

Craig Wassel

PHOTOGRAPHY

This month's article – Selective Noise Reduction - is more of a tutorial with commentary mixed in. Noise reduction is a very popular topic in many photography forums, and it is even often hotly debated. For that reason, I have added some opinion about when and how much noise reduction should be used, and – further – how noise reduction can be applied selectively rather than to an entire digital photograph.

Before we begin our noise reduction quest, we need to consider a question: is noise reduction even necessary for our image? The noise we see when viewing a digital image on a monitor is often greater than what we will see when we print. This is due to the low resolution capability of monitors compared to the high resolution of good prints. For more about this, read my January 2009 commentary "[Print Early and Often](#)".

If you are not sure your image needs noise reduction, then it probably does not. At the very least, keep one unprocessed copy of your original file. In my opinion, noise reduction has become one of those over applied and overdone techniques like HDR. Used it sparingly – like cologne – and you will make fewer people's eyes water. That is why this commentary is not named "noise reduction" but "selective noise reduction". In practice, I actually skip noise reduction more than I use it. When I do use it, I scrutinize why, where, and how much. With that out of the way, let's get started.

First, know that the technique I describe below is just that: a technique. Although I use PhotoShop as my image editor and Nik Dfine as my noise reduction filter, this technique can be done using other image editors that have layer and masking tools, and nearly any tool (including the PhotoShop's native tools) or plug-in can be used to perform the noise reduction.

Next, we need an image with noise we want to "quiet". If you don't have one, take or find an image at ISO 400 or greater that includes blue sky and some landscape. There will be noise in the blue sky that will be easy to target, and a good area of comparison once you are done. For this tutorial, I chose a photograph I took in color, but that I was picturing as a yellow filtered, high contrast monochrome. I chose it because the noise in the sky will become more pronounced when the monochrome conversion turns it from a nice blue to a dark and foreboding grey. Although I want to reduce noise in the dark sky, I also want to prevent noise reduction from softening of any of the foreground elements. The juxtaposition of the crisp foreground elements against the dark sky is part of what makes this photograph work, and I don't want to lose any of that. Therefore, I want to selectively reduce the noise in my blue sky before I convert it to monochrome.

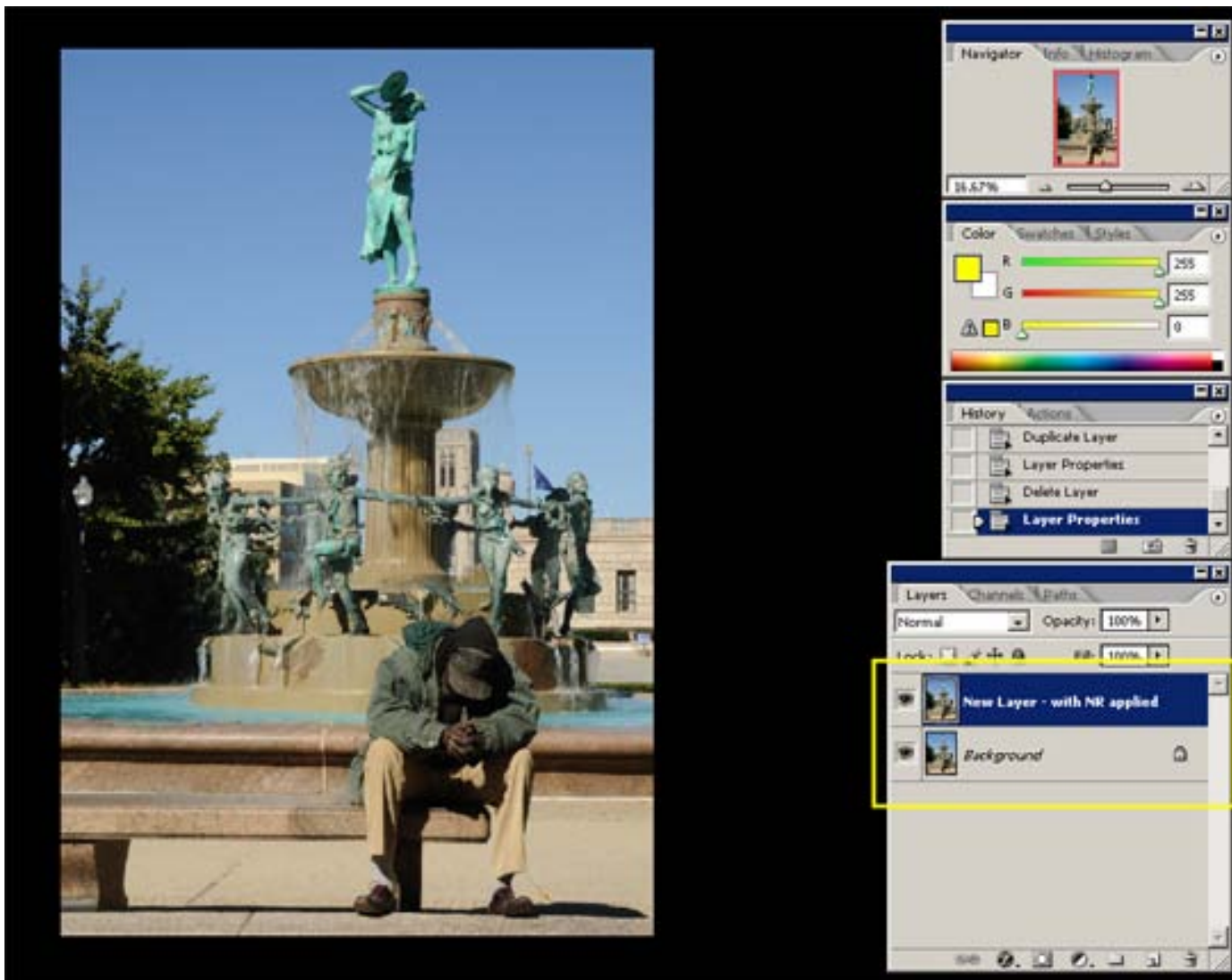
First, open the image into PhotoShop. By default, the image will begin as a single, locked "Background" layer. Next, make a copy of the "Background" layer by going to [Layer → Duplicate Layer ...]. By default, PhotoShop will name the new layer "Background copy". For those not used to dealing with multi-layered PhotoShop files, it's good to give

layers meaningful names to keep track of what each ones purpose/state.

Now it is time to perform our noise reduction, which at this point will not yet be “selective” (we will make it “selective” in the next step). We can use PhotoShop’s built-in noise reduction [Filter → Noise → Reduce Noise], Noise Ninja, Nik DFine, or any other plug-in. Again, the technique is the key, and not which noise reduction tool/plug-in is used. What is important is that we apply the reduction to the new, duplicate layer. Most plug-in filters have the option to automatically create a new, duplicate layer and apply the noise reduction to it. We just need to end up with two layers that are arranged like this (Figure 1):

New Layer -	with noise reduction applied
Background -	with No noise reduction applied

Figure 1

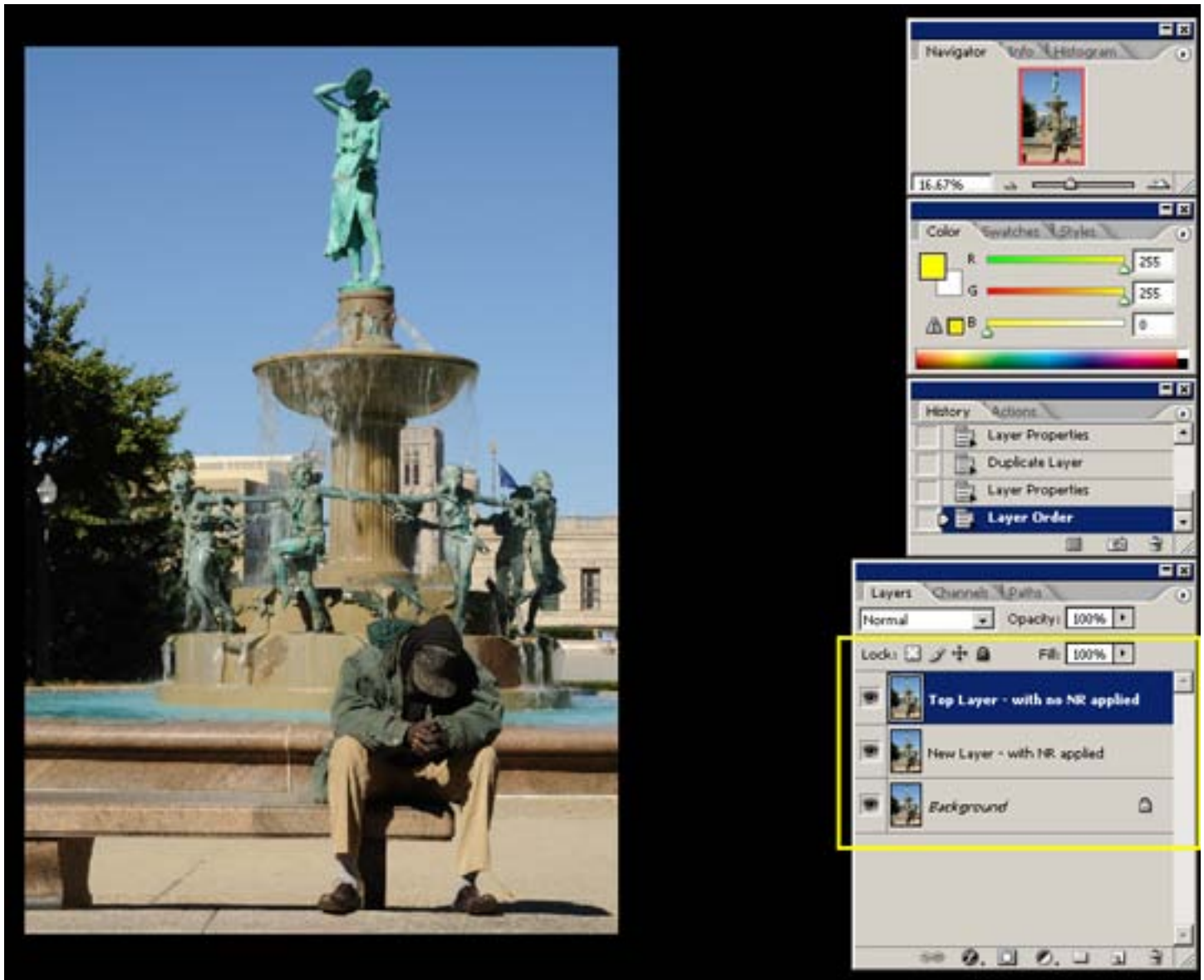


Now we have a new, top layer that has noise reduction fully applied. To make our noise reduction selective, we will need to make another copy of our original, unaltered, “Background” layer and move it to the top of our layer stack. Do

so by clicking the “Background” layer to select it, and then going to [Layer → Duplicate Layer ...]. Again, give it a meaningful name and then drag the layer to the top of the layer stack. We should now have layers that are arranged this (Figure 2):

Top Layer -	with No noise reduction applied
New Layer -	with noise reduction applied
Background -	with No noise reduction applied

Figure 2

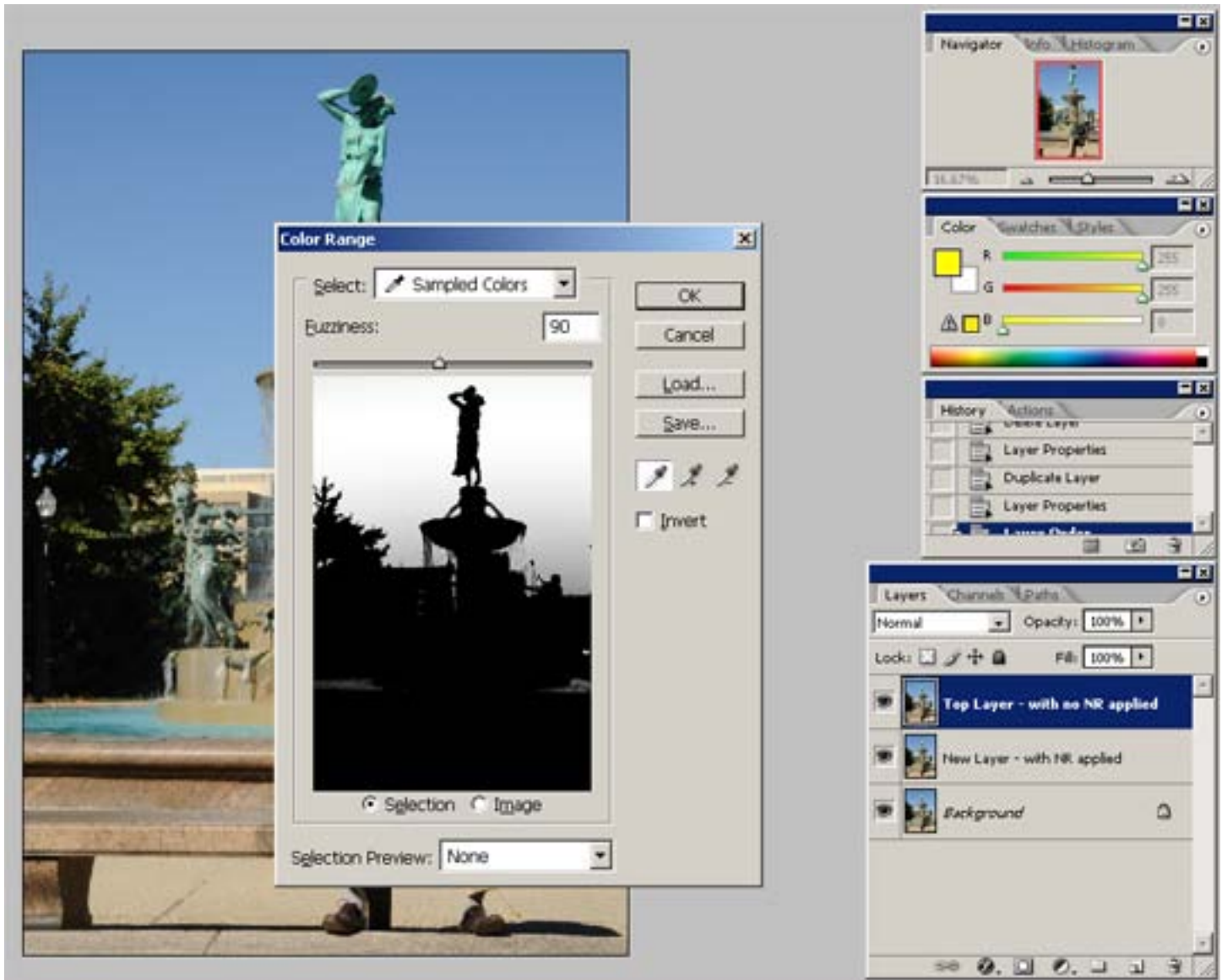


Notice that our result so far is a “Middle” layer with noise reduction applied that is “sandwiched” between two original, identical layers that have no noise reduction applied. Unlike the tool we choose to perform our noise reduction, this layer order is crucial. We not only need it to get the next step right, but also to leave ourselves options and flexibility in later steps.

Now we approach the task of removing the sky from our top layer, which will expose just the sky of the middle layer. Remember that the middle layer has had noise reduction applied to it. Therefore, if we only remove the sky from the top layer and only expose the sky of the middle layer, that will be the only part of the finished image where noise reduction is applied. This is why this technique is called “selective noise reduction”.

The question is how to quickly and easily remove the sky on the top layer to reveal the noise-reduced sky of the middle layer. Fortunately, PhotoShop’s “Color Range” tool is our powerful answer. First, make sure the top layer is selected. Next, go to [Select →Color Range] on PhotoShop’s menu bar. When the “Color Range” box opens, use the pre-selected eyedropper tool to click on a part of the sky. With that one click, most of the sky should be selected (**Figure 3**).

Figure 3

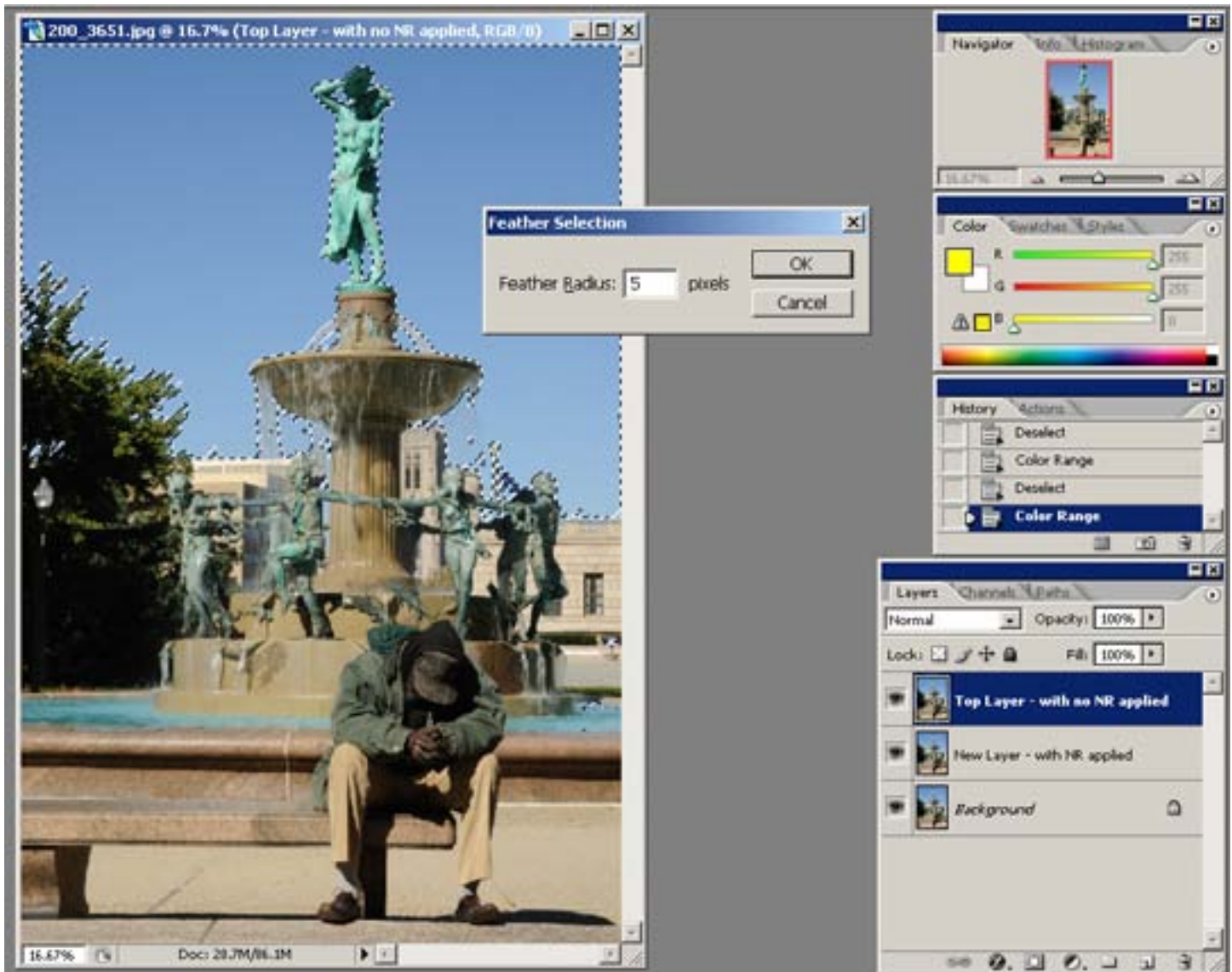


The “Color Range” tool is more sophisticated than it first appears, so here are some quick notes for first time users: The selected color will appear as “white area” in the preview box. We can narrow or broaden the range of similar colors

included in our selection by increasing or decreasing the value of the “fuzziness” slider. We can manually add specific colors to our selection by using the eyedropper with the “+” beside it and clicking on the image. Likewise, we can manually remove/deselect colors from our selection by using the eyedropper with the “-“. Re-selecting the first eyedropper and clicking anywhere in the image will clear and replace all current color selections with a new one, and restart the selection process. These tools become very useful when working on images containing similar colors that are more difficult to separate.

Once we are satisfied with our color selection and click “OK” in the “Color Range” box, we return to our image and our color selection is noted by a moving dotted line. Our next step is to add a “feather” to the selection (**Figure 4**).

Figure 4

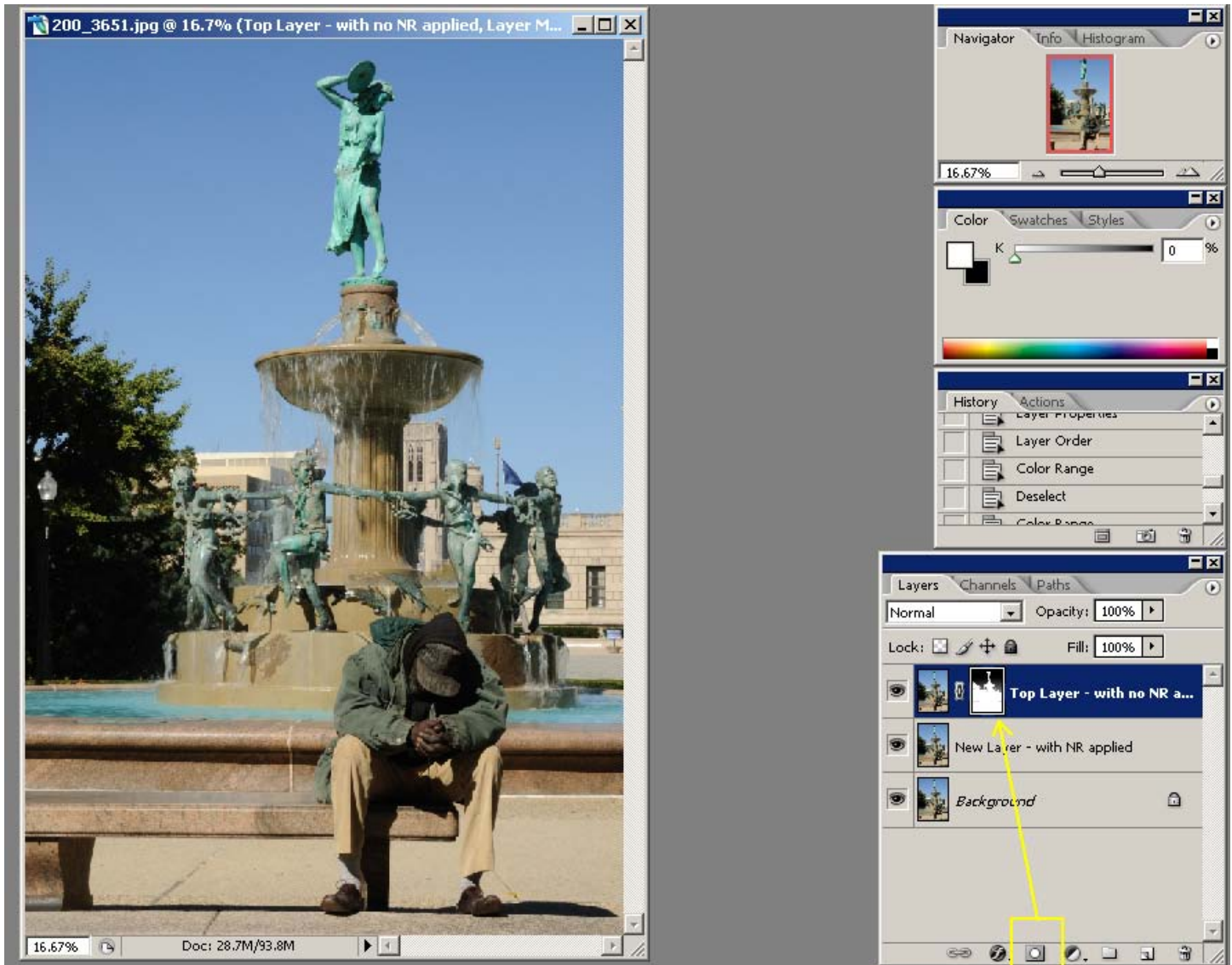


To add a feather, choose [Select → Feather] from PhotoShop’s menu bar. The idea of feathering is to blur the edges of a selection so that editing done on the selection does not have a hard edge, and allowing it instead to subtly blend into the entire image. There is no right answer about how much feathering to apply, but a radius of 5 is a good place to start.

Now we arrive at the point where we use our blue color selection to selectively reveal the blue sky of the middle layer. This is called masking. Remember the middle layer has noise reduction applied, and since we are only exposing the sky of the middle layer, it is the only part of the final image where the noise reduction will be exposed. Think of it like cutting a hole in top layer to see part of what is on the second layer.

First, make sure our top layer is selected. To create the mask, simply click on the icon in Photoshop's "Layers" palette that looks like a square with a circle in it (Figure 5).

Figure 5

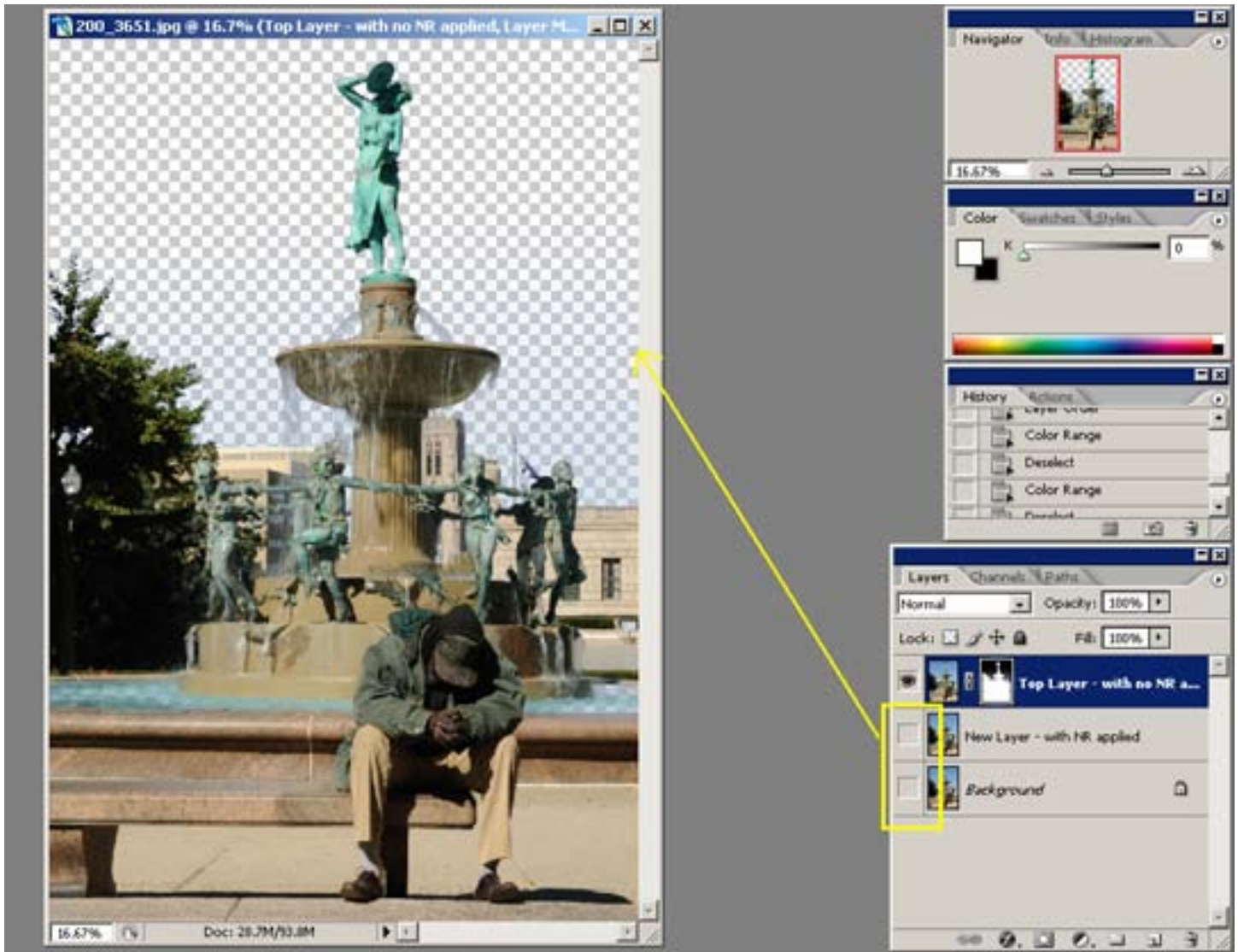


We should now see a new, square, black and white element appear on our top layer that gives us a thumbnail preview of our mask and what we will remove from our top layer.

Crucial: we need to make sure that our sky truly is what will be removed from our top layer, and that our mask is not revealing the opposite of what we want. For those who have not dealt with masks before, this mistake is easy to make. It is also easy to check if the mask is correct, and easy to fix it if it is not.

To check the result of the mask, simply un-click the “eyes” beside the middle and bottom layers (**Figure 6**) to hide them.

Figure 6



If our mask is correct, the sky from our top layer will all but disappear, and will be replaced with PhotoShop’s checkerboard pattern that tells us there are essentially no pixels present. If the opposite happens – the sky remains and almost everything else disappears - then our mask is reversed and needs to be corrected. To correct it, we click the mask thumbnail in top layer to select it, then select [Image → Adjustments → Invert] from the menu bar. If you are comfortable with keyboard shortcuts, the faster way is to click on the mask and then hold the Apple (Mac) or Ctrl (Windows) key down and click the “i” key.

Once the mask is applied properly, note a couple of things: First, there may be some traces of light blue left behind from our masking. This is normal, and is partly the result of our “Color Range” selection. It is also partly the result of the feathering we applied to our “Color Range” selection. Not only is this normal, it is desired. We don’t want glaring seams between where noise reduction is applied and where it is not. We want the layers and mask to blend together seamlessly.

Second, notice that through this whole process we kept an original “*Background*” layer at the very bottom of our layer stack. We actually could have deleted it and still accomplished our goal. There is an interesting reason to keep it, though. What if – in the editing process – we decide that even the amount of selective noise reduction we applied to the middle layer was too great? Guess what? If we reduce the opacity of our middle layer to 50%, we also reduce our noise reduction by 50% as well because the middle layer will blend in seamlessly down into the original, bottom, “*Background*” layer. If the “*Background*” layer was not there, we would be blending down into white or a background color other than white. Either the saturation or the color of the image would be altered in an undesirable way.

Well, let’s say we are now satisfied with our selective noise reduction and our layers and our masks. What do we do to finish? We might want to save it as a .psd first, which will preserve all the layers and the mask. This, of course, allows future editing without re-doing all the steps. Aside from that, it is time to flatten the layers and mask into one flat file so it can be saved as a printable .jpeg or .tif. Simply choose [Layer → Flatten Image] from the menu bar, and save the image.

To wrap up, remember the best way to decide when and how much noise reduction to apply is to print early and often. From a noise perspective, 300 dpi prints are usually cleaner than what we see on a 96 dpi monitor at high magnification. If we become familiar with the way our photographs look in print, we learn that noise reduction is needed much less often than we think, and in lower amounts.

If noise reduction is needed, I have shown here that it does not have to be applied to a whole image or even always at 100%. It can be applied to specific areas of the image by leveraging PhotoShop’s “Color Range” tool, and can be blended seamlessly into the rest of the image. Last, using the three layer technique I showed here, last minute adjustments to the percentage of selective noise reduction can be easily made.

For those of you curious about the look of this photo after the monochrome conversion, it follows on the next page ☺

Happy shooting and thanks for reading,

Craig



Craig Wassel Photography
<http://www.craigwasselphotoart.com>
craig@craigwasselphotoart.com
630.849.8511