

"ESTABLISHING A COLOUR MANAGED WORKFLOW" by MICHAEL SMYTH

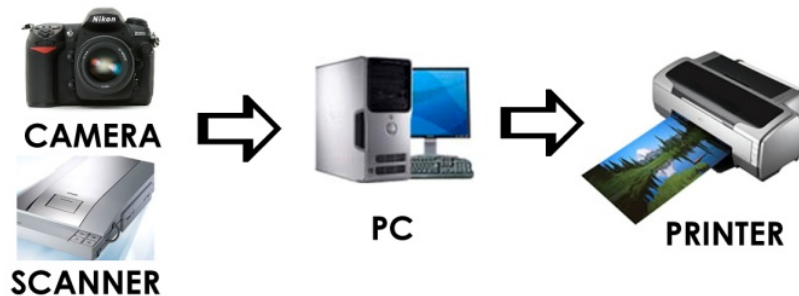
**WHAT IS COLOUR MANAGEMENT AND WHY DO WE NEED IT ?**

The goal of any photographer in the Digital age is to capture, process and print images with consistent and accurate results. In addition, you may also want to have your images presented on a website, projected at a camera club on a data projector, or publish a book through a third party publisher. In each case you will want to ensure that colours are represented accurately no matter where or how they are viewed.

Therefore a system of managing and controlling colour both within your working environment and across all other devices is of paramount importance. This is what a **Colour Managed Workflow** seeks to achieve.

*Tip:* If you do not have a colour managed workflow setup you will need to make constant corrections to each device to try to achieve a result that looks something like the initial image captured on your camera. If you change any of the components in your setup you will have to start all over again.

The digital imaging process involves several steps over several devices and each can influence how the colours will appear in your final image. The only way to achieve consistent and accurate results is to have all of these devices colour managed and working to known standards of colour:



**THE COMPONENTS IN A COLOUR MANAGED WORKFLOW**

There are three components to a colour management system.

The first is a **Colour Space**. The colour space defines the colours that can be represented within that space or "Gamut".

Colour spaces have been designed for specific uses and devices. Common colour spaces are **Adobe RGB** and **sRGB**. The colour space represents the range of colours that can be displayed or output from within that space. For example, sRGB was designed to represent the colours that can be displayed on a monitor and is useful for images that will be only viewed on the web or on a computer monitor (This space was designed over a decade ago as a "lowest common denominator" that would work on almost all devices of the time. Things have progressed since that time and many devices are capable of displaying colours well outside the sRGB space).

**Adobe RGB** is a closer representation of the colour gamut of an inkjet printer, however the newer 8 colour inkjet printers in particular can print colours that are even outside the gamut of RGB. As a standard, photographers should work with Adobe RGB as a starting point.

The second component is the calibration and creation of **Colour Profiles** for the devices used in a system. This allows accurate representation of the colours from device to device. Profiles are referred to as ICC (International Colour Consortium) profiles as they comply with a known standard (ICC standards for colour).

Thirdly, you need to instruct your computer system on how to use these profiles in the image processing workflow. This is managed as part of the **Colour Settings** and **Rendering Intents** setup in Photoshop.

Colour spaces are specific to the device that records or outputs the colour, The calibration process creates a profile for each device and these profiles are used in the data translation process. Devices like digital cameras and scanners have embedded colour profiles (for JPEG capture), computer monitors need to be calibrated on a regular basis and a profile created for the monitor used to display the image. Printer software comes with standard colour profiles for each different type of paper, or you can create your own using specialist tools.

*Tip:* Despite each device having a different colour space and profile, when correctly set up in Photoshop the handling of this colour information from camera to computer and to printer works almost seamlessly in the background.

Let's look at each device in the chain in turn and establish the preferred settings:

### **CAMERA SETUP**

If you are shooting RAW, (and you should be for optimum quality), the selection of colour space on the camera is irrelevant, as the colour space is not applied until processing in the RAW converter. You will have the choice of up to 4 colour spaces in Adobe Camera RAW.

If you are shooting JPEG, you will probably have the option of Adobe RGB or sRGB colour space. The choice of colour space will depend on your final use for the image, however if you use sRGB at capture you will lose significant colour Gamut that cannot be recovered later.

*Tip:* We recommend using Adobe RGB at capture (if shooting JPEGs) to maximise quality. Images can be easily converted to the smaller sRGB colour space later, if required.

### **PHOTOSHOP SETUP**

This is the most critical area as images brought into your computer will be handled by Photoshop all the way to the printer.

To set Photoshop to work in the appropriate colour space and control other options, go to Edit>Colour Settings. You will see a dialog box like the one below.

Adjust your settings per the following as recommended by Adobe (these are **NOT** the default settings when Photoshop is installed on your computer :

For more detail, see the white paper from Adobe at:

[www.adobe.com/digitalimag/pdfs/phscs2ip\\_colormgraw.pdf](http://www.adobe.com/digitalimag/pdfs/phscs2ip_colormgraw.pdf)

**Working spaces:**

RGB: set to Adobe RGB 1998

CMYK: ignore (not relevant for printing)

Gray: set to Gray Gamma 2.2

**In Colour Management Policies:**

RGB: Set to Preserve embedded profiles

CMYK: Set to Preserve embedded profiles

Gray: Set to Preserve embedded profiles

**Profile Mismatches:** Tick only the box for “Missing Profiles, otherwise leave unchecked. You don’t know if you want to convert from another profile until you can see it on the monitor. You can then easily go to Edit> Convert to Profile and convert to your working space (Adobe RGB).

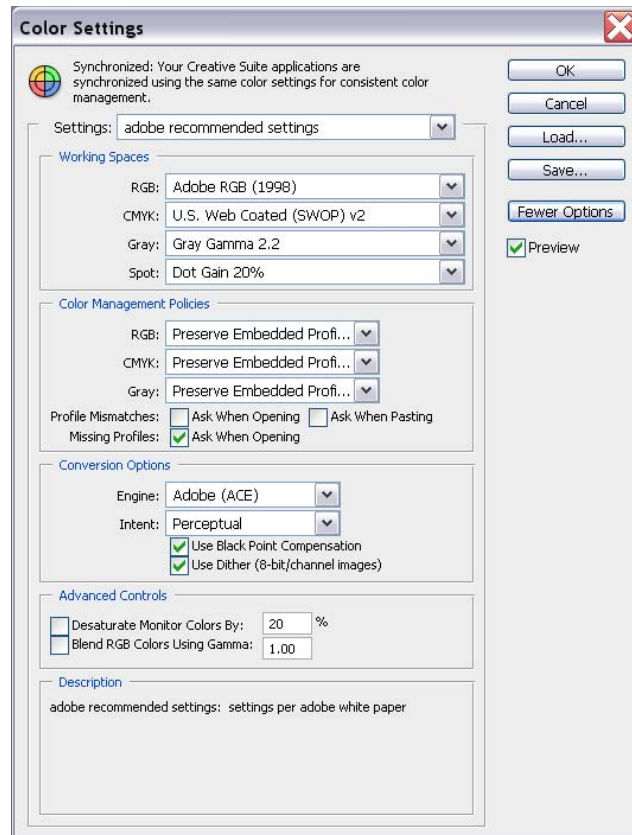
**Under Conversion Options:**

**Engine:** Set to Adobe ACE

**Intent:** set to Perceptual or Relative Colorimetric

**Tick the two boxes below.**

Leave the other advanced controls unchecked.



When done you can save these settings. I have called them “Adobe recommended Settings” (as shown in the settings title above).

In **Photoshop Elements**, go to Edit>Colour settings and choose “Full Colour Management” for Adobe RGB or “limited Colour Management” for sRGB. You don’t have any other options to set in Elements.

**ADOBE CONVERSION ENGINE AND RENDERING INTENTS – THE HEART OF THE SYSTEM**

As each file or image is handled from one device to another (camera to Photoshop, Photoshop to printer) the colour information is translated into the new profile and space.

This is handled in Photoshop behind the scenes by the Adobe Conversion Engine (ACE) and how this is handled is determined by setting the **Rendering intent**. This is a critical setting and is invaluable in translating the colour information into the monitor profile as well as sending the information to the printer.

Choices for the Rendering intent are **Perceptual** or **Relative Colorimetric**. We recommend using Perceptual as outlined above.

**Tip: Use Adobe RGB** as your working colour space if you are printing your own images as this closely matches the available printer gamut for an inkjet printer. Note: it is a fallacy that inkjet printers work in sRGB colour space, they have considerably wider gamut in some areas than sRGB, depending on the paper and printer in use. If you are only using images on the web or screen only, then convert to sRGB.

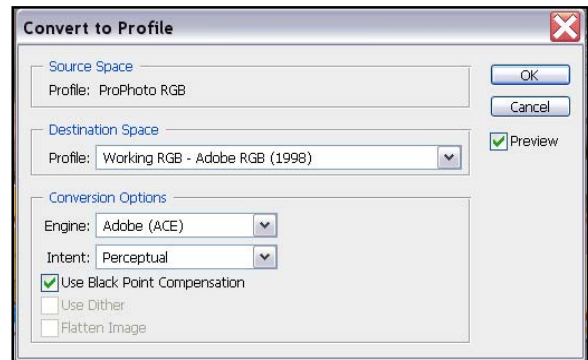
## CONVERTING PROFILES

There will be times when you want to change an image's colour profile to suit a particular purpose, for example, in converting an image for use on a web page you may want to change the profile from Adobe RGB to sRGB.

To convert an existing image, go to Edit>Convert to Profile. (Do NOT use assign profile).

You will see a dialog box as shown below:

Choose the destination space and the rendering intent. Make sure you save the file with a new name so you know the colour profile has changed.



## MONITOR SETUP

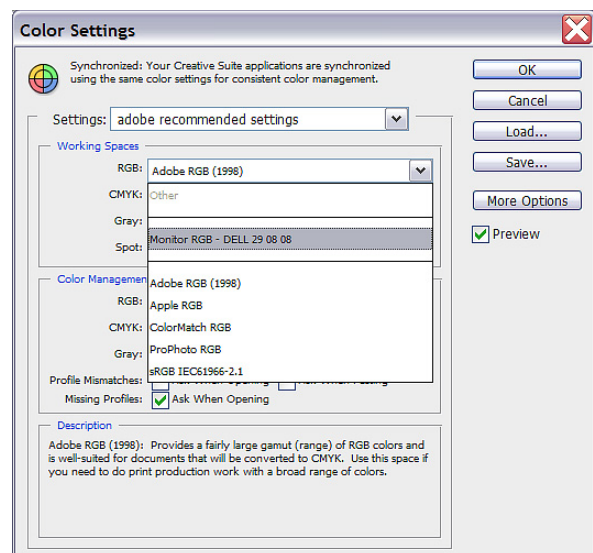
Your monitor is one of the most variable links in the imaging chain and it must be accurately calibrated and the profile saved. As monitors change over time it is also recommended to recalibrate on a regular basis.

There are several monitor calibration devices available such as the ColorMatch Spyder, Eye One and Pantone Huey. They all work by using a colorimeter attached to the monitor to read the colour values displayed by the monitor.

When you have completed the calibration process you will be asked to save the profile with a file name.

You can check that this profile is being used in Photoshop by going to the colour settings panel (Edit>Colour Settings) and clicking on the drop down tab next to the RGB working space.

Scroll down to check that the monitor profile appears in the list BUT DO NOT SELECT IT ! Just make sure it is in the list. This way you can be sure that it is being used to render the colours on your screen.



## PRINTER SETUP

When you are going to make a print, Photoshop translates the colour information into the profiles associated with your printer and paper choice. These profiles are loaded with your printer software

You can check to see if the profiles have been installed with your printer driver by going to View>Proof Setup>Custom in Photoshop.

By scrolling down all of the profiles stored you should find printer profiles. These are for an Epson R1800:

You should find profiles for the different types of paper that your printer can handle. If there are no profiles stored in this list, you will need to go to your printer manufacturer's website and download the appropriate printer driver and profiles.

You can get an approximate idea of how the image will look when printed by choosing the appropriate printer and paper combination and ticking the Preview button. Try ticking and un-ticking to see the difference between the display and print, as well as trying different types of paper.

You will notice a big difference between glossy and matte paper, both in the colours and the blacks.

The setup and sizing for printing will be covered in a separate tutorial.

## SUMMARY

We have seen why there is a need for a colour managed workflow in the digital imaging process. The steps above allow you to set up your camera, computer system, monitor and printer for optimum results.

We will cover printing in more detail in a separate tutorial.

A fuller outline of all the steps necessary in the Digital workflow are covered in the tutorial titled "**The Digital Workflow**".

