

digital noise reduction. Chroma noise is removed on a L*a*b mode duplicate and copied back to the original photo.

There are five progressive levels of digital noise reduction available in the **TLR Digital Noise Reduction** action set. There's also a manual action where you control the individual settings from mask generation through noise reduction.

There are Javascripts in the **TLR Professional Sharpening Toolkit** that employ the same method of noise reduction as the actions in the **TLR Digital Noise Reduction** action set.

Third-Party Tools for Reducing Noise

The available tools in Photoshop that perform noise reduction aren't nearly as sophisticated as some of the third-party tools. The Adobe engineers can refer to the **Reduce Noise** filter as a "smart" tool, but it's not really that smart. Not unless you're comparing it to something like the **Dust & Scratches** filter.

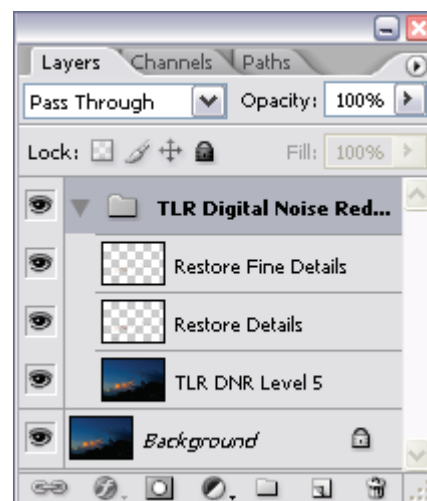
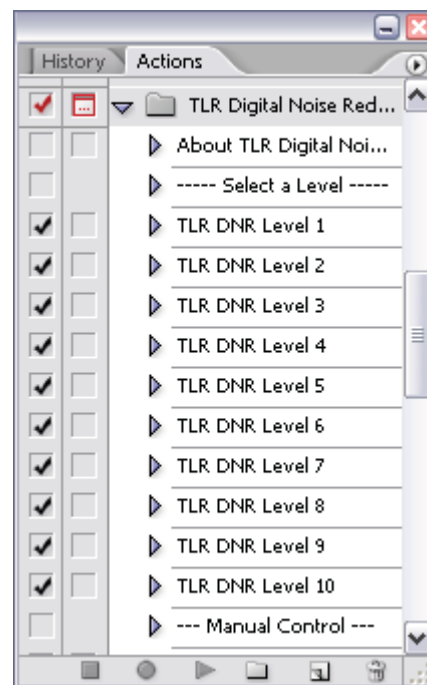
The same is true for my actions and Javascripts. I tried to give them some extra smarts, but they just automate tools like the **Dust & Scratches** filter and embellish the result with layer masks. The third-party plug-in filters do a superior job of reducing noise.

The major tools on the market for noise reduction at the time I was writing this eBook are Neat Image, nik! Dfine, and Noise Ninja. Power Retouche, a bundled set of photo editing tools, also includes the Power Retouche Noise Filter.

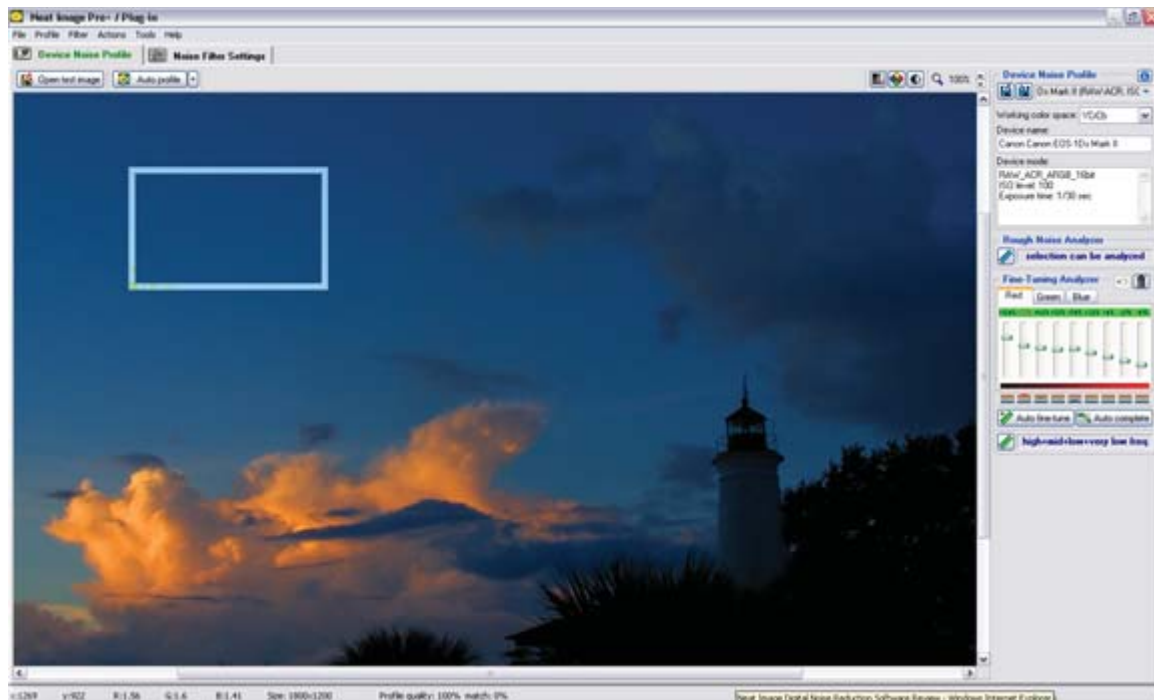
Neat Image

Neat Image has been my personal tool of choice for noise reduction for a few years now. It comes in several versions. Home, Home+, Pro, and Pro+. The major difference between the home and pro versions is support for 16-bit images. If you work with RAW files from a DSLR or high resolution scans, you'll want one of the pro versions. The "+" versions include a Photoshop plug-in filter. Without the "+" designation, all you get is a standalone sharpening program. I use Neat Image Pro+.

Neat Image, nik! Define, and Noise Ninja all recognize that the source of the image makes a big difference in the type and amount of noise. CCD and CMOS sensors have different noise characteristics. The digital signal processors (DSPs) employed by different digital



The included actions and scripts work hard at retaining image details. You end up with three layers. A noise reduction layer and two layers to restore details.



You start by identifying an area of the photo without any significant detail. Neat Image analyses the area for noise. Or, you can click on the Auto Profile button and Neat Image will select a featureless area of the photo to analyze.

cameras and scanners handle noise differently. Etc. Neat Image includes a test target that you can use to profile your digital camera. You can also download profiles from the Neat Image site for different DSLRs.

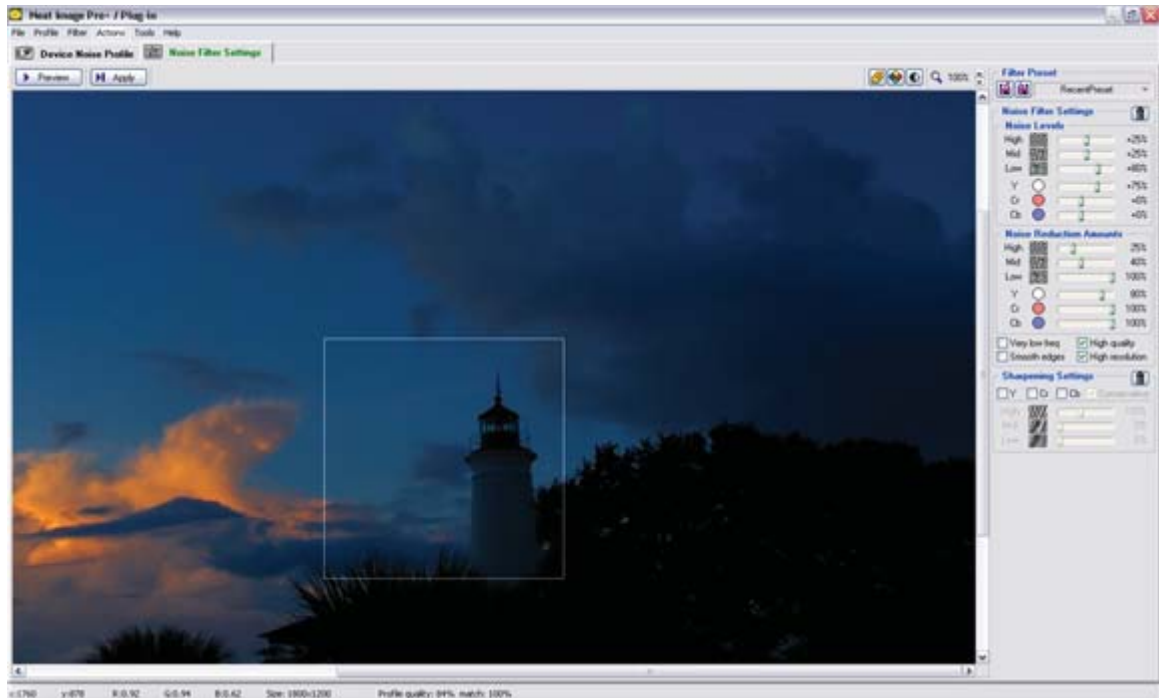
Device noise profiles are an important advantage over the tools available in Photoshop. They allow you to adapt noise reduction to your specific camera or scanner.

The noise reduction algorithms in NeatImage are a lot more sophisticated than despeckling, averaging with the Median filter, or running the Dust & Scratches filter. You don't get the artifacts that sharpening draws out from the Reduce Noise filter, either.

Effective noise reduction requires intense computation. Neat Image can take a long time to run on high resolution film scans and photos from pixel manic cameras like the Canon 1Ds MkII. That's not a fault of Neat Image. All of the noise reduction plug-ins for Photoshop can take a while to run. The more sophisticated the analysis and noise scrubbing process, the longer it takes to complete the task.

The Photoshop plug-in versions of Neat Image work with other photo editing programs, too, as long as they support Photoshop filter plug-ins. For other photo editors, you can use the standalone version. Neat Image provides excellent support. There's an active support BBS. Minor upgrades within the same version (*e.g.*, 5.x) are free.

You start with the Device Noise Profile tab. You can click on Auto Profile and let Neat Image make a selection on your photo to analyze. If you want to take control manually, you can make a selection. The selection should contain no significant detail. If your selection is not large enough (60x60 pixels), Neat Image will warn you. It will also warn you if any of the channels are clipped. If Neat Image grabs a selection with detail, you can move the selection or draw one of your own manually. Click on the Auto Profile button with an active selection and Neat Image will analyze



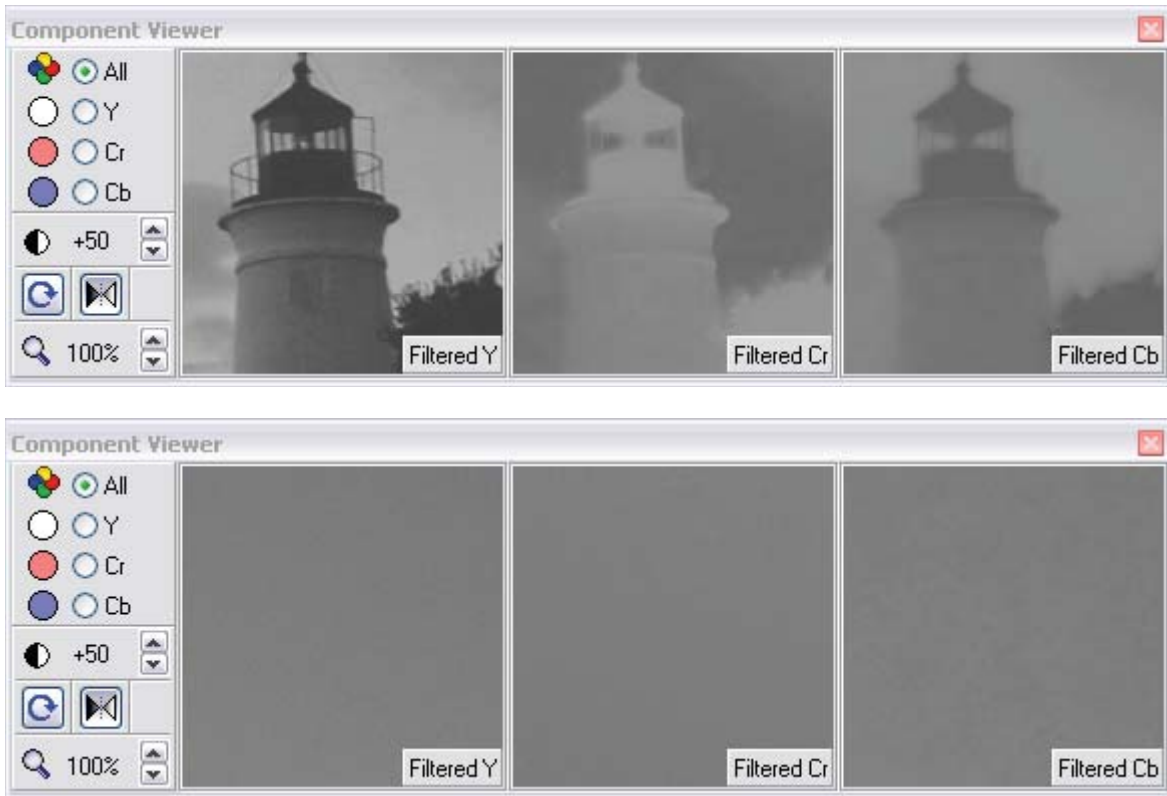
You can make a selection and preview the results on the Noise Filter Settings tab.

the selection and make a noise profile. You can also fine tune the analysis by making multiple selections and clicking the button for the Manual Fine Tuning Analyzer. In other words, you have a lot of control over the noise analysis phase, but only if you want it. Otherwise, you can handle the noise analysis with just two clicks of the Auto Profile button.

The user interface looks a lot busier than my overview would imply. Neat Image gives you the ability to precisely control the entire noise reduction process. You can click twice to generate an noise profile and once more to apply the settings and be done *or* you can manually adjust the noise reduction settings. The Neat Image site has lots of documentation and tutorials to help you get the best possible result.

Neat Image gives you finer control over the noise reduction than the other noise reduction tools. You can separately control the amount of filtration for three frequencies and three channels. This allows you to be more aggressive about noise reduction involving tiny grains or larger clumps and even refine the noise reduction among the component channels.

One feature that I really like is the ability to preview a small selection. After Neat Image builds the noise profile for the photo, you go to the Noise Filter Settings tab, where you can make a small selection on your photo. Neat Image will run the noise reduction settings within the selection when you press the Preview button. You can see visually right there what is going to happen to your photo and compare it with the noisy remainder. If you like, you can press the Preview button twice without a selection and Neat Image will grab one for you and generate the preview. The Apply button will apply noise reduction to the entire image. Checking a small preview can save a lot of time as you try to refine the noise reduction settings for their best effect because updating the small preview is nearly instantaneous.



The Component Viewer helps you visualize the noise in your photo. Here are two samples, one with image details and the another with a featureless portion of the sky.

The Component Viewer is a really helpful feature for advanced users. Again, you start with a small selection on your photo. The Component Viewer shows you the separate channels. By default, Neat Image converts images to the YCrCb working color space. This is a color space used in television production and image compression (JPEG uses it, for example). It's similar to L*a*b, where the Y channel is the luminance channel, the Cr channel is a red-blue green chrominance channel, and Cb is a blue-yellow chrominance channel. You can instead set the component viewer to display the RGB channels. Internally, Neat Image is going to convert back and forth to YCrCb, where separation of luminosity information improves the reduction of luminosity noise and chroma noise.

The Component Viewer makes it easy to visualize the noise in your image. You can make better decisions about the filter levels by analyzing the channels on the Component Viewer. Looking at the samples above, the noise in the Y channel is light and grainy. The Cr and Cb channels alternately show a moderate mottling in the two samples. I would be inclined to focus on the chroma noise and reduce any inclination to apply a healthy dose of luminosity noise reduction. That's good to know, because it's excessive luminosity noise reduction that softens photo details.

You can load **StMarks LighthouseNeatImage.psd** to see the result from Neat Image using its automated noise profile generation and noise reduction settings. No tweaks were applied.



More information on Neat Image is available from <http://www.neatimage.com>.

Noise Ninja

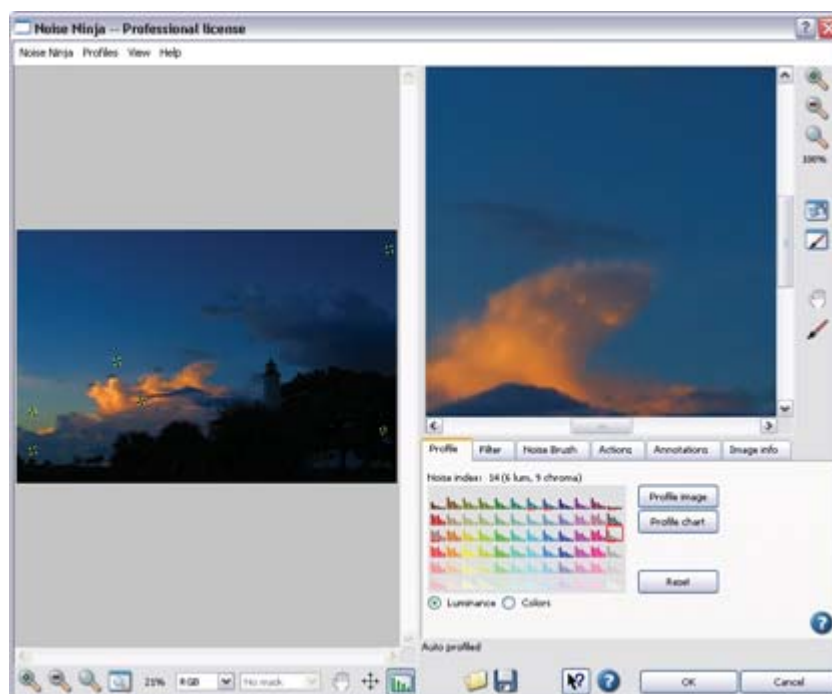
Noise Ninja is another popular tool for noise reduction. As with Neat Image, there are multiple versions of Noise Ninja. There's a home standalone version, a home bundle, a pro standalone version, and a pro bundle. The bundles include both a standalone application and a Photoshop plug-in. The pro versions support 16-bit images, batch processing, and multiprocessors.

The more I work with Noise Ninja, the more it becomes my personal tool of choice. There is a lot to recommend both Noise Ninja and Neat Image. It's obvious that Jim Christian has put a lot of thought into Noise Ninja.

Noise Ninja supports the use of device profiles. So does Neat Image and nIK! Dfine. The profiles on Neat Image are submitted by users. The profiles for nIK! Dfine are purchased separately. You get one set free, but if you have more than one camera or scanner, expect to pay around \$49.95 per device. Noise Ninja installs high quality profiles for dozen of cameras. You can download more from their site. You can build your own profile, too, with the supplied target.

Neat Image lets you preview a small thumbnail and while you can use its **Component Viewer** to view individual channels, switching between YCrCb and RGB is kind of clunky. Noise Ninja gives you all of that right from its user interface. You have a main window and a preview window. Go to the bottom of the UI and there's a dropdown box for selecting individual channels. If you let Noise Ninja do its automated schtick, you won't appreciate the virtue of being able to select individual channels and scrolling around the image to diagnose noise.

I have mixed feelings about the filter controls. They're the little color wedges you see at the bottom of the Noise Ninja UI. I lean towards the interface in Neat Image because it allows me to tweak the profile with a set of sliders for each



Noise Ninja's user interface makes it very easy to sweep over an image to identify noise and to see a preview of the noise reduction.

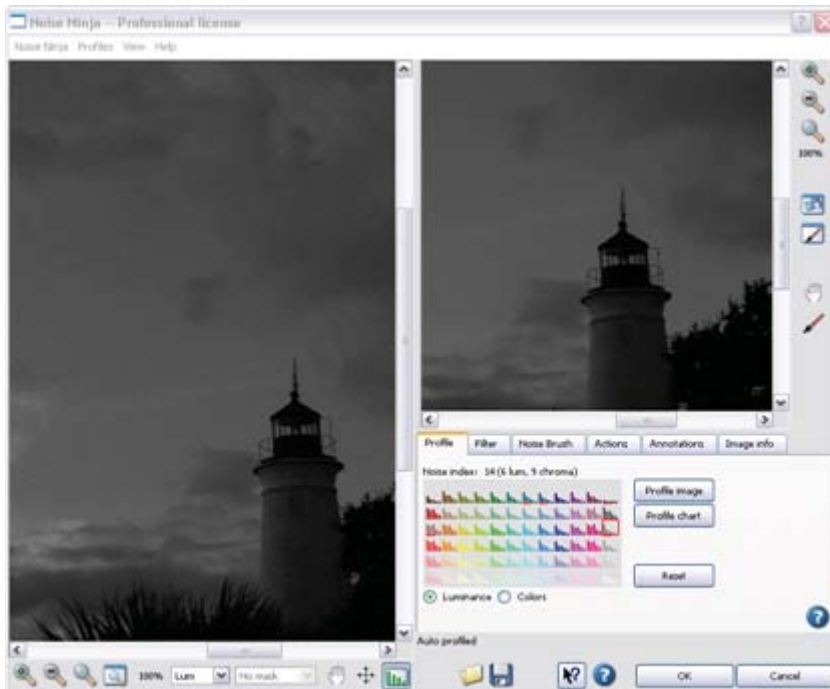
RGB channel. However, I like the display of where noise predominates in Noise Ninja. I especially like how you can switch between the analysis of luminosity and chroma noise in these tiny wedges just by clicking on a radio button. Since profiling is a separate and yet crucial stage in noise reduction with these more sophisticated noise reduction tools, I would like a bit more control over the process. Neat Image has an edge there.

The automatic profiling in Noise Ninja uses several small sample points. Neat Image selects a much larger area for profiling. Analyzing a large area has the virtue that you can better distinguish noise from small but important variations in tone or color. The Noise Ninja documentation admits that the automatic profiling can be fooled. My guess is that smaller areas were preferred for Noise Ninja because it can be hard to find large, featureless areas in a photo. Selecting smaller areas gives you a better chance of finding several areas suitable for noise analysis.

Automatic analysis is helpful when you have to process a large batch of images. If you want optimal noise reduction for individual images, manual analysis allows you to select the areas to analyze. Manual selections aren't practical for batch processing, though. It only takes a few moments to perform a manual noise analysis with Noise Ninja. You just drag out some selections at well-chosen places on your photo.

Noise Ninja (like Neat Image) temporarily converts the image to the YCrCb color space for profiling and noise reduction. This is pretty much a universal maneuver for noise reduction software.

The Filter tab is where you adjust the noise filter settings. Strength controls how aggressively noise reduction is applied. Smoothness tweaks the noise levels estimated by the noise profile. I already mentioned that Neat Image gives you a lot more control over the noise level estimates. In addition, Neat Image lets you apply separate noise reduction settings to high frequency, medium frequency, and low frequency noise.



Visual analysis of the individual channels is easy with the Noise Ninja user interface. The Y (luminance) channel appears in the example above.

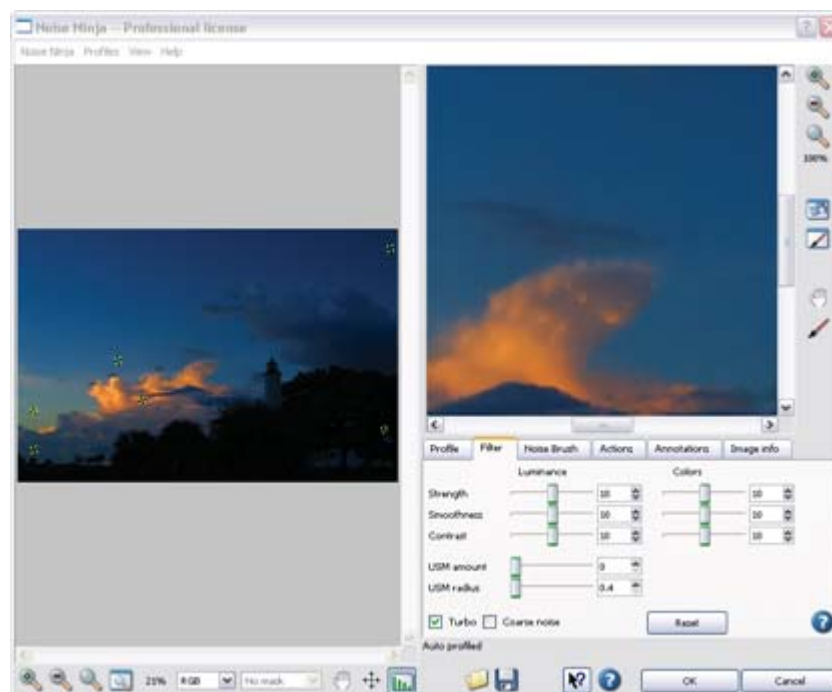
You can apply USM sharpening with Noise Ninja. The documentation notes that many photographers will want to set these to zero. I do. The USM sharpening is applied globally. There's no separate control for Threshold. However, the USM sliders are very helpful, even if you do follow my advice and sharpen in a separate step. As the documentation notes, you can use the USM sliders to visualize how the subsequent sharpening is likely to bring out any remaining noise. A very nice touch! You can torque the settings, take a look and see, and then put the sliders back to zero.

Noise Ninja is sophisticated about where noise reduction is applied. It uses a mask to limit the noise reduction away from edges. It would be helpful if the mask was preserved with the photo rather than being applied when Noise Ninja completes its work.

The **Noise Brush** tab allows you to partially or completely protect portions of a photo from noise reduction. nikitone has a similar feature. Neat Image does not.

In effect, you are painting a layer mask with the **Noise Brush**. The difference between the **Noise Brush** and a layer mask is this: **Noise Brush** is ephemeral. When you exit Noise Ninja, the mask is applied to the effect. When you generate a layer mask, it's stored with the photo and can be adjusted later. The **Noise Brush** would be more useful if it started with an edge mask and let you make refinements from there.

What I do like about the **Noise Brush** is the ability to create two separate masks: one for luminosity noise and another for chroma noise. Another nice touch! You could do this in Photoshop, but you would need to run noise reduction twice, setting one duplicate layer to **Luminosity** blend and the other to **COLOR** blend. You'll consume more resources with this maneuver in Photoshop.



The Filter tab is where you adjust the strength of the noise reduction. You can also apply USM sharpening. Even a quick preview of sharpening can be helpful.

Noise Ninja comes with adequate documentation. If you want to learn the technical details about noise reduction, you'll get a better education with the documentation for nik! Dfine or Neat Image. But if you want to learn how to use the product, the documentation for Noise Ninja and nik! Dfine are clearer and more polished than the documentation for Neat Image or Power Retouche Noise Filter.

You can load **StMarksLighthouseNoiseNinja.psd** to see the result from Noise Ninja. I used its automated noise profile generation and noise reduction settings. No tweaks were applied.



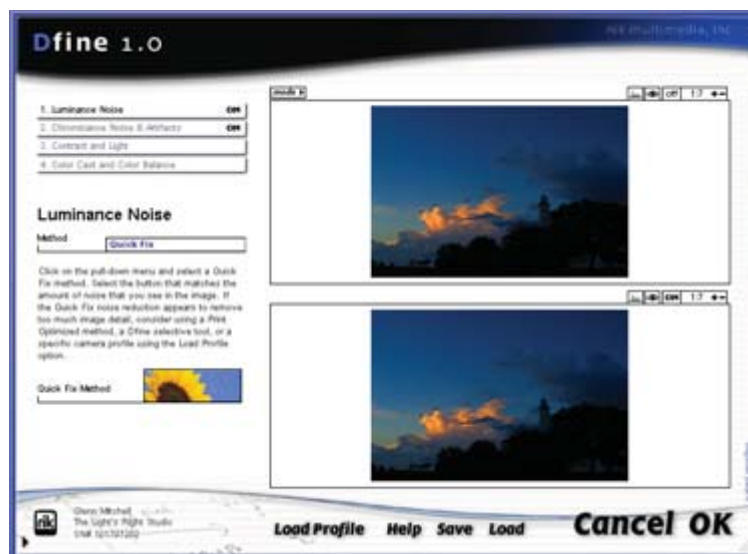
More information on Noise Ninja is available from <http://www.picturecode.com/>.

nik! Dfine

nik! Dfine is slick. This is apparent in the documentation, which is excellent. It's also apparent in the user interface, which is elegant.

One user interface feature I really appreciate is the ability to change instantly between different preview modes. You can have up to five preview windows open. That way you can preview the noise reduction for different features of your photo or with different magnifications. That's a well-designed UI!

nik! Dfine is designed to be used with a device profile. Unlike Neat Image and Noise Ninja, version 1.0 of nik! Dfine doesn't include a calibration target or any mechanism to create your own noise profile. Nik Software prefers to sell its device profiles. You get one free. After that, you pay. The inability to make your own device profiles is a serious limitation. If you don't use a device profile, Nik Software recommends that you use one of Dfine's print optimized methods for the reduction of luminosity noise. The print optimized methods treat details in the photo differently. You can iterate through the different methods easily. There are eight of them:



nik! Dfine has a very clean and elegant interface that efficiently presents a lot of functionality.

- Quick Fix
- Print Optimized, Low Noise
- Print Optimized, Normal Noise
- Print Optimized, Strong Noise
- Reduce Noise: Normal
- Reduce Noise: Strong
- Reduce Noise: Very Strong
- Color Targeted Reduction

The options vary among these different methods. Color Targeted Reduction lets you select one color to restrict the noise reduction, like blue for the sky or a black background for studio shots. The Reduce Noise methods are more aggressive than the Print Optimized methods.

You get fewer options with chroma noise reduction. There are three methods to choose from. JPEG artifact reduction is placed here.

- Quick Fix
- Global Reduction
- Protected Reduction
- JPG Reprocessing

The options vary here, too. Protected Reduction attempts to protect subtle color transitions when reducing chroma noise.

nik! Dfine is really two tools. You access nik! Dfine from the Filter menu. There's also Dfine Selective, the tool to use when you want to paint in (or paint out) the noise reduction. You access Dfine Selective from the File | Automate submenu in Photoshop. Moving back and forth between two different menu trees can be irritating.

Nice as it is, Noise Ninja's Noise Brush feature pales when you compare it with nik! Dfine Selective. With Noise Ninja, you work in the preview window and you can set a handful of brush settings. Dfine Selective gives you a lot more flexibility because you can use any of the Photoshop brush tools and adjust their settings. You can also use any of the Photoshop selection tools to limit where your brush strokes will be applied. Very nice!

Dfine Selective actually uses a layer mask. You can see it while you're working in Dfine Selective. When you hit the Apply button, it goes away. That's disappointing. However, if you hit Ctrl/Cmd + Z immediately after you hit the Apply button, the noise reduction layer and its layer mask are restored. I don't see any mention of this in the documentation or the help file, so Nik Software can label it a bug or an undocumented feature. You can also achieve the same effect by



nik! Dfine Selective lets you paint in (or out) the noise reduction using any of Photoshop's brush and selection tools.

removing the last step “Delete Layer” from the History palette. Thank goodness the software engineers at Nik Software didn’t completely enclose the history steps.

nik! Dfine also allows you to adjust tone and color. I’m not going to review those features, since I wouldn’t do my tone and color corrections with nik! Dfine. Those corrections are better done in Photoshop or with more sophisticated third party plug-ins.

The file **StMarksLighthouseNikDfine.psd** is a sample from nik! Dfine. I used the Quick Fix options with default settings for luminosity and chroma noise. No tweaks were applied.

More information on nik! Dfine is available from <http://www.nik!software.com>.

Power Retouche Noise Filter

If you’re looking for the quick click noise reduction features of Neat Image or ease of use with Noise Ninja, you won’t find that with the Power Retouche Noise Filter. This is a tool that makes you choose from different noise reduction algorithms and then adjust the various settings yourself. There is no automatic analysis. No automatic determination of noise settings that best suit the noise profile. No preview of a selection.

Power Retouche makes some excellent tools. Photographer-to-photographer, this one is not among their strongest offerings. It’s not as easy to use as the other noise reduction plug-ins. You can get equally good results with Power



Power Retouche Noise Filter lacks the preview selection found in Neat Image and the multiple preview windows of nik! Dfine making it hard to compare before/after.

Retouch Noise Filter on many images, but you'll work harder with Power Retouche Noise Filter. Price is its one comparative advantage.

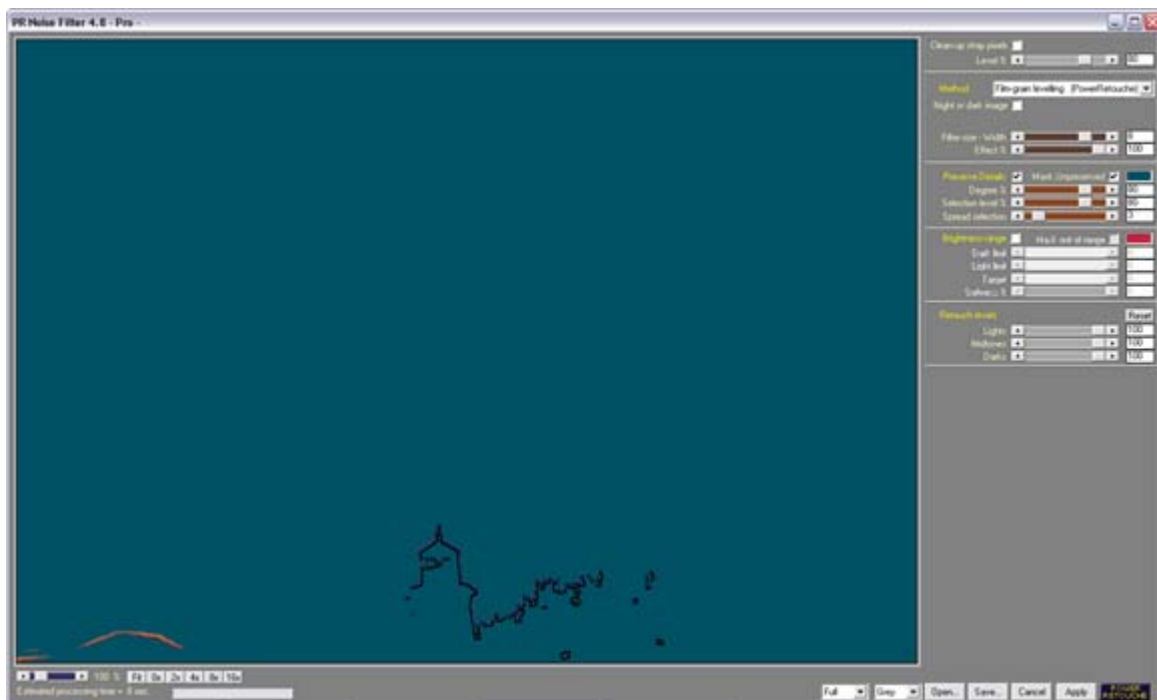
OK, that's not quite accurate. There is another feature unique to Power Retouche Noise Filter. It can display outlines where the mask to preserve details allows those details to peek through. The mask is displayed in an opaque color at 100% opacity, so it's next to useless. It might have some utility if it worked like a Photoshop Quick Mask and used a transparent color overlay.

Like nik! Dfine and most of the other Power Retouche tools, Noise Filter does allow you to limit its effect to specific ranges of tones. If, for example, you are having problems with noise in the shadows, you can keep the noise reduction away from the midtones and highlights. This can be helpful, because noise can be more prominent in shadows.

The tone-based control in the Power Retouche tools is easily applied in Photoshop to other noise reduction (and sharpening) tools with a combination of masks and Blend If sliders when you apply noise reduction via layers. The discussion of advanced masking in chapter 10 explains how to restrict sharpening (and noise reduction) to specific ranges of tones, colors, or combinations of the two.

Power Retouche Noise Filter offers five noise reduction methods:

- Soft Focus
- Film Grain Leveling
- Despeckle
- Patch RGB by Median
- Average Smoothing



The mask display might be more useful if it used lower opacity, like Quick Mask in Photoshop.

The absence of a preview selection like that in Neat Image makes it more difficult to compare after/before effects. It makes it more time consuming, too. You have to wait for Power Retouche Noise Filter to apply the settings to the entire image instead of just a small selection.

These five settings do yield different results. Some of them are very soft. The minimal documentation is not much help in selecting among them, either. Power Retouche documentation is generally very poor for all of their plug-ins.

While there are lots of sliders to tweak for the Power Retouch Noise Filter's UI, Neat Image and Noise Ninja give you a lot more control over the noise reduction process. You can, for example, affect tiny specks and larger clumps differently in Neat Image.

Power Retouche does have one feature that is often missing from other noise reduction tools. There's a setting called **Night or dark image**. Long exposures at night build up heat in a digital camera. This can result in so-called *hot pixels*. Power Retouche can target these stray, hot pixels. nik! Define Selective has a **Hot Pixels** setting you apply with a brush, which is a better way of handling hot pixels in many cases. You can dab at them with a brush tool.


Since Power Retouche is marketed mainly as a component in a whole suite of retouching tools, it's not much of a surprise that it does not support device-specific profiles.

More information on Power Retouche is available from <http://www.powerretouche.com>

Which Tool Is Best?

I came to Noise Ninja later than many reviewers because I was pleased with the results I obtain with Neat Image and its customer support, which is among the best I've experienced from a digital photography software vendor.

If I was in the market today for just one tool, I would have a hard time choosing between Neat Image and Noise Ninja. Neat Image has been my favorite, but the more I work with Noise Ninja, the more impressed I become.

So far, I've been comparing features. If you go to the **NoiseReduction** folder, you'll find a file called **St-MarksLighthouseNRTools.psd**. It's a layered Photoshop .PSD file with samples from Neat Image, Noise Ninja, nik! Dfine, and the Power Retouche Noise Filter. I allowed each tool to use its automated analysis and noise filtering abilities. In the case of Power Retouche, which does not profile noise, I used the default settings for its unique method: **Soft Focus**. 

My first observation is this. No question! You can do better with any of these tools when you take manual control. You can do an effective job of noise reduction with any of these tools.

The automated noise profiling and noise filtering capabilities of Neat Image, Noise Ninja, and nik! Define are quite good. This is especially true for Neat Image and Noise Ninja. If you turn the visibility of the layers on and off and scroll around the photo to compare the noise reduction, I believe an independent and objective assessment would favor the automated results from Neat Image and Noise Ninja with a very slight advantage to Noise Ninja in terms of noise reduction and a slight advantage to Neat Image in terms of maintaining detail and saturation/hue. Toggle on the Neat Image layer only. Then toggle the Noise Ninja layer's visibility as you carefully watch the lighthouse and surrounding image features.

I find that the automated features of nik! Dfine leave more residual noise and soften the image more than either Neat Image or Noise Ninja. I found this to be generally true with nik! Dfine, even when I took manual control. In order to reduce the noise in the sample photo, which is really not all that severe, I lost more detail than I preferred. I had finer control with Neat Image and Noise Ninja.

If you toggle either the Neat Image or Noise Ninja layers with just the *Background* layer visible underneath, you can see the effectiveness of the noise reduction in the sky gradient. You can also see where the clouds lose important detail.

Now, if you didn't toggle the layers on and off, you might not notice the loss of detail in the clouds, especially the wispy cloud features. Personally, I would want to restore those photographic details. In my case, I would forego the brush tools in Noise Ninja and nik! Dfine and instead use Neat Image or Noise Ninja on a duplicate layer with a layer mask. That way, I could go back and restore the details in the clouds.

All four products reviewed in this chapter have free trials. If you're in the market for a noise reduction tool, you should download the trials and then apply them to some test images of your own.

We've come full circle on this question about which is best. If I had to choose just one tool, it would be a hard choice between Neat Image and Noise Ninja. Both are very sophisticated tools for removing noise that enable the digital photographer to retain essential photographic details. They are flexible tools that give you very fine control over the generation of noise profiles and the noise filtration process. Fortunately, I don't have to choose just one tool! I urge readers to try both and see which works best with their workflow. You can obtain excellent results with either.