



Printing for Photographers

By OTIS Photo Lab



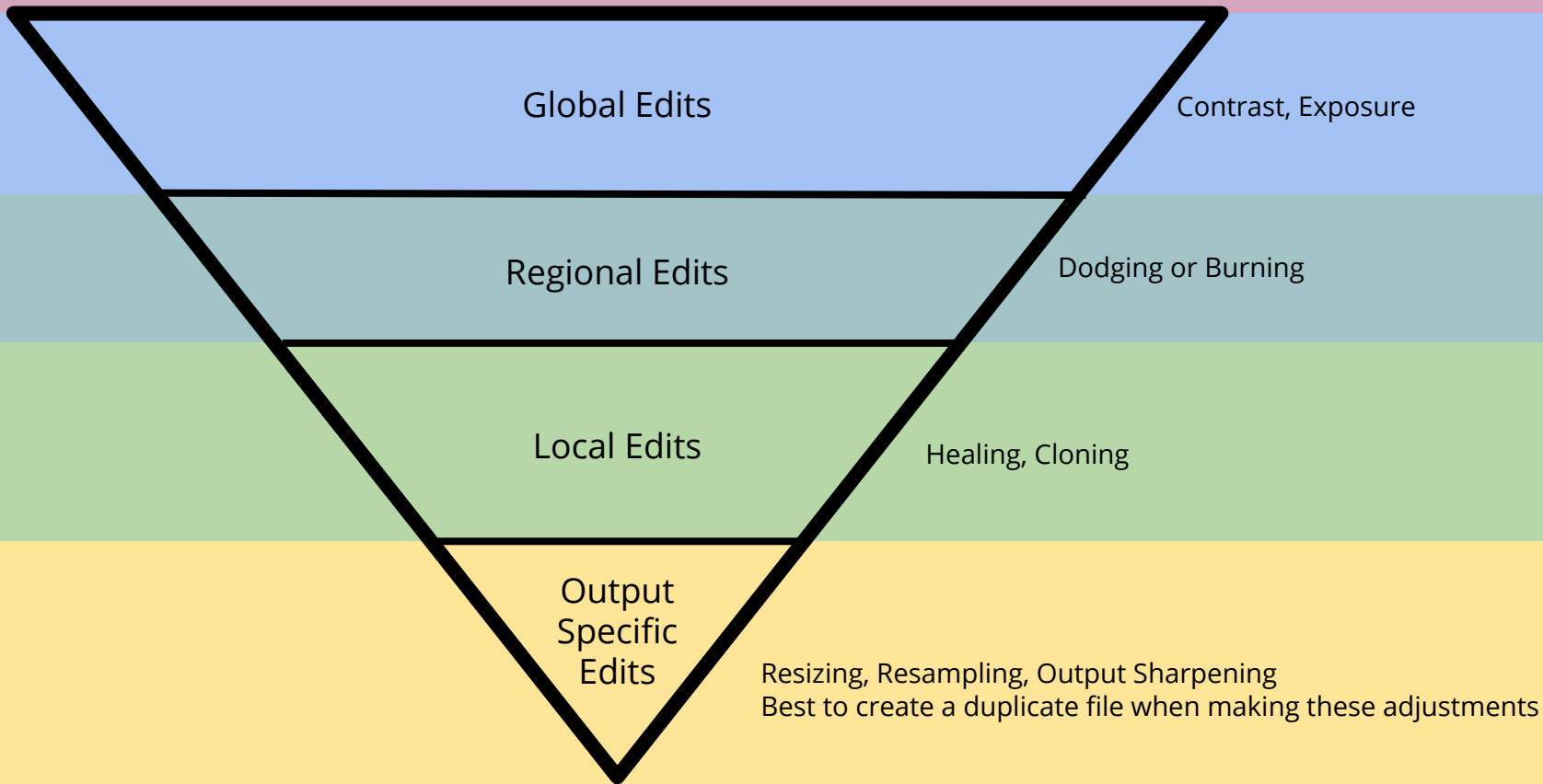
Your Printing Environment

- Aim for a neutral space with controlled light levels.
- Avoid bright colors in printing environment.
- If near window light, keep consistent hours.
- The school provides neutral color viewing lights, and magnetic walls, for print viewing. Use them!
- If you can take proof prints to the space where your work will be exhibited, make notes about how the prints look in that space before doing your final prints.

Computer Screens

- Screens at lab are calibrated monthly using Datacolor's Spyder calibration.
- **Do not change brightness of screens**
- Just like in the darkroom, test strips are still the best way to ensure your print is accurate
- Minimum test strip size is 5x5 inches on most printers, 11x11 inches on the P10000 because of larger printhead





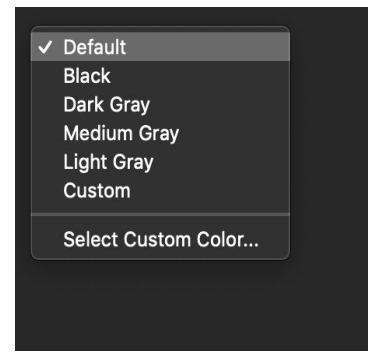
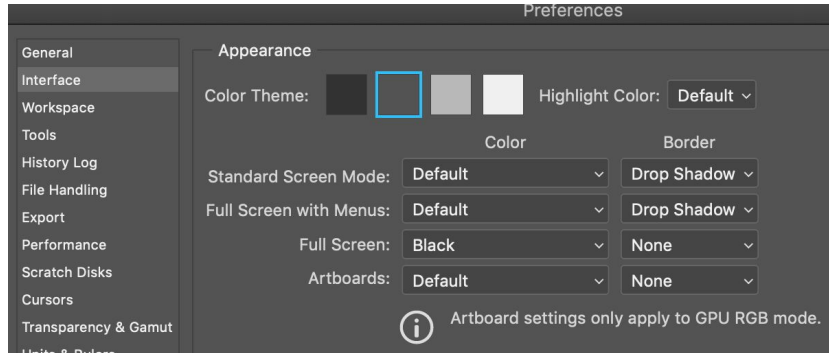
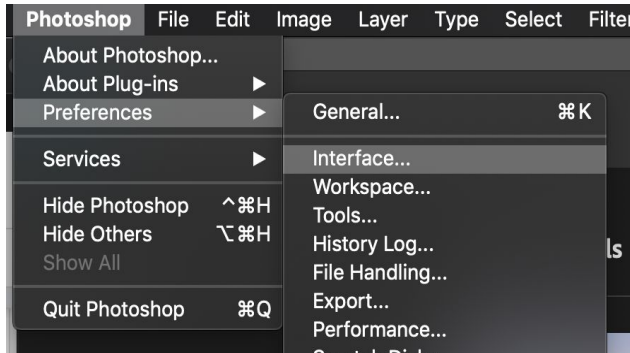
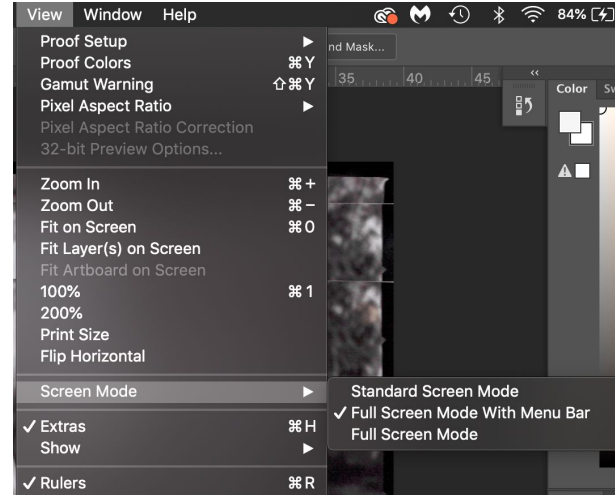
Workflow

Photoshop Interface:

Go to **View > Screen Mode**. From here you can switch from Standard Screen Mode, Full Screen Mode with Menu Bar, and Full Screen Mode. Switch your interface to Full Screen with Menu Bar.

Go to the **Photoshop tab > Preferences > Interface**. Here you can change your background colors. Try a few to see how changing from a black to white background shifts your perception of color and contrast. Most people prefer the dark gray. Your interface should be as neutral as possible.

Another way to change the background color on Photoshop is by left clicking or Control + Clicking on the background.



Photoshop Workflow: The best file possible

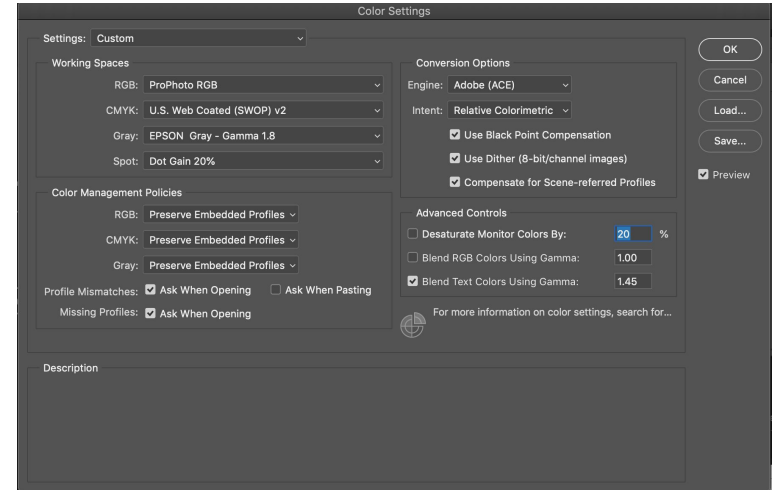
The printer is incapable of making decisions. It is imperative to maintain control of any decision you can rather than relying on the printer's automated decisions.

You want to maintain the most information in your file as possible. This will allow for flexibility later.

- Work in the **Pro Photo RGB** or **Adobe RGB** color space and with **16-bit files**.
- Create a workflow that minimizes the damage done to your file by using **Layers** whenever possible.
- Do not resample or resize your master file, instead make these changes to a duplicate file.

Photoshop Interface: Color Profile

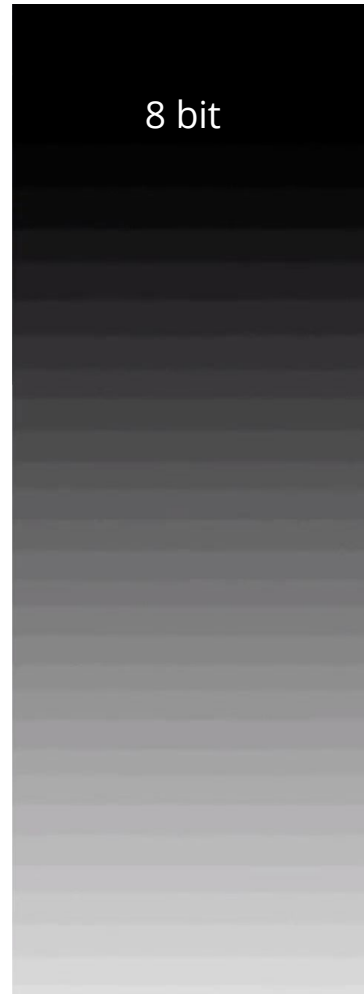
Next, go to **Edit > Color Settings** to set up a workspace and color profile. The color profile tells Photoshop how to think of colors. The default is sRGB; this became the default profile as it's a small enough space that all computer screens can see it—suitable, reliable sRGB. We can do better! We want to set up the most comprehensive color space possible. If you have shot RAW or scanned RAW, you have more color information. So the most extensive color space is **ProPhoto** and the runner up is **Adobe RGB 1998**. ProPhoto is colossal, boasting more warm and cool colors that any other space but well within the parameters of the inkjet tech. It's fine to move up to a larger color space. I would not recommend moving down to a smaller one as you will be losing colors.



Bit Depth

Bit depth is also significant to consider. Our gradient goes from pure black to pure white everything in-between those points is a shade of grey. The more bits the smoother the gradation will be. For example: an 8-bit grayscale image contains 256 shades of grey, while a 10-bit grayscale image has 1024 shades of gray. A two-bit jump yields four times the amount of information.

Let's keep this in mind when we are working in color. We are working with three channels of red, green and blue, and each has a bit depth. Bit Per Channel or (BPC) is how we talk about color. If an image contains 8 bit in the red channel, 8 bit in the green, and 8 bits in the blue, in total it will yield a 24-bit color image. 24 bit is the realm of jpegs and most video. However, when working in RAW, we have 14 BPC. This means 16,385 per channel, adding up to over 4 trillion shades!

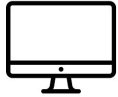


Color Management

ICC (International Color Consortium) profile provides devices with the attributes of a range of colors. When we calibrate a monitor, we are assigning an ICC profile to that computer. It is the way technology communicates color. ICC is also for mapping colors between devices. A profile will consider the different dynamic ranges between matte and luster paper, for example.



Input profiles describe the colors that are defined by the device you use to capture your image, like a camera or a scanner.

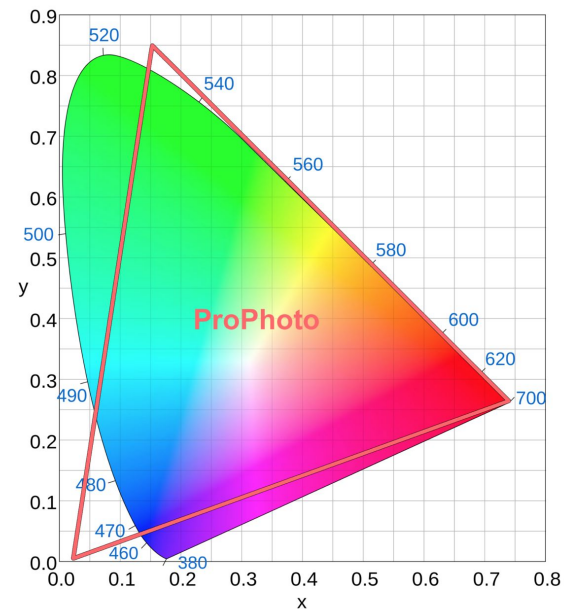
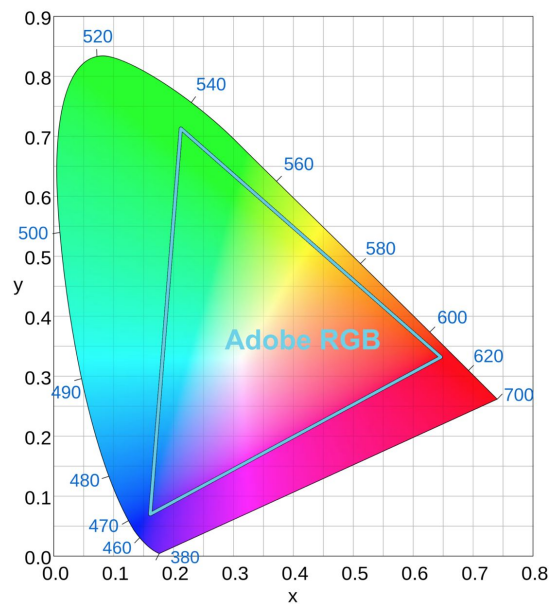
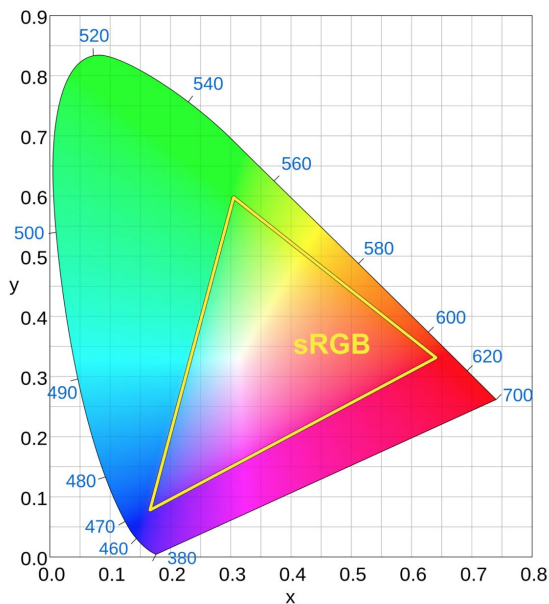


Display profiles describe the colors of your monitors.

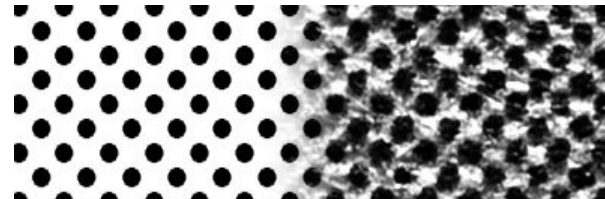


Output profiles describe the colors of your printer and paper combination.

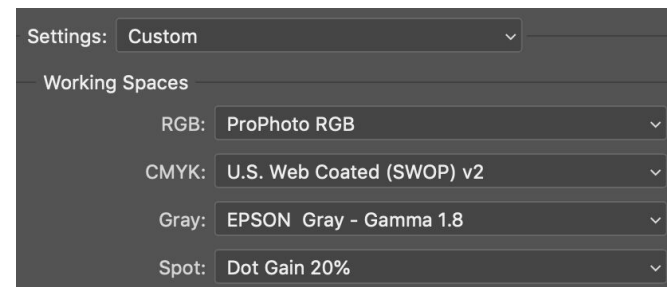
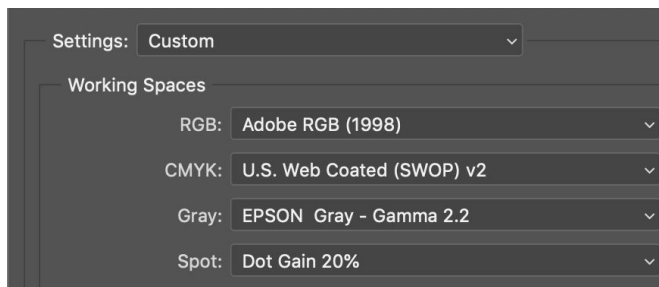
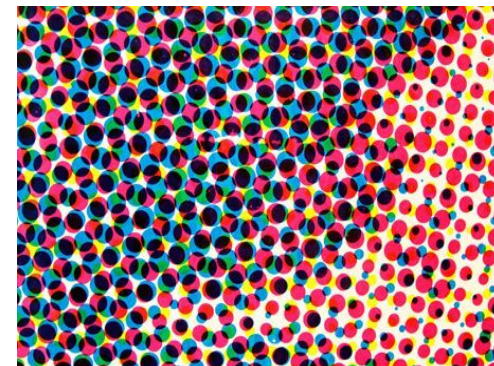
Photoshop Interface: Color Profile Comparison



Photoshop Interface: Dot Gain

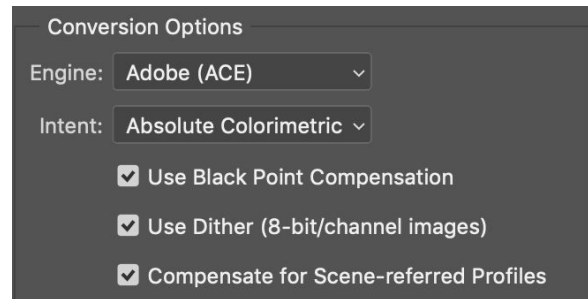
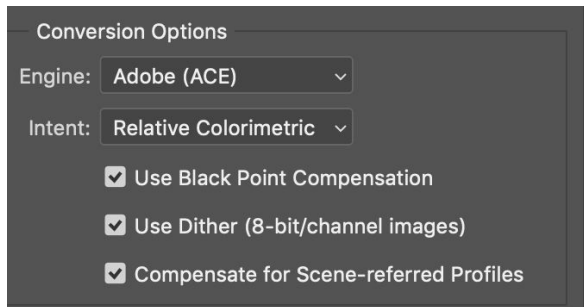


Dot gain is the amount of expansion any given ink will have on any given paper. Different inks, different paper, different dot gain. When using a laserjet or anything really that is not inkjet we pay attention to dot gain. The difference being other printing processes lay down ink like a pointillist painter -- think Ben Day dots. Inkjet is more like graffiti art -- similar to the fine mist of a spray paint can. Inkjet does have some dot gain, but it can be handled with print sharpening (more on this later). For inkjet we are more concerned about our curve response in regards to the white point of our color profile. When using ProPhoto, use **Gray gamma 1.8** for Adobe RGB 1998 use **Gray gamma 2.2**. This will set up your characteristic curve response ensuring that your tones will match better.

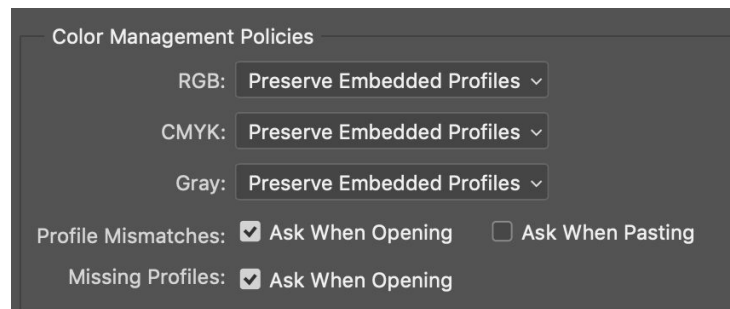


Photoshop Interface: Color Conversion

Under **Conversion Options**, set your **Intent** to **Relative Colorimetric** or **Absolute Colorimetric** (see the next slide on Color Management for details about both and how to make your decision).



Next, check boxes about **profile mismatches** so you are aware when images have colors that are outside of range.



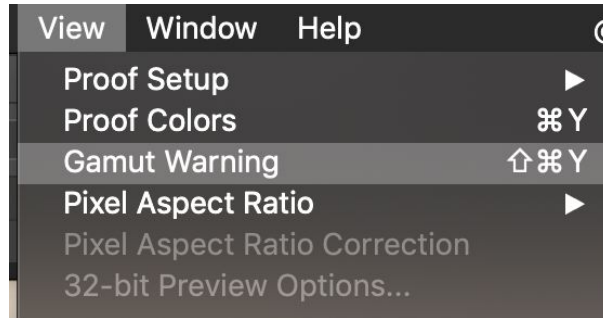
Color Management

Each profile has a **gamut**, which is the amount of color the device is able to represent. Sometimes our image has colors that are out of gamut, or out of the range of our device. **Rendering intents** are used to help deal with this situation, and tell our devices how to translate colors from one space to another. We have four options, but photography lives in only two of the four spaces. The others are for graphic design. You will have to choose what is right for your image between relative or perceptual. Neither is a magic bullet for your colors, and the decision is purely on a case by case basis.

Relative: a good place to start. When used, colors are shifted to the nearest reproducible color in the color space.

Perceptual: This will maintain the relationships of out of range colors by shifting in-range colors. Often you will sacrifice the true colors and luminosity with this option.

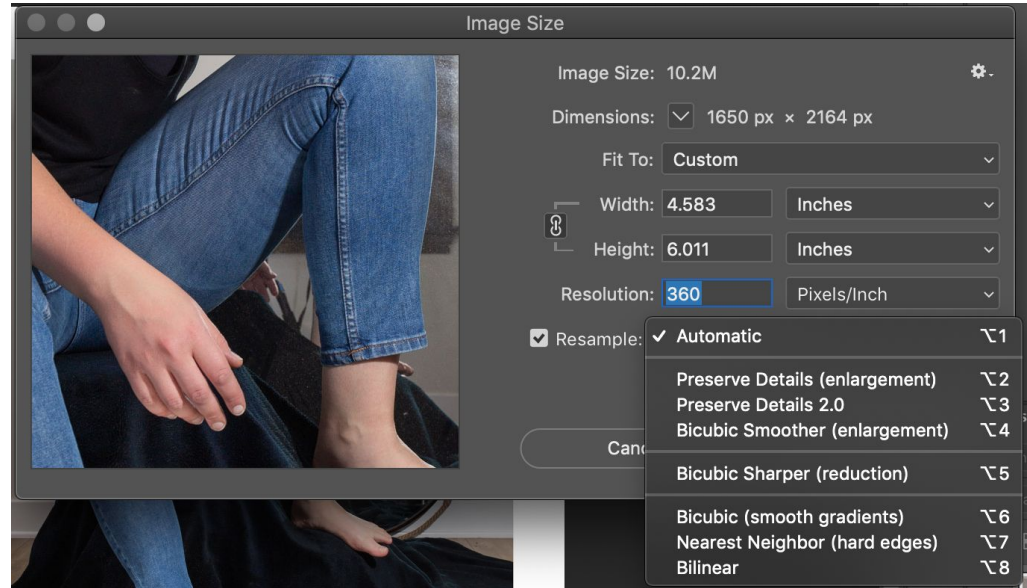
To turn on the **Gamut Warning**, go to **View > Gamut Warning**. Clicking will toggle the warning on and off.



Photoshop Workflow: Resolution

Epson printers have a native resolution of **360** or **720 DPI**. In an ideal world, you only send the printer a file of that resolution. If your image does not have this resolution at the size you wish, **resample** using Photoshop. Better to do the work in Photoshop manually than have the printer make a bad decision without you knowing.

If you are upsampling, try the **Bicubic Smoother**. If you are downsampling, try the **Bicubic Sharper**. Experiment with **Bicubic Automatic** or **Bicubic** if the effect is too strong.



Soft Proofing: What to look for

Every color consists of three fundamental elements to describe its physical characteristics:



- Hue is color.



- Saturation is intensity of color.



- Luminance is the brightness or darkness of the color.

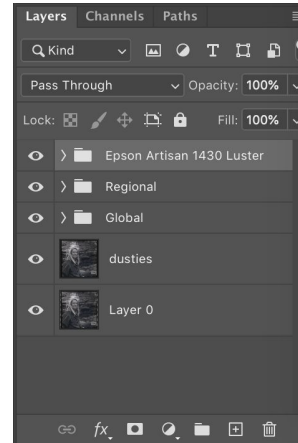
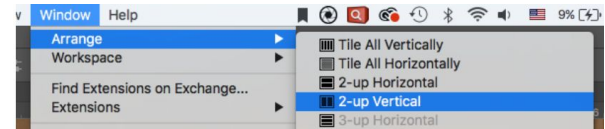
Saturation: If you see a change in the saturation of your image, try changing the rendering intent. Pay attention to how colors may shift between a relative and perceptual intent. You may also want to try using a Hue/Saturation adjustment layer.

Contrast: Typically you will see a decrease in contrast when printing, especially with matte papers. When you see this, try increasing the contrast of your image to help with the flatness that occurs from your paper choice. Try focusing your contrast adjustment on your midtones using a Curves or Levels adjustment layer.

Soft Proofing

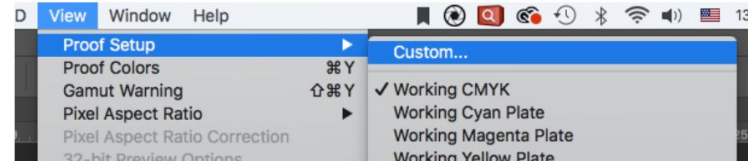
A soft proof is a preview that simulates on a screen how a final print will look, as opposed to a hard proof, or a physical test print. Soft proofing takes various settings into account when attempting to adjust the display, such as the paper and printer you are using. The screen will always show a wider range of colors than your device and material can, because of its backlit nature.

1. Go to **Image > Duplicate**.
2. View your images side by side using **Window > Arrange > 2-up Vertical**.
3. In the original file, create a **Layer Folder** and name it with the paper and printer you are printing with. Save all adjustments made while soft proofing here. If you ever print with this printer and paper combination again, you can refer back to your adjustments to make a print and save yourself extra work. If you want to print to another paper, you may just turn the layer folder off.

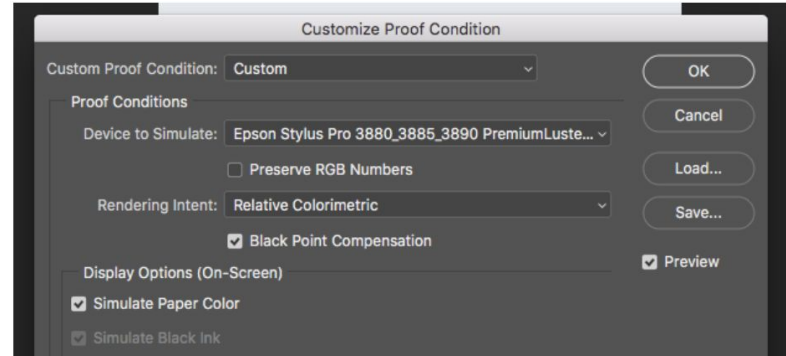


Soft Proofing

4. On your original file, go to **View > Proof Setup > Custom**.



5. In **Proof Conditions**, select the proper profile and printer you wish to use under **Device to Simulate**. Ensure Black Point Compensation, Preview and Simulate Paper Color are checked.



6. Adjust the soft proof file until it looks like the original file.

Output Sharpening

This type of sharpening is a must for prints. It is useful to offset any softness that might occur when ink is put on paper. It must be applied **at the very end** of the printing process, because the image must be at the final print size before applying sharpening.

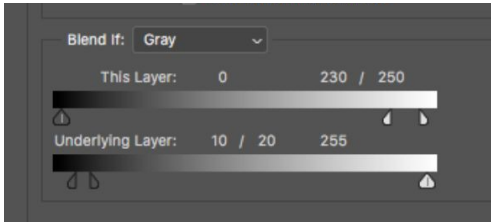
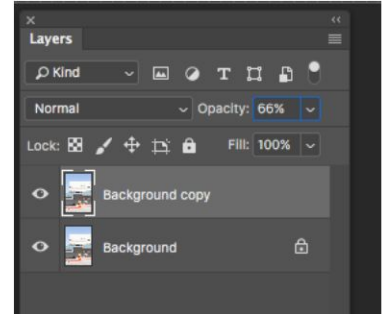
A main factor when considering what type of sharpening to apply is the type of paper you are using.

Often a combination of High Pass filtering, Unsharp Masking, Smart Sharpening is used to get desired results. Use these options to etch the edges in your image so that when printed, it looks the same on paper as it does on the screen.

Follow the steps on the following slide for an advanced sharpening technique that has many advantages over a straight Unsharp Mask application. The specific settings suggested will depend on your output (print vs web, size, surface) -- so you'll want to experiment a bit. As always with sharpening, use a light touch at first. It's best to judge from the actual print rather than the screen version.

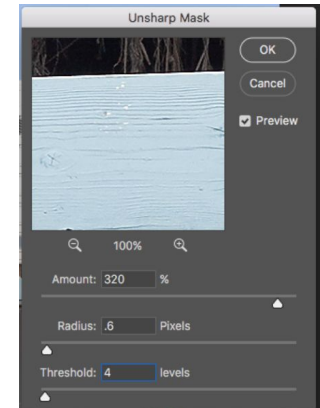
Output Sharpening

1. First, size the image and complete any other edits or local adjustments before sharpening.
2. Next, **duplicate** the background layer and set its **opacity to 66%**.



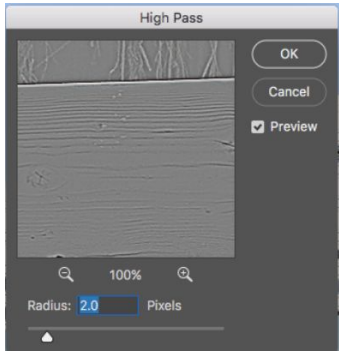
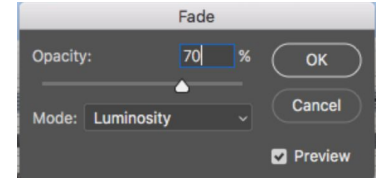
3. Open Layer Style options (by double-clicking) and set up the **Blending Options** as this image shows. Hold the Option key while dragging to split the sliders as pictured. This spreads the tolerance, resulting in subtler transitions.

4. Apply the **Unsharp Mask** filter using an amount of 320, Radius of 0.6 and Threshold of 4. Again, you may have to tweak these based on your image.



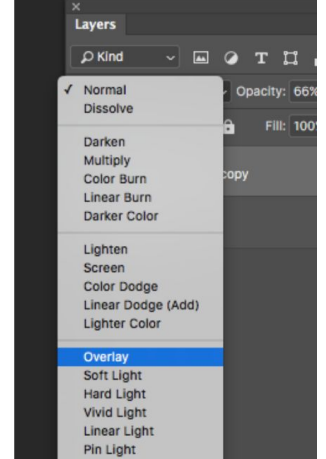
Output Sharpening

5. Then go to **Edit > Fade** and change the blend mode to Luminosity and reduce the opacity to 70%.



7. Go to **Filter > Other > High Pass filter** and apply a radius of 2 pixels.

7. Finally, change the **Layer blend mode** from Normal to Overlay.



Output Sharpening



Before



After