Movie 2

# Camera Raw sharpening and noise reduction

Improvements to Camera Raw sharpening

Sharpening is achieved by adding halos to the edges in an image. Generally speaking, halos add a light halo on one side of an edge and a dark halo on the other. To quote Camera Raw engineer Eric Chan (who worked on the new Camera Raw sharpening), 'good sharpening consists of halos that everybody sees, but nobody notices.' To this end, the halo edges in Camera Raw have been made more subtle and rebalanced such that the darker edges are a little less dark and the brighter edges are brighter. They are still there of course but you are less likely to actually 'see' them as visible halos in an image. You should only notice them in the way they create the illusion of sharpness. The Radius sharpening has also been improved. When you select a Sharpen Radius that's within the 0.5–1.0 range the halos are now made narrower. Previously the halos were still quite thick at these low radius settings and it should now be possible to sharpen fine-detailed subjects more effectively. You'll also read later about how the Detail panel Sharpen settings are linked to the Sharpen mode of the Adjustment tools. This means you can use the adjustment brush or gradient filter as creative sharpening tools to 'dial in' more (or less) sharpness. Lastly, we have the new, improved noise reduction controls which offer more options than before for removing the luminance and color noise from a photograph.

Detail panel

To sharpen an image in Camera Raw, I suggest you start off by going to Bridge, browse to select a photo and choose File ⇨ Open in Camera Raw, or use the ⌘ R ctrl R keyboard shortcut. The Sharpening controls are all located in the Detail panel in the Camera Raw dialog. If the sample photo included on this DVD (that is used here to demo the sharpening controls) won't open via Camera Raw, check you have enabled TIFF images to open via Camera Raw in the Camera Raw preferences.

Amount slider
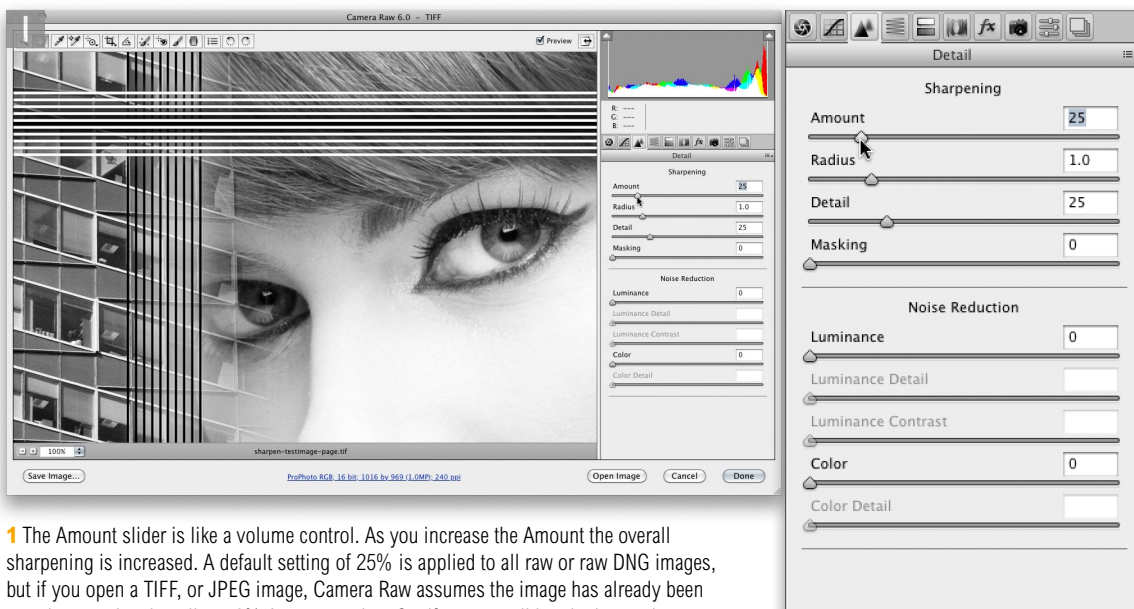
1 The Amount slider is like a volume control. As you increase the Amount the overall sharpening is increased. A default setting of 25% is applied to all raw or raw DNG images, but if you open a TIFF, or JPEG image, Camera Raw assumes the image has already been pre-sharpened and applies a 0% Amount setting. So, if you are editing the image that came on the DVD you will need to set this to 25% to simulate the default setting shown here.
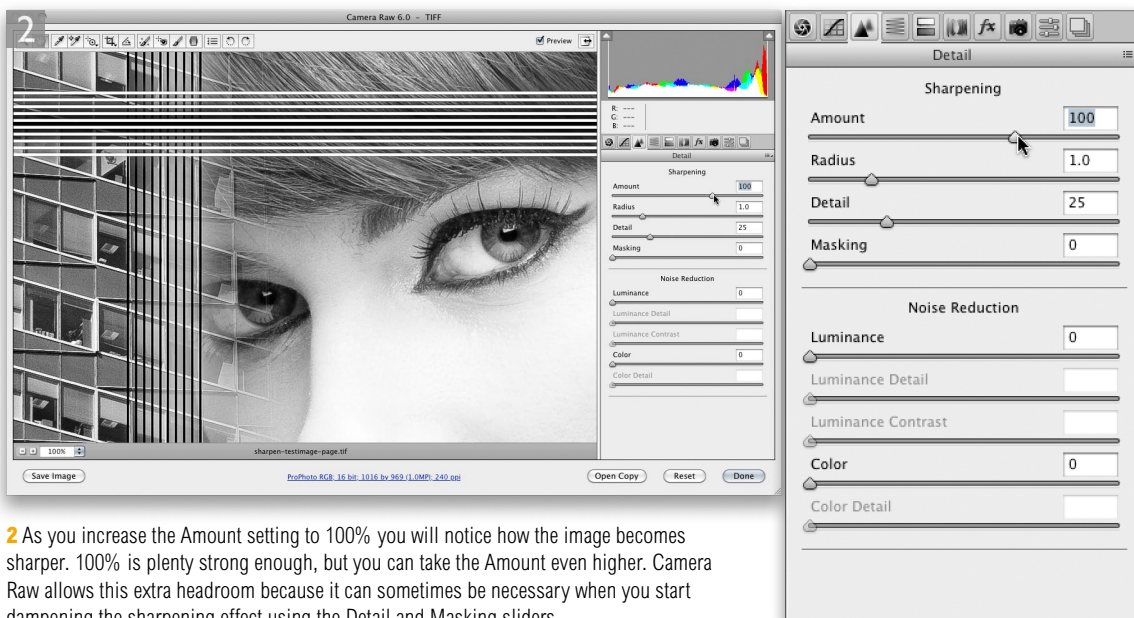

2 As you increase the Amount setting to 100% you will notice how the image becomes sharper. 100% is plenty strong enough, but you can take the Amount even higher. Camera Raw allows this extra headroom because it can sometimes be necessary when you start dampening the sharpening effect using the Detail and Masking sliders.

Radius slider
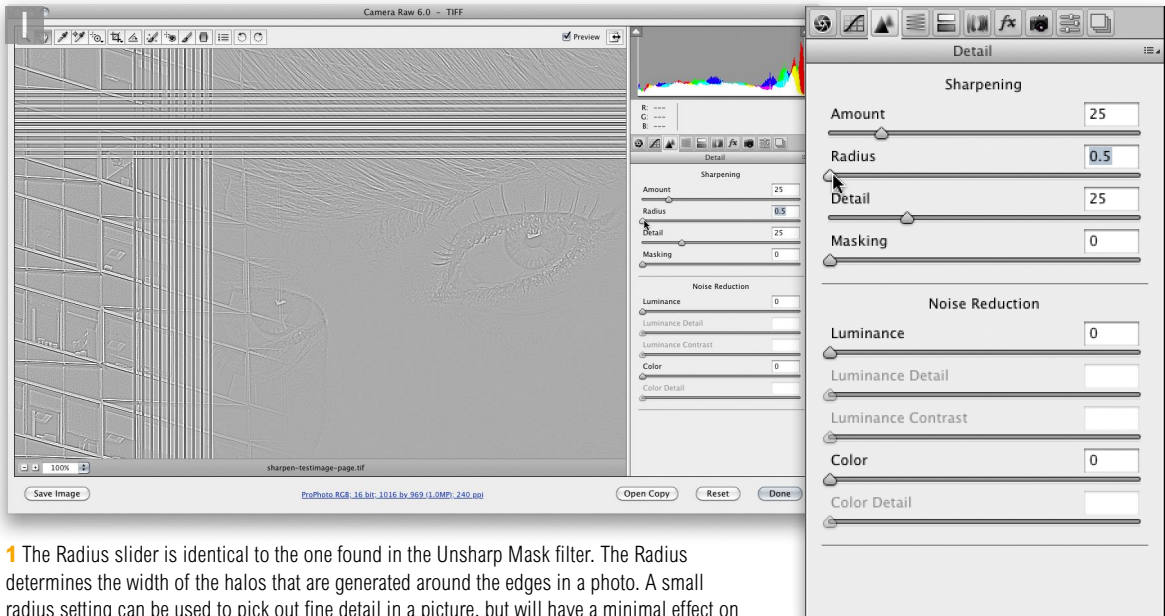
1 The Radius slider is identical to the one found in the Unsharp Mask filter. The Radius determines the width of the halos that are generated around the edges in a photo. A small radius setting can be used to pick out fine detail in a picture, but will have a minimal effect on the soft, wider edges in a picture.
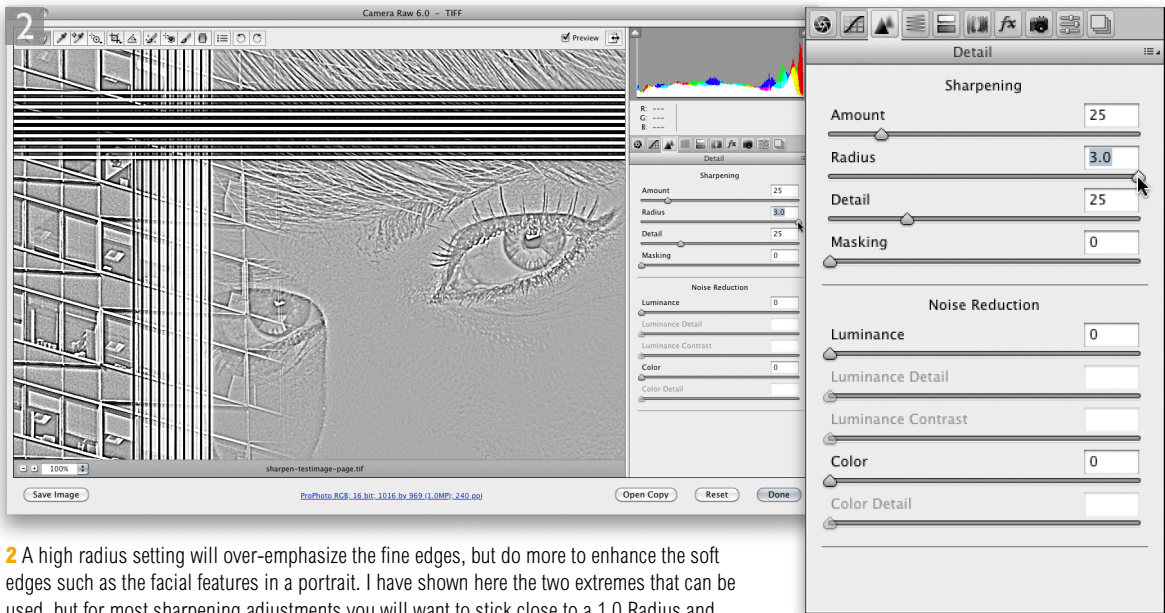
2 A high radius setting will over-emphasize the fine edges, but do more to enhance the soft edges such as the facial features in a portrait. I have shown here the two extremes that can be used, but for most sharpening adjustments you will want to stick close to a 1.0 Radius and make small adjustments around this setting.

The suppression controls

The Amount and Radius sliders are used to create the sharpening effect, while the next two sliders act as 'suppression' controls. These can be used to constrain the sharpening and target the sharpening effect where it is most needed.
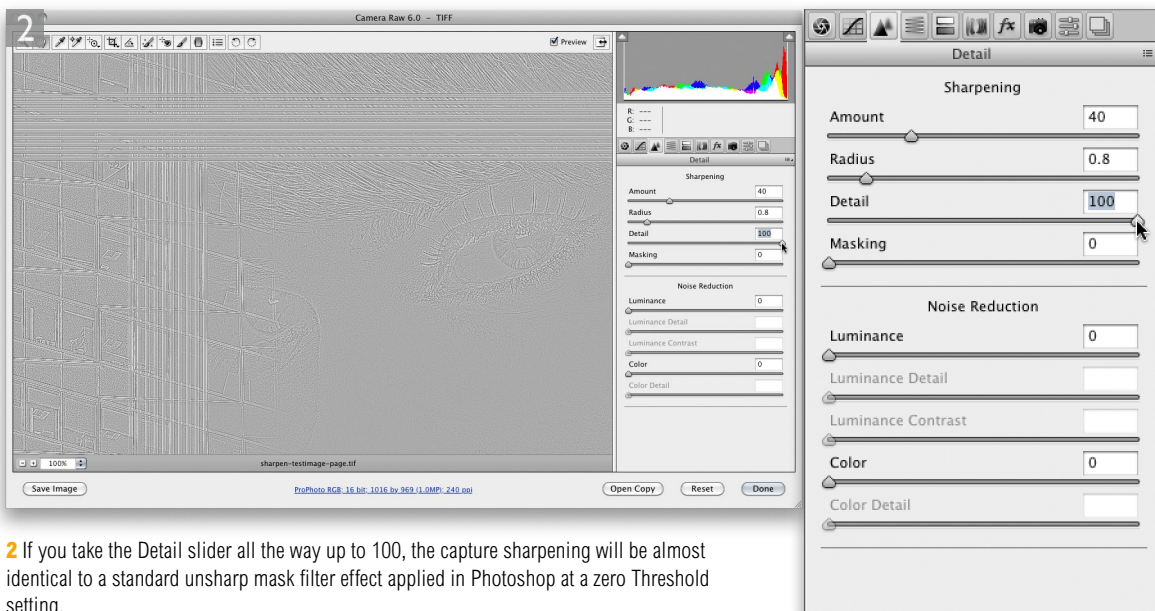
Detail slider

The Detail slider suppresses the halo effects in the image. It allows you to increase the Amount sharpening but without generating too noticeable halo edges in the image. There has always been a certain amount of halo suppression built into the Camera Raw Sharpening, but you can now use the Detail slider to fine-tune the Amount and Radius effects by setting Detail to a low value. One of the minor changes in the new Camera Raw 6 sharpening means that higher Detail slider settings are more likely to exaggerate the highest possible edge detail in the image. This can result in the Lightroom sharpening emphasizing more any areas that contain fine-textured detail (and noise). As a result of this you may want to avoid setting the Detail too high if this is likely to cause problems. Another option is to increase the Masking setting.
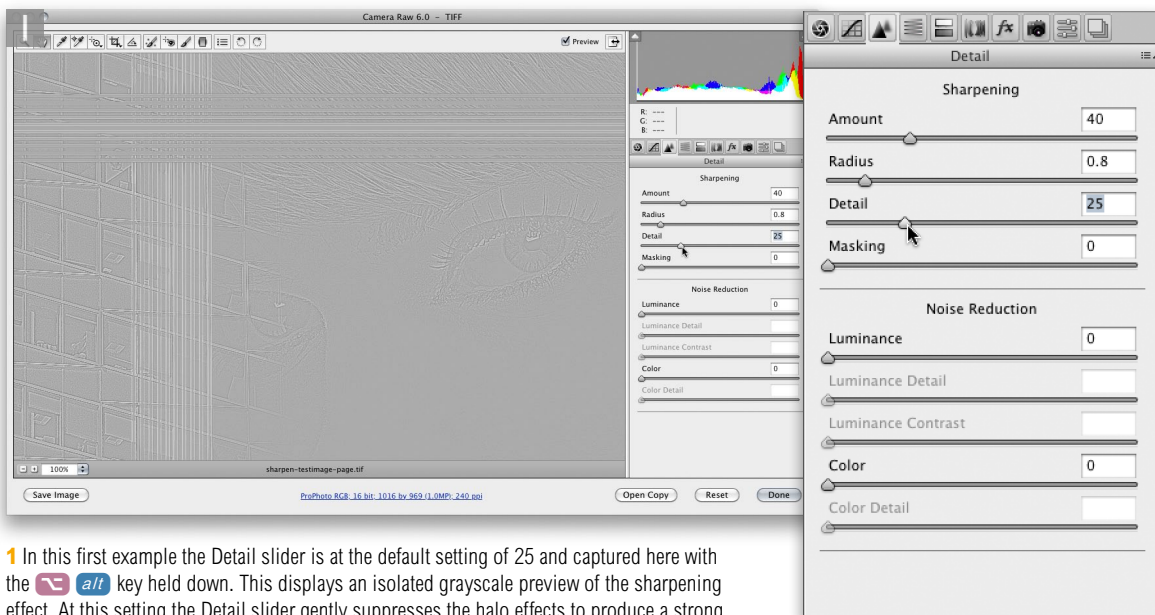
1 In this first example the Detail slider is at the default setting of 25 and captured here with the ⌥ alt key held down. This displays an isolated grayscale preview of the sharpening effect. At this setting the Detail slider gently suppresses the halo effects to produce a strong image sharpening effect but without over-emphasizing the fine detail or noisy areas of the image.

2 If you take the Detail slider all the way up to 100, the capture sharpening will be almost identical to a standard unsharp mask filter effect applied in Photoshop at a zero Threshold setting.
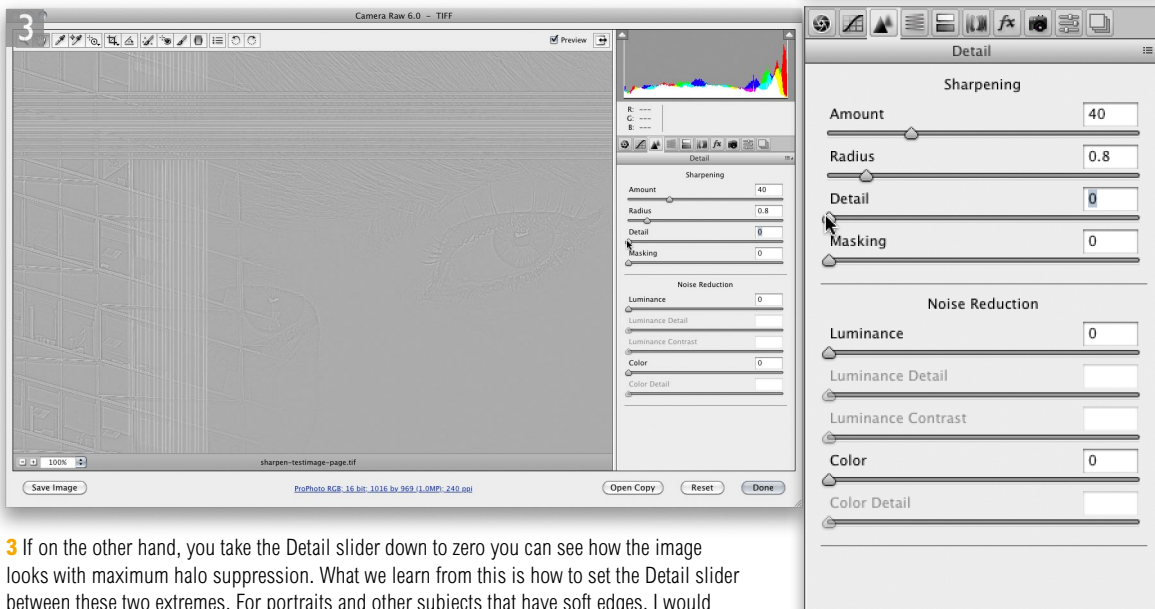
3 If on the other hand, you take the Detail slider down to zero you can see how the image looks with maximum halo suppression. What we learn from this is how to set the Detail slider between these two extremes. For portraits and other subjects that have soft edges, I would recommend a lowish Detail setting of around 20–30 so that you prevent the flat tone areas from becoming too noisy. For images that have lots of fine detail I would mostly suggest using a higher value of 30–50, because you don't want to suppress the halo edges quite so much. With these types of photos you probably will want to add more emphasis to the fine edges.

Masking slider
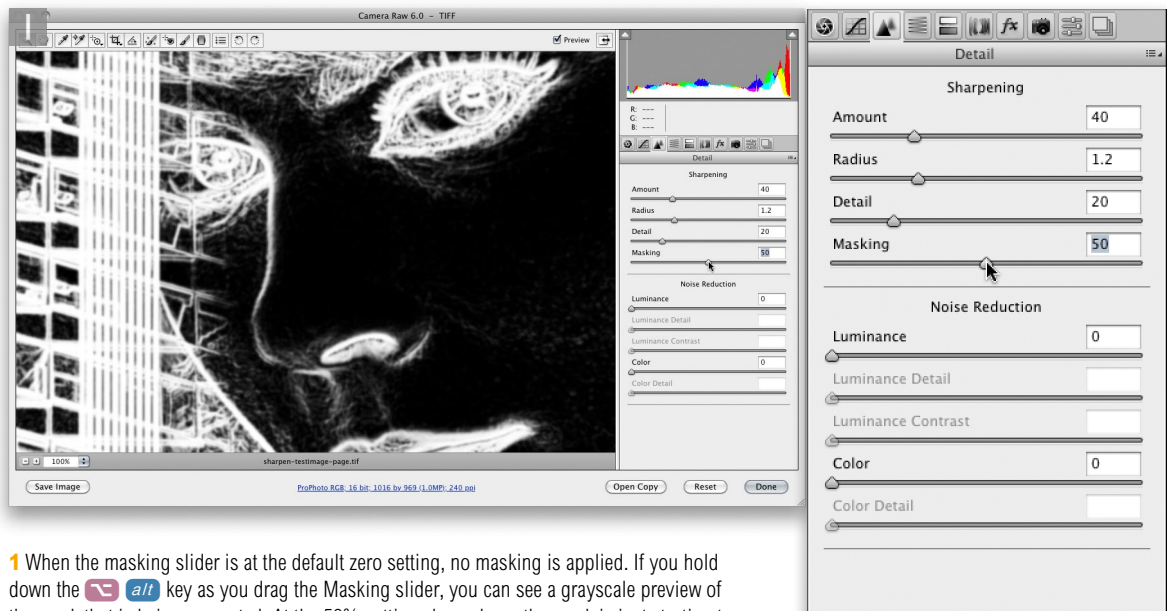
1 When the masking slider is at the default zero setting, no masking is applied. If you hold down the [⌥] [alt] key as you drag the Masking slider, you can see a grayscale preview of the mask that is being generated. At the 50% setting shown here, the mask is just starting to protect the areas of flat tone from being sharpened.
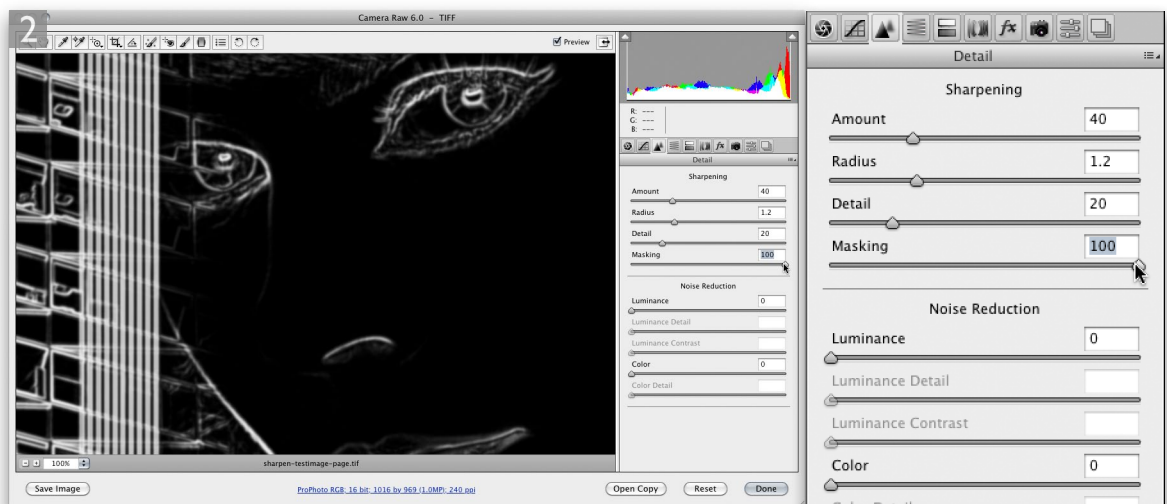
2 In this next screen shot you can see a preview where the Masking slider has been taken to the maximum 100% setting. In this example the masking is a lot stronger and protects all the flat tone areas leaving only the strongest edges unmasked. The sharpening effect is now only applied to the remaining white areas.

Noise removal in Camera Raw

All images are likely to suffer from some degree of noise, but the amount of noise present will vary according to a number of factors. The noise we see in scans made from film originals will mainly be down to the actual film grain in the film emulsion (especially if the image originated from a 35 mm film emulsion), whether it came from a color negative or chrome original, and what particular film emulsion was used. It can also be due to noise generated during the scanning process itself.

With digital images the noise seen will mainly depend on the quality of the camera sensor and what ISO setting the photograph was shot at. Some sensors definitely perform better than others when used at higher ISO speeds and with the most recent digital SLR cameras we have seen a remarkable improvement in image capture quality at high ISO settings. Another factor is exposure. In chapter 3 of the book I showed how deliberately underexposing a digital photo can lead to shadow noise problems as you compensate by increasing the Exposure slider amount. In fact, the shadow areas are always the biggest problem, and you should check the shadows first to determine how successful your camera is as at handling image noise. Whenever you shoot using a high ISO setting you will almost certainly encounter some noise. The new improved Noise Reduction sliders in Camera Raw offer better than ever noise reduction for processing digital images, so much so that I reckon Camera Raw should now be able to meet all your noise reduction requirements. As a consequence of this there may be less need to rely on Photoshop or third-party products to carry out the noise reduction. Bear in mind that JPEG capture images will have already been processed in-camera to remove any noise. To take full advantage of Camera Raw noise reduction, you'll need to work with raw capture images.

Detail panel Noise Reduction sliders

The Noise Reduction controls are shown in Figure 1. The Luminance slider is used to smooth out the speckled noise artifacts. The default setting is zero, but I think you'll find that even with low ISO captures it is helpful to apply just a little Luminance noise reduction, in fact my colleague Jeff Schewe likes to describe this as the fifth sharpening slider and suggests you always include adding at least a little Luminance noise reduction
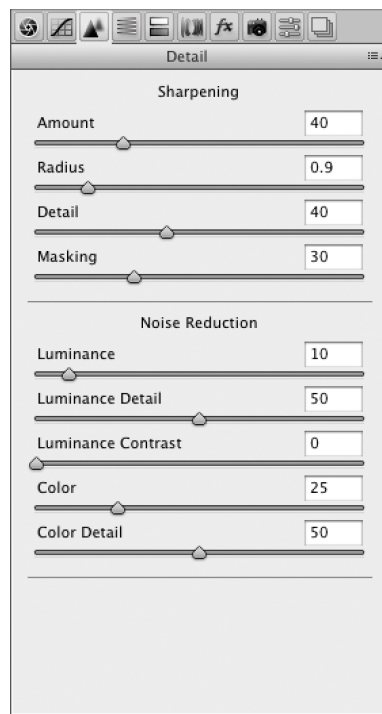

Figure 1 The Detail panel showing the Noise Reduction sliders.

Removing random pixels

Camera Raw noise reduction is also able to remove outlying pixels, those additional, random light or dark pixels that are generated when an image is captured at a high ISO setting. Camera Raw can also detect any dead pixels and smooth these out too. You won't normally notice the effect of dead pixels, but they do tend to show up more when carrying out long time exposures. Even then you may only see them appear very briefly on the screen as Camera Raw quickly generates a new preview image.

as part of a normal sharpening process. Excessive Luminance slider adjustments can lead to a softening of edge detail and to help counter this, the new Luminance Detail slider acts like a threshold control for the main Luminance slider, where the default setting is 50. When this slider dragged to the left you will see increased noise smoothing. However, as you do so, important image detail may get treated as noise and also become smoothed. Dragging the slider to the right reduces the amount of smoothing used and so allows you to dial back in any missing edge sharpness. With the Luminance Contrast slider the default setting is 50. The smoothest results are achieved by dragging the slider all the way to the left. However, doing so can sometimes make the noise reduction look unnatural and plastic-looking. Dragging the slider to the right therefore preserves more of the texture contrast in the image, but at the same time this can lead to increased mottling in some high ISO images. It is also worth pointing out here that the Luminance Contrast slider has the greatest effect when the Luminance Detail slider is set to a low value. As you increase the Luminance Detail the Luminance Contrast slider has less impact on the overall luminance noise reduction.

The Color slider works by separating the color from the luminance information and smooths out the color noise artifacts such as the magenta/green speckles you commonly see in noisy high ISO captures. For the most part you can safely crank the Color noise reduction slider up towards the maximum setting. However, increasing the Color noise slider can also result in color bleeding which will result in the fine color details in an image becoming desaturated. This kind of problem is one that you are only likely to see with really noisy images that contain fine color edge detail, so it's not something you need to worry about most of the time. The Color Detail slider allows you to help preserve color detail in such images and as you increase the Color Detail slider beyond the default 50 setting you'll notice how it preserves more detail in the color edges. Take care when you use this slider, because as you increase the amount that is applied this can lead to some color speckles reappearing along the preserved edges. In areas that have a strong color contrast you can see an over-sharpening of the color boundary edges. To understand more clearly the effect all of these sliders are having, you may want to zoom in to look at a 400% view.

Is the noise really visible?

Some of the latest digital cameras such as Nikon and Canon digital SLRs are capable of capturing images at extremely high ISO settings and although reviewers talk about seeing noise in these captures, I've yet to see much in the way of noticeable noise appear in print, unless you were to print an enlarged detail of what can be seen on the screen at say 2:1. The main point I am trying to make here is not to over-obsess when analyzing your images in close-up.
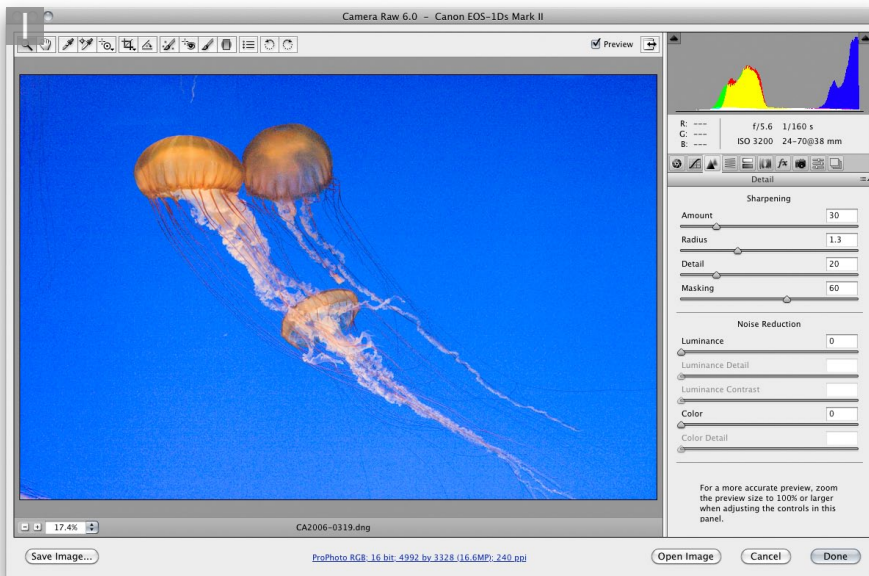
1 Here is a photograph that was shot at 3200 ISO and is a good candidate image with which to demo the Process Version 2010 color noise reduction.
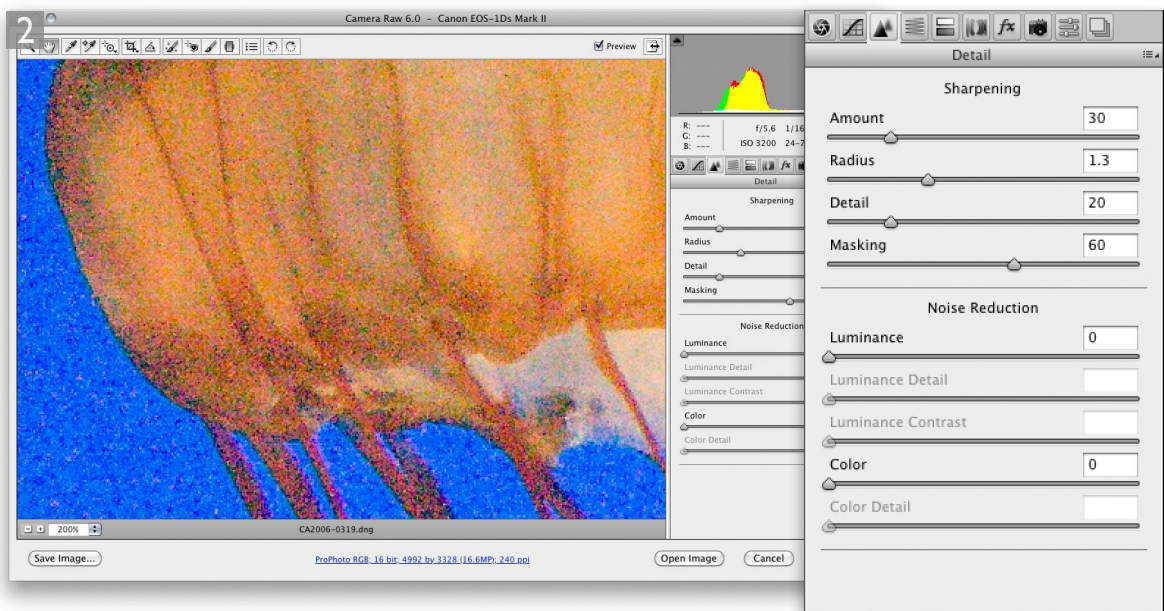
2 Here, I enlarged the image preview to 200% and set the Color slider to zero. As you can see, there were a lot of color noise artifacts in this image.
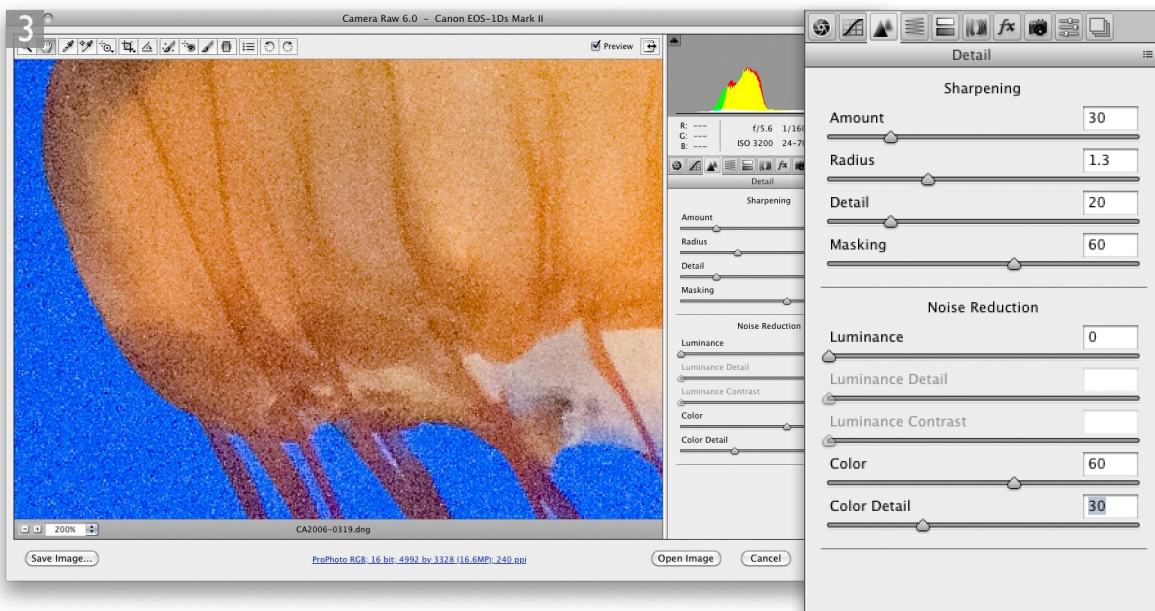
3 In this step, I applied a Color noise reduction of 60. The color detail slider can do a good job resolving the problem of color edge bleed that is commonly associated with color noise reductions. However, an excessive amount can cause edges with color contrast to appear unnaturally over-sharpened, so I applied a Color Detail setting here of 30.
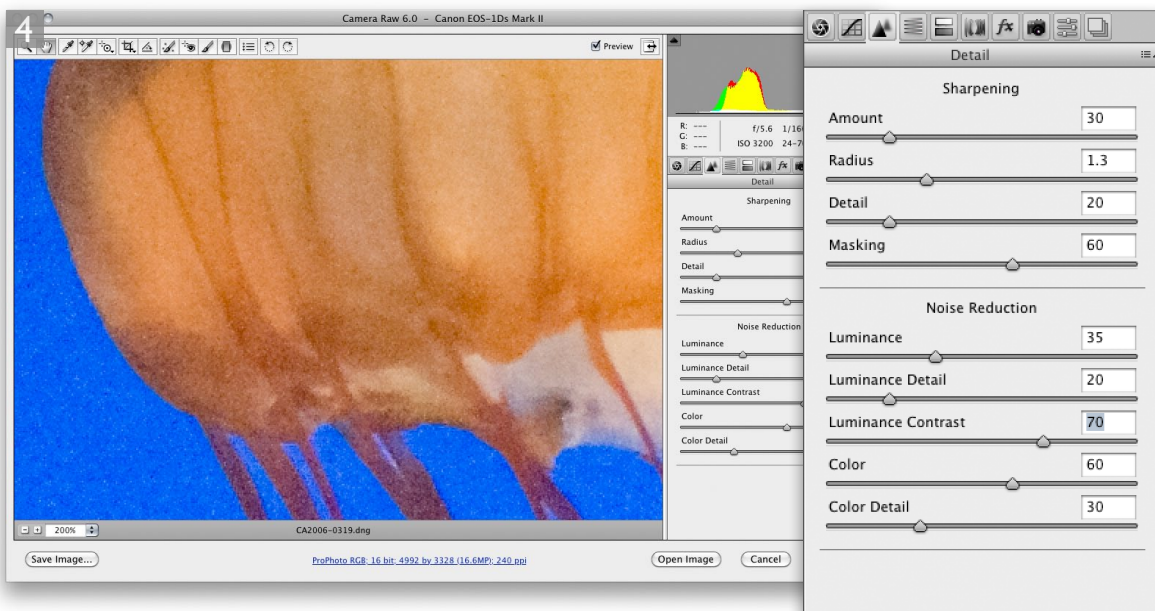
4 In this final version I applied a Luminance noise reduction of 35 with a Luminance Detail setting of 20 and a Luminance Contrast setting of 70.

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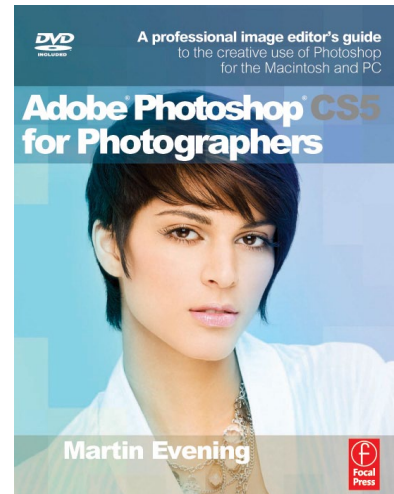
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