

The Newsletter of E.J. Peiker - Nature Photographer

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Welcome to the quarterly newsletter from E.J. Peiker, Nature Photographer and <u>www.EJPhoto.com</u>. In this quarterly publication, I share with fellow photographers my photographic experiences, photo equipment reviews, photo and processing tips, and industry news. I also inform subscribers about upcoming workshops and products that I offer. All content is copyrighted by E.J. Peiker and may not be reproduced but it is permitted to forward this newsletter but only in its entirety. If you would like to be added to the mailing list, unsubscribe, or access back issues, please visit: <u>www.ejphoto.com/newsletter.htm</u>



Water Taxi Blur, Singapore River, Singapore (Sony a7R Mk II, 24-70mm)

Techniques For The Advanced Photographer

In this issue of the now 16 1/2 year old newsletter I am going to focus on some advanced techniques for the photographer who wishes to take their imaging experience to the next level...

Focus Stacking

In landscape, macro, and product photography we are often required to produce very significant depth of field where everything from the foreground to the background must be in perfect focus. This presents some significant challenges. One can stop down to f/22, f/32 or even smaller apertures on some lenses but at a significant loss of quality due to ever increasing diffraction. In some instances, especially in macro photography, there simply is no aperture available that can give one the depth of field required to render a subject sharp from front to back. Using tiny apertures (high f-numbers) can also result in shutter speeds getting very slow where motion blur could be a serious problem. In product and macro photography, slow shutter speeds can often be mitigated by using strobes but this is usually not an option in landscape photography. Furthermore, as sensors have gotten to higher and higher resolutions and digital imager sizes have increased, getting the depth of field needed without losing too much detail to diffraction has required photographers to find ways to mitigate these compromises. One solution is to use tilt shift lenses but there is a very limited selection of lenses and focal lengths available and they do not have autofocus.

Another solution, one that I have turned to quite often, is a technique called focus stacking.

Focus stacking is when a photographer photographs the same scene and takes several photographs at different focus settings using the sharpest aperture that is not recording diffraction for your specific sensor. This is generally in the f/5.6 to f/8 range depending on lens and sensor. The images are then combined in post processing using a number of tools that pick the sharpest parts of every frame to render a sharp image from background to foreground without losing any detail.

My general approach to focus stacking in landscape photography is to determine the farthest point I want to be in focus, which is usually infinity, and the closest point I want in focus, which is usually whatever is bottommost in the frame. I have determined that a general rule of thumb for the number of frames to shoot is to take the focal length in use divided by 10 at f/6.3 for a shot that has everything in focus from something very close to me to infinity. I choose f/6.3 because it is the best aperture on most lenses where neither my Sony a7R Mk II or my Phase One XF-IQ3100 record lens diffraction as both have approximately the same individual pixel size. For example if I am shooting a scene with a 35mm lens I will take 4 shots. I always round up so a 24mm shot would be 3 frames, an 85mm shot would be 9 frames, etc... The photo on the right was taken with a



Silly Mountain, Arizona (D800E, 24mm, 3 focus stacked frames)

24mm lens so I took 3 focus stacked frames. To determine the amount to change focus by between shots I use focus peaking on the a7R Mk II and watch the peaking move from back to front making sure that there is significant overlap in the peaking highlights between the frames. On the Phase One XF, I use it's built in focus stacking feature which allows me to set maximum focus distance, minimum focus distance and the number of frames and the camera automatically calculates the correct focus position for each frame and executes the focus stack exposures with the push of a single button. On a 35mm DSLR, which I no longer recommend for landscape photography unless it has live view with focus peaking, I would execute the stack in live view with peaking turned on. If you are shooting with something like a Nikon or Canon DSLR that does not have focus peaking you will have to eyeball it by either manually focusing between frames or moving the AF point from the top of the frame to the bottom of the frame sequentially as you execute the stack.

Make sure that the camera is not in automatic white balance mode (AWB) and make sure it is in manual

exposure mode so that neither the colors nor the exposure changes as you take the individual shots for the focus stack. I would use the same focus peaking method in macro photography but this is best done with a focusing rail that allows one to move the entire camera ever so slightly so rather than changing focus on the lens, you are changing focus by moving the whole camera/lens combination.

Once you have all of your images captured and downloaded, the challenge becomes assembling the various images in the focus stack into a single high depth of field photograph. Nature Photographers tend to use three methods to this. The first and most likely to already be on your computer is Photoshop. In Photoshop, simply load all



Australian Fan Palm Frond (Phase One XF-IQ3100, 80mm, 9 focus stacked frames)

of the images in the stack into a single layered document, then use the autoalign function by selecting all of the image layers (File > Autoalign Layers) and then select the automatic blending option (File > Auto-Blend Layers) - make sure in the Auto-Blend Layers dialog box, you check "Stack Images". Earlier in the article I said to shoot the infinity focus shot first and finish the stack with the closest focused frame. While this may seem counterintuitive, it will save you some time in post processing. Most lenses, as they focus from minimum focus to infinity focus change their focal length slightly, the lenses tend to get longer in focal length at infinity. By shooting this shot first, the areas that are slightly wider in the closer focused images will be below the farthest focused layer in the Auto-Blend operation so the areas that are shot with a slightly wider focal length will not be visible. If you shoot the closest focus frame first, you will need to crop all of the areas that are wider than the farthest focused frame in the final merged image.

If you do focus stacking a lot, as I do, you may find that Adobe's built in feature is a bit limiting and you may want to explore purpose built applications for focus stacking. These feature many more fine tuning options which can be very useful if there are things that are moving in the image such as grasses in a breeze, clouds, etc... The two big hitters in this game are Helicon Focus and Zerene Stacker - both are outstanding products. I personally use Helicon Focus and have found that the following settings followed by some fine tuning with the built in layer brush give me the results I want nearly 100% of the time - Rendering Method B (depth map), Radius 8, Smoothing 3.

If you need to exposure bracket in addition to stacking focus, my recommendation is that you perform the exposure blending or HDR rendering first and then do the focus stacking; just be sure that you do EXACTLY the same blending or HDR technique on each HDR image. Once you have several identically processed exposure blends, each at a different focus point, do the focus stacking procedure outlined above. While all of this seems complicated and time consuming, you will definitely get much better and much faster with time and if it is a truly worthy image, then even an hour or more of post processing time is not time wasted.

Lens Cast Calibration

Just when you thought focus stacking was complicated enough, I introduce the concept of lens cast calibration. If you are a user of technical cameras with a digital sensor attached then this technique is old hat as you need to do it for almost every shot. In the 35mm full frame camera world and smaller (APS-C, m43, etc) this technique isn't practiced much but it can be very useful. The basic concept is that you characterize a lens for its cross frame color cast and light fall-off characteristics and then apply the negative of these lens shortcomings to your images thereby eliminating any vignetting, color shifts and even sensor spots. Wide angle lenses, especially super wide angle lenses are more prone to these problems since the angle of incidence of the light reaching the sensor from the exit pupil at the rear element of the lens is not a perfect 90 degrees in the corners and on the edges of the sensor. This can cause some light to spill to adjacent pixels causing color shifts due to the nature of the RGGB Bayer sensor array. Sensor manufacturers have compensated for this to some degree through advanced micro lens designs over each pixel of the sensor but this is a compromise as every lens type is a bit different. In order to remove any other lens artifacts that the microlenses do not compensate for, a technique called Lens Cast Calibration or LCC can be used. All you need is a neutral toned white translucent piece of plastic that is free from any color cast or changes in density. Retailers of medium format gear have these in stock and will be happy to sell them to you. Here is a link for a product that will do this if you want to get started https://www.digitalback.com/product/pocket-lcc/. If you heed something bigger than these, a plastic manufacturer such as https://www.OnlineMetals.com (Enter "Plastic Acrylic White" in the search box) will sell you any size you need. I suggest the thinnest size.

Once you have your translucent piece of plastic, simply photograph the scene with this in front of the lens making sure that it fully covers the lens and make sure you use the same focal length setting and aperture as your photograph; adjust the shutter speed to give you a mid tone or a zero meter reading. In post processing you will apply this lens cast correction frame to your photograph. This is most easily done in Capture One which has LCC built in due to its heritage as a tool for Medium Format photographers. If you are an Adobe user, there is a LightRoom plug-in that is available that also performs this function. Adobe calls this Flat Field Correction - you can get it here: http://labs.adobe.com/technologies/lightroomplugins/

After the lens cast calibration frame is applied to your image any vignetting, color cast that is uneven across the frame, and even dust spots will magically disappear. Many technical camera photographers do this for every frame but I find it is not necessary for DSLR and mirrorless photography, even medium format photography. Instead, I have built a library of LCC shots for lenses that need it at every aperture and then

apply those in my Capture One Pro workflow. If you do a white balance on the LCC frame in the center of the image in either C1 Pro or LR prior to applying it to your image, it will not change the white balance on the actual photograph to which you are applying the LCC profile but it will remove any odd color casts. Of course if you work off of an LCC library, the dust removal option won't really work since dust spots change over time - the LCC tools specified above allow you to turn off the dust mapping portion. If you would like to incorporate lens cast correction with focus stacking and exposure bracketing, you only need to take a single

LCC frame for all of the exposures unless you are using a lens with extreme focus breathing like the older Nikon 70-200 f/2.8G VR2 or either of the Tamron 70-200 f/2.8 lenses including the just released G2 model.

To the right you will find an example. These are just some quick and dirty shots to show you the effect of applying an LCC profile. The photos are of a cloudy sky at Palouse Falls in Washington taken with the Schneider Kreuznach 28mm lens. In full frame 35mm terms that is a field-of-view of around 18mm. A lens this wide is very difficult to make for the very large 645 medium format sensor without vignetting and color shifts. As you can tell in the uncorrected photo, there is significant lightfalloff and a slight green shift in the corners. After applying the LCC profile to the photo on top, as illustrated in the photo on bottom, these lens/sensor interactions are completely eliminated. Applying the correction also reveals that the lens has a slight overall green cast as you can see slightly warmer clouds in the center of the corrected frame.

You may ask, why not just let the automatic lens corrections in our RAW processors correct this? If you are using a native mount lens on a camera it was designed for then in most cases you won't need this as long as a lens profile is supported by the RAW converter but in the age of mirrorless cameras where so many are adapting lenses designed for different cameras, different flange distances, and different sensors, there aren't built in profiles in your RAW converter. Even if you are



Schneider 28mm f/4.5 with and without LCC profile

shooting a native lens on your camera, the profile that is in the RAW converter is specific to the lens that was used by the software company that made the profile and variations in samples or manufacturing updates during the production life cycle of the lens may result in your lens having different characteristics than the one used to make the profile. My old Nikon 70-200 f/2.8G lens was one such lens. The Adobe profiles for the lens in Camera Raw resulted in reverse vignetting when I used the canned lens profile.

If you are an Infrared photographer and want to use any lens, even one with the dreaded IR hot spots, this technique will completely eliminate the hot spots. I have an IR converted Sony a6000 that I like to use with the very versatile Sony Zeiss 16-70 f/4 (24-105 full frame equivalent) but this lens has a significant hot spot in the center of the lens. By creating LCC profiles with the IR converted a6000 at 16, 20, 24, 28, 35, 50, and 70mm and at apertures ranging from f/5.6 to f/11, the only apertures I'd be likely to use with this lens I can easily and quickly eliminate any hot spots.

Fast/Slow Exposure Technique

In landscape and travel photography, where there is water involved, we often want to use a very long exposures to smooth out the water. When you don't have smooth water, it usually means you have wind so simply slapping on a high powered Neutral Density (ND) filter to slow the exposure accomplishes blurring the water just fine but also blurs everything else that's getting blown by the wind. Additionally, to get a slow

enough shutter speed to blur the water, even with a strong ND filter, the situation might still dictate the use of small apertures that lead to diffraction induced sharpness loss and ultimately photographs that aren't as sharp as they could be. Finally, on days with wind, even the sturdiest of tripods can still impart a tiny bit of movement which today's most advanced sensors will record resulting in a less sharp shot that what is desired. There is a simple solution to this that surprisingly few photographers use. I use this guite often in these situations. The Fast/Slow exposure technique consists of taking two photographs, one with a fast shutter speed that provides sharp results and one with a long exposure to blur the water (or sky, or whatever you would like to blur). These two shots are then combined in post processing and the blurred area is selected off of the long exposure shot and everything else in the final frame from the short exposure shot.

Let's take an example from a breezy morning in Singapore. Shot 1 was taken at f/5.6 and 1/2 second, Shot 2 was taken at f/18 and 25 seconds. Astute readers will notice that my second shot is overexposed by one stop compared to the first shot. This was done intentionally since I wanted a more dramatic blurring of the water. Since the water is dark to begin with, I can

easily underexpose this frame by a stop in post processing and get all the blurring benefits of the much longer exposure time but then return it to the proper tonality by reducing the exposure slider by 1 stop in the RAW processing software. I am left with one shot at a very sharp aperture well away from the diffraction limits of the sensor but with choppy water and another shot with nice and smooth water but the other areas having a reduced sharpness due to diffraction and any wind induced camera shake. Combining them is as easy as bringing them both into







the same Photoshop document as two layers, performing an auto align and then using a layer mask to hide or reveal the sharp and blurred areas.

Slow Shutter Speed and Multiple Exposure People Remover

For much of the photography I do, I don't particularly want people in the shot but I also don't want to spend a bunch of time cloning them out of my final photographs in Photoshop. I use two different techniques to eliminate them:

1. My favorite technique, which works well when people are moving along relatively quickly and light is low, is to simply shoot the exposure at a long shutter speed. This may require a neutral density filter. If a person's position in a certain location is much shorter than the overall shutter speed, they occupy that point in space for such a short time that they do not show up in the picture. I used this technique in the photo below where there were people walking across the helix foot Bridge in the left hand position of the photo but my long exposure made them completely disappear without having to eliminate the people in Photoshop.

2. Another technique I employ is to take multiple shots making sure that I have at least a couple of shots where every area in my photograph is people free even though there isn't a single photo that is completely free of them. When I take the clear areas of all the shots and combine them, I get a people free shot. In post processing one can use several methods to select just the clear portions of each frame. If you have a newer version of Photoshop that has the Median filter built in you simply bring all the images into a single layered document, convert the layers to smart objects and then select the median filter - the people instantly vanish. If you do not have a version of Photoshop that allows this, you can do it manually by using layer masks although this can be a slow process with some trial and error. Finally you can retask a program like Helicon Focus, the focus stacking software, to do this by using it's adjustment tools to select clear frames to paint in areas where there are people.



Marina Bay, Singapore (Sony a7R Mk II, 16-35mm)

The Story Behind The Photo

Going forward, when I have an interesting story to tell about a photograph, I will dedicate a bit of the newsletter to this photo and its story. Here is one from my recent trip to Washington's Palouse area:



Palouse Solitude, Washington Phase One XF-IQ3100, 75-150mm @ 100mm, ISO 50, f/8, 1s

I had visited this spot in southeast Washington's Palouse area earlier in the week but it was solid overcast at mid-day so I wanted to return before I left since I really like the solitude of the scene and thought it might make a good photo if there was something going on in the sky and if the mountains in Western Idaho in the background were visible. After a night of significant rain, I looked outside at 3:30AM and saw that the rain had stopped and since there was already a bit of light at that hour in Washington in June, I could see that there was some definition in the clouds with a few breaks. So I decided to return to this spot pre-sunrise on this, my last day, before flying home. This little farm is located in a bowl in the rolling hills of the eastern side of the Palouse near the Idaho border. Access is via a dirt road followed by a grassy double track. My front wheel drive Toyota Corolla rental car had no problem getting there despite having to climb a dirt road hill just after leaving the main road. After taking this shot and a few others, I was preparing to leave and spotted a small wind-mill/wind vane situated next to a tree in the distance. I thought it would make for a nice final photograph. I proceed down the relatively steep gravel hill and about halfway down my car started slipping and sliding as the road had turned to mud - I knew it was going to be difficult going back up that hill to get back to the main road. I got near the bottom and took the photograph. I decided rather than to try to go back up the hill I just slid down I would keep going on this road and link up with another that would take me back to the main road. Not too far along the muddy road, I was faced with another muddy hill - my little Toyota made it about halfway up before bogging down. I put it in reverse to back down... and nothing! The wheels wouldn't even turn. Time to find the traction control switch and turn it off! This allowed me to back back down even though my driver's side wheels had slid into a bit of a trough. I finally made it back to the bottom and tried again, this time with traction control off. The car was sliding all over the place and I made it no farther up the hill than before. Even with the traction control off, there must still be some sensors in

this car that basically disengages the transmission and drive by wire throttle when it detects two much wheel spin - I'm starting to think I would need a locking differential to get back out and may have to hike back to the main road... there is no cell service here and it is 5:00AM! I clearly wasn't going to make it up that hill so I somehow got the vehicle turned around in the mud and proceeded to try to drive up the hill that I initially came down. I got about halfway up and bogged down again. Meanwhile my white car no longer had any white visible and the windshield wipers with wiper fluid assist were giving me just a small hole to look through. I backed back down, spun out, and decided to try again. I bogged down again but what was puzzling to me was that it wasn't that my wheels were digging in, it was the computer in the car that was shutting down the drive; if I could just keep the wheels going there would be a chance I could get out. I was now getting really worried that I might not get out of here for some time and might miss my flight. So back

down I went for one more try. This time when I bogged down due to the wheels no longer turning I decided to hold the car with brakes while I brought up the RPM of the engine in neutral and then shifted it into gear while simultaneously releasing the brakes and sure enough I could go forward about 10 feet before the wheels stopped turning again. I now had a procedure to get out and after many of these neutral, RPM up, shift into gear while releasing the brakes cycles, I made it back onto the gravel part of the road and got out of there. I was now driving along a state highway in a car that probably weighed several hundred pounds more due to the mud that was all over and under it with just a little semi-clear hole in the windshield to look through. The car did start to shed some of the bigger chunks at speed and as I went through the tiny town of Palouse at 5:30AM, I saw a single bay coin operated car wash. I pulled into the bay and dug through my pockets for change since I needed \$1.75 for 5 minutes of high pressure wash; sure enough I had left my coins at the hotel. No problem, there is a change machine! I got out my wallet and of course the smallest bill I had was a \$20 bill. Fortunately the change machine took \$20s but did I really want 80 quarters? I didn't have a choice so the answer was yes. I got the change and got the mud washed off of the car and went on my merry way... The moral of the story - next time rent a true 4 wheel drive vehicle with locking differential.



Lone Tree with Weathervane Windmill - The Palouse, Washington (XF IQ3100, 40-80mm

The photo that led this section was the photo I set out to get that morning. The photo directly above was the one I got stuck in the mud for...

The Best Lenses For Your Nikon DSLR, Canon DSLR, and Sony (FE) Cameras

There are a few changes this quarter to the list of best lenses and I expect more, especially on the Sony side in the coming month due to some recent lens announcements. I have added the Irix 11mm, a new player on the best lens list for Nikon and Canon - look for more info on this lens in an upcomming newsletter. i have also added the Zeiss Batis 135mm f/2.8 on the Sony side.

Lens Category	Canon EF Mount	Nikon F Mount	Sony (F)E Mount
Full-frame Fisheye	Canon 8-15mm f/4L	Sigma 15mm f/2.8	N/A
	Sigma 15mm f/2.8		
Hyper Wide	Canon 11-24mm f/4L	Irix 11mm f/4	Voigtländer 12mm f/5.6
	Irix 11mm f/4		Voigtländer 10mm f/5.6
Ultra Wide Prime	Zeiss 15mm f/2.8 ZE	Zeiss 15mm f/2.8 ZF.2	Zeiss Batis 18mm f/2.8
	Canon TS-E 17mm f/4	Nikon 19mm f/4 PC	Voigtländer 15mm f/4.5
Extra Wide Prime	Zeiss Milvus 21mm f/2.8	Zeiss Milvus 21mm f/2.8	Zeiss Loxia 21mm f/2.8
	Sigma 20mm f/1.4	Sigma 20mm f/1.4	Tokina Firin 20mm f/2
Standard Wide Prime	Zeiss Otus 28mm f/1.4	Zeiss Otus 28mm f/1.4	Zeiss Batis 2/25
	Zeiss Milvus 25mm f/2	Zeiss Milvus 25mm f/2	Sony 28mm f/2
	Sigma 24mm f/1.4 Art	Sigma 24mm f/1.4 Art	-
Moderate Wide Prime	Sigma 35mm f/1.4	Sigma 35mm f/1.4	Sony-Zeiss 35mm f/1.4
	Canon 35mm f/1.4L II	Zeiss Milvus 35mm f/2	Zeiss Loxia 2/35
Standard Prime	Zeiss 55mm f/1.4 Otus	Zeiss 55mm f/1.4 Otus	Sony-Zeiss 55mm f/1.8
	Sigma 50mm f/1.4 DG Art	Sigma 50mm f/1.4 DG Art	Zeiss Loxia 2/50
Portrait Prime (short	Zeiss 85mm f/1.4 Otus	Zeiss 85mm f/1.4 Otus	Sony 85mm f/1.4 GM
telephoto)	Canon 85mm f/1.2L II	Nikon 105mm f/1.4E	Zeiss Batis 1.8/85
Medium Telephoto Prime	Zeiss 135mm f/2 Apo Sonnar ZE	Zeiss 135mm f/2 Apo Sonnar	Zeiss Batis 2.8/135
	Canon 135mm f/2L	ZF.2	
		Sigma 150mm f/2.8 Macro OS	
200mm Prime	Canon 200mm f/2L	Nikon 200mm f/2G	N/A
	Canon 200mm f/2.8L II	Nikon Micro Nikkor 200mm	
		f/4ED	
300mm Prime	Canon 300mm f/2.8L IS II	Nikon 300mm f/2.8G VR	N/A
		Nikon 300mm f/4 PF	
400mm Prime	Canon 400mm f/2.8L IS II	Nikon 400mm f/2.8E VR	N/A
	Canon 400mm f/4 DO II		
500mm Prime	Canon 500mm f/4L IS II	Nikon 500mm f/4E VR	N/A
	Sigma 500mm f/4 DG OS HSM	Sigma 500mm f/4 DG OS HSM	
600mm Prime	Canon 600mm f/4L IS II	Nikon 600mm f/4E VR	N/A
800mm Prime	Canon 800mm f/5.6L IS	Nikon 800mm f/5.6E VR	N/A
	Sigma 800mm f/5.6APO DG	Sigma 800mm f/5.6APO DG	
Wide Angle Zoom	Canon 11-24mm f/4L	Nikon 14-24mm f/2.8G	Sony-Zeiss 16-35 f/4
	Canon 16-35mm f/4L IS	Tamron 15-30mm f/2.8 Di VC	
Standard Zoom	Canon 24-70mm f/2.8L II	Tamron 24-70mm f/2.8 Di VC	Sony 24-70 f/2.8 GM
	Tamron 24-70mm f/2.8 Di VC	Nikon 24-70mm f/2.8E ED VR	Sony Zeiss 24-70 f/4
Telephoto Zoom	Canon 70-200mm f/2.8L IS II	Nikon 70-200mm f/2.8E FL VR	Sony 70-200 f/2.8 GM
	Canon 70-200mm f/4L IS	Nikon 70-200mm f/4G VR	Sony 70-200 f/4 G
			Sony 70-300 f/4.5-5.6 G
Super Telephoto Zoom	Canon 200-400mm f/4L 1.4x Ext	Sigma 150-600 f/4.5-6.3 Sport	N/A
	Canon 100-400 f/4.5-5.6 II	Nikon 200-500 f/5.6 VR	
Macro	Sigma 150mm f/2.8 Macro OS	Nikon Micro Nikkor 200mm f/4	Sony 90mm f/2.8 Macro

Workshops

All of my group workshops are run through NatureScapes Certified Workshops. Please check out all of the great offerings from NSN here: <u>https://www.naturescapes.net/workshops/</u>

Private instruction in landscape and wildlife photography are also available as well as image processing training. To learn more click here: <u>http://www.ejphoto.com/duckshop_private.htm</u>

Facebook Page

I routinely post new photos on my Professional Facebook page as well as links to my latest articles. If interested, please click below and then click on the Like button.

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Newsletter Info

This is the 16th year of my quarterly Newsletter. I try to cover the wide array of digital imaging and products from mirrorless to medium format and everything in between. Throughout the years, the information contained herein has always been free and will continue to be free despite the many hours it takes to put it together and significant equipment and travel expenses. Most of the products I have tested and reviewed, I have purchased myself; some have been made available to me for review and evaluation by loyal readers and a few have also been made available to me by the manufacturers themselves. While the newsletter is free either via eMail subscription or via accessing it on my website at

http://www.ejphoto.com/newsletter.htm, if you find the information useful to you and you do wish to donate for my continuing efforts, you may do so via PayPal and sending the funds to ejpeiker@cox.net.

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Palouse Falls, Washington (XF, IQ3-100, 28mm)

