Topaz Labs
DeNoise 3 Review
By Dennis Goulet

The Problem

As grain was the nemesis of clean images in film photography, electronic noise in digitally captured images can be a problem in making photographs with smooth, clean colors. Noise becomes prevalent when the camera's sensor doesn't receive enough information, in the form of light, to adequately record the image the eye sees. The conditions which cause noise in digital images occur most often when using high ISO sensitivity settings, in dark areas of a scene, in underexposed images, or capturing long exposures.

Without going into a long technical discussion of signal to noise ratios and electrical background noise, noise occurs at the sensor sites: the longer the exposure, the more noise, the less signal (light) being recorded by the sensor, the more the noise is apparent. In short, if you left the lens cap and made a long exposure, a clean black image would not result, but it would have specks of red, green and blue spread throughout it. This is the background sensor noise. Noise is also related to the size of the image sensor; we can expect more noise from point and shoot cameras, less noise in APS-C size sensors, and much less noise in full frame sensors. This relationship is associated with the size and spacing of the individual photo sites on the sensor. There is generally more noise in the darker regions of an image.

Noise manifests itself in an image in two ways; color noise and luminance noise. Color noise, sometimes referred to as "chroma" noise, shows up as colored speckles in an image. Luminance noise, also referred to as "luma" noise, shows up as variations in brightness. For an image with a clear sky, luminance noise will show up as a texture or variations in the color of the sky pixel to pixel. This noise is most notable in smooth tonal areas such as sky, and at transitions into clouds. Figure 1 is a portion of an image with noise due to long exposure of the nighttime sky. The image was made lighter than captured so that the noise is more apparent in print.

Figure 1. Noise in the night sky.

A Solution

Topaz Labs offers a suite of software plug-ins for Windows-based Photoshop 7 through CS4, Elements 1 through 8, and other images editors that are Photoshop plug-in compatible. Mac users don't need to feel left out (again), the plug-ins are compatible with Aperture, Lightroom 2, Photoshop CS3/4 and Elements 6/7/8 running on an Intel-based Mac using a Topaz Fusion Express, which is available free on the Topaz Labs website. While not currently available for Lightroom running on a PC, communication from Topaz Labs indicate a Windows version will soon be available.

Topaz DeNoise is a plug-in that makes reduction of noise in digital images an easy task to manage. It's designed to remove noise in an image, while preserving the details of the image. Installation of the SW is straightforward, the installer loads the software where it needs to go, and the window to install the license key is available from the Menu button on the DeNoise interface. The interface screens of all the Topaz plug-ins, with the exception of ReMask, follow the same template, with easy to understand controls.

After loading the plug-in(s) and prior to using them, I strongly recommend reviewing the manual, which can be accessed via Start/All Programs/Topaz Labs/Topaz Denoise 3/UserGuide.pdf or via the Menu button on the control panel of the plug-in tool. The User Manual describes the user interface controls in greater detail than in this review, and includes a workflow example which steps through the process of reducing noise in a sample image.   The manual could use a minor update, primarily in the screen captures of some of the screens, which appear slightly different on my PC, but not so much as to be confusing.

It's also advisable to view the two tutorial videos available on the Topaz Labs website at http://www.topazlabs.com/tutorials/denoise/ .   The first video is a demo of DeNoise 3, and the second video is a tutorial of DeNoise 2. Although there are some differences between version 2 and 3, the tutorial is very instructional as many of the controls are similar.   The website also has a link to the Topaz Labs Channel on YouTube, where a number of instructional videos have been uploaded.

Removing noise from an image is best done after removal of dust spots and defects in the image, and before any adjustments to color, exposure, contrast, and other detailed editing. It is important to set the sharpening and noise reduction settings of Lightroom and Photoshop Camera Raw sliders to zero, to avoid any conflict with DeNoise operations. Open the image in Photoshop, and create a duplicate copy layer of the background image. It's always best to make corrections on a duplicate layer rather than the original image layer.

The DeNoise 3 Plug-In

Once activated by selecting Filters/Topaz Labs/ Topaz DeNoise 3, a separate window is created and is divided into three sections; a preview window, a set of presets, and a control panel.
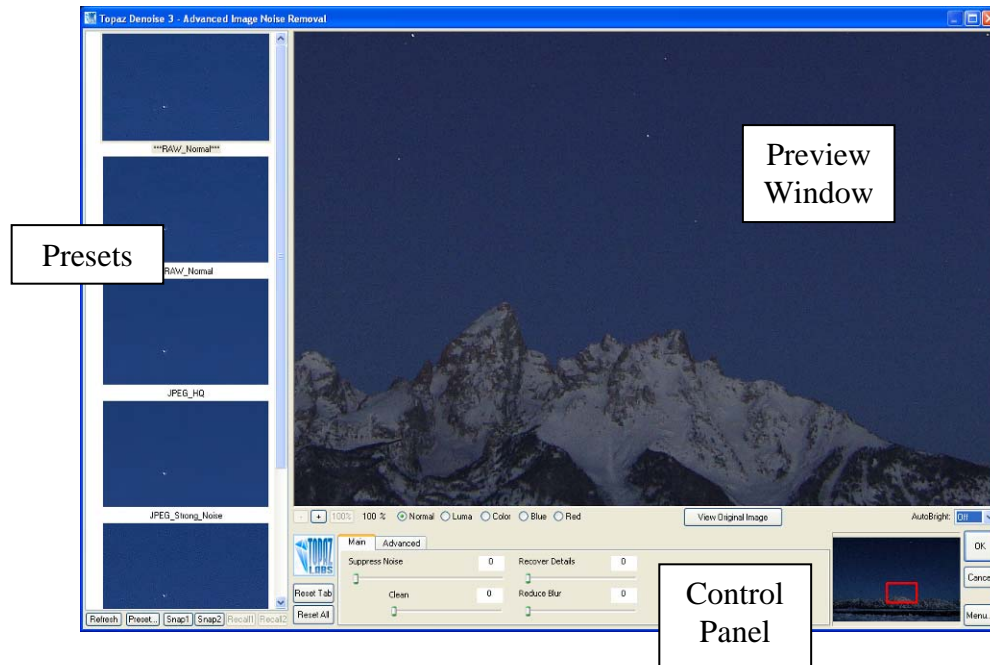
The preview window has features in common with many Photoshop tools. The preview is typically a fraction of the total image, and comes up as a 200% segment with the image section outlined in red in the preview navigator located to the right of the control panel. The section being previewed can be moved by clicking and holding the cursor on either the image in the preview or the red box on the preview navigator and moving to the desired section.
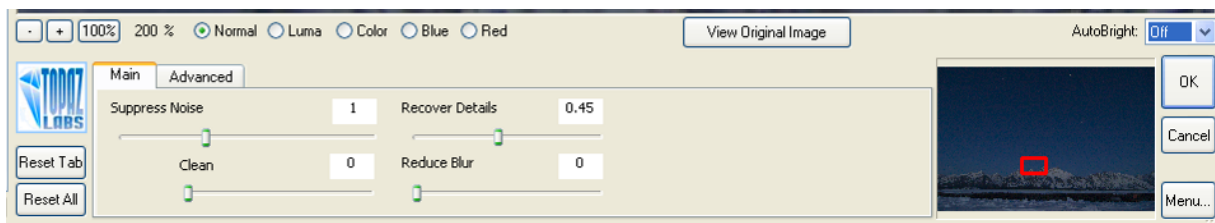
The preview magnification can be changed with the +/- buttons in the upper left of the control panel, and can be "jumped" to 100% using the button provided. "Ctrl+ and Ctrl-also zoom the preview in and out. The radio buttons along the top render the preview in different states, with "Normal" being self evident. "Luma" presents the preview in a B&W, allowing the comparison of the relative brightness of adjacent pixels across the preview section. "Color" displays the color components, and "Blue" and "Red" isolate

and displays those colors as a B&W image. The View Original Image button displays the original image for comparison with the corrections made, but I found it more convenient to use the spacebar, which is an alternative method for this action.

One very useful feature is the AutoBright selection, which brightens the preview section to permit easy viewing of the noise. As the selection is moved around the image, the relative brightness of the preview remains essential the same as it adjusts the brightness. When set to "Off", no adjustment to the preview is made, and when set to "On", the preview image will maintain a certain level of brightness, and automatically adjust regardless of the relative brightness of the section selected.   Selecting "Strong" will result in an even brighter preview image adjustment.

Another very useful feature is the ability to capture up to two snapshots of settings, which can be recalled for comparison. This is far easier than saving a set of presets for each adjustment variation. The feature is meant to allow comparison of two sets of adjustment to select the best rendering of the image before applying the adjustments to the layer. To view a previous saved snapshot, simply click on either Recall button.   Make certain to save the second set of settings as Snap2 before recalling the first set as this is the only way to shift between two sets of adjustments.

The Workflow

I selected an image of the Grand Tetons Mountains and night sky with stars, captured before dawn, to use for illustration. The image is one that I've always liked, but was never able to edit so that it looked as nice as I remembered when I captured the image. The exposure was 13 seconds at ISO 400, and has detail in the mountains which I need to preserve and a lot of noise in both the sky and the trees in the foreground.   I set the preview to 100% and the set the AutoBright to "On" to better see the noise and the effects of the adjustment sliders.   DeNoise opens with a default level of noise elimination applied to the image preview based on its noise. Figure 2 shows the selected image with the sliders set to 0 to view the image without correction. This is a good way to start to understand the effects of the controls available. However, a set of preset corrections is available and in some cases can result in very little "tweaking".
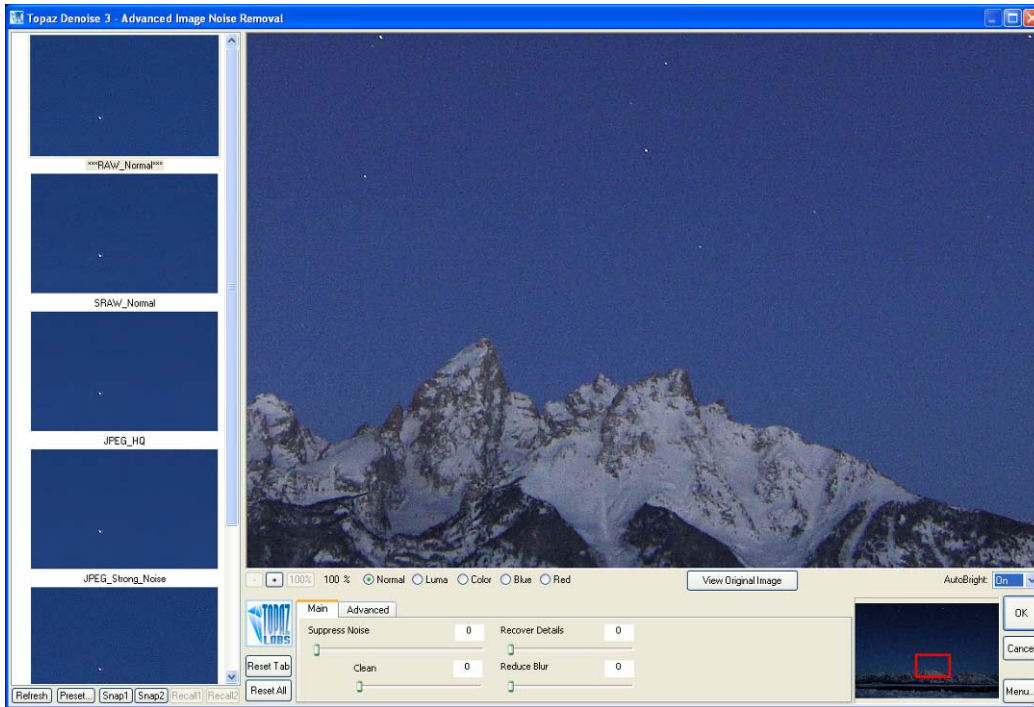
Figure 2. Image without noise reduction.

I did try the "RAW Normal" preset and in this image, additional adjustment was required to sufficiently reduce the noise.   Figure 3 is the image with the preset applied.
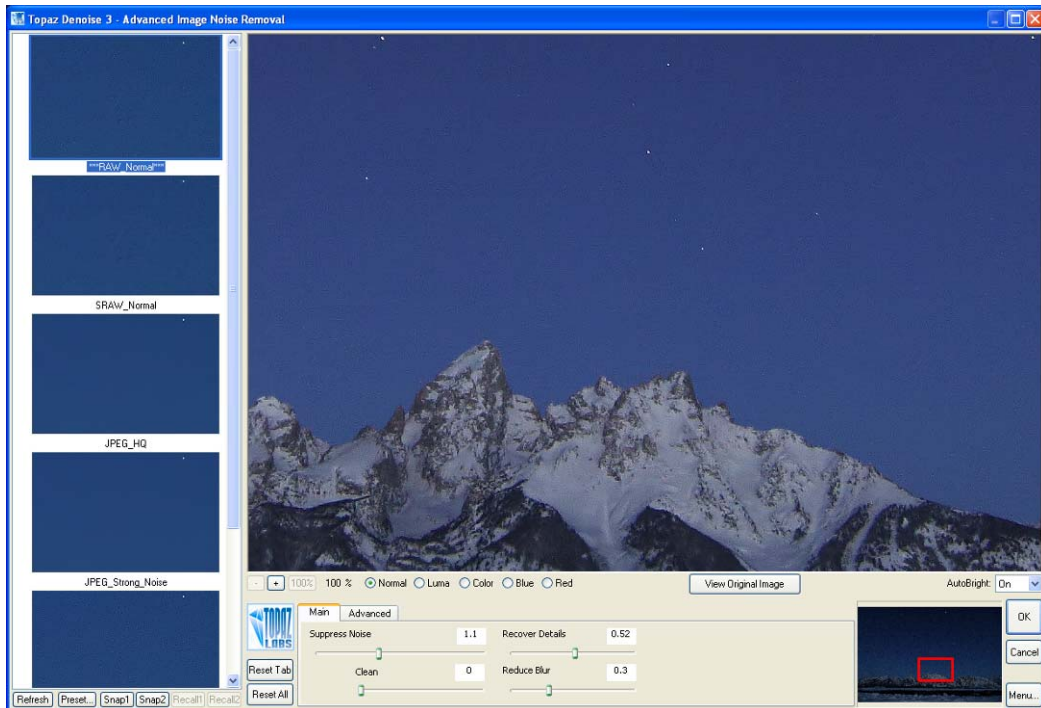

Figure 3. Preset "RAW Normal" applied.

Noise was still evident in the sky, so I followed the recommend workflow of viewing the preview in Luma mode without the color artifacts. The Suppress Noise slider is the main control for reducing noise. The control is intuitive, with less reduction to the left and more reduction to the right. There's a little lag time between moving the slider and seeing the effect on the preview, and the effect does not take place until the slider is "let go" from the click and drag.   As the noise reduction increases, some details start to disappear and can be restored using the Reduce Blur control to increase the edge sharpness. It's easy to overdo this control, and the recommended range is 0.25-0.50. If the edges appear too sharp, the Clean slider can take the edge off. I found the Clean control also did a good job of removing some swirling effects in the broad expanse of the evenly toned blue sky. In this case Recover Details, which is provided to restore detail lost to noise reduction, was not needed to improve the look of the image. Figure 4 shows the Luma mode and the final set of adjustments displayed in the Normal mode.
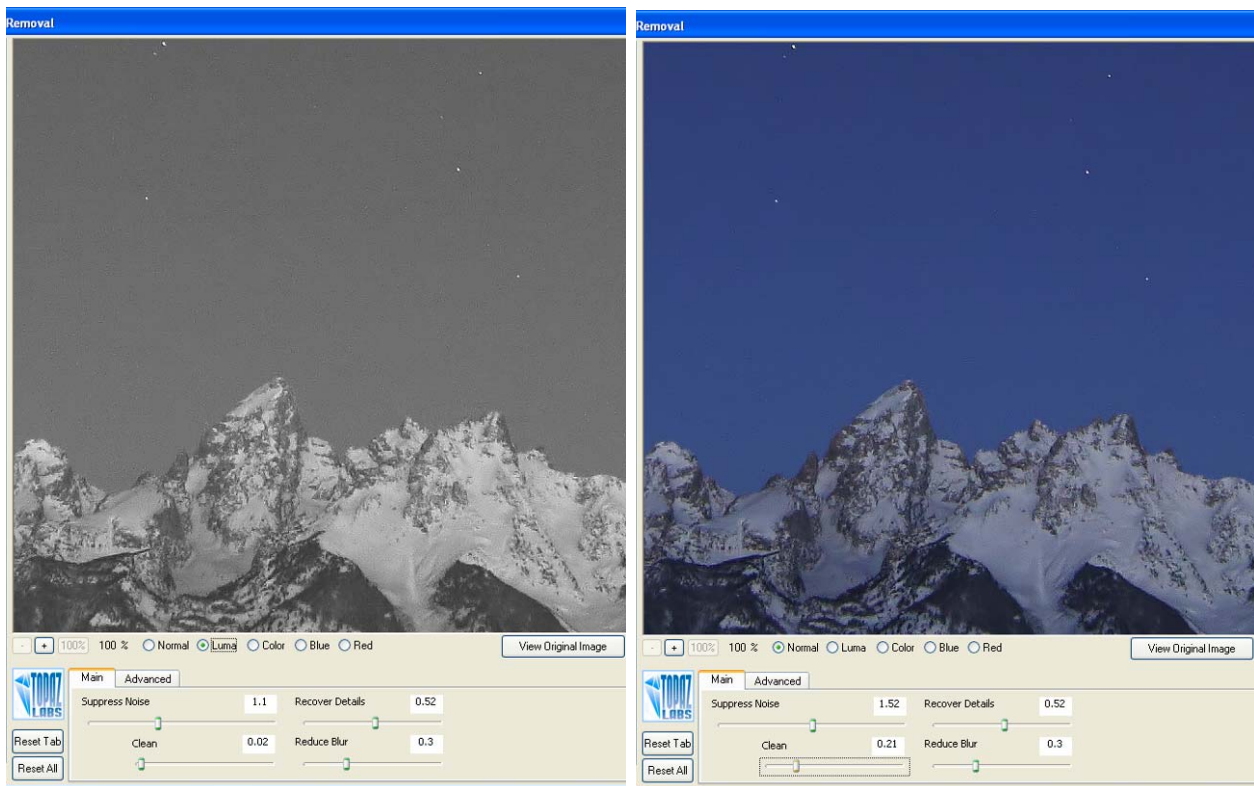

Figure 4. Luma view with RAW Normal presets; Normal view with final adjustments.

Additional finer detail noise reduction is provided in the Advanced tab controls. The controls are used in concert with the preview modes Color, Blue, and Red to view the direct effects of the individual controls.

- ▪ **Clean Color** reduces random bits of color.
- ▪ **Remove Color Specks** removes random color artifacts.
- ▪ **Add Grain** adds monochrome grain.
- ▪ **Recovery Blue** restores blue detail.
- ▪ **Recover Red** restores red detail.

While I did not readily find an image that needed this level of adjustment, the effects of the Advanced tab controls are very clear in the video tutorials.

I did find an image which suffers luminance noise, but little color noise. There are few random bits of color in the feathers of this image, but the out-of-focus mountains exhibit a graininess that appears unnatural. In the past I've smoothed out this effect in images by a combination of masking and blurring techniques in Photoshop, but was very intensive when the sky included trees, which added to the masking task. DeNoise corrected the Luma noise with the application of the RAW Normal preset settings as seen in Figure 5. There appeared to be little softening of the feather edges.
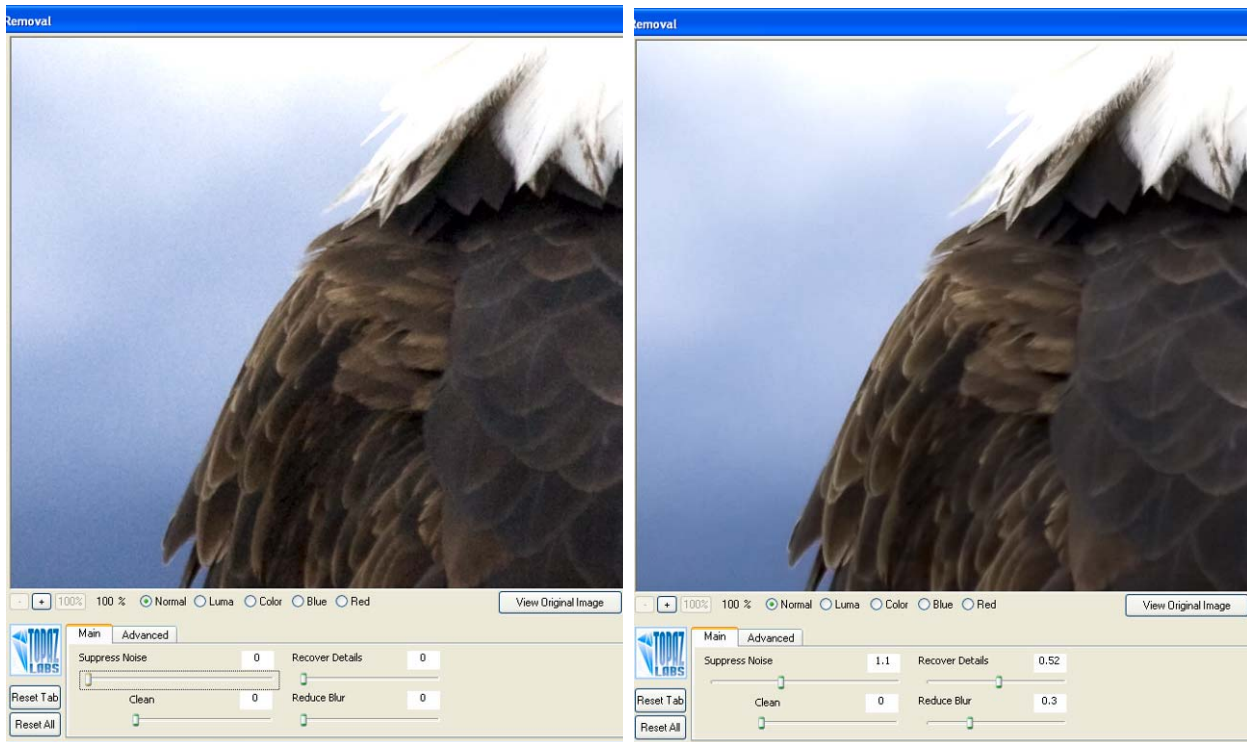

Figure 5. Before and After Luma noise reduction.

Tips for reducing noise in digital images:

- Shoot in RAW format to offer more control in exposure after the image is taken.

- Ensure the histograms of your image captures are as bright as possible. It's noise free to darken an image in processing; noise lurks in the underexposed areas of an image.

- Turn off the default image sharpening and noise reduction in Lightroom or Photoshop.

- Reduce noise as the first step in the image processing workflow, after elimination of spots and defects.

Conclusion

I am not, by anyone's measure, a Photoshop wizard. The tools I prefer to edit images need to be simple and easily understood, almost intuitive. I find Topaz Labs DeNoise 3 to be a powerful noise reduction tool, with simplified adjustments suitable to handle high levels of noise in an image. The tool also provides the more complex adjustments required for images with severe noise problems. An impressive feature of the tool is the capacity to preserve details while eliminating noise. Although not intuitive at first thought, editing the image in the black and white Luma mode facilitated seeing the effects of the adjustment sliders without the "clutter" of color. Topaz DeNoise 3 is far simpler to use that other noise reduction tools I have used. The eventual addition of the capability to access the plug-in tool via Adobe Lightroom will smooth my current workflow and is eagerly anticipated.

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