

Nauticam EMWL-160 lens

by Alex Mustard

Strange as it looks, Nauticam's EMWL lens is ideally designed for extreme WAM images (Wide Angle Macro), where a small subject is photographed at macro levels of magnification, within a wide angle scene. This viewpoint is often called "bug-eye" because it gets us right down to critter eye-level and transports us into their world. Even if you have never used such as lens, it doesn't take much imagination for any underwater photographer to see the appeal of this unique perspective.

Nauticam designed the EMWL to be modular, with interchangeable final objective lenses, to allow the user to alter the angle of view underwater. Three objective lenses were introduced with the EMWL: the 130°, the 110° and 60°. If Field of View (FoV) isn't your currency, these are approximately equivalent to full frame, rectilinear lens focal lengths of 10mm, 15mm and 38mm, respectively. Frustratingly, the EMWL lens was released in 2020, timing that meant that many owners still haven't given the lens an appropriate workout. I first shot the finished lens in January 2020, and I am still waiting for the chance to use it in a SE Asia muck

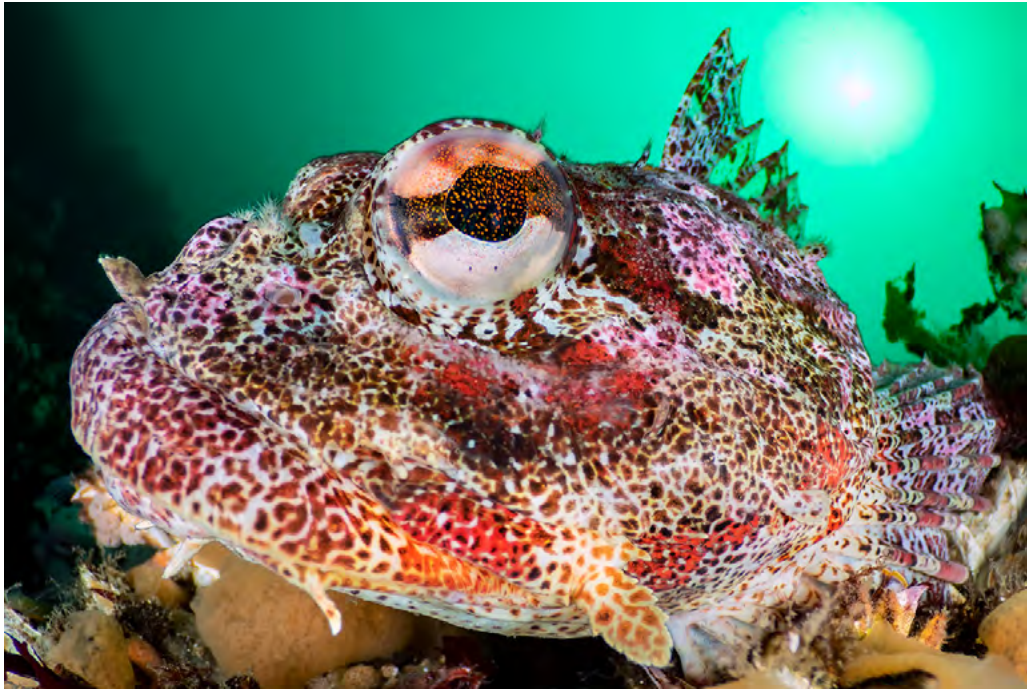
diving mecca, where it will be most at home. But the limited travel opportunities for owners have not stopped Nauticam's development. They have just announced new lens option for this modular system, which is also the widest yet – a 160° optic. I had the chance to test a production ready prototype on a recent trip to the chilly, but rich waters around God's Pocket Resort, Canada.

The reason that the 160 has me salivating is that it simply makes the EMWL better at what it is designed to do. The wider view allows us to set the subject against the widest background, while

The EMWL is a wet lens and can be attached to most macro ports. The big buoyancy arms aid handling and the bayonets store spare objectives. This system, Nikon D850 + 105mm, Nauticam EMWL + 160 optic, Subal housing, Retra Pro strobes, were used for all images featured here.

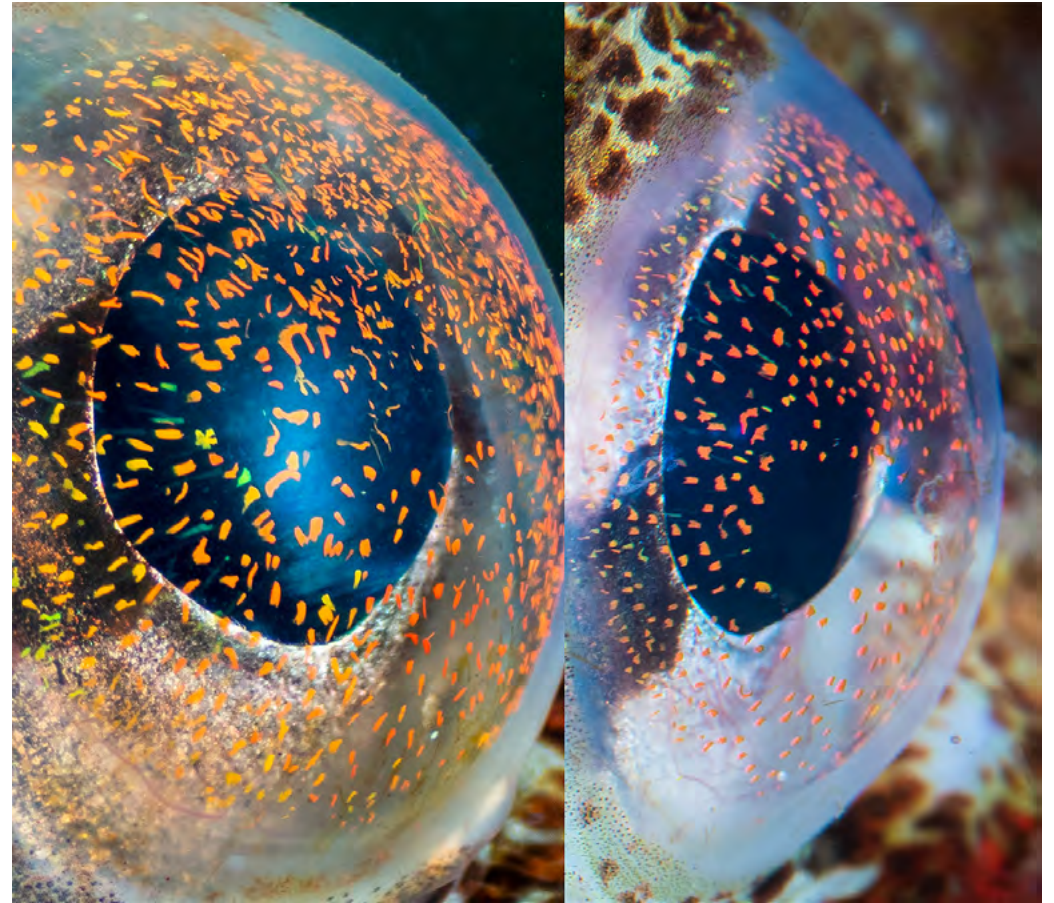
EMWL objective lenses, the 110°, the 130° and the new 160° (there is also a 60°, not pictured)





(Above) The small, wide EMWL lens gives a bug's eye view of creatures, making small critters seem giant. 1/40th @ f/18, ISO 320.

(Right) A comparison with and without EMWL. Detail of a red iris lord eye (off centre in both cases), shot with 105mm and EMWL-160 on left and with just 105mm on right. To me, the EMWL-160 is giving sharpness that is equivalent to the prime lens.



the small size of the front element increases how large the subject appears in the picture. The small size also makes it easier to light the subject when it is very close to the lens, because there is almost no shading from the lens. In short, the 160° objective should be top of the range. The EMWL is designed for extreme WAM images, and the 160 is the most extreme option.

That's all good in theory, but the

challenge for Nauticam was making this small and wide angle lens deliver usable image quality and the more extreme optics. How sharp will it be in the centre of the frame? And is it sharp right out to the edges? I attached it to my Nikon D850 and plunged it into the chilly waters of British Columbia to find the answer. I wanted to find out if you are an existing EMWL owner should you be adding this lens to your system and if you are

a prospective owner, is this the lens that convinces you to buy into the EMWL.

The important stuff first – the sharpness is excellent. Because the 160 is both wider and smaller I was prepared for a drop compared to the 130, which was previously my most used lens choice, but I found no shortfall. Moreover, now I am home and have processed these images out at full resolution, I would say that the

160 is the sharpest of all the EMWL lenses. The 160 is sharp in the centre of the frame and sharp on the edges of the frame. In the water, the 160 made its case swiftly. I loved the angle of view I was getting and the shots it produced. Once I tried it, I used the 160 for almost every EMWL shot of the trip.

The EMWL system is a wet lens, designed to be used in front of a standard macro lens – the



Anemone detail. The EMWL colour reproduction is very good, but I find transitions in hue less subtle than a straight prime lens. 1/40th @ f/18, ISO 500.

105mm on my D850. So impressive is the sharpness from the EMWL 160, that I have simply compared it to the straight 105mm in the sample images here. Bugeye lenses have existed before in underwater photography, but have always been severely limited by their poor image quality. Anyone who has ever used an older design,

will appreciate the massive advance in image quality that the EMWL has achieved.

Such a jump in performance was only possible because of the huge amount of work Nauticam put into designing the system, and the diminutive 160 optic in particular. I have heard that Edward Lai evolved the basic design of the 160 more than

50 times to fully optimize the image quality, selecting from a choice of about 120 types of optical glass for each element (the full EMWL has 29 elements). The 160 was designed by running the de-signs on multiple computers in competition, making hundreds of millions of calculations to reach the optimum design. It took more



Backgrounds are important in wide angle macro, but challenging. Open the aperture and they blur out, speed up the shutter speed and they disappear in the dark. We are often forced into pushing the limits with settings. 1/8th @ f/20, ISO 320.

than one year of work just for this one objective lens. It must surely be the underwater lens with the most optical calculations poured into its design.

All this effort explains both the ground-breaking performance, but also the one factor that goes against the 160 - the price. At the time of writing the price is still to be finalised, but it is expected to be between \$2000-2500 USD. That sum comes directly from the extensive development costs, construction - including the two aspherical lens elements, plus the fact that the 160 will only be made in small numbers. The cost will surely push it beyond the price range of many, yet for those that get hold of one, it will give their images serious exclusivity.

Although the sharpness of the 160 EMWL is hard to fault, I feel that there is more of a deviation from, say, the WACP image quality in terms of the colour rendering and high-light capture. The subtle variation of the hues captured by the EMWL are inferior to my prime lenses or the WACP. They are very acceptable, as you can see, but not perfect. Perhaps the cause of this is that I find the many elements of my EMWL create quite a warm image. I often have to process the images below 4000K in Lightroom to get neutral colours. I wonder if this quite extreme white balance is squashing the colour information? These are minor points, and don't cause me reservations about using the lens, but I mention them for the record.

I did find the new 160 handled the sun well, when it was in the frame in Canada. The EMWL lenses can suffer flare and internal reflections when shot towards the light. Nauticam make lens hoods for them all. But I avoid them as they stop me manoeuvring and lighting quite so close to the subjects. Even shooting into the light regularly with



(Above) Subject matter is key to success with the EMWL, we need subjects (and diving skills) that allow a close approach, such as with this flighty lingcod. 1/20th @ f/16, ISO 500

(Right) Part WAM and part CFWA shot of a painted anemone beneath snell's window. The EMWL can do these shots, but I think a mini dome would produce a comparable frame. 1/80th @ f/16, ISO 500



the 160° objective, I didn't encounter any flare or reflections, despite never using the hood.

Autofocus works well with the EMWL 160, but unlike wide angle shooting it is critical to nail the focus because the subject magnification means such minimal depth of field. I tend to use single point. While WAM is promoted as a technique for shooting a critter framed against a wide angle background, with smaller subjects, this look is limited by the lack of depth of field. This also means that we need to stop the lens down, as much as possible to have some sort of detail in the background. However, shutting the aperture

makes it more of a challenge to achieve a balanced light image, which is needed to show that all important background. This was especially true in dark Canadian waters, where long exposures are often necessary to capture any ambient light. You can of course shoot the EMWL with a fast shutter speed and black background, but that, to some extent, defeats the object of the objective. To make things easier, I tend to favour shooting the lens on sunny days, and towards the middle of the day for



The EMWL produces strong colours, but I find myself using quite extreme white balance values with it, to correct for a warm hue. 1/200th @ f/20, ISO 500.



Mosshead warbonnet wide angle, peers out of a bottle at night. 1/200th @ f/22, ISO 200

maximum ambient light levels.

Wherever you shoot, key to success with the EMWL is the right subject. To produce macro levels of magnification with a wide angle lens, you need to manoeuvre that lens very close to the subject. This suits non-moving and territorial subjects. The ideal size range is marble to tennis ball sizes subjects. Go smaller and depth of field is too limiting, going larger works fine, but doesn't make use of the EMWL's unique capabilities.

So should you buy the 160? On

performance, definitely. For me, this is the best and most useful lens for the EMWL, to the point I will happily travel with just the 160 when baggage is tight. The 160 simply makes the EMWL better at what it is designed to do. The only stumbling block is the price. For newcomers to the EMWL system the 160 makes the system photographically more capable, but pushes the system purchase price even higher. Especially as the EMWL is a special effect lens, one that you won't use for every dive. So, its justification depends greatly on the

type of photography that you do and how regularly you will use it. I do think it is a good lens to consider buying with a friend, to share on trips to-gether and have it for yourself when traveling solo! But quite clearly, the new 160 makes the EMWL considerably more desirable.

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