Printing Basics

Steve Daly
steven.s.daly@gmail.com
www.stevendaly.com

Rules to make your prints better (and life a little bit more lovely):

1. **Expose** your photos well.

2. **Don't fear the Photoshop** - You can always undo (**command-z**), and you can always start over or go back to your last saved version. But don't be afraid to try something.

3. With Photoshop, the question isn't, Can I do it? The question is, **How do I do it**?

4. Whatever it is, **someone else has already thought of it** ... Google, Adobe Help and YouTube are your friends.

5. True freedom = **Learning keyboard shortcuts**.

RAW FILES

The difference between this type of file and all others is a RAW file is unprocessed. It hasn't been assigned a colour space, a size and resolution, and bit depth - all of these choices are up to you. Other people like working in the RAW dialog, but I prefer working in layers in Photoshop because you can go back and change things.

BUT there are a few things I do in RAW:

*White balance

*Exposure

*If highlights or blacks are crushed or clipped, try to adjust for that in the RAW dialog, because RAW is where you can best pull in detail the camera has captured.

This is where the histogram comes in.

What's a histogram? It is a visual representation, from black to white - and dark to light - of the tonal representation of an image, which is an interesting thing to consider, but for our purposes what we particularly care about is what it looks like at each end. Typically (though not always) **you want your histogram to taper off at each edge** - your white point on the right and your black point on the left:
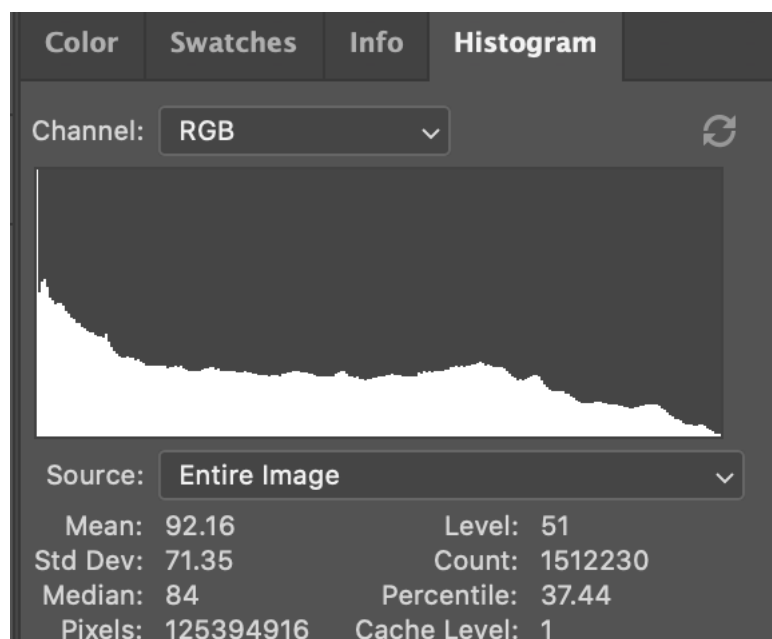
Here's an example of a histogram with perfect black and white points:
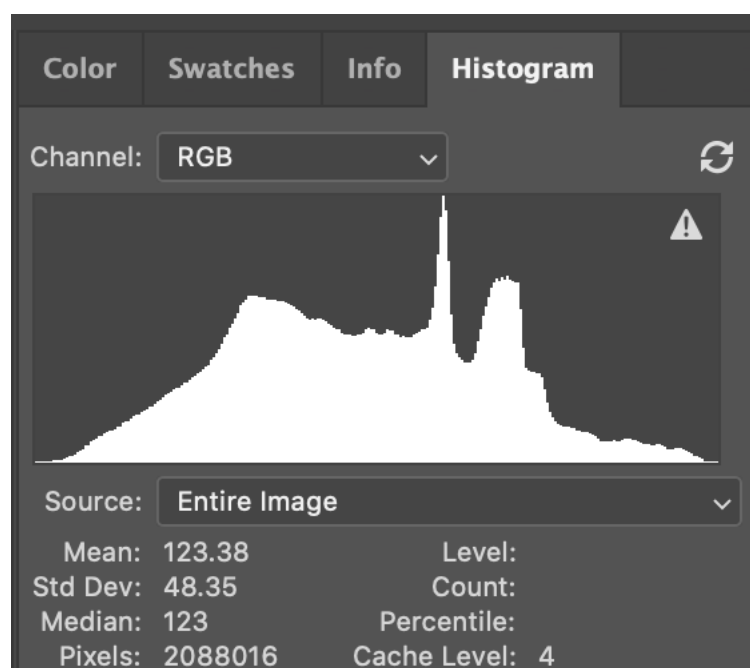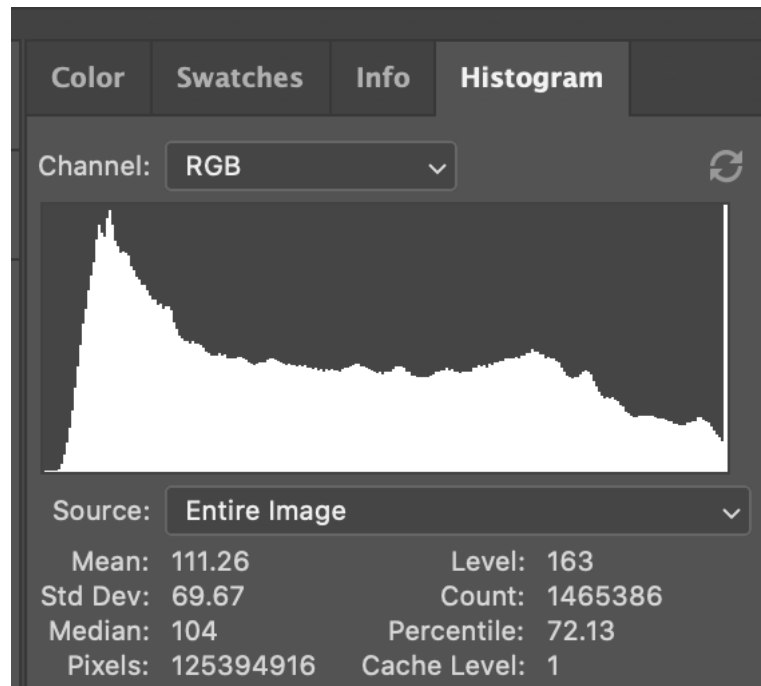
Here's another:
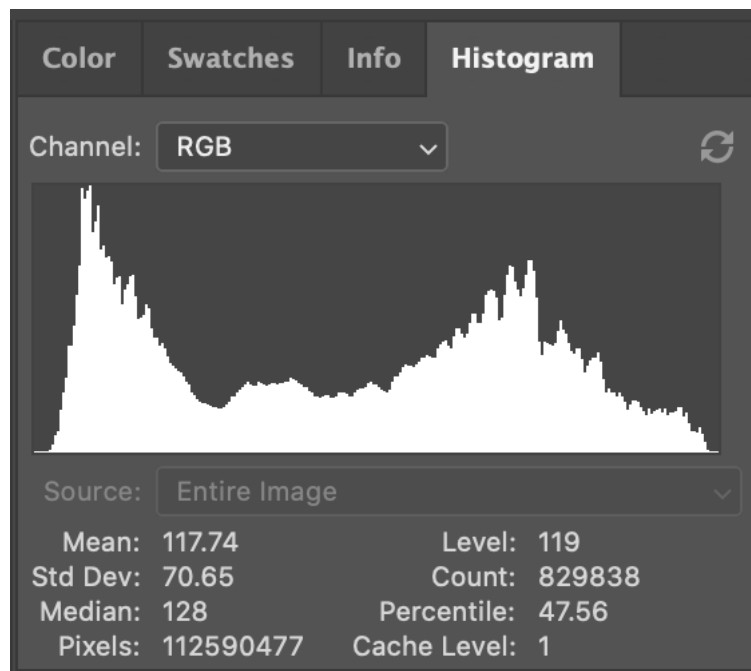
If your **shadows are crushed** on the left side, essentially you've underexposed in some areas of your image. What happens is you lose all detail and sense of depth in your blacks. What happens from a pigment standpoint is you're laying down solid black in your black areas:

If your highlights are **clipped** on the right side, you've overexposed in some areas of your image. What happens is there's literally nothing in those areas. From a pigment standpoint, you're not laying any ink down in those places, so what you get is an effect called bronzing that can also be visually unpleasant.

| Color | Swatches | Info | **Histogram** |

Channel: RGB

Source: Entire Image

Mean:	111.26	Level:	163
Std Dev:	69.67	Count:	1465386
Median:	104	Percentile:	72.13
Pixels:	125394916	Cache Level:	1

So what we try to do in RAW is address these issues as best we can *before* we process our file.* Use the highlights and whites sliders to try to recover overexposed areas. * Use the shadows and blacks sliders to reveal underexposed areas.

Auto   Default

Exposure	0.00
Contrast	0
Highlights	0
Shadows	0
Whites	0
Blacks	0

One last thing to do RAW, but which you only need to do once, is click on this super-obvious bit at the bottom of the screen:

Adobe RGB (1998); 16 bit; 11903 by 9459 (113MP); 300 ppi

These are your ideal settings:

Adobe RGB (1998) & 300 PPI & 16-bit at the native size of your digital image. Then click open.

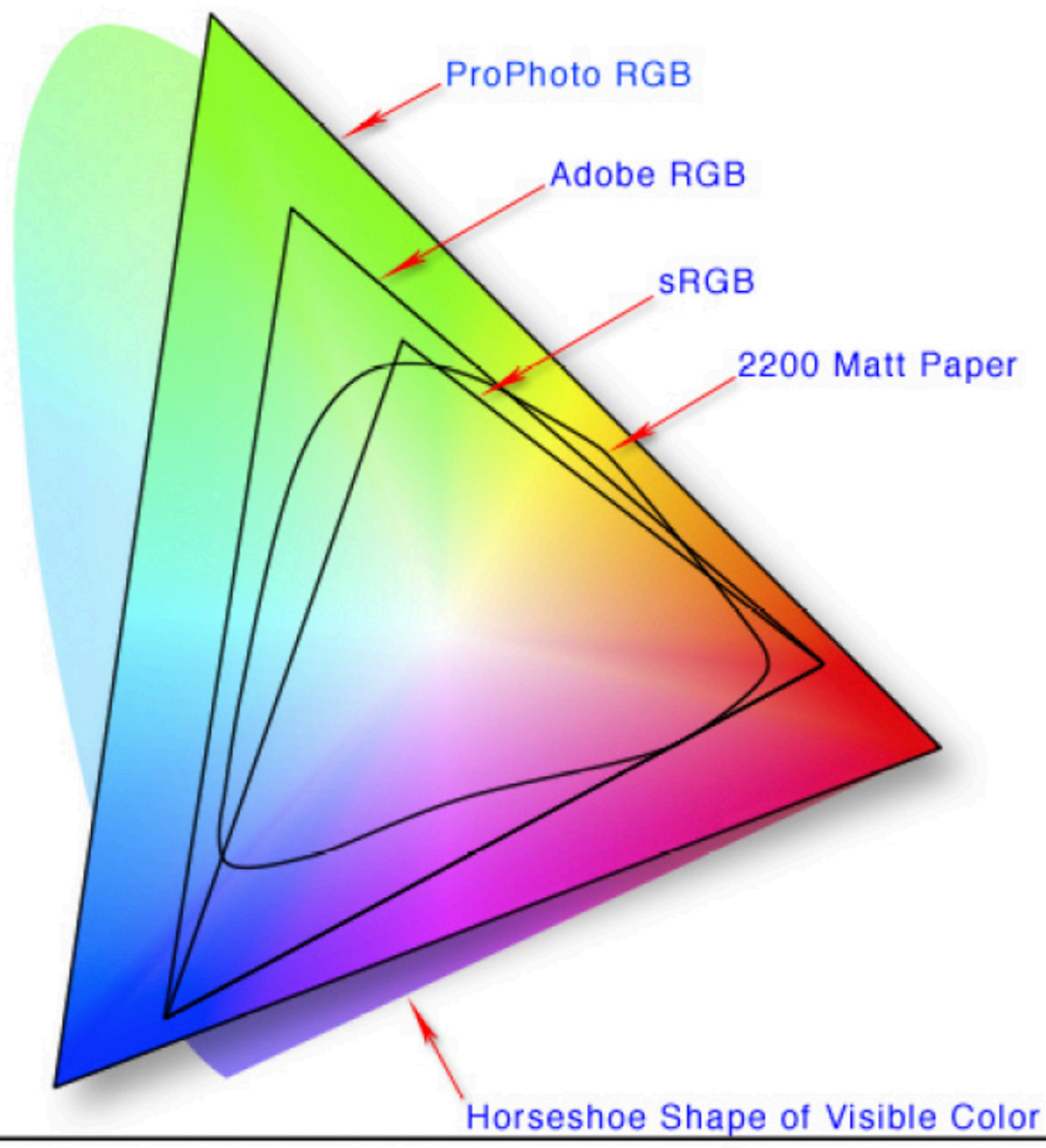## COLOUR SPACES

AdobeRGB1998 = Printer's colour space

sRGB = Web colour space

AdobeRGB1998 = Larger colour space

sRGB = Smaller colour space

Edit images in AdobeRGB1998

Print images in AdobeRGB1998

ProPhoto RGB

Adobe RGB

sRGB

2200 Matt Paper

Horseshoe Shape of Visible Color

The reason we use AdobeRGB1998 as a printer's colour space is because it is the colour space that is closest to (a) what a printer can print, and (b) what you can see on a monitor.

Here's how to ensure you know what colour space you're in:

Edit > Color Settings
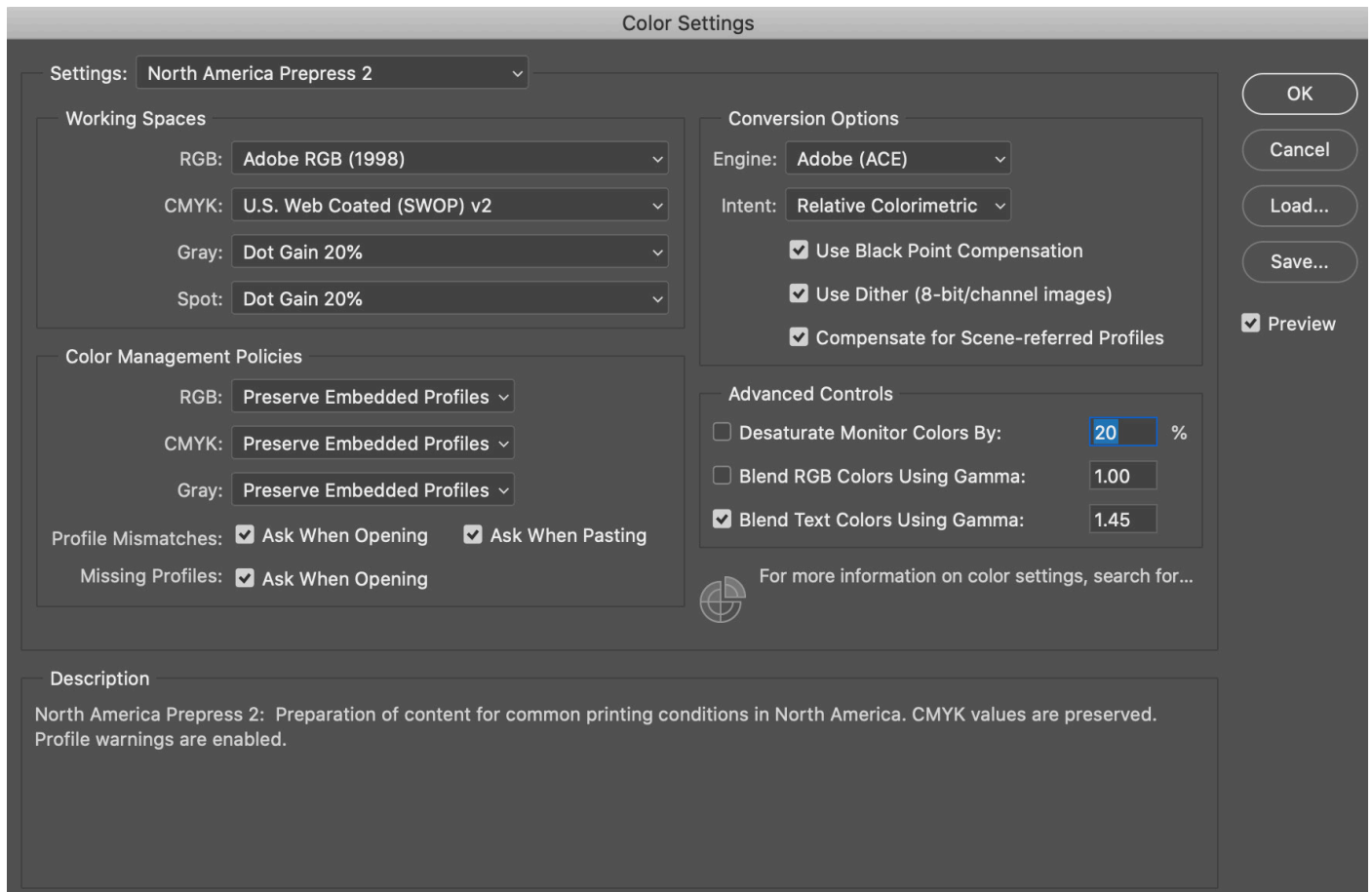
With these settings chosen, whenever you open a file that isn't in Adobe 1998, you get a warning, so you always know what colour space you're image is in.
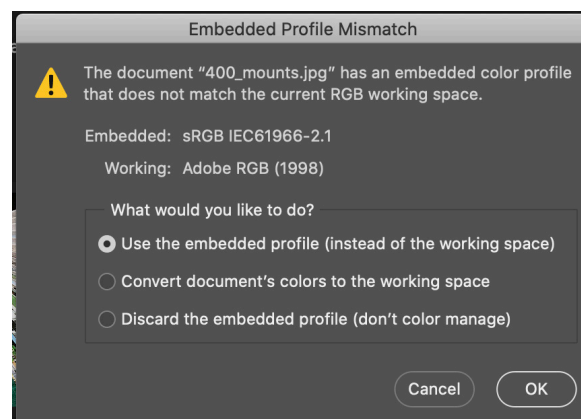
Convert images to sRGB for the web …. If you do not take this step when posting images to the web, your images will look flat.

IMPORTANT CONCEPT

Once you have converted your colour space from AdobeRGB1998 to sRGB, i.e., gone from bigger to smaller, you cannot convert back because you cannot regain what you have lost moving from a larger-gamut space to a smaller-gamut space.

You can still print in sRGB, and lots of people do, and that's what you should do if you have, say, an iPhone picture that was photographed in sRGB - converting it to AdobeRGB1998 will just make your image look dull.

You may have heard of a colour space called **ProPhoto - DON'T USE IT** - Monitors can't see it, printers can't print it.

BIT DEPTH

If your file is 8-bit, your image contains 256 lines of tone, from black to white, per colour channel. If your file is 16-bit, there are 65,000 lines of tone. A 16-bit file is twice the size of an 8-bit file.

If you have the disk space and a bit of patience, 16-bit files are better than 8-bit files. A 16-bit file can be pushed around and manipulated much more than an 8-bit file. However, in most cases, if 8-bit is what you have available, it will print fine.

Much is gained by processing, editing, and printing in 16-bit. Nothing is gained by converting an 8-bit file to a 16-bit file. All you get is a bigger file.

FILE TYPES

There are a few others, but mainly we come across three file types:

TIF

PSD

JPG

A **TIF** and a **PSD** are essentially the same thing - high quality formats that accomplish two key things: 1) They measure each pixel in your image individually, 2) You can save the file with open layers.

The way a **JPG** works is it compresses information. In the compression process, it loses data. As it relates to an image, this equates to a loss in subtle shifts and nuance of colour and tone, and it can also result in digital artifacts.

The advantage to a JPG is it's portable. That's why the internet likes it. The problem with it is once you've converted your file from TIF (or PSD) to JPG, you can't get that data back.

To sum up:

*Use TIF/PSD for editing and printing.

*Convert to JPG for sharing on the web *reduce resolution to 72 ppi and convert to sRGB*

IMAGE RESOLUTION

Command-option I opens the image size dialog:
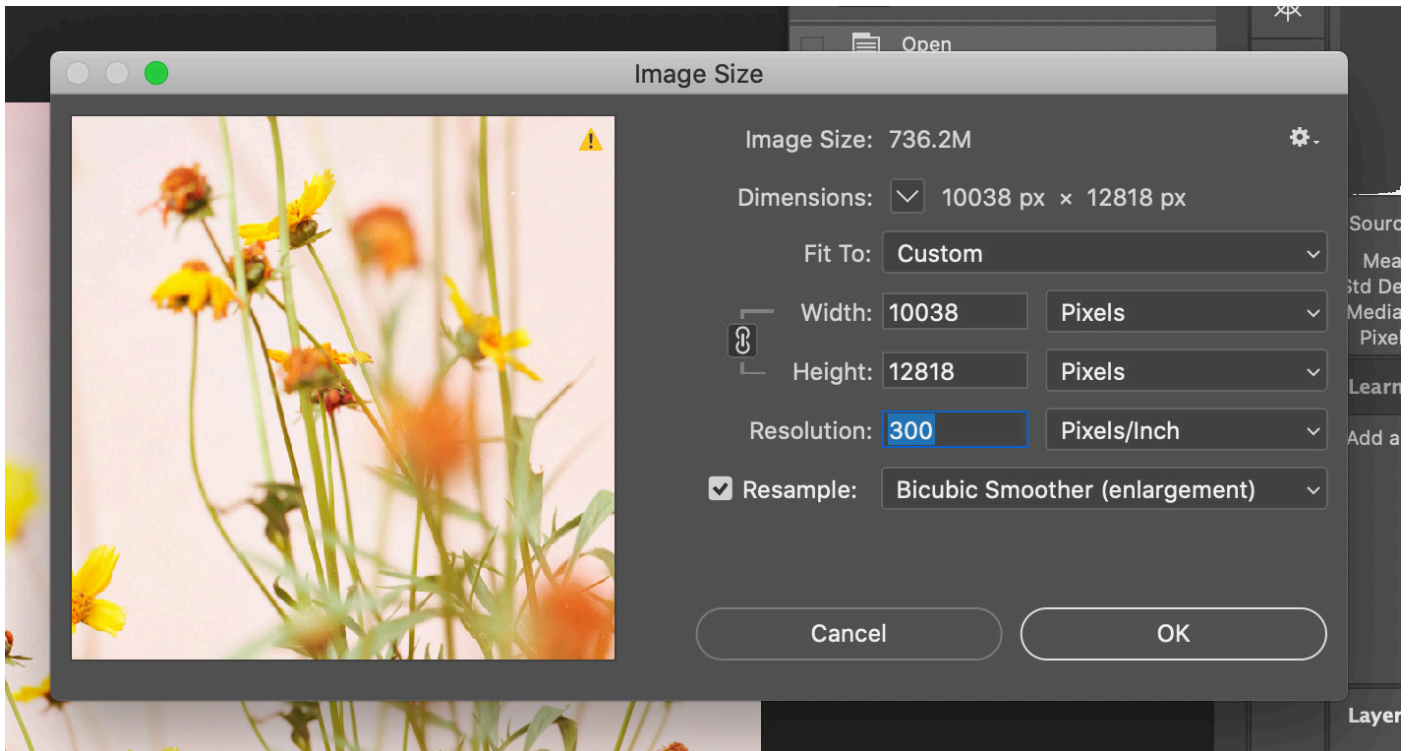
Ideal printer's resolution = 300 ppi

Minimum printer's resolution = 180 ppi

*You can print at a lower resolution, but I don't recommend it.

How does image resolution work? The resolution of an image is easiest to describe in pixels. If, for example, you decrease your resolution from 300 ppi to 180 ppi, but maintain the same number of pixels in the image, the you see two things happen: 1) The total size of the file in MBs is unchanged. 2) The size of the image becomes greater, actually it almost doubles in size … without changing the basic composition of the file!

Somewhere along the lines, you've probably been told you can't up-res, or you need a special application to do it, and even then it's a very dicey proposition. That's old news.

Photoshop's image size algorithms have become very good at adding resolution.

Contrary to conventional wisdom, you can up-res, and people do it all the time.

However: when you add resolution to an image, you are telling Photoshop to invent information. Thus, **the quality of the result is going to be dependent upon the quality of the source image**. How good is the camera? How good is the lens? How well is the photograph exposed?

The only way to really determine how much you can increase the size of your image is to experiment.

When changing resolution, but not increasing or decreasing the total number of pixels, choose:

Bicubic (smooth gradients)

When increasing image size, choose:

Bicubic Smoother (enlargement)

When decreasing image size, choose:

Bicubic Sharper (reduction)
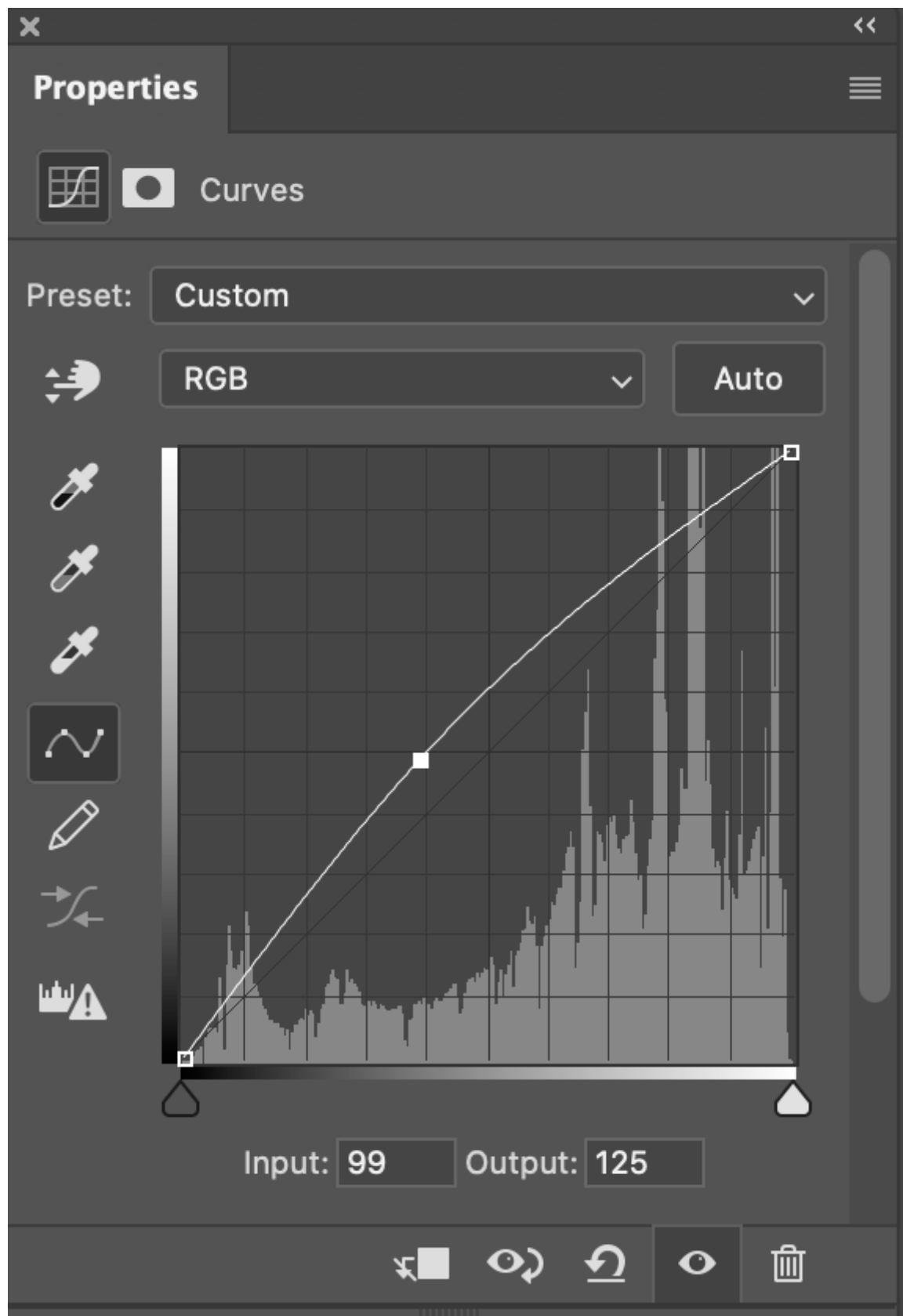
BASIC PHOTOSHOP WORKFLOW

1. Levels

Levels sets the black point and white point of your image. You can use the Curves adjustment layer to set your levels, or the Levels adjustment layer. You have three colour channels, so you want to set levels for each channel individually. Use the option key in conjunction with your slider to see where the black point and white point is for each colour channel.
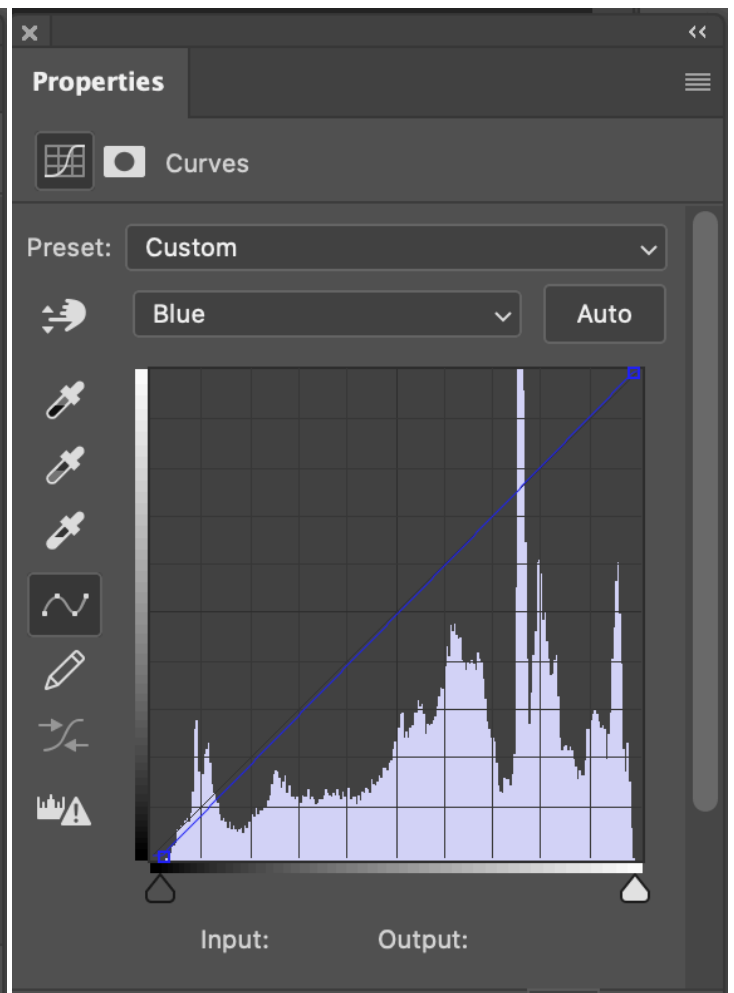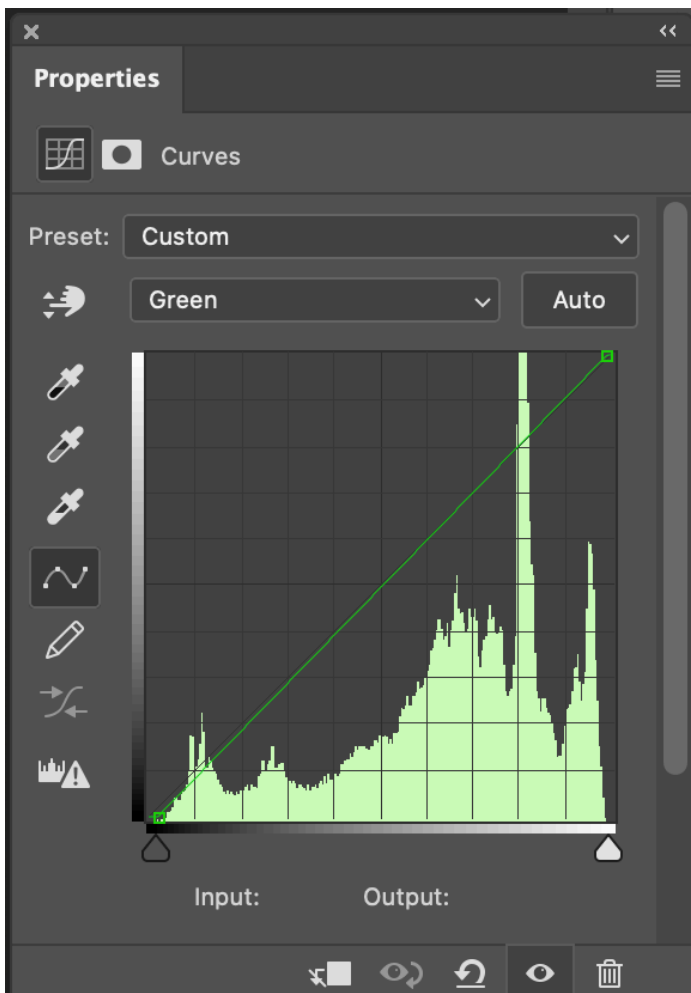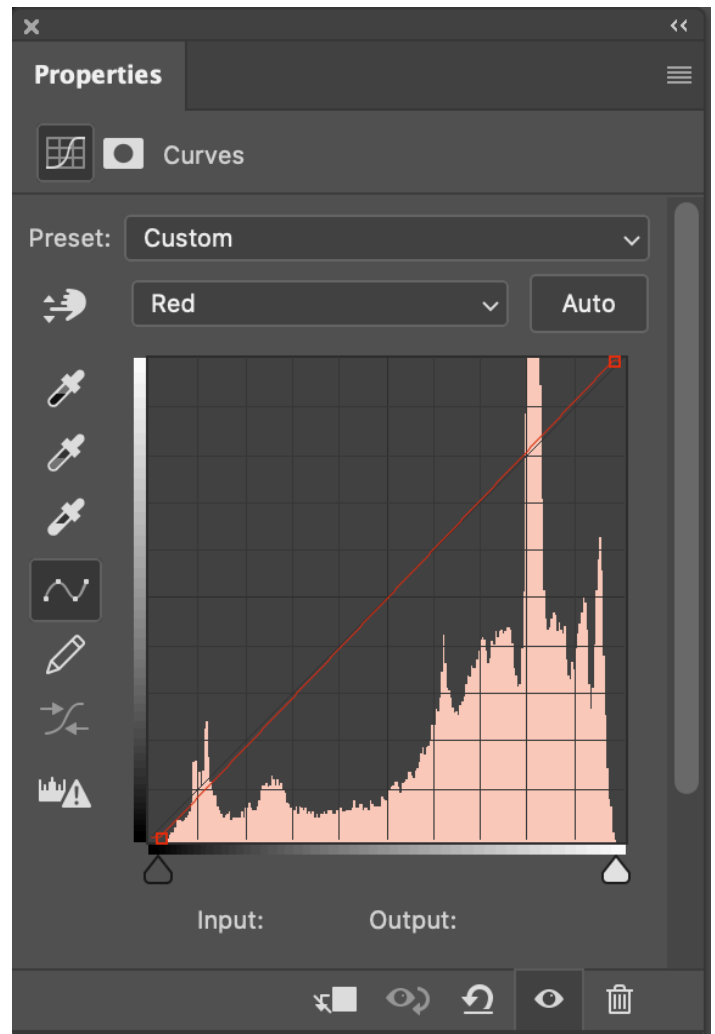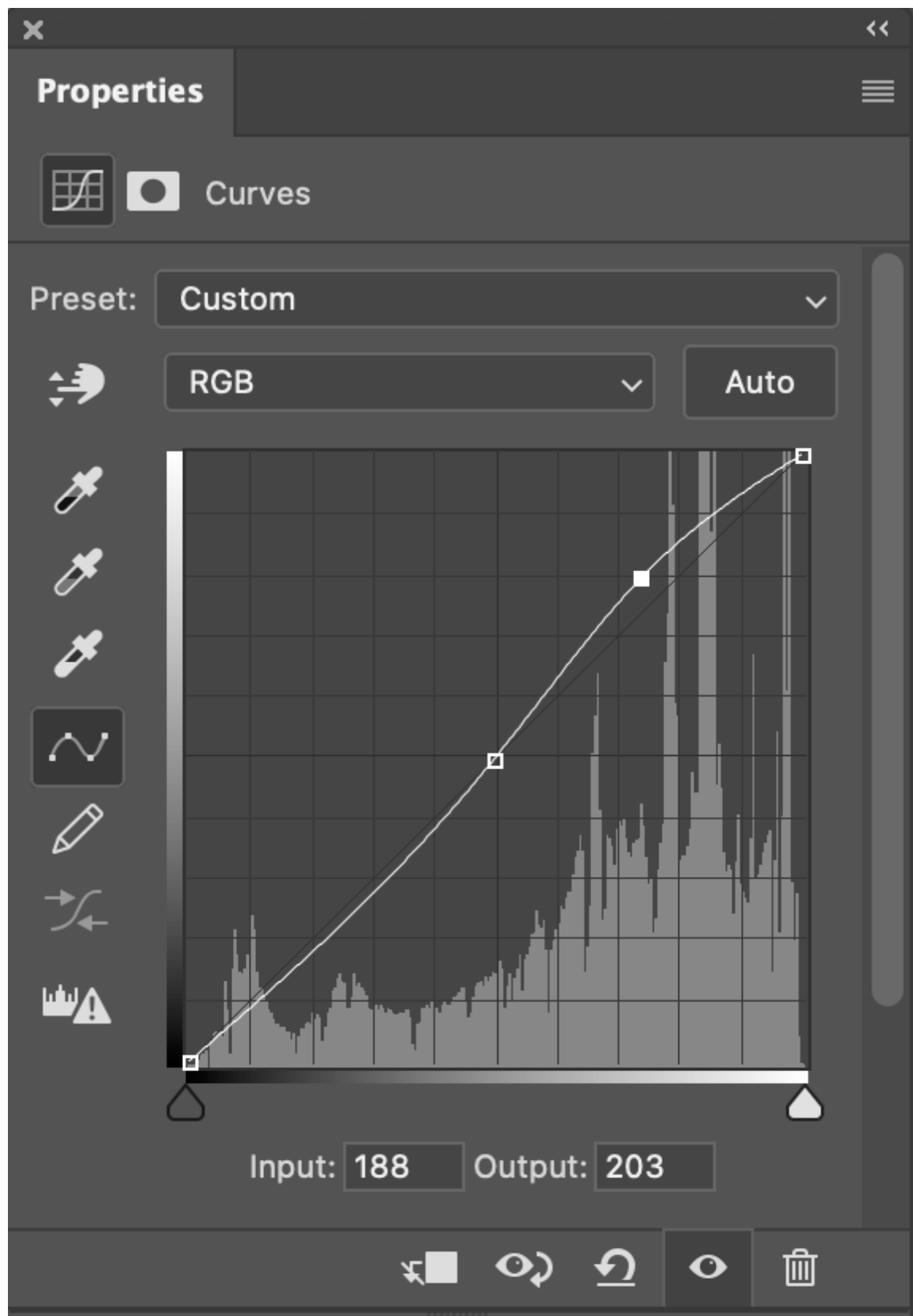
Here's a more dramatic example of a three-channel levels adjustment, where the red, green and blue highlights are in substantially different places:
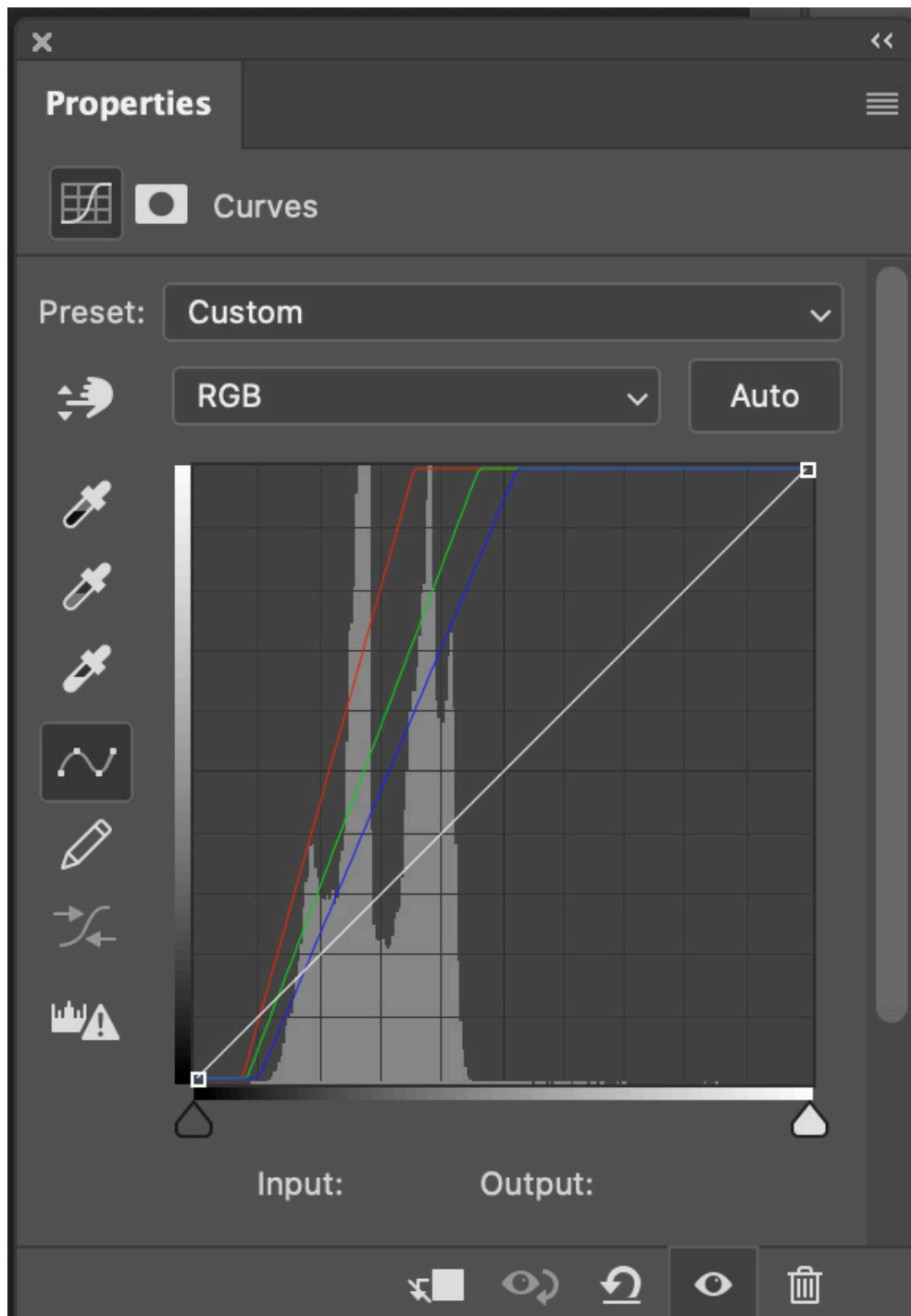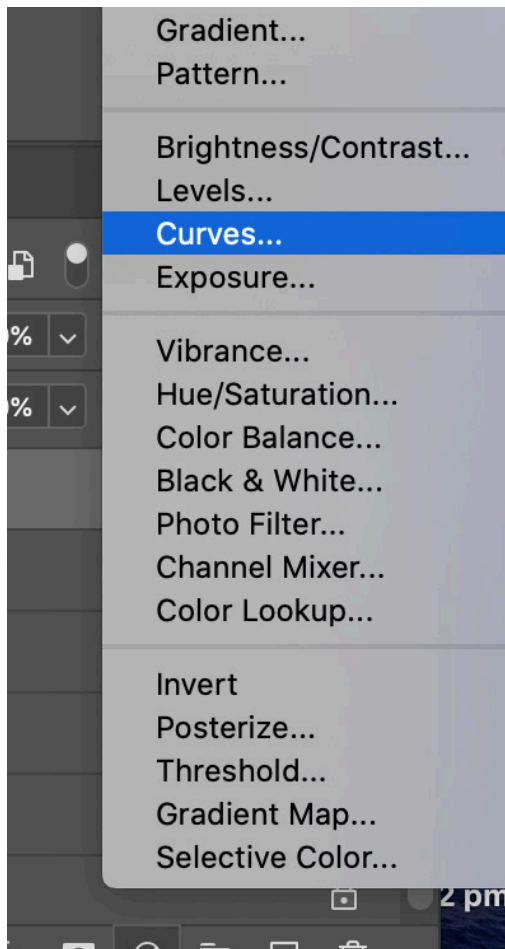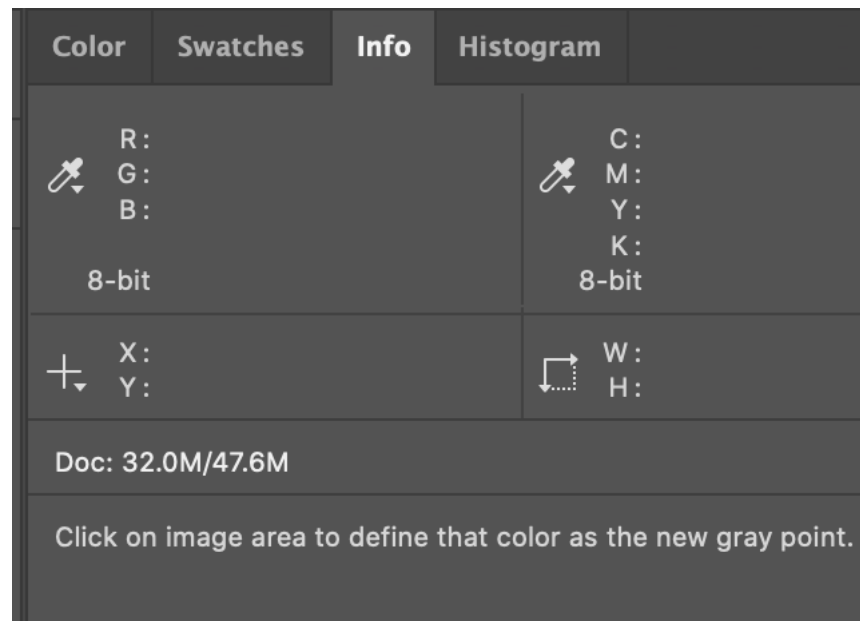
2. Midtones

3. Contrast

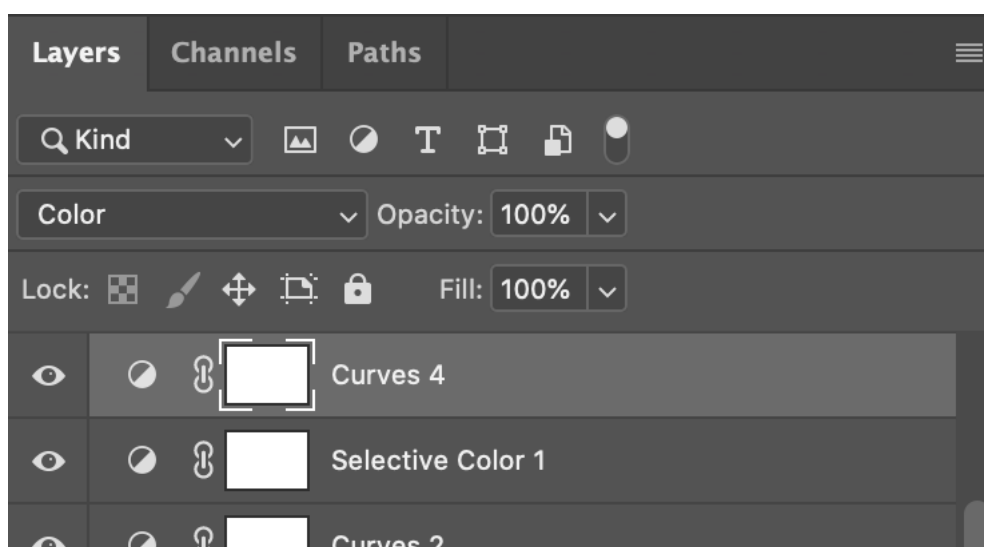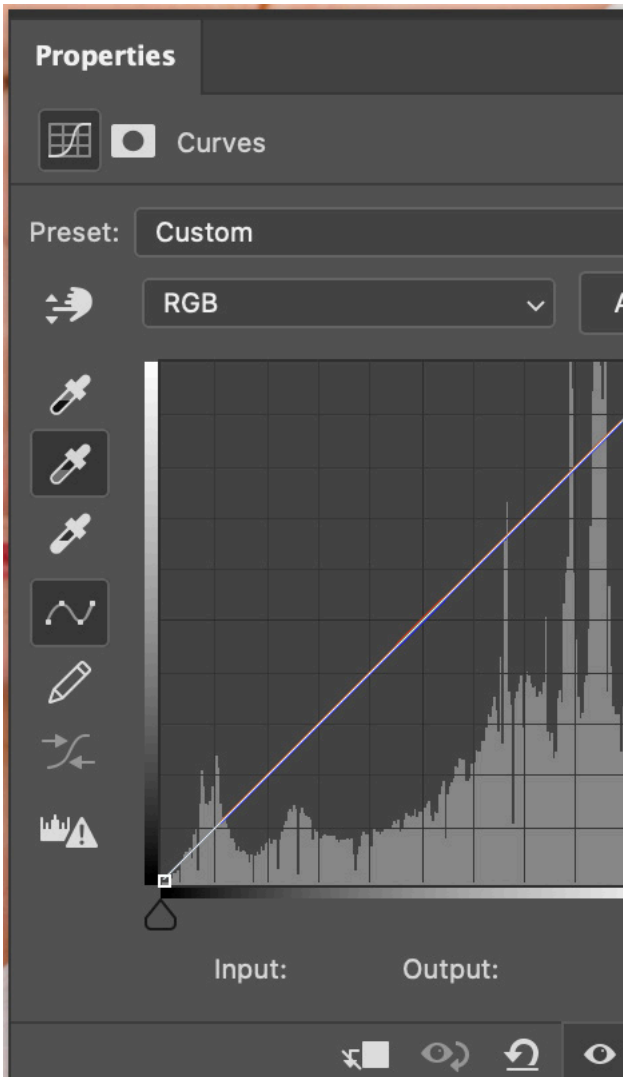## 4. Colour

Open a curves layer.   Click on or Info pallet (Window > Info).

Gradient...
Pattern...

Brightness/Contrast...
Levels...
Curves...
Exposure...

Vibrance...
Hue/Saturation...
Color Balance...
Black & White...
Photo Filter...
Channel Mixer...
Color Lookup...

Invert
Posterize...
Threshold...
Gradient Map...
Selective Color...

| Color | Swatches | **Info** | Histogram |

R:
G:
B:

C:
M:
Y:
K:

8-bit

8-bit

X:
Y:

W:
H:

Doc: 32.0M/47.6M

Click on image area to define that color as the new gray point.

Set the blending mode to **Color**.

| **Layers** | **Channels** | **Paths** |

Q Kind

Color   Opacity: 100%

Lock: Fill: 100%

Curves 4

Selective Color 1

Curves 2

Click the middle eyedropper button on the curves pallet

Set the sample size to 11x11 average (or 5 x 5 if you're sampling a smaller area)
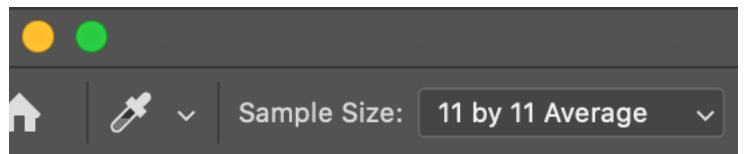
Use your mouse pointer, which is now an eyedropper tool to hover over your image. What you are trying to do is neutralise the image, and get rid of colour casts. So you're looking for a sample of middle grey, which is often expressed as a an area of white that's in shadow.

Look at your Info pallet: since your tonal range is 0 to 255, black-to-white, you're looking for something where the values are about 125 +/- 50. Find a good spot, click on it, and see what happens.

Once you've clicked on the grey you're neutralising, you'll see the colour shift. Sometimes it's perfect, sometimes it needs a bit of fine tuning, sometimes it's whack and way off, and you have to adjust the colour completely by hand. Start by looking at your reds. Are they too red or too cyan? Too green or too magenta? Too blue or too yellow? Colour balancing is as much art as it is science, and sometimes it takes a bit of trial-and-error.

Go into each colour channel individually to
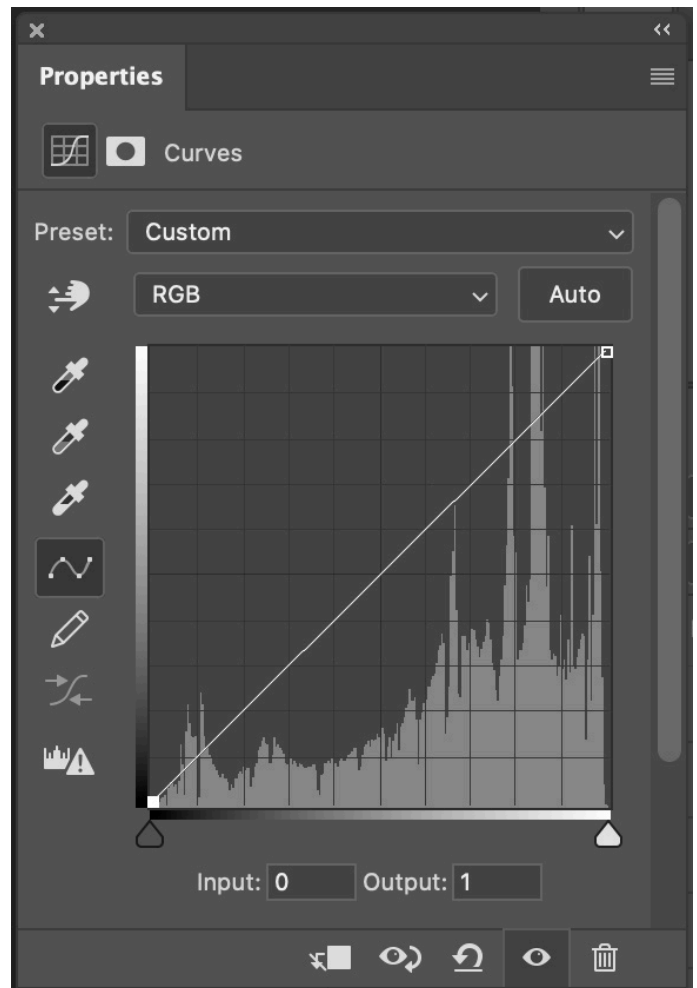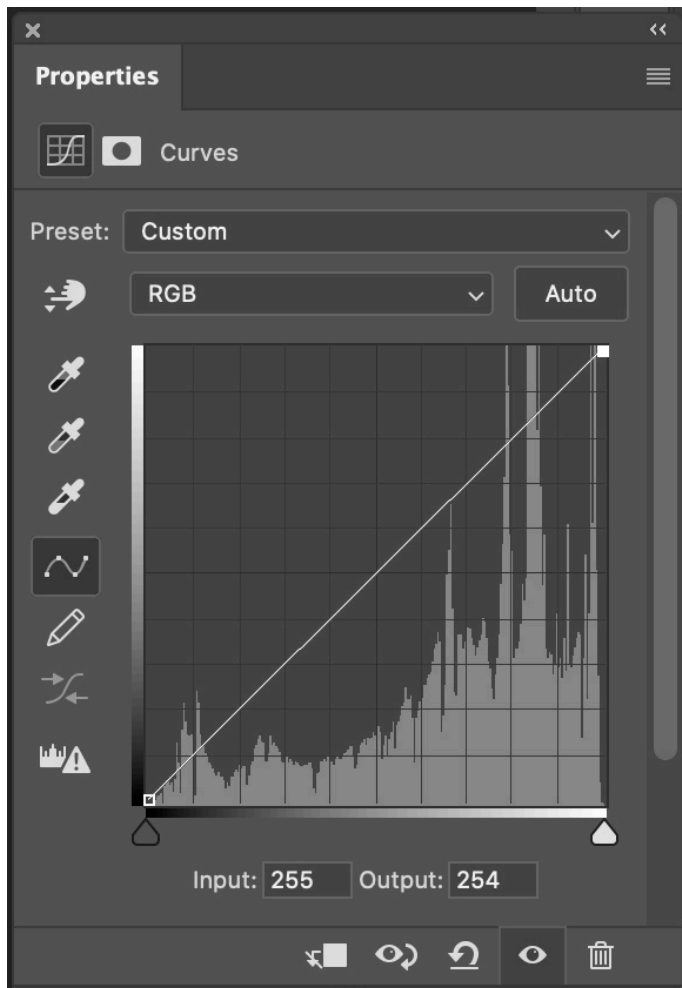complete balancing by hand.
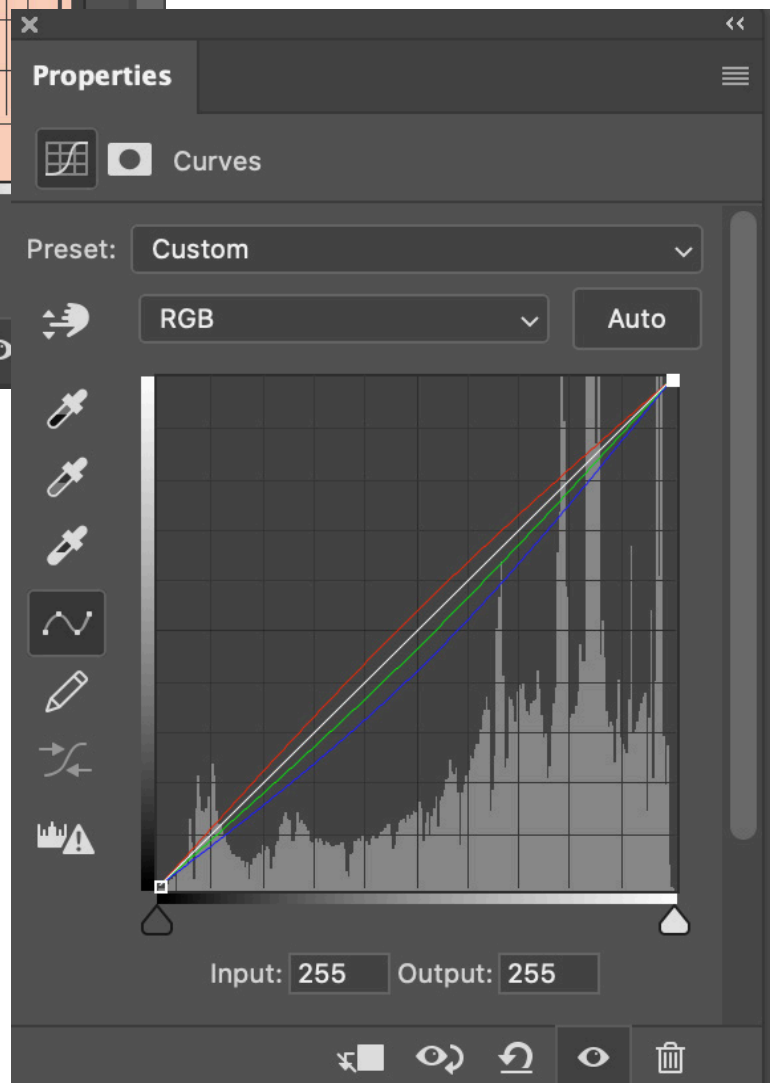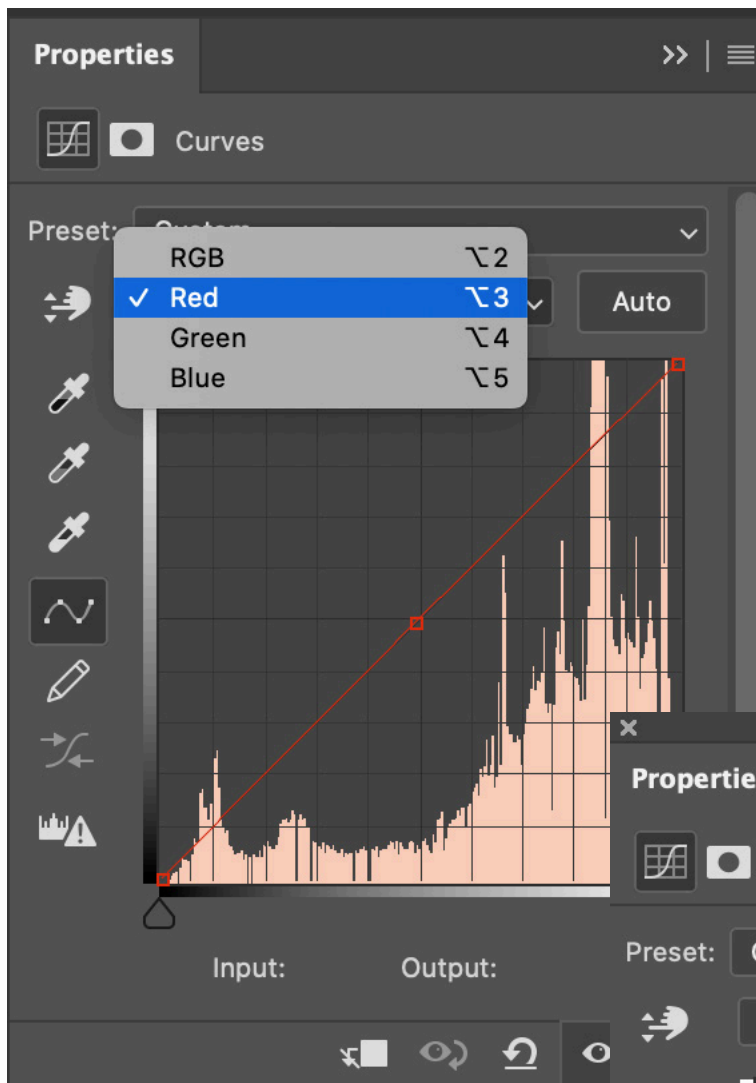
5. Saturation
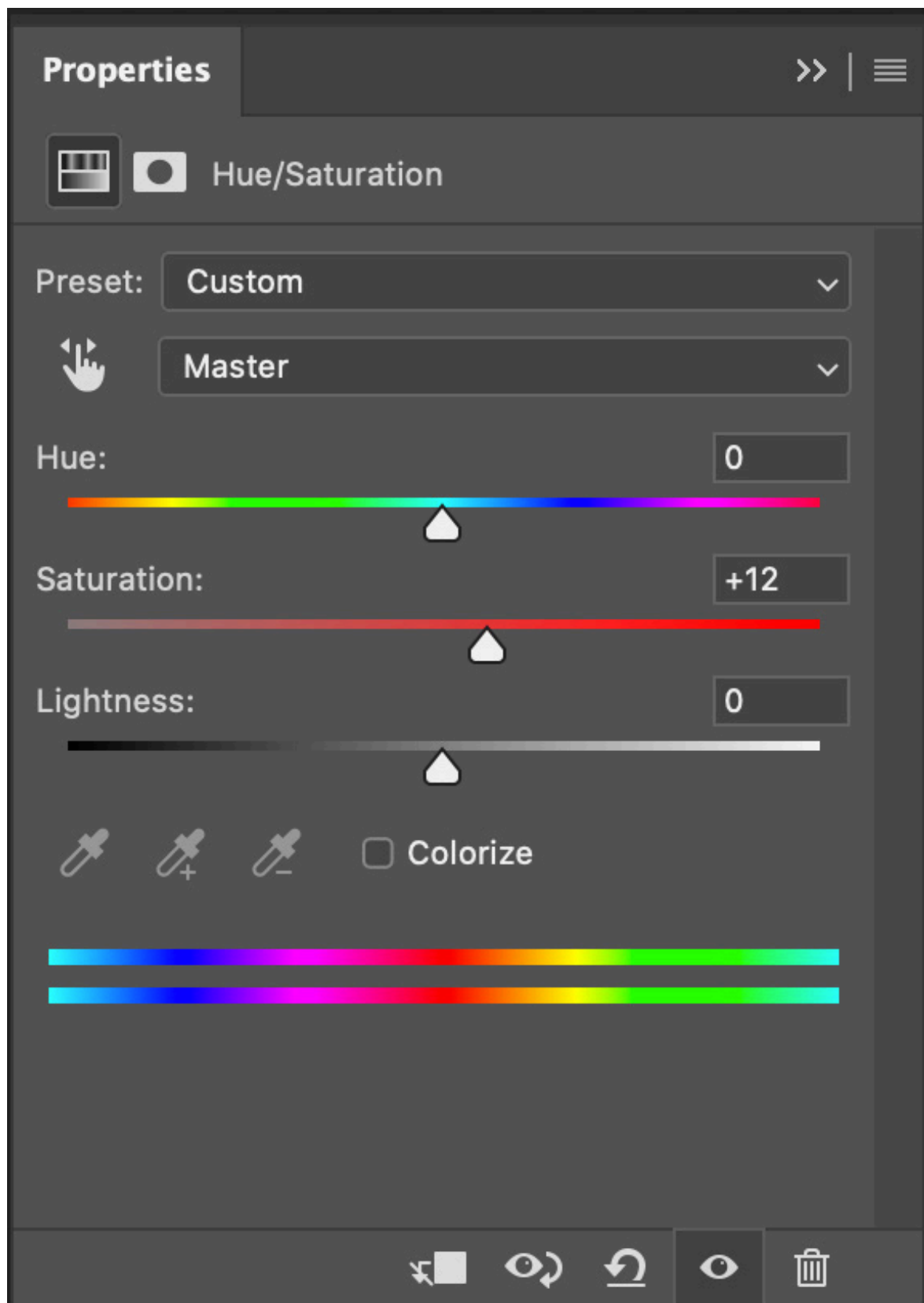
# 5. Output Levels (if necessary)

Note the numbers in the output boxes at the lower right of each box. What we're doing here is squeezing the tonal range - only slightly - to ensure good ink coverage and tonal depth.

This is only necessary when your blacks are crushed, or your highlights are clipped. Otherwise, skip this step.
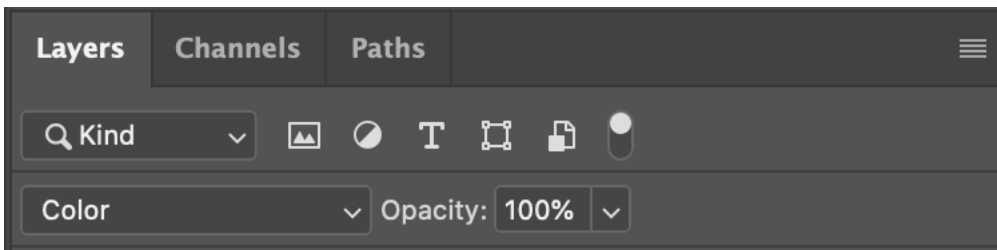
Blending Modes

For adjusting tones and contrast, use **Luminosity**. This is particularly important if you have already colour corrected.
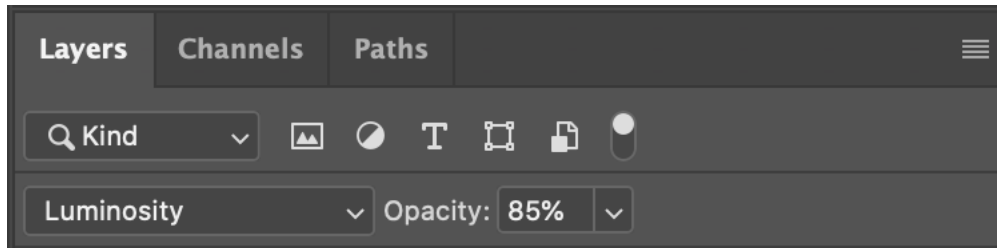
For adjusting colour, use **Color**

For adjusting saturation, use **Saturation**