

Nikon D850 review

by Backscatter staff

When the specs for the Nikon D850 were released, we couldn't help but lick our chops. With high resolution, fast frame rates, and some big claims in the video arena, the camera sounded too good to be true. Since then, we've had a chance to plunk the Nikon D850 in a housing and test its features in some demanding underwater situations. Read on for what we found to be the camera's biggest strengths and a few of its weaknesses.

A Note About Our Testing

Backscatter CEO Jim Decker took the Nikon D850 to Roatan to test both the wide angle and macro abilities of the camera. To say that conditions were less than ideal would be a gross understatement. Rain was measured in feet, not inches. The runoff created a blackwater top layer of about 2 to 3 feet thick in some areas, which when combined with black thunderstorm clouds and constant pounding rains, reduced available light and visibility to extremely low levels that would not normally be expected for a tropical shooting environment.

At the same time, Backscatter

operations manager Becca Boring took the Nikon D850 to Truk Lagoon to shoot wrecks, with her shots in this review occurring below recreational dive limits. Her testing varied between good visibility exterior shots and cramped, zero-ambient-light interior images that can get silted pretty quickly.

Keep these conditions in mind while reading this review. It only strengthened our opinion of the Nikon D850.

High Resolution, Low Noise, And High Dynamic Range—Yes, You Can Have It All

The Nikon D850 is probably best defined by its extremely sharp 46MP sensor and its ability to capture a very high dynamic range without sacrificing resolution. The resolution increase from the Nikon D810's 36MP to the new 46MP of the Nikon D850 would usually come at the cost of a drop in dynamic range and a drop in high-ISO low-noise performance, but in our testing, we have found this to not be the case. This high-resolution performance is important for divers who want make very large prints of their images. It also gives shooters the



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ISO 3200 | f/8 | 1/60 sec. Our testing conditions during this dive were severe. There was a thunderstorm overhead with black clouds and runoff from feet of record rains obscuring the surface. It looked like a dusk dive at 65 feet where this photo was taken. Even in such extreme low light conditions, at ISO 3200 the Nikon D850 performs extremely well with very low noise levels. ©Jim Decker

option of selective cropping without losing too much resolution.

In the past, photographers had to decide between high resolution or good low-light performance and high dynamic range from their camera.

We can now have both. The Nikon D850 is the first SLR from Nikon to feature a backside illuminated sensor (BSI). This design allows more light to directly reach the sensor by moving the electronics behind the sensor. This



ISO 200 | f/11 | 1/100 sec. With 46mp of resolution, the Nikon D850 has plenty of room to crop even if you have the wrong lens for the job. In this case, I had a Nikon 8-15mm fisheye, when a more medium range zoom lens would have been appropriate.

is what accounts for the increase from 36MP to 46MP without increasing noise and decreasing dynamic range. The Nikon D850 gives us underwater shooters the low-light ability we need for the underwater environment while maintaining one of the highest resolutions in the industry. In Roatan, the camera handled the murky water and cloudy skies at up to ISO 3200 without noise severely degrading image quality. The Nikon D850's ability to shoot at high ISO allows

underwater photographers to utilize shutter speeds and apertures that ensure sharp results with minimal noise.

Along with the step up in resolution and improvements to low light sensitivity, we also get a slight bump in dynamic range over the D810. Dynamic range is the amount of detail you can capture from shadows to highlights, without clipping at either end and losing detail. The Nikon D850 is the only



ISO 400 f/6.3 1/60sec. The Nikon D850 does very well in low light conditions like the interior of this wreck of the Nippon Maru in Truk lagoon. This image was shot with a pair of Gates GT14 video lights which makes it easier to navigate the pitch black interiors of deep wrecks. The original image had a very compressed looking dynamic range with a lot of dark shadows, but the Nikon D850's RAW files preserved that detail and it was able to be brightened in post to reveal hidden shadow detail while not really adding any noise.

SLR besides the D810 that has a base ISO sensitivity of 64, giving an extra 2/3rds of a stop of shadow detail beyond what other cameras are able to capture at ISO 100. This extra sensitivity to shadow detail is what allows for the wide dynamic range.

Why does this matter for the underwater photographer? Sun balls are a great example. When shooting

a sun ball, you are trying to expose for literally the brightest subject possible, the sun, plus an often dark or shadowed reef in the foreground. The Nikon D850 maintains detail in the shadows, and the sun is still exposed properly and maintains detail in the highlights. The second reason is the ability to boost shadow detail in post with a zero to minimal noise hit.

Speed And Megapixels

The Nikon D850 is capable of shooting 7 frames per second with a 51-shot RAW buffer. It is impressive to get this fast of a frame rate with such a huge 46MP image file. For most underwater shooters who use strobes, this is going to be plenty fast enough to keep up and will always be faster than the recycle time of your strobes. The Nikon D850 will pretty much always be ready for the shot and you won't buffer out. We felt that the previous Nikon D810 model had a noticeable lag when it came to image review immediately after the shot was taken, but the Nikon D850 image processing speed is majorly improved meaning you can review your images quicker allowing you to pull off more shots while chimping when time is critical.

Superior Autofocus Gains Over The D810

Autofocus has always been one of Nikon's strong points. The autofocus engine is carried over from the Nikon D5 and Nikon D500. We've been impressed by both of these cameras' accuracy and speed when shooting macro and super macro and how they snap to focus while other lenses just hunt back and forth.

The Nikon D850 gains 3D focus tracking which works really well in our topside testing, accurately picking up the subject and following it. After shooting tiny blennies in Roatan, we can confirm that the camera's focus speeds are a major boon to underwater photographers, especially those chasing moving macro subjects. Anyone coming from a Nikon D810 will be pleasantly surprised with the performance upgrade.



ISO 100 | f/22 | 1/250 sec. Super macro is the hardest test of any autofocus system. Even when shooting at 2.3:1 with a macro diopter such as the Nauticam SMC-1, the Nikon D850 snaps to focus instantly, allowing me to change my usual technique of manual focus and move the camera to have the AF system keep up with the micro movements that happen in even the steadiest of underwater shooting conditions.

Video Mode—A Revolutionary Step Up For Nikon

In the past, Nikon hasn't exactly been at the forefront of video technology. Strange exposure restrictions and weird crop factors combined with a complete inability to white balance at even the shallowest depths made Nikon cameras a no go for anyone who had even the slightest inkling to dabble in video. Well, all of that has now changed...

The Nikon D850 can now capture 4K video from the full width of the sensor. We're happy about the full frame 4K feature because the Nikon D5 and Nikon D500 used a heavy crop factor in 4K of over 2 times, reducing the angle of coverage by

massive amounts and making it not very usable for wide angle video. Adding the full sensor coverage puts the Nikon D850 in company with the Sony A7 series, like the Sony a7R II, as the only full frame cameras to over 4K from the full width.

So how does a 46MP sensor get down to the about 8.3mp resolution of 4K video? The Nikon D850 uses pixel binning, which is the less-intensive way of achieving this but it won't yield as sharp of a result as downsampling from 46MP to 4K. That being said, the processing power to achieve that downsampling would be monstrous, so it's understandable for Nikon to go the pixel binning route.

There is an option to shoot in DX crop mode and still maintain 4K resolution. This is similar to the Super 35mm option in the Sony A7 series. This uses a smaller area of the sensor, a 1.5x crop, that results in a tighter angle of coverage and apparent increased focal length. Why would you want to do this? In macro, this has the effect of getting even tighter shots with no loss of quality or depth of field. This is very useful when the camera is on a tripod and not practical to move the camera to get a tighter shot.

In wide angle, the Nikon 8-15mm fisheye becomes a wide angle zoom lens with the capability of being shot around 10mm-15mm. This yields an angle of coverage of 180 to 110 degrees, allowing for tighter wide angle shooting. Most video shooters don't want to shoot at full 180 degrees and DX crop mode feature introduces a lot of flexibility.

Bit Rate And Compression

Nikon went with the H.264 compression format and a spec bit rate of 144 MB/s. This results



in much smaller file sizes than the less efficient Motion JPEG compression recorded at 500 MB/s that Canon uses in the Canon 5D IV while yielding around the same quality, although at a 4:2:0 color space rather than the 4:2:2 color space of the Canon. During our testing underwater, we observed bit rates of between 121 MB/s and 128 MB/s. This drop from the stated bit rate reflects the variation that all cameras use to adapt to changing color and complexity in images and is common in underwater scenes. The Nikon D850 bit rates are a bit higher than the Sony A7 series, which are at 100 MB/s.

Vast Improvements In Underwater White Balance

We are happy to say the Nikon white balance curse is over. We were shocked at how well the Nikon D850 performed underwater, even in the worst conditions with such low light and a brown to green color cast in what would otherwise be clear blue tropical water.

Despite this, the Nikon D850 was not only able to execute an accurate white balance at depth, but the foreground was accurate and the blue water background water came out with a very pleasing blue color. With Canon being the benchmark for excellent underwater white balance, this was completely on par for a match in color.

We cannot understate how much



ISO 100 | f/8 | 1/125 sec. The sharpness, resolution, clarity, dynamic range, and color from the Nikon D850 are amazing. Blues, which are the hardest colors for a camera to reproduce, render out beautifully, and show smooth gradations with no signs of banding.

of a game changer this is for Nikon.

Even in extreme horrid shooting conditions, the Nikon D850 shocked us with its excellent execution of an ambient light white balance. It was so dark the deepest scene at 66 feet was shot at ISO 4500, and the camera was still able to pull off a great looking white balance. No previous Nikon has been able to even remotely pull this off, so we are super excited about the secret sauce Nikon deployed in the white balance department for the D850.

Setting a manual white balance is the same easy three button-press sequence that the Nikon D810 had, continuing Nikon's tradition of being the easiest WB capture of hybrid photo/video camera. The Nikon D850's six manual white balance banks allow the user to store a variety of custom color settings and navigate between them easily, making adjustments for different depths or with and without video lights a breeze.

Switch from Video to Photo Modes And Maintain Settings

In video shooting, shutter speed is usually set and left at 1/60 in video, while in photo it is usually set a bit higher and is changed very often. White balance settings are always different between video and photo. Even for the same scene, video and photo settings will always be different.

One feature of the Nikon D850 we're really excited about is the camera's ability to switch between video and stills and maintain separate settings in both modes. Now, properly exposing for still images with added strobes and jumping over to natural light video is as simple as moving one switch to change all settings to what was previously set in that mode.

This makes the Nikon D850 the easiest camera to use for the hybrid photo/video shooter that switches back and forth from photo to video often on a dive, or even on the same scene.

While Nikon has made a 180-degree turn in the video department, there are still a few downsides when compared to other cameras. In video mode, the camera's autofocus is not usable. After the Canon 5D IV's stellar push with Dual Pixel autofocus during video, we were hoping Nikon could follow course.

The focus technique that is needed with the Nikon D850 is to prefocus and hold, which has worked just fine for years before Dual Pixel autofocus was introduced, and this is what you'll need to do with the Nikon D850.

The Nikon D850 has no exposure meter visible in video mode. This is a definite disappointment as the preferred technique for underwater video exposure is to expose at -2/3rds of a stop on the meter. There is zebra striping and a live histogram available, but nothing really beats the simplicity and success we have had at shooting -2/3rds on the meter. A workaround is to shoot in manual mode with auto ISO and set exposure compensation to -2/3rds.

While you can set either half-press of the shutter or the AE lock button to hold exposure when recording, we found both of these controls to be clumsy and impractical to hold while shooting. Not a deal killer by any stretch, but a bummer nonetheless.

Nikon did add a focus peaking feature to the Nikon D850, which comes in handy for manual focus operations and especially macro. However it does not work during 4K video, or during stabilized 1080HD, or with a whole other host of limitations, which to be honest, forces us to ask why bother to have it at all?



The Nikon D850 is hands down the best all around camera we've ever shot. The photo image quality is second to none, renders blue backgrounds beautifully, and has plenty of resolution to make massive prints, or severe cropping with plenty of resolution left over.

Conclusion: Nikon's Best Yet

The Nikon D850 is hands down the best all around camera we've ever shot. The photo image quality is second to none, renders blue backgrounds beautifully, and has plenty of resolution to make massive prints, or severe cropping with plenty of resolution left over. Autofocus is quick and accurate, even in the most challenging conditions of super macro. And the speed and buffer

performance is impressive especially when considering how large the files are.

"Holy crap, it white balances!" was the exclamation on the boat after the video test dive. This is the biggest step forward for Nikon in the video realm. As we have said before, it doesn't matter how much the camera costs, or if it can shoot in 8K, or whatever pie-in-the-sky video spec



you can dream up—if the color sucks, it just doesn't matter.

The white balance at 60 feet even looks great. That combined with 4K from the full sensor and a whole host of other improvements in video

took us from never recommending Nikon for even the most casual video shooter, to having no problem recommending the Nikon D850 for shooting video.

If video is your primary

purpose in an underwater camera rig, we would recommend either the Panasonic GH5 or Canon 1DX II over the Nikon D850 with their higher bit rates, 4K 60p, and 4:2:2 color space. But for anyone wanting a hybrid photo/video camera, the Nikon D850 is an excellent choice.

Pros

Best image quality we have seen from a camera yet

Big increase in resolution from D810, but no sacrifice in low light or dynamic range

Lightning fast and accurate autofocus, even in super macro

It can actually white balance at depth! Video is now a viable pro level option Ability to hold different settings for stills and video mode

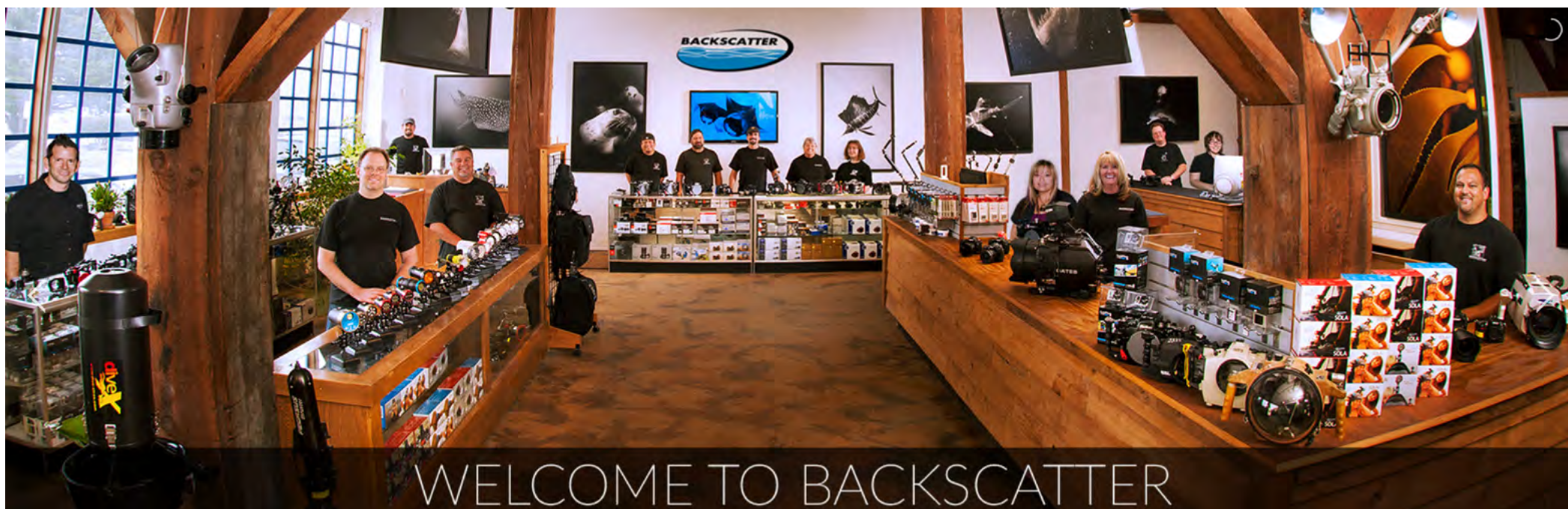
Cons

Lack of meter in video mode

No useable autofocus shooting video

Has focus peaking in name only, not available when you'd actually want to use it

The Backscatter staff
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