Catchin' The Rays

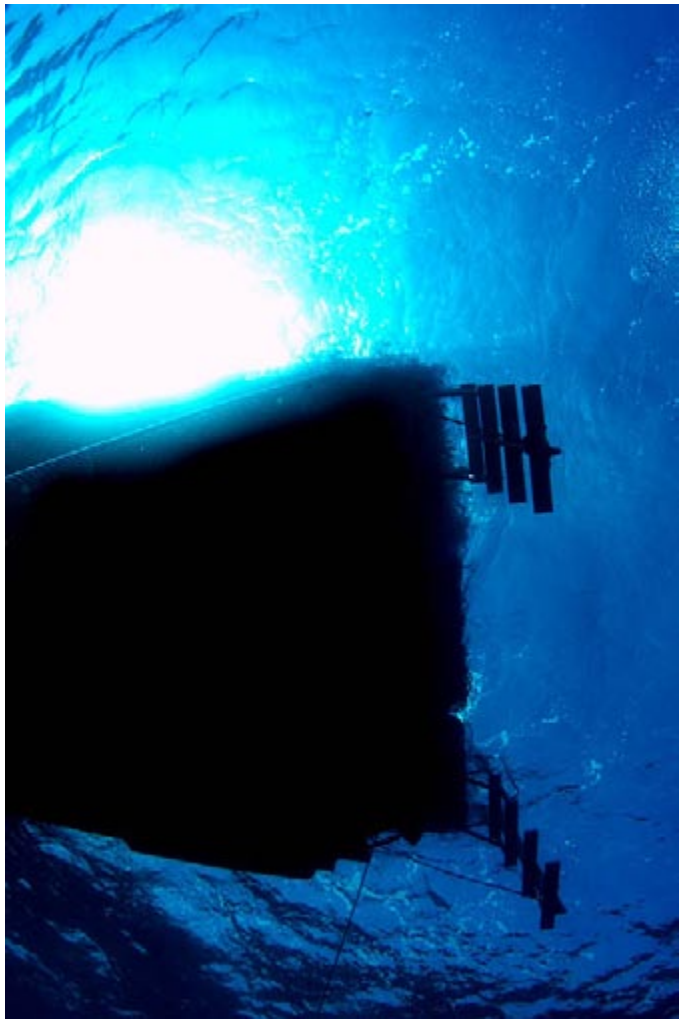
By Alexander Mustard

As you join me I am making a leisurely safety stop at the end of my first digital dive. I have a wide angle lens on my Nikon D100 and I roll onto my back and zap off a few shots of the shafts of Caribbean sunlight dancing in the water around the back of the diveboat. I've taken this shot hundreds of times before and I guess I take it again mostly out of habit.

"But today, is different! There is no need to finish a film," I think smugly to myself as I go through all the positives of my new camera in my mind. "I can even press the image review button after each shot and admire my beautiful images." Then disaster. The image I have just taken flashes up. It is disgusting. On film, aperture priority would have produced a tasty image, but the result from the same setting on digital is far less palatable. Instead, there is a big white blob where the sun should be, which is encircled by a garish cyan halo. It's really awful. I think about all the money I have invested to take this dreadful picture and I feel sick!

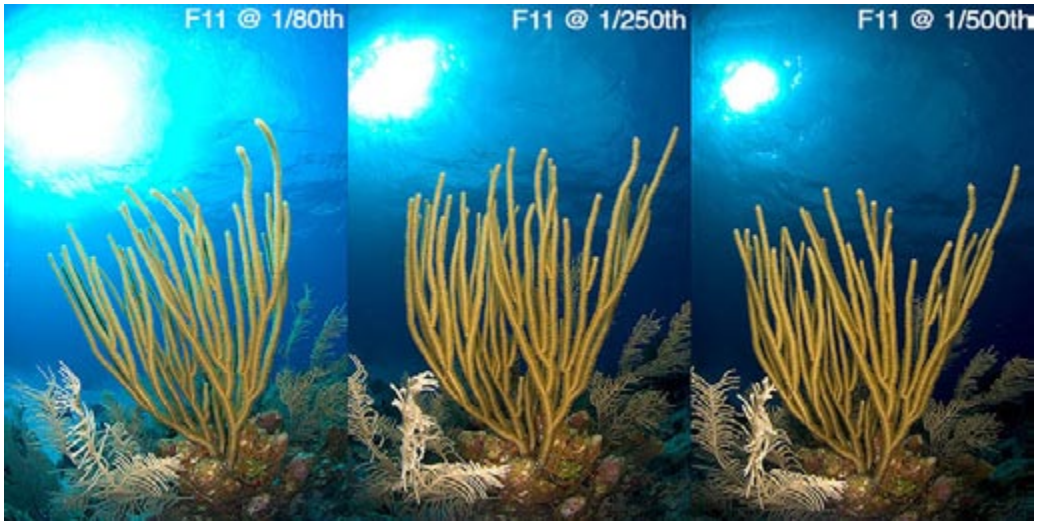
And I am not alone in this experience. The most often cited failing of digital cameras is probably their inability to capture sunbursts. This article is here to help. While I believe that sunbursts can be more easily captured on slide film, digital is not as bad as many people say. The key is to understand that a digital sensor is different from film and to adapt our techniques accordingly. In this article I want to describe some of the techniques that digital photographers are using to catch the sun.

The simplest solution for the digital snapper is not to photograph the sun at all! Shoot with the sun behind us and we never have a problem. An added advantage is that smooth blue water backgrounds tend to print much more reliably than sunbursts, which makes such images more suitable for publication. Obviously this advice is also a total cop out. Sunbursts are very important in our



My original disgusting sunburst! Highlight clipping has removed all detail in the sunball, blooming has expanded the area of the sunburst and overexposure in the blue channel has caused a nasty cyan colour shift forming a halo around the sunburst. Nikon D100 + 16mm. Subal housing.

Partly obscuring the sunball behind a large object, in this case UWP editor Peter Rowlands, can help prevent overexposure. Nikon D2x + 10.5mm. Subal Housing. Subtronic Alphas. F10 @ 1/250th



Underexposing a sunburst acts to reduce the size of the sunball and the cyan halo, but also note how the water colour, away from the sun also darkens. Nikon D70 + 10.5mm. Subal housing. 2 Ikelite DS125s.

images because not only do they look beautiful and add depth, but they also evocatively capture the ambience of being underwater, than plain ol'blue water does not.

The core of the problem of digital sunbursts is that digital sensors do not record highlight detail as forgivingly as film. Digital sensors do not respond well to overexposure because once a pixel is overwhelmed with light it cannot record any more information and detail is clipped from the image. Underwater light is predominantly blue, so sunburst clipping tends to occur first in the blue channel, which manifests as a colour shift around the edge of the sunburst, often seen as a lurid cyan halo. Blooming compounds this problem; when excess light overwhelms one pixel it can leak into adjacent pixels, increasing the area of overexposure and clipped detail.

The solution to all three problems is to stop too much light getting to the sensor – in other words to underexpose the sunburst. It is a common slide technique to underexpose a sunburst exposure by about a stop to produce a more pleasing image. Small apertures also help reduce the size of the sunball and fast shutter speeds help to freeze and define the sunrays. On digital we should underexpose further usually by about 2 to 3 stops. The easiest way to achieve this is by increasing the shutter speed. So, for example, if the meter tells you to shoot F11 @ 1/60th, on film we might try F11 @ 1/125th and on digital this might be F11 @ 1/250th or even 1/500th.

Alternatively frame the image so that the sunball is not included in the image and concentrate only on capturing the sunrays. In such circumstances aperture priority automatic exposures can be accurate. Nikon D100 + 16mm. Subal Housing. F8 @ 1/250th.

The downside of underexposing the ambient light is that the water away from the sunburst can quickly become too dark. While this can look dramatic, ideally we want a nice sunburst set in beautiful blue water. The alternative to extreme underexposure is to obscure part of the sunball behind a subject, or to not include the entire sunburst in our image. Combining 1-2 stops of underexposure with a composition that does not show the entire sunburst usually produces the best results.

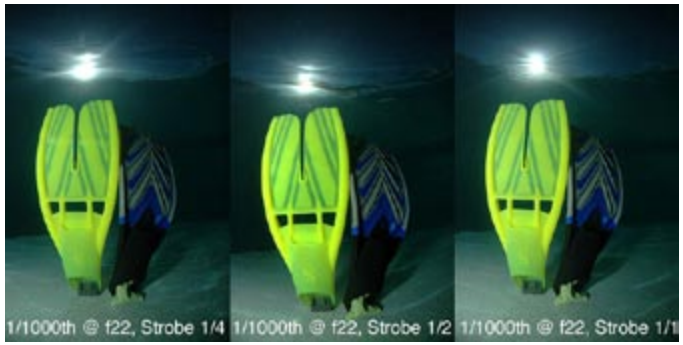
As I said above underexposure is most easily achieved by increasing shutter speeds, which also helps to freeze sunrays. The upper limit for shutter speed is limited by the camera's maximum flash synchronisation speed, when we

are using flash to fill the foreground. And in this respect, not all digital cameras are created equal. Curiously, most compact cameras are better equipped to capture sunbursts because they can synchronise at very high shutter speeds because they use an electronic rather than a mechanical shutter. There is a lot of variation among the DSLRs: for example the Nikon D100 will synch to 1/180th, the Fuji S2 to 1/125th while the cheaper D70/D70s will synch officially to 1/500th, making it very suitable for this type of photography. I say officially because the D70 will actually synch at even faster shutter speeds because it dispenses with its mechanical shutter at high speeds and uses an electronic one.

One unusual consequence of using flash synchronisation speeds faster than 1/500th, is that these very short exposures do not give most strobes long enough to fully discharge. At shutter speeds over 1/1000th many strobes will only be effective at 1/4 power, and increasing them to 1/2 or full power will have no effect on exposure. I mention this just so you are aware, as it is not something that underwater photographers encountered on film.

Another important factor in camera choice is the ability to capture a wide dynamic range because this will help preserve highlight detail. Generally DSLRs are better than most compact cameras and the Fuji S3 is particularly good in this regard. DSLRs are also more resistant to blooming than compacts and newer models tend to be better than older ones.

We can also improve our cameras performance by looking to our photographic peers. Land photographers have a similar problem to the highlight issues of sunbursts - wedding dresses. Wedding photographers have to make dresses look



At high shutter speeds, that can be useful to control sunbursts on certain digital camera, we should be aware that there is not sufficient time for the strobe to discharge fully. In this example I increased my strobe from 1/4 to 1/2 to Full power and did not see any increase in foreground exposure as a result. Nikon D70 + 10.5mm. Subal Housing. Subtronic Alpha. F22 @ 1/1000th.

white, while preserving the detail of their design. A popular solution is to load a "wedding curve" onto the camera. This gamma curve controls the distribution of brightness in the final image when our camera processes the data from the sensor. Wedding curves are designed specifically to preserve highlight detail and can be ideal for sunbursts too. Similar effects can be achieved using more traditional methods: Berkley White of Backscatter has pioneered the use of Neutral Density graduated filters to help conserve highlight detail and has produced some very impressive digital sunbursts.

Another useful step in producing pleasing digital sunbursts is post processing the images. Post processing can help in two areas. Firstly we can lighten underexposed water to create a more pleasing colour. Secondly post processing can help to reduce cyan halos around sunbursts by shifting

Post processing can improve sunburst shots. The top image here is straight from the camera. In the lower image I have adjusted the HUE of the CYAN halo around the sun to move it more towards blue. This modification produces a more pleasing water colour behind the snappers. Nikon D2x + 10.5mm. Subal Housing. 2 Subtronic Alphas. 1/60th @ F9.

the tone of the halo back more towards blue to counteract the problem of blue channel clipping. How much post processing you want to do depends on your personal preferences and how much time

Environmental conditions are one of the most important factors for getting good sunbursts. A glassy smooth surface with small waves (but no wind) tends to produce the best sun rays. Nikon D100 + 10.5mm. Subal Housing. F9.5 @ 1/350th (aperture priority no exposure compensation).

Digital compact cameras are surprisingly suitable for shooting sunbursts because their electronic shutters mean that they can synchronise with flash at high shutter speeds. Photo by Rand McMeins. Olympus 5050, Inon UWL and Dome. 1/1000th @ f5.6.

you have spare to spend with your mouse.

Perhaps the most important factor is that we must choose the right conditions to shoot sunbursts. "Is it sunny?" isn't the only factor to consider! The best sunbursts with lots of nice rays occur in calm conditions, where a smooth surface acts to diffract the sunlight into focused rays. Choppy conditions tend to disperse the sunball and are less photogenic (such as in the soft coral image in this article). Time of year, lee of land and even choosing a country away from trade winds can all be worth considering when capturing sunbursts! Some turbidity in the water, particularly close to the surface can also really help to define the sunrays. Another important consideration is time of day, although this is more complex. Sunbursts can be most beautiful late in the day or early in the morning. But at these times of day the angle of the sun means that the sunburst is spread across the surface and it is difficult to get a small sunball. At midday the sun is stronger, but there is also more light underwater and it is easier to set the sunburst against nice blues. Both times can produce good results.

I still believe that sunbursts look best shot on a slide and viewed on a lightbox, although the difference is less pronounced once that film has been scanned and is printed alongside a digital file. It is also important to remember that film is not perfect and if the conditions are poor then film shots are poor too! These days we judge digital sunbursts pretty harshly and when we go back and look at published slide images of sunbursts we realise that many have the same problems we worry about in our digital images today. Have a look at books or competition pictures from 5-10 years ago! The key with digital is to realise that it is different from film and if we adjust how we shoot we can produce pleasing sunbursts.

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