



Depth of Field (DoF)

AN OVERVIEW IN ANTICIPATION OF TAPC TOPIC OF
"SHALLOW DEPTH OF FIELD"
FOR APRIL 2019

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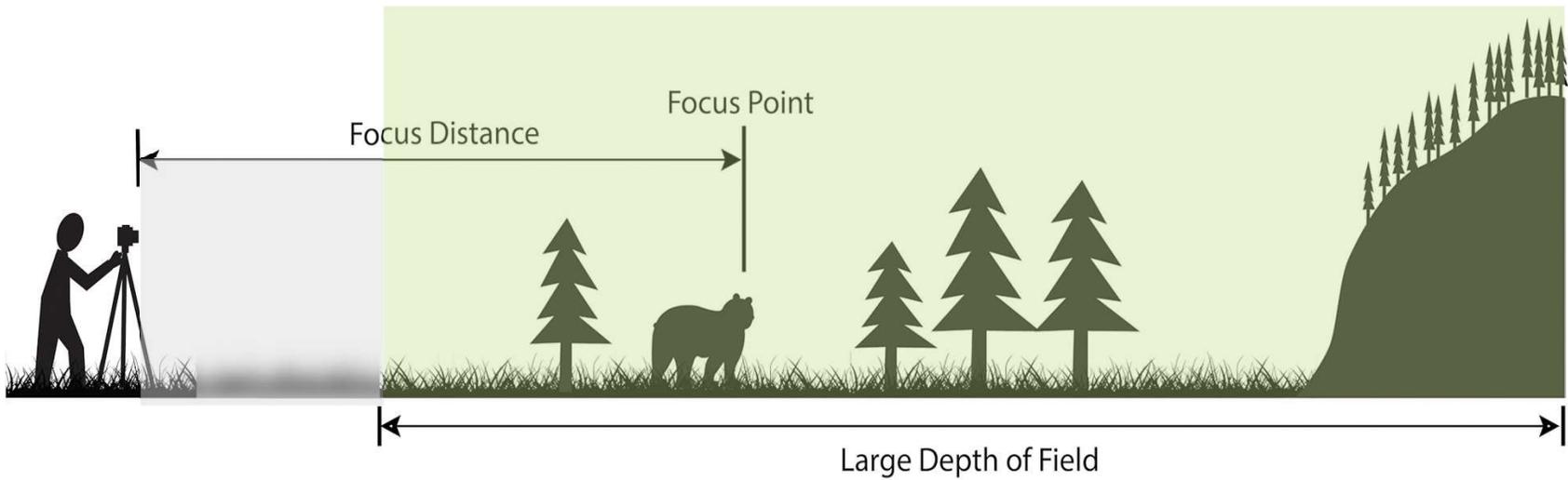
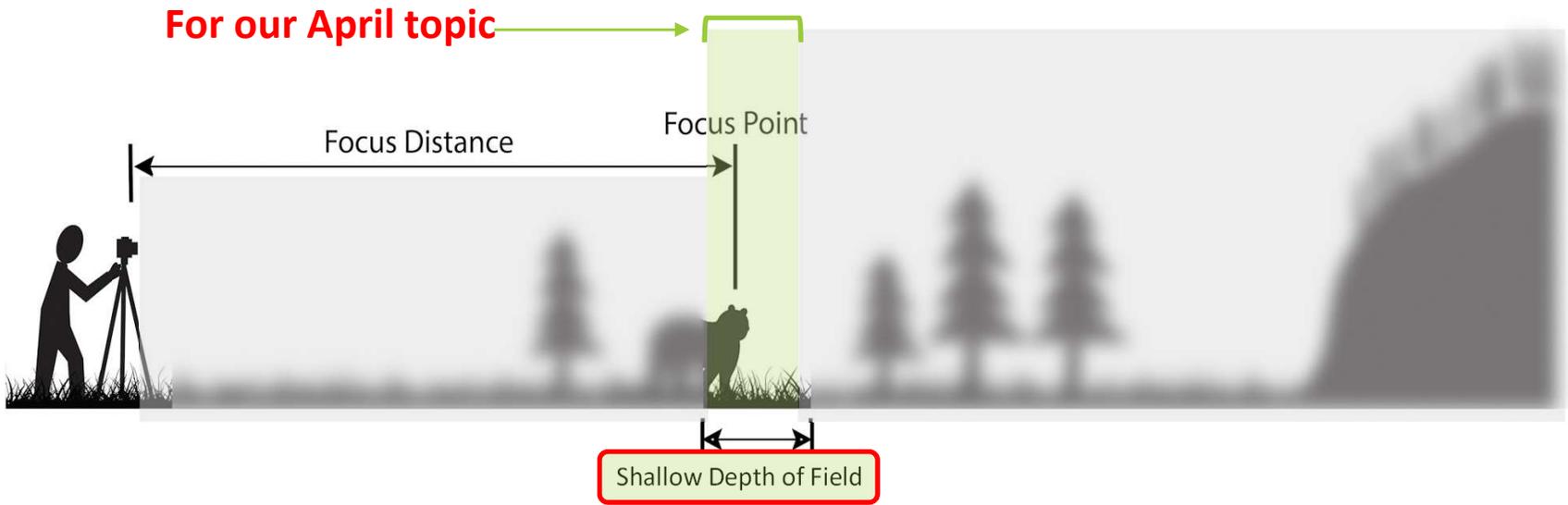
What is DoF?

Depth of Field = The zone within a photo (in front of, and behind the subject) that will appear in focus.

Some images may have *very small zones of focus* which is called *shallow depth of field*. That is what our April topic is all about.

Note: For our submissions we want the shallow depth of field to be created in-camera, not by blurring portions of the image in post-processing.





In The Field

Why shallow depth of field?

Using a shallow depth of field is a good way to *make your subject stand out from its background.*





How can you control it?

- 1) Aperture (f-stop)
- 2) Focal Length (wide-angle to telephoto)
- 3) Distance to Subject

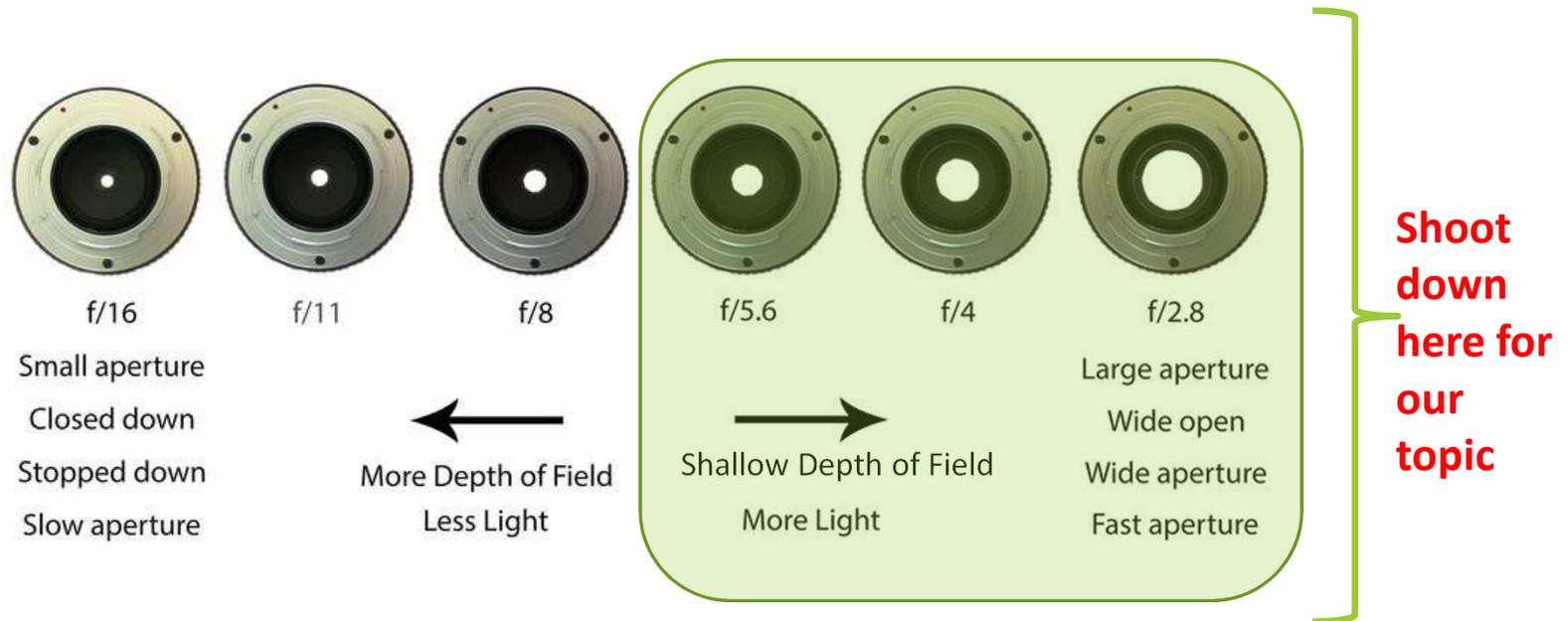
Also: Sensor Size (Full-frame, APS-C, MFT, cell phone) effects DoF. The smaller the sensor, the GREATER the DoF but these are not controllable in the camera settings.



1) Aperture

Aperture (f/stop) is the first thing most photographers think of when they want to adjust the depth of field.

The smaller your f-number, the smaller (shallower) your depth of field. For example, using a setting of f/2.8 will produce a very shallow depth of field while f/11 will produce a deeper DoF.



2) Focal Length of the Lens

Shallow depth of field is easier to obtain using a telephoto lens or the long end of a zoom (like the 200mm reach of an 18-200mm type zoom lens)

In general, wide-angle lenses (short focal lengths like 12mm, 24mm) have a deeper depth of field than telephoto lenses. **This is NOT what we want for our April topic.**

Note: With most zoom telephoto lenses the smallest available aperture will get smaller, (bigger f/number) as you zoom to the long end of the range.

Example: a “24-240mm f/3.5-6.3” means that at 24mm you can set an aperture as wide open as f/3.5 but when you zoom out to 240mm, the best you can get is f/6.3.

Basic: Use a longer lens for shallower DoF.



3) Camera-Subject Distance

Another important factor affecting depth of field is the distance between the camera and the subject

...AND the distance from the subject to the background.

The shorter the distance between the camera and the subject, the shallower the depth of field.

Think about those times you tried to take a close-up shot of a flower or insect, but couldn't get the entire subject in focus, even with a small aperture – because you were so close to the subject.

Basic: Get closer to the subject for shallower DoF.



4) Sensor Size (Just FYI – Not much you can do about this)

In general, cameras with smaller sensors have greater depth of field. (Not what we want for April.)

If you shoot at the same camera-subject distance, with the same apertures, you will find that the larger sensors have a shallower DoF.

Camera	Crop Factor	Physical Focal Length	Effective Focal Length*	Aperture	DoF
<i>*Effective Focal Length = Physical Focal Length x Crop Factor</i>					
Full Frame	1.0	120mm	120mm	f/9	3 ft
APS-C	1.5	80mm	120mm	f/9	4.5 ft
Micro 4/3	2.0	60mm	120mm	f/9	6 ft
Cell Phone (just FYI)	~7.0	~4mm	28mm	f/2.2 (f/16)	~1ft - ∞

Basic: Your iPhone probably will NOT work for our April topic.



To summarize:

Decrease depth of field (Shallow DoF)

- Widen your aperture (use a smaller f-number)
- Move closer to the subject
- Lengthen your focal length (use telephoto end of a zoom lens range)

**For our
April topic**

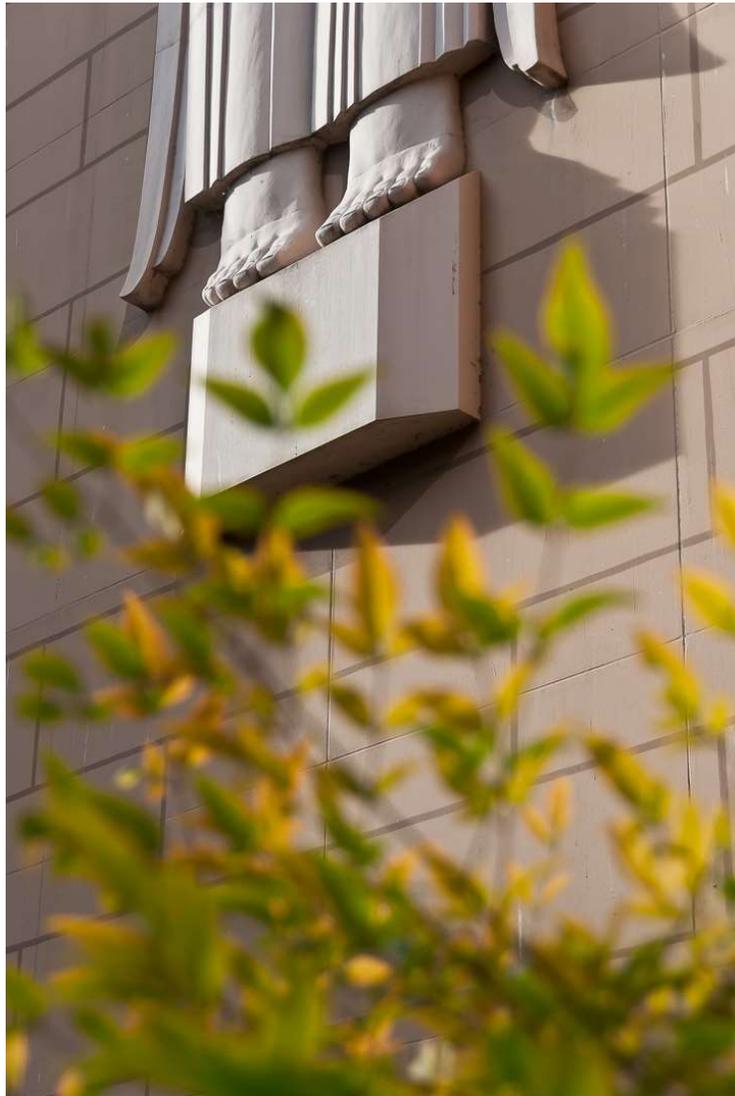
Increase depth of field

- Narrow your aperture (larger f-number)
- Move farther from the subject
- Shorten focal length



Example - NOT shallow, 18mm lens, f/9
Sharp from the foreground boulder all the way to Yosemite Falls
NOT what we want for April

82mm, f/5.6



160mm, f/3.0



Shallow Depth of Field

160mm, f/2.8



200mm, f/7.1



Shallow Depth of Field

Getting Close- 200mm macro, f/16

- Close to subject; About 6 inches from the subject
- VERY shallow DoF (less than ½ inch)
- The entire flower & leaf is less than 1" in diameter
- In this shot just the very front edge of the leaf and the foreground flower are in focus



What's Next?



Start thinking about some subjects you want to try this with.



Go out and take some photographs, trying different things. Maybe get together with other members.



If you are not having success, call someone who you think can help you. Many club members really like to help.

Resources & Other Topics



Depth of Field for Beginners
[\(Article here\)](#)
[\(and here\)](#)



Hyperfocal Distance – [\(Article here\)](#), Charts on next slide)

The focusing distance that gives your photos the greatest depth of field

At the hyperfocal distance, your photo will be sharp from *half* that distance out to infinity. So, if your hyperfocal distance for a given aperture and focal length is ten feet, everything from five feet all the way until the horizon will appear sharp.



DoF Apps (free except PhotoPills)

True DoF-Intro (very good & easy – my choice)

Digital DoF (fair)

DOF (free-ish, must pay for some camera types)

DoF Table (poor)

Set My Camera (poor)

PhotoPills (excellent & versatile; much more than just DoF)



Hyperfocal Distance (feet) Full Frame								
Lens Focal Length (mm)	Aperture Setting							
	2.8	4	5.6	8	11	16	22	32
14	9.2	6.4	4.6	3.2	2.3	1.6	1.2	0.8
18	15.2	10.6	7.6	5.3	3.9	2.7	1.9	1.3
24	27	18.9	13.5	9.4	6.9	4.7	3.4	2.4
35	57.4	40.2	28.7	20.1	14.6	10	7.3	5
50	117.1	82	58.6	41	29.8	20.5	14.9	10.3
70	229.6	160.7	114.8	80.4	58.4	40.2	29.2	20.1
105	516.6	361.6	258.3	180.8	131.5	90.4	65.7	45.2
135	854	597.8	427	298.9	217.4	149.4	108.7	74.7

For Micro Four-Thirds cameras, double the Full-frame distance numbers

Hyperfocal Distance (feet) Crop Sensor								
Lens Focal Length (mm)	Aperture Setting							
	2.8	4	5.6	8	11	16	22	32
14	14.4	10	7.2	5	3.7	2.5	1.8	1.3
18	23.7	16.6	11.9	8.3	6	4.2	3.0	2.1
24	42.2	29.5	21.1	14.8	10.7	7.4	5.4	3.7
35	89.7	62.8	44.8	31.4	22.8	15.7	11.4	7.8
50	183	128.1	91.5	64.1	46.6	32	23.3	16
70	358.8	251.1	179.4	125.6	91.3	62.8	45.7	31.4
105	807.2	565	403.6	282.5	205.5	141.3	102.7	70.6
135	1334.3	934	667.2	467	339.6	233.5	169.8	116.8

Circled example:

Using a crop-sensor camera with a 24mm lens set to f/16, focus at 7.4 ft from the camera and everything from 3.7 ft (1/2 of 7.4 ft) to infinity will be in focus.

Hyperfocal Charts