington. What a shock and incredible loss this is to the dive community. I regret that I never had the chance to meet her, yet she was on my list of people I'd like to meet. Her presence will be missed, indeed!

On a happier note, the popularity of the magazine is increasing after each issue. We now have over 620 subscribers to the mail list, and that doesn't include the folks who download from other sources. Thank you, readers, for your continued interest.

As we continue to evolve, and you'll see sections come and go as we figure out what works and what is too difficult to keep up. Sadly, we rarely hear from readers. May I encourage you to speak up and tell us what you would like to see in future issues, the things we do well, the things we could improve on, and the people you know that we could showcase?

We have some really interesting articles in this issue. Dale has stirred my desire to try diving with a double hose regulator while Robert has taken some of the scariness out of rebreathers. Our featured photographers are incredible, particularly with macro. Jim, the videographer featured, brings years of experience rigging up systems which supports what Mike has been teaching us. Please take the time to not only enjoy the images but to read the articles these folks have put so much effort into. Feel free to drop them a line if you really liked what you read. They'd like that!

~Kerry Enns
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In Memory of Lynne Flaherty

By Dale Carlisle

This week the PNW lost a valued member of its dive community when Lynne Flaherty, 61 of Woodinville WA., failed to surface during an open water dive with her husband off of Duncan Rocks near Neah Bay.

Lynne, an ER doctor by profession, was an accomplished diver, mentor, instructor assistant, well-respected advocate for the Seattle GUE scene as well as a talented equestrian rider.

As well as traveling extensively and being active on the local level, Lynne maintained a strong presence online as TSandM and LCF where she shared her enjoyment and knowledge of diving with others worldwide. The outpouring of sadness, fond memories and condolences for her husband Peter has been overwhelming since news of her passing was announced. For many, it is a struggle to come to terms with the loss of such a vibrant, thoughtful, intelligent and helpful person.

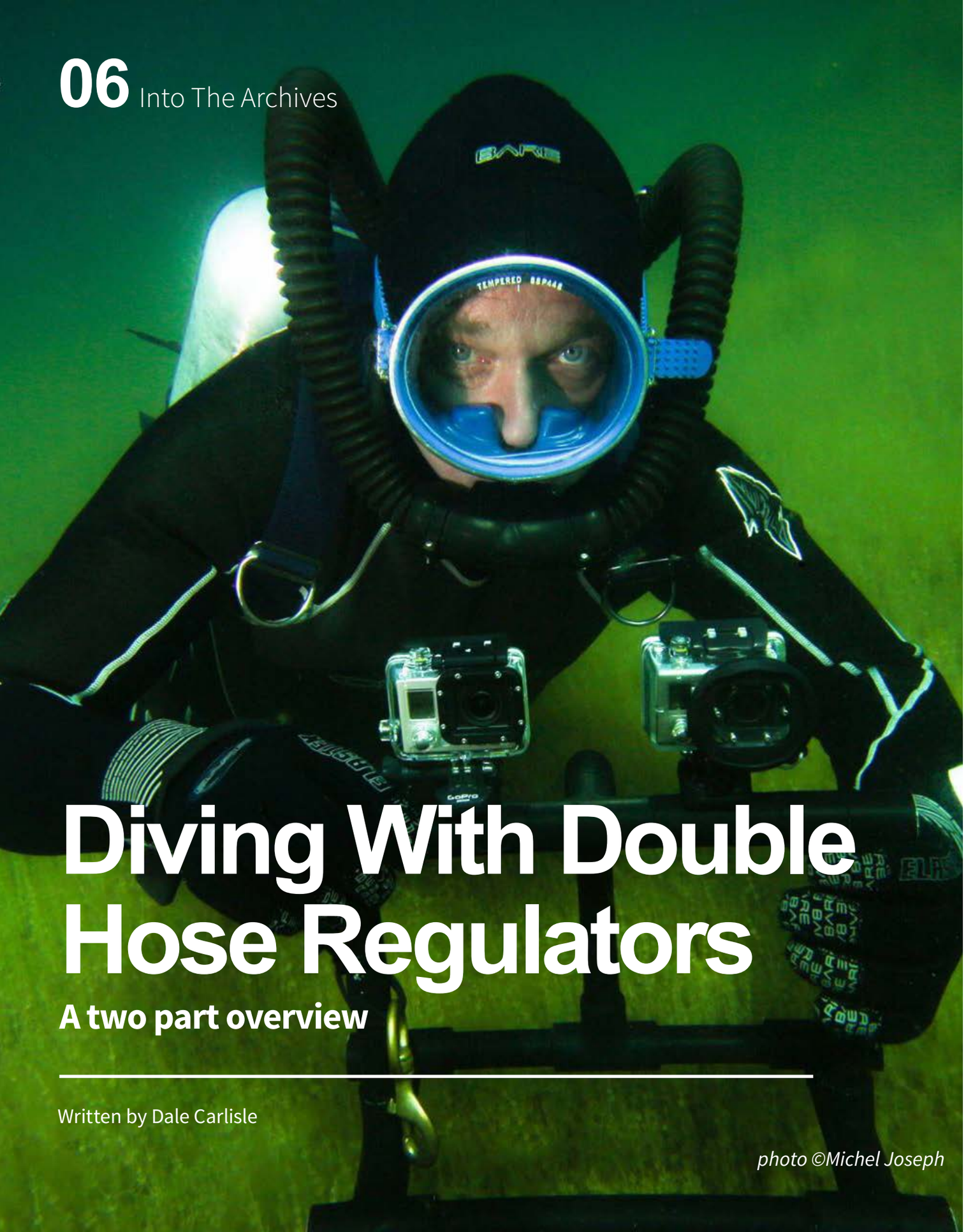
Lynne began diving 10 years ago and after a short time found her home within the GUE community. Trained in recreational, technical and cave settings, she traveled and dove with some of the top members of our sport and became a strong advocate for safe diving practices. At the same time, Lynne spent many hours talking and diving with newer divers, offering advice, encouragement and mentorship. Her consistent message was her passion for the aquatic realm and that a focus on safety and skill made diving more fun.

Many people online this week have expressed the sentiment that Lynne was one of the persons they most wanted to meet and dive with in real life and I count myself fortunate to be one of those to have been able to do so. We had spoken many times over the years in discussion forums and by a rare stoke of serendipity met this year to take a GUE Fundamentals training course. Although Lynne had already taken more advanced training, she was eager to participate with our group to exchange ideas and create more connections within her community. I will always carry fond and funny memories of our time together.

No one article can completely capture Lynne Flaherty's spirit. Everybody who met her has their own impression of this remarkable woman who constantly strove to better herself and help others along the way. She so completely loved all aspects of diving, whether it were the cenotes in Mexico or the pilings at Keystone Jetty.

Farewell Lynne, you touched the lives of many people and our worlds are brighter and better because you were in it.

Image courtesy of Peter Rothschild



Diving With Double Hose Regulators

A two part overview

Written by Dale Carlisle

photo ©Michel Joseph

Many enthusiasts enjoy using vintage era equipment for the simple pleasure of restoring a piece of history and diving as many people did in the past. They may be history buffs, inheritors of family heirlooms, DIYers in search of a challenge or even old time divers going back to their roots. Occasionally, photographers and videographers also choose double hose regulators in an attempt to reduce the effect of bubbles on shy aquatic subjects without resorting to the expense, if not more effective but complicated, rebreather units.

This article, in two parts, is intended to give those divers some very basic information about double hose regulators that they can use to determine which type they may wish to purchase and some simple tips on how to dive with them. The discussion will fall under three broad headings:

- Types of regulators
- Basic construction
- Techniques for diving

Types of Double Hose Regulators

There are two major sub categories of divable regulators to choose from for divers. Which avenue one pursues will depend on how much time one wants to spend working on the regulator itself, what features the diver is seeking in a regulator and how capable and confident the diver is at effecting repairs and servicing. The first category is the rebuilt vintage regulator.

Choosing an Older Regulator

Double hose regulators were manufactured in large numbers from approximately the mid 1940's until the mid 1970's. Just like the many single hose regulators that wind up in storage boxes, those old regulators keep popping up whenever someone cleans out the attic or garage. With a little knowledge and patience, almost anyone can pick up a serviceable unit for a fairly reasonable price. Another option is to pick one up online in already restored, ready to dive condition.

Along with shopping for a regulator I would strongly recommend shopping for a good online community of vintage equipment divers who can help guide you along in your restoration project. As examples, I have found a wealth of information in the form of manuals, parts and helpful advice at vintagedoublehose.com and vintagescubasupply.com as well as the vintage sub forum at scubaboard.com.

Like many hobbies of this nature, everybody has their own opinion on which regulator is better, and I am no exception. I will preface my bias towards US Diver models for a couple of practical reasons. First, there are commonly available original and reproduction parts for all aspects of the regulator. Second, many people dive and have knowledge of how they work to pass on and share with others. In my case, it comes down to ease of access to parts and information. There are many other brands such as VOIT, DACOR, and such that will work as well as US Diver models but they may require a step up in a person's DIY skillset. For only that reason, I will focus on the US Diver series.

The US Divers Company produced three basic designs for double hose regulators: The Single Stage (Mistral), the unbalanced two stage (DAAM) and the balanced two stage regulator (RAM).

The Single stage regulator is a work of supreme simplicity with only a few moving parts and the ability to reduce air pressure from roughly 2500 psi down to breathable ambient. It is an unbalanced design; initially harder to breathe at higher pressures and then easier to breath as tank pressure drops (more on this later). When you inhale you will know it by the whoosh of sound as the air enters

the regulator from the tank ala Darth Vader. The sensation of diving a Mistral is akin to that of driving a small sports car wherein you are aware of the "feel" of the vehicle. Many hobbyists consider them their favorite "fun" regs to dive, even though they are very rudimentary in nature. One note: if buying a Mistral regulator determine that it is a US Divers version and not the French equivalent La Spiro technique model. They are sister companies. The French model is very desirable to own, but its fittings will be for European metric valves and may require some conversion.

The unbalanced two stage regulator DAAM (DA Aqua Master) still have variation in breathing resistance (harder to easier as the dive progresses) that the unbalanced Mistral has, but the reduction of pressure from 2500psi to ambient is achieved via two stages, like most modern single hose regulators. This allows for a smoother inhalation cycle. However, both stages are combined in the primary housing attached to the tank and not split between the tank and mouthpiece as single hose stages are. The downside of this is that breathing resistance varies with diver position (discussed further in technique section) but the upside is that exhaust bubbles exit the regulator behind the divers head instead of in front of their mouth. This may make the diver appear less threatening to shy subjects and allow them to get closer for shots.

The balanced two stage regulator RAM (Royal Aqua Master) is the Cadillac model of the US Diver series. It resolves the variable pressure issue by providing a constant breathing resistance throughout the dive as well as reducing the pressure in two stages. It is often sought by divers seeking as close to a modern feel from their double hose as possible while still diving a vintage model, though with proper tuning and technique, DAAM's and Mistrals provide perfectly sound platforms for most recreational dives.

Choosing a New Double Hose Regulator

For a lot of years, vintage equipment hobbyists have been pining for the days when they could purchase an all new modern double hose regulator. Divers have scrounged and cobbled together old parts from various sources to make serviceable units and there was a "fly by the seat of your pants" attitude needed when diving them. Over time, various parts were reproduced from old templates to allow for the installation of new diaphragms, HP seats, hoses and mouthpieces. This is one reason I prefer the USD models is this ease of availability for parts. Even plastic bodies were recreated allowing old guts to be retrofitted to create almost new regs but still, the all-new regulator remained an elusive dream. That dream was almost fulfilled by USD when it announced it would recreate the double hose in a new Mistral model, but it turned out to be an uninspired cobbling of mismatched parts that was poorly received and discontinued.

Image Source: vintagedoublehose.com

Meanwhile… in a small workshop (or series of workshops) based within the vintagedoublehose.com community, a group of dedicated divers continued to develop, create and test parts and designs improving rebuilt performance and leading towards a fully modern double hose regulator. This work finally paid off with the introduction of the "Argonaut Kraken". This new double hose regulator contains all of the features that a modern diver might expect from a single hose regulator while still retaining the classical vintage double hose look. It is a balanced, two stage design with superb breathing characteristics that has both low pressure and high pressure ports to allow for SPG, octo, drysuit and BCD attachment.

Today, the modern diver has a choice between rebuilding an original older model regulator, buying a ready to dive rebuilt model, or using a brand new, high performance design.

Basic Construction

While there may be slight variations in individual regulator designs (a way many companies got around patent laws in the past) most double hoses have the same basic features. While this list is not meant to be an exhaustive explanation of parts, which could fill a book, it should highlight some things to look for when considering a regulator and will move physically from the tank valve forward towards the

mouthpiece.

Yoke: Older regulators came with yoke fittings that have proved to be reliable for decades of constant use. When looking at the yoke, however, you need to decide whether you want to use an SPG or not. Early era divers didn't, so the regulator might not accommodate one. If not, you will need to use a Banjo Adaptor. This is a small fitting that goes between the tank valve and the first stage and allows an SPG hose to be screwed into its port. If that is the case, you will need a Long Yoke to allow space for the Banjo. Older models such as the Mistral, Navy and early DAAMs had short yokes but can be retrofitted with long yokes.

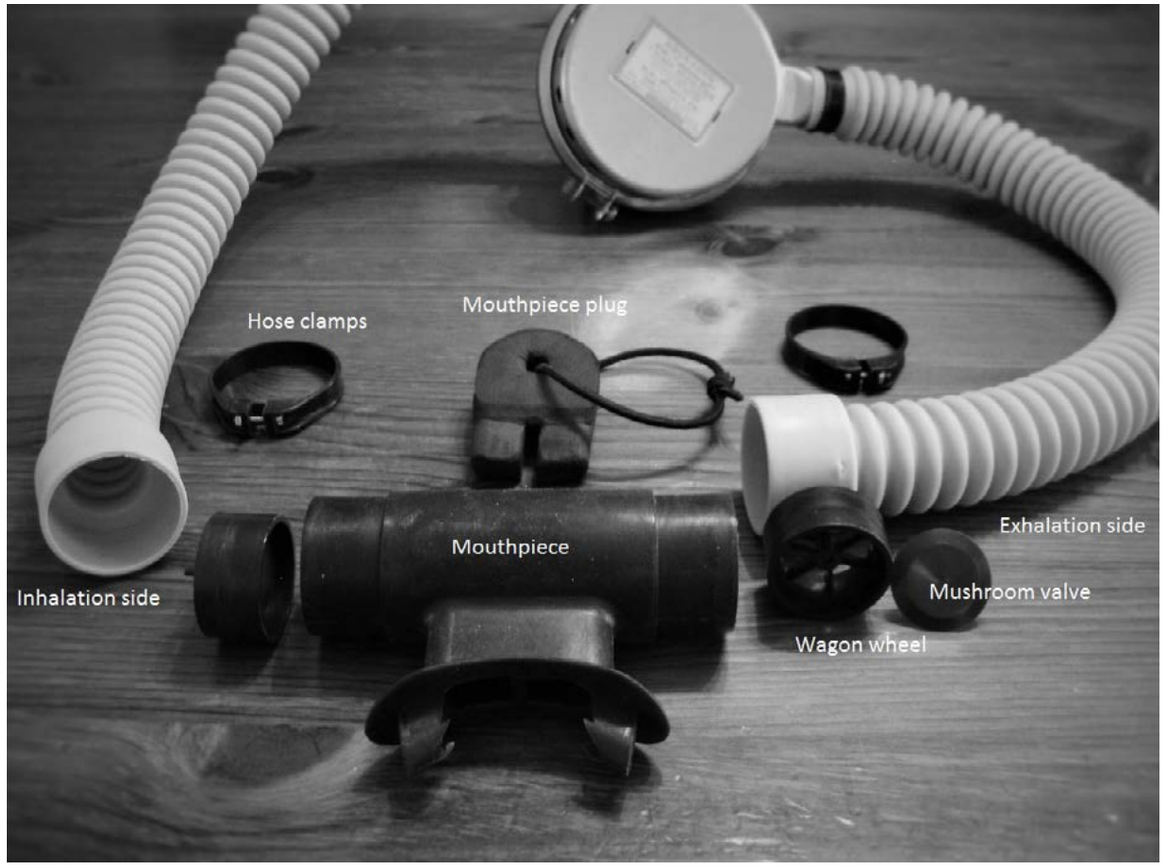
Another option for SPG placement, if you have a short yoke or don't have a Banjo Adaptor, would be to select a tank valve that has an HP port built in (I own both USD and DACOR valves with such ports). If you use these ports you may find they have vintage era thread sizes that won't allow modern HP hoses, but simple inexpensive adapters are commonplace for this issue.

The Argonaut Kraken of course, has an HP port contained within the regulator itself as all modern regs do and can come with a DIN adapter.

Cans: The "cans" are the body or shell of the double hose regulator and are two pieced and round, with smaller pipes or "Horns" extending out of the top. The horns are where the breathing hoses are attached. The cans are usually chromed metal but may also be made of a strong plastic and are held together by clips or screws. Contained within the cans are the stages of the regulator, the levers and large diaphragm (usually found in the mouthpiece of a single hose reg), and the duckbill or one way exhaust valve.

C Clips: Older metal cans were held together by a series of clasps known as C clips that were loosened and tightened each time one wanted to access the guts of the regulator. Most active divers now remove these clips (kept for display or resale) and replace them with a stainless steel Band Clamp. This is a loop of metal that circles and captures the edges of the cans and is tightened by a screw. This makes servicing far easier.

Duckbill Valve: The exhaust valve of old was a flattened tube of rubber with slots cut in it called a duckbill and when you look at one, you can see why. This was a simple yet practical design that worked well, but was delicate and easily damaged and made replacement a semi-common occurrence. Recently, a new design called the "Duck Bill Eliminator" was developed which can be retrofitted in place of the duckbill. It uses a modern mushroom valve that is more durable and easily replaced.



Diaphragm: If you crack open the cans, you will see a large disk of rubber called the diaphragm. This can become stiff, brittle or torn in older regs but can be swapped out (as all perishable parts can be) with either a new reproduction rubber or silicone replacement.

Stages, levers, service kits: The guts or stages of double hose regulators, especially USD models, can be repaired or replaced with either old stock parts or new service kits, as well as upgraded to increase breathing performance. There are full schematics online that go into great detail so I will skip delving any further into them here as they could be the subject of a whole separate article. Needless to say, they are there, they can be serviced and they are reliable.

Hookah Port: No, this is not for installing a hookah pipe! The hookah port was used to connect a surface supply of air for divers doing shallow work (i.e. Hookah diving) and were installed in some models but not in others: Mistrals do not have them, DAAM and RAM's do. This is an important feature to look for when selecting a regulator as it allows a LP hose to be adapted to the reg via a fitting known as a hookah port adapter. If you don't have a hookah port you will either have to dive in the vintage style or carry another bottle and regulator to supply your LP needs. With a hookah port adapter and a splitter you can run one or several hoses for BCD, drysuit or octo needs. And, as mentioned earlier, the Argonaut Kraken has several LP ports already installed in the reg.

Hoses and Mouthpiece: The best way to think of the hoses and how they function is to visualize them as a loop. Wearing the scuba rig, the hose that comes from the right side is the inhalation, or supply hose. This is fed air from the part of the cans which is sealed behind the large diaphragm. The air travels through the right side hose and then passes through the mouthpiece where it is breathed by the diver. Each side the mouthpiece should contain a circular plastic insert called a "wagon wheel" (because they sort of look like them) and a one way mushroom valve (two of each in total for the mouthpiece). This is an important item to be aware of. Some older models did not have one way valves and allowed water to enter the breathing loop past the mouthpiece, which requires a greater degree of skill and technique to clear (how to clear hoses will be discussed in detail in the next issue). I would suggest only those who are highly motivated to develop such specific skills should ever consider using a valveless mouthpiece.

On the inhalation side, the mushroom valve should allow air to pass from hose to mouthpiece but restrict water flow from mouthpiece to hose. On the exhaust side, it should allow air flow from mouth piece to hose but not water flow from hose to mouthpiece. If you lay it out and think about it you will see how this creates one direction of flow only, from inhalation to exhaust.

After the mouthpiece, airflow is directed along the exhaust hose and out via the duckbill through a series of small holes in the cans forward from the diaphragm.

A note about regulator placement: Ordinarily, the hoses should protrude upward from the top of the cans but I sometimes see cans upside down on the valve, so that the hoses point down. I don't know why but perhaps the diver feels this looks more "streamlined" or they simply don't know which side is up. What is important to remember is that, in this scenario, the inhalation side will be on your left and exhalation on the right. This is very crucial to know when you employ the technique of clearing the hoses. For the most part, always remember that the hoses point up, not down when installing the reg on the tank.

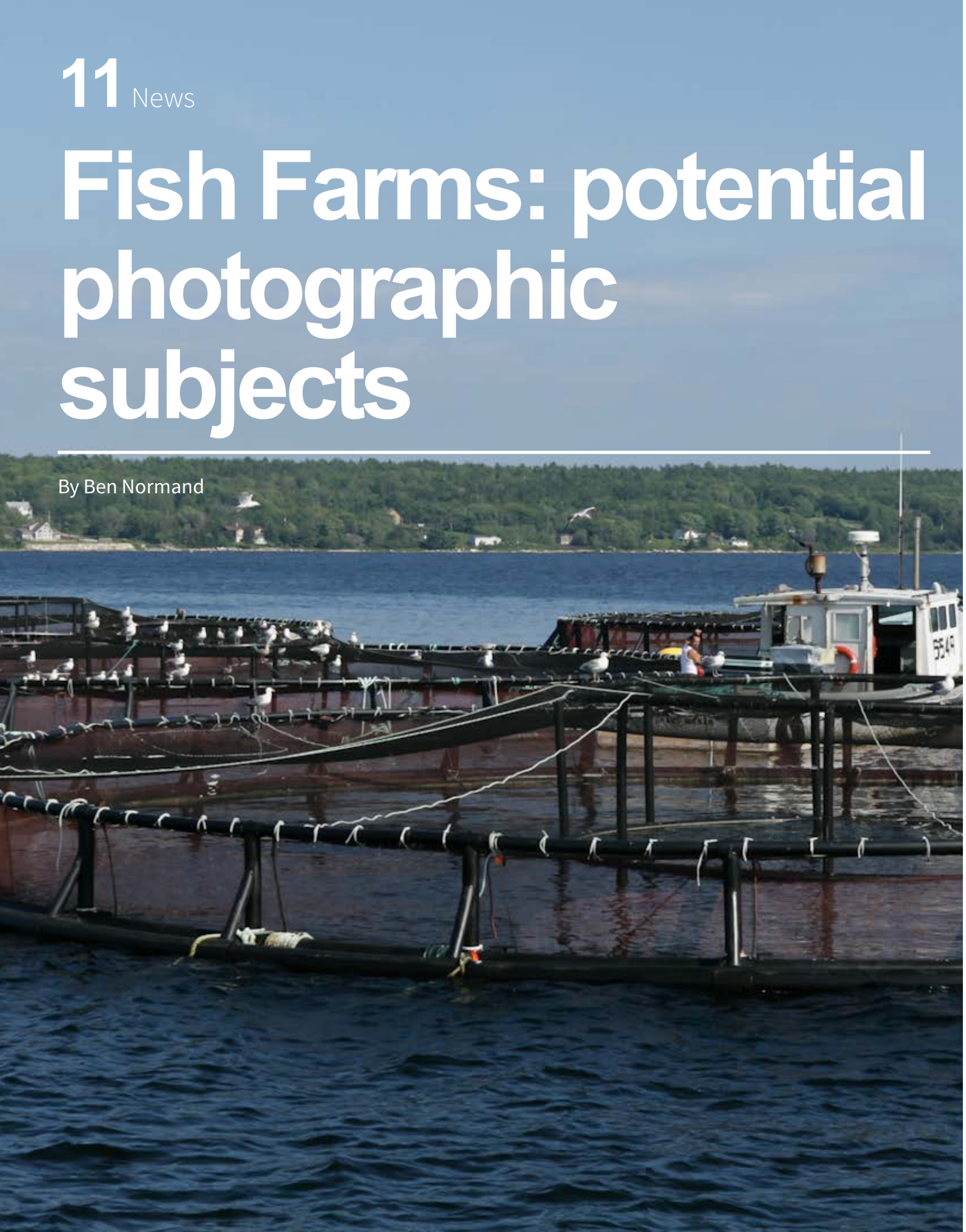
Mouthpiece Plugs/DSV's: Because the regulator is sensitive to diver position, double hoses often free flow when the diver is floating upright on the surface. While not a part of the double hose regulator itself, many divers try to solve the unique problem of free flowing air while on the surface by inventing and installing various restrictive devices. Some of these can be quite complicated like the DSV's used by rebreathers or quite simple like rubber plugs. I personally use a medium density foam rubber plug I made myself. On the surface, I put it in the mouthpiece and during the dive I slip it onto my wrist with an attached bungee cord. No free flow - problem solved.

Conclusion

This concludes the first section on the mechanics of the double hose regulator. It is only intended as an overview and I would encourage anyone interested in these regulators to do their own further investigation. Again, great online resource communities are available at vintagedoublehose.com, vintagescubasupply.com and scubaboard.com; the two former also having online stores. There are also many excellent books on the subject and older diving manuals such as The New Science of Skin and SCUBA Diving all contain sections on double hose regulator construction and function. In the next issue I will discuss the basic techniques of diving with a double hose regulator as well as some tips and pitfalls one may encounter.

Fish Farms: potential photographic subjects

By Ben Normand



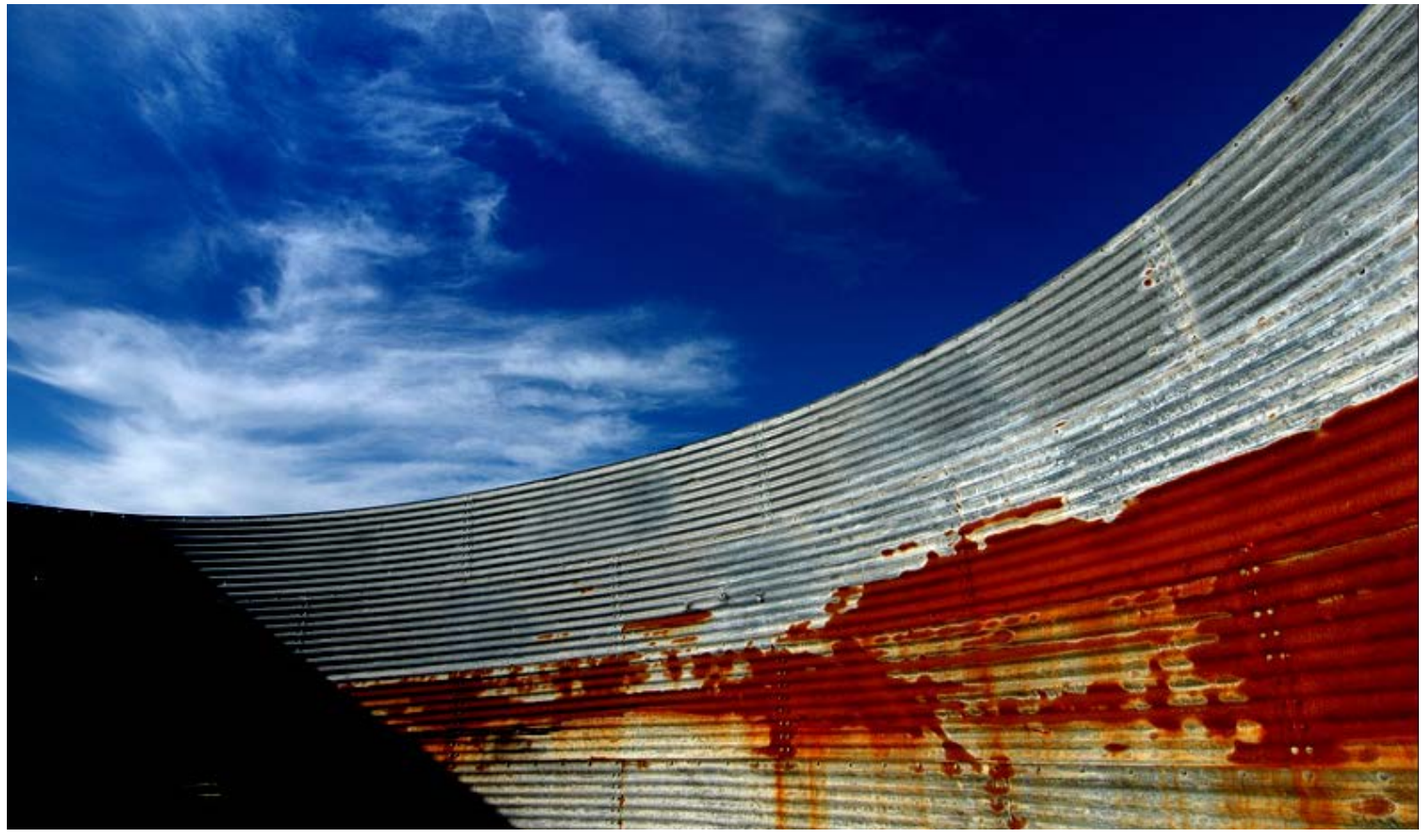
For at least 40,000 years, humans have relied on the Oceans for their survival. From fish to whale, its reliability as a source of food has allowed us to pursue more long term goals than mere subsistence.

With its reliability now faltering, we humans have begun expanding the use of aquaculture to fill the ever increasing gap between what the sea can offer us sustainably and what we want from it. Since it was introduced into Canada, installations have been cropping up across the Pacific Northwest, mainly due to its favorable geography (e.g. plenty of protected, relatively shallow salt water inlets) and its proximity to large consumer markets.

While the presence of this relatively new and inexperienced industry is often a point of serious contention in the Pacific Northwest, these installations can act as fascinating and unique focal points for underwater photographers.

What it looks like

The aesthetic strength of aquacultural installations lies in the contrasts they provide. In the fluid, colourful and non-linear environment of the ocean, they often stand out, being rigid, relatively colourless and straight. Nevertheless, they are as much a part of the ocean environment as a rock on the sea floor. While this may seem contradictory, one must remember that the marine environment has taken many man-made objects and made them its own via the attraction of shelter and rock seeking organisms and their predators. This makes them valuable photographically and as a diving destination. For example, artificial reefs made from scuttled ships are becoming popular within the diving community. See the January 2015 and May 2015 issues of the PNWDiver on the sinking of HMCS Annapolis.



Icelandic Aquaculture Trgedy - Eirasi

Icelandic Aquaculture Tragedy (5) -Eirasi

The photo on the right comes from a series done by an Icelandic photographer showcasing a monument to some of the country's failed aquacultural ventures.

The most striking feature of this photograph is the glaring juxtaposition between the colours of the tank walls and the sky. The blue stands out against the red, while the gray inhabits some sort of colourful limbo in between. In an unexpected use of urban photographic principles, the darkness in the corner of the tank is reminiscent of the ever present possibility of failure when installing new farms, bringing the mind back to the purpose of this installation.

Aquaculture_Canada-10 – Ingoism

This photograph (previous page) is more of an exploration of linearity. While the pens themselves are, as a whole, curved, they are constructed mainly of straight pieces and lines. This makes them seem out of place when one starts to focus on the typically dynamic shapes of the sea surface. However, they are part of this environment and one can find similarities between the two. The lines on the top of the pens, with their curves leading to one meeting point, are reminiscent of the waves which surround them.

It also calls into question the linear nature of the food chain. Instead of the sky offering the predatory bird to the ocean's fish, it is now the realm of the caretaker, offering the fish food so that they may be healthy.

Why it Matters

Aquacultural practices and tools will evolve over time as operators find ways to be more efficient and sustainable; the general practice is here to stay. While you, the Pacific Northwest Diver, may not be an avid appreciator of the farms, it does not hurt to explore them as a focal point in some of your photographs. By approaching it from different angles, with an open mind, one may be able to witness something remarkable. This sort of moment might come in the form of catching the enclosed fish doing something ancestral, or in the form of learning something new.

Happy Diving.

Author's Note: *I was having difficulty finding photographs to write about from the Pacific Northwest via the commons. I'd love to see any of yours! Please send them to* ben.r.normand@gmail.com

Photo Credits:

Icelandic Aquculture Tragedy (5) – Eirasi via Flickr

Aquaculture_Canada-10 – Ingoism via Flickr

Featured Photographer & Videographer: Jared Jensen

© Jared Jensen
Canon EOS REBEL T2i, 100mm Macro, f14, 1/200sec, ISO200

I started diving in Seattle in 2004. Other than a few trips to Mexico, Belize, Bonaire, and Hawaii, all of my underwater hours have been spent in the Pacific Northwest. A few years ago, I made the switch from open circuit to closed circuit technical rebreather diving. I enjoy the challenge that gear-intensive, mission-driven technical diving provides.

Many years before I became conditioned to hemorrhaging large amounts of cash in the pursuit of ever better gear, I began my photography journey with a Casio EX-Z1050. I shot the heck out of that camera for years before upgrading to the popular Casio G10, this time with an external strobe. I had around 100,000 exposures between those two cameras, mostly of close-up subjects, before a major upgrade to a Canon T2i with two external Inon Z240 strobes in 2010.

© Jared Jensen
Canon EOS 5D Mark III, 100mm Macro, f11, 1/125sec, ISO1600

For several years, I was obsessed with macro, getting closer and closer with my Canon EF 100mm and Subsee +10 diopter until I was filling the frame with only my subject's eyeball. That series ended up on display at the MaST Marine Science Facility at Highline College in Redondo, Washington.

Today, I shoot more video than still photography. I am using a Canon 5D Mark III with several lenses: Sigma 15mm fisheye, Canon 16-35mm f/2.8, Canon 24-105mm f/4, and Canon 100mm f/2.8 macro. I still have my trusty Inon Z240 strobes (now with sync cords), as well as Northern Light Scuba Supernova Mini and Fisheye Aquavolt 7000 video lights. When capturing video, I also use a SmallHD external monitor. Like the 5D, it has a Nauticam housing and is usually mounted to my CUDA 400 scooter. In post, I use Lightroom and Premiere on a PC.

© Jared Jensen
Canon EOS REBEL T2i, 100mm Macro, f25, 1/200sec, ISO400

© Jared Jensen
Canon EOS REBEL T2i, 100mm Macro, f25, 1/200sec, ISO100

There are a few bits of advice I can offer to photogs of all levels. First, don't upgrade your gear until you've used it extensively and really understand the limitations that require a change. The difference between good and "less good" photographs is seldom due to the equipment used.

Second, shoot the camera and strobes in manual mode and even focus the lens manually. I find a good 45-degree viewfinder helps. Once you are comfortable with what each setting does, then try the auto modes and decide if they really make things easier.

Third, leave the camera at home every once in a while. Underwater photography is hard, and it's easy to get into a rut. Taking a break to "just go diving" will remind you why you fell in love with the sport to begin with.

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Canon EOS 5D Mark III, 100mm Macro, f10, 1/125sec, ISO1600

Canon EOS REBEL T2i, 100mm Macro, f14, 1/160sec, ISO100

Cabin Cruiser at Three Tree Point © Jared Jensen
Canon EOS 5D Mark III, 15mm Fisheye, f22, 4 sec, ISO200

Note: Links to the videos will open in your default browser

Little Things In Puget Sound
March 11, 2015

At first glance, there doesn't appear to be much life at Three Tree Point in Burien, Washington. If you look a little closer, the little things start to pop out. Here are some of the things I found in a single dive at this site.

Lake Crescent Cars
July 28, 2015

Using scooters and rebreathers, we were able to visit both the Steele and Warren wrecks on a single dive. These wrecks are at depths of 175 ffw and 190 ffw, respectively, and approximately 800 feet apart.

Clear Lake Scooter Jockeys
June 2, 2015

A montage of shots from our recent Boys With Toys weekend down to Clear Lake, Oregon.

Featured Photographer: Steve Taylor

Scalyhead Sculpin © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/250sec, ISO80

Born in Melbourne, Australia in 1960, Steve Taylor came to Vancouver in 1988 to complete a Ph.D. in clinical psychology at the University of British Columbia. After graduating he remained at UBC, where he is now a professor in the Department of Psychiatry. Although he spent his youth snorkeling the reefs of Australia, his scuba training came relatively late. He completed his Open Water certification in Cozumel in 2013, Divemaster and various other PADI certifications in Vancouver in 2014, and Tec 40 in 2015.

During the past two-and-half years, over the course of over 300 mostly cold-water dives, he has developed an active interest in underwater photography, originally using a compact camera (Sony RX100) and more recently graduating to a full frame DSLR (Nikon D810). Steve's training in photography began years earlier with a year of part-time study at Melbourne's Photography Studies College in 1983, but then he dropped out of photography to become a psychologist. Many years later he completed underwater photography workshops conducted by luminaries such as Eiko Jones, Richard Salas, and Doug Coutts.

Warbonnet © Steve Taylor
Nikon D810 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with Nikkor 105mm macro lens, f25, 1/160sec, ISO100

Topsnail © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/250sec, ISO80

Most of Steve's diving has been in the Pacific Northwest, including Port Hardy, Hornby Island, and his local favourites, Kelvin Grove and the various reefs and walls visited by Sea Dragon Charters out of Horseshoe Bay. He has also dived Cozumel, the Great Barrier Reef, Cayman Islands, and Flower Garden Banks in the Gulf of Mexico.

Four things have influenced his approach to photography.

First, his training as a psychologist included many graduate and undergraduate courses (and a Master's thesis) in visual perception, which are relevant to things such as the effects of colour, lighting, composition, and anthropomorphism. These all shape the perceiver's emotional reactions to photographic images. In terms of anthropomorphism, people are more likely to have a more intense emotional or visceral reaction to an image of a creature, such as a fish, that appears to be displaying some discernibly human expression.

Flabellina © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/250sec, ISO80

Second, his training in psychology led to a keen interest in animal behaviour. By observing how organisms behave, such as the territorial posturings of Painted Greenlings, it is possible to photograph marine creatures doing interesting things, at least in principle.

Third, diving in the Pacific Northwest, with its richness of small nudibranchs, crabs, and other mini-creatures, led to a keen interest in macro and supermacro photography.

Fourth, and perhaps most important, Steve was dissatisfied with the effects of conventional strobe lighting in macro photography. Too often the images, or at least his images, looked flat and lacking in dimensionality when photographed with conventional strobes.

Accordingly, he began experimenting with fibre optic snoots. Snoots enable the photographer to precisely focus a small beam of strobe lighting, such as a side light to highlight the profile of a fish. Snoots permit precise control of shadowing and lighting, which can highlight the texture and three dimensionality of, say, a fish or a nudibranch. In other words, snoots can make the subject “pop”. A significant limitation of snoots is that it can be difficult to precisely focus the strobe beam. So, not surprisingly, on a typical dive, most of Steve’s images are entirely black because he did not properly position the snoots. He has tried attaching underwater laser pointers to the snoots, to facilitate positioning, just like the laser pointers on sniper rifles. Unfortunately, many fish act just like cats; when they see a laser dot wiggling about, they chase it, thinking that it is prey. So, the use of laser pointers actually made it more difficult to photograph some creatures.

Zoanthids © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/250sec, ISO80

Some of Steve's fellow divers have complained that he is particularly boring to have as a dive buddy, because he will park himself over a small section of reef and barely move, taking in all the macro splendor. Indeed, dive charter boat captains have looked at the pattern of surface bubbles and expressed surprise about the diver who hasn't moved in over an hour. For live boat dives along a reef or wall, Steve is typically about a kilometer or so behind all the other divers, and usually has to send up an SMB so the boat can go back and pick him up. He is a PADI self-reliant diver.

Current camera equipment:

Nikon D810 with Nauticam housing. Various dry lenses and their ports (60mm, 105mm, 10mm, 16-35mm) and wet lenses (Subsee +5, +10, Nauticam SMC). Sea & Sea YS-D1 strobes, Reefnet snoots (currently 4), Sola 800 focus lights, Sola 8000 video light, Nightsea fluorescence gear (focus light, strobe excitation filters, camera and mask filters).

Post-production software:

Lightroom 6 (on PC when at home or on Macbook when travelling).
Photomatix Pro (used very occasionally to enhance the dynamic range of images).

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Facebook and Flickr

Scalyhead Sculpin © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/250sec, ISO80

Speckled Sanddab © Steve Taylor
Nikon D810 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with Nikkor 105mm macro lens, f25, 1/200sec, ISO64

Multicolor Dendronotid on Hydroid © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f11, 1/200sec, ISO80

Cockerell's Nudibranch © Steve Taylor
Sony RX100 with dual Sea & Sea YS-01 strobes and fibre optic snoots, with dual stacked wet lenses, f10, 1/200sec, ISO80

Octopus © Steve Taylor
Nikon D810 with dual Sea & Sea YS-D1 strobes, Nikkor 16-35mm lens at 16mm, f20, 1/100sec, ISO64

Featured Videographer: Jim McGauhey

My journey began in June 1964 when a couple friends asked me if I wanted to go SCUBA diving. Not sure what that involved, I agreed anyway. Their sole instruction was "just keep breathing." I used spare gear and the rest rented (tank included) from Ed Brawley's Dive Shop in Monterey, CA – no certification required. Soon after, I bought my first set of gear. For a mere $30 I bought a duffel bag full of stuff, including a skin with both sides wetsuit that required corn starch to put on. Jim Powell was one of the guys who invited me and he had a Nikonos camera; I was envious.

Two years later I was certified at Stanford University – and that's a story by itself. A few years after college graduation and a stint in Vietnam, I returned as the proud owner of a Mamiya Sekor SLR and bought an Ikelite case and a surface strobe, also in an Ikelite case. About the same time, in 1973, I became an NASDS instructor and started working at Aquarius Dive Shop in Monterey. Not much later, I bought the shop.

I switched to a Nikonos system after the Mamiya flooded on a night dive, but I still wasn't too serious about photography yet. Most of us were more into spearfishing. Sometime in the late 1970's I became more serious; enough to set up an E6 slide processing darkroom in our bathroom. I was buying bulk film and rolling it into cassettes, shooting, processing, and mounting in plastic slide mounts. By this time I had amassed a collection of Nikonos cameras, including an original Calypso with square lens opening to the iris.

On tropical trips I'd set up at least two, sometimes three systems (wide, standard, and macro extension tube), each with a strobe. Sometimes it was a set with two cameras on a bracket, each with a slave strobe so both went off with each shot. Still, it was all manual; shutter speed, iris, strobe power.

In Monterey the water is very similar to Puget Sound. Within 2 degrees of same temp, mostly the same critters, and similar visibility variation. I usually carried the two camera system or lugged around two separate systems. I led a tropical trip each year and during a Bahamas trip, our divemaster Dee Scarr, (now at http://www.touchthesea.com), before she moved from San Salvador Island to Bonaire, challenged me. “Why are you carrying those systems around. Why not just make a pile in the middle of the dive site and go get whichever system you want for the next shot?” The answer was simple – in Monterey I’d never find my gear again. No such problem with 100 ft viz!

I read the books, studied, and really wasn’t very good at photography. Technically I could get good exposures, but I discovered I was not artistically, nor really visually, minded. But, if you shoot several thousand times, the odds are a few will be good; and so it was with me. I even had the help of Jim & Cathy Church, who used my shop early in their career when they were together. They were school teachers in Gilroy and came to Monterey during the school year to try new techniques before conducting photo classes in Grand Cayman during summers. They gave me autographed books, talked to me, and while it helped a bit, it couldn’t improve my lack of artistic ability. I persevered, nevertheless, learning to shoot up instead of down, rule of thirds, shoot the eyes, look for their food, get closer; and it’s all about learning behavior. I sold the store in 1984 and moved to the Puget Sound area in 1986. I took a couple years off diving to start a new career.

I had started taking video on the surface in 1983 with a Beta system. Cumbersome and large, it was a shoulder mounted camera with a thick umbilical to a large recording unit that hung over my shoulder. There were some very large housings for these systems, but they were pro priced and well out of my budget. About $2000 at the time, however, as the units got smaller and I had gone from Beta to VHS to Digital8. D8 used the same codec as DV, but the cameras were cheaper than DV, and it used cheaper 8mm cassettes instead of the smaller MiniDV tapes. The video, audio, and codec were same, and they used the same Firewire connection to the computer.

My TRV740 with HAD CCD sensor and was a very good lower cost compromise. Having always been on a tight budget and being technically minded, I enjoyed searching for such bargains. For lights, I couldn’t afford the new HID systems, so I settled for a halogen twin 50 watt light system powered by a 12 v gel-cell battery commonly used for snowmobiles and lawn tractors. It took 5 or more hours to charge the battery, and only an hour to discharge it. No matter, I had several batteries. I soon discovered I liked the warmer 3200 Kelvin temperature of the halogen lights as it gave that “Playboy” glow to images, instead of the cooler, blue, 6500K light from HID systems. True, the HID blue light penetrates water further, but most light shooting is 1 to 3 ft. Sunlight is generally 5,500K, except during the “golden hours” when it’s closer to 3,200K.

My first housing for D8 was not a bargain. It was a Quest Tiburon and after about 3 years the clear acrylic back warped in the sun and wouldn’t seal. Since Quest went out of business, I switched to Backscatter’s Top Dawg housing, keeping the TRV740 and the halogen lights. This served me well until 2006, when I went HD.

I bought a used Sony HDV A1U pro camera at a bargain price but it needed a new housing. I bought it from a small family operation in Florida, Ocean Images. Their system worked well. The HDV tapes were great at first, and even when Compact Flash cards and SD cards became popular for video, I stayed with tape because of the archive ability. I still have hundreds of HDV tapes from 2006 and still use that housing, but now have two such housings, and a Sony HC1, the consumer version of the A1U, so I have a complete backup system.

A couple years ago Jack Connick at Optical Ocean Sales had a great deal on LED lights, so I switched from the cumbersome halogen system to a couple LED lights. They are the size of a medium flashlight but are self-contained with a battery that lasts about an hour. This eliminated the cumbersome large battery and housing. I’m getting used to the 5500K natural sun light LED’s, but miss my 3200K halogens. Even today many commercial movies are shot with 3200K light systems to give skin tones that nice warm glow. True, you can “adjust or fix it in post,” but every pro knows it’s always best to put as close the final image “in the can” as possible. Or I could filter the lights but that is too many parts to lose.

Now I don’t consider myself a pro videographer, but I am a “serious amateur.” I picked up a Panasonic GH2 mirrorless camera a couple years ago and like most DSLRs and mirrorless counterparts, it shoots great video. The GH2 out of the box has been acknowledged by reviews and pros as one of the best video images (in its day), and remains competitive even today because there are hundreds of “hacks” available. I hacked it to go from the native 27Mbps to a variable 150 Mbps. I tried 250 Mbps, but the camera would lock up and while the cure is simple, remove battery, replace, reboot; that’s rather difficult when you’re 100 ft underwater. So while all HD systems are 1920x1080 pixels (except HDV which is 1440x1080 rect-

angular instead of square pixels to get same 16:9 aspect ratio), many video neophytes think pixels are pixels and 1920x1080 systems are all the same. This is not the case.

Although I have a housing for my GH2, I really prefer the A1U or HC1 dedicated video camera. Mostly because of the 10x zoom ability and smooth power zoom instead of ratchet gears. Toggling to macro is a simple switch, and the A1U not only has macro, but tele-macro. This puts it in maximum telephoto mode, but instead of the usual 6ft minimum focus distance, it's only about 8 to 14 inches. This allows me to stay a comfortable distance from critters so they don't spook, and still fill the frame with a macro image. Where most video cameras use wide angle lens that focus right up to the port, it's not easy to get that close to a critter.

Another thing I like about my dedicated video camera system instead of the GH2 is that I have a 7 inch external underwater monitor. It helps these old eyes to see more clearly. That's much better than staring at a 3 inch camera monitor. There just isn't room in the GH2's 10bar housing to drill and install the external monitor connection, and the 12 volt power source. I was fortunate to land a prototype from a guy who was machining some for his own use, fairly inexpensively.

Example of Tele-macro Video

For a still, you only need to be steady and in focus for about 1/400 sec during the flash, but for video you want at least 10 second clips, if not 30 second clips. I often find myself counting slowly to 10 underwater to be sure I have enough of a clip to work with in the final production. Early in my video career, I made the mistake of shooting for just 2 or 3 seconds, saying to myself "I've got that shot." When editing later, I'd get frustrated because the clip was too short or I didn't see the critter in the background. So when shooting video – go slow and stop to smell the anemones, count the length of the recorded clip, and look all around the frame, not just at the subject, to see that even more rare critter in the background.

Although with a still camera I use manual controls, with video, I usually leave the camera on auto or shutter priority. The difference is with video the camera is moving, and so is the subject, most of the time. Move six inches and the aperture, or shutter speed, or ISO must be changed. I typically use shutter priority at 1/60 sec.

When focusing, I use a combination of auto and manual. For moving subjects, I definitely prefer auto, but for stationary ones, manual works best. For tele-macro I'll use a combination of the two. Finding focus on macro can be difficult, so I'll switch to auto to find the focus, then back to manual for the shot. It can be challenging with current or even breathing, so here's my personal solution. For a moving subject, say 3 ft away, I'll use auto focus, when finished shooting I switch to manual focus to "lock" it at the 3 ft. It then keeps this distance for focus while I travel. Finding the next subject at, say 2 ft, I'll stabilize and frame, then switch to auto and press Record. Now it only has to hunt from 3 ft to 2 ft, which takes only a second, then it will track the new subject.

This video was shot in Maui with the A1U system with halogen lights. A monk seal visited us and stayed around for about 40 minutes. Typically, these are very shy, lone critters, but this one kept rubbing against us. It "attacked" Jim Boon until the Divemaster finally had to push it away with her light. Then it ran up and down our safety stop/anchor line, and even tried to join us on the boat. NOAA is in charge of marine mammals in Hawaii and we called them immediately upon boarding the boat. When I posted the video they called to thank me, said this #043 seal had jumped on others, including snorkelers who are not experienced and can panic. They immediately captured #043 and moved it about 500 miles away.

These videos were shot in Cozumel in 2013 with the GH2 system. One is a cenote dive, the other shows the colors of Cozumel both lit with LED lights. The GH2 definitely has better color than the older generation HD A1U camera.

Here's an old video shot with D8 in 2005 before I went to HD. This octopus was at 80 ft out in the open. I was within a foot, getting intimate, when it opened its mantle and completely enveloped my video system, which was huge with the lights. The camera was rolling and the lights were on. I thought "when it figures out it can't eat or mate with it, it will release and move on." No such luck. I was already at 40 minutes at 80 ft and was running out of bottom time, so I started to peel it off my system. Then I had to peel it off me. At one point the camera took my video selfie. I finally got the system back, signalled to the 2 buddies it was time to go up, and headed up the wall. Since I was leading, I didn't realize it had followed us up to the 15 ft level, occasionally grabbing my buddy's fins along the way. It left when we did our safety stop.

About 3 or 4 years later I get a call from a producer of an episode of the History Channel's Monster Quest. They wanted to use my footage for a story about octopuses. They wound up also renting my system at the Seattle Aquarium, interviewing me, and I flew them in the Cessna for aerial shots for the episode. They wouldn't tell me the story line or the name of the show. If they had, I probably wouldn't have participated. They created a totally fictional story about looking for Octopus Giganticus, a 200 ft tentacle spanned beast hidden in Puget Sound waters.

Here's some highlights of diving Maui. It includes a shark, octopus, eels, tele-macro shots, getting teeth cleaned by shrimp, and some other interesting looking critters. At times you can hear the humpback whales sing faintly in the distance. These were all shot with the A1U in the Ocean Images Housing and halogen light system.

Posting videos online is another challenge on its own. Even though there are many editing programs that "optimize" for YouTube and online viewing, it's usually better to use manual settings and know your codecs.

I recall one unique filming experience where we had a live underwater feed to the surface to record a pumpkin carving contest. It was a joint effort between myself and Randy Williams. We used my camera system and a buddy's expertise as a ham radio operator. We bought a cable and fitted the ends with waterproof connectors (Subconn), the same as I have on the 7" external monitor so it plugged right into my housing. The cable went up to a buoy on the surface and connected to a box with a wireless video transmitter. We set up a receiver onshore and which plugged into a video switching board. A surface camera was also connected to the board. The output went to a 40" monitor and a laptop that had a mobile phone type internet connection. Bingo! A live feed from underwater, with switchable surface narration, streamed online and shown on a large monitor to the surface crowd. Diving became a spectator sport! Randy has done several events like this in the Washington area.

Most of my videos are simple travelogues of dives without a dramatic story line or compelling critter behavior. I'm not shooting for profit, but just to share these with my fellow divers and show some non-divers what we see. So, yes, some are shaky, and I could color balance better, but I'm taking 2-5 hours per minute of finished video editing these. For commercial work, I'd stabilize and take longer, but I'm like most of you – shooting for fun and sharing. I'm now over 300,000 views on YouTube, so that's a lot of sharing! Let's ENJOY it and not take our hobbies too seriously.

Your Lens. Your Story.

This is our readers' turn to shine and to show what they have learned or experienced. Please submit entries to editor@pnwups.com.

Sometimes You Just Get Lucky

by Bob Bailey

Octopuses are my favorite marine creatures. And it's a special event to watch them coming into this world. When I heard about an octopus hatching at Three Tree North, I arranged with my dive buddy Jen Vanderhoof, to show up early the next morning to capture some pictures of this special event. We arrived at 3:30 AM, quietly geared up and were in the water by around 4:00. Little did I know that we'd have a third dive buddy along – his name was Murphy.

We surface-swam out to a buoy that would drop us conveniently close to the den and slipped below the surface. Conditions were just about perfect, with little current, great visibility, and no wind to kick things up. Jen stopped briefly on the way down to watch a tiny squid nestled among the life growing on the buoy line. All the tiny creatures swimming in the water column, barely big enough to see, fascinated me. There were tiny translucent shrimp-like creatures, jellies of various varieties, and tiny ctenophore colonies everywhere. I stopped at the bottom of the buoy line to take a test shot, and that's when I discovered the presence of our third dive buddy.

Lining up a nudibranch as a test subject, I went to press the button on my housing that allows the lens to focus, and that's when I realized it was MISSING! Yup! I had a hole in the housing where the button used to be. A quick inspection assured me that the inner pieces were intact, and so the housing wasn't leaking. Realizing that I was still able to take pictures, I figured I'd just have to move the camera to where the lens is set to focus.

After taking a couple of test shots, I found a second problem. For some reason I have yet to explain, my Display button wasn't working either. So I could neither review the shots I took to make sure my settings and lighting were right, nor auto focus. There I was, on what could turn out to be the most special dive of the year, and two of the most important functions on my camera were not accessible. I carried on thinking that maybe Jen will get some nice pictures, and I'd still get to see the hatching, which is something most divers would never get to experience firsthand.

We swam down to the den, where 'octomom' was in the process of giving birth to thousands of tiny, fly-sized progeny. We waited. There wasn't a whole lot of activity going on. Perhaps this is the tail end of the hatching; over the next 45 minutes or so we only saw maybe a dozen tiny hatchlings exiting the den. We were also competing with the rockfish, hanging around looking for an easy snack.

I went through the motions of taking pictures, doing my best guesswork and hoping for the best with no way to focus other than moving the camera back and forth looking for that "sweet spot", and no way to review the results. It was like going back to the old days of film photography, where you had to wait till after the dive and develop the film to see what you got.

After the dive I could hardly wait to drop my gear, pull the camera out of the housing to see if any of my pictures turned out. As it happened, I got one good one. And all I can say about it is "Bob, you are one lucky son-of-a-gun".

As Stevie Wonder so famously put it: "Isn't she lovely"– less than a minute old!

Photo Stats: *Canon T2i, Canon 60mm macro lens with 5x diopter, Sea & Sea RDX550 housing, Sea & Sea YS110a strobes – shutter speed 1/200, aperture f13, ISO200*

Postscript: *Upon inspecting the housing afterward, I realized that the only thing holding the inner parts of the missing Servo button in place was the ambient water pressure. Once out of the water, those pieces literally fell out, leaving a gaping hole in the housing that would have flooded the camera in seconds. So Mr. Murphy may have been along on the dive, but as it turns out he's an inattentive dive buddy.*

Transitioning to Rebreather

Robert Roy tells about the challenges and benefits of diving with a rebreather.

photo by Mazyar Jalayer

This article will discuss the advantages and disadvantages of rebreather diving vs. conventional open circuit scuba, particularly as it applies to underwater photography in British Columbia and the Pacific Northwest.

Some History

Rebreather devices for diving were invented over one hundred years ago, long before conventional open circuit scuba, but because of issues of complexity and cost, their use was for most of that time confined to industrial or military purposes. It is perhaps only in the last 10 years or so that the technology and costs have evolved to the point that commercially-produced rebreathers have become accessible to recreational divers.

Rebreather diving has some compelling advantages, and also some potential disadvantages. Their popularity has increased 10-fold in the past 10 years, but rebreather diving still forms only a small percentage of all recreational scuba diving. Let's look at some of the pros and cons, particularly as it applies to underwater photography. (For the sake of simplicity, I will confine my discussion to the type of rebreather that I own, which is an electronically-controlled closed circuit rebreather, or eCCR).

The Science Behind Rebreathers

When you are breathing at the surface, the air you inhale contains 21% oxygen, and the air you exhale contains about 16% oxygen (as well as about 5% carbon dioxide (CO_2) that your body has produced and needs to get rid of). Therefore at the surface, you are only metabolizing about 5% of the air (and about 25% of the oxygen) that you are inhaling.

This inefficiency is not a problem at the surface, since there is an unlimited supply of air to breathe. However, underwater, your gas supply is of course limited by the size of the cylinder on your back. With conventional open circuit scuba, your exhalation is vented into the water and lost as bubbles. Therefore, if you happen to be breathing from your scuba kit just below the surface, you are wasting about 75% of the oxygen and 95% of the total volume of air in you are breathing from your cylinder. The deeper you go, the more gas you waste. If you go down to 30 meters (4 atmospheres of pressure), the air you breathe will be 4 times as dense, but your requirement for oxygen is unchanged, assuming the same activity level. Therefore at that depth, you are only metabolizing 1% of the air you breathe in, and 99% is wasted as bubbles! Very inefficient!

A rebreather device is a simple concept. Rather than have your exhalation wasted as bubbles, the rebreather consists of a closed loop system that captures your exhalation so it can be recycled (rebreathed). Your exhalation is run through a "scrubber", which is basically a canister containing granules of calcium hydroxide, which chemically bind the CO_2 and removes it from the breathing loop. Once the air has cleared the scrubber, there are 3 sensors that monitor the level of oxygen in the breathing loop.

The rebreather also has two small cylinders of compressed gas, in order to supply gas to the breathing loop. One contains "diluent" (usually air, but it can also contain some component of Helium which is beneficial if doing deep diving), and the other contains 100% oxygen. The user manually adds diluent to the loop, which is usually only necessary upon descent). The computer-controller monitors the oxygen level in the breathing loop and automatically injects oxygen to replenish what your body metabolizes, and maintains a certain set-point of oxygen, usually a pO_2 of 1.2 or 1.3, which is the optimum level of oxygen to minimize nitrogen loading and maximize the efficiency of decompression, while still avoiding the risk of too much oxygen. (The user can also manually override the computer and control the oxygen set-point independently.)

Advantages

The first advantage is the potential for greatly increased bottom time. My particular unit is the Hollis Prism 2, which contains a 6 lb. scrubber. Hollis recommends a maximum total dive time of 4 hours per scrubber fill. The Prism 2 can also accommodate a variety of cylinder sizes. I dive a typical configuration consisting of twin 3 L steel cylinders (one for diluent and one for oxygen), which when pressurized to 3400 psi, contain about 23 cu. ft. of gas. These cylinders are about ¼ the size of a conventional scuba cylinder. When starting with full cylinders, I have enough gas to last about 6 hours underwater. Basically the only oxygen you use is what your body actually metabolizes, and therefore your gas consumption is independent of depth!

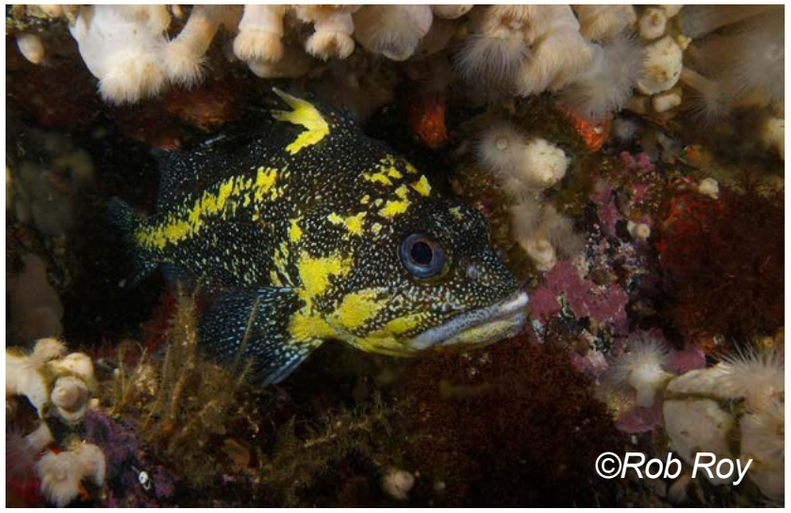
Along with the greatly increased gas supply, is the advantage of increased no-decompression limits and accelerated decompression (if doing deco diving). In conventional scuba, the diver is breathing a fixed fraction of oxygen (for example, 32% if diving nitrox), and therefore the pressure of oxygen will vary with depth, and the diver only reaches his/her maximum pressure of oxygen at the maximum depth of the dive.

It would be nice to breathe a richer mix when shallower to accelerate decompression, but the only way to do this is to carry an additional cylinder with the richer gas (which in fact many technical divers do). However, a rebreather is able to provide an optimal set-point of oxygen pressure, (for example, a pO_2 of 1.3) throughout the entire dive. Because you are always breathing the optimal nitrox mix regardless of depth, your no-decompression limits are increased, and whatever decompression obligations you accumulate are shed much more quickly as you ascend compared to open-circuit diving.

Another benefit is warmth. There are actually 3 reasons why rebreather diving is warmer than open circuit diving. Air that is breathed from a compressed cylinder is very cold. Many divers do not realize this, because our lungs are not sensitive to temperature. Nonetheless, the air from your cylinder has to absorb a lot of heat as it decompresses, and most of that heat will come from your body. With a rebreather, the dive is a much warmer dive, because the air is being recycled and has already been warmed.
The recycled air in a rebreather is not only warm, but also humid (as opposed to the very dry air in open circuit), and this reduces evaporative heat loss from your lungs. (An additional benefit is less dehydration and less dry mouth compared to open-circuit scuba.)

Furthermore, the scrubber emits heats as it absorbs the CO2 (since it is an exothermic reaction), which further warms the air. What I find in practice is that I can easily do a dive that is twice as long as on open circuit without getting cold.

Perhaps the most important advantage of rebreather diving as it pertains to underwater photography is the lack of bubbles. For many marine species, “bubbles mean troubles”. The release of bubbles into the water is very noisy, and scares many underwater creatures away. Certain species will be more sensitive to the noise of bubbles than others. For example, I have noticed that on my rebreather, I can get much closer to many species of rockfish. I can literally bump into them as I approach quietly.



For macro photography, it may perhaps not make as much of a difference, since smaller critters may lack the ability to swim away. However there is still some advantage as smaller critters are perhaps less likely to hide if one is able to approach silently. For photographing large animals, the lack of bubbles can be a huge advantage. Sharks in particular seem very sensitive to the noise of bubbles, and I have found that it is much easier to get close to sharks on rebreather compared to open circuit scuba.

I recently had the experience of diving the same local dive site near Vancouver on three consecutive days. On the first day, I stayed near my open-circuit dive buddy for the entire dive, and we saw no sharks. On the second day, I dove the same site solo, and there were no other divers around. On this occasion, I had the delightful experience of being repeatedly approached by several rather curious dogfish (a small species of shark). Although I have seen dogfish before, it was usually only fleeting glimpses, as they would usually dash off as soon as they were within sight. I had never seen them swim up to me to check me out like this before. They actually seemed attracted to me, perhaps because they were using their sense of electro-location to hone in on the electrical field my body was generating. When I saw the first dogfish, I happened to be slightly overly-buoyant, so I had to release some bubbles through my nose, which caused the shark to dart off quickly. However, I was later approached repeatedly by several dogfish, and saw as many as three at a time. I was able to manage a few decent shots of the dogfish, although I had a macro lens on that day, which is of course too long for such a subject.

The next day I returned to the same site with another open-circuit buddy, and our plan was that we would stay a good distance apart at the beginning and end of the dive to see if any dogfish would appear. Sure enough, when I was alone, I did have several sightings of dogfish, but when we were together, there were none to be seen. Quite humorously, when I was alone and rounding a point, I almost bumped nose to nose with a dogfish, and we were both quite startled!

Another significant advantage of rebreather diving pertains to deep technical diving. Since gas use with rebreather is independent of depth, the deeper one goes, the greater the advantage of rebreather over open-circuit scuba. Deeper than about 30 meters, nitrogen narcosis becomes a factor. Many agencies are recommending that Helium should be added to the gas mix to replace some of the Nitrogen if diving deeper than 40 meters, to reduce the narcotic effect.

Personally I have noticed that it becomes more difficult to concentrate on photography when diving deeper than about 30 meters (regardless of whether on open circuit or rebreather), and this is no doubt due to the effect of nitrogen narcosis. Many experienced divers will claim that it does not affect them, and it is certainly possible to ac-

climatize to some degree to the effects of Nitrogen narcosis. However, it likely does affect all divers whether they realize it or not. I probably would not notice the narcotic effect as much if I did not have a camera, since reduced task -loading will make the narcosis less noticeable. One of my goals is to eventually get certified for using trimix (as opposed to just plain old air) as a diluent on rebreather. I would anticipate that this would improve my ability to concentrate on photography when diving deep.

The costs of helium can be quite prohibitive when diving open-circuit, but due to the amazing gas efficiency of rebreathers, the helium becomes much more affordable when recycled. For example, the cost of Helium for an hour of diving on open circuit could be as much as $200 for an hour of diving (the deeper you go, the more helium you discharge into the water!), whereas a trimix fill on a small rebreather cylinder might cost about $20, and be good for 10 hours of diving, regardless of depth.

Disadvantages

There are some disadvantages to rebreather diving. They are more costly to purchase, and are more complex and require more time to set up. It is very important to complete your pre-dive checklist before getting into the water, to ensure that everything is working properly, because unlike open circuit scuba, a rebreather can malfunction in ways that are not always immediately obvious. With open circuit, you either have gas to breathe, or you don't. With rebreather diving, if you do not follow all your checks, and monitor the unit during the dive, the machine can potentially malfunction and deliver a gas that is incapable of sustaining life, causing you to loose consciousness and drown.

However, for me personally, rebreather diving is definitely not as scary as I thought it was going to be. There is no doubt that rebreathers are less tolerant of human error, but as long as all the checks are done before entering the water, I feel perfectly safe on the unit. In fact, in some ways I feel safer, because for any given dive profile, the risk of running out of air and/or getting bent is significantly less on rebreather compared to open circuit. The rebreather does have quite a few redundancies to it, so once all the checks are complete, it is very unlikely something catastrophic will happen. I would compare it to flying an airplane, in that as long as you are properly trained on the unit, and you have done all you're your pre-flight checks, then you are good to go!

"rebreather diving is definitely not as scary as I thought it was going to be"

For me, the only significant disadvantage I have had is that my buoyancy control is not quite as good as it was on open-circuit. Most experienced divers know that they can fine-tune their buoyancy by varying the volume of their lungs. With enough experience, this becomes a subconscious process, which is a significant advantage for underwater photography. One can approach a subject, hover, get the shot, inhale, and then gently float away, without even consciously thinking about buoyancy control. With a rebreather, one is inhaling from and exhaling into counter-lungs, so the total volume of air in your lungs plus the loop remains constant (unless you add air to the loop manually or exhale from your nose). Therefore, unlike open circuit, your buoyancy is not affected by lung volume.

For an experienced open-circuit diver, it can take quite some time to unlearn the ingrained process of trying to control your buoyancy with your lungs. After one year and over 100 dives on my rebreather, my buoyancy control has definitely improved, but not to the fine degree of precision I previously enjoyed with open-circuit scuba. If I happen to be diving rebreather without a camera (which is admittedly a rare event!), buoyancy control is not an issue, because I have plenty of bandwidth to devote to buoyancy control. However, with a camera, I do find I have to spend more time thinking about my buoyancy, so I find I have a bit less concentration to devote to photography. I have to admit that I still find it somewhat difficult to hover while taking a macro shot while on my rebreather, something I had previously mastered on open-circuit. For wide-angle photography, it is not really an issue, because it is really only when photographing something very small that ultra-precise hovering skills become important.

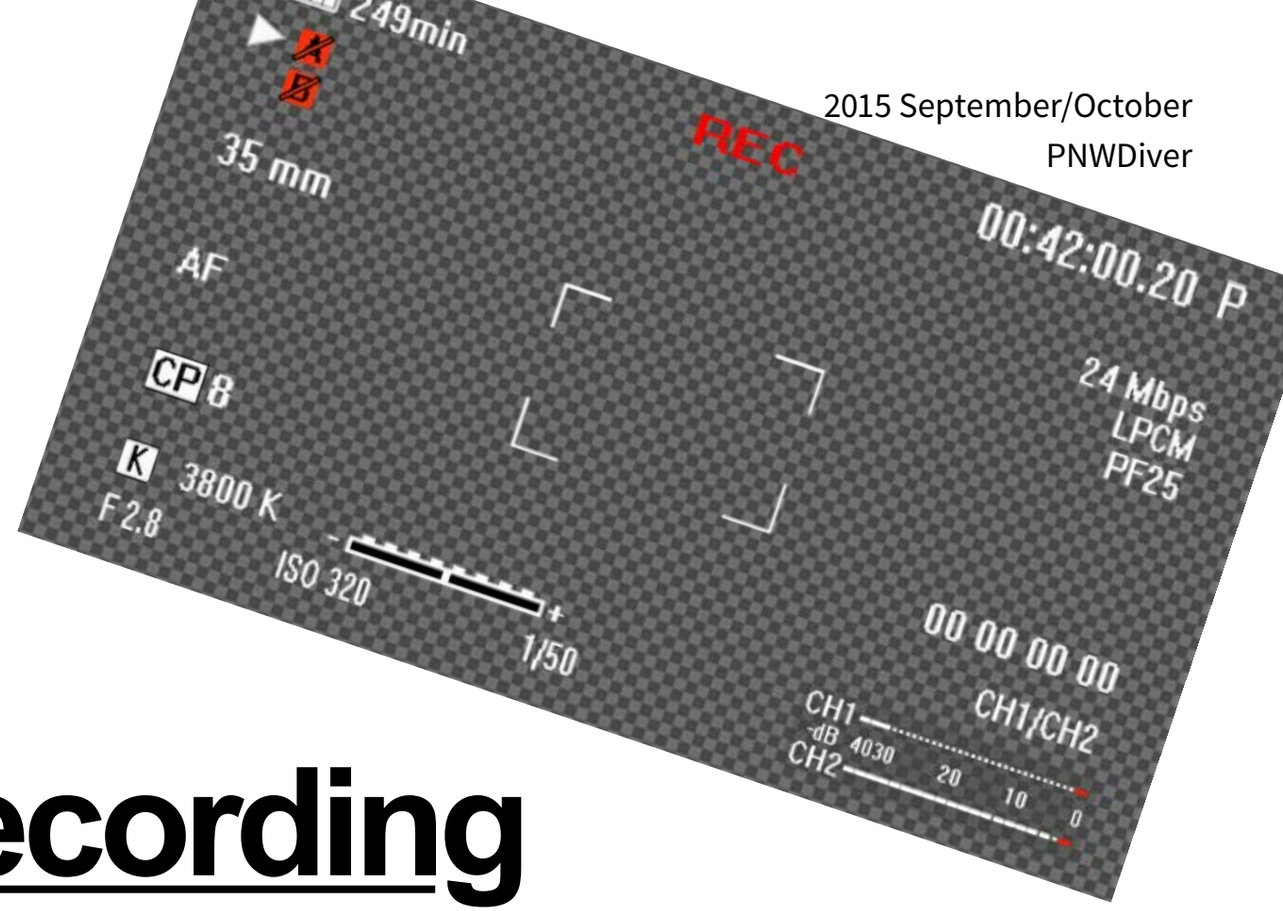
Overall, I have greatly enjoyed diving the rebreather, and I have no thoughts of going back to open circuit. In fact, since getting certified a year ago, I have not done a single open-circuit dive! (Perhaps part of the reason is I do not want to fall back into the habit of trying to control buoyancy with my lungs!) I find that diving on rebreather is a much more peaceful and relaxed experience. If I am shore diving near home, there is no longer any time pressure, for example having to constantly check the SPG to see how much air I have left or checking my computer to watch my no-decompresson time wind down. Certainly I still have to check my computer and gauges on rebreather, but when diving within normal recreational depths, the information is invariably reassuring; there is still is plenty

of gas and no-deco time left, and I can therefore continue to stay underwater as long as I am enjoying the dive. What I now find in practice is that my main limitation to dive time is the battery life of my camera and the capacity of my bladder!

I find resort diving with a rebreather is also very relaxing. Rather than rushing through 3-4 dives a day as is typical of an open circuit schedule, I find that a schedule of doing a 2-hour dive in the morning followed by a two hour dive in the afternoon a much more practical schedule. I can spend the same 4 hours underwater, but with less time wasted motoring around, getting in or out of the water, or waiting between dives to allow enough for off-gassing of nitrogen in order to dive again. On a rebreather, after about two hours, I am perhaps getting a bit hungry, my camera battery is running low, so it is time to go for lunch, have a short rest, then do it again in the afternoon! So for the same 4 hours underwater per day (2 x 2hour dives on CCR vs. 4 x 1 hour dives on OC), I actually have more free time topside for other activities such as photo-editing while on vacation.

For me, diving is a Zen-like experience. The peaceful quiet and lack of time pressure that a rebreather affords certainly enhances the experience of being at one with the underwater environment.

(Special thanks to Bill Coltart at Pacific Pro Dive in Courtenay, BC for mentoring me and certifying me on the Hollis Prism 2 rebreather.)



Creating Great Underwater Video: Part 4 – Camera Recording

By Michael Meagher

In the last segment of this series – I lied. I thought by now that we would be covering the techniques of underwater film making. But I realized that I needed one more technical section to cover image resolution.

Second to the quality of your camera's optics, the manner in which data is processed has a lot to do with video image quality. We will cover the basics of sensor resolutions, sensor size, codecs, bit depth, data rate, compression, and more. In depth detail regarding these topics can be found online or in the reference book The Filmmaker's Handbook, by Steven Ascher & Edward Pincus.

Video Resolutions and Image Quality

The video image resolution is generally the most influential component of a sharp high quality image. The greater number of pixels (a single point or dot of the image) the more information there is to display on a television or screen. More pixels allow more data to deliver more image detail. The common video resolution formats found today on the market are as follows (pixel width x row height):

- DCI 4K: 4096 x 2160, True Cinema 4K a cinema standard with 4 times the area of DCI 2K. This is what you see at a theater. ~17:9 screen aspect ratio
- UHD 4K: 3840 x 2160, Ultra High Definition video standard with 4 times the area of 1080 HDV. Video's "4K" version that's becoming popular. 16:9 ratio.
- DCI 2K: 2048 x 1080, An early Cinema 2K standard at the 17:9 ratio
- 1080: HDV 1920 x 1080, High Definition Video standard that is very common today. What you see broadcast, Blu-Rays, the TV you buy at Costco. 16:9 ratio
- 1440 x 1080, An early version of HD using non square pixels to achieve the 16:9 ratio.
- 720: 1280 x 720, An early version of "HD"

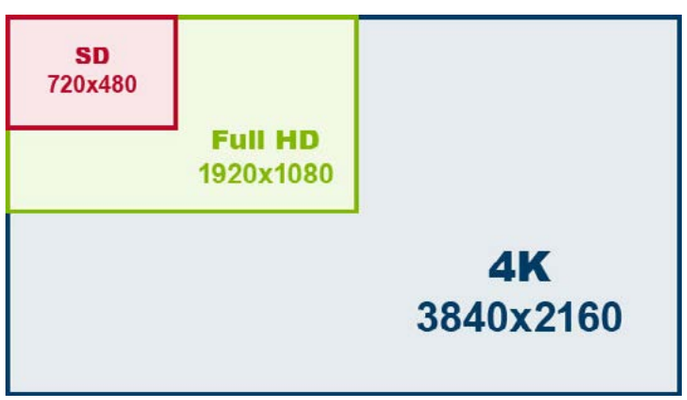
format with a 16:9 ratio. The first HD video

- 480: 640 x 480, older TV screen standard, SD, standard definition 4:3 aspect ratio

The last three are older formats and pretty much obsolete and only encountered if you purchase a used camera. Today, HDV 1920x1080 is well established and is the norm. It's what we see broadcast on HD TV and in a Blu-Ray disc.

Why record 4K?

UHD 4K cameras are now becoming affordable and this is the new standard. Although not many of us own 4K televisions, you may want to consider capturing your video in 4K for a few reasons. UHD 4K has the same image ratio as HDV but with 4 times the number of pixels. Imagine arranging four HDV screens in a rectangle and you will have a 4K image. This allows you to display a larger screen that still looks great or you can use the extra pixels when editing to crop the image for making 1080 output. 4K will be everywhere soon.



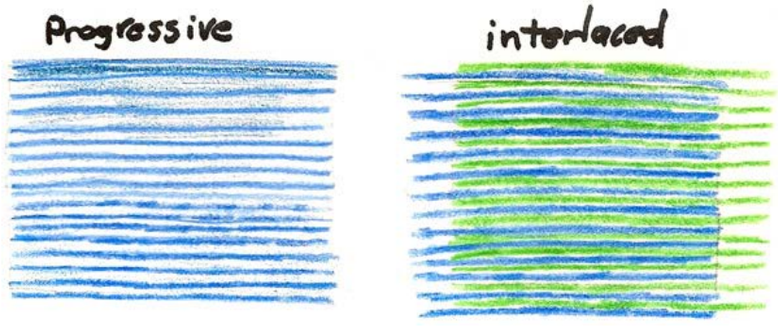
Some people capture in 4K to "future proof" their efforts knowing that they may want to sell to broadcasters hungry for 4K content. You can always take a 4K source image and scale it scaled down to 1080 for web or Blu-Ray delivery. A 4K image scaled to a 1080 often looks better and sharper than a natively recorded 1080 image.

The downside is that really good 4K is only found in the more expensive cameras, but that will change over time. The real problem is storage and editing station power. Storing a 4K video image takes 4 times the storage space. Also, editing or color grading on an older computer might stress the computer as it tries to cope with manipulating an image with that much data. Another consideration is that 4K cameras require very fast media cards capable of handling the data rates and these can be expensive. And then if you want to back up all your data, you have more data to cope with as well. Moving to 4K often costs more than just the camera upgrade.

Progressive vs Interlaced.

In the old days of TV broadcasting they had frequency limitations and came up with interlaced video as a way to reduce the amount of data transmitted. With interlaced video, for any given video frame only half of the frame's horizontal lines are displayed, alternately. For example, lines 1, 3, 5, 7, etc are shown, then lines 2,4,6, etc of the frame. A typical one second clip captured at 30fps is transmitted as 60 interlaced half-frames. Interlaced images sometime show "jaggies" artifacts with fast moving subjects and an interlaced image is not as sharp as a progressive image. Cameras recording interlaced video are a thing of the past.

With Progressive video all lines of the image are captured and displayed at the same time. Common frame rate notations that you may encounter are 24p, 30p, 60i, etc. Where the "i" or "p" denoting an interlaced or progressive format.



Sensor Size and Low Light Sensitivity

I covered this a bit in the last issue, but I'll go over it again. Larger buckets catch more rain and a larger sensor captures more photons of light. If you want better low light capability seek out a camera with a larger sensor.

Red, Green, and Blue photo receptors line the sensor and these signals are combined in a process called *debayering*, or de-mosaicing, to create one Pixel. Larger sensors have either larger photo receptors or more of them and are more sensitive in low light situations.

Compare, for example, the GoPro 1920 x 1080 image resolution with a small sensor to a physically larger "full sized" sensor in the Sony A7s that also records 1920x1080 resolution. Both are delivering a 1080p image, however, the A7's physically larger sensor is more able to sense lower light and will produce a better image in dimmer conditions. Small sensor cameras and large sensors cameras both make beautiful images in bright light, it's in the low light that you will see differences.

The smaller sensor cameras attempt to overcome this by increasing the "gain" of the sensor, the amplifying of the sensors' output. Whenever you amplify a signal you begin to introduce electronic noise and the result is artifacts in your video.

One way to try to remedy sensor noise is to apply a Noise reduction filter to your edited video such as the Neat Video Filter. This is a commonly used editing software plugin that can help make low light noisy video look better if used properly.

Sensor Size and Crop Factor

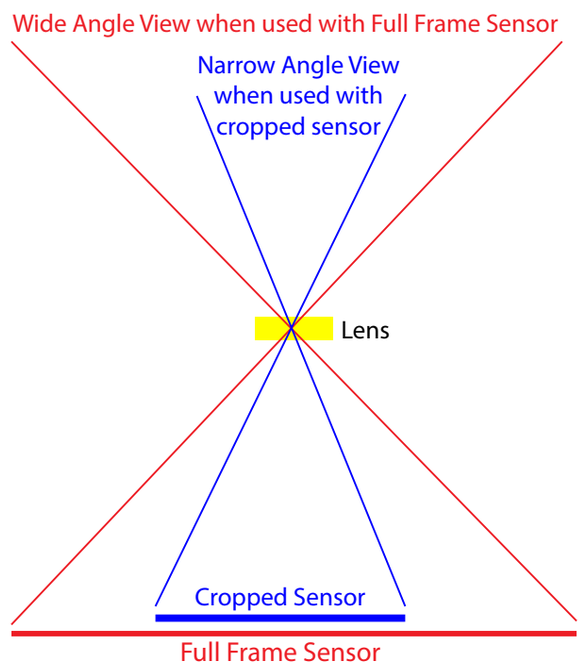
A lens with a certain focal length lens will have a different angle of coverage depending on the camera's sensor size. If the sensor is larger there will be wider coverage. If the sensor is smaller the coverage is narrower. This is called the "crop factor".

The common "standard" for discussing this is the old 35mm film format as the base image size. Us old timers still think in terms of lens focal lengths and coverage when we were shooting film. A 24mm lens on a 35 format camera will have an 84 degree angle of coverage and was considered a wide angle lens. However put that same 24mm lens on a smaller sized sensor having a 2x crop factor and now that same lens / sensor combination captures about a 48mm lens equivalent angle of view (2x24mm=48mm).

The key here is to calculate a lens's effective angle of coverage when shopping, then find out if a housing port is made for that lens. The bottom line is that underwater film makers love to record wide angle images and a camera with a smaller sized sensor makes it more difficult to find good quality extreme wide angle lenses.

Frame Rates and Slow Motion Capability

True film based motion picture cameras record at 24 frames per second. That is called film or sound speed. The comparable video standard is about 30 fps, actually 29.97 frames per second, but for simplicity we'll just call it 30 fps. If your video is captured at 30fps and played back at 30fps then the motion speed will appear real time.



If you desire to film beautiful smooth looking slow motion then you need a camera that captures at faster frame rates such as 60, 96 or 120 fps. Recording at these rates is called 'over cranking'; recording at a faster frame rate and playing back normal rate slows down the motion. Capturing at 60fps and playback at 30fps doubles the playback time resulting in slower motion. Some people will shoot at 24 fps then crank it up to 96 frames per second for ¼ real time playback. Cameras can only accomplish over cranking if they have a very fast processors and fast recording medium. You have to pay for this capability and is another thing to consider when shopping for cameras.

Editor's Note: On my Nikon D7100 my highest quality choice is 1920x1080 @ 30p. Although 60i and 50i are greyed out, they might be available with a higher quality SD card or tethered to my computer. I'm not sure.

Frame Rate and Shutter Speed

Although it's confusing remember this: the frame rate is how many individual video frames are captured per second, generally 30 or 24 fps. However for any given frame you can capture it quickly or slowly just like using a still camera. This is the shutter speed.

The normal practice is to set a shutter speed at 1/x the frame rate. At 30fps, your shutter should be around 1/30 second. At 24fps, a shutter speed of 1/25 is a good start. These settings give the most natural amount of motion blur. Slower shutter speeds let in more light but the image may be very blurred, not a bad thing if that's your desired effect. A fast shutter speeds stops the motion with a crisp image. Remember the beach battle scenes in the movie Saving Private Ryan? That staccato effect was achieved using a fast shutter speed. Remember if you over crank the frame rate you'll also need a faster shutter speed too.

Editor's Note: Although Mike is referring to dedicated video cameras, I turned to my Nikon D7100 to see

what adjustments I can make. On my Nikon D7100, I can adjust my shutter speed and ISO after I put it on Live View mode for recording. However, my aperture is not adjustable. That must be done in Manual, before I switch to Live View Mode for Movie. Also, I have my camera set on back button focusing for still images, but in when recording a movie, the shutter button depressed halfway does the focusing.

Global vs. Rolling Shutters

Today's cameras shooting progressive video have two methods implemented for scanning each frame. A rolling shutter is when the sensor takes a scan line by line very quickly on each frame. It takes a fraction of time to capture the entire image. A Global shutter records every pixel in the sensor at the exact same moment. A rolling shutter might produce some image distortion or skipping if the subject moved fast or a fast camera pan occurred while the frame was being scanned.

Global shutters don't exhibit these motion artifacts but a more robust processor is required and are found on high end cameras. Rolling shutters are the most common type of shutter in most consumer camcorders but that will change as prices drop over time.

Video Data Compression

When video data leaves the sensor, it is sent through a video processor, then sent to the recording medium. During that path is when the data usually gets compressed in order to reduce the file size. Whenever data is removed, the image fidelity is possibly degraded. There are several factors that come into play in compressing a video image and all effect the image quality.

Chroma Sub Sampling: 4:4:4 vs 4:2:2 vs 4:2.0

I won't explain here, it will take too long, but trust me when I say that every frame of the image is made up of one component of Luminance information (the darks to white brightness information) and two components of Chrominance information (the color portions in the image). These factors and how much of each are saved to the file are expressed by numbers such as 4:4:4 or 4:2:0, etc. The first number is the Luminance portion and will not change; it is always 4 meaning that the full amount of brightness information is always recorded. The second and third numbers represent the amount of color data retained to capture the Chrominance portion of the image. The lower the number the more color information is discarded.

Higher end cinema and video cameras capture and save at 4:4:4 or 4:4:2. The 4:4:4 is basically "Raw" sensor data and is no color data is discarded and this the highest quality pure sensor output and the stuff used to make major motion pictures.

A 4:2:2 image has some color information discarded but yields a slightly smaller sized file and the lost information generally cannot be noticed by the human eye. This system is used often for some cinema, tv, commercials and broadcasting.

A 4:2:0 chroma sub-sampling system throws away even more information, yielding a file size greatly reduced. This color sampling method is very common today and is seen in most consumer grade cameras. It is what most of us record.

Color Bit Depth: 12, 10, 8 bit Video

Each pixel or dot on the screen is made of Red, Green and Blue data. Each color is assigned a numeric value. If recording 8 bit color, the value of each color will vary from 0 to 255. In 10 bit color the color values can range from 0 to 1023.

Have you ever seen video with blue or green water background or a blue sky and you see distinct "banding" in the image? That happens if recorded using 8 bit color. The 8 bit data range is not able to gradually blend the subtle tonal changes. An image shot using 10 bit color has many more "steps" of colors and the tones blend much smoother together.

Higher end cinema cameras record 12 bit color or some color grading systems "think" internally and manipulate the data in 12 bit logic giving precise control. The value of a higher bit depth video becomes apparent if you do much color grading. 10 bit video provides more information to work with and to manipulate. Color grading 8 bit video can be done but color grading 10 bit color is wonderful.

Compression Codecs Types

The actual method or algorithm used by the camera to store and compress the video varies greatly. The CODEC takes the image and throws some away data. The image gets stored and then at playback, the missing data is interpolated and the image restored. Each compression method has its pros and cons, but here are some common formats from Higher quality to lower quality:

- RAW: no Compression
- Cinema DNG: another method of Raw file saving uncompressed.
- REDCODE, or ARRIRAW: High end proprietary formats designed for data acquisition.
- DNxHR: Avid's new high Quality 4K codec designed for editing
- ProRes: Apples high quality pro grade Codec designed for editing
- DNxHD: Avids high quality pro grade Codec designed for editing
- Cineform: GoPros compression scheme approaching apple's or Avids
- H.264: a coded that is a wide standard, some implementations are highly compressed
- AVCHD: consumer grade cameras, intended for direct playback but not for editing
- MPEG2 or M2T or H.262: the compression used for cable or satellite TV transmission today, and used in older camcorders

File Containers

The file that is saved by your camera or external recorder is just a "container". It's a box that holds several things: the compressed video stream in one of the CODECS mentioned above, an audio stream in a similar audio codec file, timecode and other data called metadata. Here are some common file containers:

- .MOV: Apple's Quicktime standard. The most used container in the motion picture industry.
- .MXF: used often to contain Avid codecs, an open standard
- .MP4: open standard based on the .MOV often used to store H.264 video
- .MPG or M2T: transport streams used for tv, cable, satellite broadcast.
- .AVI: A legacy container that does not support timecode or huge files.
- .WMP: Windows Media container for consumer usage.

Video Compression Impacts on Editing

Some video codecs, such as AVCHD and H.264, were designed for recording lots of video in a small space but were not designed for editing. They were intended for recording and playback directly to a TV. These videos are highly compressed at a 20:1 ratio or more. The AVC based, highly compressed GoPro video, is a "pain to edit.

More professional codecs, designed for editing, are less compressed at a 4:1 or similar ratio. Sure, they take up more file size, but every time your editing software is tasked to make a change or preview video, or playback, the video must be uncompressed "on the fly". The more compressed the source material the more computer power is needed at your editing station.

Some editors "transcode" their highly compressed video (GoPro and others) to an edit friendly format and edit that. They later relink their edited sequence to the master files when rendering to the final export file. This process is called "round tripping".

Editor's Note: My Sony NEX5N uses AVCHD but my Nikon uses MOV.

Data Transfer Rate

The chroma sub-sampling, color depth and compression methods all effect how much data is being used for one second of video. This volume is measured in mega bits per second (Mbps). Cameras can be set to record in different combinations effecting the data transfer rate, and when exporting from an editing program, you can also export manipulate this combination as well.

Highly compressed video will have a lower data rate. Minimally compressed video has a much higher data rate. For any given second of video, what is the desired data transfer rate? Well that depends on the customer and intended use. Here are some rules of thumb:

- Cinema: 200Mbps or higher
- TV Broadcast Quality: Generally 50Mbps minimum required (they keep raising this bar)
- DVD quality: 25-30 Mbps
- You tube or Vimeo: 15Mbps

The saved file's playback data rate affects the size of the file. Lower data rates have smaller files and playback may be easier on lower powered devices such as phones or tablets. However using a data rate

that is too low will result in blocking or “artifacts” when viewing the video.

Data rate is important when filming 4K video because 4K takes 4 times HDV data to fill one frame of 4K video. If you shot 1080 recorded at 100Mpbs the same video in 4K should require a data rate of 400Mpbs. But that’s a very fast rate and to get around it, consumer grade 4K cameras keep the rates lower or use more compression. The GH4 records 4K video internally at 100Mpbs but that’s equivalent to 1080 at 25Mpbs. In other words, the GH4 image data is more like 1080p at 25Mbps. This is why some filmmakers are adding external high quality recorder to the GH4 in order to capture to a higher data rate in an edit-ready professional grade Codec.

The GoPro Hero Black with ProTune records up to 60Mbps, however, the new GoPro Sessions camera only records at 25Mbps. Data transfer rates vary greatly between video cameras, so be wise and when shopping.

For example, the GoPro line of cameras use AVCHD based file compression contained in a .MOV file. The Hero4 Black records up to 120fps which is great for slow motion and also supports UHD 4K recording. The Hero4 Black supports 60Mbps when Protune is turned onfor these requirements. Other GoPro models support only 60fps or only HDV and thus have 45 or 25Mbps data rates. The popular Lumix GH4 that many videographers use records up to 100 and 200 Mbps bit rates, support 1920x1080p at 60p and UHD 4k recording to a H.264 codec to a .MOV or .MP4 file container. If using the amazing Sony A7S which records its proprietary XAVC S codec, it will be wrapped in an MP4 file container.

Storage Media

The bottom line here is sustainable data rate. This is where you can get into trouble if you go with a cheap memory card. Always look for the camera manufacturer’s recommendations. Not all memory cards are alike and advertised data rates might only occur in bursts and not necessarily sustained which a video camera demands. The same is true with SSD drives. If you experienced data dropouts and dropped frames in your video it’s likely that you’re using a card or SSD that is not fast enough to support sustained video input. Higher frame rates, higher resolution such as 4K, less compressed recording Codecs such as Protune all require a faster recording medium.

Now that we have covered the hardware and mechanics of underwater video cameras and the tools used in this and prior segments, we are ready to dive. In the next segment of this series, we will go underwater and discuss what to do when on the bottom.

In case you’ve missed the previous parts to the series, they can be found on the pnwdiver.com under Past Issues or by clicking here.

Part 1: An Introduction
(March/April Issue)

Part 2: Underwater Optics
(May/June Issue)

Part 3: Camera and Housing
(July/August Issue)

Jim Copher and I explore the sights and sounds at the Mukilteo dive site. Follow along as we explore the Geodome, and look at the colorful marine life.

In this video, I use three different cameras and recording mediums:

- A GoPro Hero4, and its AVCHD
- A Sony HC9 using Mpg2 compression
- A Blackmagic Pocket Cinema Camera using Prores 442 recording.

The DeHaze Slider:

A Lightroom CC and Adobe Camera Raw filter

By Kerry Enns

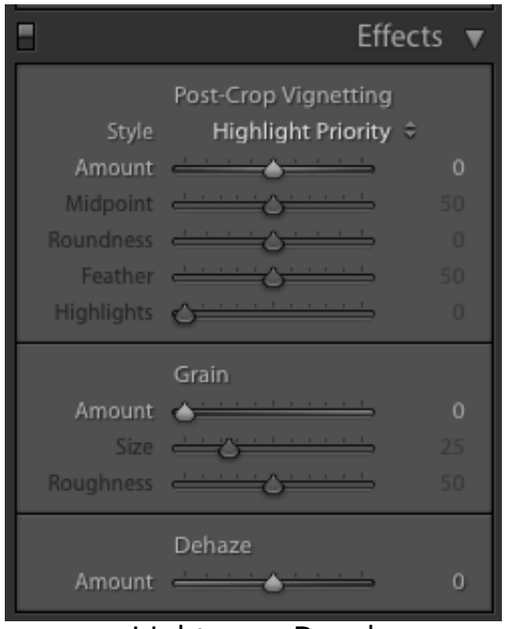
The latest release of Lightroom CC and Adobe Camera Raw has a really great filter that could come in handy for underwater photographers: the DeHaze filter. The purpose is just that, to remove haze from images. It can also do the reverse and add haze and moodiness to images above water. Haze is, by definition, slight obscuration of visibility due to suspended particles, and as any diver knows, water has a lot.

Before the DeHaze slider came to be, I would adjust the White and Black sliders, along with Contrast and Clarity to try to get rid of that haze. The DeHaze button does more than those, however. It uses an algorithm to make further adjustments. When the most recent Lightroom com out, I really enjoyed going over some of my older images to see if it would help rescue photos I thought were hopeless. I was happily surprised.

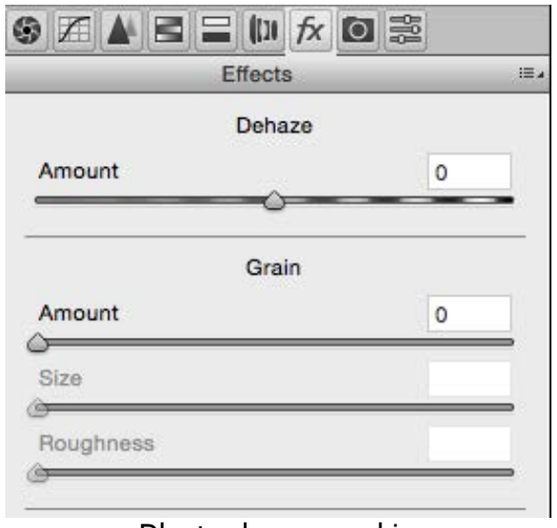
As to be expected, it seemed to make the biggest difference on images that were shot with a wide angle or images that had a fair amount of water between the lens and the subject.

The following page has some side-by-side examples of some of my rescued images. The **Before** image is after I finished my main edits, but before applying the DeHaze slider. The **After** image, is naturally, the post DeHaze slider. The image of the parasite on the jelly is an extreme crop of at least 60%.

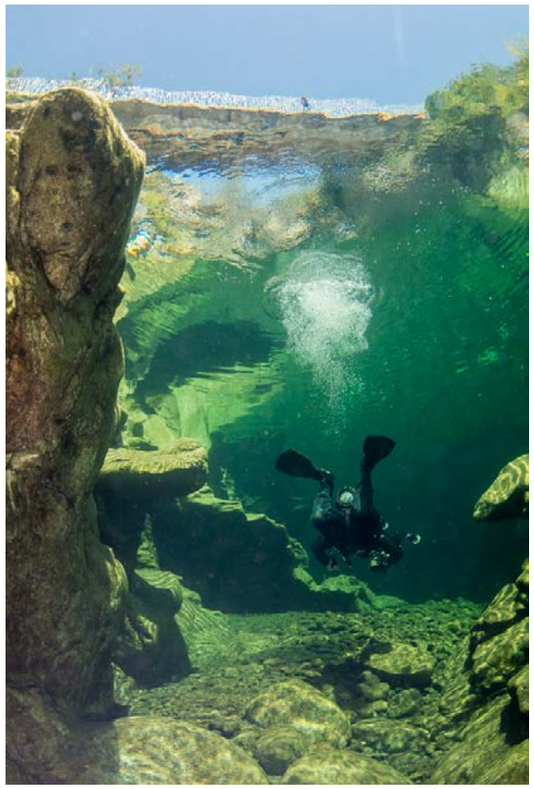
If you are not using Lightroom CC or the latest Adobe Camera Raw filter, there are workarounds available. I found one such workaround at this blog: Do It Yourself DeHaze by Bob Johnson and Earthbound Light.

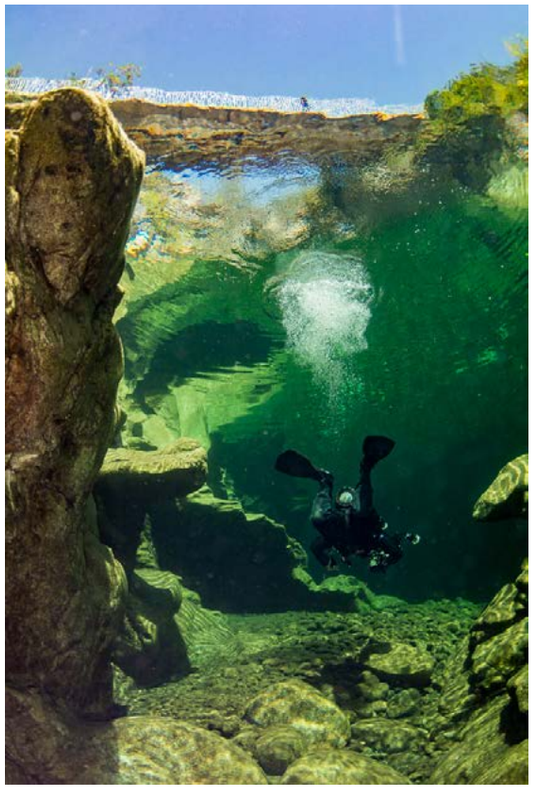


Lightroom Panel



Photoshop panel in Adobe Camera Raw





Before **After**

Before **After**

Travel Corner

This issue we are featuring travel opportunities from Eiko Jones. Featured in May 2014 issue of PNWDiver, his work can be seen at http://www.eikojonesphotography.com

There are several spaces still available on the Sea of Cortez trip. Don't miss out on this oportunity!

Eiko is also planning a trip to Hornby Island and to the Blue Sharks next summer. Keep tuned for those events here or contact him directly.

Sea of Cortez
Photo by Eiko Jones

Underwater Photography Workshop on Hornby Island
With Eiko Jones Photography June 10-15 2016

Join Eiko Jones on a fun and informative Underwater Photo Adventure on spectacular Hornby Island

This workshop will be filled with learning opportunities and exciting diving adventures. Huge schools of Rockfish and Lingcod, multitudes of macro subjects and possibly 6 gill Sharks will fill your dive days. Classroom sessions and discussions will occupy the evenings. Two boat dives a day with shore diving on location as well. Hosted at **Hornby Island Diving**, you will be spoiled beyond belief and have a great learning experience.

Workshop cost

$1199

Accommodation , meals, diving and workshop cost included.

Whether you prefer wide angle or macro photography, this workshop will help you go from taking underwater snap shots to producing images that will really stand out. Contact now to guarantee your spot.

Contact: Eiko Jones Ph 250 203 0254 sales@eikojonesphotography.com www.eikojonesphotography.com

SEA OF CORTEZ

July 9th – 16th 2016: Midriff Islands Photo Workshop

Join us July 9-16 2016 on the well-equipped Rocio del Mar for a fabulous week of maximum diving with sea lions & fish, and snorkeling off pangas with as many big animals as we can find - whale sharks, sperm whales, pilot whales, dolphins, etc.

Your host is Pro Photographer Eiko Jones, an award winning UW photographer who specialises in creative and dramatic photography. Eiko will show you how to take that perfect wide-angle, macro or critter behavior shot. As well as plenty of opportunities for topside images.

Eiko typically leads trips in British Columbia's rugged waterways, including its oceans, rivers, lakes and canyons. His unique trips guiding divers to witness the marvel of migrating salmon have helped him to gain experience in challenging and varied conditions. His work has been featured in many magazines and he has had his images shown in Galleries in Canada and the US.

Trip Features

- Extended time with whale sharks
- Expert underwater photo instruction daily
- Extra dives with sea lions & any large schools of fish we find
- Extra time snorkeling off pangas with sperm whales, dolphins & pilot whales Up to 4 dives a day, best time to dive Northern Sea of Cortez
- Fly into Phoenix, or drive from LA - it's so easy!
- Beginner photographers and non-photographers welcome

Daily Photo Workshops

- Workshops will be given daily on topics such as wide-angle and macro underwater photography, ambient light shots, snorkeling with large animals, strobe exposure and positions, avoiding backscatter, composition, post processing and workflow, and topside photography.
- We will be spending extra time photographing big animals - sperm whales, dolphins, sea lions, whale sharks, and schools of fish. The Northern Sea of Cortez also has plenty of small fish, nudibranchs, moray eels, arrow crabs, jawfish, hawkfish, horn sharks, pike blennies, rays and seahorses.

Trip cost: $2395 USD (see pdf for details)
Email sales@eikojonesphotography.com or
call 250.203.0254

Dan Clements

Washington, USA
Founder/Columnist

Dan is an adventurer who has a deep appreciation and respect for the world's natural wonders and life in its many varied forms. He has climbed, skied, sailed, SCUBA dived, and traveled throughout the world. He has made first ascents in North and South America, and run major white water rapids in Africa and the Western Hemisphere. He wrote the now sold out Critters, Creatures, and Kelp in 2009.

He was fortunate to have parents who exposed him to Hopi, Navajo, Seri, and Lacandon First Nations populations. Later in life he was privileged to be able to spend time among the Bushmen (San) of southern Africa, and Qechua and Aymara in the Andes. He is working to try and increase knowledge and appreciation of Pacific Northwest indigenous populations.

He holds an MBA in international finance and has sat on boards for United Way, Housing Hope, Cayenta Systems, Eden Systems, Snohomish County Public Facilities District, and Ibis Publishing.

When he is not underwater photographing he enjoys cooking, back country skiing, distance running, mountain biking, and opera. Everett, Washington is home base and where he and his wife Karen raised two sons.

Kerry Enns

British Columbia, Canada
Editor/Publisher

Kerry grew up in Brazil as a missionary's child and moved to Wisconsin at the age of 10. While her father worked on his studies, she entertained herself by cycling, swimming and fishing and earned spending money by delivering papers and babysitting. Her family moved to Winnipeg during her high school years. After graduating, she found herself heading to British Columbia to go to Trinity Western University. She married and stayed in BC raising 2 children.

She holds a degree in Geography and is certified to teach elementary and middle school students. She currently works part-time as a Teacher on Call in order to fund her diving, photography and travel.

She enjoys traveling and has had recent visits to the India, the UK/Ireland and Maui. She hopes to continue to travel as much as her finances allow it and would like to someday dive the beautiful tropical waters world wide. She particularly wants to visit Brazil, not only to dive but to work on her fluency of the Portuguese language.

She has recently taken up freediving and hopes to learn photography in that new venue.

Talia Cohen

British Columbia, Canada
Creative Consultant

Talia grew up in South Africa, and has lived in Missouri, Rhode Island, and New York. She now calls Vancouver her home with her husband and 2 dogs.

She is a Creative Director, and has attended the Rhode Island School of Design, Brown University, MIT and Babson. Talia has produced work for some of the world's leading companies and organizations including Unilever, General Mills, SportChek, and The BC Dairy Foundation.

Since a young age she has been enchanted with the world below the surface. And, when not at the studio, she takes every opportunity to explore the underwater world, camera in hand.

Ben Normand

Ontario, Canada
Columnist

Ben Normand is a keen explorer of the aquatic realm. He is constantly striving to expand his knowledge and experience. While all facets of oceanography, biology and geography interest him, his true passion lies with the study of, and interaction with, marine mammals. Notable marine achievements include diving the Great Barrier Reef and swimming with the Hector's dolphins in Akaroa.

He currently holds a B.A. With honours from the University of Toronto where he studied environmental policy and religion. He is currently taking steps towards obtaining a Masters degree on one of the coasts. He is hoping to study the impact of various fishing methods on the health of regional populations of the rorquals.

His personal interests include sailing, skin and SCUBA diving, hiking, reading and movies. He resides in beautiful Port Hope, Ontario with his wife, daughter and dog.

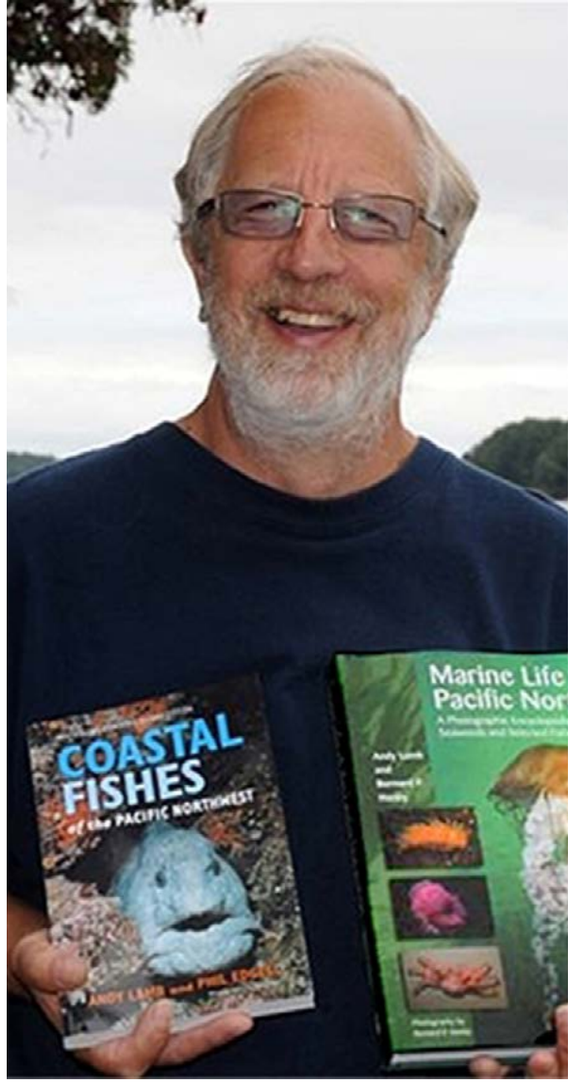
Dale Carlisle

British Columbia, Canada
Columnist

Certified in 2007, Dale is interested in several facets of diving. As a long time fishkeeper and naturalist, he loves being able to access the aquatic realm in order to better observe fish habitat and behavior. In 2010 he began a long term study of a local lake (The Cultus Lake Project) in order to learn more about an endangered species of fish that resides there.

Out of that interest, he began learning how to capture images of his subjects and continues to develop his underwater videography as both a vehicle of communication and art form.

Dale also enjoys researching the historical aspect of diving and often uses vintage era gear and techniques himself, which he shares with others at www.manfish.ca.



Andy Lamb

British Columbia, Canada
Scientific Consultant

Andy Lamb is a marine naturalist and educator who has worked as Chief Collector at the Vancouver Aquarium and as a fish culturist with Fisheries and Oceans Canada. He is the co-author of *Coastal Fishes of the Pacific Northwest* and *Marine Life of the Pacific Northwest: A Photographic Encyclopedia of Invertebrates, Seaweeds and Selected Fishes*, both are found in almost every diver's library of the region.

Andy has served as the team for PNWDiver since the beginning and helps members identify marine life and keeps us abreast of news in the scientific community.
http://www.cedar-beach.com/about.shtml
andy@cedar-beach.com

Michael Meagher

Washington, USA
Guest Columnist

Mike began diving in 1976 in Southern California and hasn't stopped diving since. In 1977 he purchased his first underwater camera, the Nikonos III and began learning how to take photos underwater. He worked in a dive shop in So. Cal for a few years, became a PADI instructor and learned the trade in the mid 80s. During that time Mike read extensively on underwater photography, purchased more equipment as well as a small dive boat named the "Shark Bait" in order to explore the shipwrecks and reefs. It was also during those years that Mike was an active member of the Los Angeles chapter of the Underwater Photographic Society, and won several awards and international competitions. Graduating from Cal State Fullerton, Mike relocated to Washington in the early 90s, and began exploring local dive sites. In 2008 he took up videography using Sony camcorders. Mike enjoys custom modifying his underwater photography and video equipment. He is a regular contributor to the San Diego Underseas Film Exposition and his short underwater films can be seen on-line at youtube/wolfeeldiver. Recently mike founded DeepPro systems, a niche manufacturer of underwater video equipment, and resides in Bellingham, Washington.