SECOND EDITION

REAL WORLD

Image Sharpening

with Adobe® Photoshop®, Camera Raw, and Lightroom®

INDUSTRIAL-STRENGTH PRODUCTION TECHNIQUES

- Nuts and bolts of sharpening
- Creative-sharpening techniques
- Workflow strategies

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REAL WORLD IMAGE SHARPENING

with Adobe Photoshop, Camera Raw, and Lightroom,
Second Edition

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color artifacting and Moiré patterns (discussed in Chapter 2, "Why Do We Sharpen?"), which has the effect of softening the image. As a result, traditional sharpening, which is optimized for transparency scans, often undersharpens digital captures.

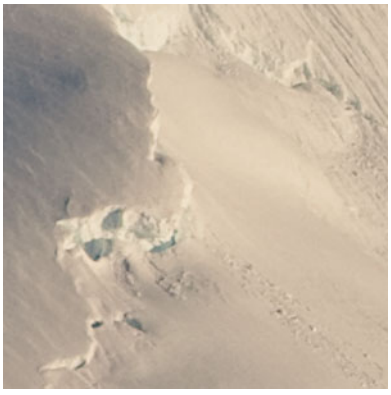
Figure 3-3 shows the difference between a traditionally sharpened and an optimally sharpened digital raw capture.

Figure 3-3
Digital raw capture and undersharpening

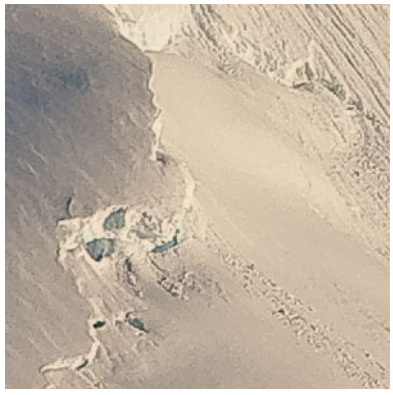
This is the full-frame image from a Canon EOS-1Ds Mark III shot with a 300mm F2.8 lens at ISO 200. The full print size of this image was 18.75" x 12.5" at 300 ppi (pixels per inch).

This contact-print–sized version of the image was produced by applying zero global sharpening in the raw converter, followed by traditional one-pass sharpening at final print size. It's not really sharp at all.

This contact-print–sized version of the image was produced by applying optimal selective sharpening in Adobe Camera Raw, followed by output sharpening at print size. It's noticeably sharper than the version above.



This is a 200% zoom view of the image without sharpening in the raw capture but with output sharpening.



This is a 200% zoom view of the image sharpened in Camera Raw with the following settings: Amount: 65; Radius: 0.7; Detail: 80; Masking: 10; Luminance: 8; and Color: 25. The output sharpening was suitable for 150-lpi (lines per inch) halftone with 300-ppi resolution.

This failure to understand the inherent properties of digital capture and the differences between digital capture and scanned transparencies has given rise to a considerable body of prepress myth regarding the perceived superiority of film over digital capture. But like it or not, digital capture has already largely replaced film for most commercial work, and the trend is clear and irreversible.

Traditional Sharpening Roots

Traditional sharpening is rooted in the drum scanner and, moreover, in the analog drum scanner. The earliest drum scanners, from the 1960s, were analog devices that produced actual CMYK film separations, and the sharpening was done optically. By the 1980s, drum scanners produced digital CMYK files from RGB scans, still with optical sharpening.

When the desktop revolution hit in the early 1990s, the old paradigm of scanning at final resolution for a specific use fell by the wayside. Adobe Photoshop 2.0 introduced CMYK support and changed print manufacturing forever—though not overnight. Proprietary systems from the likes of Scitex, Linotype-Hell, Crosfield, and Agfa continued to hold sway for much of the decade, but by 1999, Photoshop had become not only a ubiquitous noun, but also a verb.

Photoshop Sharpening Practice

As has often been the case when an analog process is replaced by a digital one, most practitioners of sharpening in Photoshop used Photoshop's sharpening tools to replicate the drum scanning workflow. There is still considerable debate as to whether to sharpen before or after conversion to CMYK (some even advocate converting to Lab and sharpening the Lightness channel), but it's generally agreed that sharpening must be done at the final output size and resolution, after all major tonal adjustments have been performed.

Traditional Sharpening Problems

The main problem with the traditional sharpening approach is that it tries to account for image source, image content, and output process in a single round of sharpening. After nearly 20 years of experience using Photoshop to produce images both on press and on desktop printers, Bruce and Jeff have concluded that it's simply impossible to address all three factors in one sharpening pass. The preceding pages of this book show the kinds of problems that arise when we attempt to do so. While the results aren't invariably bad, they're never as good as they could be.

Multipass Sharpening Problems

Many Photoshop users have, at some point, tried a multipass sharpening approach. A few have made it work, but the vast majority have wound up creating grossly oversharpened images, usually by falling into one or more of four potential pitfalls:

- Relying on the computer display to judge sharpness is a practice fraught with peril, yet until we make the print, it's all we have. The temptation is to make the image look sharp on screen, then to sharpen it again for output, often with unacceptable results.
- Failure to take image content into account in the first round of sharpening typically results in applying the wrong *kind* of sharpening for the image, so wanted detail may be obscured, and unwanted detail or noise may be exaggerated.
- Applying the first pass of sharpening globally, rather than through a mask that isolates edges, sharpens noise, flat-textured surface areas (such as skies), and the edges. When the second pass of sharpening is applied, the image becomes oversharpened.
- Applying the first pass of sharpening to the entire tonal range, rather than protecting the extreme highlights and shadows, almost guarantees that the second pass of sharpening will create blown highlights and plugged shadows.

The good news is that all of these problems are avoidable given sufficient attention, care, and skill. Building a multipass sharpening workflow is not a trivial undertaking, but neither is it impossible—otherwise we wouldn't have bothered writing this book!

A Multipass Sharpening Workflow

It's impossible to address the varying needs of the image source, the image content, and the output process in a single pass, because each imposes requirements that can contradict the others. The solution, then, is to build a multipass sharpening workflow that addresses the individual needs separately.

Each component has its own requirements, and by ignoring everything else, we can tailor each sharpening pass to address a specific issue.

Phase One: Capture Sharpening

When the first edition of the book was released, some people were somewhat confused about the definition and role of capture sharpening. Bruce had written about sharpening for the image source as well as the image content as though they were two different sharpening passes. They weren't. The intent was to describe two different aspects that needed to be considered when doing sharpening at the early input stage, which Bruce called "capture sharpening."

Whether the capture is on film and scanned or made with a digital camera, the concept remains the same. You must apply initial sharpening to the image, and this initial sharpening must consider two components very carefully: the image source and the image content. Done properly, both components can be addressed in a single round of capture sharpening.

The goal of this first pass of the sharpening workflow is to create an image that responds well to subsequent rounds of sharpening aimed at the image content and at the output process. We recommend performing any major tonal correction before doing any sharpening or noise reduction, because sharpening and noise reduction can't easily be undone if it's done before the tone and color correction.

Figure 3-4 shows an image in Camera Raw at the default sharpening settings. (We'll follow this image through the entire sharpening workflow.) Optimizing Camera Raw's sharpening settings is one example of capture sharpening. Note that the tone and color correction settings have already been determined; only the sharpening and noise-reduction settings are being addressed at this stage.

Optimizing for the Image Source

Optimization for the image source is dictated by two factors: the noise signature and the amount of detail the system can record. The inherent softness of most digital captures (due to the anti-aliasing filter) requires actual sharpening, where with film the emphasis may be on grain reduction instead.

Optimizing digital captures. With digital capture, the lens is more often than not the practical limiting factor on the amount of detail the system can record, but the optical low-pass (anti-aliasing) filter found in the majority of digital SLRs sets an absolute limit.

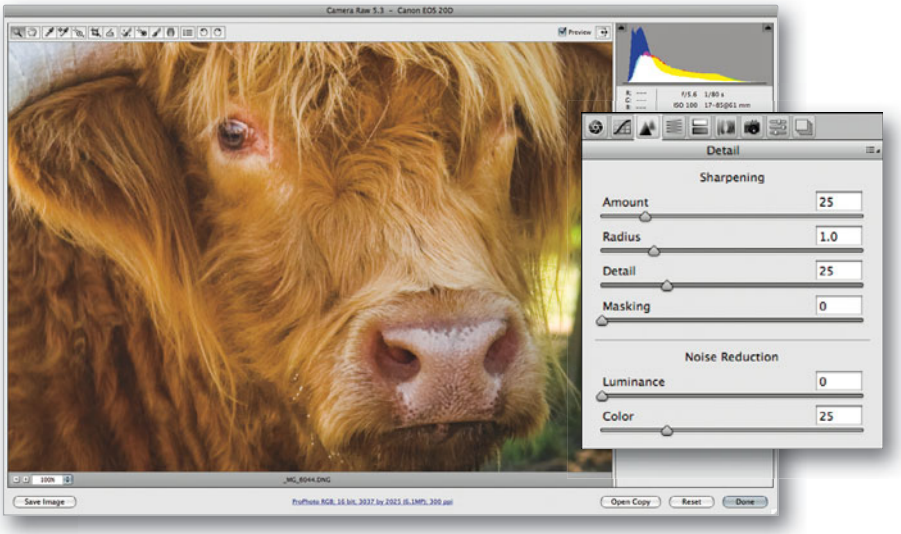


Figure 3-4 Capture sharpening's default settings in Camera Raw

For those few cameras that lack an anti-aliasing filter, it may be worthwhile making lens-specific settings, but in general we can come up with a single sharpening routine that is optimal for a given camera. High-ISO shots and significantly underexposed images may need special handling of noise, in either the raw converter or in Photoshop. Severe noise may call for a dedicated third-party noise-reduction plug-in.

With normal exposures at low ISO settings, it's often enough to simply avoid sharpening the noise by protecting the extreme shadows.

Figure 3-5 shows the beginning of the process of optimizing the settings. In general, the controls of Camera Raw are set out in the logical order of use. It should be expected, however, that adjusting subsequent settings may require modifications of previously made adjustments. In this figure, the Option key (Mac) or Alt key (Windows) is being held down while adjusting the Amount slider. This instructs Camera Raw to display the luminance image data that will be sharpened in the processing pipeline. In addition to sharpening only the luminance data, Camera Raw also rolls off the extreme highlight and shadow detail so that image sharpening won't cause clipping.