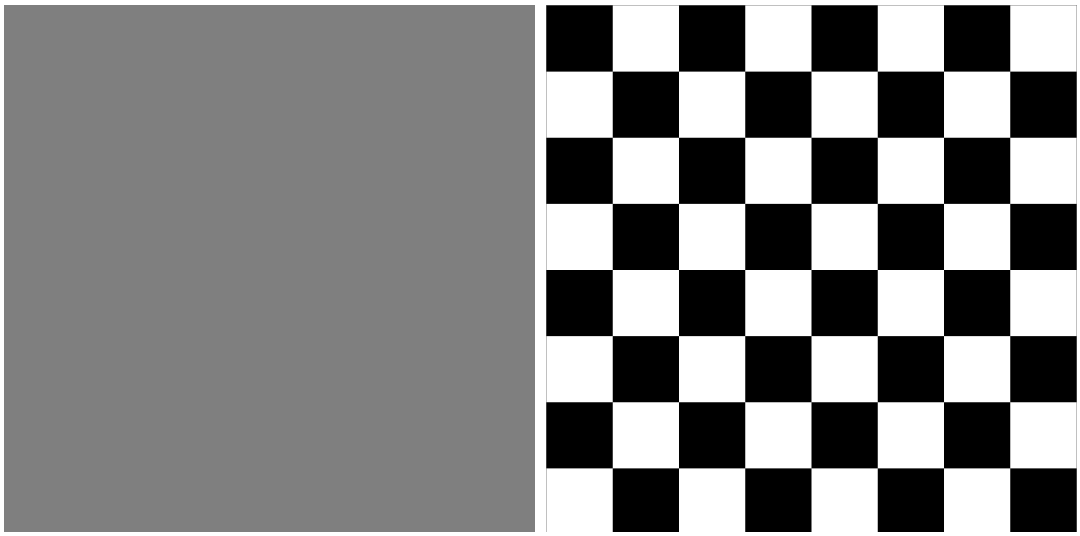
Photographing white birds: an exposure challenge

Ian Smissen October 2020

Many photographic scenes and subjects pose problems for getting the exposure 'right'.[1] In this article I describe how understanding how a camera light meter works and how to adjust exposure settings will enable you to get the best exposure using two examples of white birds. However, the advice here is equally useful for any tricky exposure situation.

How do exposure meters work?

The exposure meter in your camera assumes the world is mid grey in tone, i.e., half-way between black and white. Mid grey reflects approximately 18% of light so you may see this referred to as 18% grey.

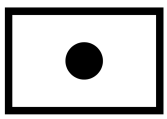


Mid grey and black and white – your camera meter will perceive these as the same.

If the scene you are photographing is roughly mid grey in tone or composed of the same amounts of light and dark tones, then the camera's exposure will be 'correct'. However, if your scene is brighter or darker than normal, the camera does not know this so will try and expose the scene as if it were mid grey in tone, i.e., the camera will under- or over-expose.

Metering modes

Most cameras allow you to select how much of the scene will be used to determine the exposure:



Spot

Centre-weighted

Matrix, Evaluative or Multi-Segment

Back in the days of film cameras, many photographers used spot metering, where the exposure metering is taken from a small part of the scene that is mid grey in tone. Some studio photographers and many videographers still do this today, often using a grey card (a small mid-grey toned card) placed in the scene, from which the exposure is metered then set manually on

[1] Note there is really no such thing as the 'right' exposure—you can choose to deliberately over- or under-expose an image for artistic purposes or to get the best exposure for your subject even when the camera suggests otherwise.

the camera. With practice, spot-metering can work well but with modern cameras with built-in exposure aids (such as histograms and highlight alerts, both discussed below), it is easier (and more productive) to set your camera to the widest mode possible: Evaluative, Matrix or Multi-segment metering,[2] where all areas of the scene are contributing to the evaluation of the exposure.

Exposure modes

Modern cameras have a range of exposure modes, typically: Manual, Aperture-Priority, Shutter-Priority, Program.

Program mode automatically selects ISO, aperture and shutter speed for the scene according to an algorithm built into the camera. Many cameras have settings allowing you to adjust the Program algorithm but, even then, Program mode is still handing the responsibility for evaluating the best settings over to the camera. This often works well for taking family or holiday 'snaps' but, for specialised subjects such as birds, it is preferable to take control of the exposure settings yourself.

Many photographers suggest that Manual mode is best as it gives you full control but there is essentially no difference between Manual mode and either of the semi-automatic modes: Aperture-Priority or Shutter-Priority used in conjunction with exposure compensation (discussed below). Depending on the scene or subject, choose whether you want to set the aperture, e.g., a large aperture (or small *f*-number) to blur out the background, in which case the camera will set the shutter speed to get the exposure; or select the shutter speed, e.g., a fast shutter speed to capture birds in flight, in which case the camera will set the aperture to get the exposure. Some cameras have an Auto-ISO mode where you can select both aperture and shutter speed and have the camera change the ISO to get the exposure.

In practice

Now, let's consider these two images:

[2] Different camera manufacturers use different terms for this mode.

The birds are essentially the same tone—mostly white—but the backgrounds are very different. In both cases, the exposure meter will assume that the overall tone is mid grey and will calculate an exposure accordingly, significantly under-exposing the first photo and over-exposing the second:

Can't we just 'fix' this in post?

Modern digital camera sensors have very good dynamic range (i.e., the range of light intensity that can be recorded as distinct tones) and today's software is very good at allowing us to adjust exposure, contrast, colour, etc., in post-processing. The first photograph of a Little Egret could be adjusted in Adobe Lightroom, Photoshop or other image editing software to make an acceptable image but the overall quality of the image would suffer by pushing the exposure up. In the second photograph of a Royal Spoonbill, the bird is so overexposed that much of the detail in the plumage is lost. The blown highlights would be unrecoverable in post-processing as too many pixels have been recorded as pure white. Adjusting the exposure in software would just make the bird look a dull grey.

It is not possible to fix everything in post-processing, and many people don't post-process their images, so it is preferable to adjust the exposure in-camera to get the best image possible by compensating for the camera's suggested exposure.

Exposure bracketing

Many cameras allow you to take multiple images in a rapid sequence, exposing each at different exposure values. My camera allows me to take 7 images at up to 2 stops difference for each image, giving me a very wide range of exposures from which I can choose the best later. This is very useful in landscape photography, particularly when the dynamic range in the scene is greater than the dynamic range of the sensor so I would lose detail in either or both the darks and lights in a scene shot at the 'correct' exposure. Exposure bracketing is less likely to be suitable when photographing birds because they move so you are unlikely to get a sequence of images where the only difference is the exposure value. However, bracketing can be useful practice to provide

test shots and help you learn how much to over- or under-expose an image using the techniques discussed below.

Exposure compensation

The exposure value of an image can be adjusted in camera using manual settings for ISO, aperture and shutter speed. In Manual mode, if an image is too dark, you can increase the ISO or the aperture or reduce the shutter speed, or do the opposite if the image is too light. In semi-automatic modes—Aperture Priority and Shutter Priority—many cameras allow you to set one of the wheels or buttons on the camera to adjust the exposure by changing the other setting. I typically use Aperture Priority mode and have my camera set to adjust the aperture with the front wheel (controlled by my index finger) and adjust exposure compensation with the rear wheel (controlled by my thumb). So, I set the desired aperture, take a meter reading and then over- or under-expose by rolling the thumb wheel to the left or right and the camera increases or decreases the shutter speed to give me the amount of exposure compensation required.

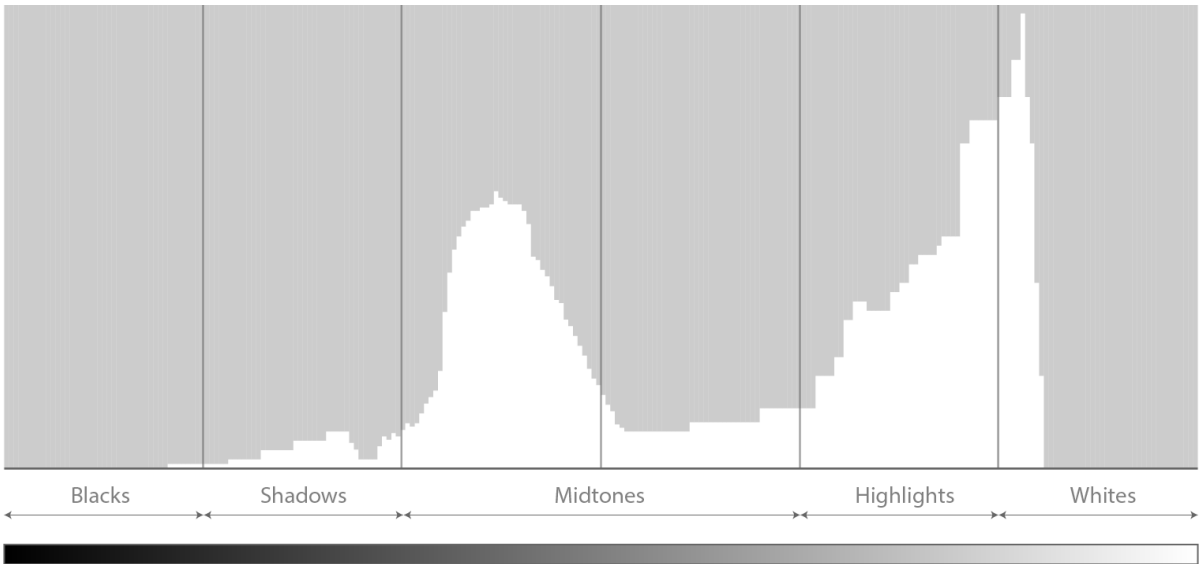
Estimating exposure

With practice, you can learn to estimate the amount of exposure compensation and make the relevant adjustment manually. As a general 'rule', if the overall scene is light then overexpose by 1 to 2 stops; if the overall scene is dark, under-expose by 1 to 2 stops. In some extreme cases you may need to compensate by 3 or more stops.

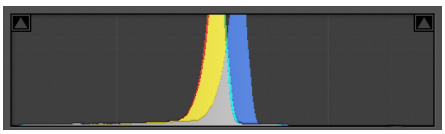
In the above images, however, I did not do this by educated guessing. I used the histogram.

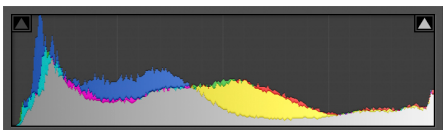
Histograms

In photography, a histogram is a graph displaying the relative amount of each of 256 tones between pure black (on the left) and pure white (on the right).



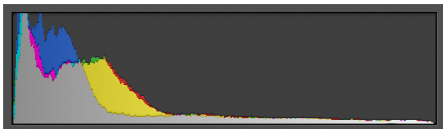
Let's look at the histograms (from Adobe Lightroom) as they would have been as initially metered in camera:





The histogram for the first image shows a mostly mid-tone image with no highlights or whites being captured, indicating the image is significantly under-exposed because, unlike the camera, we know the egret is white. In the second image, the histogram shows a wide distribution of tones from deep blacks to blown out whites, the latter indicating the image is over-exposed.

Histograms for the final versions of the bird images in Adobe Lightroom:



In the first image, most of the pixels are pushed to the right or light end of the histogram as would be expected for a mostly light-toned image. In the second, most of the pixels are on the left or dark end of the histogram but there are no blown out highlights so we can detect detail in the white feathers of the bird.

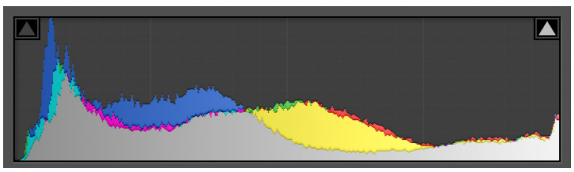
Using the histogram in-camera

It is all very well to be able to view the histogram in software while post-processing but this doesn't help at the time of shooting. Fortunately, most DSLR cameras allow the histogram to be shown in Live View and/or in Image Review. For most photographers, Live View is too difficult to use when photographing wildlife with long lenses but you can estimate the exposure compensation needed, based on the overall average tone of the scene or take multiple test shots using exposure bracketing, then check the histogram on the LCD screen and adjust the exposure compensation accordingly, allowing you to get the best exposure for the subject when you start shooting.

Mirrorless cameras come into their own in this scenario. They allow you to display the histogram directly in the electronic viewfinder so there is no need to take test shots and review them – you can check the histogram and adjust the exposure compensation 'live' while shooting. In addition, many mirrorless cameras allow full exposure preview in the viewfinder while shooting so you can see the effect of exposure compensation 'live' before taking the shot.

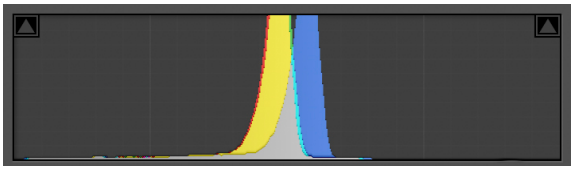
Exposing to the right

Once you are familiar with the histogram and how to use it to judge exposure, you can use the histogram to capture the best possible exposure for post-processing. It is beyond the scope of this article to discuss the physics of light 'capture' by digital sensors but, to put it simply, most of the digital information captured by the sensor is at the highlights (or right) end of the histogram. Very little digital information is captured at the dark (or left) end of the histogram. This is why noise is more obvious in dark areas and why it is harder to pull details out of shadows than highlights. To get the best possible capture of digital information, trust the physics and expose your image so you get the histogram pushed as far to the right (hence the term 'exposing to the right' or ETTR) without 'blowing the whites', i.e., having pixels 'piled up' on the right end of the histogram – as can be seen in the histogram of the initial exposure of the Royal Spoonbill image:



This indicates that too much of the image is pure white. In this case, I adjusted the exposure compensation in camera to underexpose the image by 1.7 stops removing the over-exposed whites from the right of the histogram.

In the initial histogram of the Little Egret image:



at least two stops of possible light capture (which equals approximately 75% of the digital information) would be lost if we took the photograph with the exposure as suggested by the camera.

In this case I added 2.3 stops of exposure to move the 'bulge' into the right (highlights and whites) end of the histogram.

You will get a better final image (i.e., with more retrievable detail across the whole dynamic range from darks to lights) by overexposing using ETTR and reducing the exposure in post-processing than by getting the 'best-looking' exposure in camera.

Blinkies and Zebras

An additional aid to checking for over exposed images are the highlight alert options. Most DSLR cameras allow you to turn on highlight alerts—often blinking coloured areas (hence the slang term 'blinkies')—in Live View and/or Image Review. Mirrorless cameras can display these highlight alerts – often flashing black and white striped areas (hence the term 'zebras') – directly in the electronic viewfinder so you can easily see and compensate for over-exposed areas while shooting.

In conclusion

When exposing for white birds, or any scene darker or lighter than 'mid-grey', remember your camera's light meter will be fooled into under- or over-exposing the image so you need to compensate accordingly by deliberately underexposing for darker scenes or over-exposing for brighter scenes. The amount and direction of exposure compensation can be established by educated guessing but the use of exposure aids—the histogram and highlight alerts—will give you the best exposure for your images.