

# Resizing Images in Photoshop



Dr Roy Killen, EFIAP, GMPSA, GMAPS, APSEM

# Resizing Images in Photoshop CC

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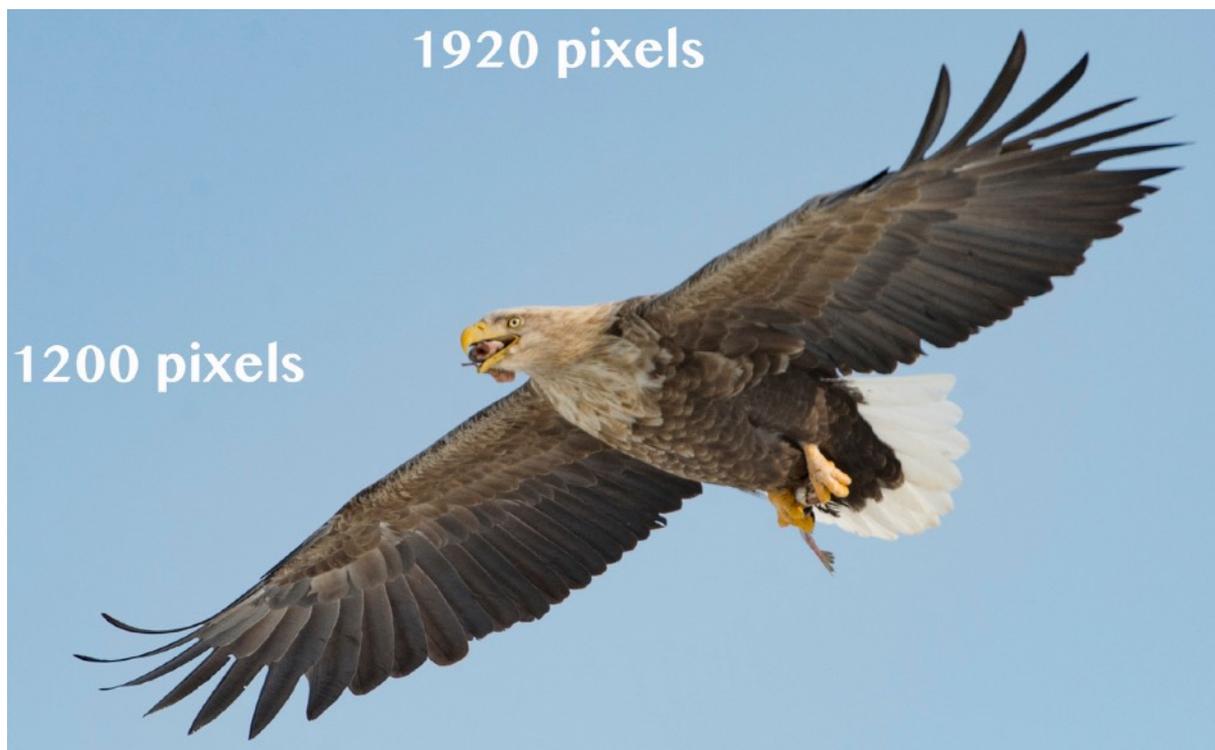
These notes assume that you want to produce an image that fits the following size requirements:

Maximum pixels dimensions 1920 x 1200

Maximum file size 2MB.

These are the size limits for files submitted to digital image competitions for Belmont 16s Photography Club and competitions such as the Lake Macquarie National Exhibition of Digital Photography. However, the procedures described here can be adapted to produce images of any size.

The first thing to understand is that the maximum pixel dimensions of 1920 x1200 means that the image must fit within a rectangle that is no more than 1920 pixels wide and no more than 1200 pixels high **when the image is viewed in its correct orientation**. Note that you images will be judged in the orientation you submit them - they will not be rotated for judging.



The image you submit to the competition may be smaller than this, but you should always try to have at least one of the dimensions at its maximum. If both dimensions are smaller than the maximums that are allowed you will be at a disadvantage when your image is judged. So, you should aim to have one of the following:

- a) an image 1920 x 1200 pixels, or
- b) an image 1920 pixels wide but less than 1200 pixels high, or
- c) an image 1200 pixels high and less than 1920 pixels wide.

If you have a square image it can be no more than 1200 x 1200 pixels.

If you have a portrait format image it can be no more than 1200 pixels high - so naturally it will be less than 1920 pixels wide.

It does not matter what size image you start with, you can always resize it to fit within the 1920x1200 pixel limits. However, you should remember these points:

- a) 1920 x 1200 is an aspect ratio of 16:10 and this is not the same as the aspect ratio of the files saved by most digital cameras.
- b) If you start with an image that is a different aspect ratio (perhaps 4:3) and you want to make your image exactly 1920 x1200 pixels without distorting it, you will have to crop the image to the 16:10 aspect ratio.
- c) If you start with an image that is a different aspect ratio (perhaps 4:3) and you do not want to crop it (or distort it), you will have to choose to either make the width 1920 pixels and the height something less than 1200 pixels, or make the height 1200 pixels and the width something less than 1920 pixels.
- d) If you start with an image that has an aspect ratio of anything other than 16:10 and you force it to be 1920x1200 pixels without cropping it, *it will become distorted*.

All image editors will allow you to crop and/or resize images. These notes explain how to do it in Photoshop CC. Other programs, or other versions of Photoshop, will require different procedures but the basic principles are the same.

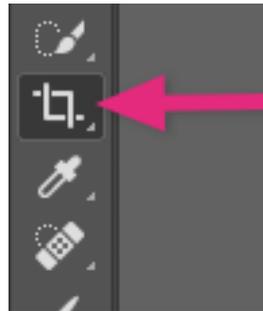
Let's assume you have opened an image in Photoshop that is 4928x3280 pixels (or whatever size image your camera produces). For example:



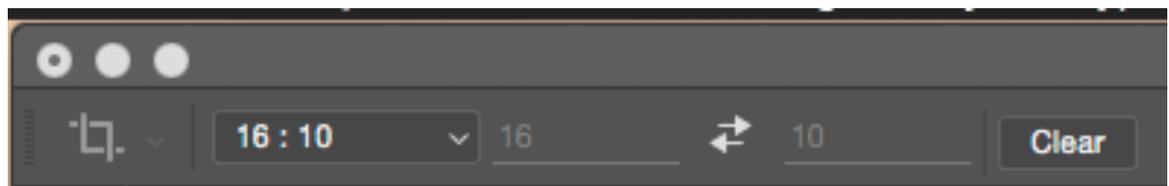
Quite obviously, this is an image that would benefit from some heavy cropping, so you would normally do that before making other adjustments to the image. There are several ways to crop in Photoshop but, keeping in mind that your image will eventually be 1920x1200 pixels it is useful to use a cropping technique that will produce the 16:10 aspect ratio that we want. (At this stage we are not concerned about the actual pixel dimensions, just the aspect ratio.)

The steps to follow to crop to an aspect ratio of 16:10 are:

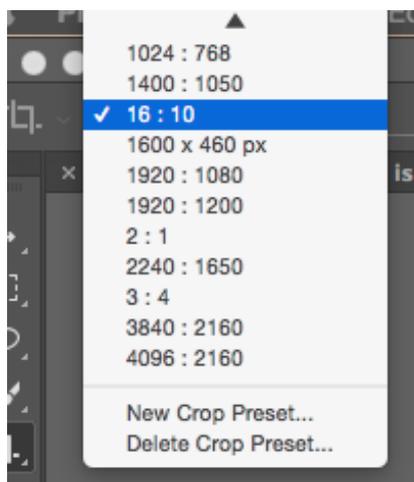
1. Select the Crop tool from the toolbar:



2. At the top left of the screen you should now see the options for the Crop tool. The second option from the left is a small window that shows the aspect ratio selected for the crop.



If this does not already show 16:10 (which it probably will not) then click on the downward facing arrow next to the displayed crop ratio and select 16:10 or 1920:1200 from the dropdown list.

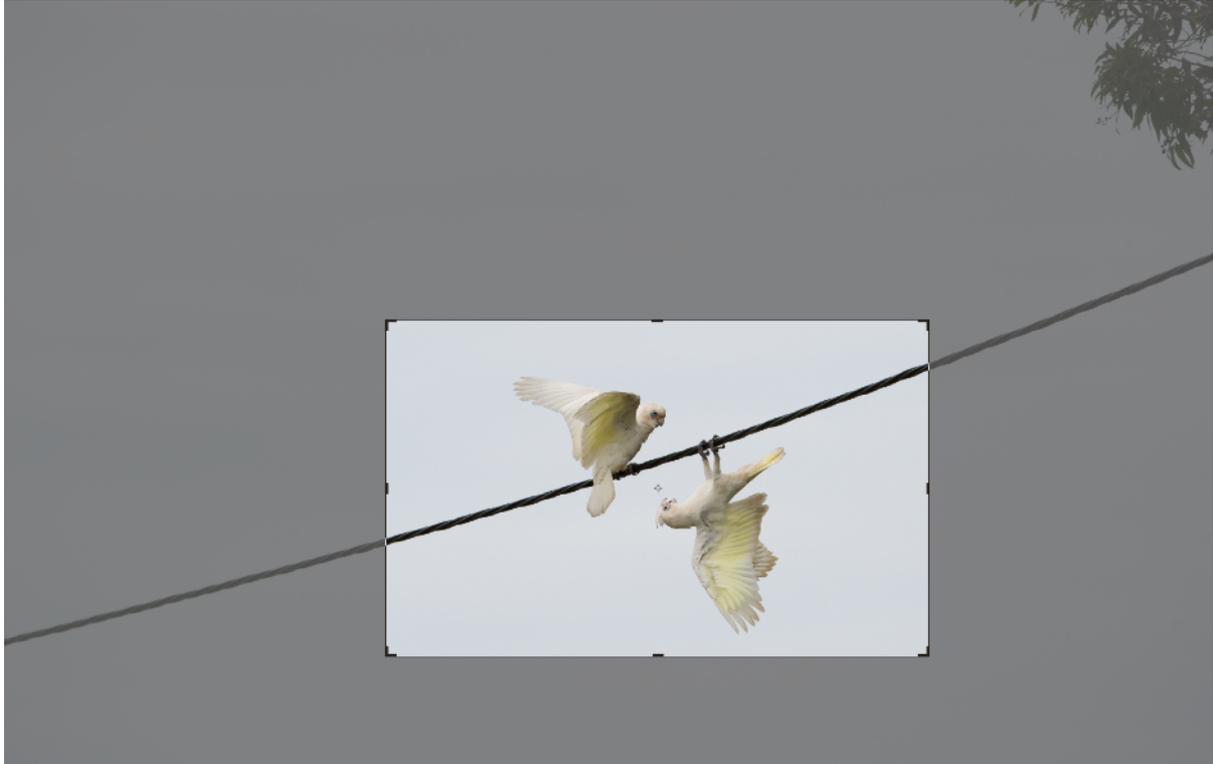


If neither of these ratios appears in the dropdown list you can create a new ratio and save it. Just type “16” and “10” in the boxes to the right of the box that shows the aspect ratio (where they are shown faintly in the graphic above); then select “New Crop Preset” from the dropdown list of aspect ratios. The 16:10 crop ratio will then appear whenever you select this drop down list - this will save you time when doing future crops.

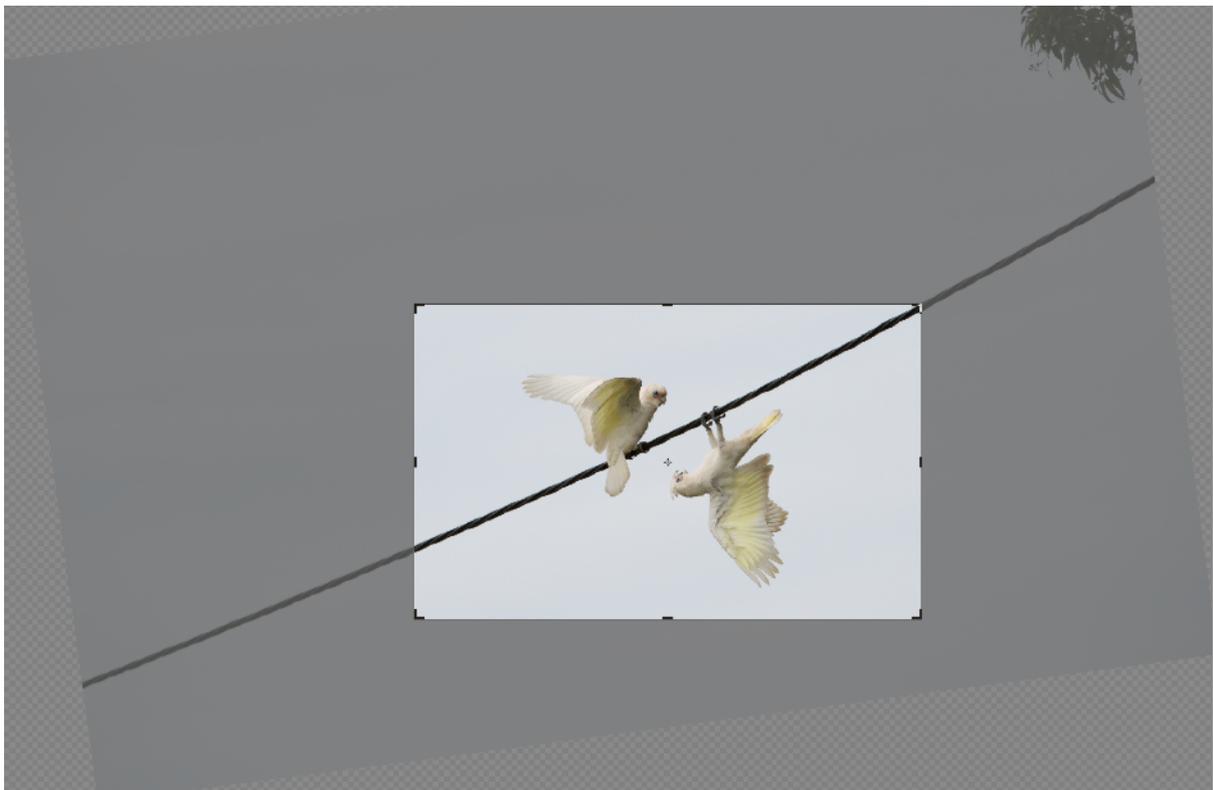
Once you have selected the required crop ratio you will see an outline of the crop area on the image and there will be “handles” at the corners and sides of this crop area that you can grab and drag. As you

drag the crop area it will maintain the aspect ratio that you selected. At this stage we are still not concerned about the actual pixel size of the cropped area, just its aspect ratio.

In my example, I dragged out a crop area that just happened to be 2218x1386, pixels (Photoshop shows this size as you create the crop area) so the screen looked like this:



I then chose to add a little more tension to the image by slightly rotating the crop area:



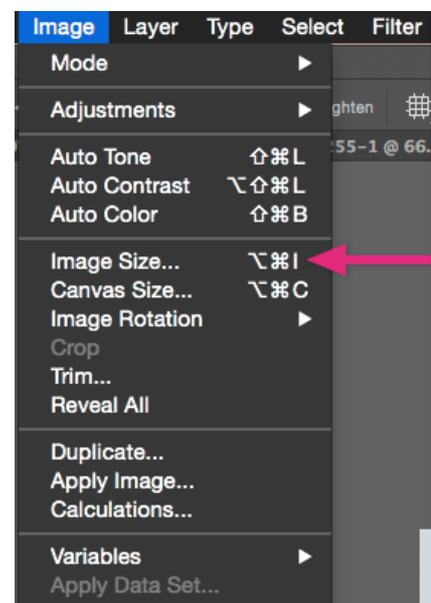
I then hit return/enter to accept the crop it gave me this:



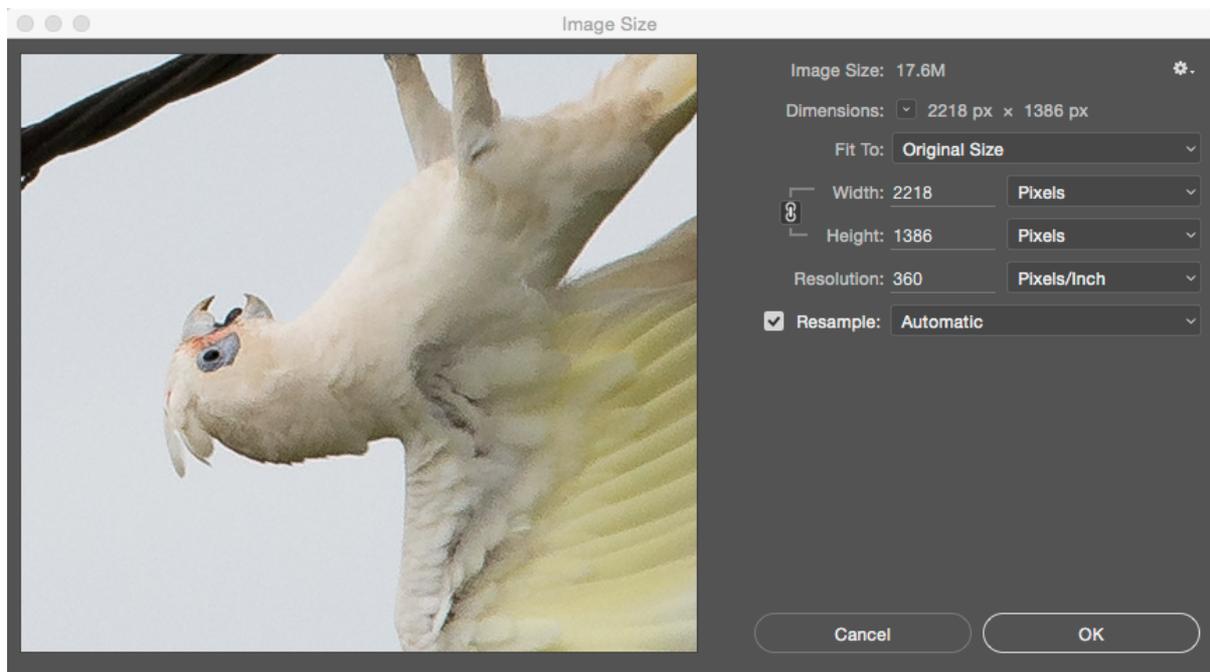
Of course, I could have chosen many other (perhaps better) ways to crop the image, and you generally will not need to rotate the cropped area, but do not be concerned about that as this is just an example.

Normally I crop my images before I process them, particular images such as this example that obviously need heavy cropping. I can then work on the part of the image I want to keep without being distracted by anything else in the image. For images where I want to retain most of the captured image area I take a different approach and process/edit the image before cropping it. Either way, after the cropping I have an image that is the correct aspect ratio but the pixel dimensions will still be too large (unless I made a very heavy crop). You should save the image at this time (as a Photoshop file with layers if you have created any layers in the editing process) and then resize it before saving the final version.

To resize the image, select **Image>Image Size** from the menu:

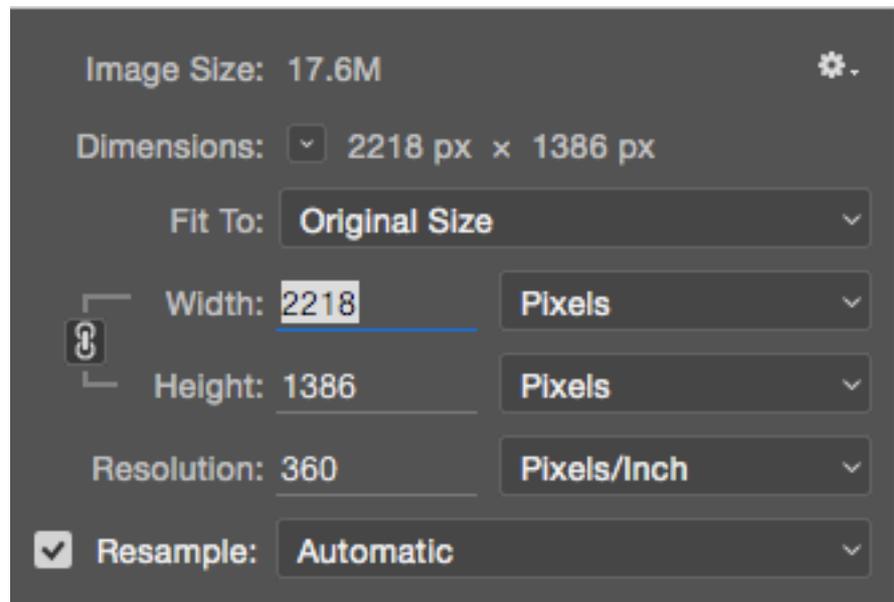


This will open the resizing window, which in **Phototshop CC 2015 on a Mac** looks like this:



You should note the following:

- a) The pixel dimensions are currently shown as 2218x1386, so only a slight reduction in size is needed in this case. Because of this it is safe to leave the “resampling” set on “Automatic”. If you are doing more drastic reductions (or enlargements) you might want to choose one of the other options from the “resample” dropdown menu.

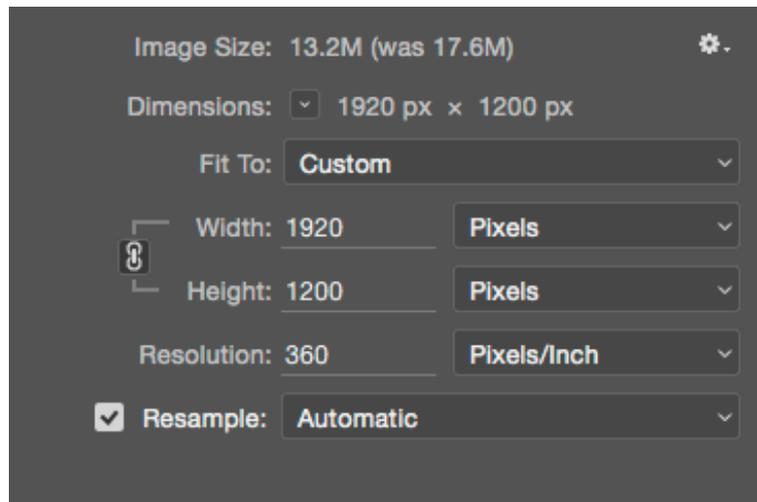


- b) There is a “link” symbol connecting the words “Width” and “Height”. This tells you that Photoshop will keep the aspect ratio of the image when you resize it. If you click on this link symbol it will disappear and you must NOT do that or the resizing will distort your image. [In earlier versions of Photoshop you actually had to tick a box called “Constrain Proportions” so that the aspect ratio would not change.]

c) Opposite “Fit To” is says “Original Size”. We don’t want to do that. We want to change (reduce) the size. So all you need to do is type “1920” into the Width box (or 1200 into the Height box) and the other dimension will change by the appropriate amount (because the link constrains the proportions). When you do this, the “Fit To” message will change to “Custom”. Make sure that the dimensions are shown in “Pixels”, not cm or inches or something else.

d) You could ignore this step, but the first time you resize an image in this way it is worth saving this custom 1920x1200 setting as a preset.

This is easy to do. Just click on the arrow beside the word “Custom” and from the dropdown menu select “Save Preset”.



Next time you want to resize an image to 1920x1200 pixels

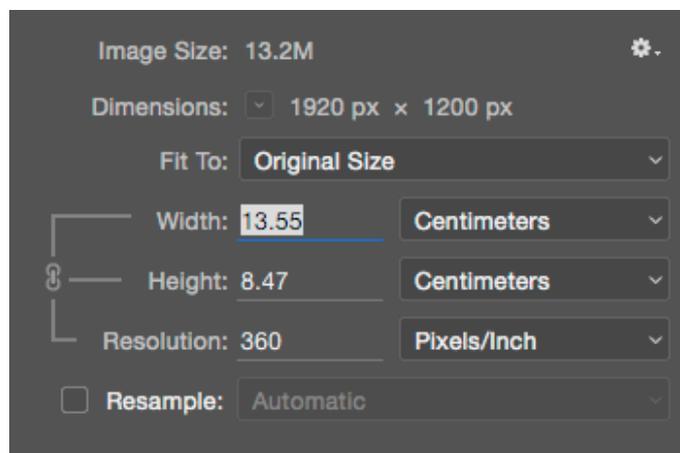
you can just select this preset instead of typing in the width or height. It will prevent you from making mistakes such as resizing to 1200x1920 instead of the correct 1920x1200.

e) The final thing to note in the Image Size window is that there is an option for changing the Resolution of the image. (In this example it is shown as 360 pixels/inch which is the correct setting if you were going to print the image on an Epson inkjet printer.) However, *this setting can be ignored for images that will be shown on a screen or projector*. The resolution will make no difference to the size or appearance of the image on the screen, it just matters when you are printing (which will be explained later).

#### NOTE:

If you uncheck the “Resample” check box you will see that the “link” locks together three things - Width, Height and Resolution. Changing any one of these will change the other two.

This will not matter for digital images that will be projected but it does matter if you are resizing images for prints. If the resampling is unchecked, changing width or height will change resolution and you do NOT want that to happen if you are printing the image.



For printing, you can set up your favourite settings for resizing images (width, height and resolution) and save those settings as a preset using the same technique described previously.

## SAVING IMAGES FOR COMPETITIONS

After you have resized your image to the correct pixel dimensions you should save it as a PSD file with a different name than the one you used when you saved it before resizing. You will then still have your original file and you will be able to resize it to different dimensions for other purposes if you need to.

To save the file in a format that is ready for uploading to a competition you need to :

- a) converted the image to the sRGB colour space if it is not already in that colour space
- b) save the image as a JPEG file with an appropriate file name
- c) make sure the saved file is less than 2MB (file size)
- d) save the file in a location that you have set aside for your competition files.

The first step, converting to the sRGB colour space must be done BEFORE you attempt to save the file.

From the Photoshop menu select **Edit>Convert to Profile**.

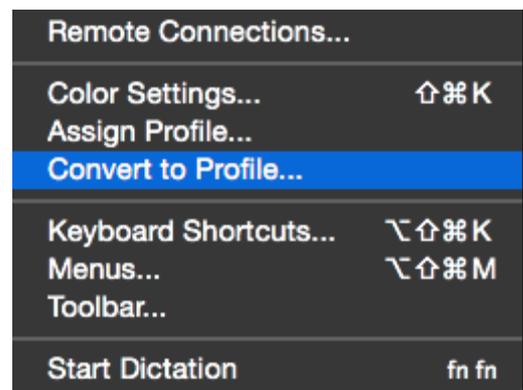
Make sure you select “Convert to profile” and *not* “Assign Profile”.

If you are wondering why you need to do this, the answer is fairly simple. Regardless of whether the competition you are entering will display the images on a computer monitor or through a digital projector the files need to be in the sRGB colour space to display your colours accurately. The files from your camera may or may not be in the sRGB colour space.

Also, if you are saving RAW files in your camera, the RAW conversion process in Adobe Camera RAW or Lightroom or whatever RAW converter you are using may be set to produce files in RGB or ProPhoto or some other colour space.

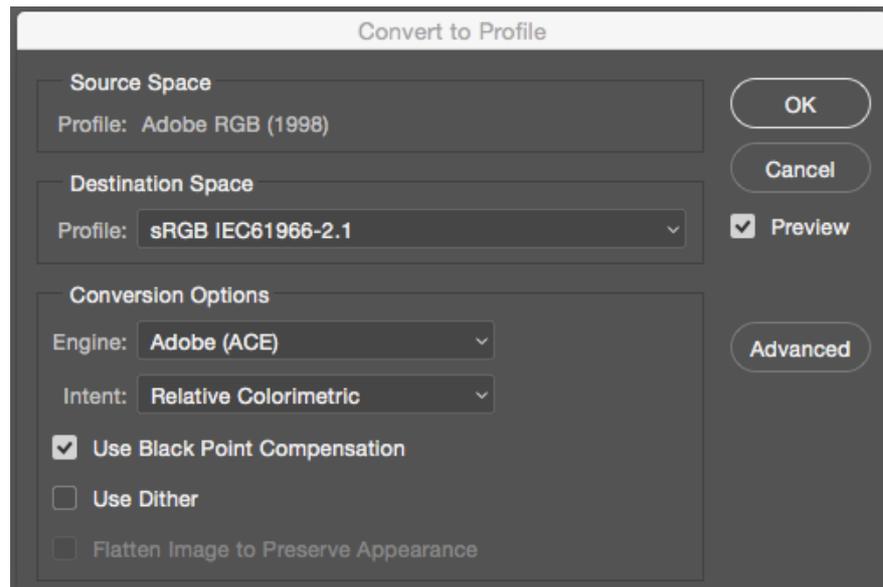
When you select “Convert to Profile” from the Photoshop menu it will open a window similar to that shown on the next page.

In the Source Space it shows the current profile (Adobe RGB in this example). If this already shows sRGB you can click “Cancel”. Otherwise go to the Destination Space section and, if



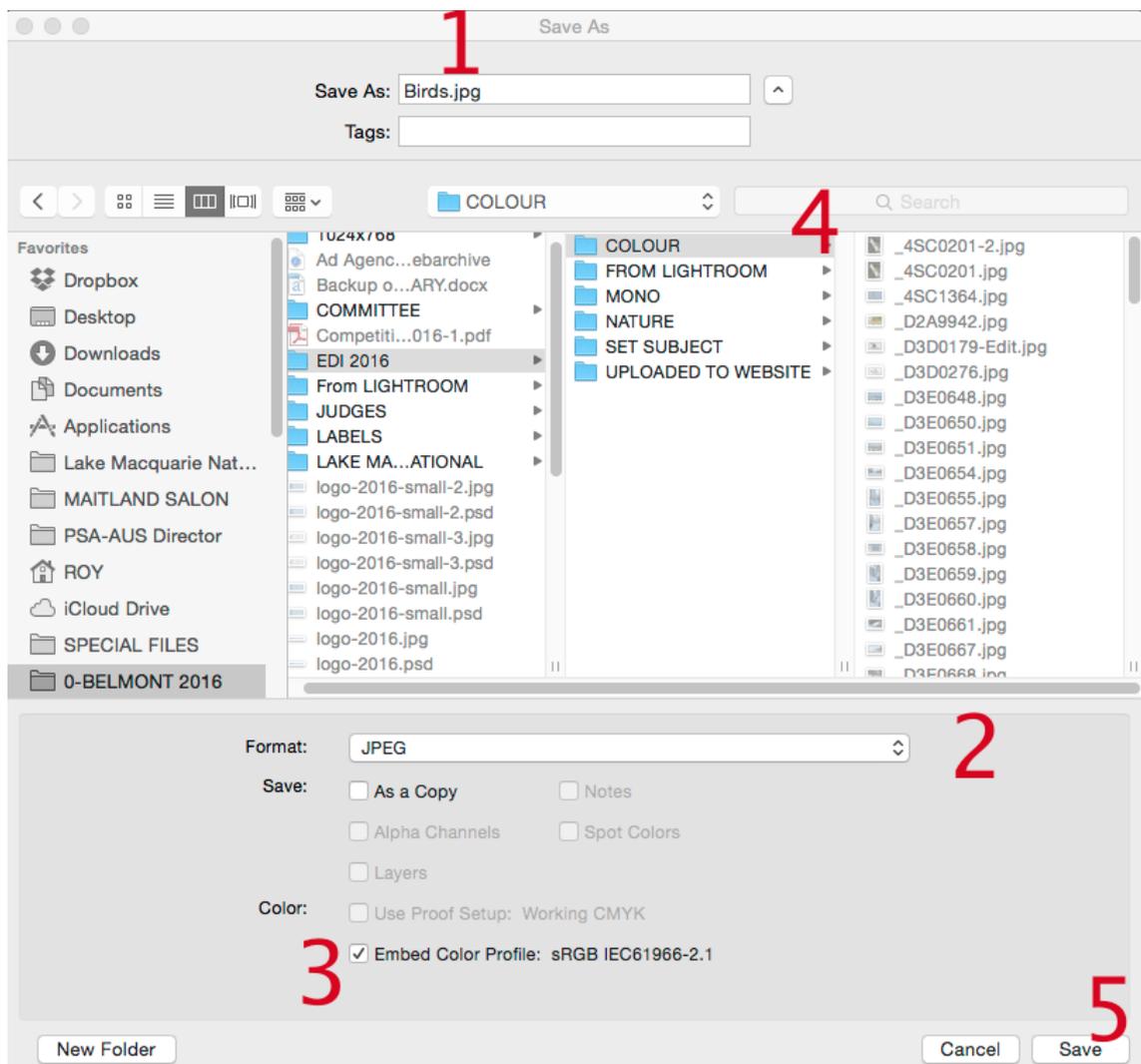
it does not already show sRGB then click on the small arrow and select sRGB from the dropdown list. (Note: it will probably show sRGB IEC61966-2.1 and that is what you want.)

The Conversion Options should be the same as those shown here; if not, select those options from the dropdown lists. Then press OK.



The file is now ready to save.

From the main menu, select **File>Save As** and navigate to the folder/directory in which you want to save the image. This opens a dialogue window that will look something like this:



The save dialogue will look a little different if you are using a Windows computer, but the same options will be there.

You need to do five things:

1. Type the name of the file (same as your image title) in the space next to “Save As”.
2. Select JPEG from the “Format” drop down list.
3. Make sure there is a tick in the “Embed Colour Profile” check box.
4. Make sure you have navigated to the folder where you want to save the file.
5. Click on “Save”.

That’s it. The image is now saved and ready to upload to the competition website.

## Resizing images for printing

When you are preparing images for use in digital competitions all that matters in terms of “size” is the *pixel dimensions* of the image and the *file size*. When it comes to printing images things are a little different.

When an image is printed there are two things that determine how large the print will be: the ***pixel dimensions*** of the image and the ***resolution*** at which it is printed. The *file size* has no effect on the *size* of the print (but it can affect its quality).

The resolution describes how closely together the pixels are printed - it is usually quoted in pixels per inch. For example, if an image is 3000 pixels wide and is printed at a resolution of 300 pixels/inch the print will be 10 inches wide. If the resolution of that image is changed to 360 pixels per inch the print will be only 8.3 inches wide.

The resolution (pixels/inch) that you need in order for a print to look good (smooth tonal transitions and no pixelation) depends on the size of the print and most importantly the *viewing distance*. As the size of the print increases, it is best viewed at a greater distance (so that perspectives look correct) and it needs less resolution to look satisfactory.

It is generally agreed that the ideal viewing distance is around 1.5 to 2 times the diagonal of the print. So, for a 6x4 inch print (15x10 cm) the viewing distance should be about 30cm. For an A3 print (42x30 cm) the ideal viewing distance is about 75-100cm.

There are various ways of calculating what resolution a print needs to be to show the best possible detail at the ideal viewing distance. In practice, it’s not worth wasting your time doing an individual calculation for every print. It is much more practical to settle on a fixed resolution that you can use for all your prints that will be used under similar situations (such as club competitions). For club competitions you can assume that your large prints will be

viewed from a distance of 50-100cm by people with reasonable eyesight. However, judges may look much more closely. If the print is approximately A3 size then it would need to be printed at a resolution of at least 200 pixels per inch for the details to be clearly visible. However, this should be considered as a lower limit and it is worth taking into consideration the recommendations of your printer manufacturer.

If you are printing at home on an Epson inkjet printer you will probably get the best quality results with a resolution of 360 pixels/inch. If you are printing on a Canon printer the best quality results will probably be obtained at a resolution of 300 pixels/inch.

If you are having your images printed commercially, you may need to talk to the printer to ascertain what resolution they prefer for images. Generally, it will be 300 pixels/inch although they may say something different, such as 240 pixels/inch. The other thing you need to ask the commercial printer is whether or not they resize images and change the resolution during the printing process. As with printing at home, the most important factor in determining print quality is going to be the number of pixels in the image.

Keep in mind that the surface on which a print is made can make a difference to how much detail is visible at typical viewing distances. Gloss and semi-gloss papers will generally show more detail than matte papers when the same image is printed on them.

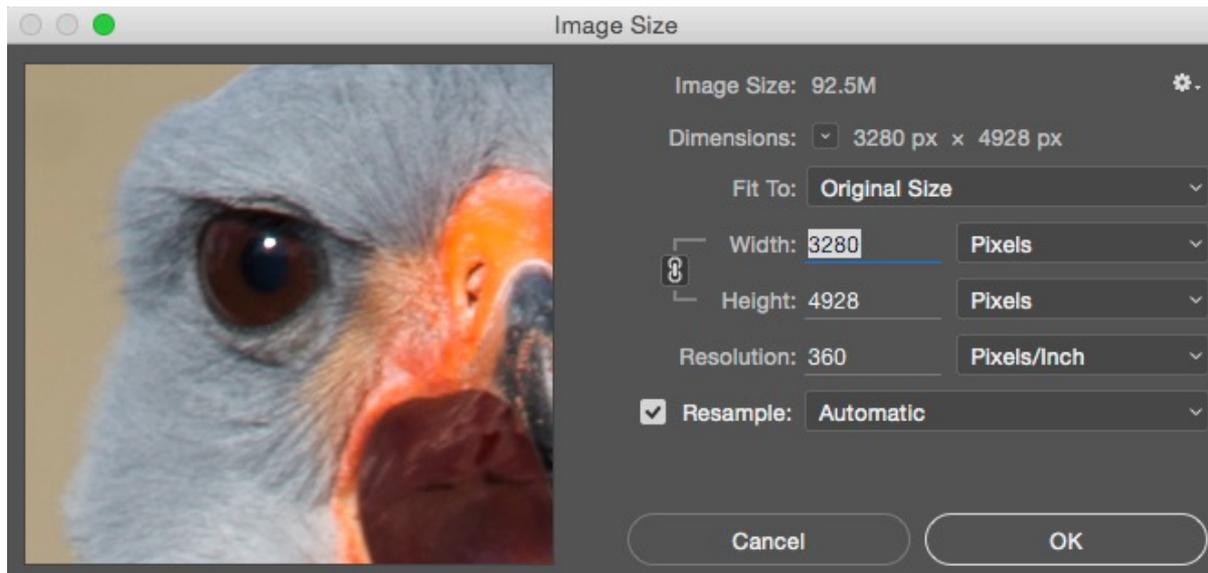
You also need to consider how the printer is laying down its droplets of ink. In the Printer Settings dialogue box in Photoshop you are able to select the 'output resolution'. This is the number of **dots** per inch (dpi) of ink that the printer uses. Generally, inkjet printers give good results at 1440dpi. Higher print densities might give better results for high-key images. The number of dots per inch of ink that the printer uses to produce a print (the dpi) is independent of the resolution of the image (the ppi).

### PPI is not the same as DPI.

The next section of these notes assumes that you are printing at home, so it describes how to get your images to the right pixel size and resolution for printing on an inkjet printer.

When you open an image in Photoshop you can check its pixel size and resolution by selecting **Image>Image Size** from the main menu. If this is an uncropped image, its pixel size will be whatever your camera produced, for example, 6000x4000 pixels. The resolution of the image will be whatever the EXIF information from the camera has it set to, or whatever resolution was set in Adobe Camera Raw if you are converting your RAW files with that software. Whatever the resolution is when you open the file in Photoshop does not really matter because you can change it to whatever you want in the **Image Size** dialogue box.

In the following example the pixel dimensions of the image are 3280x4928 and because I intend to print it on an Epson inkjet printer the resolution is set to 360 pixels/inch. With these settings it would print at a size of 23.1cm by 34.8cm.



If I want to make a larger print (but at the same resolution) I will have to resize it by increasing the number of pixels in the image - this process is called “**resampling**”. You will notice in the screen shot above that the resampling box is ticked and the resampling is set to “Automatic”. This means that if I increase the number of pixels in the image (by typing a larger number next to either ‘Width’ or ‘Height’ and the pressing OK, Photoshop will decide what mathematical process to use to enlarge the image. If I wanted to have more control over this I could click on the arrow next to”automatic” and select the process I wanted Photoshop to use. The options for resampling are:

<input checked="" type="checkbox"/> Automatic	\1
Preserve Details (enlargement)	\2
Bicubic Smoother (enlargement)	\3
Bicubic Sharper (reduction)	\4
Bicubic (smooth gradients)	\5
Nearest Neighbor (hard edges)	\6
Bilinear	\7

When you resample an image to larger pixel dimensions, Photoshop has to create some new pixels based on the colour values of existing pixels. The resampling method determines how Photoshop does this and the options shown above give some indication of when to choose each one. If you are making only small adjustments to image size (say a 10% increase in size) you might as well leave the resampling on “automatic” as the various methods of resampling will make little difference to the final result. However, if you want to make large changes (say a 50% increase in size) you might want to try several methods and see which one gives the best result for your particular image.

Keep in mind that whenever you increase the number of pixels in an image by resampling you will loose some detail and sharpness because Photoshop (or whatever other program

you are using for resizing) has to create new pixels and “guess” what their colour and brightness should be. (See later example.)

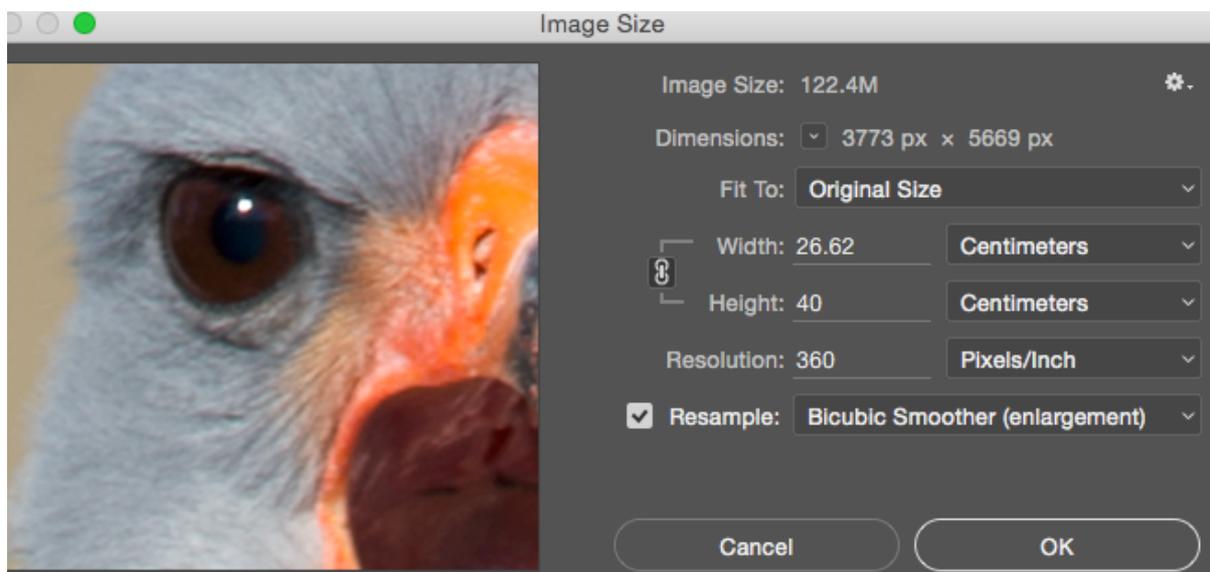
For the previous example, I want to increase the height of the image from 34.8cm to 40cm. The height is the critical dimension in this case; the width will be taken care of automatically because I have checked to make sure that the width and height are linked:



If the width and height are not linked you need to click on the link symbol so that the aspect ratio of the image will not change when you resize it.

I know from experience with similar images that the “Bicubic smoother” resampling method will give me a satisfactory result, so I select that resampling method, change the width or height units to cm (the other one will change automatically), type in 40 as the required height and click OK.

You can see now that the number of pixels in the image has increased to 3773x5669 and the width and height are what I require for printing. Before printing, the image will require sharpening but otherwise it is ready to go.

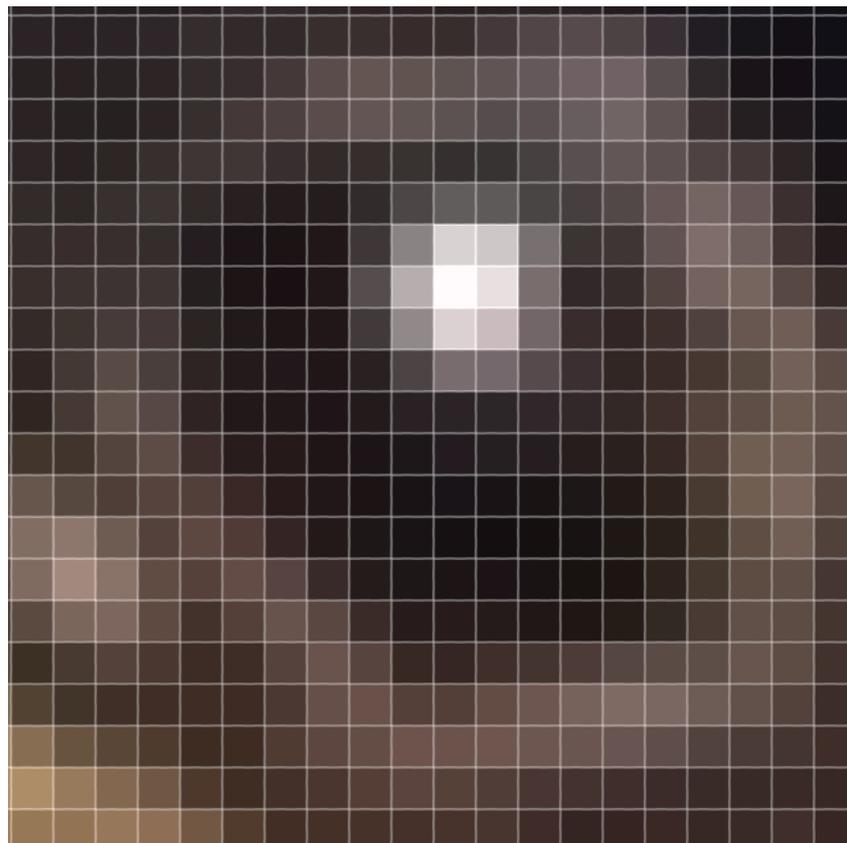


### How much should you enlarge an image?

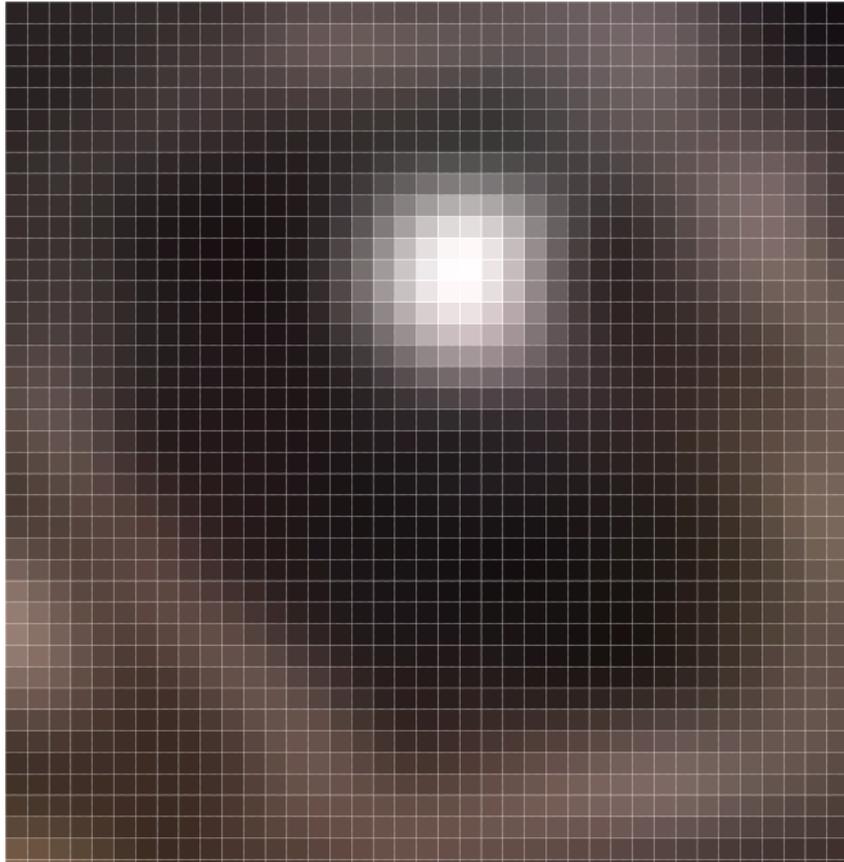
If you enlarge an image too much you will find that the print lacks detail and clarity; it may even start to pixelate. So, let's assume you want to make an A3 size print. A3 paper is 42x30cm so you could comfortably print an image that was 40x28cm and mount it easily. For this example, I will assume you are going to make the print at a resolution of 300 pixels per inch, which is equivalent to approximately 118 pixels per centimetre so the 40cm dimension of the image will need to be about 4720 pixels (40x118). So, before resizing the image you want to print you need to think about how much it will be enlarged.

Let's assume you want to make an A3 print from an image that is only 2000 pixels high (because you cropped the original image) - for example, this image of the whydah.

Enlarging this image to 4720 pixels high may or may not produce a satisfactory result, depending on how I enlarge it. Here's why. You cannot see it in the small image but in the original image the bird had a catchlight in its eye. Zooming in to the pixel level on the 2000 pixel high image we can see that the catchlight is made up of just one very bright pixel and several others that are not quite so bright. There is also a fairly well defined ring around the bird's eye. This is shown below.



If the image is enlarged to 4720 pixels high in Photoshop and I view the same size area of the image this is what the eye looks like:



The pixels that have been created produce a distinct softening of the image. Where previously there were just two or three distinct tonal values between the lightest and darkest pixel in the bird's eye there are now at least six distinct tones in the same region. The ring around the eye is also much softer. In this particular case, the image may still look sharp enough when printed but the greater the amount of enlargement the more chance there is that your image will become too soft as a print.

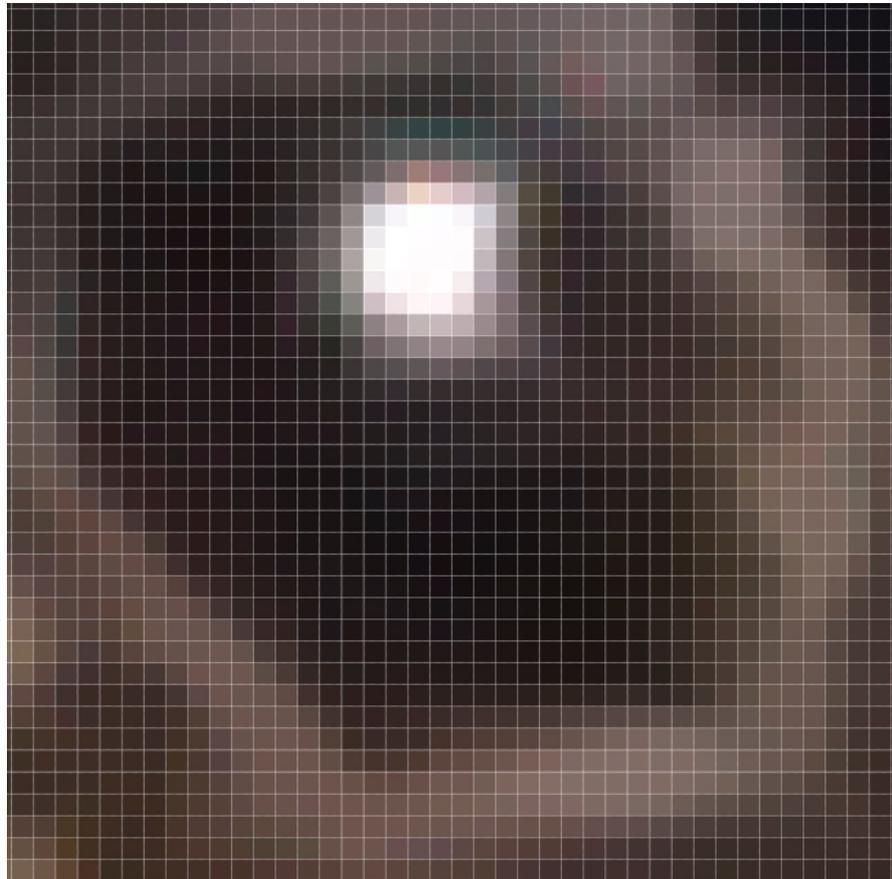
Obviously your prints will not show the pixel level of detail that is in the above image. I am simply illustrating what happens when Photoshop creates pixels during an enlargement. You should be able to see that you will have to be cautious about trying to enlarge images too much.

If you try enlarging an image in Photoshop and you are not completely satisfied with the results of the print you have two alternatives (besides deciding not to enlarge it). One option is to print at a lower resolution, perhaps 240 ppi instead of 300 ppi. This can work well for images that do not contain a lot of fine detail, such as clouds and sunsets. It may not be a satisfactory approach for images with fine detail as those details may tend to be softened too much by the enlargement process.

A basic guideline is this: if you use Photoshop to enlarge your images by more than about two times you can expect to see some deterioration in quality when you print the image at A3 size. Of course there are lots of other factors that influence print quality so my best

advice is to experiment with some test images and try to determine the limits of what you can do successfully when printing at home or commercially.

Another approach is to use a different process for enlarging. Because different programs use different enlargement algorithms (different ways of calculating the values of the pixels that are created) they can produce quite different results. One program (or Photoshop plug-in) that usually gives good results is *ON1 Resize 10* (which was originally called Genuine Fractals). It gave this result result:



You can see that this enlargement has much more well-defined boundaries between the light and dark areas so it will produce a more detailed print than the enlargement done in Photoshop.

Please email me if you find any errors in these notes or if you want to suggest ways in which they could be improved.

Roy Killen

Email: [roykillen@mac.com](mailto:roykillen@mac.com)

12th November, 2017