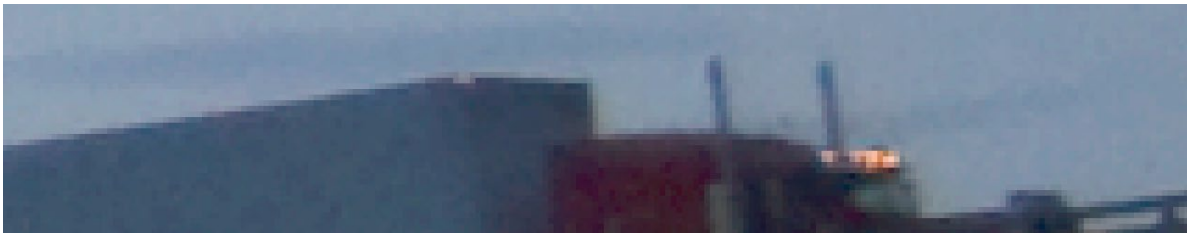
Practical Matters: Compression, Color Space, File Naming, and Editing

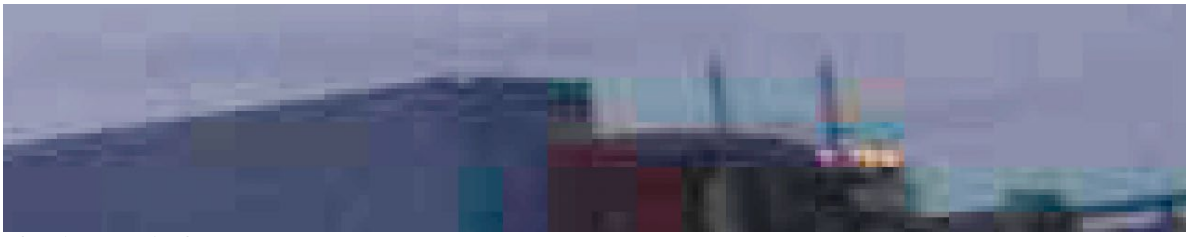
Compression and File Size

File size, measured in kilo-, mega-, or even giga-bytes is the space your image take up on your hard drive. You can see this number by selecting the file with Windows Explorer or Mac's Finder. A file's size in influenced by its image size, image depth, and the number of channels it contains. An image that is twice as wide will also be twice as tall, and therefore have four times as many pixels, with a corresponding quadrupling of file size. The file for a 16 bit image will be twice as large as one for a same-sized 8 bit image. An RGB image file is three times as large as a grayscale image, and a CMYK image file is one third larger than an RGB image. These factors combine in every permutation, so that a 16 bit CMYK image has eight times the file size of its grayscale counterpart. Providing a way to store the large amount of data is one of the real challenges to working with digital images.

One scheme for reducing file size while preserving the number of pixels in an image is compression. The most common way to do this is to save your file in the JPEG file format. The good side to this is that the images take up less space. The down side is that each time you compress an image you destroy some part of the image's original data. Many digital cameras save their images in the jpeg format, allowing you to fit more images on a memory card. If you edit these images and save your results you are compressing the compressed image even further. If hard drive space is a concern, using JPEG images for derivative uses is a good alternative, but it is never acceptable for edited master files that have multiple future uses.



Uncompressed tif



After three rounds of jpeg compression

If you can avoid shooting jpeg originals, you should do so by setting your camera to the "tiff" or "raw" setting for important work. If you can't avoid jpeg originals, use the finest setting your camera has—either "fine" or "superfine" along with the largest file size. Then treat these files as you would a negative. Don't edit them, don't save over them, and don't erase them. When you want to make adjustments, open the file, make your adjustments, and then save them in an uncompressed format (.tif or .psd) to use as masters.

Color Space

A color model tells us the method by which an image will be translated into bits and bytes, but it does not tell us how those numbers will be translated into something we can see. This is the job of a color management system and the profiles that describe the *color space* of each monitor, printer, or scanner that you use. Because these devices' capabilities vary, their color spaces also vary. The color management system in your computer must translate from one color space to another to ensure that colors appear consistent between each device. There are three areas where you can change color space settings,

© 2008, Woody Packard
www.woodypackard.com/

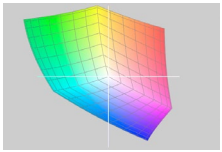
for better or worse—at the capturing and editing stage, when viewing on the monitor, and when printing. While there may be ways to get to good results without paying attention to these color settings, you will probably arrive at them with the trial-and-error method. If you then hand your file over to someone with different settings they will see very different results. The goal of color management is to standardize the color appearance of your images across different systems and devices.

Working or Editing Space. With all the color translating that must be done, there must be some starting color space for making these translations. This space must be large enough to include all the colors that will be translated to, including the color space of the monitor. This is the *working space*, sometimes called the editing space or simply referred to as the embedded rgb profile. This can be chosen in some cameras, so if you have this choice you should choose a large space. Adobe RGB (1998) is generally preferred because it is larger than most monitor spaces and includes the space of practically all printing inks. If you can set this on your camera it will allow you to capture and work with more detail in the darker areas of your image. You should also change to this as your working space in Photoshop's settings. (Edit > Color Settings. The original default is sRGB.) This setting determines which profile is embedded in your files by default.

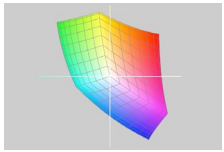
Monitors. Every monitor, even when new, reacts differently to the color signal sent to it. To get consistent and standardized results you must calibrate and profile your monitor. The utilities built into your system will get you close and are a huge improvement over ignoring calibration altogether. But to correctly profile your monitor you need a hardware calibrator and the accompanying software. This has become considerably more affordable and easy, but comes as another cost of consistent results. I worked for many years without a hardware calibrator, using Macintosh OSX's Display Preferences and a patient and sensitive eye to calibrate visually. Changing to a hardware calibrator produced a noticeable improvement in consistency, and is especially useful when working across several systems.

Printers. Every printer has different ink and lays it down in different proportions. It is absorbed at different rates into different papers. This leaves an almost limitless set of combinations for outputting the colors. To bring control to this process, you must standardize these conditions. Part of the challenge is to have an accurate color profile for your paper-printer combination. Probably more important (because they will give you bad results even with a good profile) is your ability to reproduce the appropriate settings for your printer. If you use the paper recommended for your printer by the manufacturer you will probably already have decent profiles on your system. To set up your file for printing you need to tell the printer driver what kind of print media to use, (plain paper, glossy, matte) what resolution to print at (photo quality, fine, draft) and other options that you'll need to repeat *exactly* for consistent results. You can save and name these setting within the driver to help you repeat them.

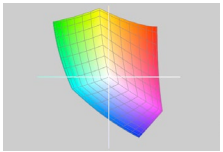
You also need to know whether your printer is managing color or if your printing application will manage it. With applications like Photoshop, you can specify that Photoshop will manage the color and then preview the results on your monitor, a process called *soft proofing*. If Photoshop manages your color, you need to make sure that color management is turned *off* in the printer driver. If it seems like everything else you've done is right you may be managing color twice!



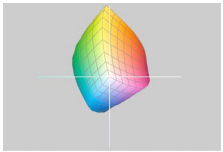
Working space profile Adobe rgb(1998)



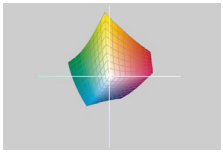
Working space profile sRGB



Monitor Profile



Inkjet printer profile



CMYK profile

File Naming

On your hard drive, images are stored in files, and files are placed in folders. If you place a file into a folder that already contains a file of the same name, you will write over that file. (Your operating system should give you a warning first.) The primary function of a filename in any workflow is to prevent this from happening. Although many people give other functions to filenames, in the long haul it is the task

© 2008, Woody Packard
www.woodypackard.com/

of protecting files from being overwritten that is the most important. If you are just starting out it may make sense to name your files by what the subject is. (puppy1.jpg, puppy2.jpg…) If you have just a few files, you can take this approach, but it won't take long before you bump into its limitations. You will need to consult your computer to find the last puppy image before you know what to name the next one unless you keep each batch in a separate folder. If you keep them in separate folders you will not be able to consolidate them without renaming the files. If you have images of other subjects they will all have to be managed in the same hands-on manner.

A better approach is to find your images by some other means and let filenames simply do the job of keeping images from being overwritten. It also helps if you can devise a system that can be automated, and which a computer will help you keep organized. Here is the simplest I've found, based on the fact that time does not repeat itself.

20081023-001.tif
yyyymmdd-nnn.ext

Most workflow management software will automate this renaming scheme, and all operating systems will arrange these filenames in chronological order. If you work with others who use this scheme on the same computer, you could also add some other identifier, such as your initials, either before or after the number. (Is it more important to find this work by date or by author?) The beauty of a scheme like this is that you do not need to know anything about pre-existing files (what was the number of that last puppy?) and you can use it on any computer you have access to. All you need to know is the date that you created the image, which, if you set the clock on your camera, is embedded in the file.

Non-Destructive Editing

As noted in the section on image depth, making adjustments to a file causes pixel data to be rounded to the nearest whole step. This can cause degradation of the original image quality even though it is not yet visible in a print. If the same file is then adjusted again, addition errors will accumulate and eventually you will be able to notice a decrease the image quality. (Permanent damage is also done when you sharpen, apply filters, or do retouching to an image.) At that point there is nothing that can be done with that file to restore it to its original state. This method of editing an image is called *destructive editing*, and until a few years ago this was a limitation you simply worked with by preserving your original files and making copies for each derivative. As you can imagine, if you have a lot of original images and generate lots of different derivatives, you will end up with many, many similar versions that will make organization a challenge and hard disk space scarce. Eventually software developers and hardware manufacturers put together a better method to manage this process.

Non-destructive editing is a strategy that preserves the integrity of the original image file and draws upon it in its un-edited state to make derivatives. This is the workflow described and advocated here. The core of this method is the reliance on metadata, "data about data," to store information about changes you make to your original file's appearance separately from the actual image data. Derivatives are made by combining the original image with the adjustment metadata to produce a file that is targeted for a new application. Although this method of working was built around the use of "raw" camera files, applications like Adobe Lightroom apply it to other more fragile formats such as .jpeg files. This allows you to view your changes without actually applying them to the original file. The application then lets you control every aspect of the exported derivative while keeping your original in tact.

Within Photoshop you can practice non-destructive editing by always making your adjustments with *adjustment layers* instead of making them to the original image layer. This gives you the flexibility to change the adjustment layer later or simply turn it off without affecting your original image. The introduction of smart objects extends the non-destructive editing principle to the application of filters and sharpening, allowing you to revisit these settings in the future without the normal destructive side effects.

© 2008, Woody Packard
www.woodypackard.com/