

Sharpening scanned images

Shortly after the launch of Photoshop CS3, Adobe released a Camera Raw 4.1 update which greatly enhanced the capture sharpening capabilities in Camera Raw. In my view, this new feature changed the Photoshop workflow completely, such that everything I had written in my CS3 book about sharpening was immediately out-of-date. As you will have read in the book, I now advocate using Camera Raw to capture sharpen all your raw images and there is also no reason why you can't also use Camera Raw capture sharpening to sharpen (as yet unsharpened) scanned TIFF images. Having said that, I do realize that some people may prefer to carry out everything in Photoshop. For those readers I have made the Photoshop capture sharpening method instructions still available in this PDF.

Image sharpening

It is an unavoidable fact that image detail will progressively become lost at critical stages of the digital image making process. Without corrective sharpening, a printed image will appear softer than expected.

This is by no means a new phenomenon or one that is unique to digital imaging. The problems begin as soon as you focus the subject in your viewfinder and press the shutter release. The first variable is the camera lens. Most photographers are all too aware that cheaper inferior lenses will produce less sharp pictures, but the film emulsion can also influence the sharpness, as can the quality of the digital sensor and the number of photosites on the sensor chip. If you are shooting film, then you will have to scan a chrome transparency, negative or photographic print made with a darkroom enlarger (which involves yet another optical step). Therefore, even if you use the finest quality lenses and digital equipment, it is inevitable that the capture/scanning process will lead to some image degradation and an apparent loss of sharpness before you bring the photograph into Photoshop and start editing it.

The other problem concerns the loss of sharpness at the output stage. Whenever you make a print output you are usually converting an image that is made up of pixels into an image that is made up of ink dots on paper. Translating pixels into an image that is printed via a mechanical process will inevitably incur a further loss of sharpness. Figures 1 and 2 summarize the factors that can cause a captured image to lose sharpness.

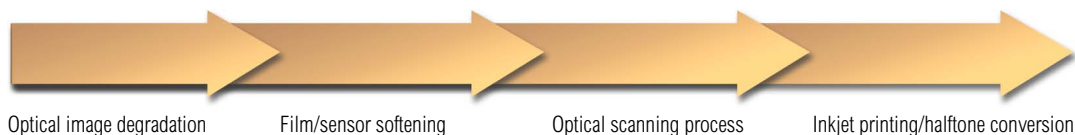


Figure 1 This diagram maps out the path to blurry destruction from the point where photons enter a camera lens to when digital image information is eventually interpreted as printer's ink on the page. At each of the above stages a certain amount of detail will become lost.

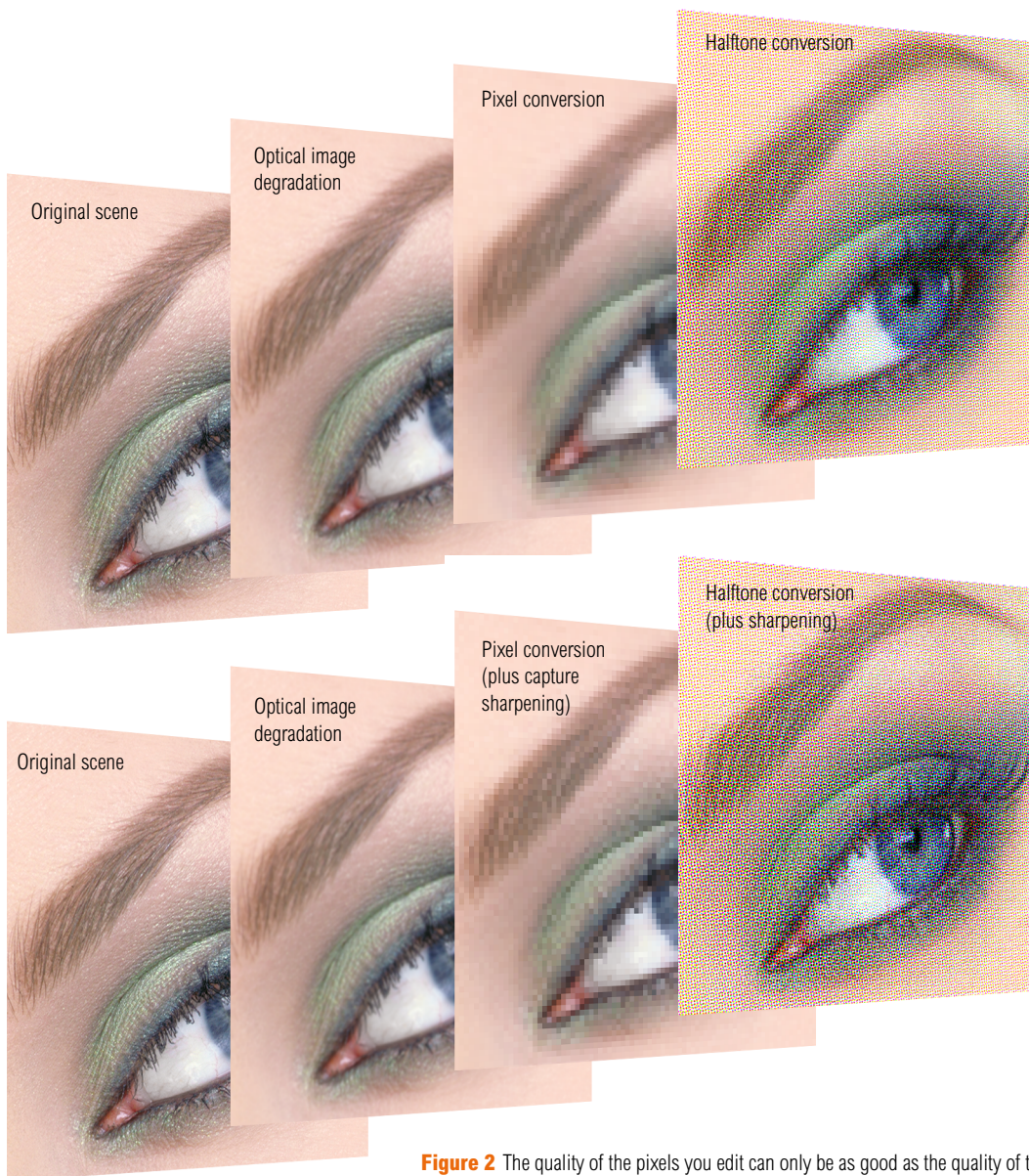


Figure 2 The quality of the pixels you edit can only be as good as the quality of the lens used on the camera, the number of pixels captured and the quality of the camera sensor or scanning device. Even the finest recorded images will benefit from some sharpening to adjust for a loss in sharpness. More sharpening losses will occur when outputting the image as a halftone print or inkjet. Further sharpening in Photoshop is therefore recommended before you make any type of output.

Sharpening solutions

Over the years various strategies have evolved. For example, some film scanning devices are set up to automatically sharpen scanned images so that they can go straight to a printing press. To some extent this is fine if all you are concerned with is preparing images to go to print in a publication. The downside of this one-step sharpening approach is that because the sharpening is so heavy-handed, the scanned photos will be more difficult to retouch. Such sharpening is usually calculated for a specific print output size and this also raises more limitations as to what else you can do with photos that were scanned this way.

If you shoot digitally and capture anything other than a raw file, the camera's built-in software will apply a small amount of sharpening in order to make the output files look acceptably sharp. Of course, nobody wants to see blurry pictures from their expensive cameras, but it is important to realize that an unsharpened 'soft' capture file is not necessarily the sign of a bad camera or scanner. For example, all raw digital files will look soft in appearance until they have been sharpened, which is why raw processing software such as Adobe Camera Raw have controls to adjust the sharpening. The question is, how much sharpening does an image need and when is the best time to apply the sharpening? There are several competing considerations that need to be taken into account here.

Multipass sharpening

Noted author and imaging expert Bruce Fraser (who sadly passed away in 2006), concluded that there really are no one-shot sharpening solutions that can sharpen an image to address the deficiencies in the softness of the original image and sharpen the image ready for print output. In response to this problem, Bruce came up with the notion of multipass sharpening, where sharpening is applied to the image at the beginning stages to take into account the source origin of the image along with a further sharpening to optimize for the image content and finally an output sharpening that must be applied before making a print.

Capture sharpening

The first step is to apply an initial corrective sharpening to each image before you start any retouching. The aim here is to compensate for the loss of sharpness which occurs naturally during the photographic process. This is what we call capture sharpening, and there are various ways you can achieve this. If you are happy with the amount of sharpness that is automatically applied by your scanner or digital camera, then you won't need any more sharpening at this stage. If you prefer, you can disable any sharpening in your camera or scanner software and apply the capture sharpening in Photoshop instead. One should recognize of course that not all methods of scanning and capture are the same and not all film emulsions or digital camera types and resolutions are the same either. Also, different amounts of sharpening will be required in order to attain a standard level of sharpness where each image appears sharp enough to look good on the computer display you are using.

Sharpening for output

What you see on the display won't exactly match the printed result. The process of converting a digital image to a halftone plate and from there to ink on the page (such as when making an inkjet print) inevitably incurs a further loss of sharpness. For this reason it is always necessary to 'sharpen for print' as well. This means that if you are preparing a picture to appear in print, you should apply an extra amount of sharpening at the print stage. Sharpening for output should be done at the end of a Photoshop session and after the image has been resized to the final print size. It therefore makes sense to keep a master version which you can make copies from as requested and always apply the final sharpening on a resized copy of the master. In this PDF I shall concentrate purely on the image capture sharpening processes, but you'll find print output sharpening is covered in the book in Chapter 12.

Turning off the auto sharpening

Wherever possible, use an unsharpened original as your master and apply any sharpening as necessary in Photoshop. Do check the settings in the camera capture or scanner software carefully because a lot of manufacturers like to sneak in some unsharp masking even when they tell you everything is set to zero. If you find this is happening, check to see if you can turn off the sharpening completely in the camera processing or scanner software.

Unsharp Mask filter

The only Photoshop sharpening filters you'll ever need are the Unsharp Mask (Figure 3) and the Smart Sharpen filter. The Sharpen and Sharpen More are simply preset filters and these have none of the flexibility associated with the Unsharp Mask filter. While unsharp masking can make a picture look sharper, this apparent sharpening is achieved at the expense of introducing artifacts into the image that can permanently degrade a photo. If an image is over-sharpened, there is the danger that it will emphasize any noise that is present. Furthermore, if you over-sharpen an image before carrying out color adjustments or retouching, the sharpening artifacts may be even more noticeable afterwards. So the main aim when using the Unsharp Mask filter is to increase the apparent sharpness, but at the same time try to minimize the amount of artifacting that's introduced by the sharpening process. We do this by refining how the Unsharp Mask filter is applied. Firstly, through the use of the Luminance blend mode so that only the luminance information gets sharpened, and at a more advanced level, through the use of an edge mask, to selectively apply the sharpening to the edges only. Let's begin though by looking at the three controls in the Unsharp Mask filter dialog and what they do.

Amount

The Amount setting controls the intensity of the sharpening. This is a really simple one to understand. The higher the percentage (up to 500%) the greater the sharpening effect will be. The correct amount to apply will vary depending on the state of the image or the type of press output. Generally speaking, I would typically apply an amount between 50 and 200% for a capture sharpening (experience will help you make a correct judgement on the display as to what the right amount to use should be). Here is a good tip: try setting the Amount value really high to begin with. Try to find out which Radius and Threshold settings work best at this high Amount setting and then reduce the Amount percentage to a more appropriate level.

Origins of unsharp masking

Unsharp masking sounds like a contradiction in terms, because how can unsharpening make a picture sharper? The clue is in the word 'masking'. It is the masking that is unsharp, leaving the edges of an image to be sharpened more than areas with less detail. The term in fact relates to the reprographic film process whereby a light, soft, unsharp negative version of the image was sandwiched next to the original positive during exposure. This technique was used to increase the edge sharpness on the resulting plate. The Photoshop Unsharp Mask (USM) filter reproduces the effect digitally and you have a lot of control over the amount of sharpening and the manner in which it is to be applied.

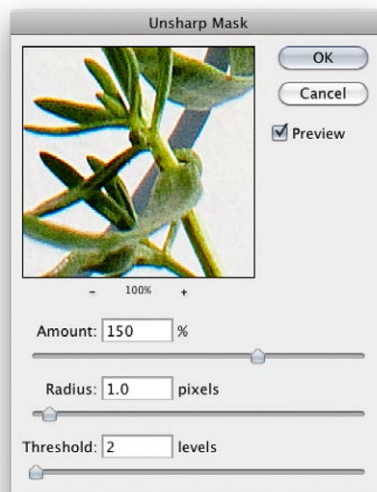


Figure 3 The Unsharp Mask filter dialog.

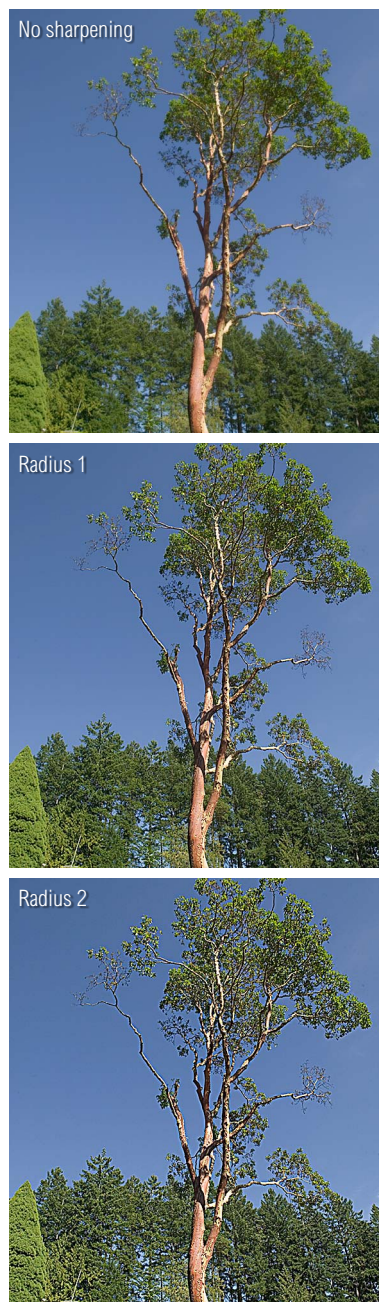
Radius

The Amount setting controls the level or intensity of unsharp masking, while the Radius and Threshold settings affect the distribution of the sharpening effect. The Radius setting controls the width of the sharpening effect and the ideal setting will depend very much on the subject matter and also the size of your output. Normally you would use a Radius of between 0.4 and 1 for capture sharpening and a Radius between 1.0 and 2.0 when sharpening for inkjet or halftone outputs. As the Radius setting is increased you will notice how the edges are emphasized more and Figure 4 demonstrates the impact increasing the Radius can have on the edge sharpness.

Threshold

The Threshold setting controls which pixels are sharpened based on how much the pixels deviate in brightness from their neighbors. Higher Threshold settings apply the filter only to those neighboring pixels that are markedly different in tonal brightness, i.e. edge outlines. The Threshold setting is most critical when preparing a scanned film image, and as a general rule, you use a Threshold of between 0 and 10. At lower settings more, or all of the pixels are sharpened including areas of smooth continuous tone. For example, if the Threshold setting is 4 and there is a difference of fewer than four levels of tone between any two neighboring pixels, they won't be sharpened, and if there are more than four levels of tone difference between them they will be sharpened. Raising the Threshold setting therefore allows you to sharpen edge contrast but without sharpening scanner noise artifacts or film grain (the things you don't want to make sharper – see Figure 5). For this reason, scans made from 35 mm film originals usually benefit from being sharpened with a higher Threshold setting than would need to be applied to a 120 film scan.

Figure 4 These pictures demonstrate the effect of increasing the Unsharp Mask filter Radius size and have been treated as follows: no sharpening (top). Amount 200% Radius 1, Threshold 0 (middle). Amount 200% Radius 2, Threshold 0 (bottom).



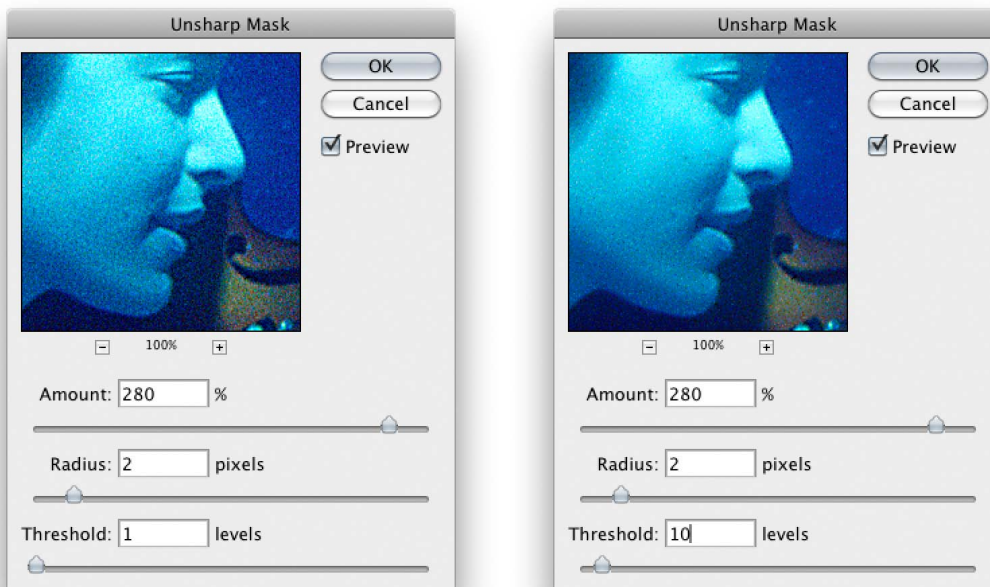


Figure 5 This photograph taken of musicians underwater was shot through a scratched glass porthole. As a result of these environmental conditions, the picture was already quite soft in appearance and therefore needed a lot of extra sharpening. But the problem with doing that is that at a low Threshold setting, the high Amount and Radius also emphasized the film grain. Increasing the Threshold to 10 solved the problem. The photograph was made to appear sharper but without sharpening the grain so much.

Photograph by Eric Richmond.



Luminance sharpening

The Unsharp Mask filter can be a fairly blunt instrument to sharpen with. As I pointed out earlier, in order to get the best results from the Unsharp Mask filter, we need to look at ways to fine-tune the way it is applied to the image. Since we only want to sharpen the detail in a photograph, the main thing we want to do is to restrict the effect of the Unsharp Mask filter to the luminance information only. For example, after you have applied an Unsharp Mask filter, you could go immediately to the Edit menu, choose Fade Filter and change the blend mode to Luminance (Figure 6). You might therefore want to make the initial unsharp masking amount a little stronger than is required and use the Fade Opacity slider to adjust the sharpening effect to achieve the desired result. Or, you can duplicate the Background layer, set the layer blend mode to Luminosity and apply the Unsharp Mask filter to this layer (Figure 7).

After the CS3 edition of this book was published I was taken to task by some readers for ignoring certain Lab color mode techniques. These omissions were deliberate. This is not because I have an anti-Lab mode agenda. If I were writing this book seventeen years ago, I too would be telling you to convert the image from RGB to Lab color mode and apply the Unsharp Mask filter to the Lightness channel, because that is how we did things back then. Photoshop has for a long time now had layers, which means that we don't need to go through the procedure of converting an image from RGB to Lab mode and back to RGB again in order to target the image luminosity when sharpening. For one thing, if you are editing an 8-bit per channel image, the conversion from RGB to Lab and back again is unnecessarily destructive. Although there is a small difference between sharpening the Lightness channel of an image in Lab mode compared to a luminosity sharpen, the difference is only slight. The more important issue is *how* you refine the luminance sharpening next, not whether you converted to Lab mode to sharpen or applied a Luminosity blend mode sharpen.

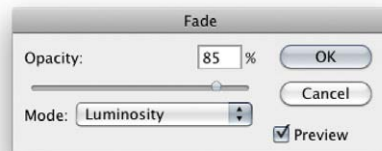


Figure 6 Unsharp masking can produce chromatic artifacts in some areas of the image. Luminance sharpening can help when you want to avoid overemphasizing the color noise artifacts in an image. Apply an Edit ⇨ Fade command and change the blending mode to Luminosity. This has a similar effect as converting an image to Lab mode and sharpening the Luminosity channel only, but is less destructive (and faster).

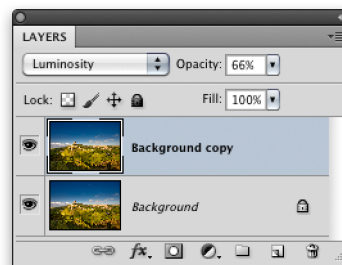


Figure 7 The other alternative is to make a copy of the Background layer first, set the layer blend mode to Luminosity and then sharpen the layer using the Unsharp Mask filter. There is also another advantage: if you set the layer opacity to 66% before you sharpen, you can judge what would be the best sharpness to apply at the 66% Opacity setting and then have the freedom to increase or decrease the sharpening strength after you have applied the filter.

Apparently non-destructive?

It has been argued that converting RGB to Lab and back to RGB keeps the histogram smooth, but this does not necessarily mean there is no data loss. Profile conversions always incur rounding errors when converting from one space or color mode to another and these can sometimes fill in the gaps in the histogram after a conversion.

Sharpening for the image source

If you don't wish to explore any further, then I recommend you stick with the simple Fade ⇒ Luminosity technique. If you do want to refine the capture sharpening process, then I recommend you follow the steps shown here and use the Actions panel to record these steps. You will then have a simple action that can be applied to any image that needs to be capture sharpened.

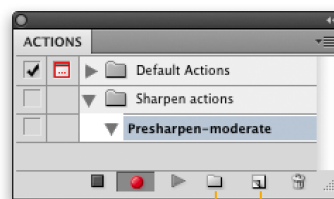
Let's now look at how to use the Unsharp Mask filter with the Luminance blend mode to apply a capture sharpening layer that is tailored to the source image. By this I mean that you choose a sharpen setting that is most suited to the image file source. We shall assume that where there was any noise in the original, this has first been removed using one of the noise reduction methods described in the book. The following steps are based on the advanced techniques first described by Bruce Fraser in his *Real World Sharpening with Adobe Photoshop CS2* book.



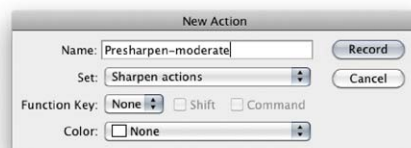
1 Here is an image that was processed from a raw capture shot using the Canon EOS 1Ds Mk 1 camera. The file was processed using Adobe Camera Raw with the Detail Sharpen slider set to zero and with the Color Noise Reduction set to 25%. Before doing anything to the image, I went to the Actions panel, clicked on the Create new action set button to create a new action set and then clicked on the Create new action button to open the New Action dialog shown here. I named the action Presharpen–moderate and started recording the subsequent steps described here.

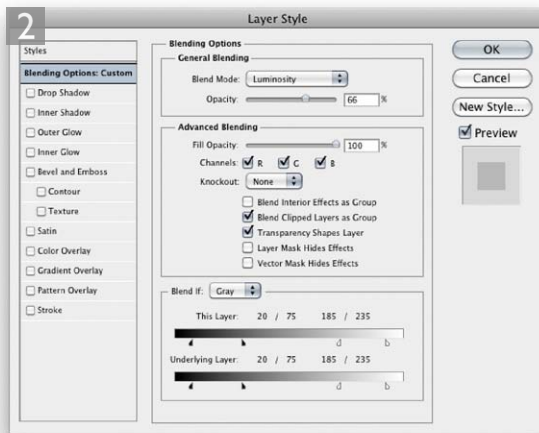
Real World Sharpening (2nd edition)

Bruce's original book on sharpening has been updated with help from Jeff Schewe. 'Real World Image Sharpening with Adobe Photoshop, Camera Raw, and Lightroom (2nd Edition)' now describes how to make the best use of the sharpening tools in Camera Raw and Lightroom, as well as in Photoshop.

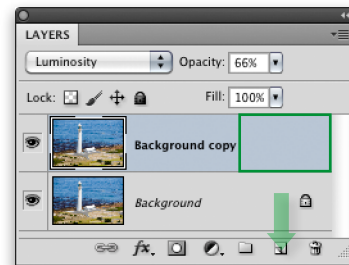


Create new set Create new Action



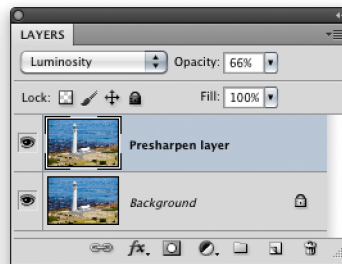
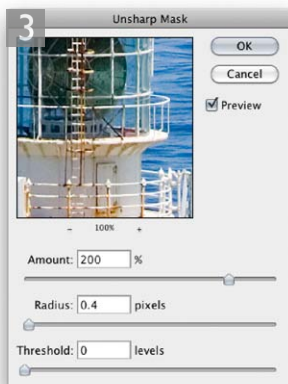


2 The first step was to make a copy of the Background layer, which could be done by dragging the Background layer to the New Layer button in the Layers panel. Here, I set the layer opacity to 66% and changed the layer blend mode to Luminosity. I then double-clicked on the layer (targeting the area inside the green box area) to open the Layer Style options dialog. The Blend if sliders (including the This Layer and the Underlying Layer sliders) had to be adjusted as follows: Minimum black: 20, Maximum black: 75, Minimum white: 185, Maximum white: 235 (to split the Blend if arrows, hold down the **alt** key to separate the slider into two halves).

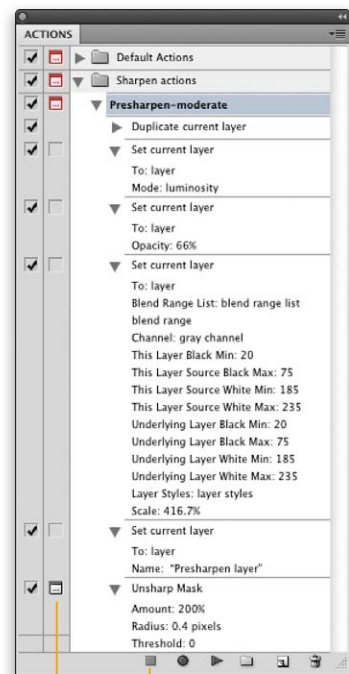


Sharpening the midtones

In Step 2 I show how to adjust the Blend If sliders. The reason for including this extra step is to restrict the sharpening so that it affects the midtones only. This is because we need to concentrate the sharpening where it is needed most and we want to avoid clipping the shadows and highlights.



3 After I had clicked OK to the Layer Style dialog, I was now ready to sharpen the layer. I applied the Unsharp Mask filter to the new layer using the settings shown here (I used a low Radius value because the original image came from an 11 megapixel digital camera). At this point I clicked on the Stop button to stop the Action recording. But there is one more thing you can do that might prove useful. If you click on the box next to the final Unsharp Mask step, you can insert a pause in the action. On playback this will open the Unsharp Mask dialog, allowing you to modify the settings each time you replay the action.



Click on Stop button to stop recording

Click in the space next to the Unsharp Mask step to insert a pause in the action

Which sharpen settings to use

The 'sharpen for image source' technique offers some significant advantages over the ordinary method or Lab mode method of sharpening. You gain the main benefits of Lab mode Lightness channel sharpening, but without the need for a double mode conversion from RGB mode to Lab and back again. Secondly, the Unsharp Mask step is applied at the very end, rather than at the middle stage. Lastly, the sharpening is applied on a layer at 66% opacity. This gives you the freedom to modify the final sharpness, to make it stronger or weaker.

The 'sharpen for image source' steps are actually intended as a preliminary sharpening step where you sharpen the image according to the size of the source file and what type of image the source file is. The steps I have just shown are intended for capture sharpening an image from an 11 megapixel or greater digital capture file, and the final Unsharp Mask settings you should use will vary according to the file source type. For example, with digital capture images the Amount and Threshold settings should remain the same. With a 6 megapixel camera, I suggest you use a Radius of 0.6 pixels. With an 8 megapixel camera use a Radius of 0.5 pixels and with an 11 megapixel camera or higher, use a Radius of 0.4 pixels.

Over the next few pages we shall look at the second stage capture sharpening where we sharpen for the image content. To summarize, 'sharpen for image source' is about sharpening for the file size and source type. 'Sharpen for content' is about choosing the best sharpening routine based on whether the image contains lots of detail where the fine edges need a lot of emphasis, or whether the image contains soft flat areas of detail (such as skin tones), where it would be more appropriate to leave these areas unsharpened and sharpen the areas of higher contrast only.

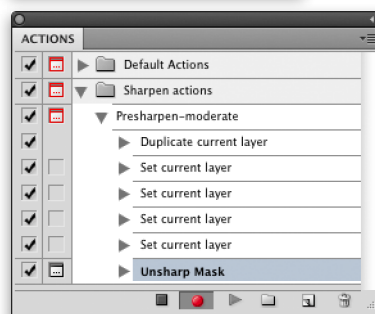
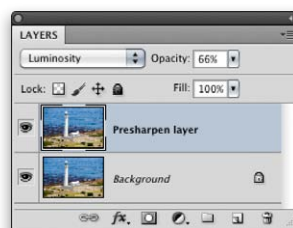
All the capture sharpening techniques shown here are based on just a few of the recipes recommended by Bruce Fraser in his book, which has now been updated by Jeff Schewe (see side panel on page 10).

Sharpening for fine to moderate edges

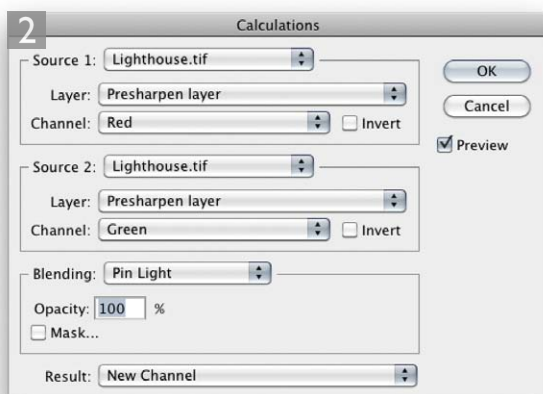
This next stage takes the capture sharpening process one stage further and shows you how to additionally presharpen an image where the photograph contains fine to moderate edge detail, such as in this landscape image example.



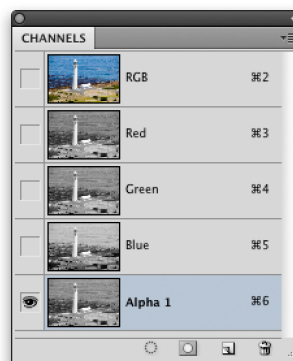
1 Here is the same image as was processed in the previous example, where I had reached Step 3. The object now was to apply a second pass sharpen to complete the capture sharpening process but in doing so, take into account the image content. This particular photograph had a lot of fine edge detail on the lighthouse, so I needed to apply an edge sharpening technique for fine to moderate edges. To do this, I went to the Actions panel, selected the action I had recorded up until Stage 3 and pressed the Record button to resume recording the action.



Click on Record button to resume recording

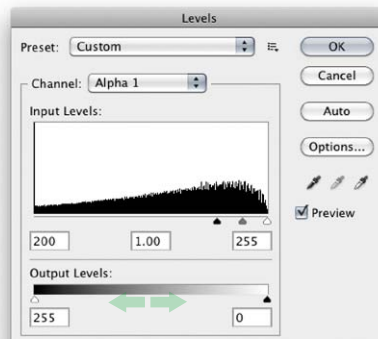


2 I chose Image ⇒ Calculations and configured the dialog as shown here. I was basically creating a new alpha channel that was a blend of the red and green channels, using the Pin Light blend mode.

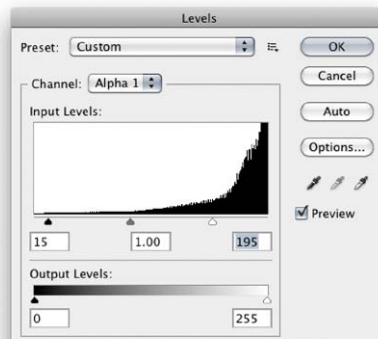
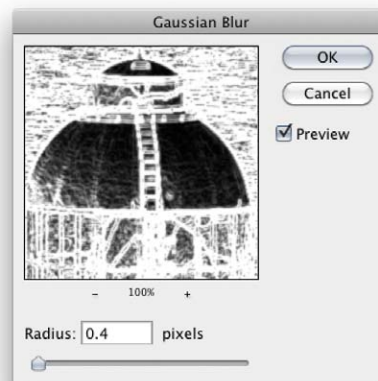


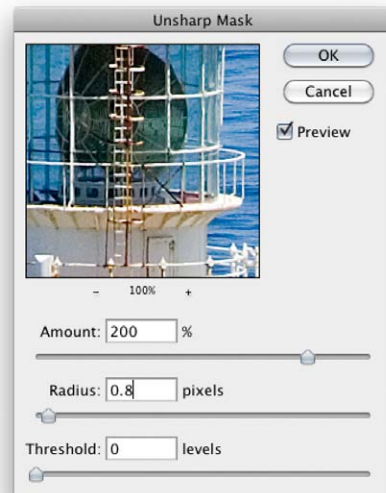
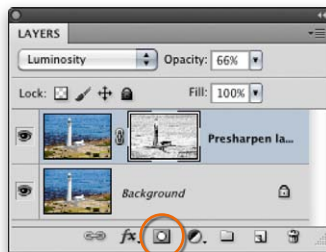
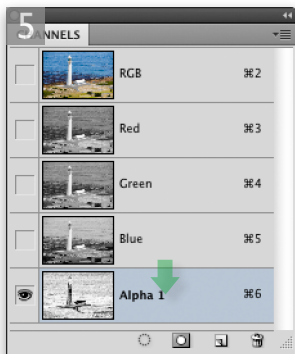


3 I then went to the Filter ⇒ Stylize menu and chose Find Edges. This was followed by a Levels adjustment using the settings shown here. The Levels adjustment increased the contrast and emphasized the edges more. Note that with this adjustment, I swapped the Output levels so that the shadow output switched from 0 to 255 and the highlight output switched from 255 to 0 (this Output levels switch is the same as choosing Image ⇒ Adjustments ⇒ Invert).

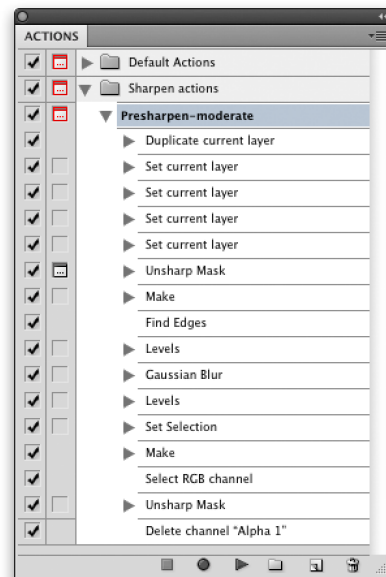
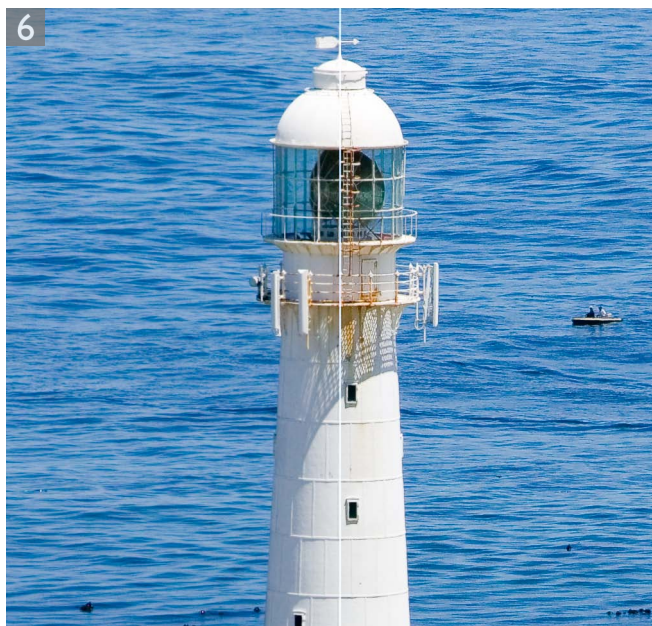


4 I then went to the Filter menu and chose Blur ⇒ Gaussian Blur and applied a small 0.4 Radius Blur to the channel. The blur amount used here is quite critical, because this stage is very much tailored to the content of the image, where I wanted to emphasize the narrow edge detail of the lighthouse. If I was capturing an image with softer edges, I would apply a larger Radius Blur. This was followed by the Levels adjustment shown here.





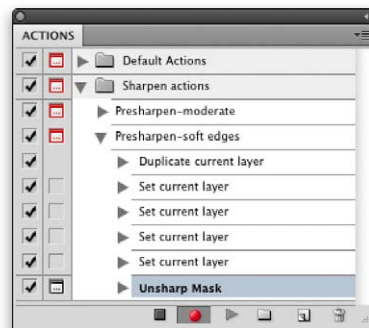
5 For the next step, I dragged the Alpha 1 channel down to the Make Selection button to load as a selection and then clicked on the Add layer mask button in the Layers panel to convert the active selection into a layer mask that masked the 'Presharpen layer'. It was now critical that I clicked on the Presharpen layer image thumbnail to make it active (instead of the layer mask) and applied the Unsharp Mask filter, using the settings shown here (if the layer mask appears in the Unsharp Mask filter preview, you will know you have forgotten to target the actual layer).



6 After applying the final sharpening, I clicked on the Stop button to end the action recording. And here is a close-up of the finished image, showing the unsharpened version on the left and the presharpened version on the right. Note that the combined pictures shown here have been further sharpened for print output at 300 ppi.

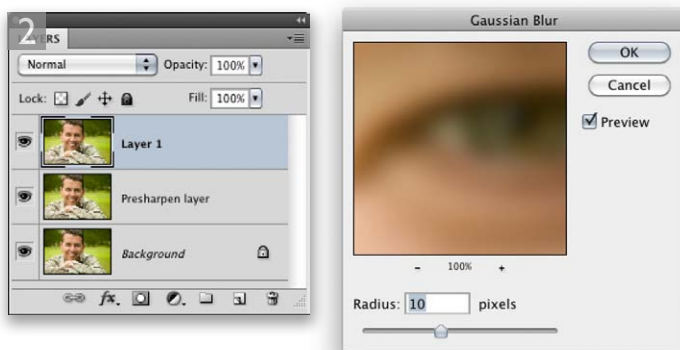
Sharpening for smooth edge content

The following steps show the basic method for sharpening images where the image content mostly features soft edges, such as this portrait of myself taken by my wife, Camilla. The intention here is to generate a very soft wide edged mask, through which to apply the final Unsharp Mask.

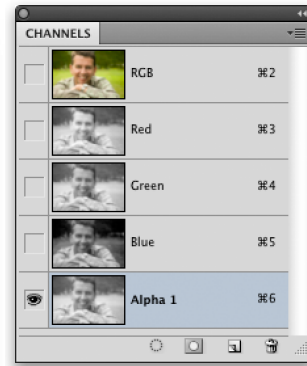
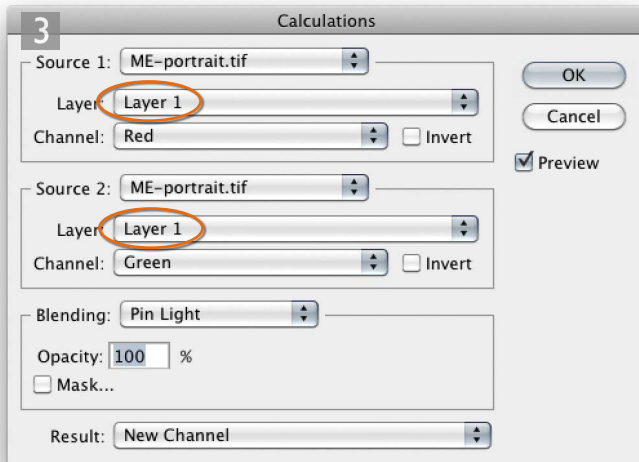


Click on Record button to resume recording

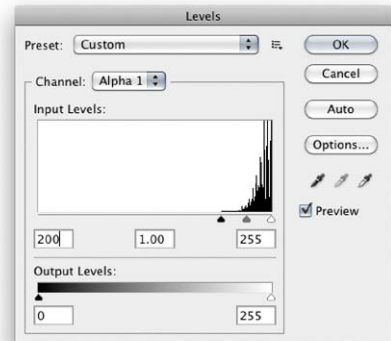
1 Here is an image that has lots of soft edge detail. As in the previous example, the image was initially processed using the first pass steps, as described on pages 10–11. You can see in the Actions panel that the action steps are currently at the same point as shown at step 1 on page 13. I pressed the Record button to begin recording this new action.



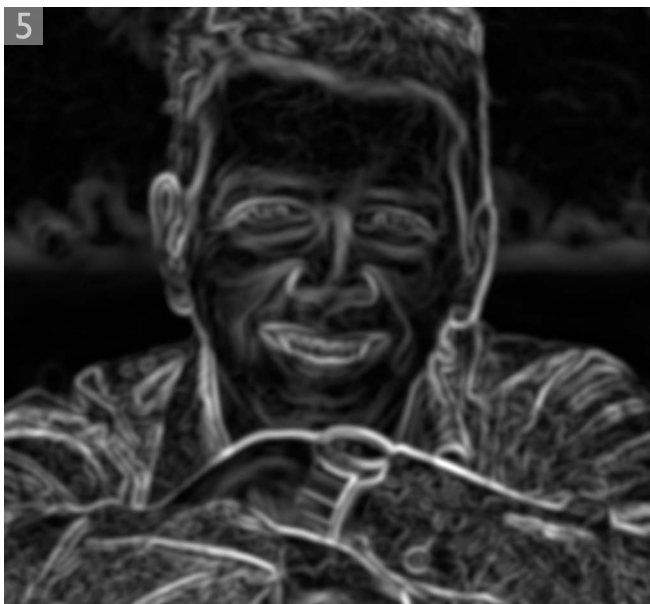
2 The steps for sharpening an image with soft edge content are slightly more complicated than those used for an image with fine to moderate edge content. The first step was to add a new layer filled with a merged copy of the image. I use this step a lot in all my retouching, so it is worth memorizing. The keyboard shortcut is: **⌘ + Shift + E** (Mac) **ctrl + alt + Shift + E** (PC). I then applied a 10 pixel Gaussian Blur to the new merged copy layer.



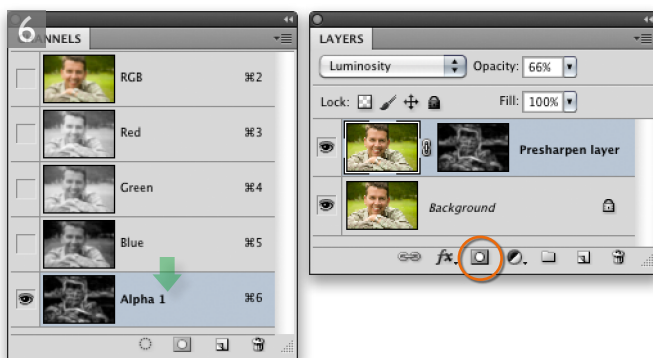
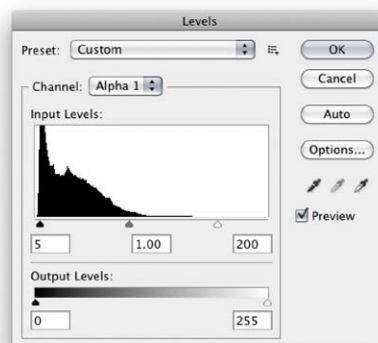
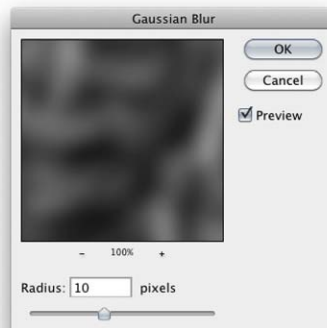
3 With this new blurred layer selected, I chose Image ⇒ Calculations and used the same settings as before. But note that the Layer section should point to this new blurred layer: Layer 1. I then clicked OK to create a new alpha channel.



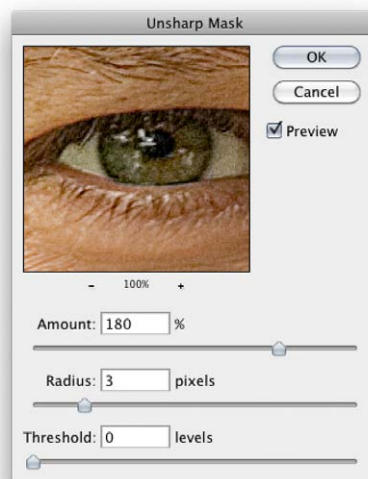
4 The following steps all took place on the new alpha channel and these steps were now more or less similar to those used in the moderate edges technique. I began by going to the Filter menu and choose Stylize ⇒ Find Edges. This was followed by applying the Levels settings shown here.



5 I then chose Image ⇒ Invert to create a negative image of the Alpha channel and followed this with a 10 pixel Gaussian Blur, to soften the edges more. I then followed this with the Levels adjustment shown here, which added more contrast to the channel mask.

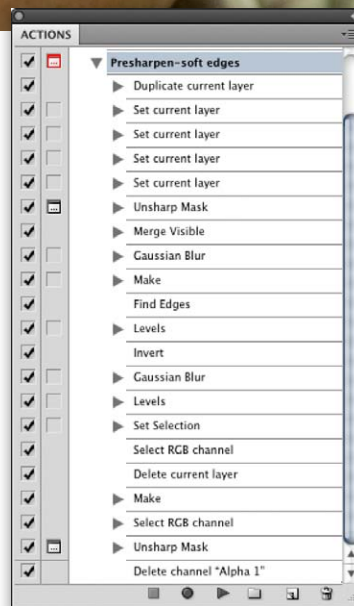


6 The mask was now ready for use. I went to the Channels panel and dragged the Alpha 1 channel down to the Make Selection button (you can delete the channel after loading it as a selection). I then clicked on the Add layer mask button in the Layers panel to convert the active selection into a layer mask that masked the Presharpen layer. The merged copy layer was no longer required, so I also deleted the Layer 1. And I also made sure the image thumbnail (not the mask) was selected in the Presharpen layer. I then applied the Unsharp Mask filter using the settings shown here. The Radius was deliberately set to a wide setting, but remember that the Unsharp Mask filter was being applied here through a wide edges layer mask.





7 Here you can see the finished photograph, shown with the unsharpened version on the left and the presharpened version on the right. After applying the final sharpening, I clicked on the Stop button to end the action recording. In the Actions panel you can see all the additional steps that had been recorded and how I placed pauses next to the two sharpening stages: the first one was at the first pass capture sharpen stage and the second at the second pass capture sharpen stage at the end. As I mentioned earlier, one of the advantages of having the capture sharpen layer set to 66% is that you can increase the sharpening easily (as well as reduce it) by adjusting the opacity of the layer. In this example, I increased the opacity to 100% in order to make the sharpening difference more obvious.



Capture sharpening summary

In these few pages I have tried to distill some of the key benefits of a multi pass capture sharpening workflow. At the very least I would advise you to use a Luminosity fade when applying the unsharp mask filter. I would also recommend you to record the preliminary sharpening steps shown on pages 10–11 as an action that can be replayed on other images. The secondary ‘sharpen for content’ steps are also worth using and I have so far shown two distinct methods: one for images with fine to moderate edges and one for images with soft edge detail. If you follow the instructions shown here, you can create two basic actions that can then be applied in many sharpening situations. Remember, the Unsharp Mask settings used for the initial sharpen are determined by the source. The settings used in the subsequent sharpening are dependent on the image content.

Third-party sharpening plug-ins

As you can see, there is a lot more to sharpening than meets the eye. The Unsharp Mask filter in Photoshop is perfectly capable of giving good results and these can be further enhanced using some of the selective sharpening tips I have described here. But there are also some third-party plug-in solutions available that offer an alternative to the Unsharp Mask filter. For example, there is a product called PhotoKit Sharpener from Pixel Genius (see Figure 8), a company I am personally involved with. But all credit goes to fellow Pixel Genius member and author Bruce Fraser, who devised this special set of Photoshop sharpening effects that are designed to apply just the right amount of image sharpening for all different types of film and digital file formats. Bruce’s sharpening routines incorporate all the techniques discussed here in this chapter, and then some. They include import sharpening for a multitude of film types and digital captures, output sharpening for inkjet printers or repro, and creative sharpening layers for selective image sharpening. A demo version of PhotoKit Sharpener can be downloaded from the Pixel Genius website: www.pixelgenius.com.

Actions assumptions

The Photoshop action recordings I have described so far were all carried out on a flattened image with just a single Background layer. Since capture sharpening is the first thing that you do to an image, it is likely that you too will be starting out with an image that has just a single, background layer.

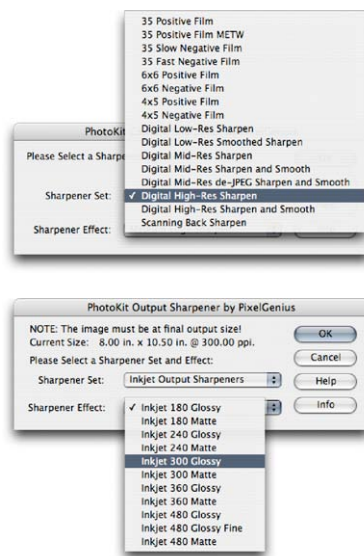


Figure 8 The Pixel Genius PhotoKit Sharpener automated plug-in is able to apply sharpening routines in stages for capture, selective (painting in on a layer) and output sharpening. The sharpening routines are each customized to provide the optimum amount of sharpening for these different tasks.

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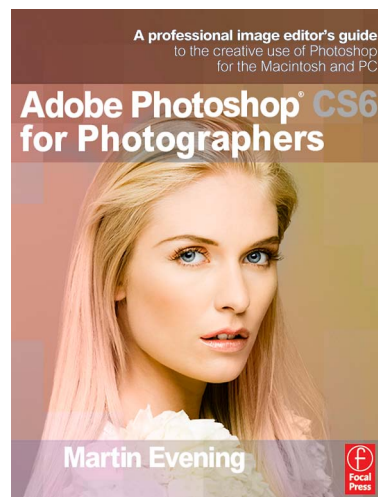
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