

DIGITAL PHOTOGRAPHY

creating divesites^o

+ EVER BOUGHT A PIECE OF CLOTHING ONLY TO FIND THAT IN THE REAL WORLD, AS OPPOSED TO THE SHOP WHERE YOU BOUGHT IT, THE COLOUR WAS DIFFERENT THAN YOU FIRST THOUGHT? OR MAYBE YOU'VE BOUGHT A MUSIC CD AND A WEEK LATER WONDERED WHAT THE BLAZES WERE YOU THINKING BUYING SUCH A SHALLOW, ANNOYING PIECE OF POP?

PHOTOGRAPHICALLY, WE MAKE DECISIONS DURING THE SHOOTING PHASE WHICH WE FIND TO BE NOT ONLY WRONG BUT DOWNRIGHT CRAZY ONCE WE'RE BACK IN THE REAL WORLD OF DIGITAL MANAGEMENT. LET'S LOOK AT HOW WE CAN GET THE 'RIGHT' EXPOSURE, CONSISTENTLY AND RELIABLY.

The first time I took a photograph underwater with a digital camera and looked at the LCD screen I had a major panic. The LCD screen showed a disturbing pink image. I thought I may have flooded my brand new housing in the first five minutes of the dive and the camera was going nuts prior to a complete flood. The problem is that the human brain is a very adaptable colour adjuster. When underwater your brain automatically dials in about 50 colour units of red to overcome the cyan (red is the opposite colour to cyan, which is the colour we may refer to as 'sky blue') of the surrounding sea water. The pink/red image was the result of that red bias that my brain had dialled into the view. Look at the screen on a night dive and the same shot suddenly looks OK, or at least different again, as the brain is not compensating for all that sunlight filtered with the ocean's cyan filter.

A HISTO... WHAT?

The point I am trying to make here is that while digital cameras give you instant feedback, as opposed to film which needs to be developed in a lab, visually checking the image on the camera's LCD screen can be a trap for new players, if you don't know what you are doing. All SLR and some of the 'point-and-shoot' cameras should allow you to view a histogram of your image. A histogram is a graph which shows you the quantity and brightness range of pixels captured in a particular image.

In addition, just to make life harder for you, all LCD screens will tend to make your image look brighter than it actually is and the angle at which you view the screen will change the apparent brightness of the image. Add to that the brain's clever colour adaptations and there's a good chance you'll make some wrong decisions or make (or fail to make) correct adjustments.

To get your exposure right, take a deep breath and check your camera's instruction manual. I know, it's painful (particularly to males) but you need to find out if your LCD screen can show you

a histogram of your images, preferably a thumbnail and a histogram together. That way you can then check your composition as well as the exposure at the same time.

The histogram should not 'clip' or cut off any highlight or shadow detail. The illustrations shown will explain what I mean by this. If the highlights are clipped then you will end up with highlights with zero information. If you are shooting upwards with a bright sun ball in the image then you will have clipped highlights, no matter what you do. However, the histogram should show you where the



majority of the image detail lies. If you have a large gap in the shadow end of the graph and the highlight end is clipped then you need to reduce exposure. If the shadows are clipped then you need to increase exposure. A histogram that shows a spread of pixels across the brightness range without clipping at either end indicates a correct exposure.

If your camera doesn't enable you to view both a histogram and a thumbnail but allows you to view either, then opt for the histogram. It will, after a little practice, enable you to nail the correct exposure every time. You can sit back and view your perfectly exposed shots later while sipping one of those funny green drinks complete with miniature umbrella. But if your camera does not have a histogram option then the best you can do is to view the LCD image with the camera tilted vertically away from you. Hold the camera in front of

you to view the LCD screen as you normally would then tilt it forward by about 30 degrees. The image will look darker but will be a more realistic indication of the actual exposure.

Some cameras will also allow you to see areas that are over exposed, flashing grey or another tone on the thumbnail image when there is zero information in the highlights. One of my cameras lets me turn on the "over exposure" feature in all viewing modes. Another camera only lets me see the over exposed highlights in a particular viewing mode. Sorry, but you will need to



refer to that camera instruction booklet again to find out what your camera model will allow.

No matter what method you use, the histogram, the over exposure warning or both, you can tweak your exposures to give the best possible exposure. While negative film records more information with moderate over exposure and slide film with slight under exposure, digital image files will contain the maximum amount of information when the exposure is as close to over exposure as possible without clipping the highlights.

There are technical reasons why this is so which would take up way too much space and time to fully explain. Suffice to say that most of the information in a digital image file will be in the upper end of the sensitivity spectrum. In practice what this means is that you

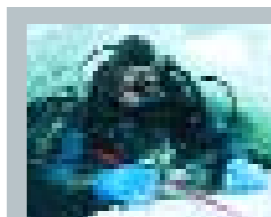
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will want to expose your images so that the histogram shows an exposure where the highlights are close to being clipped and the shadow end is left with a bit of space. The bulk of the pixels should be on or to the right of the mid point of the histogram. Check out the accompanying illustrations for a visual explanation. All of the above exposure techniques apply to available light, strobe light and mixed light in day or night situations.

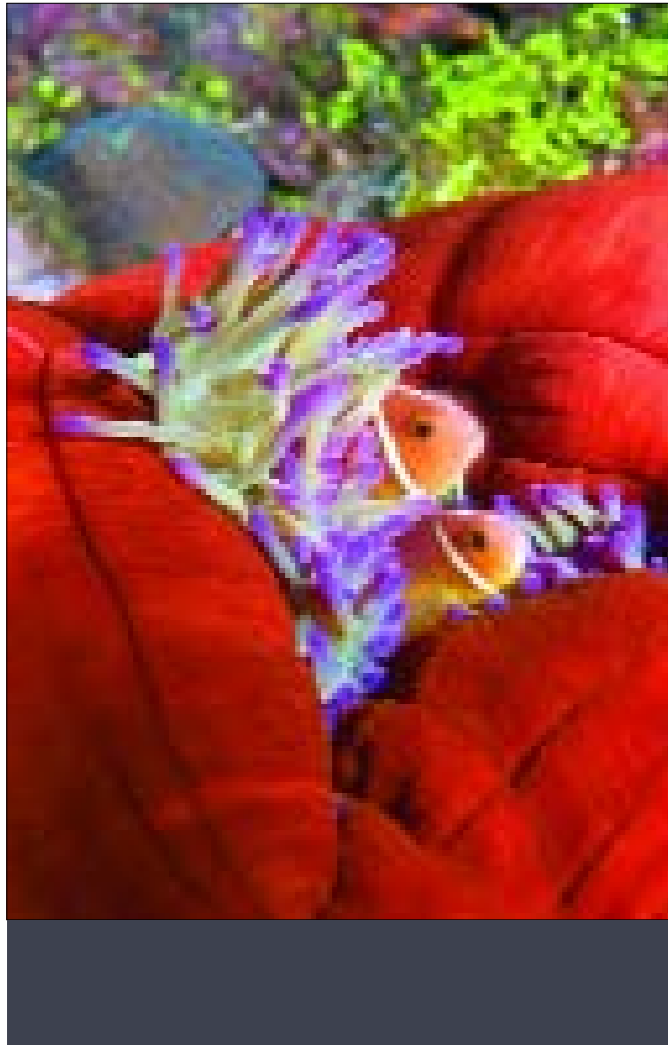
IN THE DIGITAL DARKROOM

Your dive day is over and you now have a folder full of images in your computer. With your perfect exposures, there is nothing to do but collect gold medals. Well, maybe not. Your first problem will be, without any doubt, your monitor. For reasons which I cannot fathom, all computer monitors are supplied with their settings set too bright and too blue. It does make an enormous difference to how your images appear so it is important to fix the problem. I once had an internationally well known marine photographer submit a few hundred images to my Marine Themes stock library. They were all about 2 f-stops too dark. He had never calibrated his monitor. It was much too bright causing him to make the scans way too dark, at least they were when viewed under 'correct' conditions.

You'll need to calibrate your monitor. This is not as difficult as it sounds and there's a number of ways to do this. The best method is to purchase a calibration kit. It will include some software and a sensor which is attached to your monitor screen with suction cups, reading the light output directly from the monitor. Before you complain about the added cost, just think how much money you're not spending on film and processing. To keep costs down you could organise to share the calibrator with others in your dive club or



Kelvin Aitken is a Melbourne-based professional photographer and diver passionate about the big blue and the big sea creatures to be found out there. He's dived from the Arctic to the extremes of the South Pacific and if there's a new marine dive adventure to be experienced or invented, he's always the first to put up his hand. He's also dived the southeastern Australian continental shelf and photographed shark species nobody knew would be found out there. Kelvin is a BBC Wildlife Photographer of the Year marine category winner and his unique work is on www.marinethemes.com



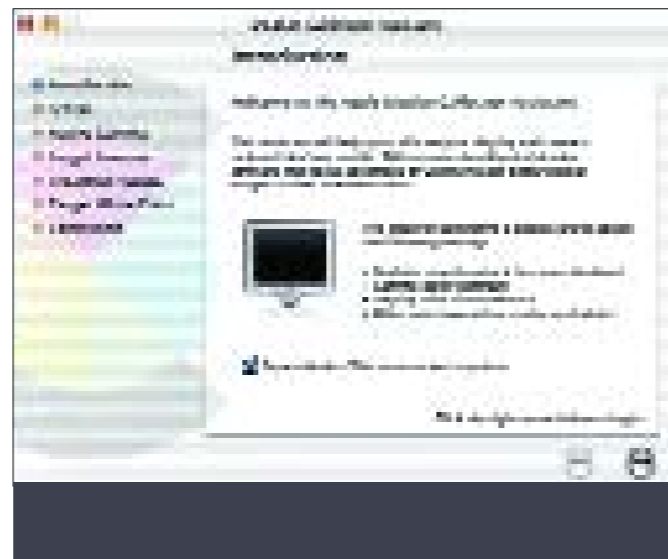
working within realistic visual parameters. Opening one of your 'perfectly exposed' image files on a calibrated monitor doesn't mean the image will look great straight off. You'll always need to make some adjustments. A good digital file will look slightly flat, a touch bright (remember that a good Raw file will be exposed as close to the highlight limit as possible) lacking contrast and be in need of some increased colour saturation. This is because a file that has captured as much visual information as possible will look just so; with flat contrast, slightly bright and with low colour saturation.

We've covered in earlier articles how to change or correct colour and contrast. In order for your masterpiece to be viewed by others and perceived as you intend it to be there are a few things that are needed to ensure a consistent appearance.

A computer and monitor do not 'know' what colours are or how they should be displayed. To a computer they are just numbers. You need to tell other computers how to display the image. This is done by embedding a colour profile. A colour profile does not do anything to the image - its simply a small label that the computer reads to interpret the colour information. It says that this yellow is this particular yellow and that blue is that particular blue.

If you are shooting Raw files (and you should) you can assign a colour profile during the raw conversion. If you've set your camera to make jpg files (and you should be setting your camera to save the raw file as well) then you can tell your camera which profile to assign to the jpg file. Some cameras may not let you choose a profile, in which case the profile set is often the sRGB profile. Like jpg compression, the sRGB profile reduces the variety of colours in your file. It is intended for images used on the internet and viewed through a web browser, not for colour printing or reproduction.

The profile you should be assigning, either in your camera for jpg files or in your raw conversion software, should be a wide gamut profile such as Adobe RGB(1998) or ProPhoto RGB. I strongly recommend that you use the Adobe RGB(1998) profile. When saving your finished file make sure that you select the 'Embed Color Profile' option in the Save dialogue box.

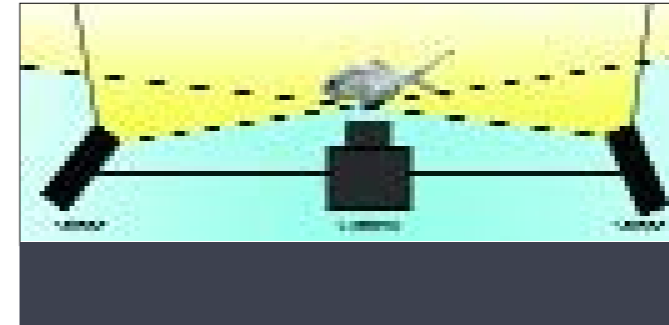


other social group. Prices start at around A\$150 and go up to about A\$600. My calibrator is made by Lacie which not only calibrates but also can adjust the photon 'guns' in my Lacie monitor to fix colour fringing problems. Newer models will calibrate CRT (traditional monitors), LCD screens and laptops. Ensure you choose one with software to calibrate LCD and laptop screens.

They are easy to use and will very quickly set your monitor to the right colour balance, brightness and contrast. The monitor will, for various reasons, 'wander' over time. Some pre press companies calibrate their monitors every day. In your case, a monthly calibration will keep your monitor consistent in colour, brightness and contrast levels.

Alternatively, if you are using a Mac computer you will find built in monitor calibration software in your System Preferences. Choose Displays then the Color tab. Both Mac and Windows users with Photoshop installed can use the Adobe Gamma software. Windows users will find it under Start>Settings>Control Panel. These 'software only' calibrators are not as precise as a calibration kit but are far, far better than doing nothing. At least you'll be in the same digital swimming pool, not on Mars.

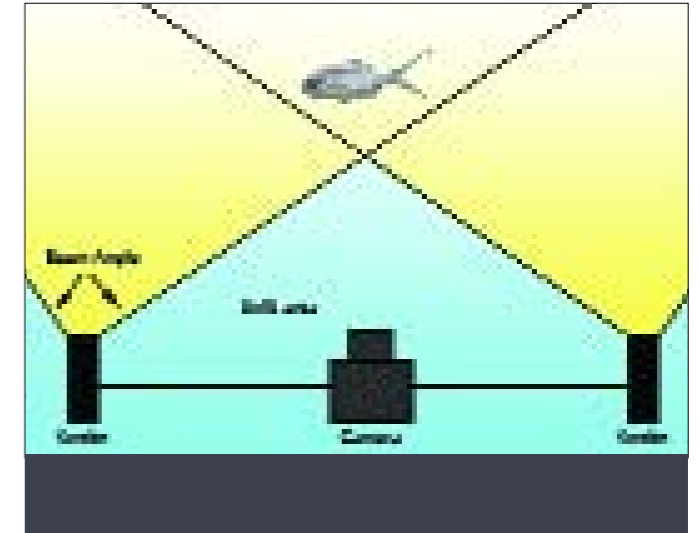
With your monitor calibrated to give you a realistic view of your images, you can now make adjustments knowing that you're



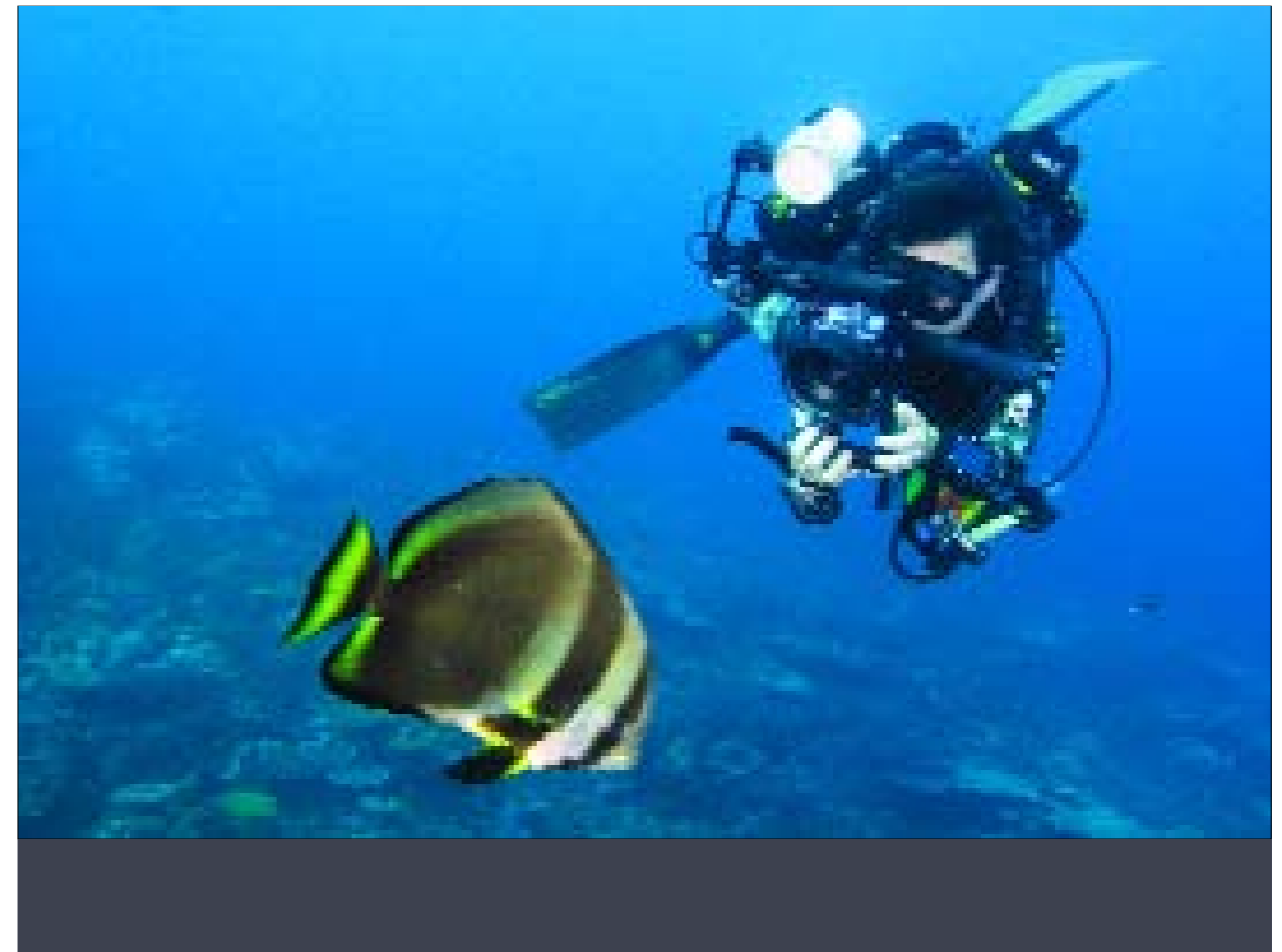
THE INVERSE SQUARE LAW.

Ever wondered why keen photographers have those wide strobe arms when shooting wide angle? Usually it's because they've seen others using that gear and it looks kinda cool. However there are two reasons why long strobe arms are the way to go.

Back scatter, as mentioned in early articles, is caused by strobe light illuminating suspended particles in the water. If the particles are close to the lens between the subject and the camera then the result is a snow storm of enlarged blurry specks. Lit particles beyond the subject are visually so small they're of no consequence. The solution to back scatter is to avoid lighting the water and associated particles between the camera and the subject. A strobe on the camera or mounted close to the lens makes this almost



impossible, especially with large subjects shot from a metre or more. Long strobe arms move the strobe away from the camera allowing the light to be angled to light only the subject. Another reason to use long strobe arms is usually unknown or misunderstood. The Inverse Square Law as applied to light (it also applies to other items such as gravity and sound) states: "The intensity of light observed from a source of constant intrinsic luminosity falls off as the square of the distance from the object."



Put very simply, an object one metre away from a light source will be two f-stops brighter half a metre away. So if a fish is one metre from your strobe and it moves to half a metre away then suddenly the fish is 2 stops brighter. If the strobe is on or near the camera then obviously there will need to be a drastic change in flash output or aperture setting. If the strobe is out on a long arm one metre from the camera then the subject will, within reason, receive the same amount of light as the strobe to subject distance will be unchanged (still at one metre). This example is not strictly mathematically correct as there are other factors to consider but in practice a wide angle set-up with strobes placed out on long arms will both avoid back scatter and exposure change within a reasonable distance.

In real terms, this means that a housing set-up that utilises the camera's built in strobe will always have problems with back scatter and very touchy strobe lighting. Money will solve the problem. Buying a separate strobe then mounting it away from the lens will, with a little practice, give you much better results. Twin strobes will be even better.

When shooting close subjects the same principles apply. Placing the strobes away from the lens optical axis will cut down on back scatter. In addition, the camera using built in flash will begin to give improved results as the relationship between the subject, strobe and lens begins to become equidistant. Back scatter becomes less of a problem and exposure changes minimised. As long as the flash can cover the subject as it is placed closer to the lens the cleaner and clearer the finished photo will become.

At this point we come up against the single strobe vs double strobe contention. Some people insist that a single strobe is more than ample for underwater photography. They say it provides 'interesting shadows' or 'more dramatic lighting' or that, when travelling, there's less gear to tote around. I must say I'm totally convinced a dual strobe set up is ALWAYS a superior system. If you absolutely must have severe dark shadows or 'dramatic' lighting then just turn one off. An even better method is to turn one right down so that the shadows still receive some light and retain some detail. A lot less harsh, less visually annoying with the same impact. Single strobe users soon find that the 'dramatic' lighting appears in every photo. It's like a wedding photographer who uses a cross star filter on every shot. Or a dinner guest who puts tomato sauce on every dish, including the ice-cream.

A dual strobe system can be adjusted so that the subject is evenly lit or one strobe on either side turned down to create a more three dimensional effect with lighter and darker areas but with detailed shadows. Or one can light an upper reef subject and the other aimed into a lower ledge. The possibilities are far greater than a single strobe system. And if conditions or subject require a single strobe (such as freediving where two may be too cumbersome) you can always leave one on the boat. Not to mention the possible strobe flood. Imagine being stuck in some remote exotic location

(achieved at great expense, more so even than a second strobe) with your one and only light source holding more water than a fish bowl.

If one strobe is all you can afford then there are things you can do to avoid the 'sameness' of single strobe systems. With wide angle lenses you can use available light to add depth and stop the shadows from blocking up into pits of tar. With macro subjects you can use a small reflector, such as your white dive slate or similar, to bounce light back into the shadows.

In my long experience in underwater photography, the single strobe enthusiasts are always content with sub standard images or the results they get are adequate for their needs and personal standards. That's their decision and you may be happy with such a set up. But twin strobes are 'better'. Finito.

So, if you want to create great images, start with what you can afford, learn and understand its limitations, push your equipment to it's lighting limits and save up for more gadgets. As time quickly passes you'll grow photographically and be ready to expand your skills with new gear as it comes along.

Like the last few articles with a mix of computer and practical subjects, the next edition will examine TTL vs manual strobe exposure and the thorny problem of making your printer produce the goods.