

DIGITAL
PHOTOGRAPHY

BASIC COLOR, TONAL & SIZING ADJUSTMENTS YOU CAN LIVE WITH USING PHOTOSHOP CS3

by Scott Musson

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Introduction

This article describes basic color, tonal and sizing adjustments that can be made with digital image captures using Adobe Photoshop and is specifically demonstrated using Photoshop CS3. The adjustments are presented in the order I suggest they be made. Many of the concepts in this article apply to other image editing software such as Adobe's Photoshop Elements and Corel's Paint Shop Pro. In this article there is a special emphasis on making changes that limit damage and degradation of image quality. Often these changes are presented in a way that can be modified or removed selectively in the future. In other words, these are image changes "You Can Live With".

I strive to make my images look as they did through the camera using Photoshop to do color and tonal corrections and removal of dust spots. I certainly also use Photoshop to create digital art and enjoy the creative freedom it allows me to create images I couldn't create in the camera. I don't however like to waste a lot of time on the computer fussing with my images. I feel that it is far more important to spend time capturing images correctly rather than spending significantly more time correcting the image to the way I should have captured it to start with. With practice it only takes a minute or so to properly compose an image and it can take many more minutes to correct an image with a computer program and you will more than likely degrade the quality or discard valuable pixels in the process. The point of this article is to help you quickly, methodically and predictably get results with your images in Photoshop without spending your life in front of the computer.

Before We Begin

I recommend that you calibrate your computer monitor with a colorimeter (Spyder, XRite, etc.) and you disable the Adobe's Gamma software on your system. The article at the link <http://kb.adobe.com/selfservice/viewContent.do?externalId=321608&sliceId=2> will provide you information on removing Adobe's Gamma and its critical you do this when using a colorimeter.

I also recommend using the Adobe RGB color space or the Pro Photo color space as these color spaces are much larger than the sRGB color space. The sRGB color space is really only appropriate for the web when using a non-color managed application like an internet browser. It's important when opening RAW images that you open it using the intended color profile and bit depth. I highly recommend shooting RAW for the most flexibility and the best possible quality. The files are substantially larger using RAW than JPEG, but it's a tradeoff I'm willing to accept.

Also note that all steps in the workflow described in this article are optional and should be used as needed. I use levels and or curves adjustments with the majority of my images and I often sharpen my images. All other adjustments I make infrequently and in some cases almost never such as color balance. You are encouraged to make all changes subtle and not with a heavy hand. Any adjustment that stretches the image histogram runs the risk of causing posterization. Posterization will make smooth color changes look very jagged. The following is a simulation of posterization.

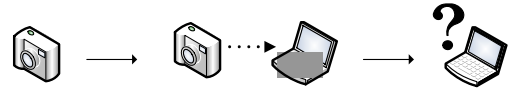
Normal



Posterized



Image Capture, Transfer, Review & Rate



The most important step in this workflow as with most photography workflows is the capture of your image. This is the step when you can make the most difference in the quality of your image. Try not to adopt that “I’ll just fix it in Photoshop” mentality and take your time, use your tripod, carefully compose, check the edges of the viewfinder for objectionable objects and look for object overlaps. While this is not the focus of this article, the importance of this step cannot be over emphasized.

After you’ve captured your images you will next transfer them to your computer and review them and choose which images you want to work on. Adobe Bridge provides valuable tools to review and rate your images; this is worth learning more about to help streamline your workflow. I’ll be doing a presentation on Workflow which will include some features of Bridge used for rating images for Vienna Camera Club in February 2008 and I’ll make the companion article available on the NVPS website after the presentation.

Open Raw Image & Make Adjustments



You can use either Adobe Camera Raw (ACR) or your camera provider’s Raw converter to open your Raw captures and convert them to image files.

Set your white balance, exposure, recovery, brightness, etc. The details of these settings are beyond the scope of this article, but it’s important that you properly set the white balance, exposure and blacks to make sure no clipping or as little clipping occurs as possible.

The correct color space, bit depth, ppi (pixels per inch) and resolution all depends on the intended use of the image.

Color Space: If you want to have a high quality 16 bit workflow I suggest using ProPhoto RGB for your color space or Adobe RGB (1998) for 8 bit workflows. This will give you the widest color space available.

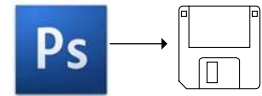
Depth: If you have no concerns about disk space I suggest using 16-bit depth. Once you’ve saved the image at a lower bit depth you cannot get the discarded information back without going back to the original Raw capture.

Size: Use the default size unless you are considering making drastic changes to the size of your image. Since Raw conversion will be interpolating (or creating pixels) in the conversion process, this is the optimal time to make large image size changes. However generally you should use the default and make minor size changes in Photoshop.

Resolution: This setting is just for convenience and saving you a step later on. Normally this should be 240, 300 or 360 for printing, but this value can be changed later in Photoshop without any penalty or image degradation.

Import/Open in Photoshop

If you open your Raw capture with ACR pressing the **Open Image** button will open your converted image directly in Photoshop. Some other camera Raw converters require you to save the image in an interim file format, but once you are done, open your image in Photoshop. It's a good time to save your master image file in either TIFF or PSD (Photoshop) format. It's important to have a logical file naming and folder/directory naming convention. It's a good idea to retain a connection from your master image file to your Raw capture. The easiest way is to retain the same file name or include the original file name in the master image file name. There are lots of ways to keep this connection and whatever works for you is fine, but from time to time you will want to find the original Raw image and this naming convention will help you find it.



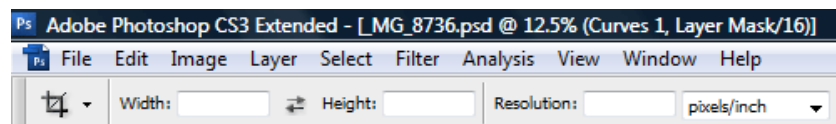
Crop, Rotate & Straighten

If your image horizon line is off and it needs straightening or if your composition isn't quite what you wanted and would benefit from some creative cropping, now is the time in your workflow to correct these defects. Of course it would have been better to correct these problems before you press the shutter as it's likely you will at least have to discard some pixels from your file to perform these corrections, but at least you have an option if your capture wasn't exactly as you planned.



Cropping with the Crop Tool and the Marquee Tool

When you want to crop your image to improve the composition there are several ways you can crop your images. The crop tool is very handy to improve your image composition or to fit the image into a precise canvas size. You'll notice once you've selected the crop tool, several fields will appear below the menu. You



are not required to use these fields when using the crop tool, but it's a good idea to be sure they are set the way you want them before continuing. A common mistake is leaving a value in one of these fields from a previous crop and then you go to crop again and you've not removed one of the values and you get unexpected results, sometimes not noticed until much later in your workflow. The clear button on the crop tool options bar is helpful to remove values once you don't need them and the front button will copy the current size and resolution to the crop tool options boxes in case you want to maintain the current size and resolution of the image you are on.

Drag out the area you want to be retained in your image with the mouse, holding down the mouse button and releasing when you are done. The marching ants will indicate where your crop is, and if you have the shield color turned on (on the crop options), you can clearly see what will be removed and what will be saved. You can easily adjust the selection area you have chosen by grabbing one of the handles on the selection and dragging them in or out.

At this point you have the option of either cropping the image or hiding the cropped area in case you might want to bring it back later and you aren't committed to the change. Remember this article is

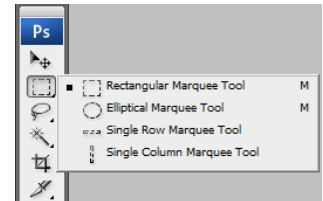
about changes you can live with! Either press the enter key to perform the crop or the accept checkbox ✓ on the toolbar. If you are still are not happy with your selection and you don't want to crop, either press the escape key or the cancel button ⓧ on the toolbar. If you want to show the hidden cropped area in the future use the **Image/Reveal All**.

The crop tool has some more advanced features that are very helpful. I recommend you explore these on your own. The crop tool can be used to correct perspective of your image as well as straightening your image.



IMPORTANT NOTE – The crop tool will interpolate when all 3 values are entered in the crop options fields for height, width and resolution and the default interpolation mode is used in this case. If you would like to change which interpolation mode is used when cropping, go to **Edit/Preferences/General** to modify the “Image Interpolation” setting. More information on interpolation can be found in the section on resizing images in this article.

The rectangular marquee tool can also be used for cropping and I often use it for this purpose. It's very simple with none of the advanced features of the crop tool which means it's easy to use, especially when I'm cropping for composition and focus and not when I'm also trying to make my crop a certain size or proportion.



Rotate your Image

Newer cameras record the position your camera is in when you take an image so you rarely need to rotate your image to be horizontal or vertical, but this is a fairly recent improvement in technology. In case your camera doesn't have this feature or in case you want to rotate or flip your image for creative purposes, there are several commands to help you. They are all under the menu selection **Image/Rotate Canvas**. It's best to look at a visual image of the results of each menu selection to understand exactly what they do. Here's the image we will use for the starting point, and then look at each menu selection's impact to this image.

The first rotate canvas command is **180°**. This of course rotates the image ½ of a circular rotation so the result will look like this:

The next rotate canvas command is **90° CW**. This command will rotate the image ¼ of a circular rotation in a clockwise direction. The result of our original image will look like this:

The next rotate canvas command is **90° CCW**. This command will rotate the image ¼ of a circular rotation in a counterclockwise direction. The result of our original image will look like this:

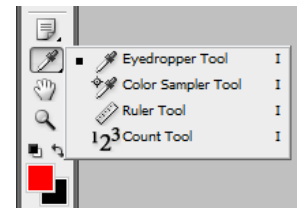
The last two rotate canvas commands are **Flip Horizontal** and **Flip Vertical**. Notice the difference in these commands and the rotate commands produce images much like with film when you flip a slide over and it gives you a reverse image effect.

The rotate canvas command **Arbitrary** (not pictured) brings up a dialog for you to make precise rotations and is often used for straightening your images (see the next section in this article).

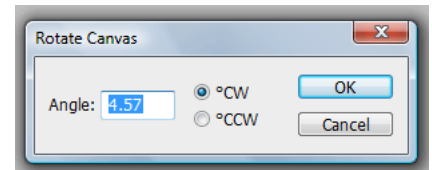


Straighten with the Ruler Tool

Hidden under the Eyedropper tool is a very useful tool called the “Ruler Tool”. The ruler tool can be used to measure the distance between 2 points, the angle, the position on the canvas, etc. An even more valuable function of the ruler tool for photographers is its ability to help you straighten or align your images.



If you have an image where the horizon is not quite level or a building that is not parallel to the vertical edge of the image you can use the ruler tool to correct the problem. Drag the ruler tool to draw a line where it currently isn't horizontal (or vertical) but you would like it to be. Now go to the menu and choose **Image/Rotate Canvas/Arbitrary** and the following dialog will pop up pre-populated with the correct value to straighten your image to the line drawn by the ruler. Press OK and the image will be rotated. You'll now need to use one of the cropping techniques described earlier in this article. The rotation will automatically expand the canvas to allow the rotation and will fill with your current background color, but you'll now have some blank canvas area that will need to be cropped.



Set Black Point & White Point



This technique is not well known and is fairly complex and advanced. To learn this technique I suggest taking a class with local Photoshop Guru Eliot Cohen who first introduced me to this technique. I've included a reference to the technique in this article as a point of honesty; this is what I do when processing my images. The Levels and Curves adjustments I will explain in this article are not the techniques I use today, but here I explain a technique that is simpler, quicker and fairly effective and is how I started refining my workflow. If you would like a step by step instruction on the black point & white point technique there is an article on the internet by a photographer/teacher Matt Siber that explains it well. Once you are comfortable with the workflow in this document or if you already have a successful workflow, you might want to explore this technique.

http://www.siberart.com/teaching/oberlin/downloads/setting_points.pdf

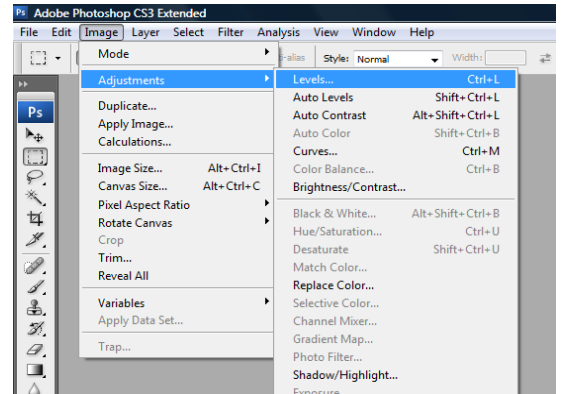
In this article I'll explain setting black point and white point through the levels dialogue.

Adjustment Layers vs. Image Adjustments

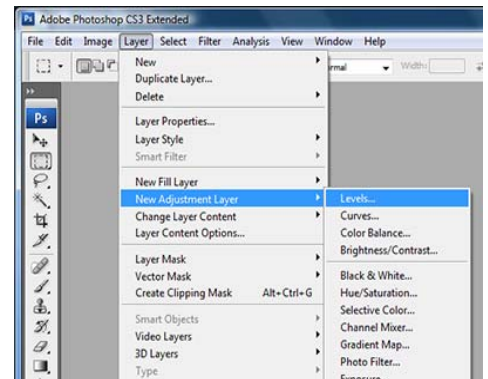
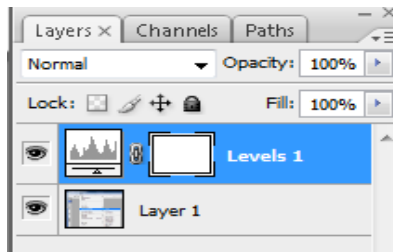


Adjustment layers were created so you can make more precise tonal and color corrections to images without committing to the changes. You can save the image and come back and make further changes to your previous adjustments without ever altering a single pixel in the image itself. I always use adjustment layers whenever possible to have this flexibility to modify my adjustments at anytime in the future. Additionally the use of adjustment layers will not have a cumulative impact on the quality of the image as using image adjustments will. Adjustment layers can be easily turned on and off or dialed to any level of opacity to have degree of effect. They are truly changes you can live with.

When performing adjustments from the menu via **Image/Adjustments/...** you are making permanent irreversible changes to the pixels of the image. So you either have to work on a duplicate file or a duplicate layer if you don't want to alter the pixels of the image. This will make your files more numerous or larger and in either case more work to manage them.



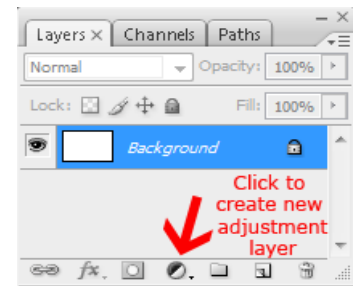
If you instead choose **Layer/New Adjustment Layer/...** choosing **Levels** for example (then pressing OK to the adjustment layer dialog), the new adjustment layer is created and can now be seen in the layer pallet.



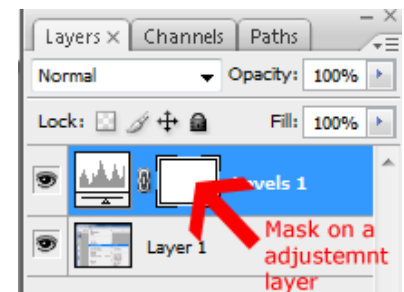
If for some reason you can't locate the layers pallet, choose **Window/Layers** from the menu.

Should you not like the adjustments made in this adjustment layer, you can reopen the levels dialog by clicking on the levels image in the layer palette and readjusting the settings. Alternately you can discard the layer completely. If you would like to remove the adjustment layer drag it to the layer pallet trash can or use the **Layer/Delete** menu command. All of this is done without any modification to your original image layer.

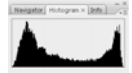
Shortcut: To add a new adjustment layer you can either use the menu command **Layer/New Adjustment Layer/...** or you can click the new adjustment layer button on the layer pallet.



Advanced Topic: Your adjustments can be selectively applied using the mask on the adjustment layer. By filling or painting black in the mask you will hide the effect of the adjustment layer, by filling or painting white in the mask you will show the effect of the layer or by filling or painting with neutral grey in the mask it will neutralize the effect. Adjustment layer masks are filled with white by default, therefore reveal or show the adjustment.



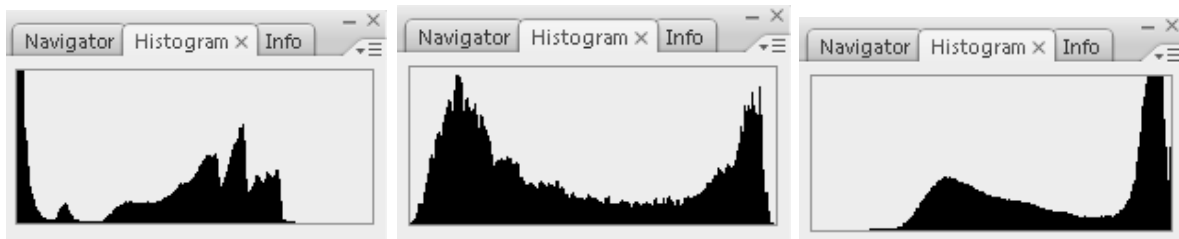
Get to Know your Histogram



“A histogram illustrates how pixels in an image are distributed by graphing the number of pixels at each color intensity level. The histogram shows whether the image contains enough detail in the shadows (shown in the left part of the histogram), mid-tones (shown in the middle), and highlights (shown in the right part) to make a good correction.” - Adobe Photoshop Online Help CS3

The histogram gives a view of the overall tonal range of an image. A dark image has detail concentrated in the shadows or the left side of the histogram. A bright image has detail concentrated in the highlights or the right side of the histogram. An image with a full tonal range has pixels in all areas of the histogram. Understanding the tonal range helps determine tonal adjustments.

If your histogram pushes up against either side then you are losing detail in your image. You are clipping the highlights if the histogram is pushing up to the right, which means your image is overexposed. You are clipping darks if the histogram is pushing up to the left or your image is under exposed.



Under Exposed



Properly Exposed



Over Exposed

Some images do not have a full tonal range and the histogram may not span the whole scale and this is not a problem if the image you were capturing was of a limited tonal range. Also the height of the histogram is generally of no concern, but does tell you how many pixels have that tonal value in relative terms. These concepts apply to both the histogram in your digital camera, as well as they do in an image editing program. If you should see a histogram when you are shooting that indicates your image is over or under exposed, you should try to retake the image if possible with a better exposure instead of trying to correct it in Photoshop.

It's important to understand that there is no such thing as a correct histogram. You must look at you histogram in context with your image. Some images are appropriate having lots of pure black or white tones and in this case you will have a histogram pushed to one side or the other. This histogram is just representing the pixels you have in your image.

Levels Adjustment Layer



Levels adjustment layers are for correcting the tonal range and color balance of an image. You can adjust the shadows, mid-tones and highlights. There are 3 sliders on the top scale in the levels dialog for black point, white point and mid-tones. The position of the black and white point sliders redefines the histogram's "Input Levels" so they are mapped to the "Output Levels" on the lower scale. In this article we will focus on the "Input Levels".

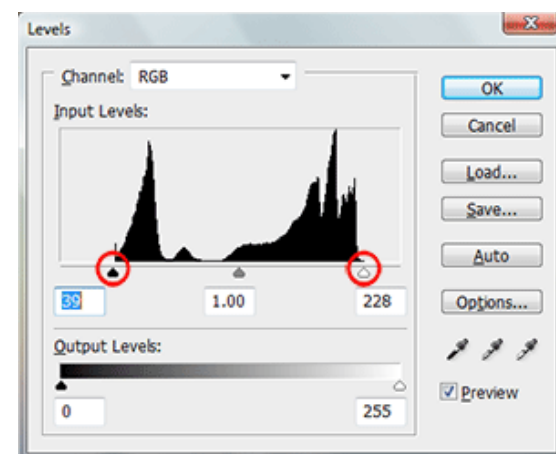
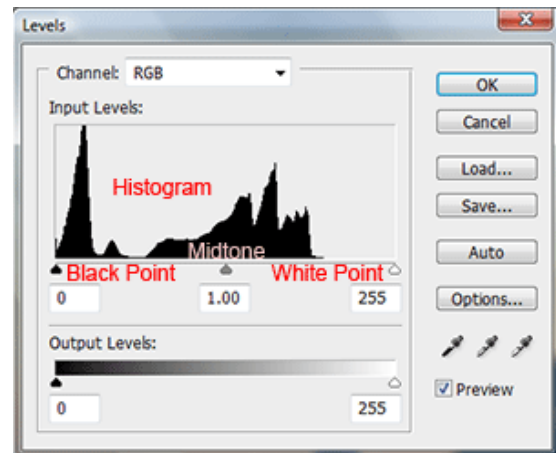
You can adjust your images using all 3 color channels combined or for each individual red, green and blue channel. Using the combination is quicker and using each channel is more accurate. This article will describe adjustments using the combined channels but the same technique can be used for each individual channel.

The objective is to move the black point slider underneath the first point on the left of the histogram. If your histogram goes all the way to the left then you likely don't want to adjust the black point. If you push the black point slider to the right of the first point on the left of the histogram, you will push all the pixels to the left of the slider to pure black. You'll have to decide if this is appropriate or not for the image you are working on. Next move the white point slider under the first pixel on the right of the histogram.

If you hold down the ALT key on the PC or the Option key on the Mac when making your levels adjustments for black and white point your image preview will show what pixels are being clipped. When adjusting the black point, the preview will be all white unless pixels are being clipped. When adjusting white point, the preview will be all black unless pixels are being clipped.

You can adjust the overall brightness in your image using the mid-tone slider however there is not a lot of control in the levels dialogue. Using curves is a more effective way to adjust mid-tones.

Using the levels dialogue to set your black and white point as described in this article will effectively adjust an image to broaden its dynamic range. It is much less effective in adjusting images that have dynamic range that is too broad or is clipping pixels. The most effective technique for adjusting images that have too large a dynamic range is to make changes in the Raw processing dialogue.

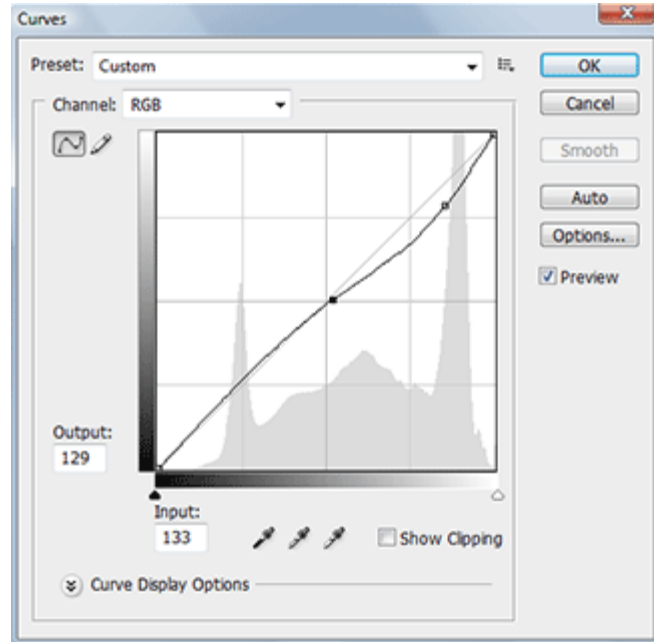


Curves Adjustment Layer



Curves adjustment layers, like levels, are for correcting the tonal range and color balance of an image. However curves give you more fine grained control and is used for more subtle changes. In curves you can work with the individual color channels or with a composite channel just like in the levels dialogue. While many of the same adjustments you made in the levels dialogue can be made in the curves dialog, the advantage to the curves dialogue is you can independently adjust the mid-tones, highlights and shadows by adding multiple points on the curve. Curves can also be used to increase contrast in a flat image, but be cautious not to overdo it.

Here's an example. If you have an image that is too strong in the highlights, place a point in the highlight area of the diagonal line. Pull the point down to reduce the highlights. To keep the impact of the change from impacting the whole image, put another point down on the curve where you want the change to stop, in this case the mid-tones. You can readjust either point to produce a desired effect. If you want to remove a point, just grab it with the mouse and pull it out of the dialog and release the mouse.

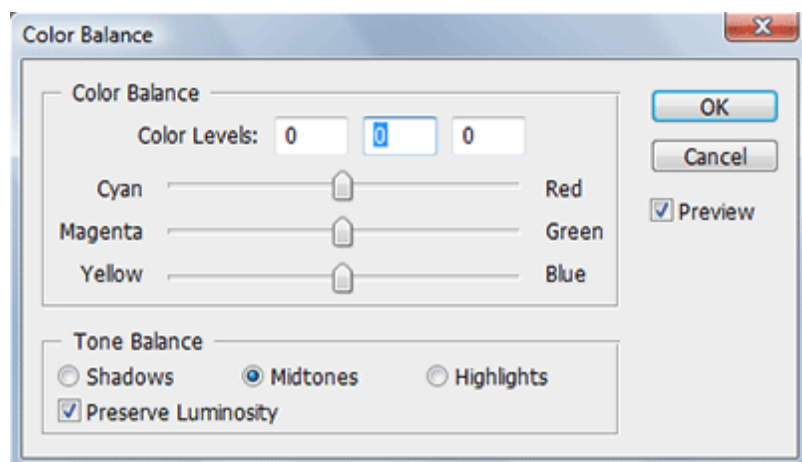


If you find that the curve adjustment is shifting colors or saturating your image, you can change the adjustment layers blend mode to luminosity or lightness.

Color Balance Adjustment Layer

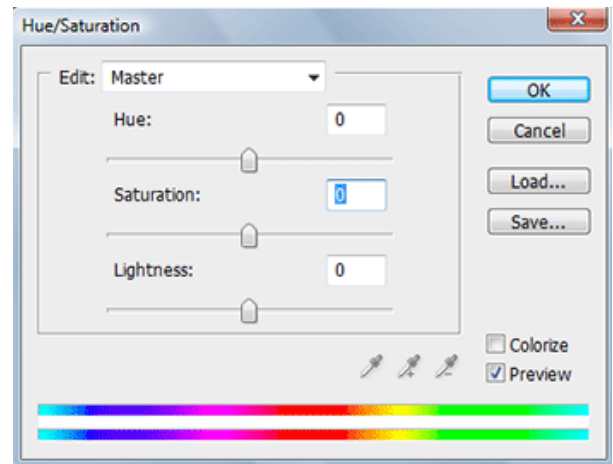


While I rarely use this feature, it can come in handy if your color is slightly off. You can individually adjust each color channel for 3 different tonal ranges, shadows, mid-tones and highlights. Check Preserve Luminosity to prevent changing the luminosity values in the image when changing the color. This will maintain the tonal balance in the image you've already achieved in previous steps.



Hue Saturation Adjustment Layer

This is another less frequently used adjustment, but it can be very helpful in making your image more appealing if you are not heavy handed with its application. This is a feature I'll sometimes use when converting an image to JPEG as sometimes the image gets slightly de-saturated when converting to JPEG from a 16-bit image. You can apply this adjustment to all colors (Master) or to any of 6 individual colors. I usually apply it to master. You should limit the maximum saturation increase to somewhere around 12 to 15.

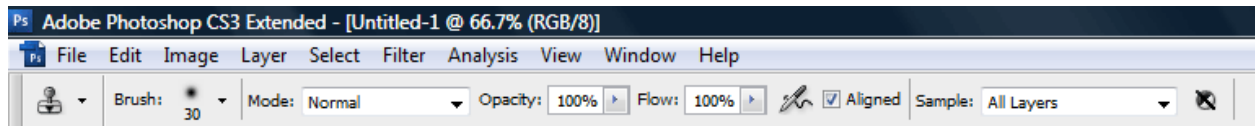


You can also use the saturation adjustment to de-saturate your image either partially or even completely, however there are better techniques to convert to black and white.

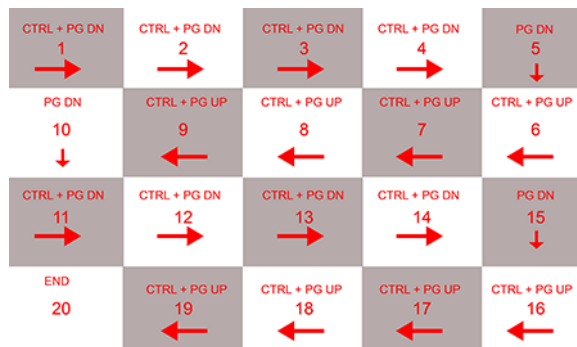
Clean Dust Spots



You can use a new layer and the clone stamp to remove any dust spots on your image. Add a new layer, not an adjustment layer in this case. Choose the menu command **Layer/New/Layer** then press OK on the new layer dialog accepting the defaults. Now choose the clone stamp from the tool pallet. Now the options for the clone stamp appear at the top of the application. Choose to sample all layers in the options bar.



Size the brush to as small as you can to cover the dust spots and use the square bracket keys “[” & “]” to enlarge and shrink your brush as needed. Select **View/Actual Pixels** and then press the Home key to take you to the upper left hand corner of the image. Using a combination of control page down & control page up which moves you horizontally and page down and up which moves you vertically down, you should review the whole image for dust spots. Hold down the ALT key when you click the mouse to set the source of your clone. Then just clone out the dust spot on the screen.



Using a new empty layer will not significantly increase the size of your image as it would if you duplicated the background layer and cloned on that layer. Using an empty layer keeps your files smaller and will isolate your changes to a layer that can be turned off or discarded if you later realize you've made a mistake. Your original image will be unchanged, but all your edits are preserved and modifiable.

Save Your Image



If you haven't been saving your image as you go, now would be a good time. Consider the image you've saved as your master image. As you go on to prepare to print, prepare for projection or for the web you will use this image as your source.

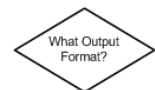
Duplicate Image



This is a good time to duplicate your file to preserve your master image from being changed. This duplicate image will be used to prepare for final output. The reason you should duplicate your image and work on the duplicate is that all steps going forward (resizing and sharpening) will make irreversible changes to the pixels in your image. You will always have your master image to go back to, and not have to go all the way back to your Raw image and start over. You can use the duplicate image command and never save the duplicate copy of the file if you like, this way you will not damage your master file. You can discard the duplicate file without saving it.

Choose **Image/Duplicate** and I choose the option to merge all layers since I don't save the duplicated image.

Choose Your Final Output



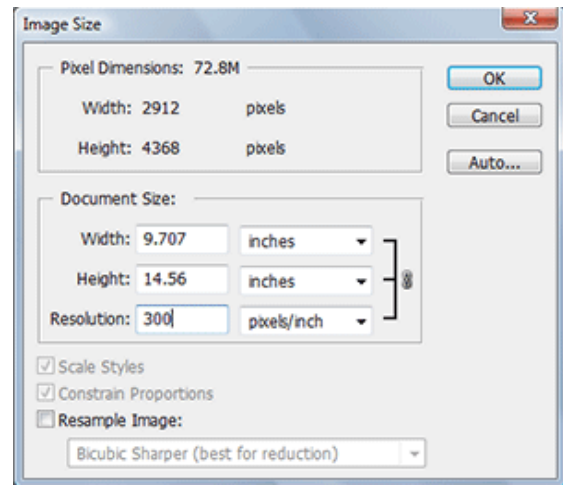
Processing for print, projection and the web all have a few unique characteristics so I'll address them separately. All 3 involve resizing but with different characteristics. The last step before preparing for your final output is sharpening.

Printing



The first step when preparing to print your image is to resize the image to the size you would like to print it. When resizing for printing it's important to consider what resolution your image is. Your specific printer will likely recommend specific ppi (pixels per inch) for best results. 300 ppi is a common optimal value for printers. I've had good success with 180, 240, 300 & 360 ppi on both Canon & Epson printers I've used, but it's best to consult your printer documentation.

Choose the **Image/Image Size** dialog to resize your image. If your resolution is not set to the appropriate size for printing, uncheck resample image and set the resolution to 300 or your preferred ppi. When resample is unchecked you are just shuffling pixels and you are not removing any pixels or making any up. Now check the resample image checkbox. If you are going to reduce your image size use the “Bicubic Sharper” re-sampling method and if you are enlarging your image use “Bicubic Smoother”. I suggest you do not use “Nearest Neighbor” in photographs and use one of the 3 Bicubic methods. Set either the height or width value of your document and if you have the constrain proportions checkbox checked the other value will adjust. Adjust them as close as you can to the image size you desire. If the image is still too wide or tall by just a little bit, you can use the canvas size dialog to crop off the extra bit. If you need more creative control you can go back to the crop tool as discussed earlier in this article.

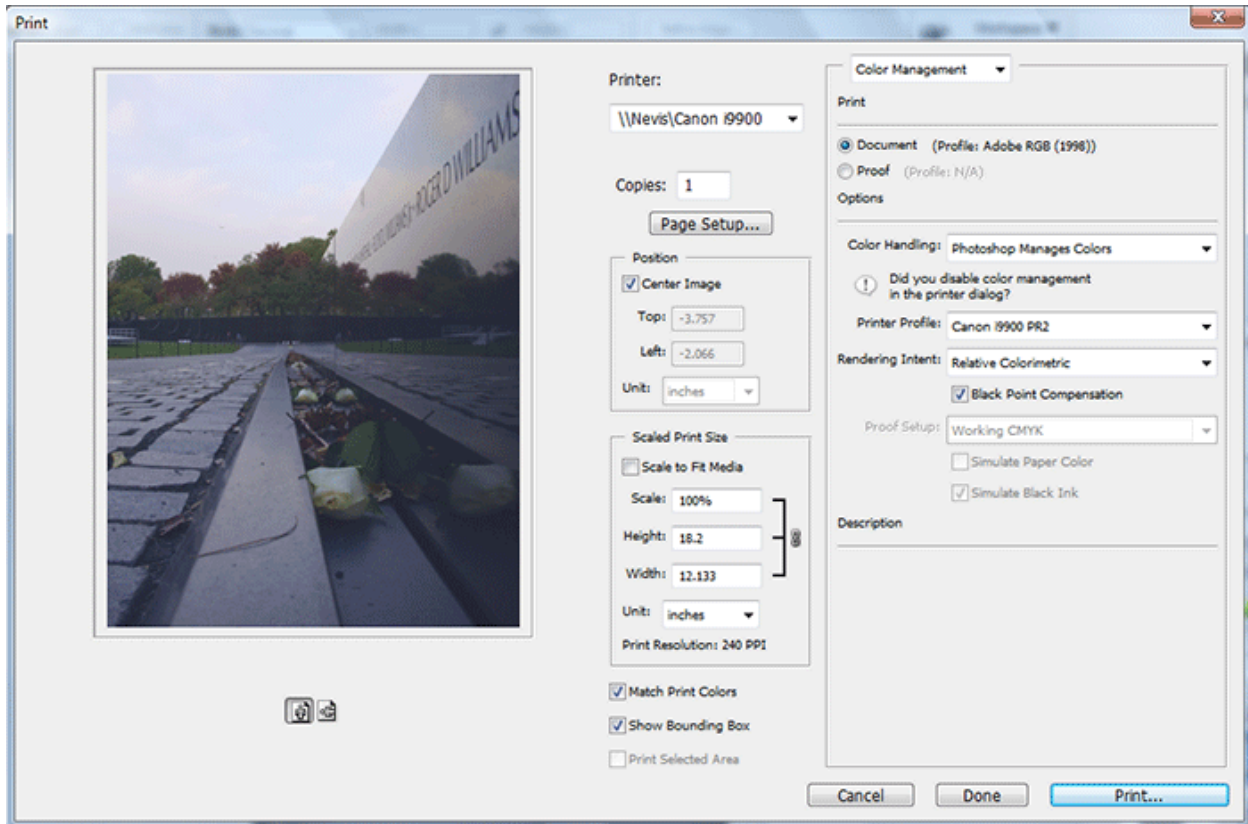


Sharpen your image using **Filter/Sharpen/Unsharp Mask** or Smart Sharpen if you like. Be careful not to over sharpen your image, as this will cause color fringing and all sorts of undesirable artifacts. This is a common mistake of novice photographers.



The following assumes you have a printer that supports printer profiles and that you have the proper profiles for the printer/ink/paper combination you are using. If you are unsure about printer profiles, please consult your printer documentation to determine if your printer supports printer profiles. Without this feature, it will be very difficult to have predictable, repeatable results with your printer. Also do not try to follow these instructions if your printer doesn't support printer profiles as this will produce poor results.





Choose print from the menu **File/Print** and the Photoshop printer dialog will appear.

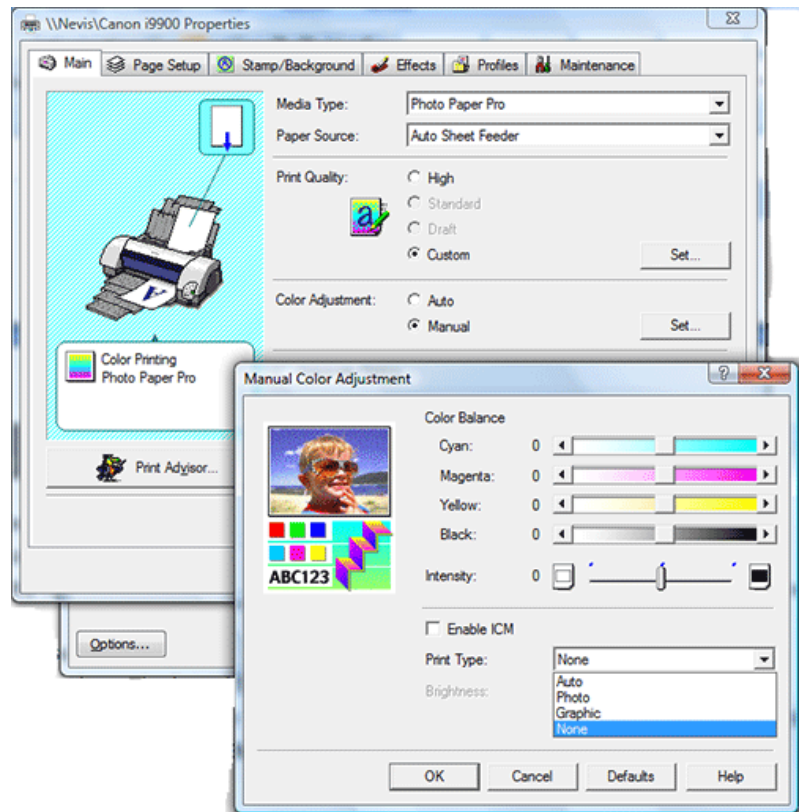
1. Choose the printer where you will print your image
2. Open the page setup dialog (printer specific) and indicate the paper size and orientation of the image you will be printing
3. Make sure scale to fit media is unchecked
4. Under color management choose Photoshop manages colors
5. Choose the printer profile you will use with the printer/ink/paper combination used
6. Set the rendering intent and black point according to the instructions that came with the printer profile.
7. Now press print and your printers print dialog will appear.
8. Your page size and orientation should be properly set
9. You need to select the paper or media type and quality recommend by the printer profile instructions.
10. **TURN OFF COLOR MANAGEMENT IN THE PRINTER!**

Examples:

Canon i9900 (and many Canon printers):

For the Canon i9900 you see the media type at the top. The print quality is set by a separate dialog after choosing custom/set. Of course set the quality to the highest setting (fine).

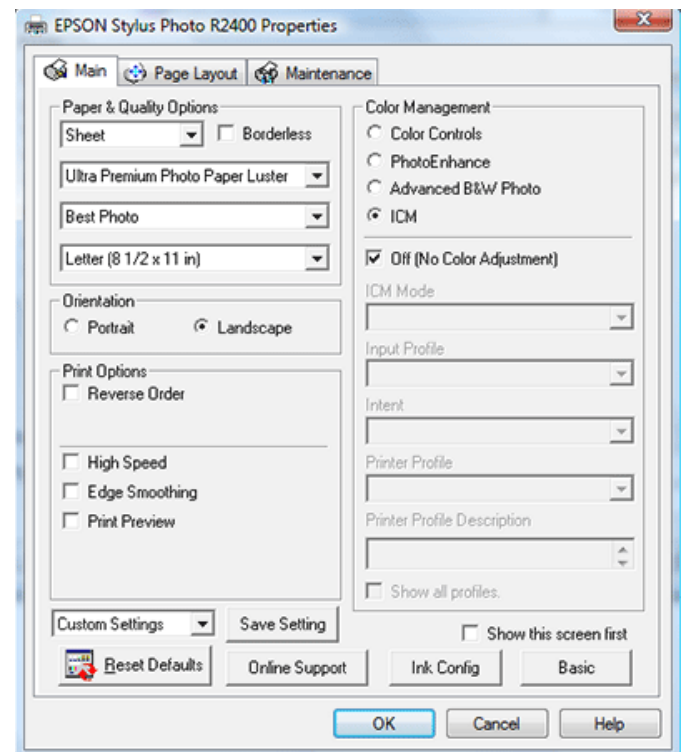
Next select manual color adjustment and it will open a separate dialog. On this dialog select a print type of "None". This is how you turn off the color management in your Canon printer and allow Photoshop control the printer.



Epson R2400 (and many other Epson printers):

Set the media type and the quality. Note that the printer profiles for Epson printers specify the print quality. For example "SPR2400 PremLuster BstPhoto.icc" is for Epson's Premium Luster Photo paper.

To turn color management off, select "ICM" in the color management section of the print dialog and then check the off check button below it for no color adjustment.



After you have finished printing and you are satisfied with the results, there is no need to save your duplicate file unless you plan on printing this image many times using the exact same settings.

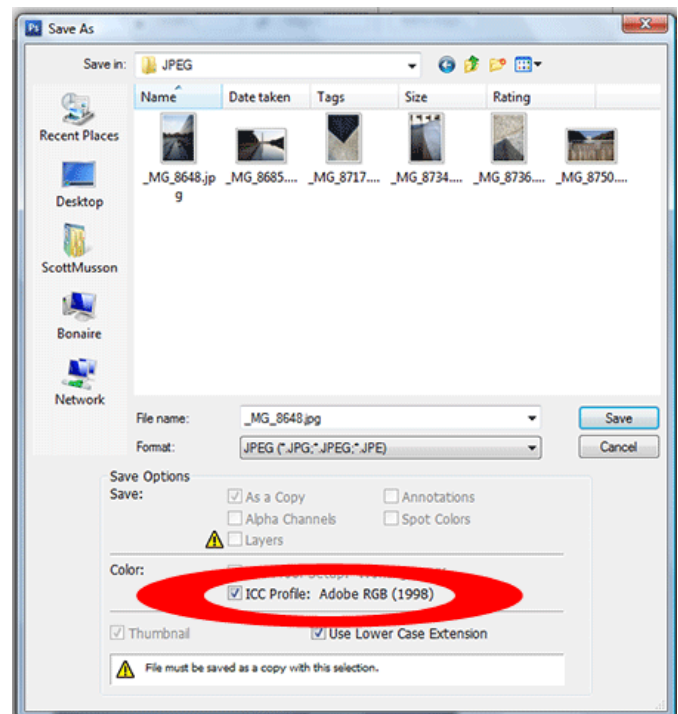


Projection

I suggest reviewing the article I previously wrote on this topic for sizing images for digital competition on the NVPS website at <http://nvps.org/main/docs/preparingimages.pdf>. In it I describe a number of different image sizing techniques for digital competition. Probably the easiest sizing technique described is the “fit image method”.

The “fit image” method is very easy, but it interpolates (resamples) using the default image interpolation so it’s important that it is correctly set. In most cases for reducing the image size this would be set to “Bicubic Sharper”. To set the default go to the menu selection – **Edit/Preferences/General** and set the default “Image Interpolation” to “Bicubic Sharper”. Press OK on the “General Preference” dialog to confirm your selection.

1. Flatten your image if you’ve not previously done so in the duplicate image step – **Layer/Flatten Image**
2. Set your image bit depth to 8 – **Image/Mode/“8 bits/channel”**
3. Convert your color space to either sRGB IEC61966-2.1 or to Adobe RGB (1998) – **Edit/Convert Profile**. If you need to you can do some additional color corrections or add a bit of saturation to your image, but only if needed.
4. Set your resolution to 96 – **Image/Image Size** uncheck resample image and set resolution to 96. This is unnecessary in most cases, but it depends on the program used to display the images. Setting this value will ensure the best compatibility.
5. Go to Menu Selection – **File/Automate/Fit Image**
 - a. Enter 1024 in the width field and 768 in the height field, or the target resolution of the projector you will be showing your image on. *Note:* it doesn’t matter if it’s portrait or landscape orientation; the image will be constrained so neither height nor width will be larger than the target. At least one dimension will be exactly set and the other will be either exactly set or less than the entered amount.
 - b. Press OK to confirm your intentions in the “Fit Image” dialog.
6. Sharpen your image **Filter/Sharpen/Unsharp Mask** or Smart Sharpen if you like. Be careful not to over sharpen your image, this will cause color fringing and all sorts of undesirable artifacts. This is a common mistake of novice photographers.
7. Now save your image as a JPEG by choosing **File/Save As**. Choose the format JPEG and check the ICC Profile box to embed the profile in the file. Choose the highest quality (12) unless you have a file size limitation then choose the highest quality for the size you are targeting.



Web

For the web follow the general workflow for projection with a couple of key differences. The size of your image should be much smaller than 1024 x768. You also should consider using the **File/Save for Web and Devices** save command as there is significant flexibility to the file quality and size.



Save As vs. Save for Web and Devices

	File/Save As	Save for Web...
Source bit depth (both create only 8-bit JPEG's)	8-bit only	8-bit or 16-bit
Compression scale (really the same)	0 - 12	0 - 100
Preserves EXIF ?	Yes	No
Converts to sRGB for you?	No	No
Permits embedding profiles ?	Yes	Yes

Conclusion and Credits

There are three people I credit for most of my knowledge of digital image manipulation; Adobe Evangelist Julieanne Kost, acclaimed author Tim Gray and Eliot Cohen who teaches Photoshop classes at the Smithsonian and in association with local camera stores. I highly recommend training materials, books and hands on training from these three as they are clear, concise and most of all good teachers.