

Between the Canon 100-500mm and the Canon 600mm, which is the best lens for bird and mammal photography?

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Figure 1 Using the Canon 100-500mm zoom lens, I zoomed out to 451mm to make a bigger image of this small Harris's antelope ground squirrel. As the day was cloudy, I kept the shutter speed slower than I normally would, so exposure was 1/250 second, f/6.3, and ISO 2000. I used Auto ISO with a +2/3 exposure compensation.

The short answer – it depends!

I have used both the Canon RF 100-500mm and the Canon 600mm f/4 lens for bird and mammal photography to shoot more than a million wildlife photos over the past two years. Which one is the best choice, and which one do I use most frequently?

First, let us look at a couple important specifications for each lens.

Canon 100-500mm

Lens Speed

This is a variable aperture zoom lens built with the super high-quality L glass. At the shorter

focal lengths, it has a maximum aperture of f/4.5, but quickly loses lens speed as you zoom out to the longer focal lengths. Since the lens is mainly used at 400mm and greater for wildlife, essentially the lens has a useful maximum aperture of f/7.1.

The f/7.1 aperture allows Canon to produce a lighter lens as the glass does not need to be as large and therefore it is easier to carry and less expensive. The f/7.1 does mean you cannot throw the background out of focus as you might like if the aperture is bigger, say f/4, but it is a tradeoff I consider worth accepting.

It is possible to use a 1.4x teleconverter on this lens too, but I rarely do that as that cost one stop of lens speed so that makes the lens an f/10 lens. The slower lens speed forces me to use a slower shutter speed or higher ISO to make up for the loss of light.



Figure 2 The far edge of this reflection pool at the Desert Retreat near Marana, AZ is about ten feet away. That means my Canon 600mm cannot focus on this cactus wren as the minimum focus distance for that lens is 13.8 feet and that is greater than the distance to the wren. But the Canon 100-500mm lens easily focuses on wildlife subjects that are much closer as its minimum focus distance is only 2.95 feet!

Minimum Focus Distance

The minimum focusing distance (MFD) is a tiny 2.95 feet. That is incredible for a lens of this focal length and enormously useful for wildlife photography of small birds and mammals. To fill the viewfinder with a tiny hummingbird,

warbler, or chipmunk, for example, often I must be within feet of them and that means focusing closer is crucial for success. While I have never needed to focus on wildlife as close as 2.95 feet, I often have to focus as close as 6-8 feet and this lens does that easily. This lens is super for small birds especially where they must be photographed at close distances.

Focal Length Options

I do two kinds of bird photography where I work the subject quite differently. Often I use a blind to conceal myself and any movement I might make. This is especially true when photographing birds at my water drips and/or seed feeders. In this case, I am hiding in a blind that is staked to the ground, and it is not possible to move the camera closer or further away from the subject. Some wildlife subjects are bigger than others and it is necessary to change the focal length rapidly to accommodate subject size. For example, at my water drips, I need less focal length for a robin sized bird than I do for a warbler. And at my reflection pool, keep in mind the size of the subject instantly doubles when it enters the pool and I compose it to include the reflection the subject produces.



Figure 3 This mourning dove doubles in size when you include the reflection. A zoom lens makes it simple to handle subjects that vary in size!



Figure 4 This Gambel's quail liked to perch on the log far in the back of the opening. To make its image large in the viewfinder, I had to use the greater reach of the Canon 600mm f/4 lens and also set my Canon R5 crop factor to 1.6x to achieve a maximum reach of 960mm.

When on safari in Kenya leading photo tours there, once again it is imperative to change focal lengths rapidly to suit the size of the subject and whether the subject is coming closer or moving further away. A zoom lens is the answer to situations where you cannot change your photo distance to the subject.



Figure 5 The curve-billed thrasher builds their nest in cacti, and they are certainly careful about landing on one too. Here the 600mm lens gives me the reach to nicely photograph this bird on a cactus in the background.

Having every focal length between 100-500mm is enormously useful! And it gets even more useful when you use the crop factor in your

camera. For example, I am currently using the fabulous Canon R5, and that camera offers a 1.6x crop factor. I assign the crop factor to the top right button on the rear of the camera so I can quickly change from full frame to 1.6x crop. Now the 100-500mm lens when using the camera's 1.6x crop mode becomes a 160-800mm lens – at least in terms of field of view. I am well aware the optical focal length does not change but the field of view does make the subject larger in the viewfinder making it easier to see if the subject's pose is good or not. Knowing if the subject's eye is open or the subject is looking slightly away or toward me helps me know when to shoot images. While the file size does fall to around 17MP when shooting crop mode images, I find that size is most suitable for my needs. Also, the smaller files do not fill the camera's buffer and that means I can shoot continuously for several consecutive seconds if necessary, more images can be stored on the camera's memory card, and the images download quicker to my SSD external hard drive. All this is a plus that you do not get if you only shoot full size images and crop later in processing.

Canon 600mm f/4 for a DSLR but I use it on the Canon R5 with Canon's Adapter

Lens Speed

This lens is a fixed f/4 lens speed and with a 1.4x teleconverter, it is a fixed f/5.6 lens speed. F/4 lets in about four times as much light as the f/7.1 lens speed of the 100-500mm lens. This allows you to photograph effectively in dimmer light as it enables you to use more shutter speed or lower the ISO. While I prefer to stop down the lens to at least f/8 when the amount of ambient light allows me to do so, there are times when photographing at dawn where I must use f/4 to keep the ISO down and the shutter speed "reasonable." This is especially true when I am photographing water birds in my floating blind where the blind floats the camera

gear, hides me inside of it, and I wear chest waders to walk in the water along the shoreline. I enter the water a little before sunrise and quite often fog on my local lake keeps the light dim for a while. Eventually, the early sunshine dissipates the fog on the water, but photographing wild birds just as the first rays of sunshine penetrate the fog and light my subject is quite special to me. For this, the fast f/4 aperture is quite helpful for capturing sharp images without the ISO rising too high. Of course, one thing I have learned over the past couple years is now I can effectively use higher ISOs than I thought I could, especially when exposing properly and using noise reduction software to deal with the noise at ISO 2000 and greater.

Indeed, I am about to teach a bird photo workshop at Laguna Seca Ranch near Pharr, TX and I plan for the first time to try using the Canon 100-500mm lens with the RF 1.4x teleconverter. That will make the lens maximum aperture a rather slow f/10, but using higher ISOs makes that doable as proper exposure to begin with and using DXO or Topaz software to reduce noise truly make higher ISOs such as ISO 8000 useful to other bird photographers that I know. I think it can help me too. That means with the 1.4x teleconverter on the Canon 100-500mm lens, the lens is optically converted to 160-800mm f/10. And by using the Canon R5's 1.6x crop mode, then I can get the reach of $(800 \times 1.6 = 1120\text{mm})!!!!$

Minimum Focus Distance

The MFD of the Canon 600mm f/4 lens is 13.8 feet. That sounds fairly close but let me assure you many small wildlife subjects must be photographed at closer distances. If you are photographing small birds like warblers, vireos, and wrens, they will be tiny (I call them DOT birds) if you photograph them at 13.8 feet or greater with a 600mm lens. You need a lens that focuses closer than that. Now you could

use an extension tube to make the lens focus closer, but then you have a "fuss factor" of putting the extension tube on and it cost you light too. Also, I cannot find any Canon made extension tubes for the RF lens mount. They do have a 25mm and a 12mm extension tube for the older FD mounts, but that will not help with your RF lenses. Fortunately, a couple third-party companies make RF extension tubes for the new Canon mirrorless cameras, and these include Meike and Vello. I have no experience with either brand, so cannot say how good they work, but they are available.



Figure 6 This rock squirrel is rather large. It is bigger than all the other subjects I was photographing at the reflection pool. Using the Canon 100-500mm zoom lens made it easy to adjust the focal length to deal with the larger size!

Focal Length Options

This is a prime lens and that means the focal length is fixed at 600mm. You can optically increase the focal length and still get sharp images by using a Canon 1.4x teleconverter that is placed on the camera and then the lens is attached to the converter. The 1.4x teleconverter cost one stop of light but you gain more focal length. With the 1.4x teleconverter in use, you have an 840mm f/5.6 lens. That is still quite fast, especially for such a long focal length. I have found that sharpness improves if you stop down to at least f/8 when using this combination and it has little to do with more depth of field. I used a flat detailed stamp as my test target, so the subject has no depth, and

stopping down at least one stop more to f/8 produced a sharper image of the stamp.



Figure 7 The mourning dove immediately stretched its wing when it began to rain making the bird much larger. So, I zoomed the Canon 100-500mm lens to a slightly shorter focal length to accommodate the large profile with its wing up.

With the 600mm lens, obviously I have the reach of 600mm and when using the 1.4x teleconverter, the reach optically increases to 840mm. And I can increase the reach further by switching my Canon R5 to the 1.6x crop factor. Now I have the reach of $600 \times 1.4 \times 1.6 = 1344\text{mm}$!!!! Now that is a lot of reach and by the way, I define reach as how big the subject appears in my viewfinder. If you need more reach than 1344mm, move closer to the subject or find a subject that will allow a closer approach. Some use a 2x teleconverter, but I had such poor results in the past that I am reluctant to try it. Clients tell me I should try it again....and maybe I will.

When photographing wildlife where I am free to stalk it, then I prefer the longer telephoto prime lens such as the 600mm f/4. Since I can move closer or further away from a subject, I move to the most suitable distance and shoot from there. This works great when stalking birds on the shoreline, in my meadow, and especially when stalking birds in my Mr. JanGear moveable floating hide. Then I want all the reach I can get! Normally I start stalking inside my floating blind with my Canon 600mm f/4 lens and switch to the 1.6x crop factor when I want the subject

larger in my viewfinder. Usually this is enough, but for some especially nervous subjects, I sometimes use the 600mm with the 1.4x teleconverter and also the 1.6x crop factor combo to reach 1344mm. That nearly always works. I am thinking about buying the new Canon RF 800mm f/5.6 lens for use in my floating blind. That would be awesome! Nearly always 800mm works fine, but when I need more reach, merely switching the camera to the 1.6x crop factor give me the reach of $800 \times 1.6 = 1280\text{mm}$ lens! And that is without adding a teleconverter to the optical path.

I realize the new RF super telephoto lenses like the RF 600mm and RF 800mm are expensive and many cannot afford them, but Canon does offer RF 600mm f/11 and 800mm f/11 lenses that are far less expensive.



Figure 8 This pyrrhuloxia was shy, so I used the Canon 600mm lens with the camera set to 1.6x crop mode for a reach of 960mm to take this image.

The Bottom Line

I use both the Canon RF 100-500 and the 600mm for wildlife photos and use them about 50/50. Neither lens is perfect for everything I do, so I will not be giving up either lens unless a new lens made by Canon becomes available. What lens would I like you ask? Well.....thinking here.....how about an RF 200-600mm f/5.6 lens

that focuses as close as six feet. Now that would get my attention. That would certainly make me move away from my Canon RF 100-500mm lens as the extra reach of 600mm would be helpful, but I likely would keep the smaller 100-500mm lens for handheld action photos such as flying birds as the smaller lens is easier to handhold and swing with the moving subject.



Figure 9 The wood duck lived at a city park in downtown Tucson, AZ. It was unafraid of me, but swan in and out so I continually had to adjust the focal length of my Canon 100-500mm lens as I photographed it at different distances. Also, I had to shoot hand-held here with all the ducks swimming about and that was easy to do with the Canon 100-500mm with the image stabilization set to Mode 2.

A Word about Teleconverters

For many years, I rarely used my 1.4x teleconverter and never owned a 2x teleconverter because the models I tried did not meet my sharpness standards. I just was not willing to give up that much image sharpness by adding teleconverter glass to the optical path. But, over the last several years, I have been getting suitable results with Canon 1.4x teleconverters when my older Canon cameras offered AF microadjustment. I found that carefully adjusting the autofocus greatly improved image sharpness. As it turned out, nearly all lenses I tested with DSLRs, the last one being the Canon 1DX Mark III, required some focus adjustment to improve focus on the subject. Either the lens back focused or front focused and careful tests that I ran in my garage

under controlled conditions helped me achieve more precise autofocus. Now my Canon R5 focuses at the sensor plane and precise focus is vastly improved. And now that my camera will detect the eye of my wildlife subject, and focus on the eye, I routinely get amazingly sharp images today. Clearly the teleconverters are capable of sharp results, but focus problems prevented that in the past. Now that autofocus is vastly improved, teleconverters are a viable option for achieving longer focal lengths!

Thanks for Reading This Article

I hope you enjoyed it and my discussion about long lenses for wildlife photos cleared up why you need certain things for different types of wildlife photography. No single lens can do it all for me and probably not for you either. I author these articles for selfish reasons. Writing is one of my favorite ways to relax, it helps me more fully understand what all the photo issues I am thinking about are, and it does double duty by providing me another means to teach all the photography clients I have who attend my numerous photo workshops. Thank you everyone for all your support over these many decades!



Figure 10 Cactus wrens are quick little birds that move continuously. Using the Canon 100-500mm lens, I managed to catch the bird making a nice reflection.



Figure 11 I was using the Canon 600mm f/4 lens with the camera set to the 1.6x crop factor to photograph a single gila woodpecker on this cholla branch. Then a second woodpecker joined the first, and now I was too tight to photograph both. So I quickly changed to full frame mode and then I could get both in the image. I was lucky that both for a moment were in the same plane so both were in sharp focus. Most of the time one bird was slightly closer than the other, but I shot over 100 images and several caught the two birds at the same distance. The other images where one bird was not in sharp focus were deleted.



Figure 12 I needed the reach of my Canon 600mm with the Canon R5 set to the 1.6x crop mode to reach this Harris's antelope ground squirrel enjoying the flowers!



Figure 13 The male Gambel's quail liked to perch on this rock. Again, I need the 600mm lens to capture a large image of this quail in the background.



Figure 14 It is possible to make a decent image for the web even when you cannot make a subject big in the viewfinder. This is the first hooded oriole I have ever seen. I used a Canon 100-500mm with the 1.6 crop mode and still it was tiny. I cropped the image way more than I would like, but it works fine for the web, but the file size is too small for a large print. In my mind, it is a "dot bird" but that still works to show others what you saw.