

magnifications) or when I purposely recomposed.

When shooting macro with an FX camera, the depth of field will be less than with a DX camera, with the same framing at the same aperture. It is therefore important to focus accurately. These cameras do not endure sloppy technique. Of course the shallower depth of field can be used creatively to isolate subjects against busy backgrounds. I found the Sigma 150mm particularly effective for this, when opened up to F4.5-F6.3.

Shooting Wide Angle and High ISO

The FX sensor has two potential downsides for wide angle. First there is no fisheye zoom, and second we know from the experience of Canon full frame shooters that getting sharp corners can be hard with rectilinear wide angles.

It is curiously how quickly goalposts move. There was no such thing as a fisheye zoom for DX Nikon's until 2007, but now the lack of an equivalent to the popular Tokina 10-17mm is the most widely quoted reason for rejecting FX. Prime fisheyes (15mm and 16mm) perform very well on the FX cameras. I have shot both the Nikon 16mm and Sigma 15mm, favouring the Sigma for its closer focus and more modern, and I

feel marginally sharper, optics. Both, though, are very strong performers. I also found it useful to shoot these lenses with a 1.5x teleconverter, which provides a pleasing angle of view, cutting the fisheye coverage from 180° to about 100°. The optical performance remains good.

Some have suggested that rectilinear wide angles on FX are an alternative to the Tokina, but it is easy to forget how wide it is. On DX it covers 180° to 100° corner to corner. Compare this to the 14-24mm and 17-35mm on FX, which give 114° and 104° at their widest, respectively, and you see that there is relatively little overlap in their angles of view. Furthermore, the FX options are both rectilinear lenses, which are harder to optimise behind domes.

Ultra-wide angle rectilinear lenses have always been troublesome underwater because a dome port, in water, acts as a negative lens creating a virtual image that we must focus on. The virtual image is both closer to the camera than the true subject and curved. Land lenses are designed to produce flat images of flat planes of focus. The curved focal plane created by the dome has corners that are closer to the camera than the centre. Typically, we focus on the centre of the image and rely on depth of field to keep the corners in focus. FX cameras have narrower depth of field, at a



Fisheye lenses perform very well on FX cameras. But the lack of an equivalent to a fisheye zoom (like the Tokina 10-17mm) is one disadvantage. Nikon D3 + Sigma 15mm. Subal housing. Inon Z240 strobes. F13 @ 1/50th. ISO 800.

given focal length and aperture, so we struggle more to keep those curvy corners sharp.

Dioptries are useful here for two reasons. First, they help the camera focus on the virtual image, which is surprisingly close to the camera (about 50cm). And secondly, and rather fortuitously, single element dioptries actually introduce a bit of



To cut the coverage of the fisheye, but to exploit its excellent optical performance, I mounted it on a 1.5x teleconverter. This was a good solution of wide angle shots of smaller subjects. Nikon D700 + 16 mm + 1.5x TC. Subal housing. Subtronic Alpha strobes. F10 @ 1/125th. ISO 200.

field curvature, which helps offset some of the curved focal plane created by the dome. Nikon's new 14-24mm wide angle lens cannot take a dioptrie, and for this reason, is likely to be troublesome underwater. I have not tested it. I favoured 17-35mm, which does take a dioptrie, although given

time constraints I did not experiment much with different set ups.

That said, my first attempts produced perfectly useable results (and better than many I had seen from Canon FF cameras) at apertures of F8 or more, even with subjects that I thought would highlight corner sharpness problems (I used the lens at the widest zoom setting, choosing subject matter close to the camera and lighting the entire frame, to reveal detail in the corner of the frame). My tests do reveal that this lens (or at least my port setup for it) is prone to chromatic aberrations on areas of high contrast (this can be corrected in the RAW converter). I will not hesitate to use the 17-35mm.

Since digital cameras have superseded slide film for underwater photography, many have lamented their inferior ability to record sunbursts. Slide film's non-linear rendering of highlight detail meant that it was naturally predisposed for capturing the sunballs and shafts of light that are so evocative of the atmosphere of the underwater world. Shooting digital we had to adapt our techniques for capturing this light with our digital sensors. Frame and expose carefully and this wonderful submarine light can be recorded effectively in pixels. But for Nikon users the FX cameras (and D300) offer new tech, in the form of the 14-

bit Analogue to Digital conversion and therefore 14-bit per channel RAW files that have the potential to expand dynamic range and help in this area. In my shots I found the advantage over older Nikon's is not massive, but it is clearly there. These cameras do offer a step forward for digital dynamic range.

Probably the key strength of the D3/D700 sensor is its phenomenal ability to produce clean images in low light, at high ISO. In Canada, shooting wide angle I certainly got images that I felt would have been impossible with older cameras. But in the clear, blue waters of the Red Sea, more typical of the conditions that most underwater photographs are taken, I had to search pretty hard to find chances to exploit this advantage in normal diving conditions. At ISO 400 many of the other cameras we had on board, like the D300, 40D and 5D, were capable of producing comparable results. Finding justifiable uses for ISO 800 and above is not as easy as it sounds. If the high ISO performance of FX is the feature you are most focussed on, make sure that there is a real need for it in your underwater photography.

Decisions, decisions

There are no simple conclusions here, because we have three different



The 14-Bit A:D converter on the FX Nikons (and also D300) does seem to benefit capturing sunbursts and sunrays. Nikon D3 + Sigma 15mm. Subal housing. Inon Z240 strobes. F8 @ 1/100th. ISO 200.

cameras, at three very diverse price points. Whether any of them is right for you will depend on your budget, what system you already own and what and where you intend to photograph.

The D3 and D700 were both a pleasure to use underwater, and adapting to FX is not a big issue. Choosing between them is fairly simple. They both have identical imaging systems: the same 12 MP sensor, 14-bit A:D Converter and Multi-Cam 3500FX auto-

focus system. The D700 is clearly more attractive to the underwater photographer because it houses almost identical internals in a smaller, lighter and less expensive body. The bottom line is system costs because D700 housings are considerably cheaper: a D700 and Subal housing costs about 65% of the price of a D3 and Subal. The D700 also has a built in flash, for those who like to run their TTL the fibre optic way. Although the Subal ND700 negates this positive without room to pop up the flash.



The 12MP FX cameras do offer new capabilities to the Nikon shooter at high ISO, but not everyone's photography will exploit this. In most situations a D300 would match their performance for a lower price. Nikon D3 + Sigma 15mm. Subal housing. Inon Z240 strobes. F14 @ 1/25th. ISO 800.

The D3 counters with a better viewfinder that shows 100% of the scene, versus 95%, and, to me, its responses feel slightly sharper. Other D3 specs such as dual card slots, higher frame rate and extra battery life are not really significant underwater. Neither is the D700's anti-dust vibrating sensor likely to be a deal breaker.

The extra size of D3 housings means that they are close neutral in the water. D700 owners, like those with D200s and D300s, will get used

to adding buoyancy. The other big positive of D3 housings is that they take the take the D3X! Nikon had the D3's sensor in the D700 and in the shops in a little over 6 months after the D3 went on sale. It seems inevitable that the D3X's sensor will also soon become a hand-me-down. Although there is no guarantee that a D700 housing will fit a "D700x" when it arrives.

Compared to many older DX Nikons's (e.g. D70, D200, D2X) the 14 bit per channel RAW files

FX cameras do seem to improve the handling of dynamic range, helping resolve detail in contrasty subjects and holding highlight detail in sunbursts. But they are not the only ones. The 12 MP DX D300 is significantly cheaper than even the D700, and also produces 14 bit RAWs. It is a great all rounder – it has better AF frame coverage, a 100% viewfinder, it is good at high ISO, and takes the addictive Tokina 10-17mm.

From an objective standpoint, I would conclude that the D300 is the better underwater camera. The D700 and D3 are not inferior to the D300, just a more expensive way to do the same thing much of the time. They do have some advantages, but unless you have a truly justifiable need for high ISO, choosing them will probably be a decision from partly the heart, rather than just the head. But both are such delightful cameras that you would not regret your decision for a heartbeat. I haven't!

The D3X makes quite a different case. It clearly outperforms Nikon's DX range significantly both in terms of resolution and noise, and its strengths are well aligned to the needs of underwater photography. Armed with 24MP, the D3X will create much debate as to whether the extra resolution is really needed. And certainly at typical magazine and book reproduction sizes, its output would

be hard to distinguish on the printed page from Nikon's 12MP FX and DX cameras. Of course those extra pixels give more room for manoeuvre, and open up some markets less accessible to other Nikons. The only technical drawbacks I see is a lack of a fisheye zoom and poor AF sensor frame coverage (although the same as the D3/D700, and comparable with Canon's FF DSLRs).

The main obstacle for the D3X is its price. Some could never contemplate risking something so expensive in an environment where it could be rendered valueless in seconds. D3 owners, for one, will see it as excellent value, since there is no need to buy an expensive housing. Adding a D3X to their system will be considerable cheaper than their original D3 and housing purchase, and they will have a new camera that currently remains unmatched in the Nikon range. It is an attractive package.

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