

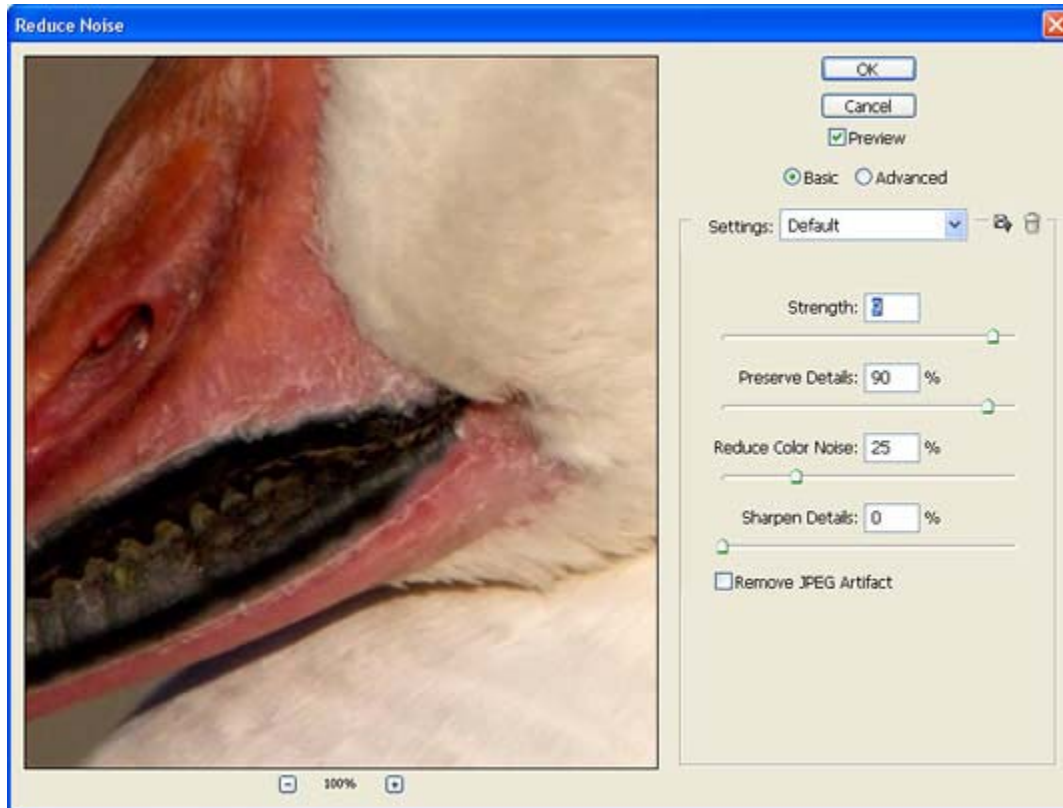
Noise Reduction in Photographs

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When I photograph birds and wildlife, I often use ISO 400 or even 800. Even though the recent Canon cameras are pretty good at high ISO, there is always some noise, in particular in the smooth, out of focus areas. It is not a problem: with Photoshop, it is quite easy to reduce the noise, and I've made excellent prints even from photos taken at very high sensitivities. Remember that, while it is possible to reduce the noise, it is not possible to correct the blur created by an excessively slow shutter speed: thus, don't hesitate to use high ISO when it is necessary.

Noise reduction with Photoshop CS3

Photoshop CS3 has a powerful noise reduction function that reduces effectively the "grain," keeping as much detail as possible. To open the NR window, click on the menu Filter > Noise > Reduce Noise. You can choose between a "Basic" and an "Advanced" interface; I always use the Basic option, since it is easier to use and faster, and it has all the controls that I need. On the left side of the window there is a large preview; in the right side there are four sliders.



Strength and Preserve Detail work together to determine the intensity of luminance noise reduction. I recommend setting both of them on a high value (I often use Strength 9 and Preserve Detail 90%). Remember that reducing luminance noise leads to a more or less pronounced loss of detail: don't use an excessive reduction!

Reduce Color Noise determines the intensity of color noise reduction. The color noise is the most annoying type of noise, but it can be reduced very effectively without any loss detail; the only downside is a diminution of color accuracy (the colors become less vivid and saturated). Depending on the image, I suggest using a value between 10 and 30.

Sharpen Details allows to apply some sharpening to the image; I suggest avoiding it (set the slider on 0%); it is better to use the much more sophisticated Smart Sharpen. The checkbox Reduce JPEG Artifacts is useful only with images that had been saved with an excessive JPEG compression; since I always use RAW, I leave this checkbox deselected.

The Reduce Noise window is a useful tool, but you should learn to use it properly. A common error is to apply excessive noise

reduction; the resulting image is noise free but it has lost a lot of detail and it has a "plastic," artificial look. I am quite "conservative" with noise reduction; it is better to leave a little noise than to get an over processed image.



Noise reduction workflow

Even though it is possible to apply noise reduction on the entire photo, I prefer to use a more advanced technique to preserve the detail of the subject and to get a cleaner image. With the Layer Mask, it is possible to apply the noise reduction only on the background, or to apply different levels of noise reduction on the subject and on the background.

This is a crop from the previous photo, without any adjustment other than the basic enhancements of brightness and contrast. The photo has been taken at ISO 400 and it was slightly underexposed (when I photograph a white subject, I often set the exposure compensation on -0.3 to preserve the detail in highlights), so there is little noise, in particular in the out of focus background.

In the second crop, I applied a slight noise reduction on the entire image (Strength 9, Preserve Detail 90%, Reduce Color Noise 25%).

With these settings, the photo looks pretty clean - the chroma noise has disappeared, and there is just a little luminance noise (the grain-like texture that you see in the background). The colors look slightly less saturated than in the previous crop, due to the color noise reduction, but the difference is very slight and the detail is still excellent.

It would be possible to print this photo with excellent results; the noise would be barely visible even in large prints. That said, if you want a 100% noise-free file, it is possible to enhance the photo even more, with selective noise reduction on background.

The first step is to duplicate the background layer (Layer>Duplicate Layer), to create a copy of the image. Now, you have the original image, in the first layer, which remains untouched, while you can apply strong noise reduction on the copy.

To remove completely the noise, apply the Reduce Noise filter with very aggressive settings (Strength 10, Preserve Detail 15%, Reduce Color Noise 0%).

Note that usually the color noise has been already eliminated with the first swipe of noise reduction, and now you are removing only the luminance noise. Set Reduce Color Noise on values higher than 0 only if there is still some color noise - you must not abuse of this control, even though it does not soften the detail: it reduces the color accuracy and it gives flatter, less punchy color.

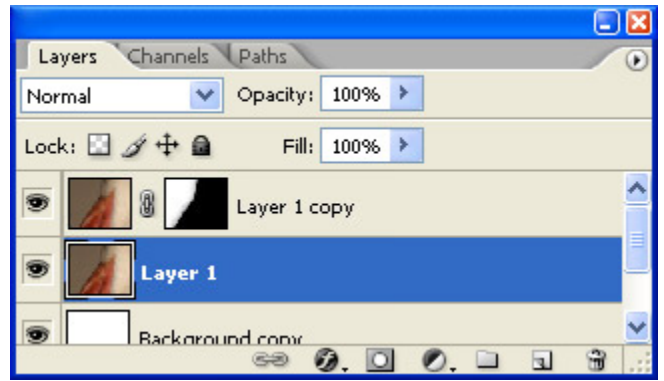
If necessary, you can apply the filter twice (even though usually one time is enough), while I recommend avoiding Gaussian Blur or Median: they are very effective, but often they create a very artificial-looking bokeh. The photo becomes very clean, noise-free, but of course the detail is completely smudged: to get a good result, you have to apply such strong noise reduction only on the out of focus areas, as the background.

Select the Layer Mask (Layer>Layer Mask>Hide All), and click on the Brush Tool. The Layer Mask is one of the most powerful and versatile tools of Photoshop - if you don't know well what it is and how it works, I recommend reading the article "Layers and Layer Mask."

Now, you have to "paint" on the areas where you want to apply the strong noise reduction. Usually, I select a relatively small brush (Master Diameter 50 or 60px, Hardness 70%) and I magnify the photo to 200% to follow precisely the borders of the subject. Remember that you don't have to touch the borders with the brush - otherwise they become a bit fuzzy. It is always better to leave a few pixels between the border of the subject the brush.

When I have finished the fine adjustments, I select a larger brush to apply the noise reduction on the rest of the background, and finally I flatten the layers with Layer>Flatten image. The fourth crop is taken from the final image: the subject is sharp and richly detailed, while the backound is nicely smooth and noise-free. This workflow takes a bit of time, so I recommend using it only on your best images; if you have to edit a large number of photos you can get quite good results even with a moderate noise reduction applied on the entire image.

The Layer palette: the white areas of the layer mask are the areas where I applied the strong noise reduction.



Juza lives in Italy. Ever since his childhood he has been fascinated by nature. In 1999 he began photographing nature subjects with a Nikon N60 film camera. Since 2005, he photographs exclusively with Canon digital SLR cameras, and is now a full time professional photographer. His goals - as nature lover and photographer - are to create photos that are both artistically pleasing and valid natural history images. To see more of Juza's work, please go to <http://www.juzaphoto.com/>.

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