

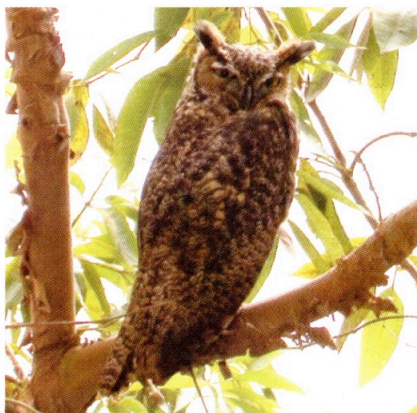
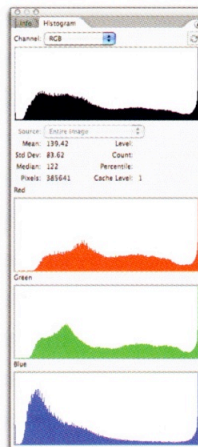
Image Editing and Image Degradation

Just about anything you do to change the tone or color of pixels results in some kind of data loss. If this sounds scary, rest assured that it's a normal and necessary part of digital imaging. The trick is to make the best use of the available bits you've captured to produce the desired image appearance, while preserving as much of the original data as possible. Why keep as much of the original data as possible if you're going to wind up throwing it away later? Very simply, it's all about keeping your options open.

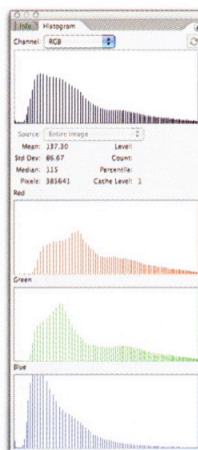
The fact is, you don't need a huge amount of data to represent an image. But if you want the image to be editable, you need a great deal more data than you do to simply display or print it. Figure 2-3 shows two copies of the same image. They appear very similar visually, but their histograms are very different. One contains a great deal more data than the other.

Figure 2-3
Levels and appearance

This image was produced by making corrections in Camera Raw, producing a 16-bit-per-channel image in Photoshop.



This image was produced by converting at Camera Raw default settings, producing an 8-bit-per-channel image that was further edited in Photoshop.



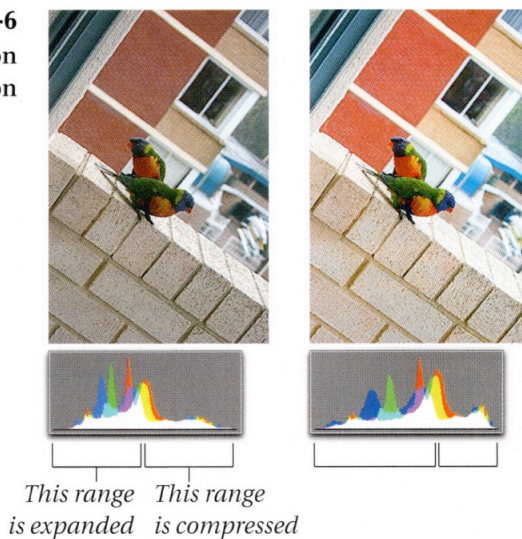
The two images shown above appear quite similar, but the histograms shown to the right of each image reveal a significant difference. The lower image contains a great deal less data than the upper one. Careful examination may reveal subtle differences in hue and detail, but the biggest difference is the amount of editing headroom each image offers.

Despite the vast difference in the amount of data they contain, it's hard to see any significant differences between the two images—you may be able to see that the one with more data shows more details on the chest feathers, but it's a pretty subtle difference. Figure 2-4 shows what happens when a fairly gentle curve edit is applied to the images shown in Figure 2-3. The difference is no longer subtle!

Tonal range compression. When you compress a tonal range, you also lose levels, in a somewhat less obvious way than you do with clipping moves. For example, when you lighten the midtones without moving the white clipping point, the levels between the midtone and the highlight get compressed. As a result, some pixels that were formerly at different levels end up being at the same level, and once you make the edit permanent, you've lost these differences, which may potentially represent detail. See Figure 2-6.

Tonal range expansion. A different type of image degradation occurs when you expand a tonal range. You don't lose any data, but you stretch the data that's there over a broader tonal range, and hence run the danger of losing the illusion of a continuous gradation. Almost everyone who has used Photoshop for more than a week has encountered the experience of pushing edits just a little too far and ending up with banding in the sky or posterization in the shadows. It's simply caused by stretching the data over too broad a range, so that the gaps between the available levels become visibly obvious. See Figure 2-6.

Figure 2-6
Tonal range compression
and expansion



When you use the Brightness slider in Camera Raw or the gray slider in Levels to brighten the midtones, you compress the highlights and expand the shadows. The images and histograms above show Camera Raw's Brightness control, and the histogram at right shows the results of using the gray input slider in Levels on an 8-bit/channel image. The gaps are from expansion, the spikes from compression.

