



## **Nikon AF-S 500mm f/5.6E PF ED VR Lens Review**

by

E.J. Peiker

For many years, photographers have been asking for a super telephoto lens that has the same uncompromising image quality as the very large, heavy and unwieldy 500mm and 600mm f/4 prime lenses but in a smaller and lighter weight f/5.6 package that is optimized to be at peak sharpness when shot wide open at f/5.6. In a world of increasing restrictions on cabin baggage size and weight, this is especially important to the traveling photographer. Prior to Photokina 2018, Nikon announced just such a lens - the 500mm f/5.6E PF ED VR. This lens employs all of the technologies found in the much larger and heavier 500mm f/4E lens including the latest Vibration Reduction module, Nano Crystal coatings to reduce flare and ghosting, super fast AF-S focusing mechanism, professional grade weather-sealing, and professional level construction. To lighten and shorten the package even more than what one would normally expect of a 500mm f/5.6 lens, Nikon employed the Phase Fresnel (PF) diffractive optics technology which allows a lens to be much shorter and lighter than its focal length would normally dictate with standard optics. In early iterations of this technology, originally found in the first generation Canon 400mm f/4 DO lens, the Phase Fresnel concept resulted in low contrast images with often very ugly out of focus specular highlights. Fifteen years of technological advances has made those shortcomings a distant memory and the technology is now mature enough for professional grade super-tele lenses. The result is a 500mm f/5.6 lens that is only 237mm or

9.3 inches long and just 1460 grams or 51.2 ounces heavy. Compare this to the current 500mm f/4 which is 387mm or 15.2 inches long and weighs in at 3090 grams or 109 ounces.

After extensive use for several weeks both in lab testing and in real field work, here are some of the pros and cons of this lens:

Pros:

- + Excellent build quality with full weather-sealing

- + Extremely light weight for a 500mm lens, it weighs less and is much smaller than the 200-500mm f/5.6 and even the Nikon 80-400mm lens (@400mm) and is vastly superior to both optically and for autofocus.

- + Very hand-holdable for long periods of time and well balanced even with a body that does not have a battery grip attached

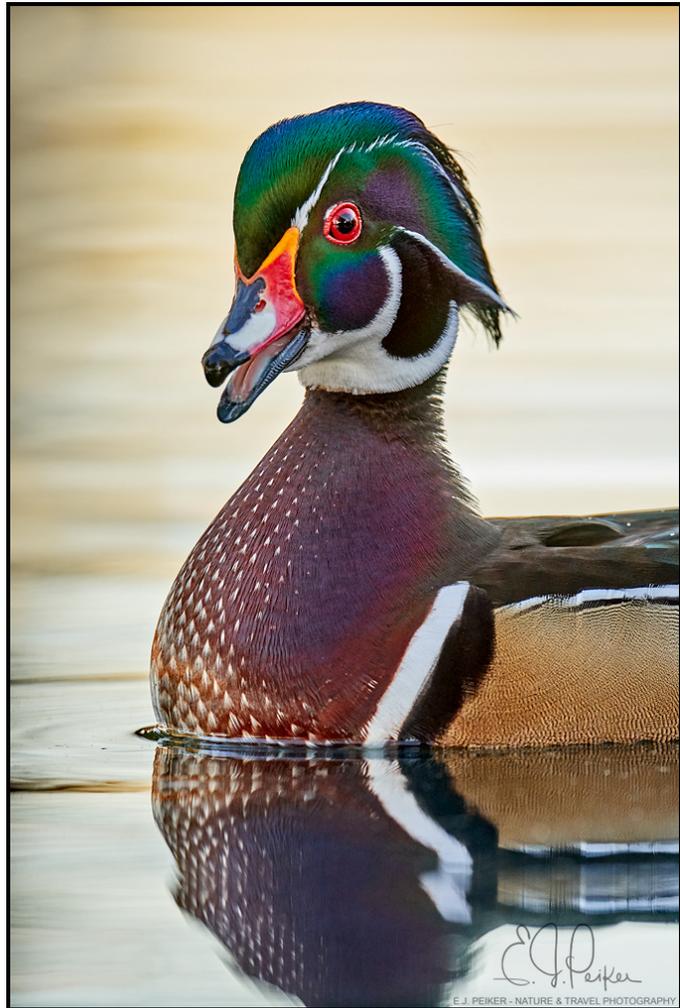
- + Exceptional image quality wide open, excellent image quality with the Nikon TC-14E III especially with VR off or in sport mode

- + No sharpness falloff seen at long shooting distances like some Nikon long lenses

- + In normal light there is absolutely no difference in focus speed or accuracy compared to the bigger, heavier and much more expensive f/4 lens.

- + While expensive, \$3600 for a super telephoto prime of this caliber is less than what I expected when the lens was announced, especially when compared to the \$10,300 price of the f/4 lens

- + The lens accepts standard 95mm front screw-on filters



Wood Duck (D500 with 500mm f/5.6E PF)

Cons:

- The lens collar, while stable is designed poorly and is fraught with danger for dropping the lens. This lens uses the same click in foot used in the 70-200mm f/2.8E lens and has the same problem that if the lens is carried by the lens foot, it is easy to disengage the removable foot accidentally and the direction that the foot slides on and off makes it very easy for the lens to fall off the foot and straight to the ground. This is even worse for the larger 500 f/5.6 because it is more likely to be carried by the foot. Make absolutely sure the twist knob on the foot is tightened firmly to avoid this drop potential. The only replacement foot available at this writing, the Kirk Photo foot which incorporates an Arca Swiss double dovetail for quick tripod mounting, also has this problem as it just slides into the same coupling that the Nikon stock foot uses. Additionally, the lens collar does not have click stops every 90 degrees like the long f/4 lenses do. This makes it a bit more difficult to go quickly from a perfectly level horizontal shot to a perfectly level vertical shot.

- The minimum focus distance of 10 feet, while relatively close for a 500mm lens, feels a little far for a lens this compact



Ringed Teal (D500 with 500mm f/5.6E PF)

## Optical Tests:

Both resolution chart testing and field testing for sharpness and other optical qualities were performed. Here is a summary of the resolution/sharpness tests shot wide open at f/5.6 without the teleconverter and f/8 with the teleconverter. There is little to no sharpness improvement by stopping down when just the lens (without TC) is used. With the TC, stopping down to f/9 or f/10 is a slight improvement but by f/11 we start seeing the first signs of diffraction on the higher pixel density cameras such as a D7200/7500 or D800/D810/D850 class. On a D4/D5, with much lower pixel density, f/11 is the sharpest aperture with a 1.4x teleconverter in place:

Configuration (at maximum aperture)	Center	Corner
500 f/5.6PF with VR off	Excellent	Excellent
500 f/5.6PF with VR Normal	Very Good	Good
500 f/5.6PF with VR Sport	Excellent	Very Good
500 f/5.6PF + TC-14E III with VR off	Very Good	Very Good
500 f/5.6PF + TC 14E III with VR Normal	Good	Mediocre
500 f/5.6PF + TC 14E III with VR Sport	Very Good	Very Good

I noticed right away, both in field testing and on the test charts that the most aggressive VR mode labeled as Normal, in every case degraded image quality noticeably. Specifically fine detail softened visibly. Fortunately the Sport mode, which is designed to be used in panning situations or other situations where the camera has to be moved while shooting, does not have this resolution reduction penalty. It must be stated that every IS or VR lens is sharper with stabilization turned off when shot in perfect conditions on a very solid tripod. In real world situations, however, the shooting scenario is often not up to this ideal standard and it is then when stabilization results in a sharper shot than if it was not present or on. On Nikon lenses, it is fairly well known that if the shutter speed is faster than 1/500 to 1/800 second, turning VR off results in sharper shots. On this lens, I found that VR Normal should not be used except in high vibration environments, like shooting from a car with the engine running or some other platform that has some vibration and the subject is stationary. In all other situations shooting with VR in Sport mode, up to about 1/800 sec is the preferred mode. For shutter speeds faster than that, turning it off gives the highest image acuity but the difference between VR in sport mode and off is minor. For most photographers permanently putting the VR switch to the Sport position is likely the best compromise for all situations.

Comparing these results with both the 500mm f/4 and the budget oriented, but generally highly regarded 200-500mm f/5.6 lenses, the new 500mm f/5.6 is essentially indistinguishable from the f/4 lens at f/5.6. The 500mm f/5.6 PF is very visibly sharper throughout the entire frame than the 200-500mm f/5.6 lens plus it is lighter and smaller than the zoom. Of course one gives up the versatility of a zoom but the image quality is on a different level which is to be expected of a lens that costs 3 times as much. Chromatic aberration is essentially nonexistent on the 500mm f/5.6PF without the teleconverter and only a very small amount that is unlikely to be seen in final photographs even without correcting in post processing is seen when the 1.4x teleconverter is attached. Again these results are far better than the 200-500mm chromatic aberration results.

## Autofocus:

Autofocus is on par with the 500mm f/4 lens and at least twice as fast as the 200-500mm for initial acquisition. Tracking is more accurate with less hunting on moving subjects than the 200-500mm lens and again on par with the 500mm f/4. The only time the 500mm f/4 has better AF performance is when the light gets low enough that the camera's negative Ev limit for AF is approached on the 500mm f/5.6 lens. Since the f/4 lens lets twice as much light to the AF sensor, it naturally will focus in lower light than the f/5.6 version can. With today's -3 Ev systems, this generally will not be an issue for the vast majority of photographers in real world photography.



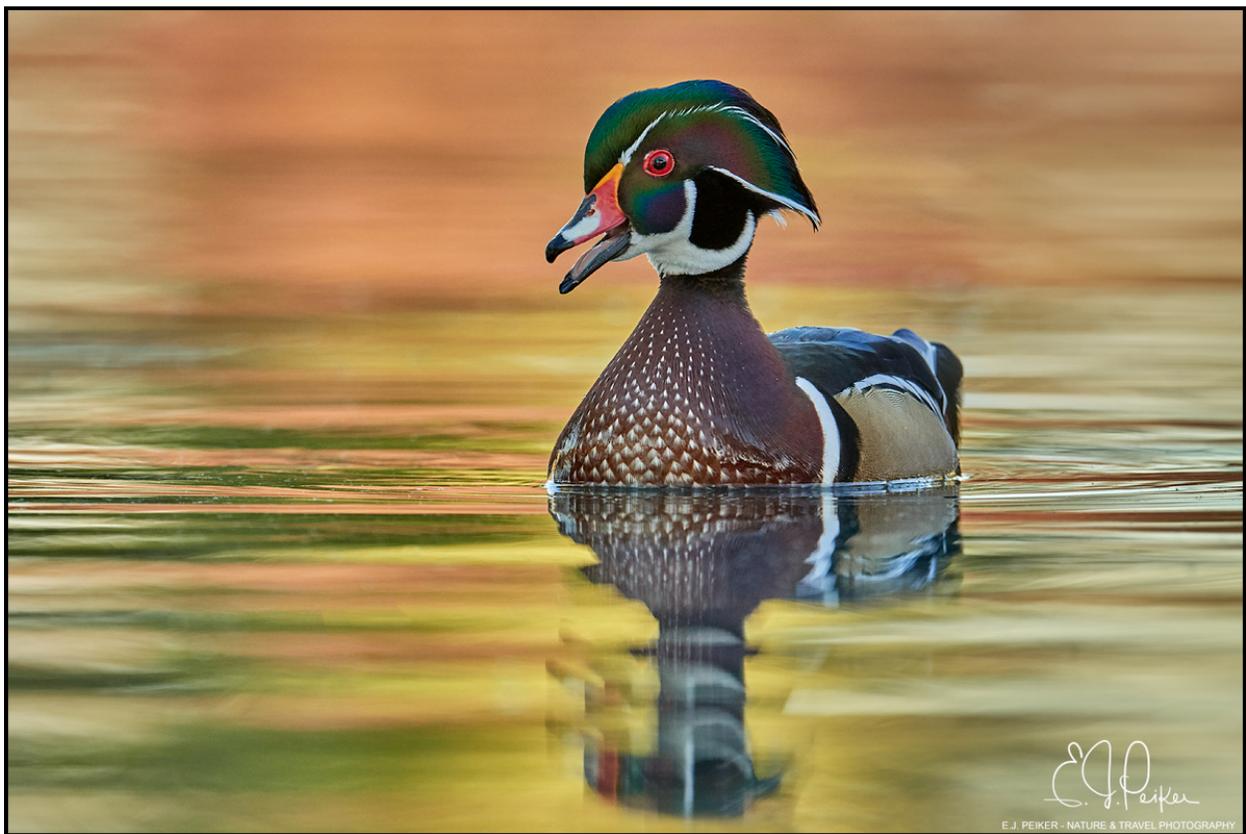
Green Heron (D500 with 500mm f/5.6E PF)

## In The Field:

The Nikon 500mm f/5.6 PF lens has put the joy back into bird photography for me. It is a lens that I can easily carry all day without hurting at the end of the day. It is perfectly stable on a lighter tripod with a lighter head and can easily be hand held for long periods of time compared to a 500 f/4 which can weigh more than two times as much and has a lot more weight on the front of the lens creating a bigger lever arm and making it feel even heavier than it is. Even though the same camera mounted on the 500 f4 weighs only about 4 pounds more, the much larger size and much more front heavy combination, makes it feel dramatically more than 4

pounds heavier and increases fatigue substantially. Additionally, the 500 f/4 really needs either an optional battery grip or a larger camera like a D5 to properly balance but the 500 f/5.6 feels well balanced without a larger heavier body and without a battery grip. It matches up perfectly with a D500 or D850 body with no battery grip attached. This further reduces the weight and fatigue. It also allows the photographer to be much more nimble making it more likely to get the shot of a quick fleeting subject.

My biggest complaint about the lens in the field is the lack of click stops in the collar resulting in more time to properly go from a horizontal to a vertical composition or vice versa and the risk of the lens falling to the ground due to the terrible design of the lens foot attachment. Always, always, always make sure that the tightening knob for the lens foot is very tight, not just sort of tight, but so tight that it is difficult to loosen.



Wood Duck (D500 with 500mm f/5.6E PF)

In summary, Nikon has an absolute winner with this lens. It is sharp, lightweight and offers excellent performance as a wildlife lens and reduces photographer fatigue by orders of magnitude on long shoots or travel - anytime one must carry the lens for more than a few minutes. With the great success of the highly regarded 300mm f/4 PF and now the even better 500mm f/5.6 PF lens, I hope Nikon rounds out the lineup with a 600mm f/5.6 PF lens. While lenses such as this most definitely eat into sales of the bigger f/4 super telephoto lenses, I think this loss will be more than compensated by sales volume of the PF lenses. An indication of this

is that wait times to get one of these lenses is long. Even for Nikon Professional Services priority customers, the wait time is about 4 weeks. Unless you are very lucky and stumble onto one at a smaller local retailer, the wait time for a non-NPS member could be as much as three months.

## **Disclaimers**

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