USPhotoGroup.com

Tutorial…
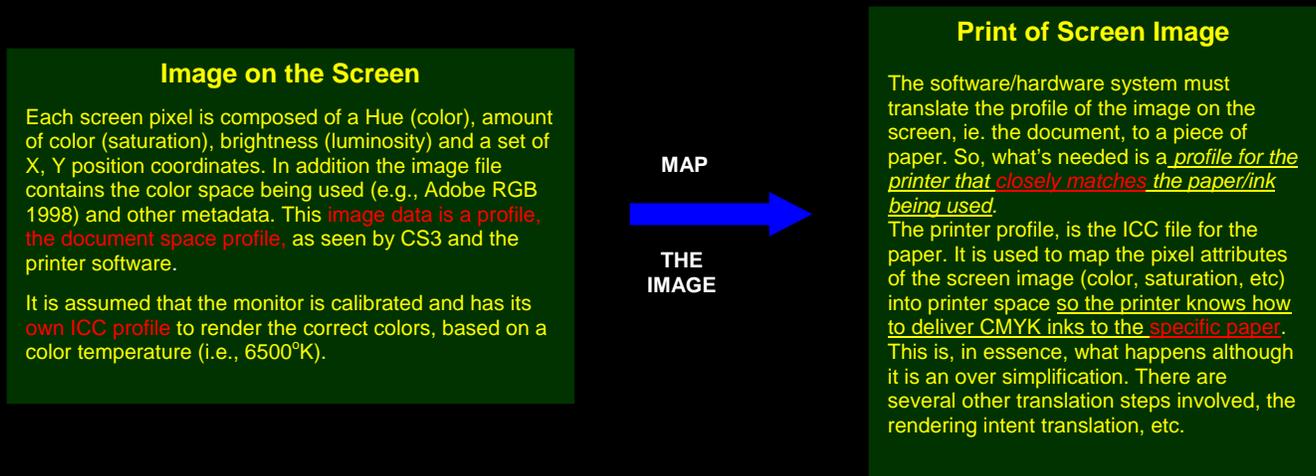## Printing Color Images in Photoshop CS3
By: Joe Votano

The question always seems to come up, what settings should I use in when printing a color image in Photoshop CS3? There are two approaches:

(a) Photoshop Manages Colors or
(b) Printer Manages Colors.

This tutorial will focus on the settings for "Photoshop Manage Colors". In another tutorial we will tackle the "Printer Manages Colors" settings and show that both methods, Photoshop or printer, give essentially the same results.

Let's go through a quick review of what goes on in printing an image. It will help in understanding the settings used.

Image on the Screen

Each screen pixel is composed of a Hue (color), amount of color (saturation), brightness (luminosity) and a set of X, Y position coordinates. In addition the image file contains the color space being used (e.g., Adobe RGB 1998) and other metadata. This image data is a profile, the document space profile, as seen by CS3 and the printer software.

It is assumed that the monitor is calibrated and has its own ICC profile to render the correct colors, based on a color temperature (i.e., 6500°K).

MAP

THE IMAGE

Print of Screen Image

The software/hardware system must translate the profile of the image on the screen, ie. the document, to a piece of paper. So, what's needed is a *profile for the printer that closely matches the paper/ink being used*.
The printer profile, is the ICC file for the paper. It is used to map the pixel attributes of the screen image (color, saturation, etc) into printer space so the printer knows how to deliver CMYK inks to the specific paper. This is, in essence, what happens although it is an over simplification. There are several other translation steps involved, the rendering intent translation, etc.

Now we can see that there are three profiles:

▸ *The front-end profile:* the document space profile, containing the color space of the screen image and its attributes.

▸ *The back-end profile:* the printer's paper profile, its ICC.

▸ *The monitor profile:* its calibrated profile (its ICC), which is loaded when the computer is turned on.

In Windows XP, the back-end and monitor profiles are located in folder: windows/system32/spool/color. I am assuming Vista is the same.

If the monitor is not calibrated, the RGB colors you see on the screen will not be correctly translated into the front-end profile; there will be a mismatch. How much of a mismatch is very much dependent on the type of monitor you have. Nonetheless, there will be a mismatch. The result will be, even with correct printing settings, *what you see on screen is not what you see in the print*. From here on, it is assumed that your monitor has been calibrated by one of several common of calibration systems (e.g. Gretag Macbeth or Spyder)

Color Settings in CS3 "Printer" Windows.

What is discussed here is independent of the paper being used except the selection of the paper's ICC profile (the back-end profile)

Photoshop Manages Color:

With a color image on the screen in Adobe 1998 RGB space, clicking *File/Print* on the menu bar will bring up the print window. Note: it is immaterial whether the image is 8 or 16 bit at this point, since the printer software converts it to 8 bit in the printing process.

We will not go through a gamut check here, (discussed in the tutorial "*From Color to Print"*) since there are no colors out of gamut (all colors can be reproduced by inks).

Settings to use in Print Window..
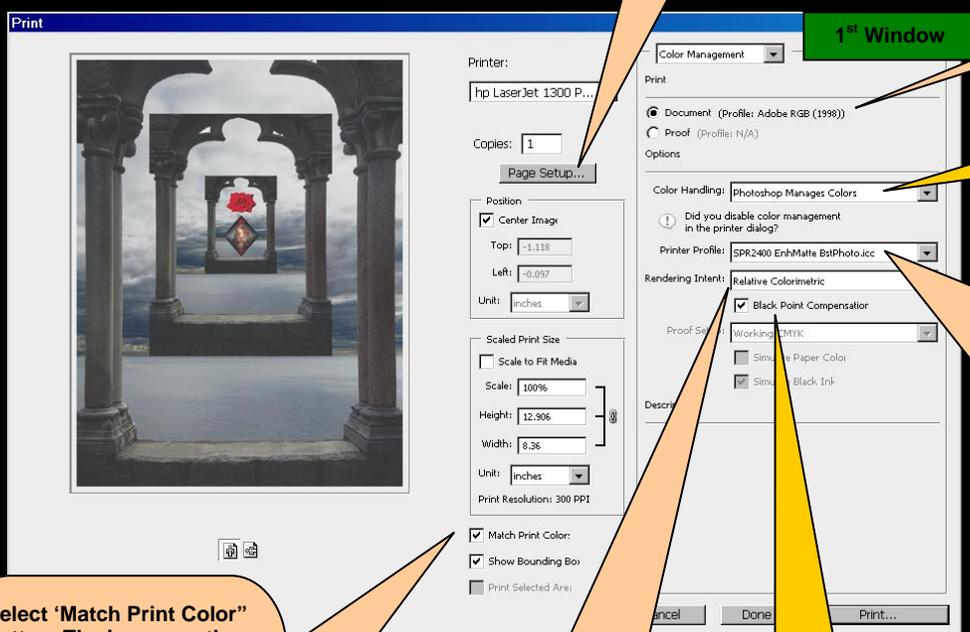
Select to bring up 2nd window

Front-end profile color space is listed

1st Window

Photoshop Manages Color is selected from the drop down menu.

Print

Printer:
hp LaserJet 1300 P...

Copies: 1
Page Setup...

Position
☑ Center Image
Top: -1.118
Left: -0.097
Unit: inches

Scaled Print Size
☐ Scale to Fit Media
Scale: 100%
Height: 12.906
Width: 8.36
Unit: inches
Print Resolution: 300 PPI

☑ Match Print Color:
☑ Show Bounding Box
☐ Print Selected Area

Color Management

Print
⦿ Document (Profile: Adobe RGB (1998))
○ Proof (Profile: N/A)
Options

Color Handling: Photoshop Manages Colors
ⓘ Did you disable color management in the printer dialog?

Printer Profile: SPR2400 EnhMatte BstPhoto.icc
Rendering Intent: Relative Colorimetric
☑ Black Point Compensation

Proof Se... Working CMYK
☐ Simulate Paper Color
☑ Simulate Black Ink

Descri...

Cancel   Done   Print...

From the drop down menu, select ICC profile for the paper (the Back-End Profile).

In this case, printing is done on an Epson R2400 so the best photo enhanced matte profile is used. It outputs 1440 dpi (dots per inch) for highest quality, lesser quality is found also (e.g., photo enhanced matte).

JUST PICK the CORRECT PAPER PROFILE based on the paper used in your case.

Epson paper profiles are available from Support at Epson. Other paper manufacturers also host ICC profiles for their paper

Select 'Match Print Color" button. The image on the screen is what you should expect in your final print.

Normally, it darkens the screen image a wee bit but that's no problem.

However, if some of the colors are out of gamut (can't be printed as is), they definitely show up when this button is toggled on/off.

Select Relative Colorimetric from the drop-down menu. It's what is used by Epson in developing their paper ICCs. Perceptual intent is really meant when you have many

Click on Black Point Compensator. Sometimes it is useful to pull out details in the shadows-always use.

The remaining settings are user preferences or grayed out. There are two more windows whose settings must be addressed: the **PAGE SETUP** Window (2nd Window) and the Advanced Window (3rd Window). Click on the "Page Setup" button to bring up the Printer Properties window, the 2nd Window.

2nd Window

3rd Window

Leave unselected

Input paper Type, Size, & orientation

It is **absolutely essential** to select the "ICM" button (interface color management) and select "Off" (no color management); otherwise bad things can happen. You can really confuse the printer. It will see two different back-end profiles.

Select "Advanced" to get to the 3rd Window

Select "Ink Config" button

Click OK to get back to 1st window.

With matte paper one sees some mottling in patches of the same color, definitely visible on a color wheel.

Set ink =- 5% and Drying Time at 0.5 seconds. The R2400 uses too much ink in my opinion so much, the print paper is damp. Reducing ink delivery by 5% has no effect on color or saturation. With dry time =0.5sec., the mottling is reduced somewhat.

Well, how well did we do? Below are the original screen image and an image scanned from a print where Photoshop managed the colors. The scanner was an Epson 750 Perfection at a resolution of 300 dpi (dots per inch). Scanners and dSLR cameras do create color casts. In some cases it's barely visible and in others, quite pronounced, especially in the grays. In the scanned image there is a slight bluish cast- no scanner is perfect. Nonetheless, it is a credit to the scanner just how close these two images are in both color and tonality. Both images are sRGB at 8 bit resolution. They certainly can never be a perfect match, since the screen is an illuminated image and the scanned image was reflective.

Screen Image

Scanned Print

High quality color printing is not so simple. Yet, it is not that difficult either. Even though great strides have been made in the ease of making prints, there are numerous considerations: fine tuning the screen image, color space and gamut problems, correction for color casts, the image match, paper match in terms of which paper to use, and lastly the confusion over which approach to use, let Photoshop or the printer manage colors. In our tutorial, "*From Color Image to Color Print*", we demonstrate how to make high-quality color prints. In the meantime, we hope this brief tutorial helps