The Techniques of Filter Photography

By Alex Mustard with Peter Rowlands

There is no doubting that digital cameras have revolutionised underwater photography. Instant review, low running costs and the ability to shoot more than 36 frames on a dive have been welcomed by photographers with open arms and wallets. A few photographers are still shooting film, but anybody who has been near a dive boat in the last few years will know that chemical cameras are harder to find than a pygmy seahorse, in a large sea-fan, in the Caribbean. As Mathieu Meur reported in the last issue of UwP, even one of the strongest bastions of tradition, the CMAS Underwater Photography World Championship, is now wholly digital.

Enough of the politicking. For the underwater photographer surely the most exciting aspect of the digital revolution is the new types of images that are made possible by digital technology. And certainly for Peter and myself, most prevalent amongst these is the chance to leave our strobes behind, attach a filter and take full colour images with just the available light.

OK, so as filter manufacturers, perhaps we are a little biased. But our aim in this article is to be objective as possible. We'd like to assure you that this article is purely about technique. We have avoided any comparisons between filters and have tried to include illustrative images from as many different types of filter as possible.

Filters are not a new development in underwater still photography. Seek out any 1960s or 70s text and there are many pages dedicated to filter facts. But reading between the lines its obvious that filters were popular only because flash photography was, at best, temperamental and at

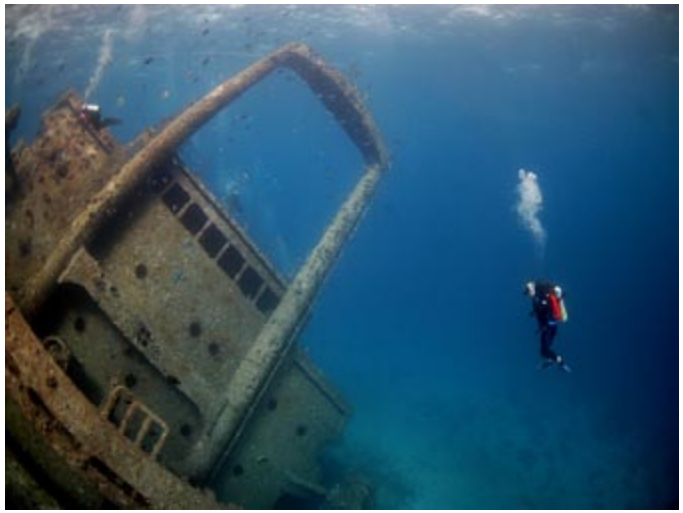
Digital cameras and filters have allowed us to take new types of images. For example wide and scenics with colour in both the foreground and background (AM). Nikon D2X + 12-24mm lens. Subal housing. Magic Filter. Manual WB. 1/80 @ F5.6.

worst, dangerous. Once electronic strobes were reliable the popularity of filters quickly waned, and most books from the 1980s and 90s hardly mention them at all (although my co-author would like me to stress that the popular 1984 title “The Underwater Photographers Handbook” by P. Rowlands covers them in detail…). All that changed with digital cameras, whose flexible white balance transformed an impractical technique into a reliable and simple one. Digital underwater photography books now devote entire chapters to filters. But despite their long lineage, the techniques for using filters with digital cameras are continually being refined. The aim of this article is to provide the latest update on the technique.

The first rule of filter photography is that they are not for every dive nor for every subject. They are not going to produce great images of macro subjects on night dives, for instance! Filters generally work best for wide angle photography, in water shallower than 15 m (50 ft) and in bright conditions. Filters are primarily a technique for tropical waters, but thanks to the fantastic high ISO performance of modern digital cameras they also have a role in darker green waters too. Perhaps the greatest benefit of this technique is for photographing, in full colour, large subjects or scenes, that we could never hope to illuminate with strobes.

Why filters?

All divers know that as sunlight penetrates the ocean it is attenuated by absorption and scattering. Bright, white sunlight is made up of a full spectrum of colours, and different colours of light are absorbed by water at different rates. Clear



Filter photography restores colour and contrast over a range which strobes could not achieve. (PR). Nikon D70 + 16mm. Subal housing. Magic Filter. Manual WB.

blue tropical water filters out red and orange light coloured light much faster than blue light. Green temperate waters are different: red and orange light still goes first, but blue light is absorbed much faster and green light penetrates deepest. Take a photo, without strobes, at a depth of 10 m (30 ft) and it will be almost entirely monochrome.

We use filters to counteract the filtering effect of seawater, bringing the light spectrum back into balance. Ideally we should want a filter that will exactly redress the balance and produce an even spectrum of light. However, small changes in our depth mean big changes to our filter requirements. And it is impractical to constantly change filters during a dive. The most useful underwater filters are those that can operate over a wide depth range, working in conjunction with the white balance of

Filters photography is primarily a wide angle technique. We favour full frame fisheyes (15/16mm) on cropped sensor cameras for most reef photography, changing to the 10.5mm fisheye on wrecks or in low viz (PR). Nikon D70 + 16mm. Subal housing. Magic Filter. Manual WB.

the camera.

Perhaps the most common question regarding filters is Do I really need one? Can't Photoshop or white balance do it all by itself? At shallow depths (to 5 m/15 ft) white balance alone can produce pleasing images. As we go deeper, stronger adjustments are required and these create colour noise (particularly in the warmer hues) and most noticeably suck the colour out of background water leaving it grey or purple, a clear sign of an over-processed image. A filter creates a more balanced spectrum of light before it is captured by the camera. This means less processing, less colour noise, better image quality and a more pleasing background water colours. Often the most obvious difference when you compare white balanced unfiltered and filtered shots of the same subject is not in the foreground but in the background water colour. The filtered photo will hold a nice rich blue, while the unfiltered shot will be washed out.

At shallow depths WB alone can resort colours, but usually at the expense of the loosing the colour background water colour. This image taken with a filter brings out the colour of the subjects and keeps the water blue (PR). Olympus C40. PT Housing. Inon 165 WL. Auto Magic Filter. Auto WB. 1/40 @ F4.8.

At deeper depths WB alone, without filter, will remove the colour cast from the subject, but will introduce a lot of colour noise and suck up background water colour, as you can see in these before and after WB images. A filter would help to keep the water colour (AM). Nikon D2X + 10.5mm lens. Subal housing. No Filter. 1/30 @ F4.

Lens choice

The best lenses for filter photography are wide angles. Accessory wide angle lenses make a big difference for compact users. For DSLR users a 180 degree fisheye is the best choice for wreck shots and in low viz, but for general reef shooting, schooling fish etc, slightly less wide lenses are better. Their slightly narrow angle of view makes it easier to control background water colour and avoid whitening of the surface when shooting verticals. Our preference is for lenses such as the Nikon 16mm, Sigma 15mm, Canon 15mm or Tokina 10-17mm zoomed in, when used on cropped sensor cameras. Unfortunately those with full frame cameras don't have this option. Rectilinear wide angle zooms are also good, but the wider apertures often required for filter photography may results in a loss of corner sharpness. It is also worth experimenting with mid-range lenses, such as 17-55mm and 28-70mm, to give an original look to portraits of marine life.

White Balancing

For the best results with filter photography we must set our white balance manually during our dive. To some this may sound like a lot of

It is easy to set white balance of the reef. To take this shot I filled the frame with one of the table corals, set the white balance and then recomposed to produce the final image (AM). Nikon D2X + 10-17mm lens. Subal housing. Magic Filter. Manual WB. 1/60 @ F7.1.

fuss, but on most cameras it is hardly any more taxing than simply taking an extra photograph and becomes practically automatic after a couple of filter dives. Before diving with a filter it is important to get familiar with the method for calibrating white balance on your camera. This differs between models, so you should check your camera manual. Of course, by shooting in RAW, if your camera has this option, you can adjust the white balance after shooting with no loss. But the advantage of doing it underwater is that way we see our finished images as we shoot them and we quickly learn what subjects and camera angles produce the best results and can really work the best opportunities.

Generally we need to recalibrate the WB when we change depth by more than a couple of metres, particularly in the upper 10m. When I started filter photography I would always use a white slate or grey card as a white balance target. However, diving with Peter I soon noticed that he never uses a card and always sets the white balance using the subject or the reef with excellent results. Convinced, I now never bother with the hassle of a card.

To set the white balance off a natural subject it is important to recompose the frame so that the subject fills it and so that it is fully illuminated by sunlight – not in shadow. For example, if I am shooting a wreck I will swim slightly closer so the metal fills the entire frame and set the white balance, before swimming back a touch and recomposing for the actual shot. Neutrally coloured rocks, coral, sand, rubble and wreckage all work well as white balance targets. Open water will NOT produce a suitable white balance and we should also avoid strongly coloured subjects, such as a bright red soft coral.

As I mentioned above, if we shoot RAW files then it is possible to adjust white balance after shooting without degrading image quality and it is not uncommon to want to tweak the setting you recorded underwater. Modern RAW converters (Adobe's Camera Raw CS3 & Lightroom) do allow us to make similar adjustments to JPG files but these changes significantly degrade image quality. Setting white balance in RAW conversion software can still be tricky. There are no right or wrong settings. Go with what looks right to you. The easiest way to set white balance is with a white balance or grey point dropper tool, that is available in most RAW conversion programs. It is worth clicking in several places within the frame with the dropper until the most pleasing result is achieved. The best WB values are usually obtained by clicking the dropper on a neutral coloured area of the foreground. If we set the white balance from a point too deep into the image the white balance of the foreground tends to be over compensated and too red. Ambient light images are also often improved by slightly increasing image contrast during RAW conversion.

Shooting Techniques

Ambient light photography requires a different approach to shooting with strobes. The most important factor is to shoot with the natural light to produce even lighting on the subject. We must position ourselves so that the light comes from behind us onto the subject. If we shoot into the light we won't see much colour on the subject at all. A slightly downward camera angle can be very effective to ensure even lighting and helps produce a pleasing blue water colour. The wider the angle of coverage of our lens the more a

It is possible to fine tune the WB of filter photos using a white balance dropper in most RAW converters. Usually the best places to set the WB are on neutrally coloured areas in the foreground (sand) or high in the frame (ray), (AM). Nikon D100 + 16mm lens. Subal housing. CC40 Red Filter. Manual WB. 1/60th @ F9.5

Filters can be used for standard lens marine life photography, although they work best on slow moving subjects, which will not cause movement blur (AM). Olympus 720SW, PT Housing. Standard lens. Auto Magic Filter. Auto WB. 1/40th @ F3.5.

downward camera angle helps (this is particularly true with 180˚ fisheye lenses).

Generally I shoot most filter shots on automatic exposure, either shutter speed priority or aperture priority. I often use about 0.3-1.0 of a stop underexposure, although this varies with the content of the frame. All filters work by the subtraction of light and therefore work best in bright conditions. Even so we can benefit from increasing the sensitivity to ISO 200 or 400. If you have a camera with good high ISO performance then you can increase this further still. Shutter priority is very useful as it is the best way to eliminate camera shake blur from our images, while we concentrate on shooting. In strobe photography I often use very long exposures to balance light and still get sharp images, but in filter photography we have to be more careful and I do not use exposures slower than 1/40th.

Although filters allow us to shoot subjects from further away than with strobes, it is still important to get close to help get a "white balance separation" of the subject from the background. If there is too much water between the camera and subject it will not be possible to set a white balance that will bring the colour out on the subject and keep the blue in the water behind. Similarly it is important to choose strong, simple compositions in available light images. Strobes provide a lot of contrast between the main subject and the background, but we do not have this with filters. It is very easy to loose the impact of our subject in the background in low contrast available light images. We can help to isolate our subject by framing it against open water.

The other important consideration for getting the most

The most important factor when shooting filters is to pay attention to the direction of light and shoot with it. This ensures even illumination of the subject and strong colours (AM). Nikon D100 + 12-24mm lens. Subal housing. UR Pro CY Filter. Manual WB. 1/40th @ F4.8.

out of filters is in subject selection. Filters are great for large subjects like coral gardens, shipwrecks, schooling fish and large marine life. When I am shooting with filters I always try and look for images that I could not light with flash. Filters allows us to add colour to our images in a completely different way to shooting with strobes. Colour is no longer limited by where we aim our strobes. In filter photography colours penetrate much deeper into our images, away from the camera and we can exploit this. Filter photography allows us to position a subject much more dynamically in the frame, running from the foreground back into the image, while still photographing it in full colour. A school of fish swimming towards us are a good example: now we can photograph the whole school in full colour. Not just the ones close to the camera!

Even at 20 metres in UK waters filters can restore very subtle colour. (PR) Nikon D70, Subal housing, 10.5mm lens 1/30th F2.8 ISO 800

Filters in Green Water
by Peter Rowlands

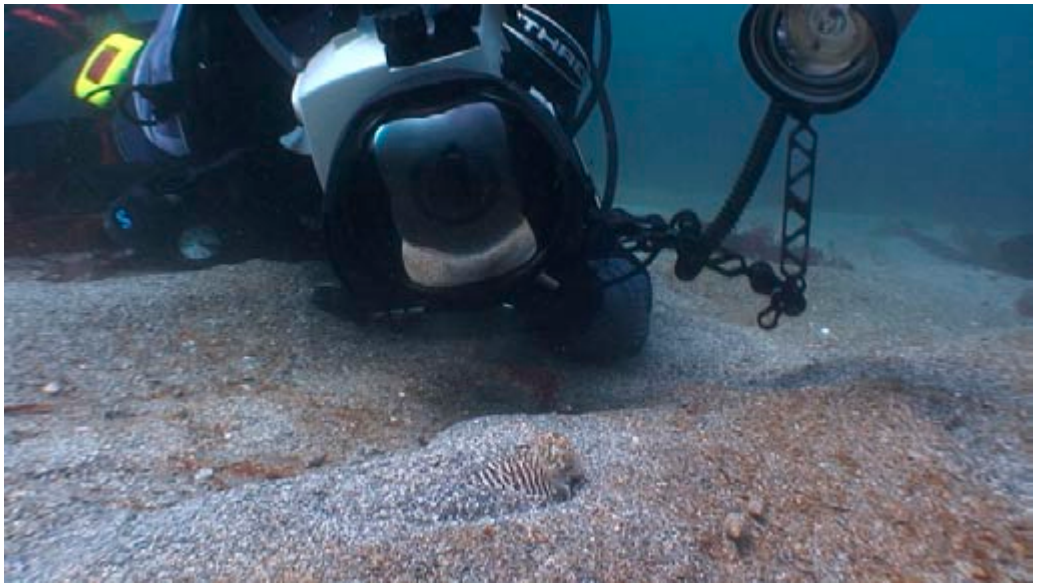
In theoretical terms, filter photography in green, temperate waters is no different. Keep the light behind you and choose the appropriate subject. The big difference is that light levels are usually much lower and when you add a filter you lose around 1 extra stop of light. The result is, quite frankly, hard work with many frames binned on a technicality. However when you get it right, filter photography in green water will produce very exciting and different results to anything that is possible with strobes.

In order to get a technically correct (sharpness and exposure) image you have to juggle with the three controls at your disposal – shutter speed, aperture and ISO speed. It is more than likely that you will be using full aperture to get a useable shutter speed so ISO speed with today's electronics is the first adjustment you should make. In theory this should make your images more 'grainy' or 'noisy' but modern

ISO800 is needed at 19 metres to achieve usable combinations of shutter speed and aperture. (PR) Nikon D70, Subal housing, 10.5mm lens 1/15th F2.8 ISO 800

cameras have been developed to provide the holy grail – high ISO with fine performance. This does vary from manufacturer to manufacturer and I very nearly jumped ship to Canon for their high ISO performance last year but fortunately Nikon bounced back with the D80 and I now quite happily shoot at 1600 ISO which means I can either use a higher shutter speed or a smaller aperture.

If light levels are really low you should look for something to rest your housing on when shutter speeds



With manual white balance and filter photography you can still capture colour and detail even in UK waters without the bulk and expense of strobes. Above and below shots are still images taken from video footage shot by PR on a Sony A1 camera in an Amphibico housing with GreenWater Magic filter

slower than 1/30th are needed. Taking this to the extreme you might even consider taking a tripod down with you.

Green water photography has always been a challenge and whilst filters do not make the challenge any easier, the results are very much worth the effort.

Now back to Alex.

Can I Use Strobes?

One of the most common questions that comes up with filter photography is "Can I use strobes?". It seems that some underwater photographers feel naked without their electronic lighting. Theoretically, it is possible to filter the strobe light so that it balances with the in situ illumination, but in practise this is impractical because the required filtration for the strobe will change with depth. It is a common misconception that strobe filters simply need to be opposite (complimentary filters) to the lens filter. This will not work because it does not take into consideration the effect of white balance. The correct complimentary strobe filter actually has to be the opposite of the combined effect of the lens filter and the WB adjustment made by the camera. And of course this varies considerably with depth.

If you are really keen to experiment with this approach, I suggest using a strong blue filter, such as a 38A and be prepared for a lot of trial and error and an narrow working depth range. Such a filter would be useful on a torch, if you plan to have a diver carrying one in your image.

Conclusion

Filters are not a technique for every dive. We need bright and sunny conditions and appealing subject matter in comparatively shallow water. But when conditions are favourable they allow us to cast off the excess baggage of flash photography. The real promise of this technique is the very different lighting that can be achieved in our shots, allowing us to capture shots that we just could not produce before digital cameras.

Alex Mustard
www.amustard.com

Have you learnt something invaluable by reading this issue of UwP?
Have you saved a lot of time benefitting for the experience of UwP contributors or do you simply just enjoy UwP and want to help it continue?
If so, please donate to the UwP contributors

You may not know this but none of the UwP contributors get paid. They provide their articles and photo talent in support of the cause of UwP which aims to keep the magazine free for anyone to download.

Donations are all handled in total security through PayPal and you can also pay securely by credit card using the PayPal links.

Your donations will be distributed to the contributors of each issue on a pro rata basis i.e. the more pages they contribute, the more their percentage.

When deciding how much you want to donate please bear in mind that PayPal's charge for amounts smaller than £3 or $6 can be as high as 24%!! Whilst I accept that PayPal is absolutely brilliant and safe, I don't want this to become a 'Donate a lot to PayPal"!!

You can make a donation in either US $ dollars, UK £ sterling or € Euros by following this link

www.uwpmag.com/donate.html

Donate here PayPal DONATE