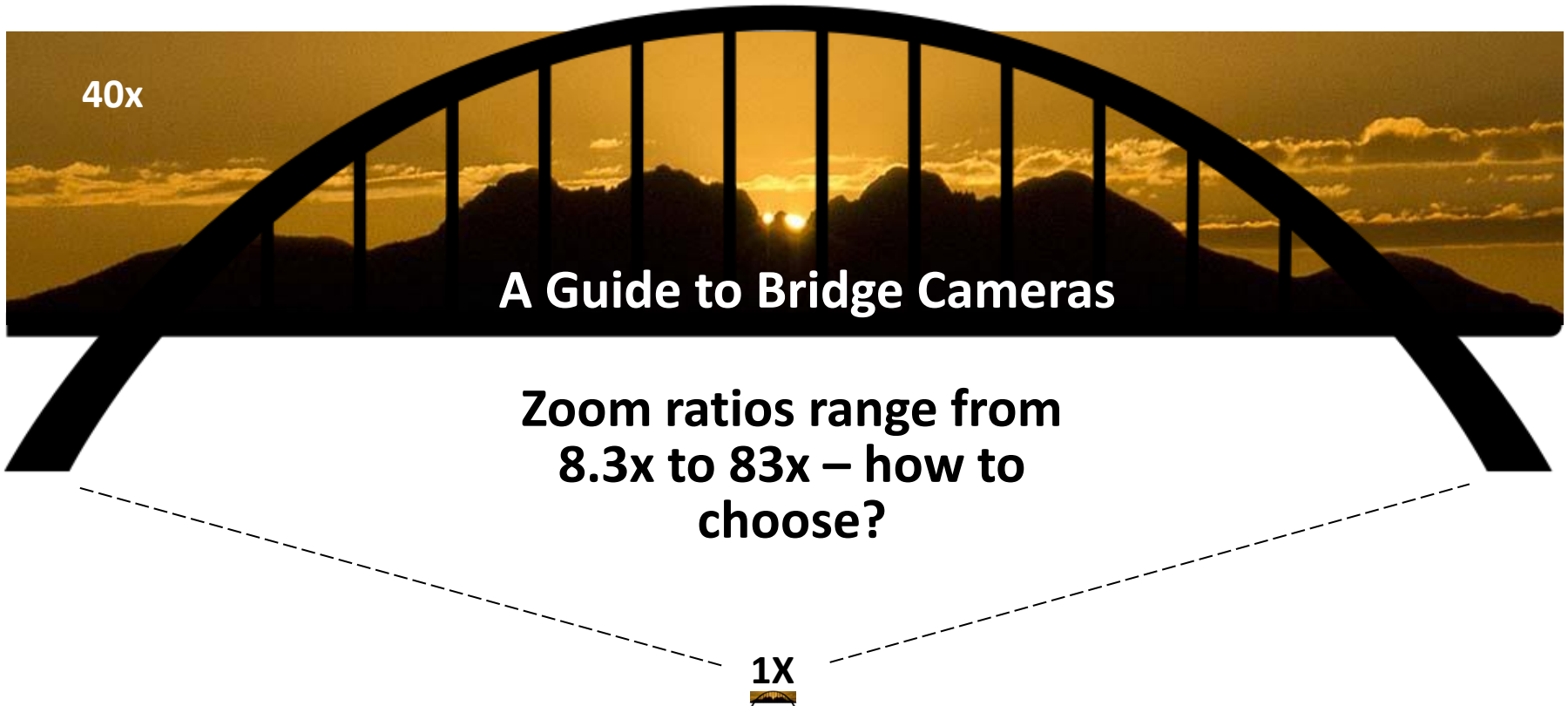


Fountain Hills Photography Club

March 9, 2016

Updated April 12, May 5 and Dec 16, 2016



A Guide to Bridge Cameras

Zoom ratios range from
8.3x to 83x – how to
choose?

- Page 6 has been updated to include new Sony RX10 III (4/12/16)
- Page 7 has a correction (5/5/16)
- Page 6 has Panasonic FZ2500 added (12/16/16)

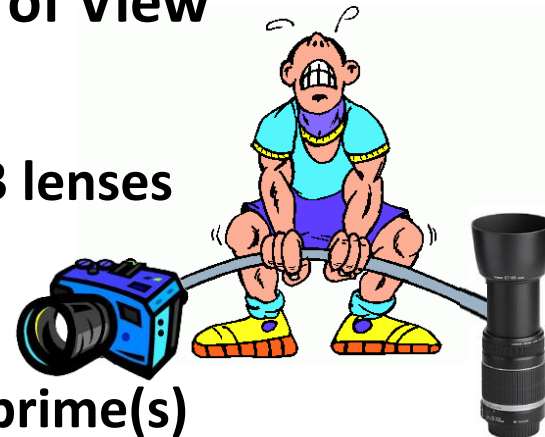
***** Warning *****

- **This short set of charts contains a very dense chart containing a summary of the attributes of all bridge cameras on the market today**
- **If you feel any physical discomfort when it appears, please close your eyes, breath deeply, and think of the Death Valley superbloom**
- **That chart is meant to be a reference document to be used by anyone who is seriously interested in buying a bridge camera; use after a proper dose of a good single malt scotch whiskey or equivalent**
- **These charts are posted on the FHPC website on the Events and Information Page (see link to that page on the FHPC website home page [<http://fhphotoclub.org>])**

2 Ways to Cover a Wide Range of Fields of View

- Carry one Interchangeable Lens Camera (ILC) & 3 lenses

- Wide angle (24-70mm)
- Intermediate zoom lens (70-200mm)
- Telephoto zoom (200-500mm) or telephoto prime(s)



- Carry one bridge camera with built-in superzoom lens

- Three categories of bridge cameras

- Zoom lens with very good image quality at all focal lengths

- 8x to 25x [1 – 1.8 lbs., \$500 - \$1,000; \$1,298]

- Extreme telephoto zoom lens (with tele performance falloff *)

- 40x to 83x [1 – 2 lbs., \$200 - \$500]

- Very ltwt zoom lens compacts (with tele performance falloff *)

- 30x to 40x [0.5 to 0.7 lbs., \$300 - \$700]

* Image softness due to diffraction and/or depth of focus challenges



Understanding Diffraction Effects on Bridge Cameras

Name	Sensor			Optics			Image Quality				Handling			Price
	MP	Format	Im Ht	Min f/no	EFL eq	Zoom	IQ-W	IQ-T	C.S.	Raw ¹	Video	EVF ²	Env.	
Canon G3 X	20	1"	3651	2.8 - 5.6	24 - 600	25x	1:1	1:1						
Nikon DL24-500	20	1"	3651	2.8 - 5.6	24 - 500	20.8x	1:1	1:1						
Panasonic FZ1000	20	1"	3651	2.8 - 4.0	25 - 400	16x	1:1	1:1						
Sony RX10	20	1"	3651	2.8	24 - 200	8.3x	1:1	1:1						
Sony RX10 II	20	1"	3651	2.8	24 - 200	8.3x	1:1	1:1						
Olympus Stylus 1s	12	1/1.7"	3000	2.8	28 - 300	10.7x	1:1	1:1						
Panasonic FZ200	12	1/2.3"	3000	2.8	25 - 600	24x	1:1	1:1						
Panasonic FZ300	12	1/2.3"	3000	2.8	25 - 600	24x	1:1	1:1						
Canon SX530 HS	16	1/2.3"	3465	3.4 - 6.5	24 - 1200	50x	2:1	3:1						
Canon SX60 HS	16	1/2.3"	3465	3.4 - 6.5	21 - 1365	65x	2:1	3:1						
Fuji FinePix S9900W	16	1/2.3"	3465	2.9 - 6.5	24 - 1200	50x	1:1	3:1						

Partial list

We'll get to these data later ...

Image Height
1733 1155

- Digital camera diffraction effects \approx fno/pixel size
- Edge blur is result [higher ratio \rightarrow more pxls of blur]

}		= No visible blur
		= Moderate blur
		= Significant blur

How to minimize diffraction blur

- faster (low fno) lenses
- bigger sensor & fewer pixels
- how much is indicated by color of IQ-W and IQ-T columns

IQ-W = Image quality at shortest focal length (Wide FOV)

IQ-T = Image quality at longest focal length (Telephoto FOV)

How to mitigate diffraction blur

- downsize images (2:1, 3:1)

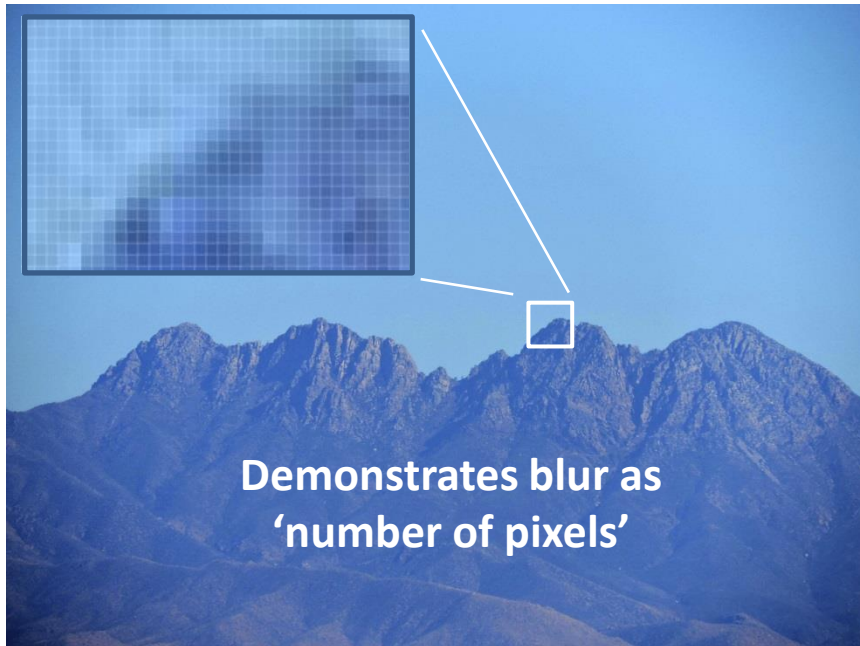
This is only an issue if you want to print full or near full size images

Nikon P530 Image Example of Effect of Diffraction

Name	Sensor			Optics			Image Quality					Handling			Price
	MP	Format	Im Ht	Min f/no	EFL eq	Zoom	IQ-W	IQ-T	C.S.	Raw ¹	Video	EVF ²	Env.	Wt.	
Nikon P530	16	1/2.3"	3465	3.0 - 5.9	24 - 1000	42x	1:1	3:1	-	No	MOV	Yes	-	1.09	\$279 U

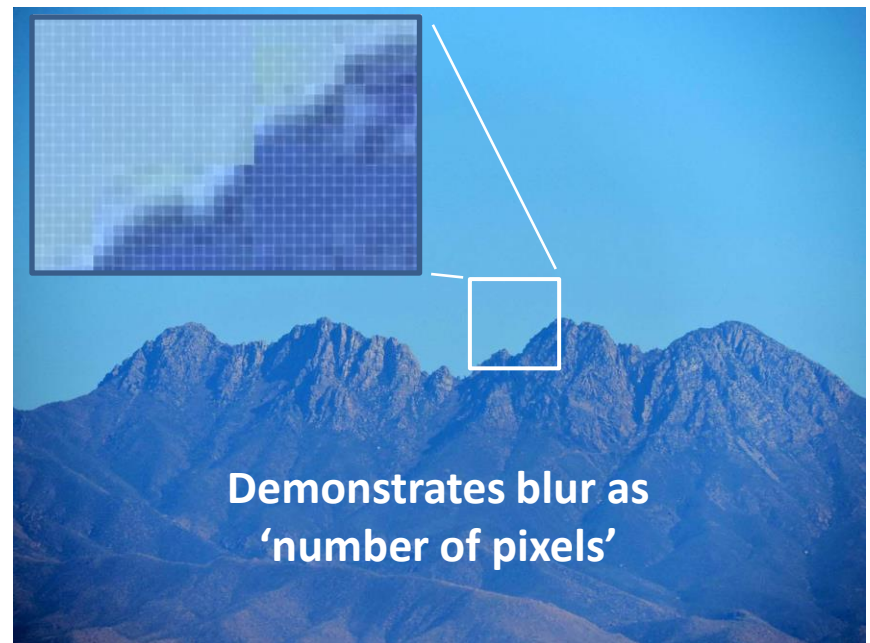


Original 4615 x 3461 image



- Image is soft due to diffraction
 - Image shot at 600mm eq. focal length
 - f/4.9 at focal length used
 - downsizing indicated

3:1 downsize to 1500 x 1000 image










- Image is sharper due to 3:1 downsizing (effective pixels are 3x as big)

This is only an issue if you want to print full or near full size images

The "Full" List of Currently Available Bridge Cameras*

Name	Sensor			Optics			Image Quality					Handling			Price
	MP	Format	Im Ht	Min f/no	EFL eq	Zoom	IQ-W	IQ-T	C.S.	Raw ¹	Video	EVF ²	Env.	Wt.	
Canon G3 X	20	1"	3648	2.8 - 5.6	24 - 600	25x	1:1	1:1	-	14Yes	MPAV	No	90%H↓	1.62	\$899
Nikon DL24-500	20	1"	3648	2.8 - 5.6	24 - 500	20.8x	1:1	1:1	s,A	Yes	4K	Yes	85% H	1.72	\$996
Panasonic FZ1000	20	1"	3648	2.8 - 4.0	25 - 400	16x	1:1	1:1	-	Yes	4K	Yes	-	1.83	\$697
Panasonic FZ2500	20	1"	3648	2.8 - 4.5	24 - 480	20x	1:1	1:1	s,A	Yes	4K	Yes	80% H	2.13	\$1,198
Sony RX10	20	1"	3648	2.8	24 - 200	8.3x	1:1	1:1	s,A	Yes	4K	Yes	DMR↓	1.79	\$898
Sony RX10 II	20	1"	3648	2.8	24 - 200	8.3x	1:1	1:1	s,A	Yes	4K	Yes	DMR↓	1.79	\$1,298
Sony RX10 III	20	1"	3648	2.4 - 4.0	24 - 600	25x	1:1	1:1	s,A	Yes	4K	Yes	Wsealed	2.40	\$1,498
Olympus Stylus 1s	12	1/1.7"	3000	2.8	28 - 300	10.7x	1:1	1:1	s,A	12Yes	MOV*	Yes	90%H↓	0.89	\$549
Panasonic FZ200	12	1/2.3"	3000	2.8	25 - 600	24x	1:1	1:1	-	Yes	MPAV	Yes	-	1.18	\$297
Panasonic FZ300	12	1/2.3"	3000	2.8	25 - 600	24x	1:1	1:1	-	Yes	4K	Yes	DSP	1.52	\$497
Canon SX530 HS	16	1/2.3"	3465	3.4 - 6.5	24 - 1200	50x	2:1	3:1	-	No	MPAV	No	90%H	0.98	\$249
Canon SX60 HS	16	1/2.3"	3465	3.4 - 6.5	21 - 1365	65x	2:1	3:1	-	12Yes	MP4	Yes	90%H↓	1.43	\$449
Fuji FinePix S9900W	16	1/2.3"	3465	2.9 - 6.5	24 - 1200	50x	1:1	3:1	-	No	MOV*	Yes	80%H	1.47	\$199
Nikon Coolpix B500	16	1/2.3"	3465	3.0 - 6.5	22.5 - 900	40x	1:1	3:1	-	No	MP4	No	-	1.19	\$296
Nikon Coolpix B700	20	1/2.3"	3873	3.3 - 6.5	24 - 1440	60x	2:1	3:1	-	Yes	4K	Yes	85%H	1.24	\$496
Nikon Coolpix L840	16	1/2.3"	3465	3.0 - 6.5	22.5 - 855	38x	1:1	3:1	-	No	MOV	No	↓	1.18	\$196
Nikon Coolpix P610	16	1/2.3"	3465	3.3 - 6.5	24 - 1440	60x	1:1	3:1	-	No	MOV	Yes	-	1.24	\$359
Nikon Coolpix P900	16	1/2.3"	3465	2.8 - 6.5	24 - 2000	83x	1:1	3:1	-	No	MOV	Yes	-	1.98	\$596
Nikon P530	16	1/2.3"	3465	3.0 - 5.9	24 - 1000	42x	1:1	3:1	-	No	MOV	Yes	-	1.09	\$279 U
Sony HX400V	16	1/2.3"	3465	2.8 - 6.3	24 - 1200	50x	1:1	3:1	s	No	MP4*	Yes	-	1.46	\$498
Canon SX420 IS	20	1/2.3"	3873	3.5 - 6.6	24 - 1008	42x	2:1	3:1	-	No	MPAV	No	90%H	0.72	\$299
Canon SX720 HS	20	1/2.3"	3873	3.3 - 6.9	24 - 960	40x	2:1	3:1	-	No	NTSC	No	90%H	0.60	\$379
Nikon S9900	16	1/2.3"	3465	3.7 - 6.4	25 - 750	30x	2:1	3:1	-	No	MOV*	No	-	0.64	\$272
Panasonic ZS50	12	1/2.3"	3000	3.3 - 6.4	24 - 720	30x	1:1	2:1	-	Yes	MPAV	Yes	-	0.53	\$397
Panasonic ZS60	18	1/2.3"	3675	3.3 - 6.4	24 - 720	30x	2:1	3:1	-	Yes	4K	Yes	-	0.62	\$449
Panasonic ZS100	20	1"	3648	2.8 - 5.9	25 - 250	10x	1:1	1:1	-	Yes	4K	Yes	-	0.69	\$697
Sony HX90V	18	1/2.3"	3675	3.5 - 6.4	24 - 720	30x	2:1	3:1	-	No	1080p	Yes	-	0.54	\$428

 = New
 = Consider
 All cameras have a built-in flash
 = Added 041216
 = Added 121616

 = No visible blur
 = Moderate blur
 = Significant blur
 n:n = recommended downsize
 C.S. = Color Space
 s,A = sRGB, Adobe RGB

1 - Prefix is Raw # bits
 2 - Electronic View Finder
 ↓ - Not waterproof (stated)
 DMR - dust & moisture resistant
 DSP = dust & splash proof
 * and MPEG-4 AVC

* Using B&H Photo and DPR websites

Things to Remember about Long Focal Length Photography

- Very hard to get both foreground objects and distant scene elements in focus using long focal lengths
 - HyperFocal Distance (HFD) goes as the square of actual focal length*
 - Going from 24mm to 72mm F.L. **increases**** HFD by factor of 9
 - Try to compose your images without foreground objects
 - Or use focus stacking
- HyperFocal Distance (HFD) calculators on the web or in books typically substantially under-estimate residual blur
 - There is an out of date criterion (CoC, from film days), translated into digital imaging terms, means that roughly 6 pixels of blur is an acceptable definition of being in focus for full frame or APS-C cameras; that's too much for today's digital images

$$HFD = \frac{f^2}{f \cdot n \cdot a \cdot w_{pxl}}$$

} A relatively complicated equation with 4 parameters*

where a = number of pixels of blur that is acceptable

* Crop factor does not affect this calculation

** **correction 5/5/16**