

Colour Management and printing – Adobe Photoshop CS2

This is where most people tend to get things wrong. You have created a masterpiece, spent hours on location, the composition is breathtaking, you carefully and sympathetically process your image and then wait in anticipation while your printer churns out something that actually resembles a collage made by a 5 year old let loose with fluorescent paints!

It is always because of workflow that this happens and over the coming pages, I hope to help you create a colour and print management workflow that will ensure that printing errors become a thing of the past.

One thing to point out is that if you are working on a monitor that has not been calibrated, then it is the equivalent of building a house without foundations, so get a calibration device and make sure that you have a good starting point.

However, before I get into describing the various Photoshop and Print Driver configurations I need to clarify two aspects of print making that still seem to confuse a lot of Photoshop users:

1. Desktop inkjet printers from Epson, Canon, Hewlett Packard, et al may use CMYK or CcMmYK coloured inks but this doesn't make them CMYK printers. Occasionally you'll see this type of printer referred to as Non-Postscript, but more often they'll be described as GDI (Windows platform) or QuickDraw (Mac platform) printers. The reason I stress this point so much is that the device drivers supplied with these printers are not designed to interpret CMYK data. So any attempt to produce a CMYK print directly from a desktop inkjet printer will produce some strange results.
2. The image displayed on a typical computer monitor (CRT or LCD) cannot be fully replicated in print. Yes we can often get close but an exact match is rarely if ever possible.

Note that while the initial screenshots used for this tutorial are based upon the Mac OSX version of Photoshop CS2 they should still provide more than ample guidance those of you using either Windows 2000 or XP. Nevertheless, the actual printer driver screenshots are OS specific; therefore I've included separate instructions for both Mac and Windows versions. These instructions and screenshots are based on the printer used on your course - The Epson Stylus Photo R2400, but should be compatible with most other current models from Epson.

Producing an Inkjet Print

Photoshop CS2 has five Print menu options: **Page Setup**, **Print**, **Print with Preview**, **Print One Copy** and **Print Online**.

The **Print with Preview** menu option is only available for selection when an image is open on your desktop so if you're following along I suggest that you open one of your images now.

Figure 1 below shows the default view of **Print with Preview**.

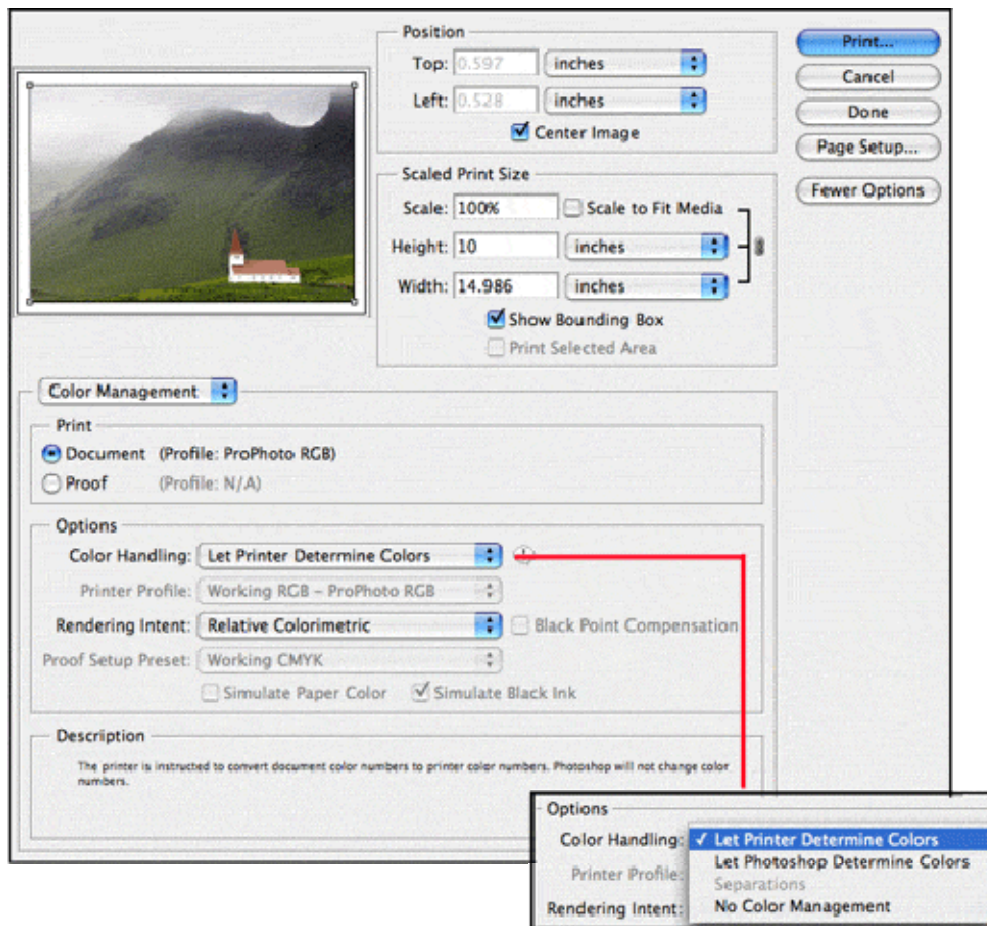


Figure 1 - Photoshop CS2 Print with Preview

Print:

- **Document:** denotes the ICC profile embedded within or assigned to the document to be printed. The example shown in figure 1 shows ProPhoto RGB, but it could be any number of user specified alternatives (e.g. sRGB, Adobe RGB (1998), ColorMatch). If the image has already been converted (i.e. using the Photoshop **Convert to Profile** command) to a printer/media profile this will be the colour space reflected here. It's actually a good way of double checking that you haven't mistakenly converted the image already.
- **Proof:** this field will normally display as (Profile: N/A). Once it's activated via the button it tells Photoshop to **convert** the image on-the-fly from the image source colour space to the destination ICC profile shown in brackets. You can only alter the destination profile from within the **Proof Setup** dialog (see: Photoshop View menu). Also, note that you'll only ever need to use this option if you are intending to make Hard Proofs or Match Prints (i.e. trying to emulate another printer such as a press), which would be another tutorial in itself.

Options:

- **Color Handling** - this is the new pop-up menu from which you choose the preferred method of managing colour when printing. By adopting this approach Adobe have separated the workflow aspects of printing from the media choices. There are four different choices: **Let Printer Determine Colors**, **Let Photoshop Determine Colors**, **Separations**, and **No Color Management**. Each of these choices has its own associated preset configuration in the **Print with Preview** dialog thereby helping you avoid erroneous settings.
- **Printer Profile** - as its name implies this is the pop-up menu form which you choose the ICC profile associated with the printer/media combination you'll be using. This pop-up will only be active when the **Let Photoshop Determine Colors** is selected in the **Color Handling** pop-up.
- **Rendering Intent and Black Point Compensation** - again, depending upon your choice in **Color Handling** one or both of these settings may be greyed out.
- **Proof Setup Preset** - by default this pop-up menu is greyed out and will only be activated when the **Proof** radio button is selected. As mentioned above this option is normally only used when simulating or proofing other output devices such as a Press.
- **Description** - this is a useful addition to the Print with Preview dialog in so far as it provides short explanations for each of the settings and options. The description itself is triggered when you hover the mouse cursor over the various buttons and popups (e.g. Color Handling, Rendering Intent, Black Point Compensation, etc).

It's all about Workflow

There are four choices or more accurately workflow options contained within the **Color Handling** pop-up. However, this tutorial will only discuss three of them, leaving the fourth (i.e. Separations) as it is not relevant in the context of what we do.

Print Workflow 1

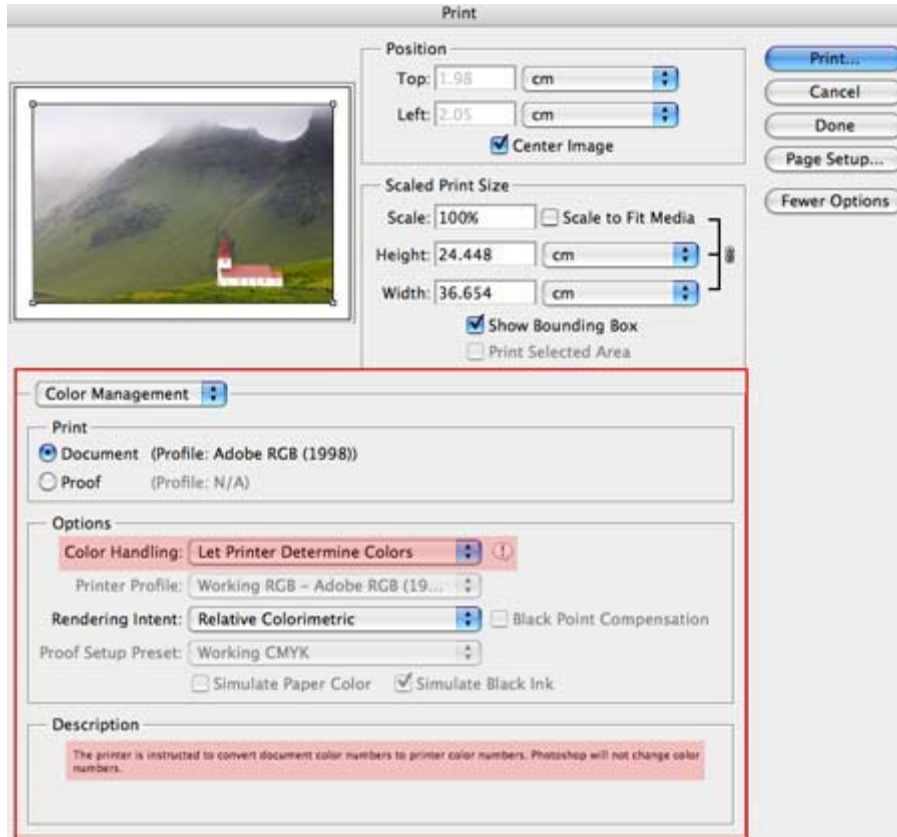


Figure 2 - Print Workflow 1

The default configuration for the **Print with Preview** dialog is shown above as Figure 2. Notice that **Color Handling** is set to **Let Printer Determine Colors**. For the purpose of this tutorial we'll call this setting **Print Workflow 1**.

Let Printer Determine Colors is probably the easiest and safest choice for new Photoshop users or those who are not yet familiar with how to integrate printer ICC media profiles into their workflow.

When you choose **Let Printer Determine Colors** you're in fact informing Photoshop that the document should be passed directly to printer driver complete with details of the ICC profile listed against **Document**. Photoshop will not make

any adjustments to the document colours nor will it take any account of the media specified in your printer driver. By tagging the document with the ICC profile Photoshop is providing the printer driver with all the information required to ensure accurate colour rendering of the print. The document colour management is handled solely by the printer driver.

Tip: Depending upon your printer model it is possible that **Rendering Intent** may not be active for this workflow. Even if it is active there is every possibility that the printer driver will ignore your choice and use Perceptual, but don't worry either way.

Print Workflow 2

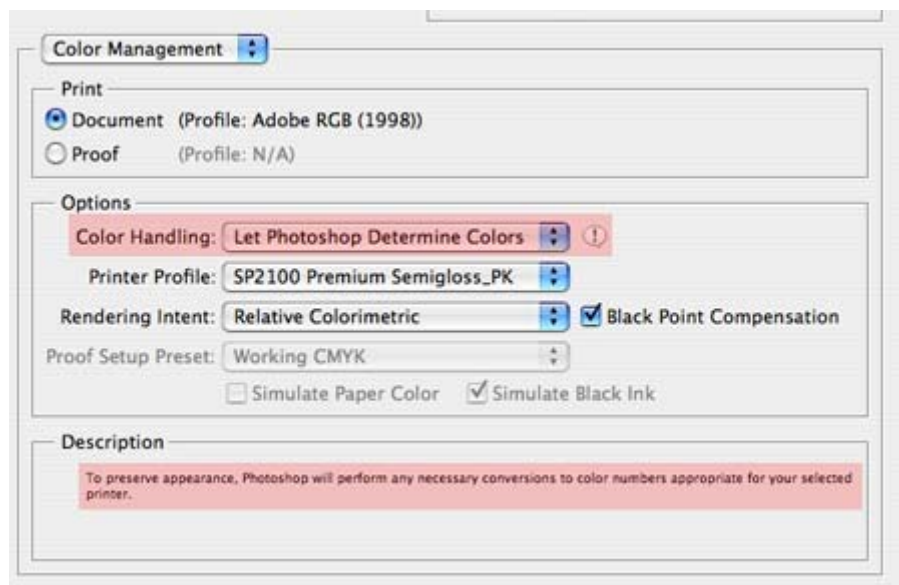


Figure 3 - Print Workflow 2

This workflow is really intended for the more advanced Photoshop user who needs total control of how their documents are rendered to print. With **Color Handling** set to **Let Photoshop Determine Colors** you are able to choose: specific ICC media profiles, the **Rendering Intent**, and whether or not **Black Point Compensation** is to be used.

When **Let Photoshop Determine Colors** is selected you'll immediately be given access to the **Printer Profile** pop-up. By default the profile shown in this pop-up is the **Working RGB** profile (defined in Photoshop **Color Settings**), but you'll very seldom want to leave it at **Working RGB**. It's important that your actual choice of **Printer Profile** matches the media and printer model that you'll be

using otherwise poor quality prints are almost a certainty. The best quality will be obtained when you use an ICC media profile, which has been created for your specific printer. These can be created by you using specialist software/hardware or purchased from a third party.

Many Epson printers are now supplied complete with ICC media profiles for a range of media types although with some models you may have to install the PIM driver (see the cd-rom supplied with your printer) before they become available.

Notice that once a printer profile is selected both **Rendering Intent** and **Black Point Compensation**" (BPC) are activated. Generally you'll want to use **Perceptual** or **Relative Colorimetric**, and have **BPC** checked. It's worth noting that with many of the newer models from Epson (e.g. 2400, 2100, 2200, R800, etc.) it is probable that choosing **Relative Colorimetric** will produce the more pleasing prints, although I would suggest trying each option as a test print to learn exactly what each does and more importantly, what you prefer the look of.

Tip: The important point to note about this workflow is that your printer driver **MUST** be configured so that **ALL** colour management features are disabled. Often you'll see this workflow referred to as the **No Color Adjustment (NCA)** workflow, but as we'll see later Epson have made changes to their recent drivers that may render the term NCA obsolete.

Print Workflow 3

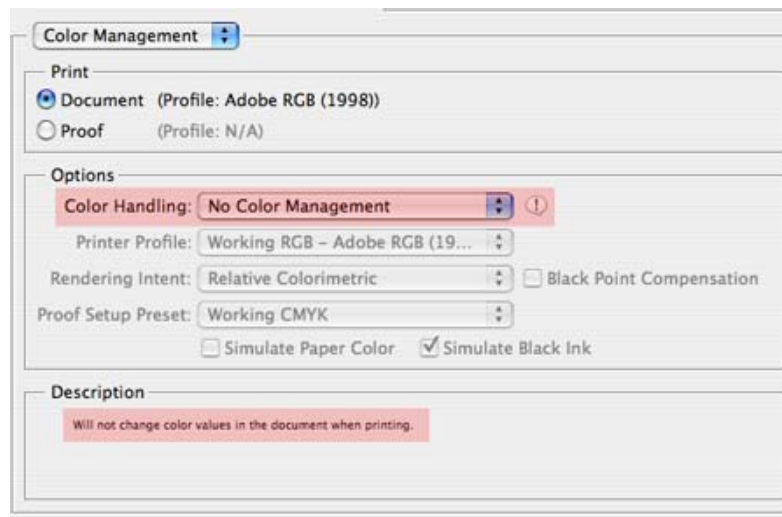


Figure 4 - Print Workflow 3

The final workflow choice is **No Color Management**. This particular workflow is primarily intended for Photoshop users who are creating customised ICC media profiles or printing the multi-patch targets for a third party to create them on their

behalf. It's **NOT** recommended when printing normal documents. If you've just upgraded to Photoshop CS2 from an earlier version then **No Color Management** is the direct equivalent of **Same As Source** in Photoshop 7 and CS. With this choice Photoshop simply passes the document straight to the printer driver without making any colour adjustments or conversions. There will be no ICC profile embedded in the image, so this option is effectively telling Photoshop to **NOT** colour manage the process of printing the document.

Tip: As with Print Workflow 2 it is important that your printer driver is configured so that **ALL** colour management features are disabled. I'll show how this can be achieved later in the tutorial.

Once the **Print with Preview** dialog has been configured to suit your requirements it's time to press the **Print** button.

Tip: by holding down the Alt/Option keyboard button you will find that the **Done** button changes to **Remember**. Using this keyboard modifier will allow you to save the **Print with Preview** settings for future use.

Whilst on the subject of things Colour Management I think it's worth mentioning a book "**Colour Management for Photographers**" *by Andrew Rodney*. This book contains a wealth of useful information, tips, tricks and tutorials. I would have no hesitation in recommending it to anyone interested in learning more about the practical issues of colour management facing photographers. Copies can be obtained from **Amazon**.

I am now going to look at OS Specific instructions, so if you are using XP, please just skip the next section and go directly to the XP tutorial on page 13.

Mac OS X

The initial few paragraphs of this section are common to all three Print Workflows described earlier. When you press the **Print** button (i.e. top right hand corner of **Print with Preview** dialog) the "**System**" **Print** dialog as shown in Figure 5 (below) should appear. The System Print dialog is actually quite complicated in so far as it includes menu options for many print setting that are better set within Photoshop itself or the actual Print driver, and are therefore best avoided. In particular, you should not need to access options such as: Layout, Scheduler, Paper Handling, ColorSync, and Cover Page. I really can't emphasise enough how important it is that you configure the printer driver in the sequence that I describe otherwise there is a good chance that one of the settings will revert to the Epson default.

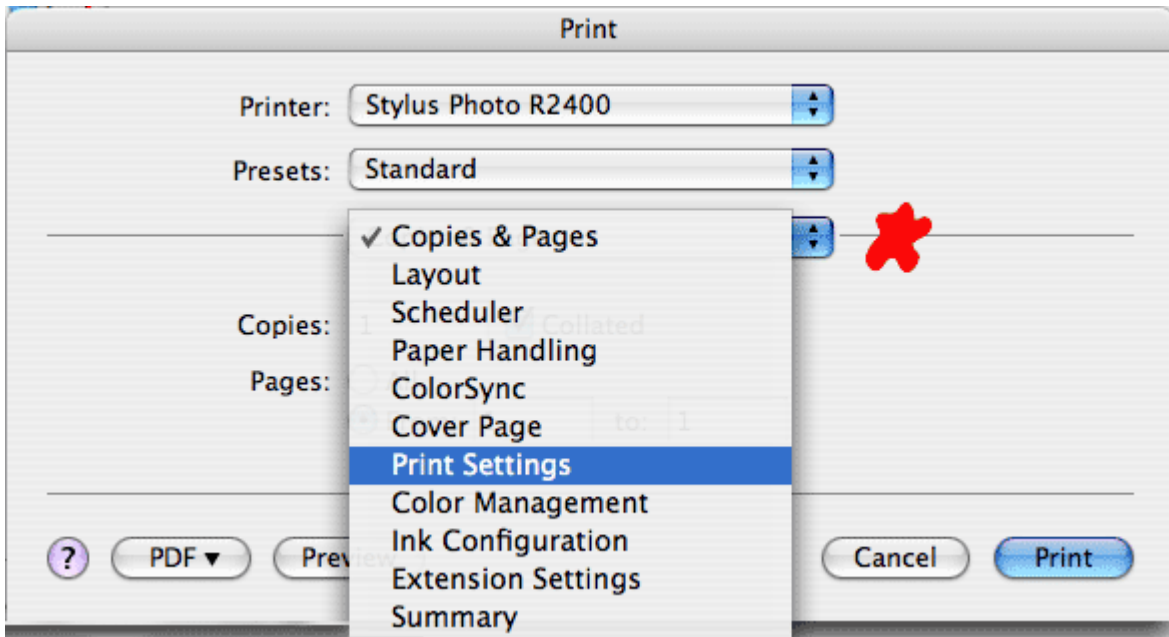


Figure 5 - "System" Print dialog

Press the popup labeled **Copies and Pages** (shown in the screenshot with a red asterisk). Choose **Print Settings** from the list of options. When the **Printer Settings** panel (figure 6 below) appears choose the type of **Media (1)** that will be used. Next select the **Advanced (2)** mode.

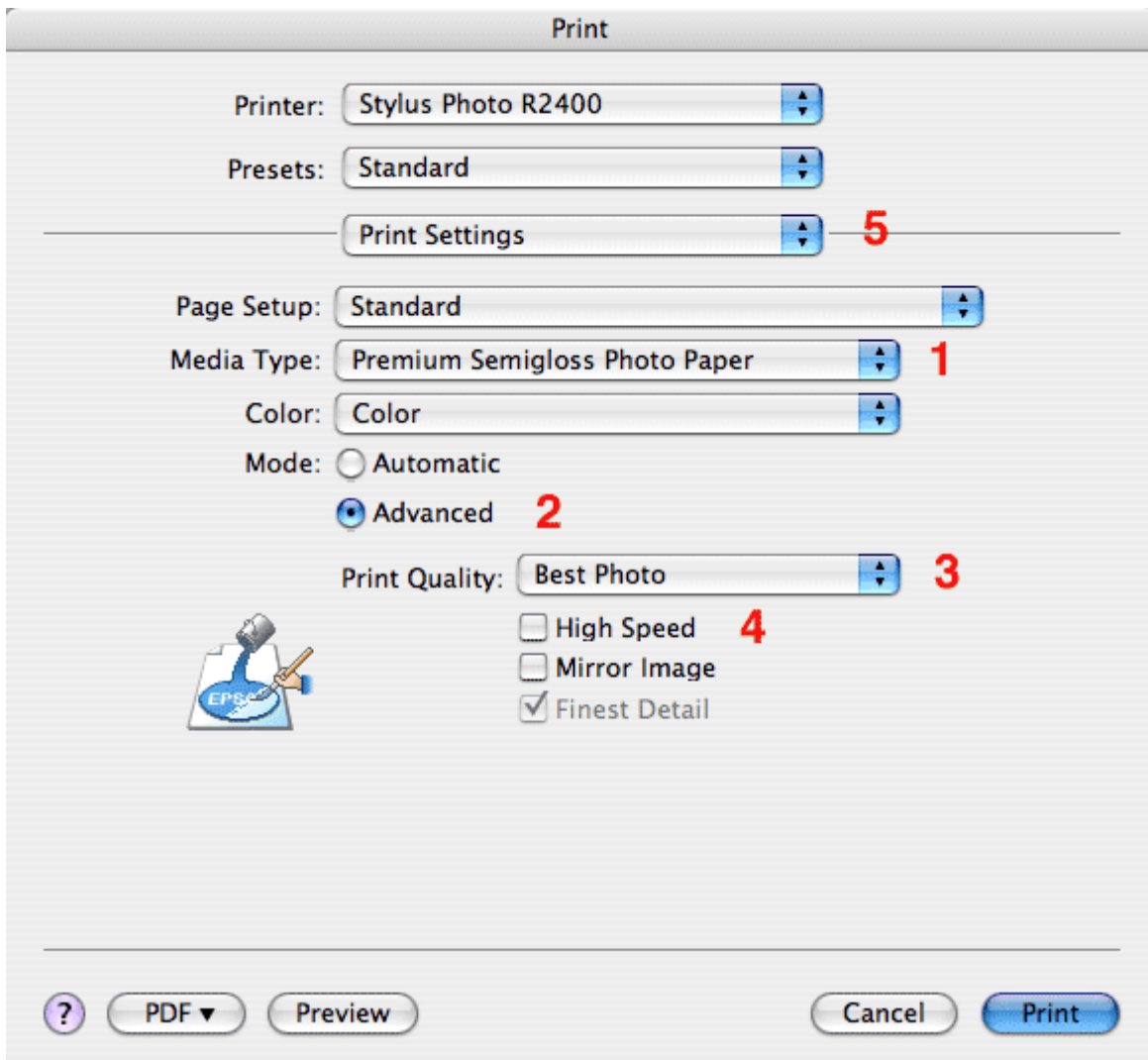


Figure 6 - Epson Printer Dialog - Main Window

Choose **Best Photo** or **Photo RPM** for the highest **Print Quality (3)** option compatible with the printer/media combination that you require. Also, for best quality **High Speed (4)** should be disabled. If you are printing a test print to allow you to determine if any further post processing adjustments are to be made, then you may wish to leave **High Speed** checked.

Return to the popup now labeled **Print Settings (5)** and choose **Color Management**. The remainder of this section is separated into two parts, the first deals with **Print Workflow 1** and the second **Print Workflow 2 and 3**.

Print Workflow 1 (Contd.)

For **Color Management** (figure 7 below) we have three options (radio buttons): **Color Controls**, **ColorSync** and **OFF (No Color Adjustment)**.

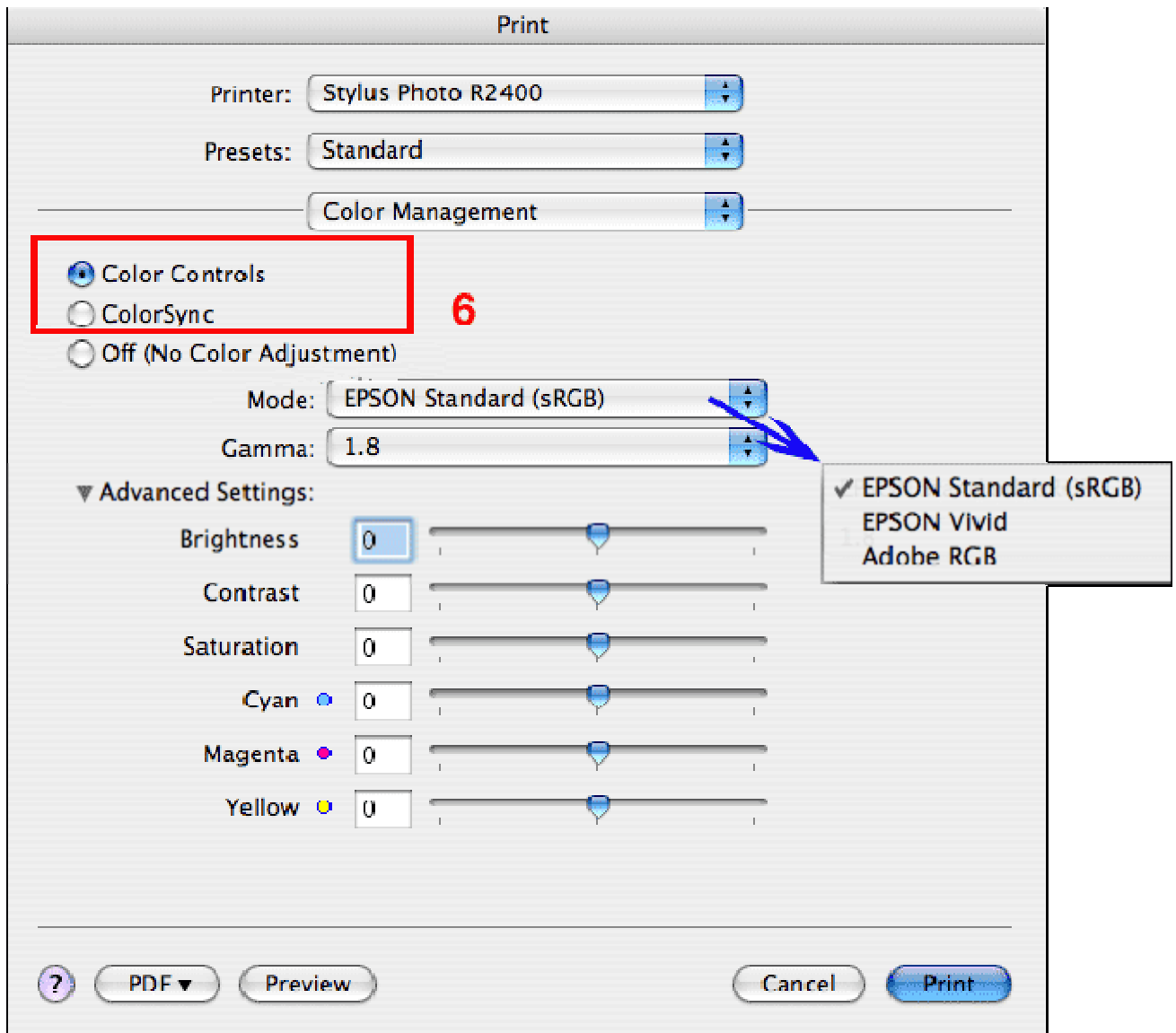


Figure 7 - Epson Print Driver: Print Workflow 1

The first two options (for this workflow we're only interested in these two), are designed to automate the process of printer colour management, and you have the choice of **Color Controls** or **ColorSync** (6). I suggest that you avoid choosing **ColorSync** as it has been known to produce very unsatisfactory results

with some printer models. Actually, I believe that **Color Controls** is the best option. Also, remember that when this setting is selected the Photoshop **Print with Preview** dialog should be configured as shown in [Print Workflow 1](#).

With the latest Epson drivers for printers such as the Stylus Photo R800, R1800 and R2400 you will see 3 modes of which **Color Controls** with the **Mode** set to **either Epson Standard or Vivid**. Lastly, unless you have good reason to choose differently I recommend leaving the **Gamma** setting at 1.8.

[Print Workflow 2 and 3](#)

The third setting for colour management is referred to as **Off (No Color Adjustment)** (6a) and is **ONLY** appropriate when you're using ICC media profiles in Photoshop or printing the targets required for creating ICC media type profiles. In other words you should only use this setting if you have chosen to configure Photoshop **Print with Preview** dialog as shown in [Print Workflow 2](#) or [Print Workflow 3](#). This setting is by far the best setting for advanced Photoshop users. It's also worth mentioning that if you find your final prints are light and magenta in appearance then there's a very good chance that you chose one of the other two settings in error or that the sequence in which you configured the print driver was not exactly as I described above.

In the following screenshot you can see that choosing **Off (No Color Adjustment)** (6a) resulted in the **Mode, Gamma** and **Color Sliders** disappearing from the print dialog; this is how it should be, so don't panic.

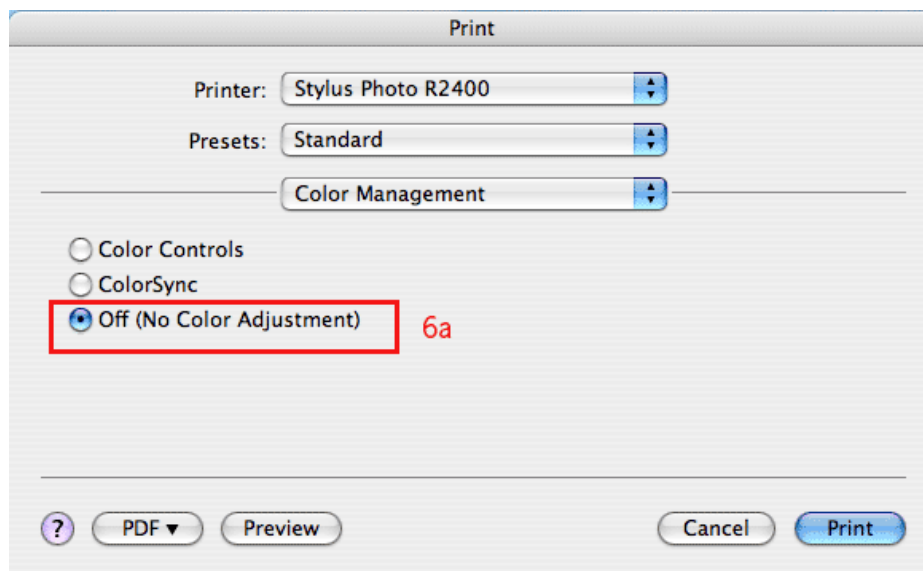


Figure 8 - Epson Print Driver: Print Workflow 2 and 3

Once you have configured the driver for your preferred media, print quality and colour management settings it's a good idea to save them for future use. This is achieved by opening the **Presets (7)** popup and choosing "**Save As**" - do be sure to choose a meaningful name. Next time you need to make a print you can simply choose this media type from your list of Presets.

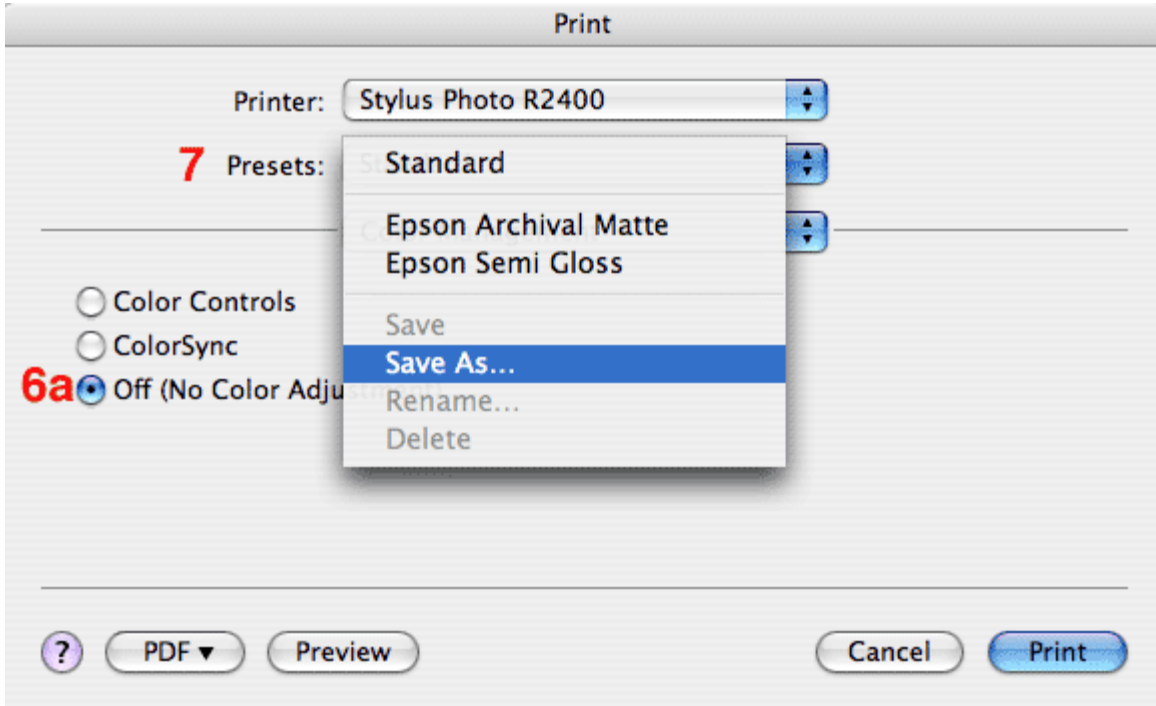


Figure 9 - Saving your settings as Presets

Microsoft Windows XP.

As with the Mac OS X page you'll find that the initial few paragraphs are common to all three Print Workflows described earlier. When you press the **Print** button (i.e. top right hand corner of **Print with Preview** dialog) the "System" **Print** dialog as shown in Figure 10 should appear.

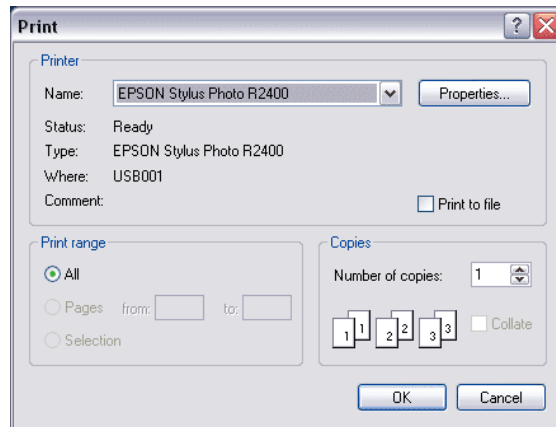


Figure 10 - Windows "System" Print dialog

Press the **Properties** button. The Printer driver dialog (Figure 11 below) appears.

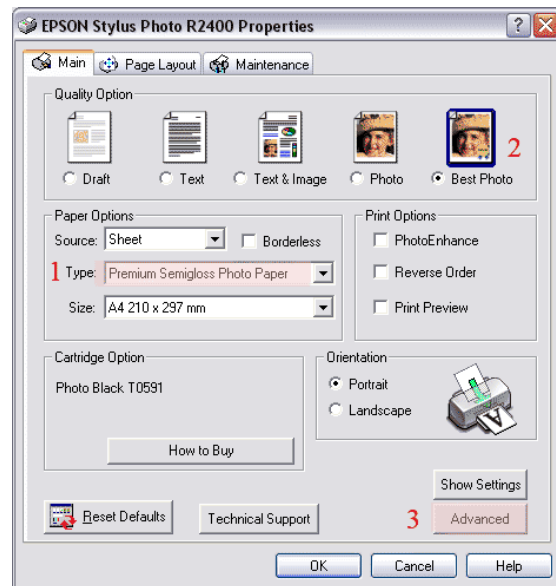


Figure 11 - Epson Basic Printer Dialog - Main Window

Choose the type of **Media (1)** that will be used. Next select either **Photo** or **Best Photo** for **Quality Type (2)**. The last setting to choose in this dialog is the **Advanced** button (**3**).

Print Workflow 1

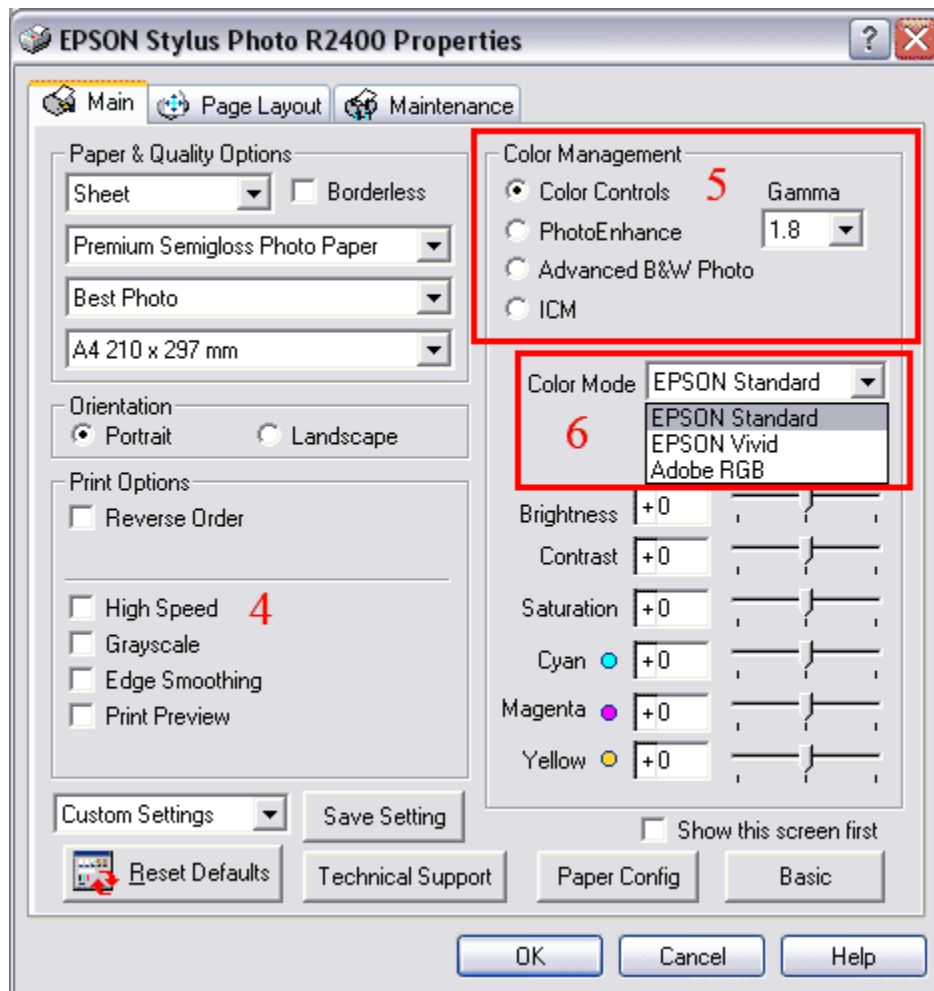


Figure 12 - Epson Print Driver: Print Workflow 1

For **Color Management** (5) we have a number of options, many of which only serve to confuse and are completely unnecessary. Also, for this tutorial I'm ignoring **Advanced B&W** since it's only available on the Epson Stylus Photo R2400. (If you own this printer, this is a good option for mono images as the results are excellent.)

For best print quality you should disable **High Speed** (4). If you are wishing simply to produce a test print to determine whether any further post processing adjustments are required, the you may wish to leave this checked.

The first two Color Management options are designed to automate the process of printer colour management and you have the choice of **Color Controls** or **PhotoEnhance**. Both these options are best suited to novice Photoshop users but I suggest that you avoid using **PhotoEnhance** since it applies additional processing and sharpening to the image and can produce very unsatisfactory results with some printer models. I also suggest that you stick with **Epson Standard** or **Vivid** for the **Color Mode (6)**. Also, remember that when this setting is selected the Photoshop **Print with Preview** dialog should be configured as shown in [Print Workflow 1](#). Lastly, unless you have good reason to choose differently I recommend leaving the **Gamma** setting at 1.8.

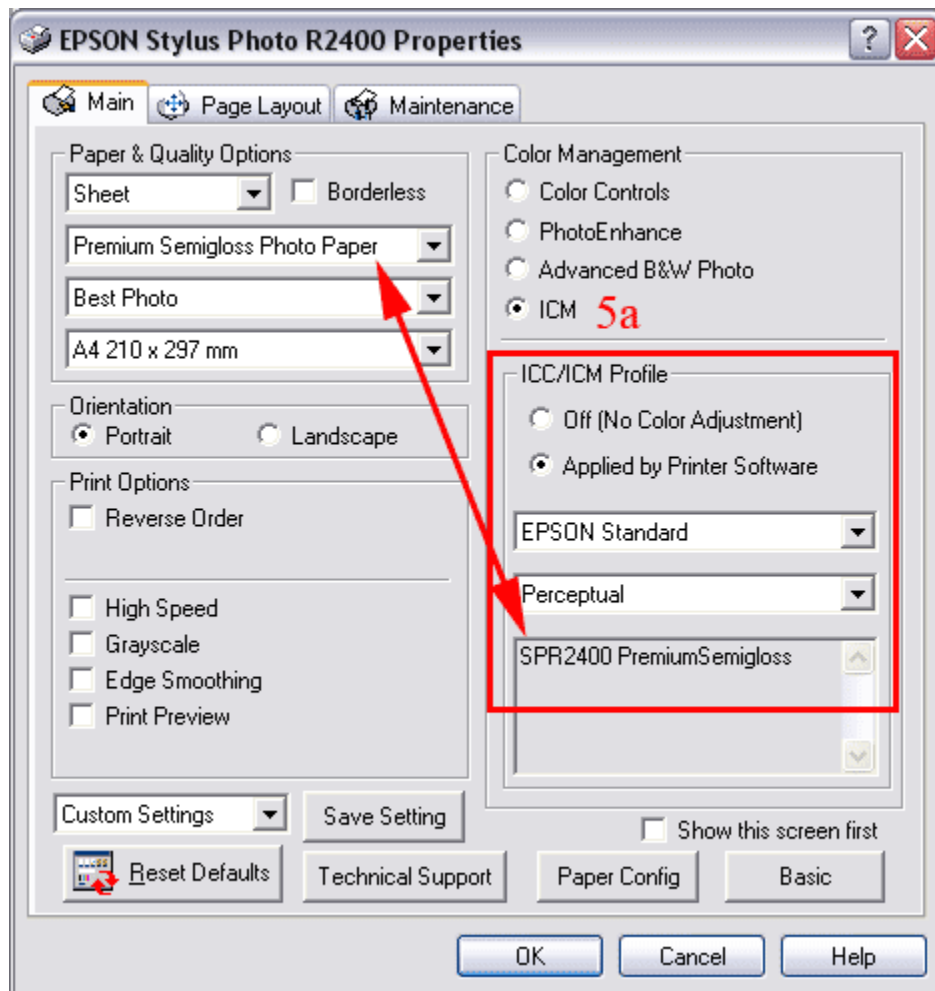


Figure 13 - Epson Print Driver: Print Workflow 1 (ICM Mode)

By choosing **ICM (5a)** (see Figure 13 above) you gain access to the internal Epson printer colour management system (i.e. **Applied by Printer Software**) and the Off (**No Color Adjustment**) mode. The later mode (i.e. **No Color Adjustment**) is **NOT** compatible with [Print Workflow 1](#) and should **NOT** be selected. When the former (**Applied by Printer Software**) is selected the driver automatically makes use of the Epson media profiles but does so in a way that means their selection in Photoshop should be avoided. Actually, using this method to select an ICC media profile in Photoshop and the Epson driver leads to double profiling, so the final prints will look awful. Therefore, to obtain the best results from this particular mode of operation you be configured as shown in [Print Workflow 1](#).

Print Workflow 2 and 3

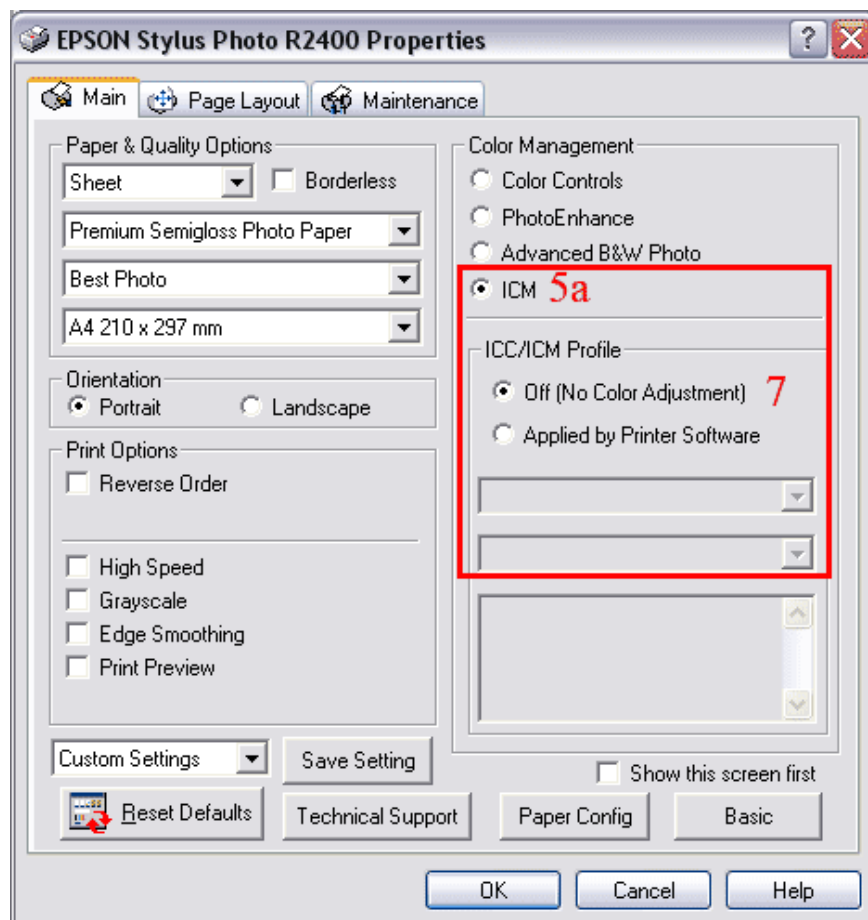


Figure 14 - Epson Print Driver: Print Workflow 2 and 3

The last setting for colour management is referred to as **Off (No Color Adjustment)** (7) and is **ONLY** appropriate when you're using ICC media profiles in Photoshop or printing the targets required for creating ICC media type profiles. In other words you should only use this setting if you have chosen to configure Photoshop **Print with Preview** dialog as shown in [Print Workflow 2](#) or [Print Workflow 3](#). This setting is by far the best setting for advanced Photoshop users. It's also worth mentioning that if you find your final prints are light and magenta in appearance then there's a very good chance that you chose one of the other settings in error.

Tip: In the screenshot shown above you can see that choosing **Off (No Color Adjustment)** (7) resulted in the **Mode, Gamma** and **slider controls** being removed from the print dialog; this is how it should be so don't panic when they disappear.

Summary

As you can see there are a number of ways that you can print one of your images, however as you can also see, because of the large number of variables, it is very easy to get things wrong. Most will be happy to use Print Workflow 1 and in some respects, it is the easiest to understand and will give very consistent results regardless of the media used. If your print does not look as you expected, then it would be fair to assume that somewhere in the process you have missed something important, so simply re-trace your steps to see where it has gone wrong.