[HOW-TO]

Tuesday, March 24, 2015

Get Perfect Exposure Every Time

How to work with your camera systems to get the ideal exposure for every shot

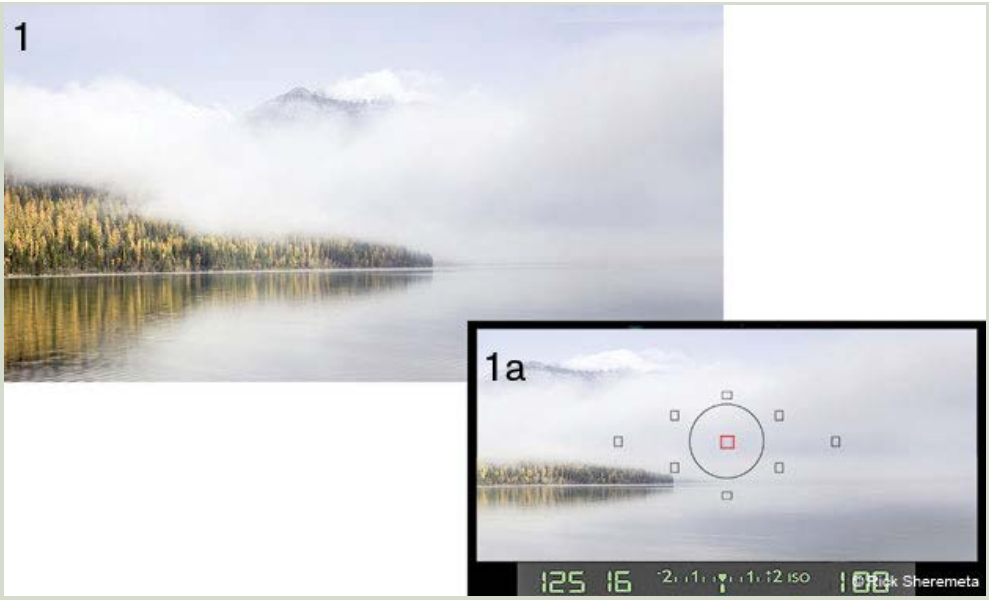
Text & Photography By Rick Sheremeta

Labels: How-To, Camera Technique

Final Adjusted Image

The final, properly exposed image of a fall scene of Glacier National Park's Bowman Lake.

Having taught workshops for many years, I've come to find that the biggest problem students have, both novice and experienced alike, is how to meter and set exposure for ambient light. You may rightly ask, does it really matter since my DSLR generally comes up with a good exposure on its own, and I can always fix problems later in Photoshop or Lightroom? While this may be true most of the time, a lack of understanding of metering and exposure control can be a severe handicap to the photographer. By relying totally on the camera's auto or program modes, not only is creative control hampered, but the chances of getting consistently good images will be pure luck. Getting as close as possible to optimal exposure initially will provide much more latitude when it comes to post-capture processing, with less time and effort required to make necessary or interpretive adjustments. Furthermore, if exposure is too far off, corrective adjustments will be limited or not even possible. Photography is all about the control and use of light as it interacts with the subject to achieve a desired effect. With that in mind, let's take a look at how light is measured and how those measurements are used to set exposure for outdoor photography.



Figures 1 and 1a: *Spot-metering on the clouds gave an exposure of 1/125 sec. at ƒ/16 and ISO 100. Note that, in the viewfinder, the exposure indicator is right in the middle of the scale. The clouds will render as middle gray.*

DSLR camera meters measure light reflected from the subject through the lens (TTL). All camera meters are calibrated to measure 12.5% gray as neutral tone, and this forms the basis upon which all exposure settings are made. Before venturing too far, understand that there are three means by which exposure is controlled: shutter speed, aperture and ISO. Creation of a photograph requires a conscious effort to choose which of these parameters, singly or in combination, govern to achieve the desired outcome. It's important, therefore, to understand the role that each plays, so let's take a brief look at what they actually do.

Figure 2: *Using the same scene as in Figure 1, I metered the bright blue sky. I wanted it to be 1 EV or stop brighter than neutral-toned as the meter shows. In this case, I didn't have to change any of the camera's settings; the sky is 1 EV brighter than the neutral gray-toned clouds.*

The Exposure Equation

Shutter speed is used to control motion. Is the goal to stop motion or to blur motion? A faster shutter speed will stop motion, and the faster the subject is moving, the faster the shutter speed must be to accomplish this. Conversely, the slower the shutter speed, the more any moving object will be blurred. Although this may be somewhat intuitive, a full understanding of the correct shutter speed to use only will come with experience and experimentation. With that in mind, doubling or halving the shutter speed will reduce or increase exposure respectively by 1 exposure value (EV) or stop. For instance, going from 1/125 sec. to 1/250 sec. would reduce exposure by 1 EV, or 1 stop, and going from 1/125 sec. to 1/60 sec. would increase exposure by 1 stop.

The lens aperture is the size of the opening through which light passes on its way to the sensor or film plane, and is used to control depth of field, i.e., how much of the scene is sharply in focus from near to far. Aperture is measured in *ƒ*-stops, *ƒ*/2.8 being considered a wide aperture, allowing more light, but with a very shallow depth of field, whereas *ƒ*/16 is a small aperture that permits much less light, but with a much greater depth of field. Each full *ƒ*-stop represents a doubling or halving of light. As an example, going from *ƒ*/2.8 to *ƒ*/4.0 (a full stop) halves the amount of light reaching the sensor, and vice versa.

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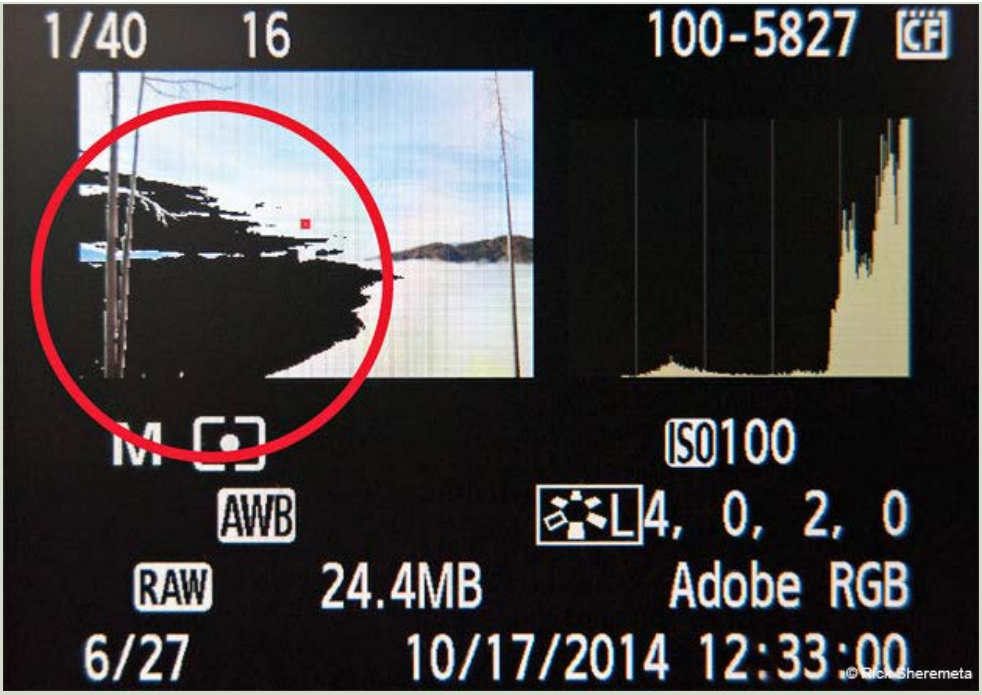

Figure 3: *The image at top shows the LCD preview of the sky taken from above a brightly lit fog layer. The shot was purposely overexposed to show a highly clipped histogram. The image above, with Highlight Alert set, shows the overexposed area flashing in black (circled in red), known as "blinkies.*

The last parameter that has a bearing on exposure is ISO. Suffice it to say that this is a measure of the sensor's sensitivity to recording light—the higher the number, the greater the ability to capture low light. Conversely, the lower the ISO value, typically 100 for most cameras, the higher the image quality. At high ISO values, digital noise can be introduced into an image. This will become more apparent in shadow or dark areas, appearing as red and green dots. Again, a doubling or halving of the ISO value doubles or halves the amount of sensor light sensitivity, respectively. It's always best to set ISO at its lowest value, and then increase it, if needed, to obtain higher shutter speeds and/or smaller apertures in low-light levels.

Metering Modes And How They Work

Now that we understand what controls exposure, let's get into metering. The first concept to understand is that every item in a scene will have a certain tonality, or level of brightness, regardless of its color, and this can vary depending on ambient light conditions. Some elements may be the same, while others may vary by several stops or exposure values (EVs). The important factor to realize is that their relative relationships to each other will stay the same regardless of lighting conditions or any changes thereto. For example, an evergreen forest will always be 1 stop darker than a neutral-tone blue sky so, as the sky gets darker, the forest still will be 1 stop darker yet. Understanding that concept, and knowing what to expect, is the whole key to understanding metering and control of exposure. Figure 4 shows some "rule of thumb" values for different objects that I've used and found to be reliable over the years. Understand that these are only starting values, as exposure is relative. It can vary throughout the day and change with the weather. Nothing is absolute—you can always get creative, basing exposure on how you would prefer to interpret the scene—after all, it's your photograph.

Figure 4: *In this image of Glacier National Park's Running Eagle Falls, I metered the white water and adjusted the shutter speed until the meter reading was +2. Then, for confirmation, I metered the rocks, which measured 0 EV. See my "rules of thumb" for setting initial exposure below.*

If you look through your viewfinder, you'll notice the meter; it's either at the bottom or side, depending on the make and model of the camera used. Now, depress the shutter release halfway to engage the meter and point the camera at different parts of a scene having different amounts of brightness. As you move the camera around, you'll notice that the meter readings change depending on how light or dark the objects are. I find that the best way to proceed, and the way I teach my students, is to work in Manual mode. That way it's possible to adjust both shutter speed and aperture independently, as desired, while the camera's meter measures the resulting exposure, i.e., showing how bright or dark different things are relative to each other in stops. So, for example, if you change sFigure 3: The image at left shows the LCD preview of the sky taken from above a brightly lit fog layer. The shot was purposely overexposed to show a highly clipped histogram. The image below, with Highlight Alert set, shows the overexposed area flashing in black (circled in red), known as "blinkies."hutter speed, the meter's pointer will move to reflect how that change has affected the exposure, either toward plus or minus on the scale.

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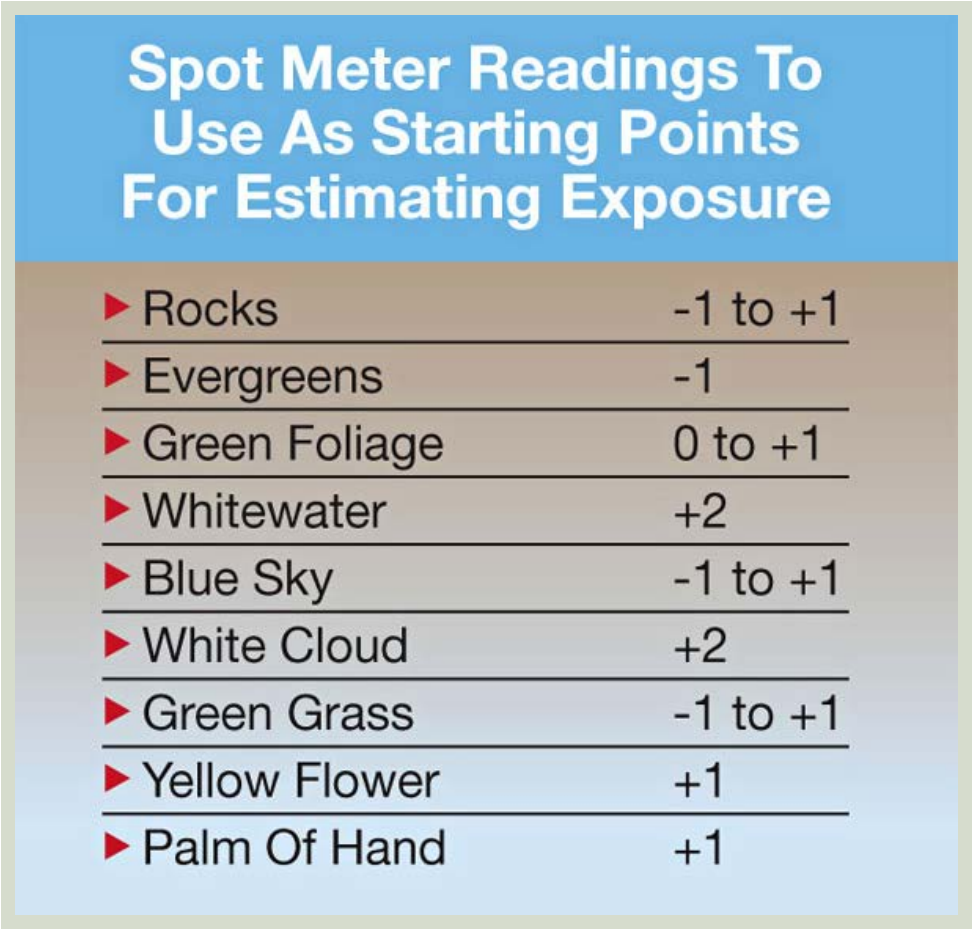
The next item to consider is what metering mode to use, and there are several options available, from Evaluative/Matrix/Pattern (as it's called, depending on the camera manufacturer) to centerweighted to partial to spot—each going progressively from a larger to smaller area within the viewfinder.



Spot metering is my first choice; if your particular camera doesn't have spot, partial would be the next choice. Metering a smaller area allows segregation of specific areas or objects, and, yes, you can zoom in to better isolate an element, as needed. Meter different things and watch the meter change as you do so. I suggest first starting with the sky (measure on the northern sky, if blue), then meter other mid-ground and/or foreground elements, noting the different meter readings. Regardless of what or where you initiate metering, the first question to ask yourself is, how bright do I want it to be rendered? This will start to make more sense in the example in Figure 1. In the first case, we'll use an area of gray clouds to set the initial exposure. This works out well since normally we'd expect the gray to be neutral-

toned—remember our "rules of thumb." As a check, meter something else like the forest on the side of the mountain; most likely, we'd expect our meter to now read -1 EV. If it does, we're probably good to go, but just to be sure, throw in something else like a neutral-toned gray rock as a final check. Does that meter 0 EV or close to it? If it does, we're golden, and the overall scene will be well exposed.

Going one step further, use the same scene, but now meter the bright blue sky as depicted in Figure 2. The resulting meter reading now shows +1 on the scale, or 1 stop brighter than neutral tone, which is to be expected since it looks brighter than the gray cloudy area. In this case, I started with the blue sky, but could have just as well used it as a check to confirm other scene meter readings, as was done in the first example.

Now that we've gone through this exercise, it's time to take a test shot and then check the preview screen along with the histogram for confirmation of good exposure. Don't just rely on the preview you see on the LCD screen, as it can be misleading—the key is a correct histogram. Learning how to properly interpret the histogram is an art unto itself, as it can vary considerably from scene to scene based on any number of factors—time of day, uniformity of light, cloud cover, etc. Bright areas show on the right and dark areas on the left. As long as the histogram isn't severely clipped (jammed to the right or left), indicating over- or underexposure, respectively, things should be okay. Anything clipped will have no detail, and it can't be recovered in postprocessing no matter what's done. Overexposure is far worse than underexposure, particularly where sky is concerned, and is to be avoided even if shadow areas need to be compromised.

Setting the Highlight Alert warning for your LCD preview screen, through the camera's custom functions, will aid considerably in your understanding of how the histogram reflects the amount of overexposure. In the preview screen, any area(s) overexposed will blink to alert you. Unfortunately, there's no preview alert for underexposure. Figure 3 shows a typical situation to illustrate this. As long as overexposure doesn't take up a significant amount or important part of the scene, it may be acceptable. If you feel that too much of the scene is over-exposed, readjust the shutter and/or aperture in 1-stop increments, taking additional test shots until there's a tolerable amount of "blinkies" remaining.

Where we can get into trouble is when meter readings measure greater than +2 or less than -2 (fortunately, most meters blink to warn of this occurrence). In both situations, it's possible something will be blown out or completely underexposed, generally an undesirable result in either case. There are exceptions to this, for example, the sun, whitewater, bright snow, the brightest part of a cloud, etc., where there's little or no detail anyway, so these things can show as overexposed with no ill effects to the overall scene. The key is to know and understand what and how much over- or underexposure is acceptable—this will come with experience. Bear in mind that metering, setting exposure based on the meter reading, taking a test shot and checking the histogram are all part of the normal photographic workflow—it's an iterative process that needs to be gone through with each and every shot until you get proficient at it.

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How about other metering modes? They work the same as spot metering except that a larger portion of the image frame is used to measure light input. Personally, I rarely, if ever, use anything but spot and evaluative metering, but you may find that other modes work for you, depending on the type of photography you do. I find that evaluative metering is best suited to midday or overcast conditions when the entire scene is evenly lit with consistent light. Metering and exposure settings will be most troublesome when light is variable, or when very bright or dark objects dominate a significant portion of the frame, such as early and late in the day. When there are large tonal differences throughout the scene, e.g., when very bright sky or deeply shadowed foregrounds dominate much of the frame, exposure can be biased, leading to erroneous exposure settings. These are the situations where I find spot metering to be most advantageous. Under conditions such as these, a portion of the scene's exposure may need to be compromised, or an entirely different approach taken, for example, use of a graduated neutral-density filter to even out exposure between bright sky and dark foreground, or use of multiple exposures to be combined in HDR. By all means, if there's any doubt, take a series of bracketed exposures at 1-EV/stop intervals and select the one you feel works best—pixels are cheap and you may have only one opportunity to capture that special moment.

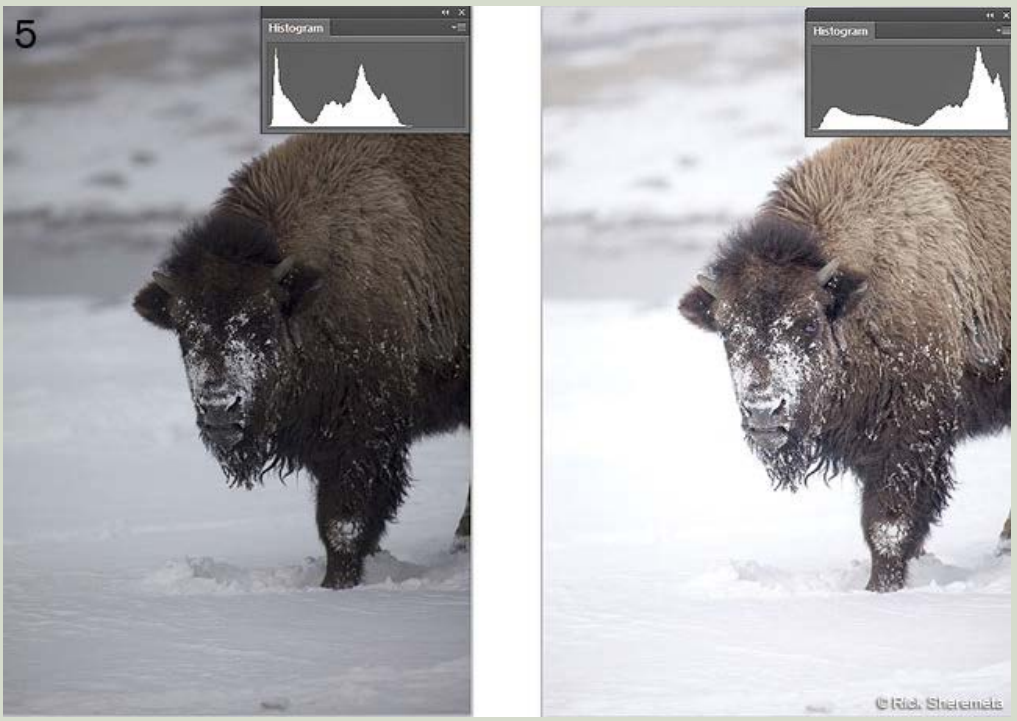

Figure 5: *An image of a bison in Yellowstone National Park shot in Shutter Priority with bright snow dominating the exposure. The image on the left has no exposure compensation, resulting in a very underexposed animal and gray snow. The image on the right is at an exposure compensation of +2 EV; the snow is correctly rendered as white, and the animal is correctly exposed. Notice the difference in*

histograms between both images.

Shooting Modes

How does shooting in Aperture or Shutter Priority or Program mode affect things? The concept is exactly the same; however, in any program mode, the camera automatically will correct exposure by adjusting aperture and/or shutter speed to render each image at neutral tonality, or 12.5% gray, regardless of how bright or dark the scene should be. As we know, unfortunately, not all scenes are neutral tone; for instance, white snow will be rendered as gray if the camera is left to its own accord, as illustrated in Figure 5. When things aren't neutral, the camera must be instructed to alter the way in which it interprets the scene, i.e., to over- or underexpose and by how much. This is termed "exposure compensation." When setting this, it's simplest to work in full-stop increments, if possible. For example, white snow may require exposure compensation to be set between +1 EV and +2 EV to be rendered correctly, depending on how brightly the scene is lit.

Likewise, for a dark scene, negative compensation, such as -1 EV for a twilight scene, may be appropriate, otherwise it may be depicted as too light. A good example of a tricky situation is in Figure 5, where you have to determine whether the exposure on the bison or the snow is more important. The animal is almost always more important than the setting, and in this case, exposure compensation was dialed up to be sure to get a good rendering of the bison.

A word of caution if spot metering: Things can go awry if the image is reframed after metering, as the camera automatically will change exposure unless automatic exposure (AE) lock is engaged until the shutter release is fully activated. Evaluative metering can be more forgiving when using Aperture or Shutter Priority modes, since light or dark areas may balance each other, giving a more uniform exposure. As long as you understand and are comfortable with these limitations, things will work fine.

I find that you can hardly ever go wrong spot metering in Manual mode, and this is what I teach all of my students. Yes, you're forced to make a decision with each shot to select a shutter speed and aperture appropriate to the situation, but then isn't that what photography is all about?

Like anything else worth doing, the art of metering and setting exposure correctly requires practice. While all of this may seem a little intimidating at first, the more experience you get, you'll come to understand that it makes sense. Soon all of this will be second nature, and your photographic efforts will improve dramatically.

*See more of **Rick Sheremeta**'s photography and learn about his photo workshops at www.alpenglowproductions.com or check out his Facebook Page at www.facebook.com/AlpenGlowProductions.*

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