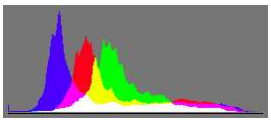
EVALUATING YOUR IMAGES—HISTOGRAMS

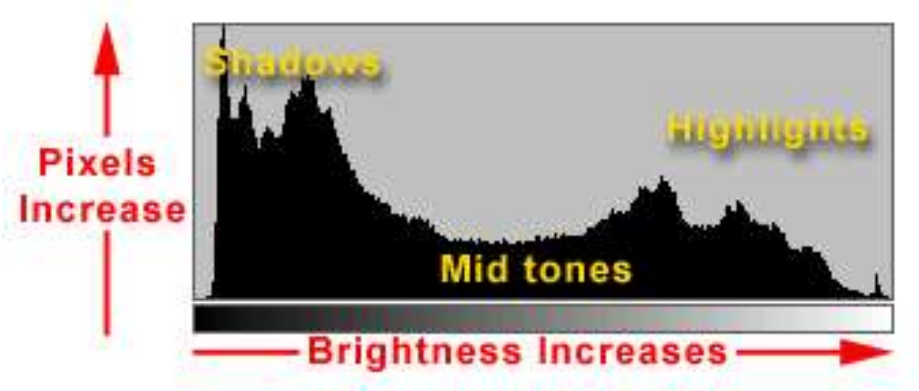


There are two kinds of histograms. Most cameras show one of the gray scale brightness levels. A few display an RGB histogram showing the brightness of each of the three colors, red, green, and blue.

Most serious photo-editing programs let you use a histogram as a guide when editing your images. However, since most image corrections can be diagnosed by looking at a histogram, it helps to look at it while still in a position to reshoot the image. It's for this reason that many cameras let you display histograms on the monitor in playback mode or while reviewing an image you have just taken. A few cameras even let you see a histogram as you are composing an image so you can use it as a guide when adjusting the camera settings you'll use to capture the picture.

EVALUATING HISTOGRAMS

As you've seen, each pixel in an image can be set to any of 256 levels of brightness from pure black (0) to pure white (255) and a histogram graphs which of those levels of brightness are in the image and how they are distributed. The horizontal axis of a histogram represents the range of brightness from 0 (shadows) on the left to 255 (highlights) on the right. Think of it as a line with 256 spaces on which to stack pixels of the same brightness. Since these are the only values that can be captured by the camera, the horizontal line also represents the image's maximum potential tonal range or contrast.



The vertical axis represents the number of pixels with each of the 256 brightness values. The higher the line coming up from the horizontal axis, the more pixels there are at that level of brightness.

To read the histogram, you look at the distribution of pixels. Here are some things to look for.

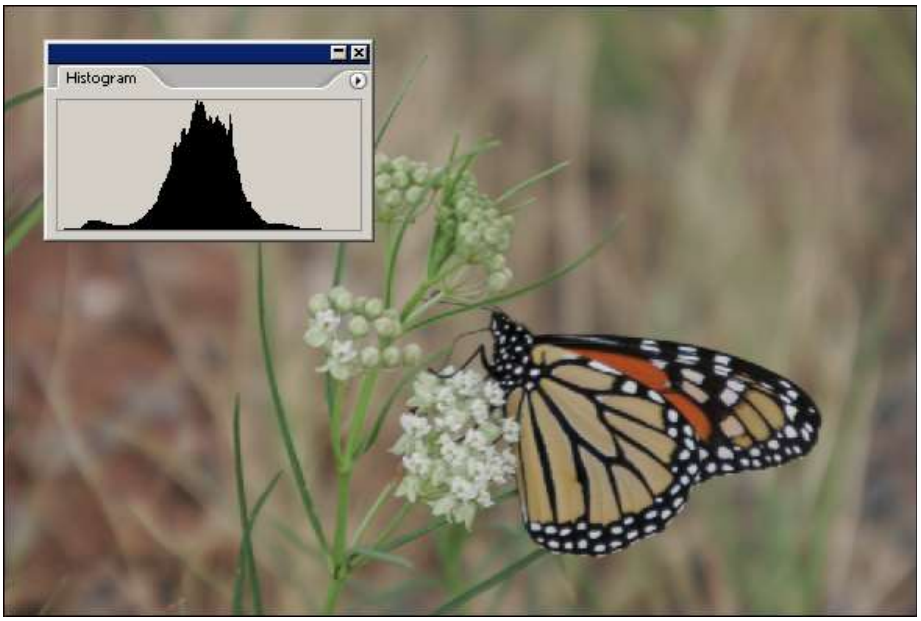
• Many photos look best when there are some pixels at every position because these images are using the entire tonal range.

• In many images, pixels are grouped together and occupy only a part of the available tonal range. These images lack contrast because the difference between the brightest and darkest areas isn't as great as it could be. However, this can be fixed in your photo-editing program by using commands that spread the pixels so they cover the entire available tonal range. These controls allow you to adjust the shadow, midtone, and highlight areas independently without affecting the other areas of the image. This lets you lighten or darken selected areas of your images without loosing detail. The only pixels that can't be fixed in this way are those that have been "clipped" to pure white or black.

When adjusting the histogram at the time you are taking photos, here are some things to keep in mind:

• If the histogram shows most pixels toward the left (darker) side of the graph, use exposure compensation (discussed in the next chapter) to add exposure.

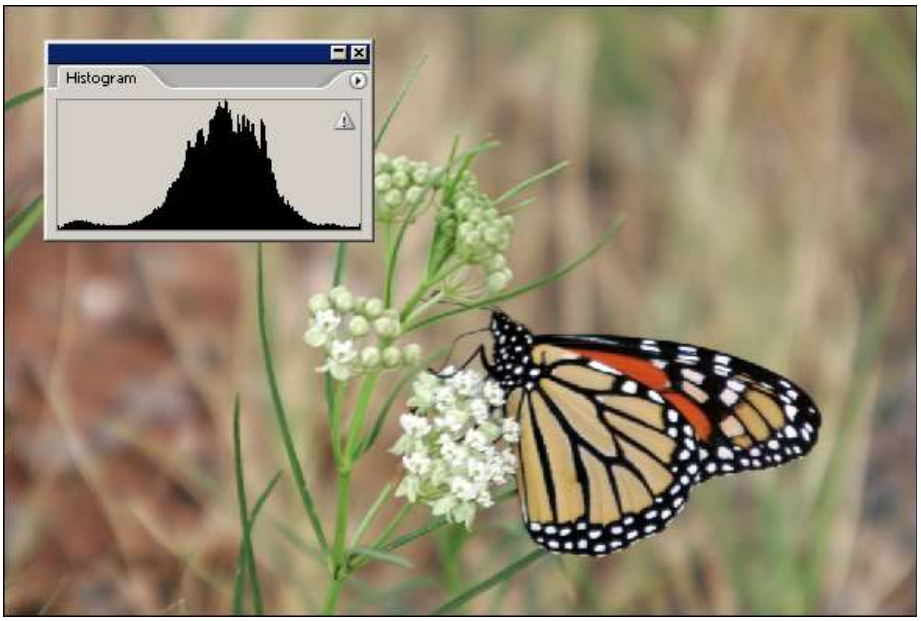
• If the histogram shows most pixels toward the right (lighter) side of the graph, use exposure compensation to reduce exposure.



The original image (top) is flat and its histogram indicates only part of the tonal range is being used. A photo-editing program was then used to expand the tonal range (bottom). You can see the change in both the image and in the histogram.

Animation

Click to explore histograms.



Animation

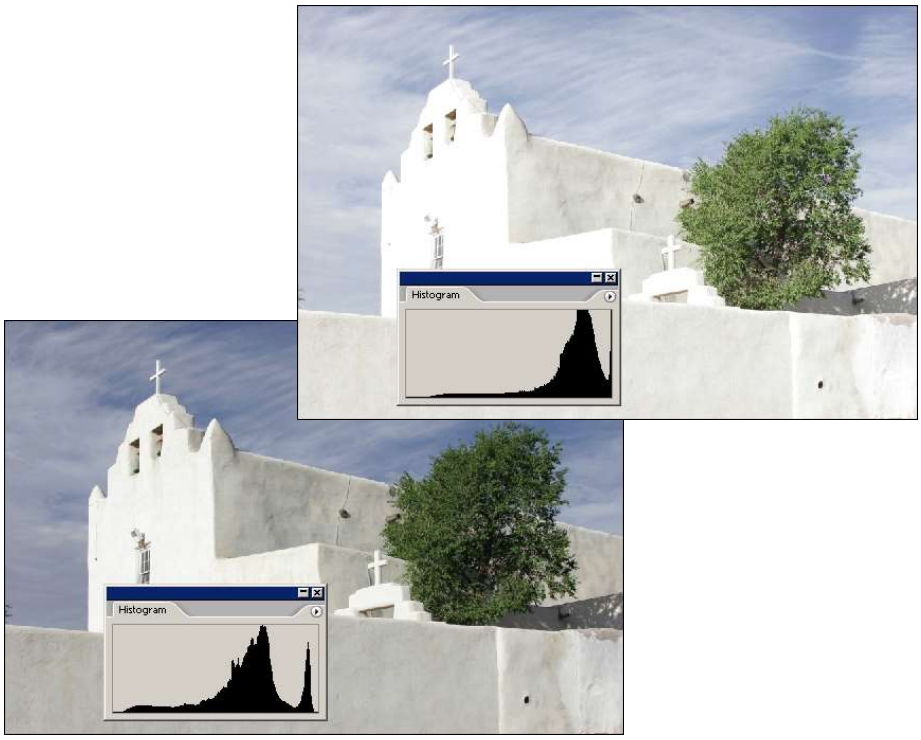
Click to explore how overexposed highlights blink.

HIGHLIGHT WARNING

One thing you want to avoid is overexposing highlights so they become so bright, or "clipped", they loose details. To help you avoid this many cameras display a highlight warning when you review or compose your images. Areas that are so overexposed they have no detail blink or are outlined in color.

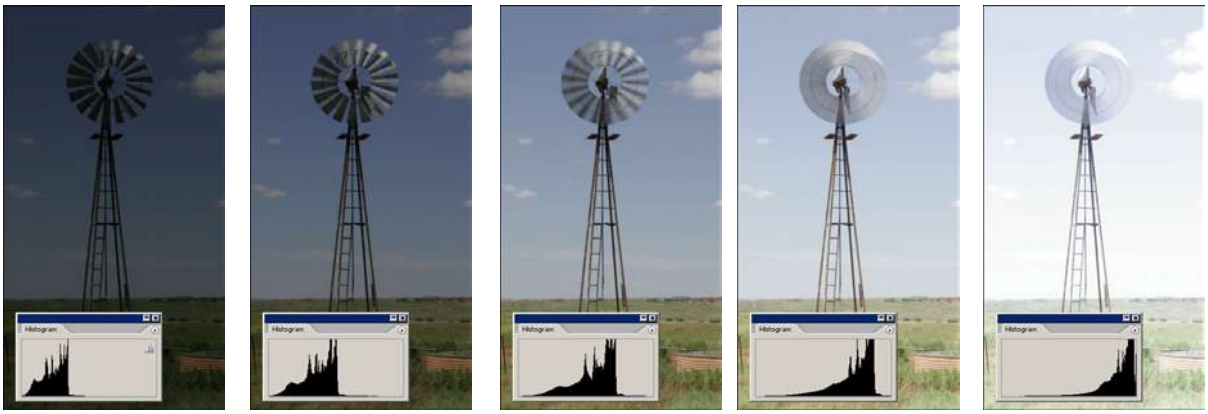
CLIPPED PIXELS

When a histogram shows pixels at the extreme ends of the range, in the 0 and 255 positions, it means details in those tones are lost or "clipped" in your image. These extremes should be reserved for specular highlights (reflections) and small dark shadows. When large areas lack detail an image suffers.



In the top image you can tell from the histogram that some of the highlight pixels are pure white and hence clipped. There is nothing you can do later to display details in the area of these pixels. However, if you reshoot the scene at a different exposure you can shift the pixels to the left and avoid the clipping (bottom).

To avoid clipping and better place the tonal values in subsequent shots, you use exposure compensation. Increasing exposure shifts pixels to the highlight, or right end of the histogram. Decreasing exposure shifts them the other way. Unless you are deliberately trying to get pure whites or pure blacks, you should shift the pixels if any are being clipped. This then gives you a chance to correct the image in your photo-editing program.

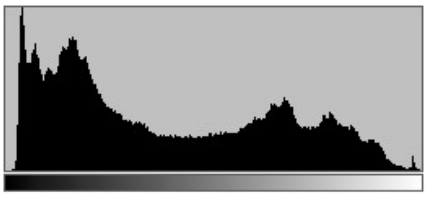


This series of photos was taken one stop apart using exposure compensation. As the exposure increased, pixels on the histogram shifted right. You can tell from the way the fan blades blur that the shutter speed was changed to change the exposure. In the image where it was faster, the image is darker and the blades are frozen. As slower speeds were used to increase the exposure, the images get lighter and the blades more blurred.

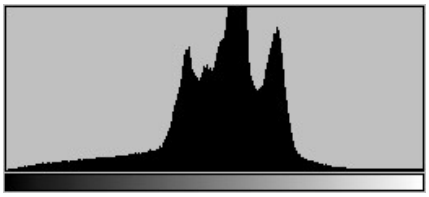
SAMPLE HISTOGRAMS

The way a histogram looks depends on the scene you're shooting and how you expose it. There's no such thing as a good or bad histogram other than one that shows unwanted clipping. Whether a particular histogram is good or bad depends on what you are trying to accomplish. If fact, you may prefer to trust your visual reaction to the image more than the very numeric image data provided by a histogram. However, even if you never use a histogram, you can learn about digital photography by understanding what a histogram can show about an image. Following are some histograms from good images along with a brief summary of what each histogram reveals.

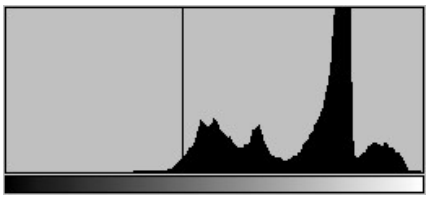
In this well exposed portrait there is a fairly even distribution of values in both the shadow and highlight areas of the image. There are no pure blacks in the image as shown by the gap at the far left end of the scale.



This brown moth on a gray card has most of its values in the midrange. That's why there are a number of high vertical lines grouped in the middle of the horizontal axis.



This high-key fog scene has most of its values toward the highlight end of the scale. There are no really dark values in the image. The image uses only a little more than half the camera's dynamic range.



The distinct vertical line to the left of middle gray shows how many pixels there are in the uniformly gray frame border added in a photo-editing program.

This low-key scene has the majority of its values in the shadow area with another large grouping around middle gray. There are wide levels of brightness that have only a few pixels.