

In the last column I described some printing preliminaries. Understanding color spaces, and printer profiles is very important in the search for the print that matches what you see on the monitor screen. Keep in mind that in this series we are going to use Photoshop and not the printer driver to manage color. This column shows you how to view your image as the printer ‘sees’ its colors.

RENDERING INTENTS

Figure 1 shows that monitor color spaces are larger than printer color spaces. This means that colors outside the printer’s color space (‘out-of-gamut’ colors) have to be ‘adjusted’ before they can be printed. This adjustment process, called ‘rendering’, can be done several ways.

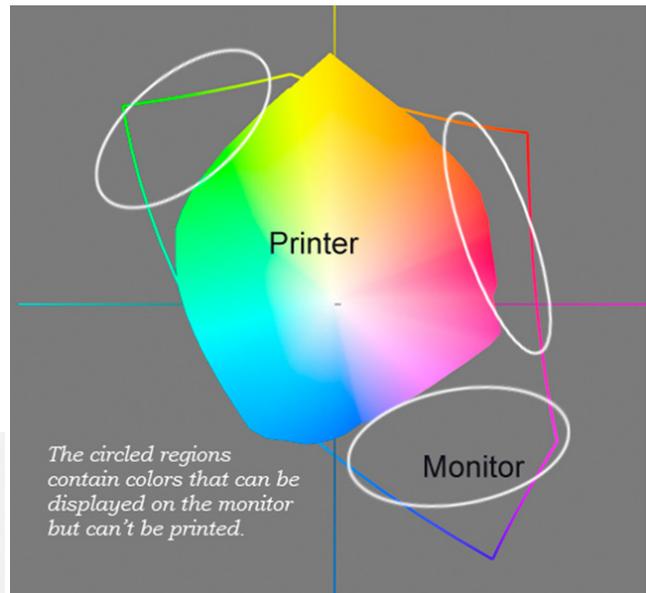


Figure 1 is a 2-dimensional comparison of color spaces. The outline includes all that can be displayed on the monitor. The smaller solid area includes the colors that can be printed by this printer. Notice the ‘problem areas’; these are colors which can be displayed but cannot be printed.

Relative Colorimetric

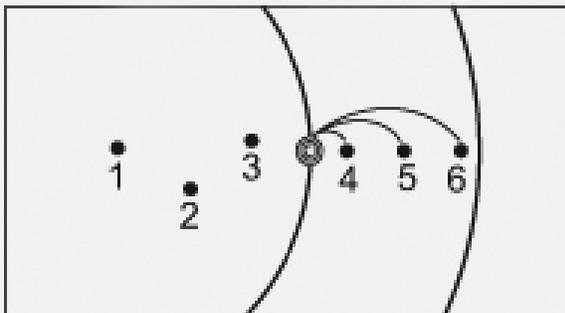
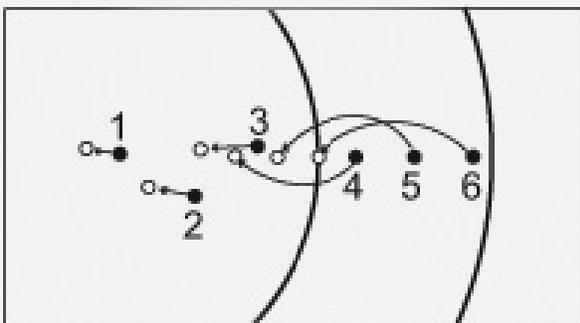


Figure 2 (above) and Figure 3 (below) show how Relative Colorimetric and Perceptual rendering differ in the methods by which they move out-of-gamut colors (# 4,5,6) into the printer color space.

Perceptual



For photographic printing, the preferred choices are Perceptual and Relative Colorimetric. Here, Figures 2 & 3 show a diagrammatic representation of how these two processes differ. In each case, colors 1,2,3 (group A) are within the printer color space; colors 4,5,6 (group B) are within the monitor color space, but are beyond the printer color space and must be adjusted for printing.

Relative Colorimetric (Figure 2) rendering is accomplished by moving all the ‘out-of-gamut’ colors to the nearest ‘in-gamut’ location; in-gamut colors are unchanged. This means that there will no longer be any color difference between colors 4,5,& 6. It also means that color difference between groups

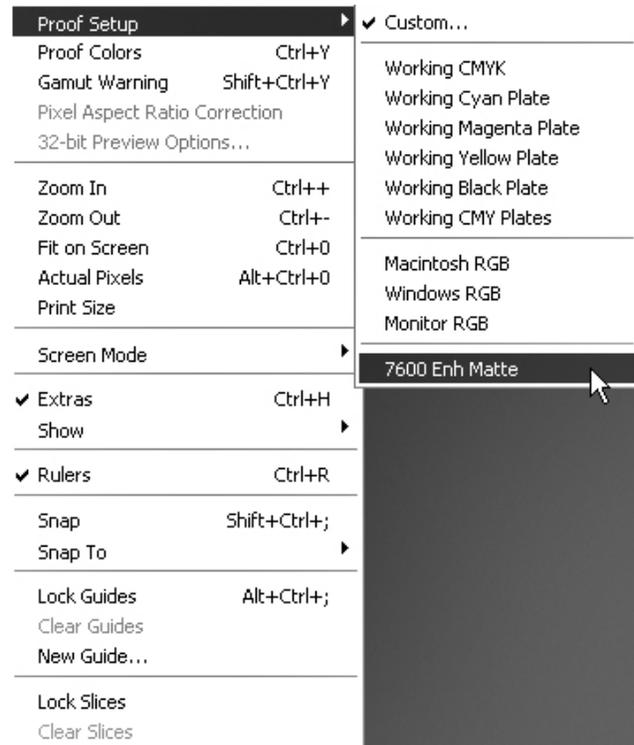
A & B are diminished. This alternative is preferred when there are few 'out-of-gamut' colors.

In Perceptual (**Figure 3**) rendering the relative differences amongst colors is maintained by moving the most out-of-gamut color to the nearest in-gamut locations, then adjusting all the other colors proportionately. This alternative maintains the overall relationship amongst the colors, and is preferred when there are a lot of out-of-gamut colors.

## PROOF SETUP

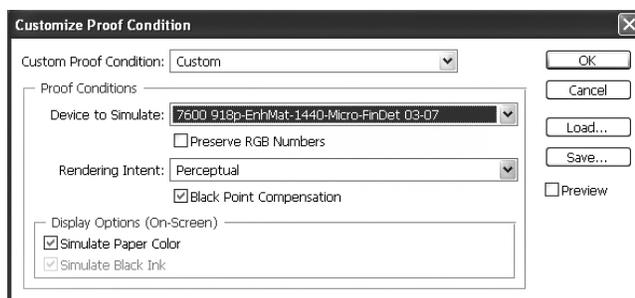
To view out-of-gamut colors in order to select a rendering intent, use the command: 'View>Gamut Warning'. In the default setup, Photoshop shows the out-of-gamut colors as middle gray.

If there are a lot of out-of-gamut colors in the image, it's likely there will be some loss of vibrancy in the printed version of the image. This is because the printer color space is smaller than that of the monitor (**Figure 1**). Moving out-of-gamut colors into the printer color space produces some loss of color range. As inkjet printer technology improves, printer color spaces are getting larger. Currently, there is no printer with a color space as large as a monitor. However, Photoshop does provide a method which allows one to examine the image as its colors are viewed by the printer. In effect this technique views the image 'thorough' the printer profile.



**Figure 4:** The Custom Proof dialog is your opportunity to view the image as it will print. You should setup create custom setups for each of the paper/ink/printer combinations you use.

Open a favorite image in Photoshop. Now go to 'View>Proof Setup' and click 'Custom' (**Figure 4**) at the top of the Proof Setup fly menu. The 'Custom Proof Condition' dialog (**Figure 5**) opens and this box is where we one specifies the paper/ink/printer combination to be simulated on-screen. This dialog includes a large box, 'Proof Conditions' inside of which are two drop down boxes, and below this another box titled 'Display Options'.



**Figure 5:** This is the dialog in which you specify the printing condition you want to proof on the monitor.

Use the 'Device to Simulate' box to specify the paper/ink/printer profile to be simulated. In **Figure 5** a profile for Epson Enhanced Matte paper on an Epson 7600 printer has been selected. In the 'Rendering Intent' box, select the appropriate choice; either Perceptual or Relative Colorimetric. There are 4 check boxes inside 'Proof Conditions'. 'Preserve RGB Numbers' should be OFF, the other 3 should be ON. Toggling the Preview box (to the right) ON shows the printer

(or proof) version whereas OFF shows the monitor version.

To save this setup for future use, click the Save button and give this setup a descriptive name, say EnhMatte-Perceptual. This new choice will appear below Custom in that fly menu (see **Figure 4**). Proof Conditions should be created for all the paper/ink/printer combinations used regularly.

Images without saturated colors will not show much proofing difference, other than a slight 'dulling' in the shadows areas. This 'dulling' is a consequence of the printer inks inability to deliver the perfect black of a monitor. Since the differences are subtle, create a copy of the image and apply the Proof Setup to the copy. This allows for a side-by-side comparison between the original (monitor) and the copy (proof) version. If there are unacceptable differences, try switching to the alternative rendering technique.

To tweak the image to minimize the differences between the monitor and the proof, its best to work with three versions of the image: the original (monitor), the proof (printer) and a third working copy of the original (monitor) to which View>Gamut Warning has been applied. Working on this third copy, a good first choice is to use the Sponge Tool (O) set to Desaturate mode preferably with a soft edge brush and a flow rate of about 25%. As you desaturate the out-of-gamut colors, it will bring those color in-gamut, and the gray overlay (which signals out-of-gamut color) will disappear. An alternate technique is to use Hue/Saturation, select the problem colors and move the Saturation slider to the left. Curves is still another alternative. Users will find their own preferred methods.

**Once satisfied with the match between the original monitor version of the image and the proof, it's now time to print. Next month I'll cover the actual printing process for PC systems; the following month I'll repeat that part of the process for the Mac platform.**