Primary Image Sharpening With Raw Files

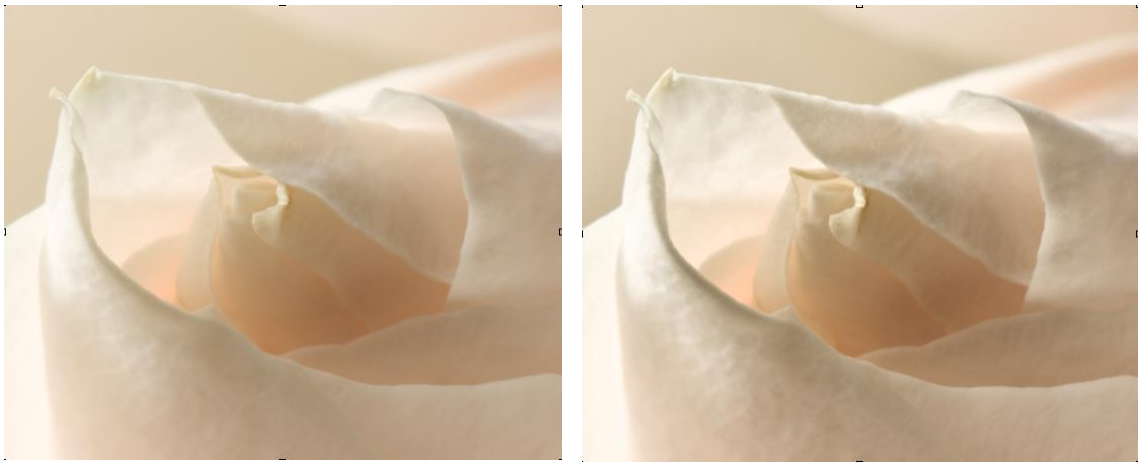
Capturing a digital image leaves it inherently soft, even with the best camera and lens combination. It is the result of the de-mosaicing process that creates the color from the raw capture, and anti-aliasing to reduce artifacts. The result is reduced contrast transition at hard edges. In digital images, low contrast translates to the perception of less sharpness. The lowering of contrast in digital capture tends to have a particularly negative effect on small areas of blacks, like eyebrows, pupils, and patterned areas of an image where lights and darks are adjacent. It is up to the photographer to overcome the shortcomings of the process.

Generally, images require two stages of sharpening – the first to overcome this capture issue, and a second pass, usually at the end of the process, to achieve a desired sharpness for output. The second stage will change depending on the image size, the output device, and the artistic desire of the photographer. It can be overall sharpening, or local sharpening of specific areas of the image to direct attention to, or away from, specific details – sharpening of the eyes and lips in a portrait, for example. It can be achieved with unsharp masking, high pass sharpening, and a number of other techniques depending on personal preference.

This article addresses the first stage sharpening techniques available in Photoshop CS3 and Elements 5.0 and above using the *Raw Converter 4.x* engine. These are global adjustments in that they apply to the entire image rather than a selection within the image.

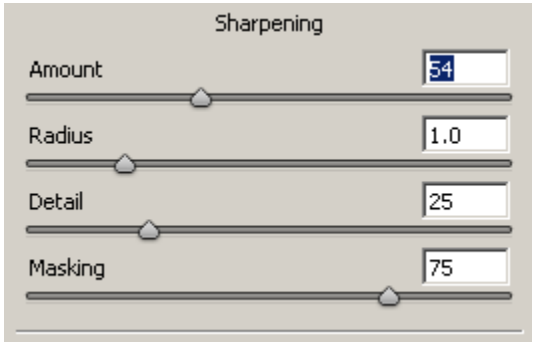
All sharpening should be done with the image viewed at 100% or 200%. Viewing the image at lower percentages will not give you an accurate preview of the results, and at higher percentages you may make unrealistic decisions as the image will be reproduced at a significantly lower actual size than you see on screen. Remember that at 100% you are already viewing the image at an enlarged size as the monitor resolution is lower than the print resolution. It is only really accurate if you are making images for the web.

The first control is in the *Basic* tab in both programs, and is called *Clarity*. It acts like unsharp masking at a low percentage with a high radius setting, with some additional mid-tone contrast enhancement. It primarily overcomes the contrast loss in the initial image capture process. View an image with a strong contrast difference between adjacent tones and you will easily see the contrast increase as the slider is moved to the right. The visual improvement in sharpness that results is also evident. How much *Clarity* to use is obviously a judgment call based on image content. A woods scene may improve dramatically with a high *Clarity* setting, where a close up portrait might suffer from a similar setting. As much as you may prefer to have a target in mind, it really is an image dependent setting. If you want a guideline, prefer low *Clarity* settings for portraits, and a higher setting for subjects with a lot of small detail or contrasting edges.



The two images above illustrate the effect of the *Clarity* slider. The left image is with the slider at zero and the right is at 100. Note the increased edge definition and overall image contrast. Some areas of the image appear darker and more detailed. This is the result of removing the "haze" introduced by the image capture. The intent of the C*larity* slider is not to increase image contrast, but to restore it and restore definition lost in capture.

The second control for sharpening raw files is in the *Detail* tab in CS3, the only other tab available if you are using a version of Elements. The *Sharpening* section at the top of the tab includes four sliders. The first two are like unsharp masking with *Amount* and *Radius* settings. *Amount* is simply "how much" where the *Radius* setting requires a little more thought. The radius in unsharp masking sets how far from the intersection of two tones the program looks for differences in value. That influences where the resulting "halos" are created that give the impression of sharpness by increasing contrast. If you have seen an image where an edge appears to have a lighter line on one side and a darker line on the other, you have seen where the sharpening was applied with a poor choice of radius. A large file like an 11x14 can take a larger radius than a 5x7 without showing in the final print. Even so, the radius is generally very small, perhaps as much as 2 pixels on an 11x14 and less than 1 pixel on a 5x7. Those are not target numbers, just an example.



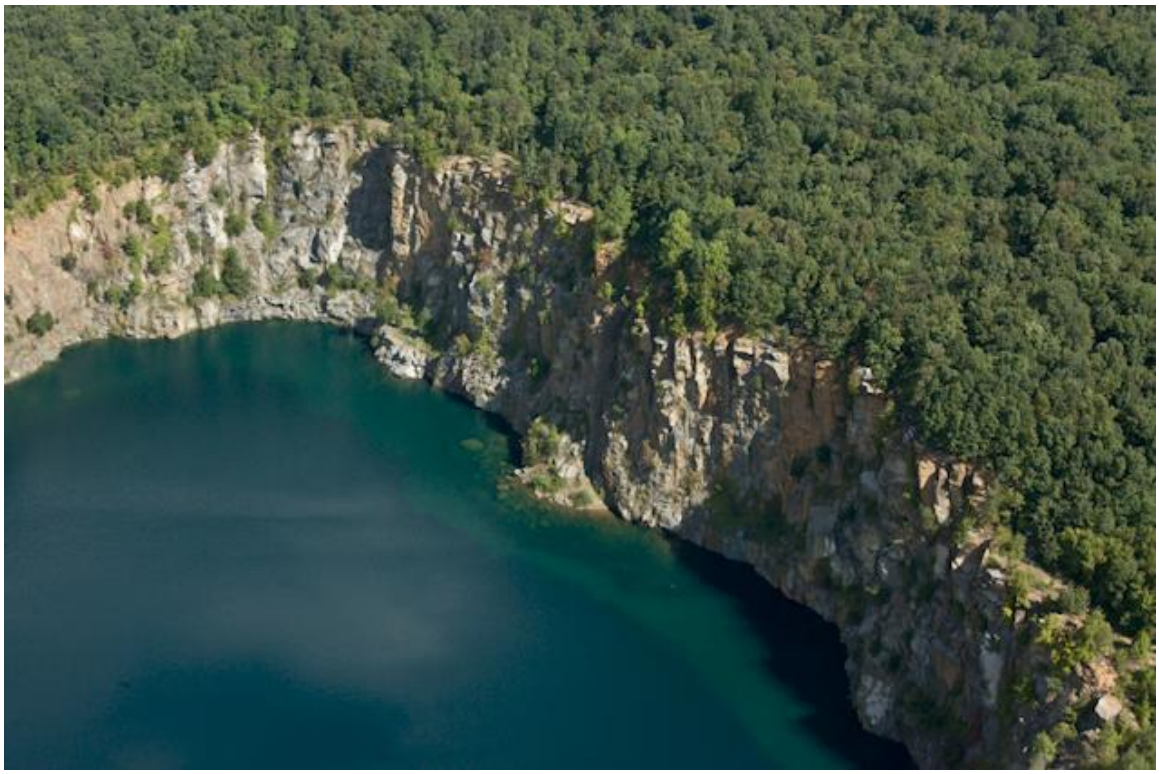
The *Clarity* slider previously mentioned increases contrast by using a very high radius, like 50 or more pixels, so that the halos disappear into the image. The radius setting in the raw converter only goes as high as 3 pixels, indicating the purpose of the Sharpening controls is a more subtle approach.

Radius settings of .1 or .2 simply have no effect. At .3 for a small file the *Amount* control begins to have an effect worth using. Even for a larger file, starting at a 1 pixel radius or slightly smaller is a good idea. If you don't get what you want after setting the *Amount*, modify the radius and try again. It is common to sharpen an average 8x10 image by 1 pixel or less.

A reminder: Always view the image view at 100% or more. In fact, some of the techniques I am about to mention actually do not function if the image is set at less than 100%.

Holding the <alt>(PC) [Option](Mac) key down while modifying the *Amount* slider will change the image view to the luminosity of the image, removing the color, and giving you a more accurate view of how the sharpening is affecting the image. In fact, the sharpening you set will only be applied to the luminosity of the image anyway. Removing the color channels from the sharpening process eliminates the creation of color artifacts that would result from the process. Note that concept for consideration of output sharpening later in Photoshop. With the <alt>[option] key pressed the effect of the *Amount* slider can also be viewed in real time. Without the key pressed, the full color image only updates after you release the mouse key if you are using it to move the slider. Another way to control the sliders is with the up and down arrow keys, adding the <shift> key to move in increments of 10 instead of 1.

With the *Radius* slider, the same <alt>[option] key technique allows you to see the actual halos created by the settings. The darker halos are easier to see in most cases. Keeping these halos as small as possible will keep your sharpening effective but not obvious. Making a decision with this technique is usually less valuable than making your judgments with the *Amount* slider.



The third and fourth sliders are something totally new. There is no “threshold” setting here as there is in Photoshop or Elements unsharp masking, but the *Detail* slider has a slight kinship to the concept. At 100% the slider acts like *Threshold* at 0, applying the maximum effect of the *Amount* and *Radius* sliders. At first this is counterintuitive if you think of *Threshold*, so train your mind to think “more detail equals more sharpening.” At low settings the *Detail* slider acts like an attenuator on the halos created by the *Radius* setting. It reduces the effect of the sharpening halos and you may have to modify your *Radius* setting if you use a very low *Detail* setting. A low setting like 15-20 is suggested for portraits, the suppression favoring the areas of maximum difference like eyelashes, and protecting smooth skin areas. A setting of 50 or more may be appropriate for detailed subjects like landscapes and such. I also suggest you put the slider at both extremes on the same image using the <alt> key technique to see the difference. It will help to cement the concept into your head.

The new Detail slider acts like the threshold slider in the unsharp mask dialog by determining how much of the image will be affected by the other sharpening controls. The left image is with the *Detail* slider at zero and the right image is at 100. The *Amount* and *Radius* sliders are determining the sharpening. These are a small portion of the larger image on the preceding page.

The last *Sharpening* slider is *Masking* and it also works with the <alt> key to reveal its true intentions. It is essentially an on-the-fly edge selection that creates a mask. Like a mask in Photoshop or Elements it allows the effect to be applied to the image where it is white, and prevents the application in black areas. This is a brilliant addition to the *Raw* process as it is possible with global sharpening to create a grainy effect in smooth areas of the image you would not necessarily want sharpened. By restricting the effect to the edges, a stronger amount of sharpening can be applied before you get into the editing stage. This will make selections and other editing in Photoshop better and easier. Watching the masking progress as you increase the setting in the slider is also an education in edge selection between tonal values.

Batch sharpening images that do not require local editing in Photoshop can be a real help in speeding up image processing. Since the *Raw 4* processor will also handle *tif* and *jpg* images, the techniques for sharpening raw files can be applied to them as well. This can be useful for creating proofs,