

Some RAW Truths!

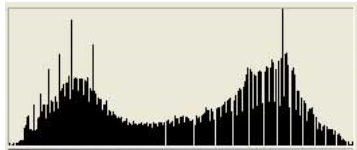
By Steve Traudt

Digital photography is absolutely amazing! I would never go back to film. There are so many advantages, I can not even list them all. There are some disadvantages too. Perhaps the biggest problem is the very ease of use and instant feedback which can lead us to be somewhat sloppy in our approach. It is as though we are less careful; we “machine gun” more knowing we can just hit the “delete” key later. Our ability to use Photoshop later to “fix” our sloppiness also further contributes to this issue.

Before digital, many of us shot slide film. Slide film had a very narrow latitude and required careful exposure for best results. As it turns out, our digital sensor is very similar to slide film: they both have about a six f-stop leeway.

If you are interested in the very best quality from your digital camera, there are two important factors to consider.

Although everyone knows about the histogram display on their camera, I am not sure how many photographers are properly using it. As slide film photographers, we often underexposed slightly to give richer colors. It is then a natural tendency to do the same with your dSLR. But underexposing a digital file leads to some major problems. Noise, in a digital camera, is those red and green dots; it looks similar to film grain. And since noise occurs in the shadow region, underexposure leads to increased noise.

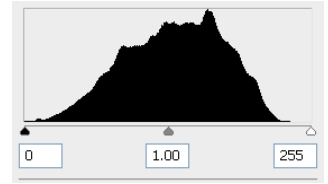


Photographers then use levels in Photoshop to correct the exposure but in doing so, they end up with “banding”. Banding is that comb-like look on the histogram where the missing gaps indicate a lack of pixel information. Instead of having a smooth toned sky for instance, you end up with a splotchy look. Also called “posterization”, this artifact can ruin an image.

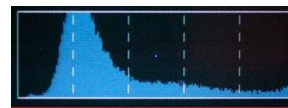
On the other hand, we have been taught to never over-expose our digital files. A “blown-out” pixel has no information in it; it is pure white. So once again, we are led to the tendency to underexpose our image.

Also contributing to this issue is the LCD panel itself. Although the panel should really only be used to gauge composition, many also use it to judge exposure, a very poor practice. Just like with slide film, a darker, under-exposed shot will appear better on the LCD panel. Couple that with the difficulty even seeing the panel in sunshine and you have a recipe for disaster!

This then, is where the histogram becomes so valuable. The histogram is a graph-like representation of the pixel values in your image. There are 256

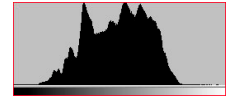


values, with zero on the left being pure black and 255 on the right being pure white. A lot of photographers get hung up on the shape of the histogram which is essentially meaningless. What does matter though, are the left and right hand points. If either the left or right side of the histogram is touching the border, the image is “clipped”. This means you have clipped off part of the pixel information. In a perfect world, your histogram would fit nicely in the center of the box, with no clipping on either end. This usually is not the case however, especially on a sunny day. Since most folks are so paranoid about over-exposure, they tend to let the histogram drift too far to the left.



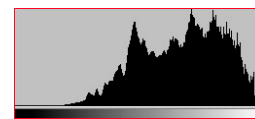
If you look at your histogram display, there are usually five evenly divided sectors. It is logical to look at these and assume they each represent 1/5 of the overall exposure. But because a digital sensor is a linear device, it turns out that the far right sector actually contains 50% of the sensor’s sensitivity!

Read that previous sentence again... If you do not use the right-hand fifth of the histogram for recording some



of your image you are in fact wasting fully half of the available encoding levels of your camera, as shown here.

So you should really adjust your exposure so that the histogram snugs up to the right side, without quite clipping any data off. Such an exposure will likely look too bright on the LCD panel, but just ignore that. For the maximum quality and least noise, expose to the RIGHT, as shown here!! By the way, this information originally came to us from Thomas Knoll. Tom is the co-inventor of Photoshop and he also created Adobe Camera RAW, so there is a pretty good chance he knows what he is talking about!



Also keep in mind that the histogram on the camera is actually a JPEG representation. If you are shooting RAW (which you should be) the histogram is only an approximation. If it looks slightly clipped to the right, in RAW it will be fine.

Get in the habit of glancing at your histogram often to make sure of your exposure. If you are using one of the Auto modes such as A priority or S priority, it is simple to apply a +/- over-ride. To move the histogram further

right, apply a plus (+) compensation. To move it left, apply a minus (-) one. And of course, in Manual mode, you move the histogram right or left by adjusting either your f-stop or shutter speed. Also, turn on the “blinkies” in your menu settings. This causes overexposed parts of the image to flash alerting you to possible problems.

Ok, so we are now getting great exposures. But the other critical part of our quest for high quality images is using RAW rather than JPEG. It is not that JPEG is so bad, considering how it was designed. It is just that RAW is so much better.

When you shoot a JPEG photo, the camera processes the file and then compresses it according to a mathematical formula. It literally throws away pixels, while keeping certain “reference” pixels to reconstruct the image later. All the camera parameters such as white balance; picture styles; contrast; presets; etc are “locked” into the JPEG file. It is very difficult to later modify a JPEG file, even in Photoshop, without causing a good bit of pixel damage. A JPEG file can only have an 8 bit depth, which equals 256 levels. Some cameras only shoot JPEG so you don’t have a choice. If you do use JPEG, be sure to select the highest quality setting, with the least compression. And getting the correct exposure, via the histogram, is even more critical for JPEG files.

On the other hand, a RAW file simply captures what the sensor chip recorded. Nothing more; nothing less. It is like a “latent” image in exposed but unprocessed film. The RAW file will “tag” the image with settings such as white balance and exposure but the actual data is not changed. Until recently, digital SLR cameras recorded in a 12 bit space, which equals 4,096 levels vs. the 256 levels of JPEG. This means you have a much bigger “bucket” of potential tones and colors, making for smoother transitions. Many recent cameras now record in a 14 bit space, which represents over 16,000 levels!

To use a RAW file, you first have to “convert” or develop it. Some folks find this confusing or too time consuming. But for the best quality, it is a necessary function. There are many ways to convert the RAW. Your camera company will usually supply a RAW converter on the software CD. There are also 3rd party converters and of course, Adobe Camera RAW (ACR). ACR is built into Photoshop CS and Elements versions. When you open a RAW file using a Photoshop product, it automatically launches ACR. There are an amazing amount of control adjustments found in ACR. You can adjust exposure and white balance without any damage to the pixels. You have clarity and vibrance sliders. You can reduce noise and chromatic aberration as well. After you adjust the image to your liking, you can open it as an 8 or 16 bit TIFF, or as a JPEG. Obviously, the 16 bit TIFF preserves the most information. You can always

downsize it later in Photoshop to an 8 bit JPEG or TIFF, as needed.

The original RAW file is never changed; it is always there on your hard drive ready for other interpretations. Be sure to backup your RAW files; they are your “negatives”!

RAW conversion software is always evolving and improving so in the future, you will have even more options available.

By shooting in RAW, you give yourself the maximum possible freedom later on as new technology is developed. For instance, HDR software can now take a single RAW file and create an amazing photo with increased dynamic range.

If you are not ready to fully commit to RAW, some cameras allow you to shoot a simultaneous RAW plus JPEG. Each time you take a photo, both files are recorded.

And even if you shoot only RAW, but need a quick JPEG, there is a neat trick available. It turns out that a JPEG lives inside of each RAW file. This is what is displayed on the back of your camera for instance. To extract this JPEG, you can use a great little free program from www.rawworkflow.com called Instant JPEG from RAW.

Some folks also complain that RAW files are much bigger and take up more room on your memory cards and hard drives. While this is true, the prices for cards and drives continue to go down. Increased file size is a small price to pay for the highest possible image quality.

I really encourage you to shoot RAW. There will be a bit of a learning curve but ultimately you will be gaining many advantages. There are many books and articles about RAW. The main thing is to start shooting RAW now and learn as you go. At the very least, shoot both RAW and JPEG if you have a fear of commitment!

So there you have it....shoot RAW and watch your histogram. These two procedures will have you making professional quality files!

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