CHAPTER FOUR

Preparing to Edit

Just as a darkroom must be prepared before it can be used, you'll need to make a few preparations to Capture NX before you can start editing in earnest. Fortunately, working with Capture NX doesn't require any hazardous chemicals, and you don't have to worry about darkening your windows. You will, however, need to make some preference adjustments to help Capture NX better represent the colors in your image.

Getting predictable color from any image editing program is not easy, but Capture NX offers some simple color management tools that make color reproduction more predictable. In this chapter, we'll take a look at some of the basics of color management theory and how color management is handled in Capture NX, so you'll have more consistent color throughout your workflow.

Configuring Capture NX for Color Management

If you've ever printed any of your images, you already know that your printed output very rarely, if ever, matches the images that you see on your monitor. You might also have noticed that as you move an image from one computer to another and look at it on different displays, its color varies tremendously. To help make the color in your images more consistent from device to device and from your camera to your printer, Capture NX provides industry standard color management features. If you properly configure these features, you'll find that the color in your images is much more consistent from device to device.

Even if you never plan on printing, it's worth taking advantage of color management technology. As your computer monitor ages, its colors will shift, and it will likely become dimmer and less contrasty. Diligent use of color management technology can keep your images looking consistent as your monitor ages.

Color management can be a very "dense" topic if you choose to get into a lot of the underlying theory. Fortunately, for everyday use, you can get by with a few simple controls and a handful of guidelines. Keeping your system color accurate will take very little time.

Color Management Basics

A lot of factors make color consistency a difficult goal. For one, there's the simple fact that color is subjective; everyone sees color slightly differently. But there are also some hard and fast objective difficulties.

As you may have learned in grade school finger painting class, by mixing a few primary colors together, you can create other colors. Similarly, if you've ever set up an inkjet printer, you know that you put just a few ink cartridges in—usually cyan, magenta, yellow, and black—and yet your printer is able to spit out full-color images.

Your digital camera and your computer monitor work the same way. They combine the three primary colors of light—red, green, and blue—to create all of the other colors that they need (**Figure 4.1**). However, there's an important difference in the way your camera combines colors and the way that a printer combines colors.

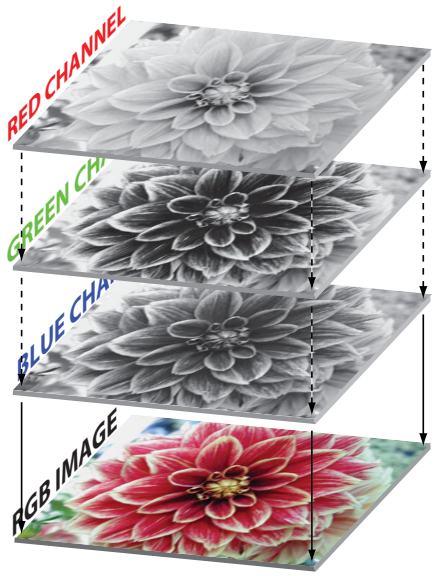

Figure 4.1 Your digital camera creates colors by combining the three primary colors of light: red, green, and blue.

Color systems

Your printer creates color by mixing different colored inks. The primary colors of ink—cyan, magenta, and yellow (CMY)—combine in a *subtractive* manner, meaning they get darker as you mix them together until they ultimately become a dark muddy brown. In theory, they should eventually turn black, but making perfectly pure inks is impossible, so very, very, dark brown is usually the best we can achieve. This is why black (the K in CMYK) is usually added to the printing process alongside the ink primary colors.

Like your eye, your camera's image sensor is sensitive to the primary colors of light—red, green, and blue—which combine in an *additive* manner. As you mix red, green, and blue, the result is a lighter color. Mix equal amounts of the three components and you get varying shades of gray or white, given sufficient intensity of the three.

As you might imagine, trying to translate one set of primary colors that mix together in an additive process into a different set of primary colors that mix together in a subtractive manner is a very complex process. Complicating it further is the fact that these two distinct methods of producing color have different *gamuts*. You can reproduce far more colors with an RGB mix of colors than you can with a CMYK mix of colors. So, the broad range of RGB colors that your camera can capture must somehow be squeezed down to fit into the more limited range of colors that can be represented with CMYK color.

As if this situation wasn't confusing enough, different types of paper yield dissimilar results, and various monitors display images very differently.

Profiles

A color management system (which consists of software and sometimes hardware) works in the background to adjust your colors as they pass from device to device to compensate for the changes in the color qualities of each device. The practical upshot is that you should see less shift as your images pass from device to device throughout your workflow.

Color management software works by examining special *profiles* that you specify for your monitor and your printer. A profile contains a description of certain color characteristics of each device. Your color management software uses this description to skew the colors as they pass through your workflow, so that your colors and tones appear more similar on each device.

Monitor profiles contain additional information, which allows your color management system to adjust special settings in your computer's video card, so that your display looks closer to an accepted standard. This process of *calibration* helps different monitors deliver a similar image.

Fortunately, there is a widely accepted standard for this profiling information. The International Color Consortium (ICC) has defined a specification for color profiles. Both the Mac and Windows operating systems provide OS-level support for these ICC profiles. Developing a working color management system begins with the process of building or acquiring good profiles for your system.

Not a magic bullet

Before we go on to profiling, it's important to understand one important fact: *The images that your printer outputs will never look exactly like what you see on your monitor!*

Your monitor is a self-illuminated transmissive color device with a huge gamut of colors at its disposal. A printed page is a reflected color device with a narrow gamut of colors and a very different contrast range. As such, your colors and tones are *always* going to look different from the monitor to the printed page. So, if you're expecting that you'll be able to configure your color management system and from then on know *exactly* what will come out of your printer, you're going to be disappointed.

However, a well-implemented color management system *can* greatly reduce the number of experiments and test prints that you need to make. I usually find that, on difficult images, working with a color managed system decreases the number of test prints I need from 6 or 7 to just 2 or 3. This is better than I was ever able to do in a chemical darkroom!

Profiling Your Monitor

Configuring your color management system begins with the creation of a monitor profile. The underlying color management software uses the monitor profile to adjust the colors in your image as they pass to your screen, as explained earlier.

You can create a monitor profile in two ways: using a software calibrator or using a hardware calibrator. The Mac OS has a built-in software calibrator and Photoshop ships with one for Windows. Both solutions work fine, but you can now buy a hardware calibrator for under $200, and a hardware calibrator does a *much* better job than a software calibrator. So much so, that the amount of money you'll save in paper and ink will probably pay for the calibrator fairly quickly.

For getting started with color management, using a software-generated profile will at least let you see how the system works.

Software profiling on the Mac

Mac OS X includes a built-in software monitor profiler that builds a monitor profile based on your answers to some simple questions.

To use the Apple Display Calibrator Assistant:

1. Open System Preferences and click Displays. A dialog box appears with a generic monitor name such as "Color LCD." If you have multiple monitors attached to your Mac, a separate dialog box appears for each monitor. For now, pick a monitor that you want to display and move the appropriate dialog box to that screen.
2. Click the Color tab to bring up the color controls for your monitor (**Figure 4.2**).

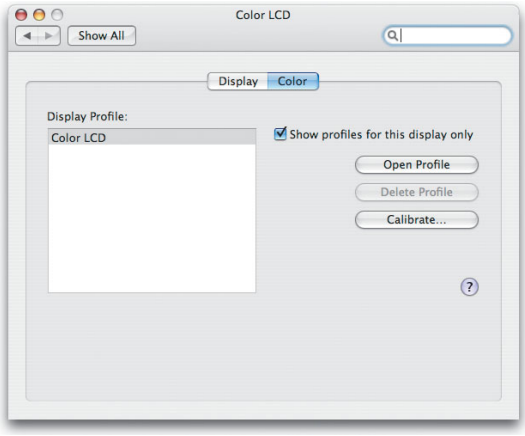

Figure 4.2 Mac OS X has a built-in software monitor calibration system that you can activate from the Displays section of the System Preferences.

3. Click the Calibrate button to launch the Display Calibrator Assistant.
4. In the Display Calibrator Assistant, click the Expert Mode check box (**Figure 4.3**).

Figure 4.3 The Display Calibrator Assistant walks you through building a monitor profile for your display.

5. Press the Continue button and work your way through each of the screens that the Calibrator Assistant displays. Follow the instructions and answer each question. On some screens, the Calibrator Assistant will ask you to choose among several different patterns. You'll find this process much easier if you squint to defocus your eyes.

6. When you're finished, the Calibrator Assistant will ask you to name your new profile. You can name it whatever you want, but it's usually best to include a date in the profile name. As I'll discuss later, keeping up-to-date profiles is very important.

Software profiling on Windows

If you have Adobe Photoshop version 7 or later, or Photoshop Elements installed, you can use the Adobe Gamma control panel that installs with the software to create a monitor profile.

1. Choose Start > Settings > Control Panel.

2. Double-click Adobe Gamma.

3. Select Step By Step (Wizard) and click Next (**Figure 4.4**).

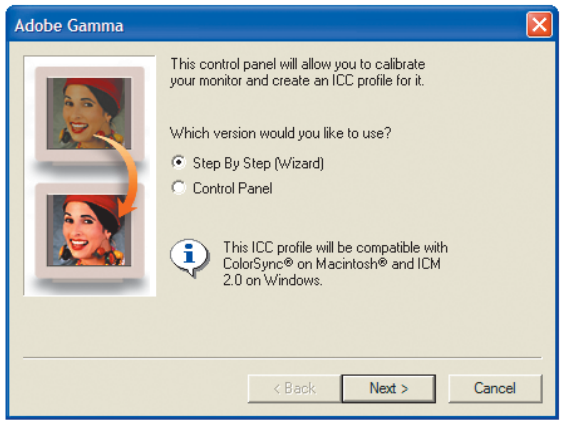

Figure 4.4 The Adobe Gamma control panel lets you create ICC profiles for your Windows computer.

4. Follow the instructions onscreen to create and save a profile.

Under Windows XP, profiles are stored in the Color directory (Windows\System32\Spool\Drivers\Color directory).

Hardware profiling

For more accurate profiles—and therefore, a more effective color management system—you'll want to use a hardware profiler. A hardware profiler is actually a combination of a *colorimeter*, a small device that you place in front of your monitor, and a piece of included software that uses the colorimeter to analyze your monitor to create a profile (**Figure 4.5**).

Figure 4.5 A hardware monitor calibrator generates a far more accurate profile than you can make by eye using a software calibration scheme.

Because a hardware profile can perform a more accurate analysis of your monitor's characteristics, hardware-generated profiles are usually much more effective than profiles that you create by eye using a software profiler.

Many different hardware profilers are available at a range of prices. The Pantone Huey sells for $80, whereas the ColorVision Spyder product line ranges from $79 to $280 depending on the options you select. At the higher end, products by X Rite and Gretag Macbeth deliver high-end quality at higher prices. All of these devices will give you better results than what you'll get with a software calibrator, but you definitely get better profiles if you buy a more expensive calibrator.

Using a hardware profiler is very simple. After installing the included software, you simply follow the onscreen instructions. At some point, you'll be prompted to mount the device on, or in front of, your display (**Figure 4.6**).

Figure 4.6 A monitor calibrator hangs in front of your monitor. Special software drives the calibrator and builds a profile for you.

Unlike with software calibration, you won't be asked to evaluate any test patterns or image swatches—that's the colorimeter's job. Profiling times will vary from device to device, but you can usually expect to have a profile within 10 minutes.

Although it may be frustrating to have to spend even *more* money, you may find that the improved accuracy of a hardware-profiled display will pay for itself fairly quickly, since you'll most likely be using less printer media on test prints.

How Often Should I Profile My Monitor?

The good news is that a monitor profile can greatly improve the quality of your displayed image, but the bad news is that it won't last. Whether you use a CRT or LCD monitor, the image on your display will shift in hue and brightness over time. The older the monitor, the faster the shift. If you're working with a fairly new display, you probably only need to profile your monitor once every month or so. After about 18 months, though, you'll want to step up your rate of profiling. If your monitor is a couple of years old, you should build a new profile once a week.

The software that ships with most hardware profilers automatically reminds you every week that it's time to build a new profile. You don't need to keep the old profiles, so don't worry, you won't soon be drowning in profiles.

Also, don't think that you can just wait until you notice a difference. Your eye can adapt very well to your monitor's subtle shifts, and you may not notice how much your image has washed out, lost saturation, and shifted colors. Trust your color management system and profile regularly.

Profiles and viewing conditions

The ambient light in the room where you view your monitor has a huge impact on your perception of the colors onscreen. Ideally, you want to work in a room where you have full control over the lighting—that is, a room with no windows and no mixed light sources.

When you build a monitor profile, your profiling software will ask you the temperature of the ambient light in the room. You'll usually want to pick an option that matches the dominant light source in your room. If you work in a windowed office, this will probably be sunlight.

In a windowed office, the ambient lighting will change throughout the day. So, you might have heavy sunlight for part of the day and mixed lighting or no sunlight at other times of the day. If you're serious about color management, you should build separate profiles for each of these ambient lighting situations and change from profile to profile as the day progresses.

Some CRTs allow you to create different configurations of monitor settings. This allows you to store different brightness and contrast settings for different ambient lighting

situations. You can build separate profiles for each of these monitor settings, and then change the monitor setting and your profile as the day progresses.

Where Is This Color Management Software?

Throughout this section I've been talking about the color management software that utilizes your profiles to correct the color on your screen and printer. This software is part of your operating system and runs in the background. You will never interact with it directly, other than to install profiles in the appropriate places. However, you *will* alter settings in Capture NX, which in turn will handle all necessary communication with the color management software.

Printer Profiling

Just as your color management software needs good monitor profiles to be effective, it also needs quality printer profiles to accurately adjust your images for output. However, although you only need one monitor profile (unless you're creating multiple profiles for different ambient lighting situations), you typically need many different printer profiles installed, at least one for each type of paper and ink combination that you intend to print on.

Printer profiles are built using special hardware that measures printer output on a specific type of media, using specific printer settings. To be used effectively, you use that profile with that same type of paper and same combination of printer settings. If you don't have a profile for a specific type of paper, you'll have a more difficult time running a color calibrated workflow.

Fortunately, these days most decent photo printers ship with a collection of profiles for all of the paper types that the printer vendor sells for that printer. These profiles are usually installed when you install the printer driver. In some cases, only a basic set of profiles is installed with more available from the printer vendor's Web site.

Nowadays, many independent paper companies such as Hahnemuhle provide free profiles for using their papers on specific printers.

Unfortunately, profile quality can vary from vendor to vendor and printer to printer. Some printer makers provide excellent profiles for all of their printers; some provide very good profiles for their high-end printers and marginal profiles for their lower-end models; and others don't provide profiles at all.

Further complicating the printer profiling situation is the fact that not every printer that rolls off the same assembly line is identical. As such, a "stock" profile may be more effective on one unit than another depending on how well each unit conforms to the ideal baseline.

If you aren't getting good results from the profiles included with your printer, or if you want to print on paper for which you don't have a profile (maybe you want to use handmade paper, paper from an art supply store, or paper from a different printer vendor), you might want to consider getting a custom profile.

Several online services will make a custom profile for you for anywhere from $15–$40. To use these services, you download a few simple test pages, print them out, and mail them to the service. The service then returns an ICC profile that you can install.

For the ultimate control, you can invest in your own paper profiling hardware: but be warned, this gear isn't cheap. Starting at around $1000, products like the XRite Pulse ColorElite provide everything you need to create custom paper profiles. The process is very simple, and you can usually create a profile in about five minutes, depending on the speed of your printer.

Installing printer profiles on the Mac

Under Mac OS X, printer profiles are stored in the Profiles folder (Library > ColorSync > Profiles). They can be loose in the folder or kept in a subfolder, allowing you to keep profiles for specific printers grouped together. Simply copy your printer profiles into this folder and restart Capture NX.

Installing printer profiles on Windows

Under Windows XP, printer profiles are stored in the Color folder (Windows\System32\Spool\Drivers\Color folder). Simply copy your printer profiles into this folder and restart Capture NX.

Why Don't I Need to Profile My Camera?

Since I'm making such a big deal out of having accurate profiles for your monitor and printer, you might wonder why you don't also use a profile for your camera. As you've already seen with printer and monitor profiles, color profiles are very specific to particular situations. For example, a monitor profile is specific to a particular ambient light level, whereas a printer profile is specific to a particular kind of paper. Because your lighting situation constantly changes when you shoot, there's no way to create a usable camera profile.

However, if you're a studio photographer who works only in very controlled lighting situations, it is possible to profile your camera. Camera profiling involves a complex process involving shooting expensive test charts and is way beyond the scope of this book. Lack of camera profiles, though, won't prevent you from running a color managed system.

Color Spaces

In Chapter 2, "Basic Theory," you learned about color spaces—mathematical specifications that define the boundaries of the color range in an image. The color space that you choose is simply stored as a tag in the image metadata. When displaying your image, your image editor looks at this tag to find out which color space you want to use for the image, and then maps the color values in the image accordingly.

Many color space specifications are available, but the two most popular are sRGB and Adobe RGB. Of the two, sRGB is smaller; the range of colors that it specifies is not as large as Adobe RGB. Probably the most noticeable difference is in the reds. An image mapped into sRGB has more muted reds than an image mapped into Adobe RGB (**Figure 4.7**).

Figure 4.7 The upper image has been mapped into sRGB, whereas the lower image has been mapped into the larger Adobe RGB, resulting in some colors being slightly more saturated.

Many digital cameras offer a menu option that lets you select sRGB or Adobe RGB (**Figure 4.8**). sRGB was designed with the hope that it would become the standard color space used on the Web. As you've probably already discovered if you've posted any images on the Web, Web pages don't look the same from one monitor to the next. However,

because of its smaller color space, if you tag your images as sRGB, there's a better chance that they'll look good on a greater number of monitors. The smaller color palette of sRGB means you'll stand less chance of pushing older or less advanced monitors beyond their capabilities.

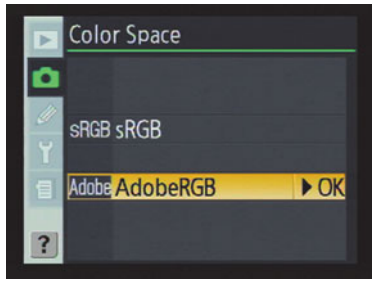

Figure 4.8 Your camera probably includes a menu option for selecting a color space, usually sRGB or Adobe RGB.

Most quality desktop photo printers have a gamut that's larger than sRGB. So, if you are shooting with the intent of printing or if you plan on doing a lot of image editing, tagging your images with the larger Adobe RGB color space is a better option. If you're shooting raw, your camera setting is not as critical, because you can always select a different color space later. But even though you can always re-tag your images later, having them come out of the camera properly tagged will save you a step during your postproduction phase.

Color Management in Capture NX

Once you've acquired and installed the requisite monitor and printer profiles, you might want to make a few preference changes in Capture NX.

1. Open Capture NX's Preferences and click the Color Management tab.
2. Change the Default RGB color space pop-up menu to the color space that you'd like to use for your images. As discussed in the sidebar "A Close Look at Color Spaces," you'll probably want to set this to sRGB or Adobe RGB, or keep it at its default of Nikon Adobe RGB. This is the same as the Adobe RGB color space and is provided for those users who don't have an Adobe RGB profile already installed on their system.

If you want, you can change the Printer Profile pop-up menu to a specific printer profile, but you'll also have the opportunity to set a printer profile when you print. I'll discuss printing and the color management issues related to printing in detail in Chapter 8, "Output."

Opening Images

You can open your images in Capture NX in many ways, and which one is right for you is largely a matter of personal preference. (I'm assuming you've already transferred your images to your computer, a topic covered in detail in Chapter 3, Interface and Basic Workflow.")

Capture NX can open TIFF files, JPEG files, or Nikon NEF files. I'll have much more to say about NEF files in Chapter 5, Basic Image Editing."

Opening with the Browser

As you saw in the previous chapter, Capture NX's Browser palette lets you see thumbnail views of all of the images in a folder. In addition, you can add ratings to your images to easily sort out the ones that you want to edit. Once you find an image in the Browser that you'd like to begin editing, simply double-click on it or drag it into the NX window to open it in Capture NX.

The Open Image Command

The Open Image command (File > Open Image) works just like the Open commands in any other application. Choose it, and you'll be presented with your operating system's standard Open dialog box, which lets you navigate to the file that you want to open. Select the file and click the Open button to open it in Capture NX.

Open Recent

Under the File menu you'll also find an Open Recent command, which lists the last nine documents that you've opened. You can simply select one of these items to reopen the document.

The Welcome Dialog Box

When you launch Capture NX, the program displays a dialog box that lists the last ten images that you've opened. Click one of these images and Capture NX opens it. The Open Recent Browser section of the dialog box shows the last ten folders that you've viewed in the Browser palette. You can click one of these folders to automatically browse that folder (**Figure 4.9**).

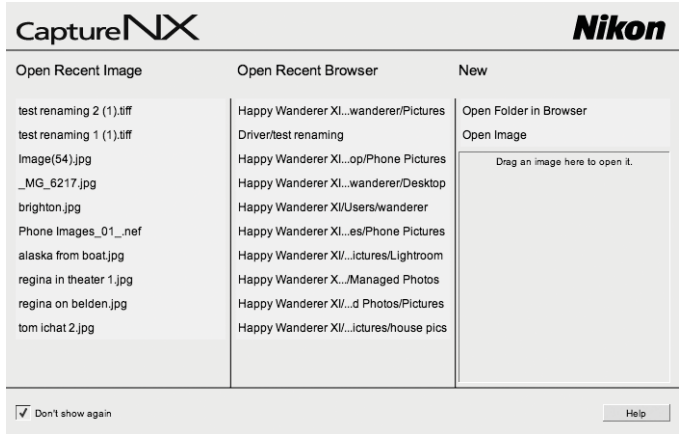

Figure 4.9 Capture NX's welcome screen provides single-click shortcuts to recently opened documents and folders. You can deactivate this screen by checking the Don't Show Again check box and reopen it later by choosing Help > Show Welcome Screen.

In the New section, you'll find options for invoking the program's Open dialog box and Open Folder in Browser dialog box. You can also drag an image from your desktop into the "Drag an image here to open it" portion of the dialog box to open it immediately.

If you'd rather not be presented with the Welcome dialog box, click the "Don't show again" check box.

Opening from Your OS

Of course, you can also open images in Capture NX using all of the normal mechanisms provided by your operating system.

Opening Raw Files

Capture NX can open the raw files that are produced by almost any raw-capable Nikon camera. It *cannot* open raw files produced by non-Nikon cameras. If you're working with non-Nikon raw files, you'll need to perform your initial raw conversion using a different program and save the resulting images as TIFF files. You can then bring those TIFF images into Capture NX. (See Chapter 3 for more on these types of workflow concerns.)

Some raw-capable image editors require you to first perform a raw conversion step before passing the results on to the rest of your image editing process. In Capture NX, there is no separate raw conversion step. Simply open a Nikon raw file just as you would a TIFF or JPEG and start editing. All of your image editing controls will look the same no matter what type of image you're editing, although you may find some extra functionality in some controls when working with raw files. I'll cover all of these differences throughout the next two chapters