WELCOME TO THE NINTH ALMOST-ANNUAL

# BETTER LIGHT OWNERS CONFERENCE JUNE 2010

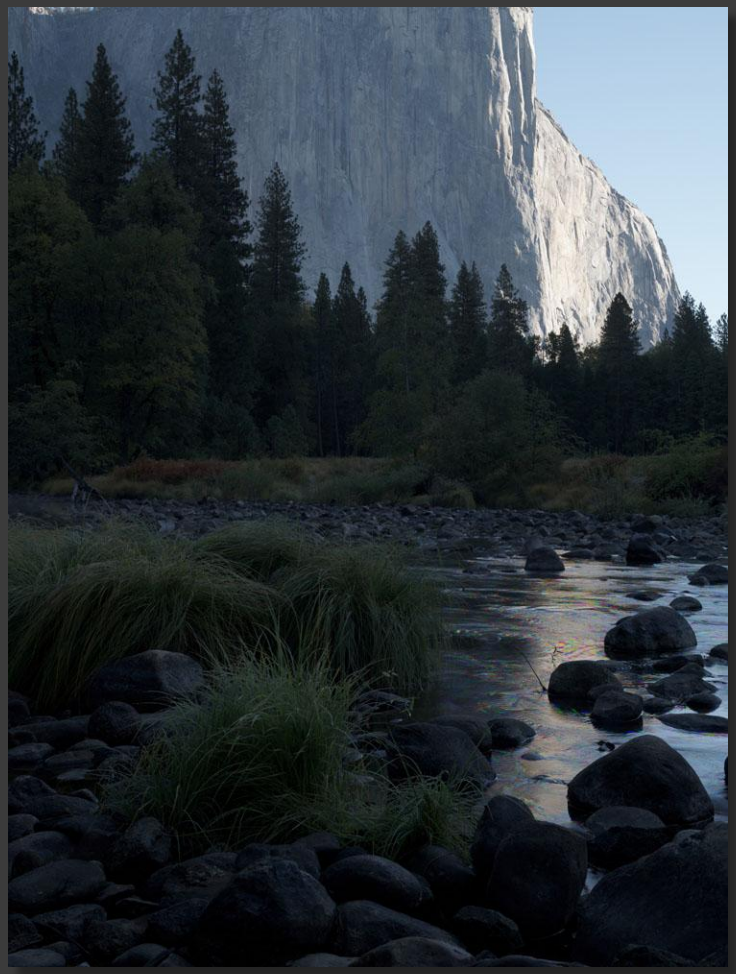
IF AT FIRST YOU DON'T SUCCEED…

# eXTREME MAKEOVERS

# It’s ROUGH out there…

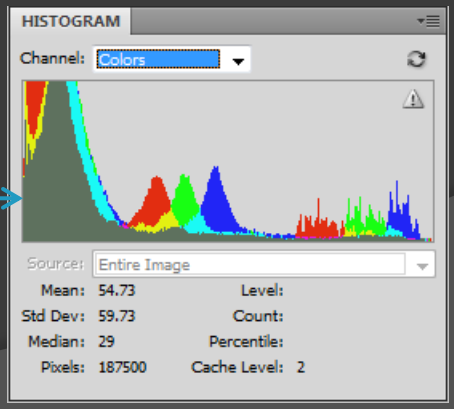
- Extremes of CONTRAST
  - Huge difference between light/dark values
  - Distance haze
- Excessive NOISE
  - Low light / high contrast repair
- Motion ARTIFACTS
  - Subject / camera / air movement
- Lighting CHANGES
  - Sunrise / sunset
- Imperfect FOCUS
  - Minor errors / inadequate depth of field

# Yosemite Valley, October 2007



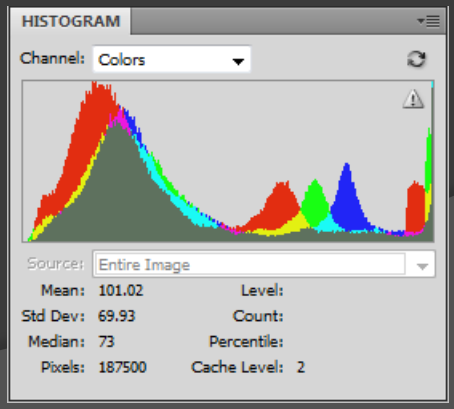
Early morning autumn sunlight reflects off the bright granite near El Capitan, and then off the rippling water of the Merced River, with everything else in deep blue shadow. This tranquil scene looked far more inviting to me, but the unbiased eye of the camera recorded very high contrast, even with a ten-stop Tone curve…

Clipped shadows are too dark to recover

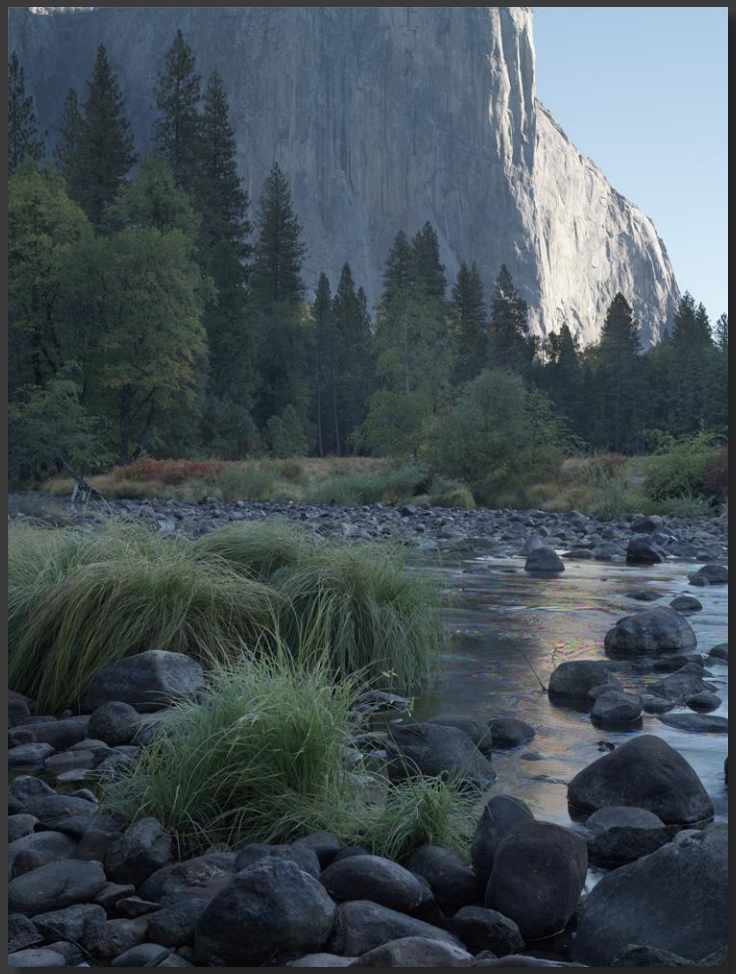


# Yosemite Valley, October 2007

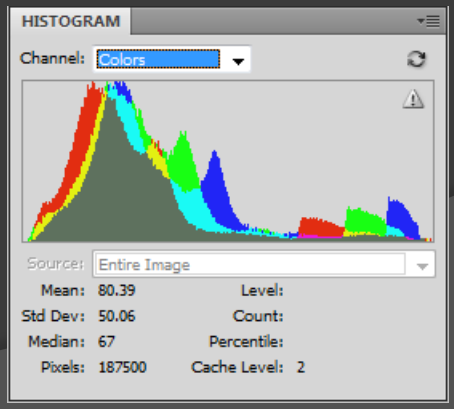
To capture the entire scene dynamic range, the first exposure (previous image) was optimized for the brightest regions of the scene. A second exposure was then made with two f-stops of additional exposure to provide much better shadow information, but with blown-out highlights.



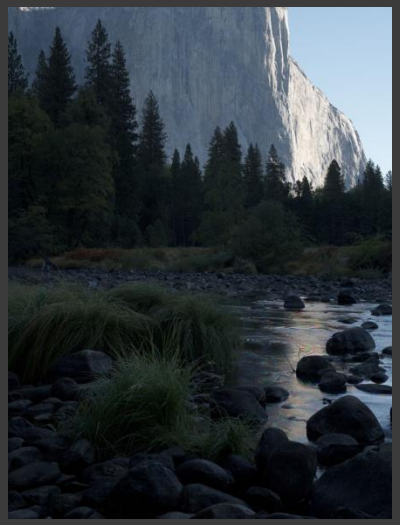
# Yosemite Valley, October 2007



The second (shadow) image was then layered over the first (highlight) image, with a mask on the shadow image to control where this image was visible, and where this image became transparent, allowing portions of the highlight image underneath to show through.



# Show me that again...



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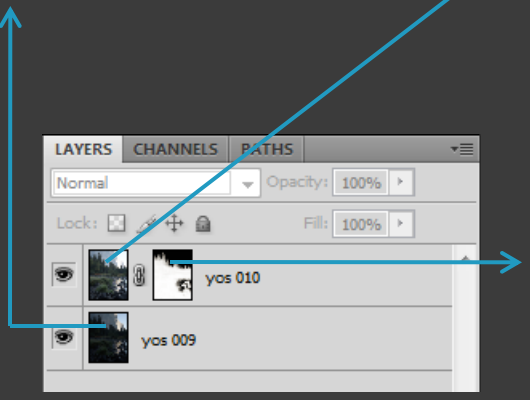
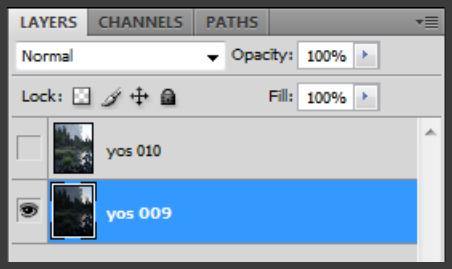


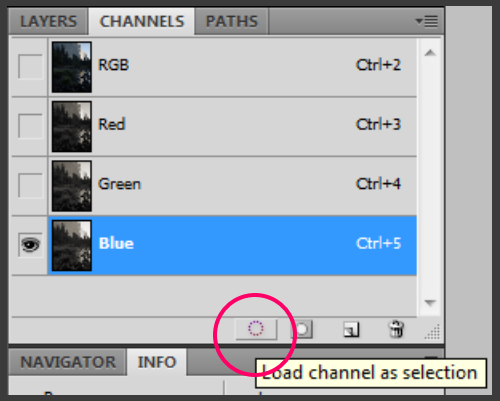

WHITE mask areas make corresponding image areas “active” or opaque, blocking lower layers.

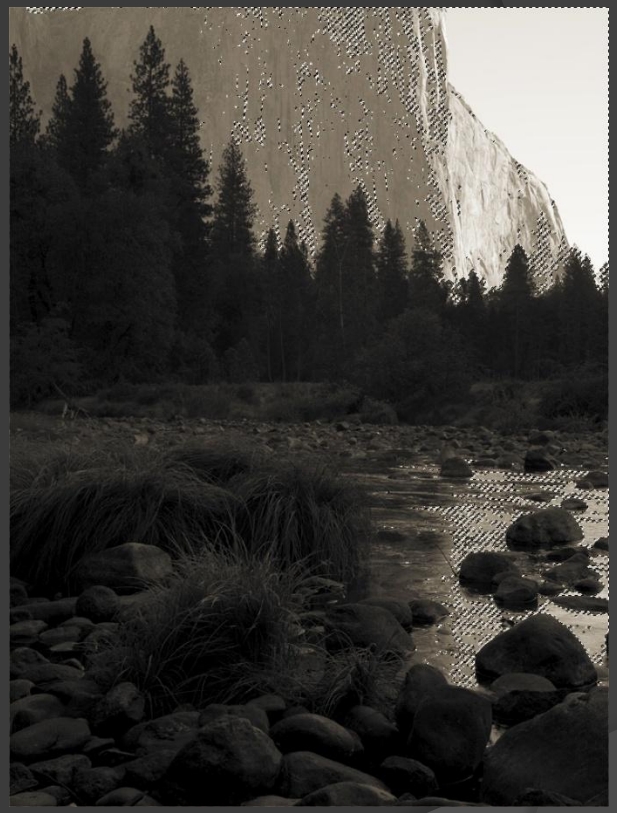
BLACK mask areas make corresponding image areas “inactive” or transparent, allowing lower layers to show through.

GRAY areas are partially opaque, and partially transparent.

# Making the Mask

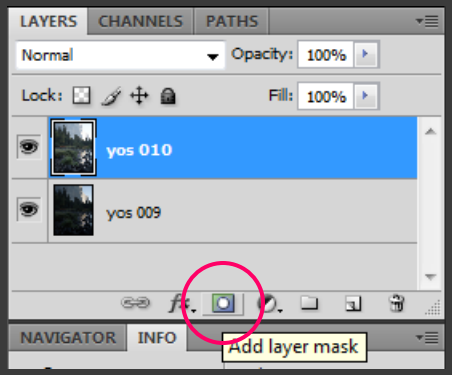


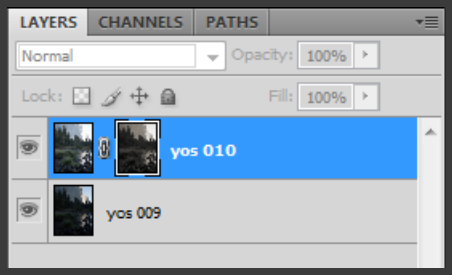



For this mask, maximum differentiation between the distant granite and dark foreground was found in the blue channel of the darker image, so the lighter image layer was turned off, and the darker image was selected. Then only the blue channel was selected, and the “Load channel as selection” button was clicked. “Crawling ants” denote the resulting selection.

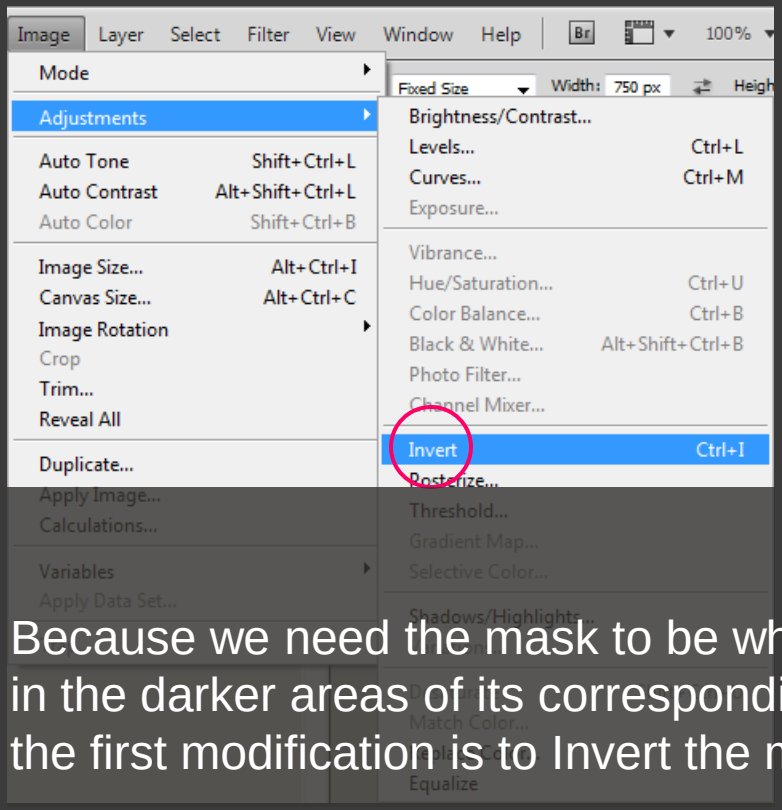
# Making the Mask



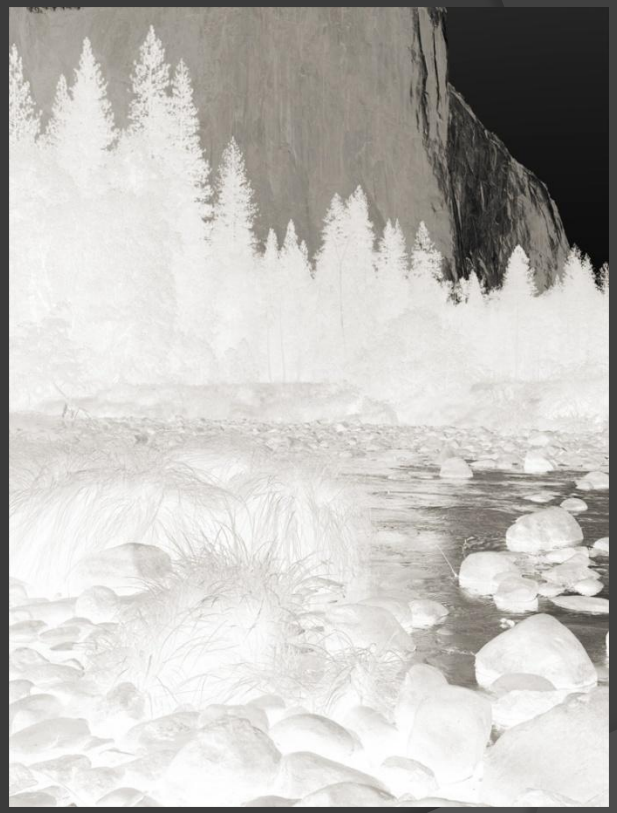




After loading the blue channel of the darker image as a selection, the lighter image is enabled and selected. Then the “Add layer mask” button is clicked, which uses the current selection as a mask for the selected layer. A mask icon appears next to the layer icon; click on the mask icon to make the mask active (denoted by a frame around the mask icon). Alt-click on the mask icon to make the mask visible.

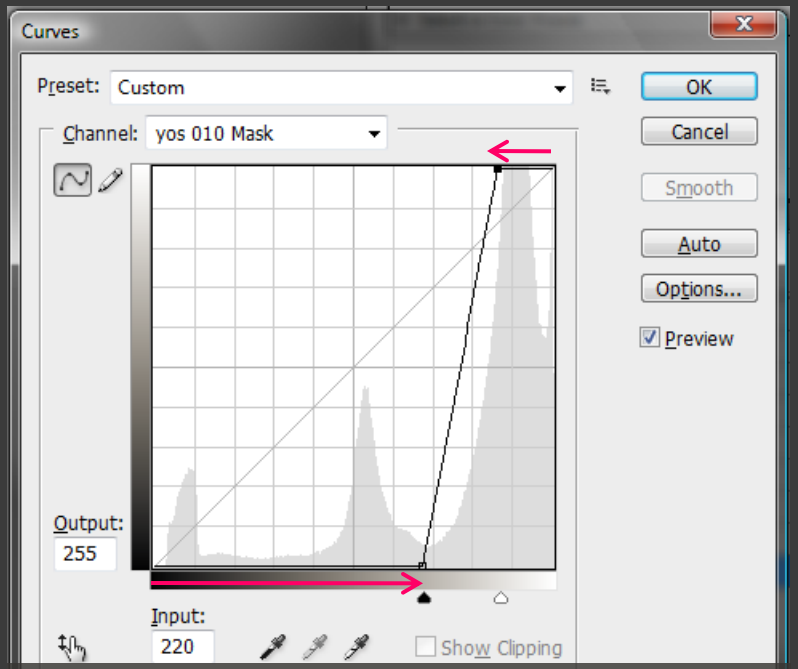
# Modifying the Mask




Because we need the mask to be white (opaque) in the darker areas of its corresponding image, the first modification is to Invert the mask.

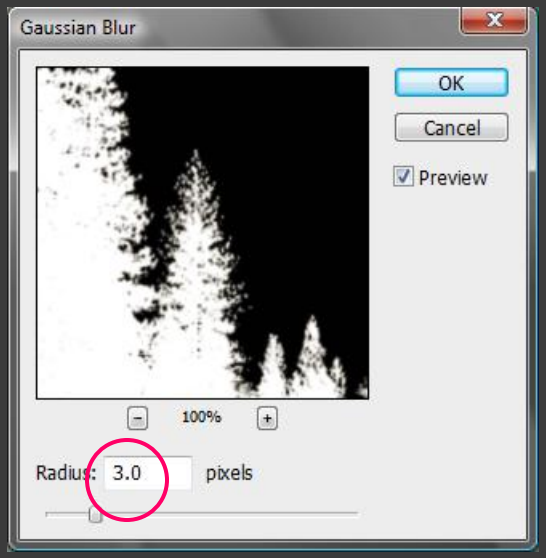


# Modifying the Mask




After inverting the mask, make a Curves adjustment (Ctrl-M) to increase mask contrast. The distant granite and sky become pure black (transparent), and most of the foreground becomes white (active/opaque).

# Modifying the Mask




To soften the transitions between white (opaque) and black (transparent) areas of the mask, apply a Gaussian Blur to the mask. A Radius of 3.0 pixels is usually appropriate for a full-resolution Better Light image file.

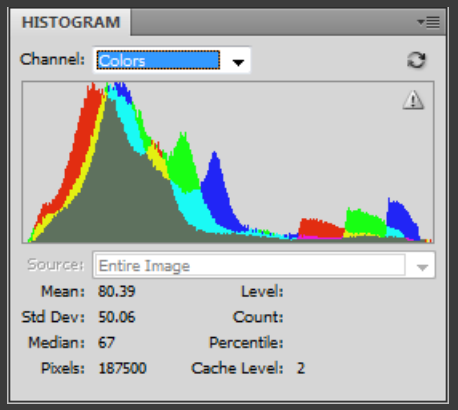
# Modifying the Mask

Finally, use a soft-edged white paintbrush with 100% Opacity to paint the remainder of the foreground areas pure white (active/opaque), staying away from the delicate tree outlines near the top, and from the dark area representing the bright water reflections.

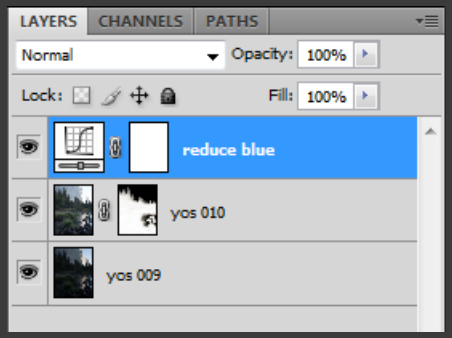
Later in the image editing process, a black paintbrush with ~30% Opacity was used to darken the tops of the tree outlines for smoother blending of the two exposures. This doesn't affect the already-black areas, so a broad, soft-edged brush can be used.

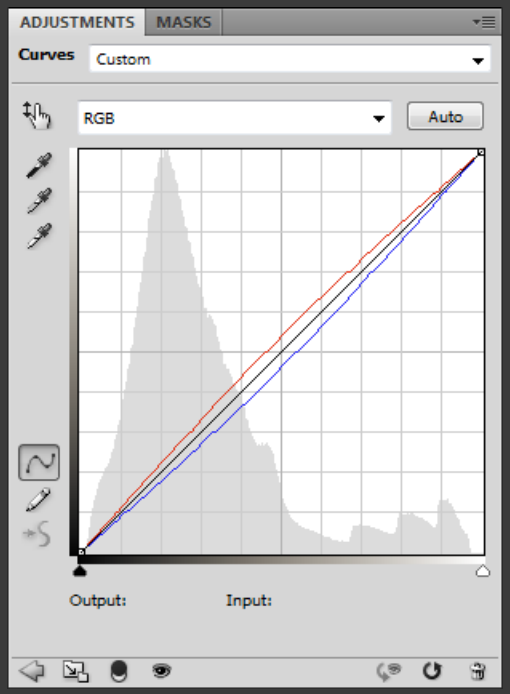
# Modifying the Image

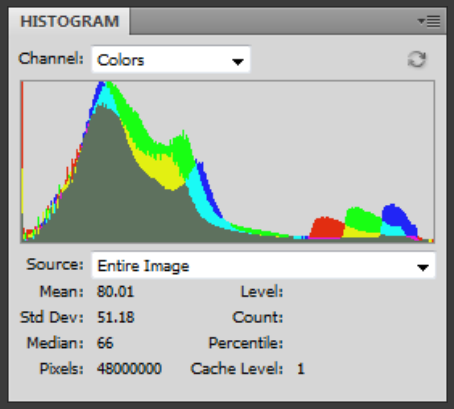
All of the preceding operations yield a workable image that already incorporates two f-stops of dynamic range compression, but much remains to be done:  there is still a strong blue color cast, the highlights are too bright, and the shadows are too dark.  Masked Curves adjustment layers will be used to create a more attractive and printable image, as described in my previous presentation “Capturing and Rendering Wide-Range Scenes”…



# Modifying the Image

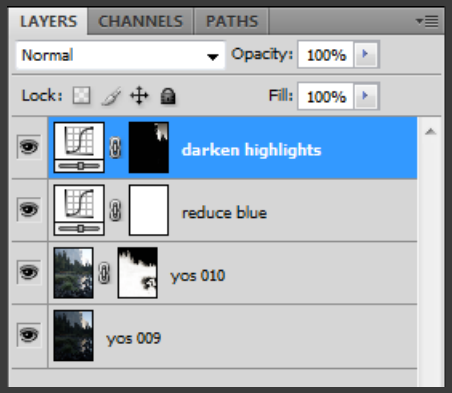


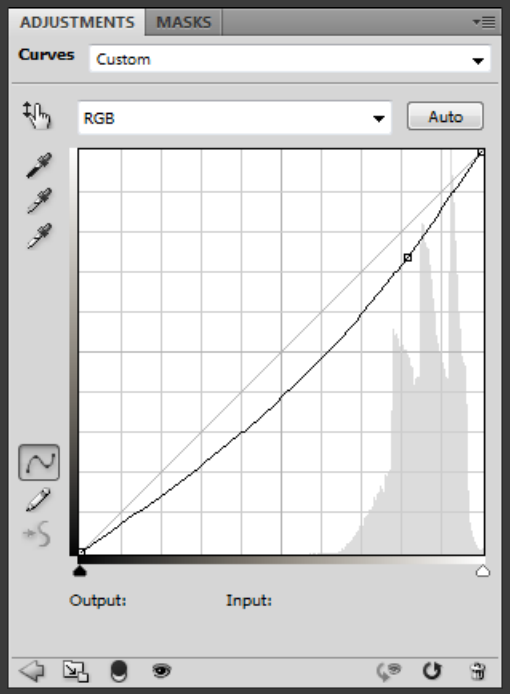




To reduce the blue color cast, an unmasked Curves layer affects the entire image

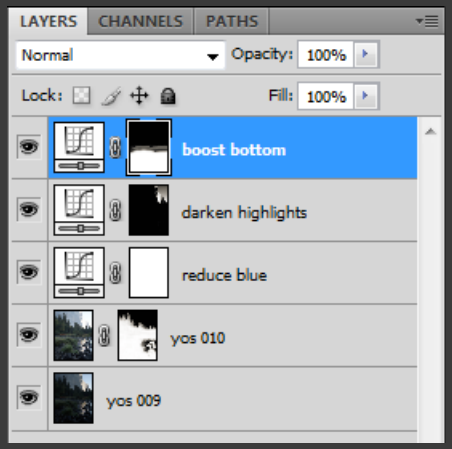
# Modifying the Image

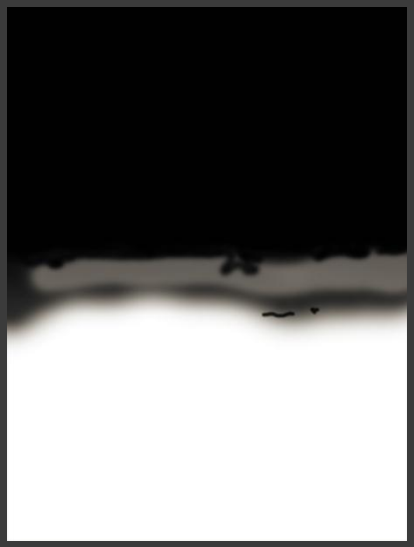


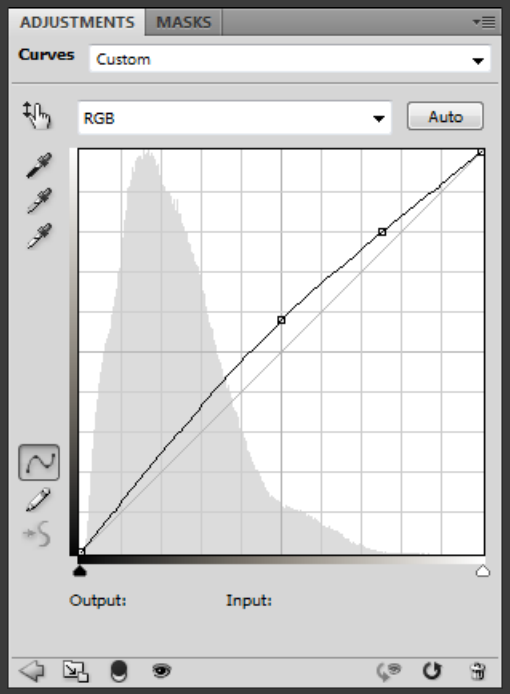




A masked Curves layer darkens only the selected highlights

# Modifying the Image

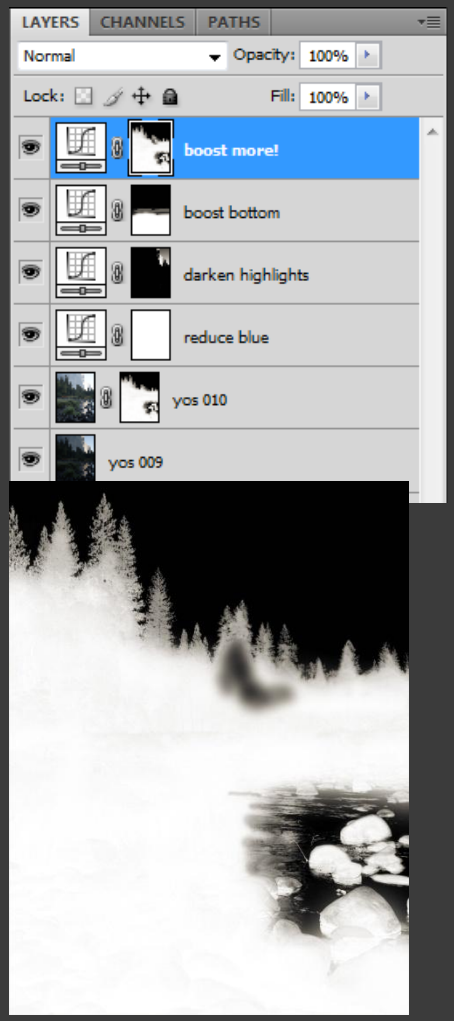


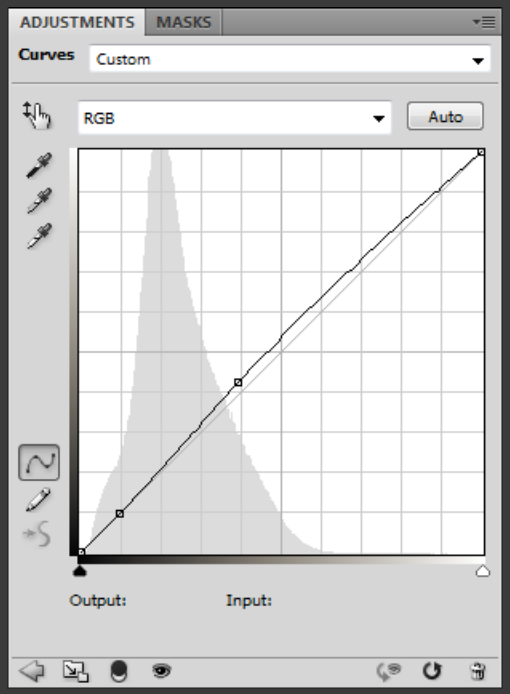






A masked Curves layer brightens only the near and middle foreground

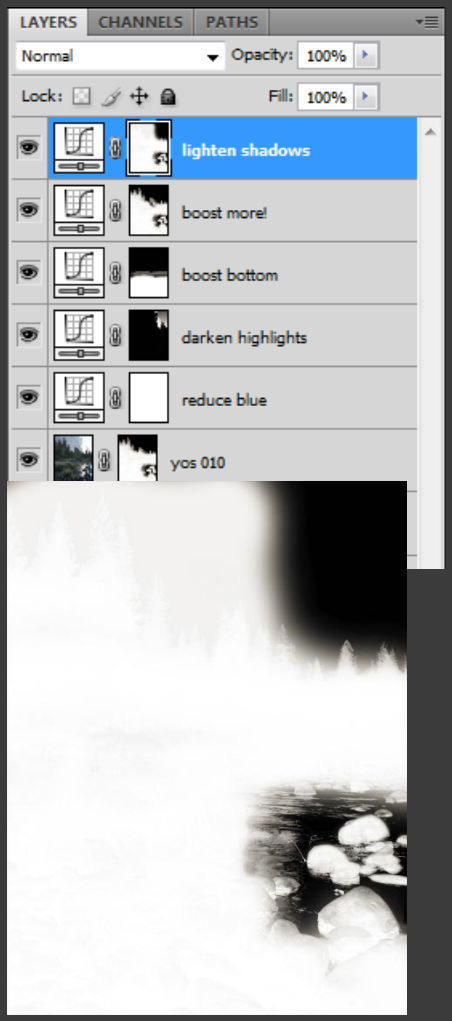
# Modifying the Image

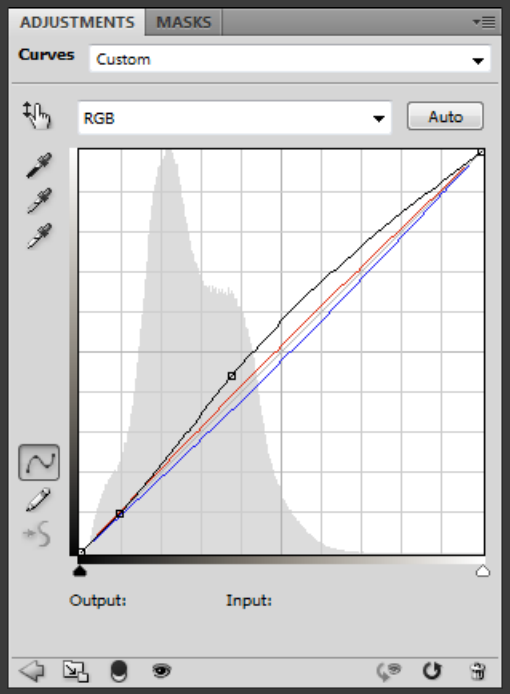



A masked Curves layer brightens all of the darker regions, with a few exceptions

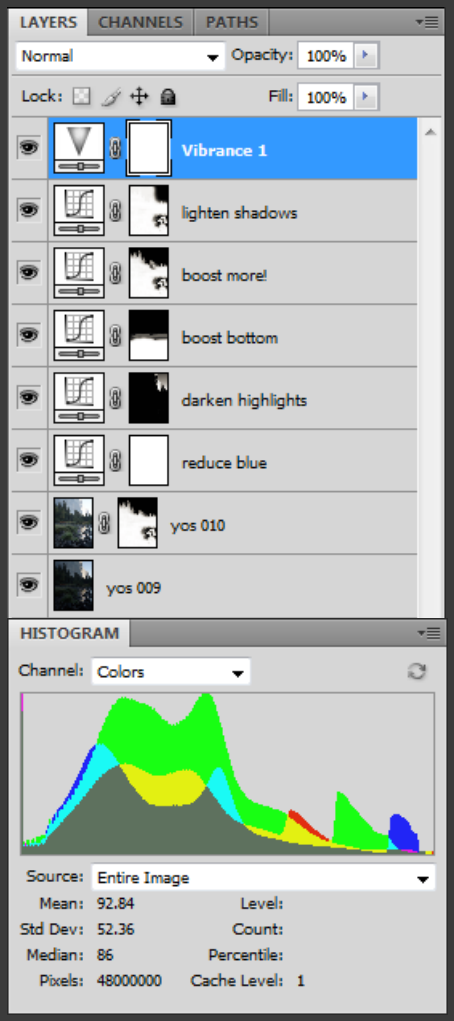
# Modifying the Image

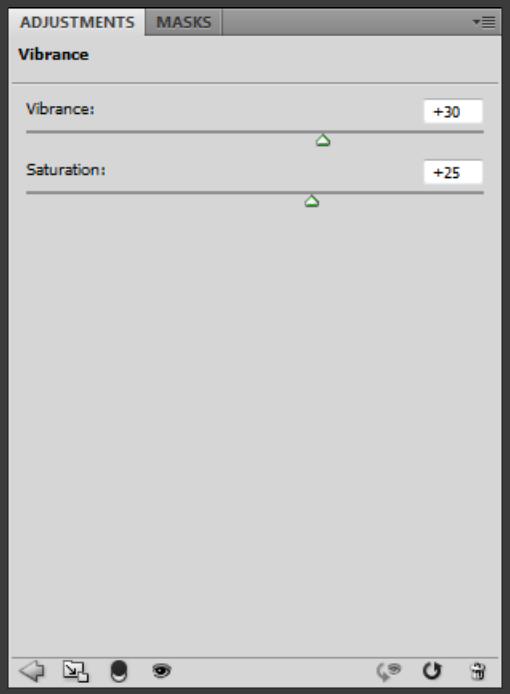



A masked Curves layer lightens all of the shadow areas, and removes more blue

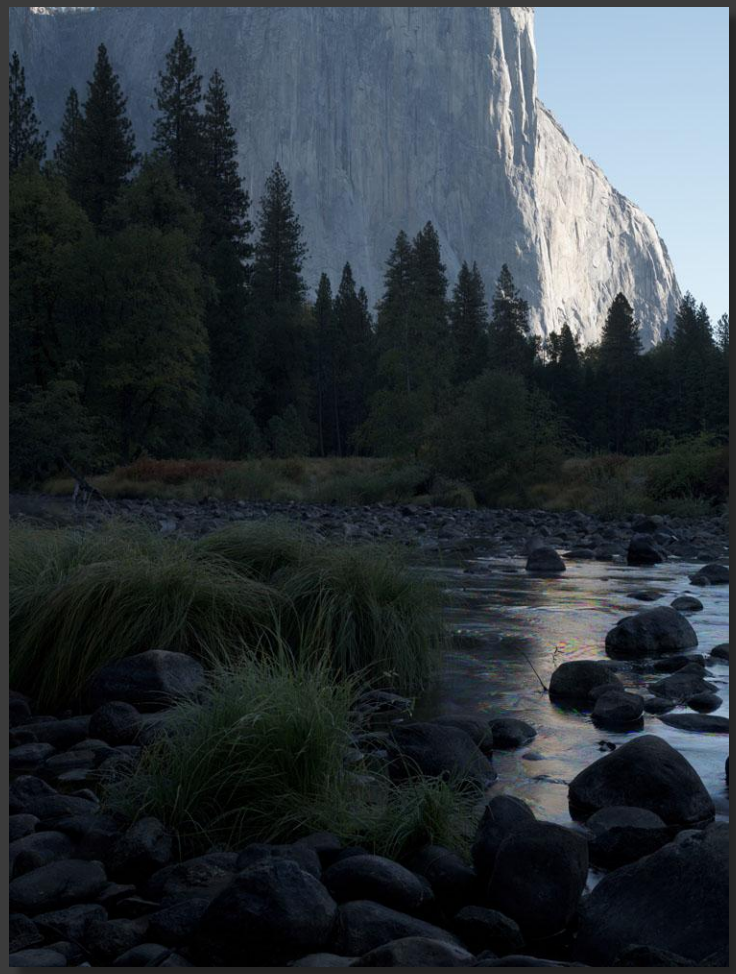
# Modifying the Image



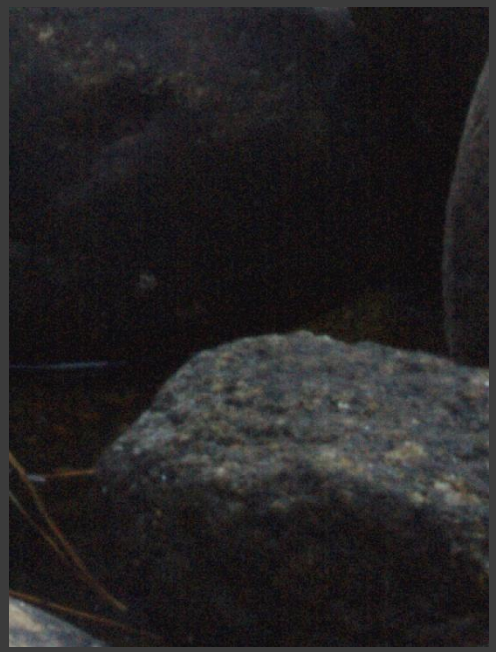




An unmasked Vibrance layer increases color saturation everywhere

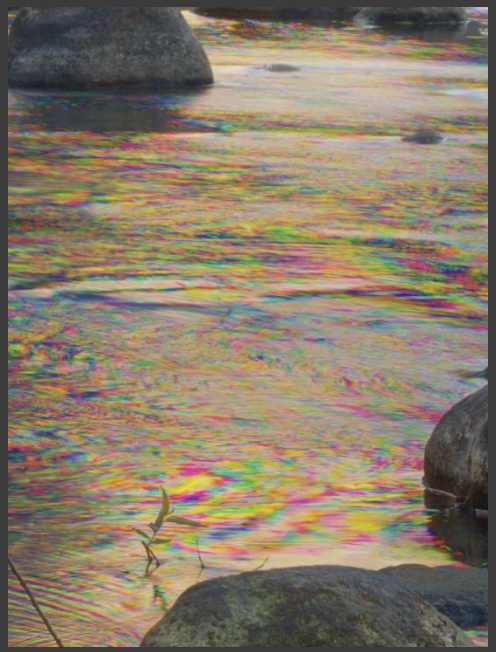
# Before and After



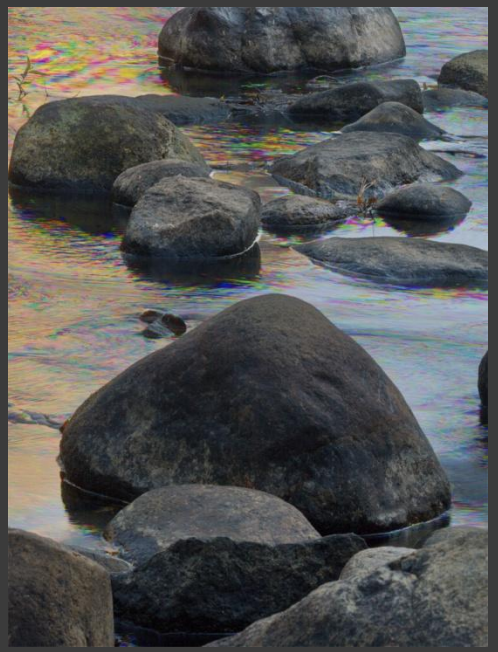
# But there are still problems...



Wicked shadow NOISE caused by aggressive boosting

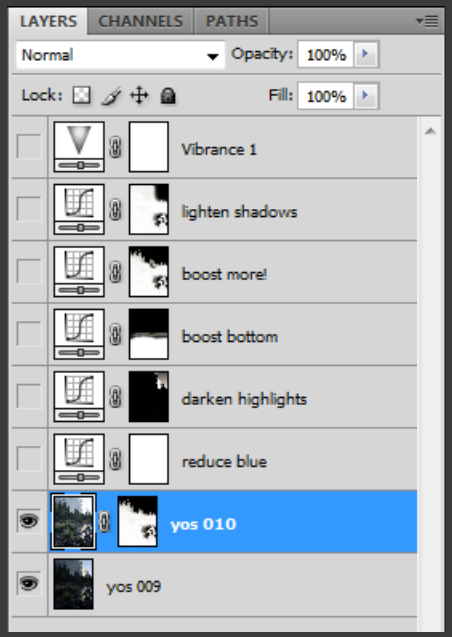


Obvious motion ARTIFACTS caused by moving water

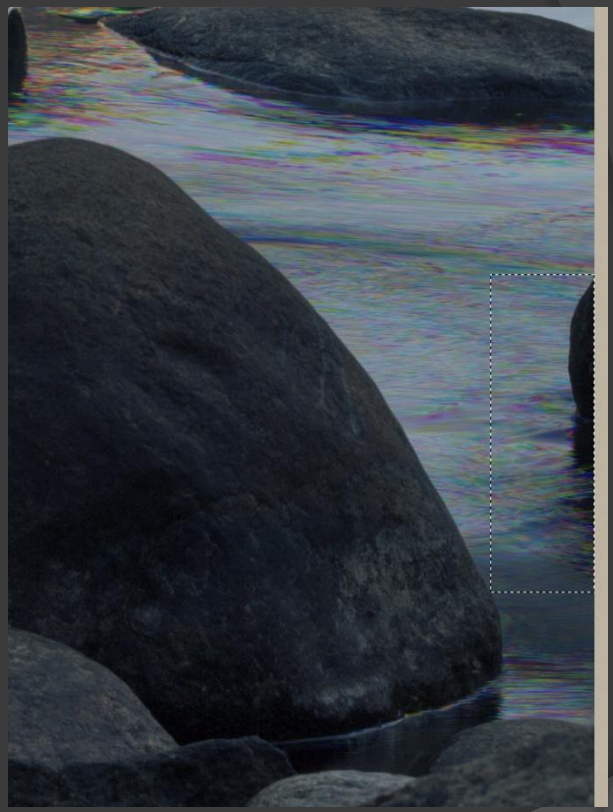


Annoying sliver of ROCK at edge of image

# Removing unwanted items

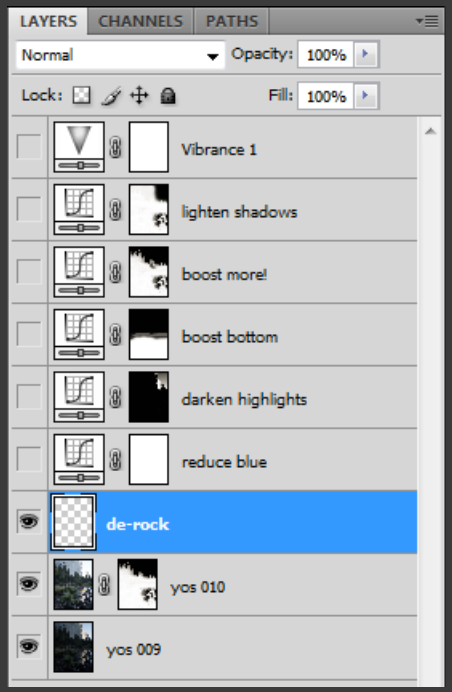



1. Turn OFF all but the (two) image layers
2. Make a rectangular selection enclosing the unwanted item
3. Copy Merged
4. Choose topmost image layer
5. Paste

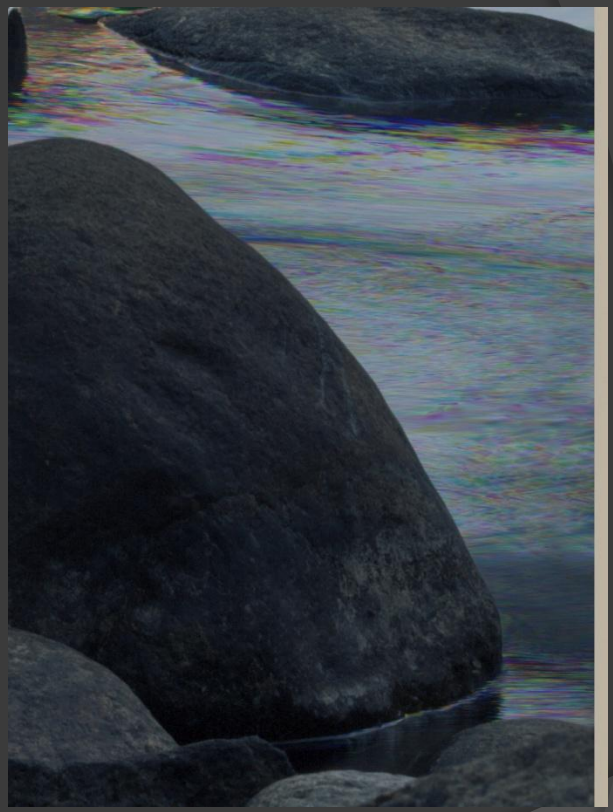


These steps will copy the selected area of the merged image layers and create a new image layer above the existing image layers containing only the selected area

# Removing unwanted items

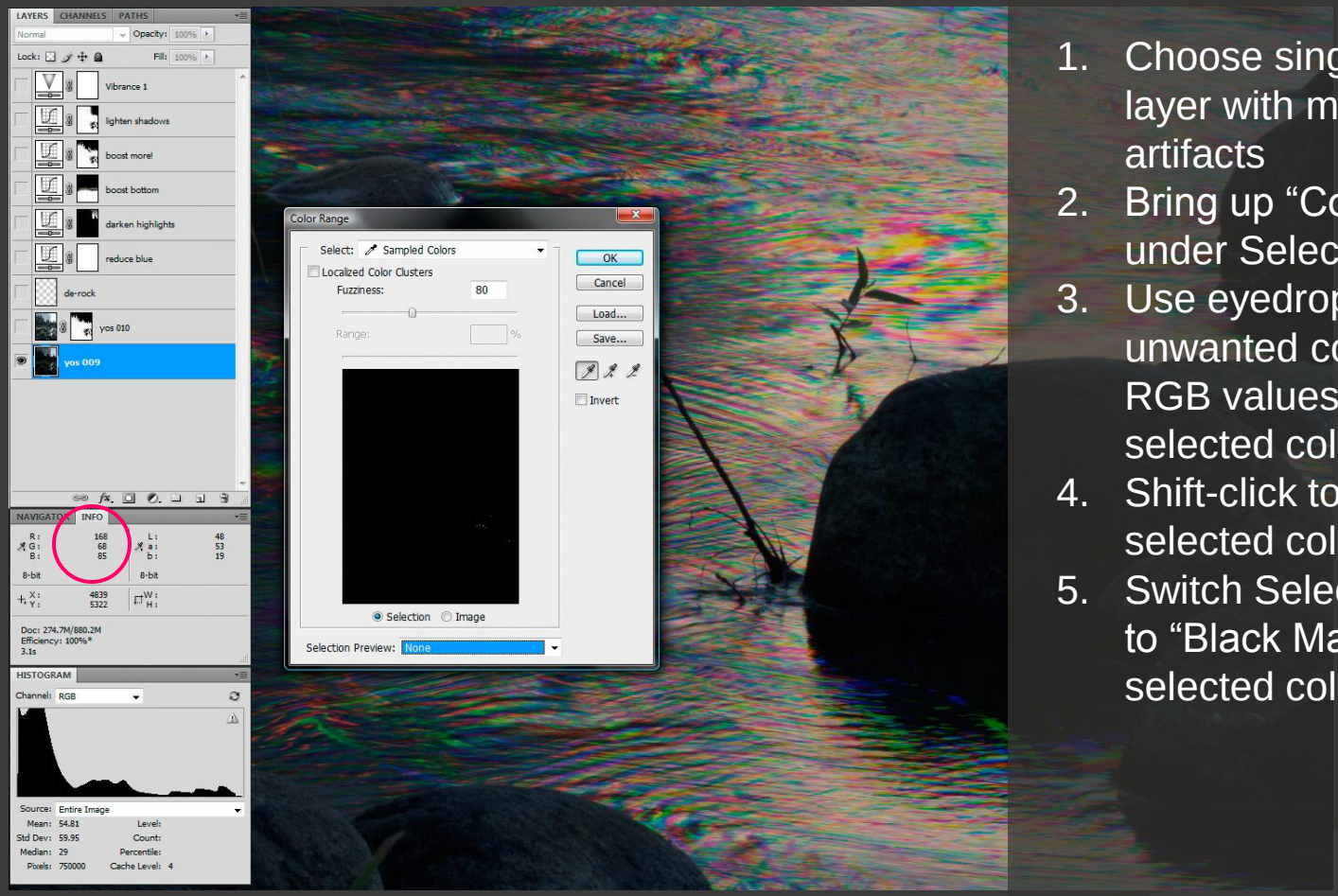



1. Choose new layer
2. Set Clone tool to 100% Opacity & Flow
3. Set Clone tool to Sample “Current and Below”, Aligned
4. Pick similar image area(s) and clone over unwanted item using small, soft brush



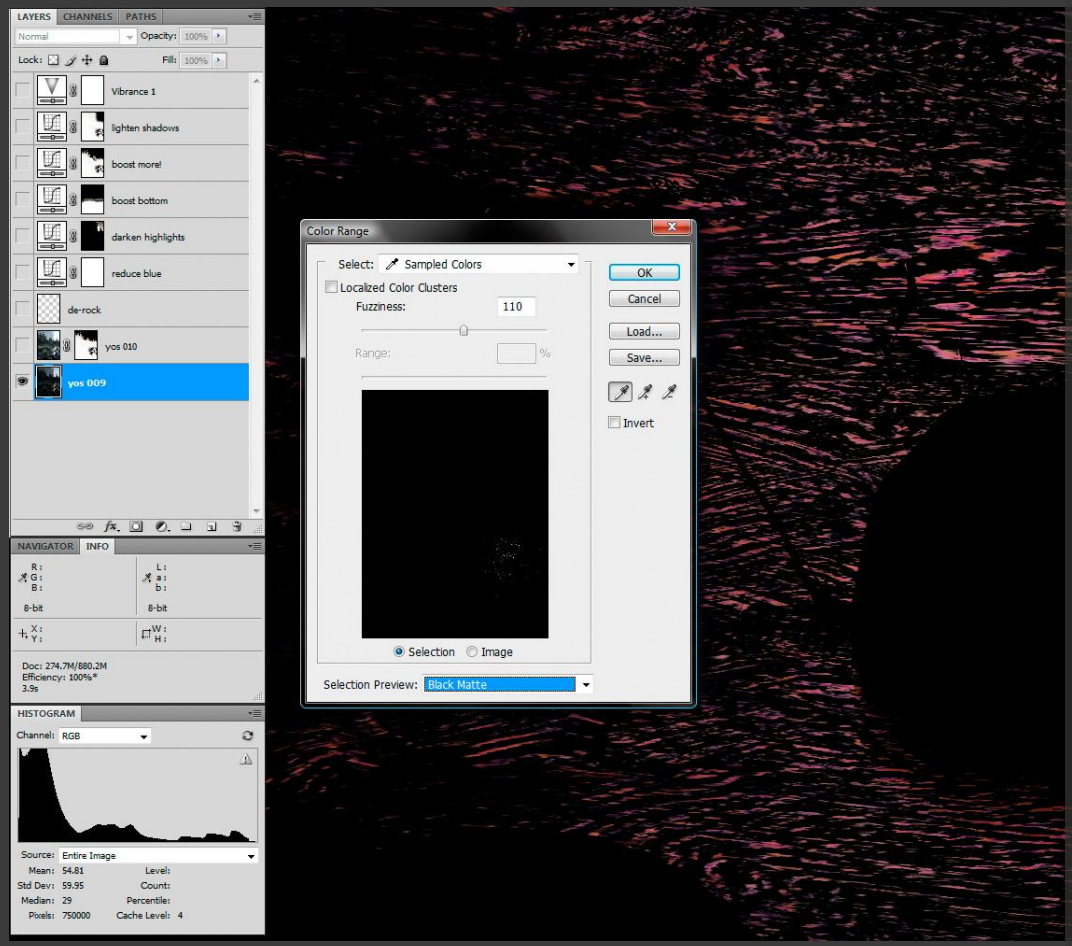
This procedure keeps the original image(s) intact, and allows the removed item to be restored simply by turning off the modified image layer (“de-rock” in this example)

# Suppressing motion artifacts




1. Choose single image layer with most visible artifacts
2. Bring up “Color Range” under Select menu
3. Use eyedropper to select unwanted color (observe RGB values to confirm selected color)
4. Shift-click to add to selected color range
5. Switch Selection Preview to “Black Matte” to see selected colors

# Suppressing motion artifacts

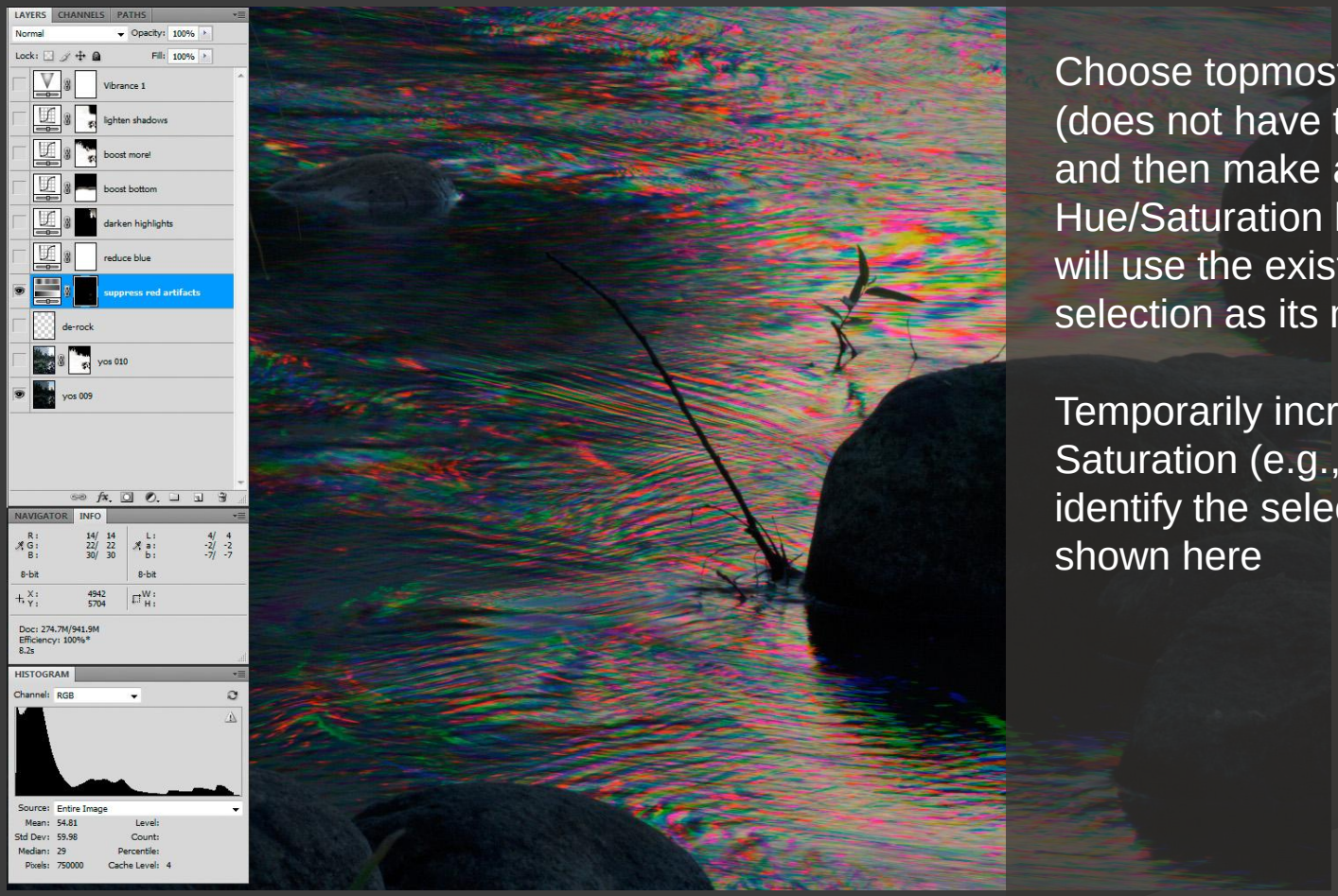



Selected colors must be similar, since all colors in between selected colors will be included in selection: e.g., red and magenta, orange and yellow, green and cyan

Use Fuzziness slider to control how much similar color is included in selection

Click OK to finish color selection, indicated by “crawling ants” on image

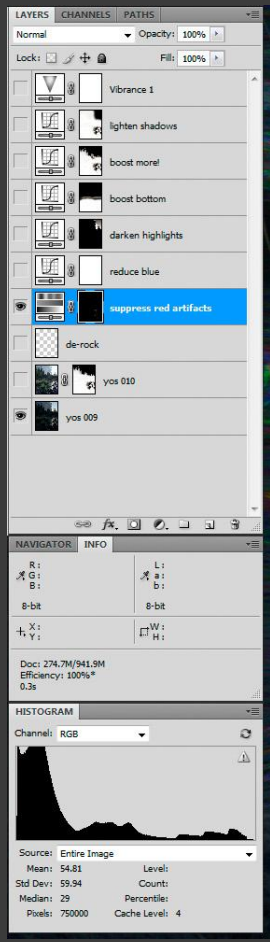
# Suppressing motion artifacts

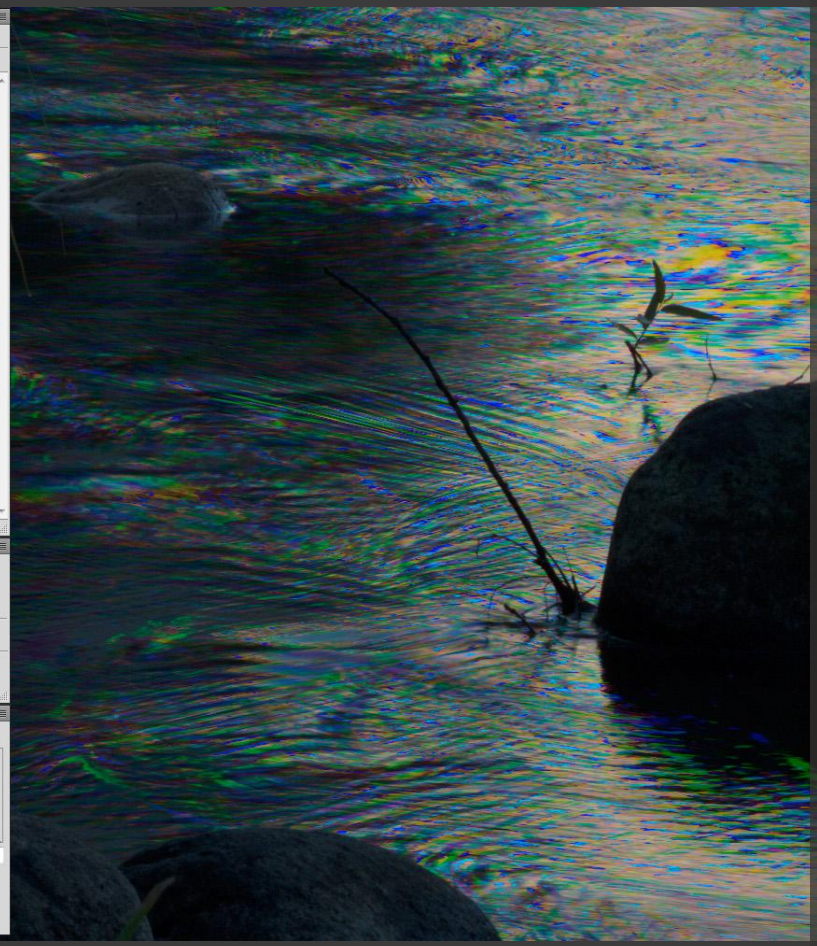



Choose topmost image layer (does not have to be visible), and then make a new Hue/Saturation layer, which will use the existing color selection as its mask

Temporarily increase the Saturation (e.g., to +80) to identify the selected color, as shown here

# Suppressing motion artifacts

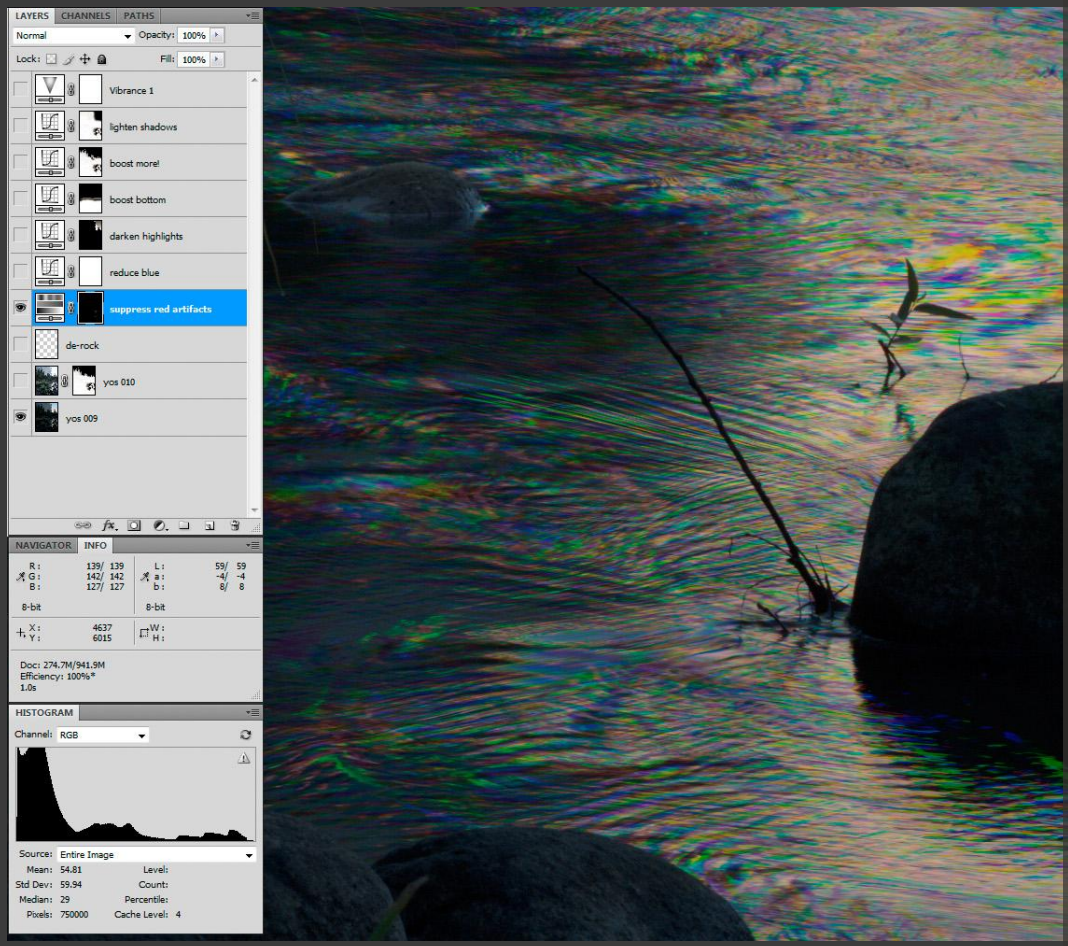


Now adjust the Hue of the selected and exaggerated color to a less obvious (more complementary) appearance

In this case, the red/magenta artifacts have been changed to blue (other colors are unaffected)

# Suppressing motion artifacts




Finally, reduce the Saturation of the affected color to blend with its surroundings

In this case, the original red/magenta artifacts were changed to blue and then desaturated to -50 to arrive at the result shown here

Repeat entire process as necessary to suppress other colors of motion artifacts

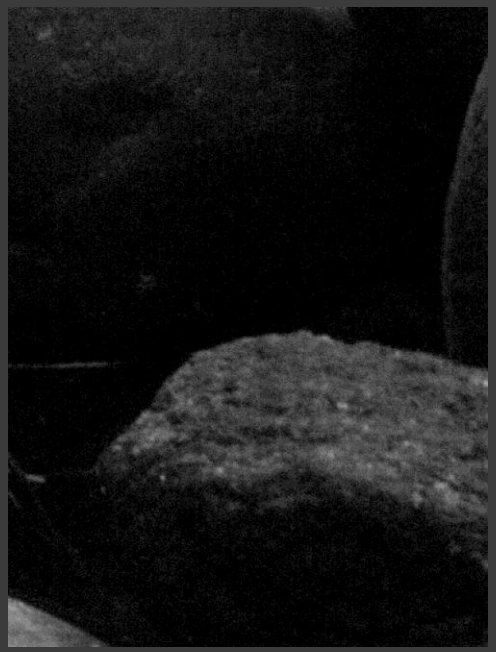
# Suppressing motion artifacts

Before and after suppressing red, yellow, blue, & green (four layers)

# Reducing excessive noise

RED

GREEN



BLUE

Inspection of the individual color channels shows that the RED channel has far more noise than the GREEN or BLUE channels

# Reducing excessive noise

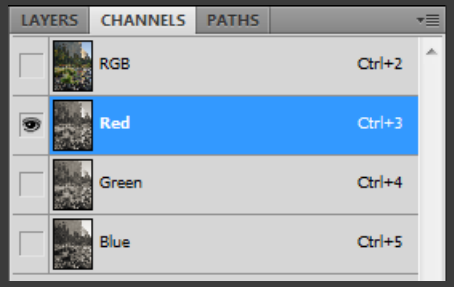
- Noise reduction is done after flattening the image layers, before sharpening
- Since the noise is only visible in the shadows, make a mask that only allows Photoshop's "Reduce Noise…" filter to affect the shadows
- Since most of the noise is in the RED channel, start by reducing noise aggressively in this channel only

# Reducing excessive noise

Making the Reduce Noise mask:

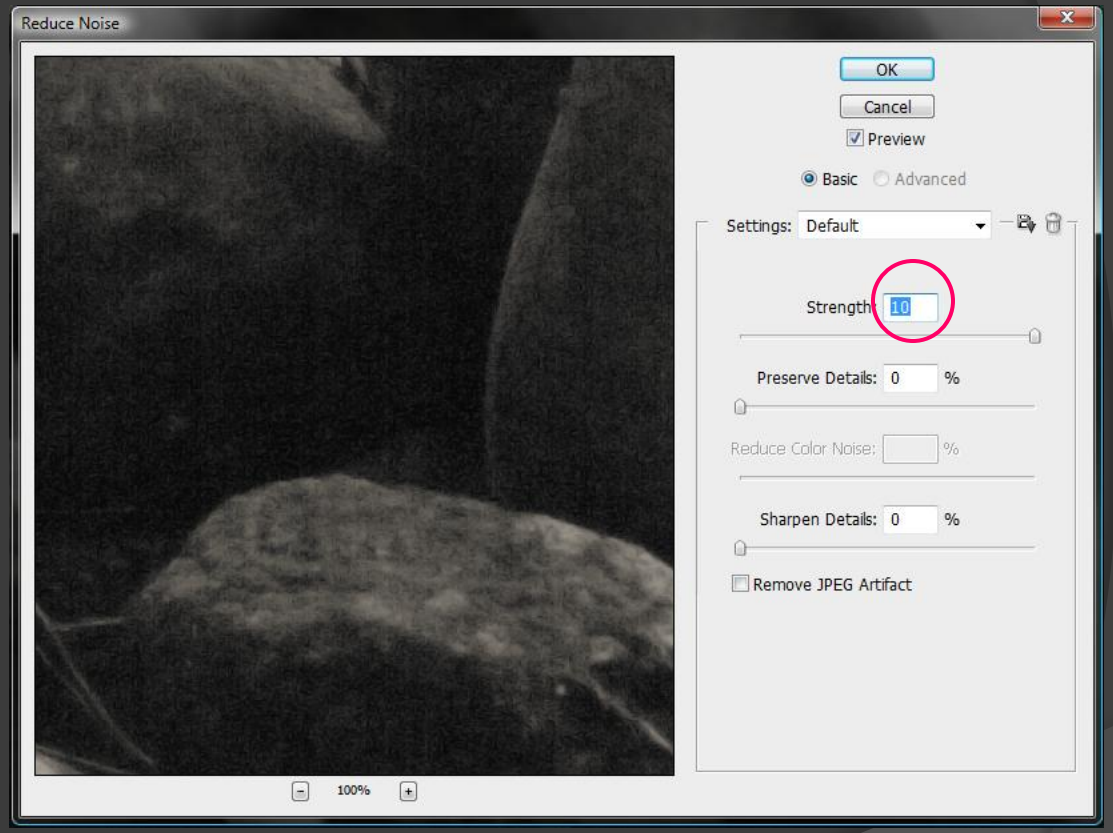
1. Flatten image layers
2. Load RGB channels as selection
3. Make temporary Curves layer to hold mask for editing (selection becomes mask)
4. Invert mask (need white in shadow areas)
5. Boost contrast of mask
6. Add mask to selection (edited mask becomes selection again)
7. Delete temporary Curves layer
8. Now have image shadows selected

# Reducing excessive noise



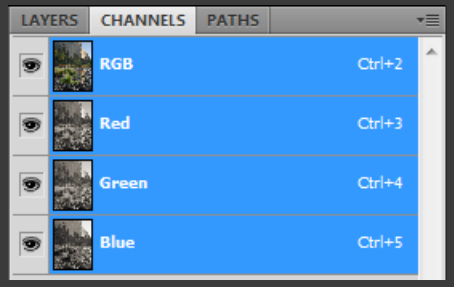

After making the edited shadow selection, choose the RED channel only and then bring up Photoshop's "Reduce Noise…" Filter

Use Strength of 10 to suppress RED channel noise (blurs RED channel shadows only)



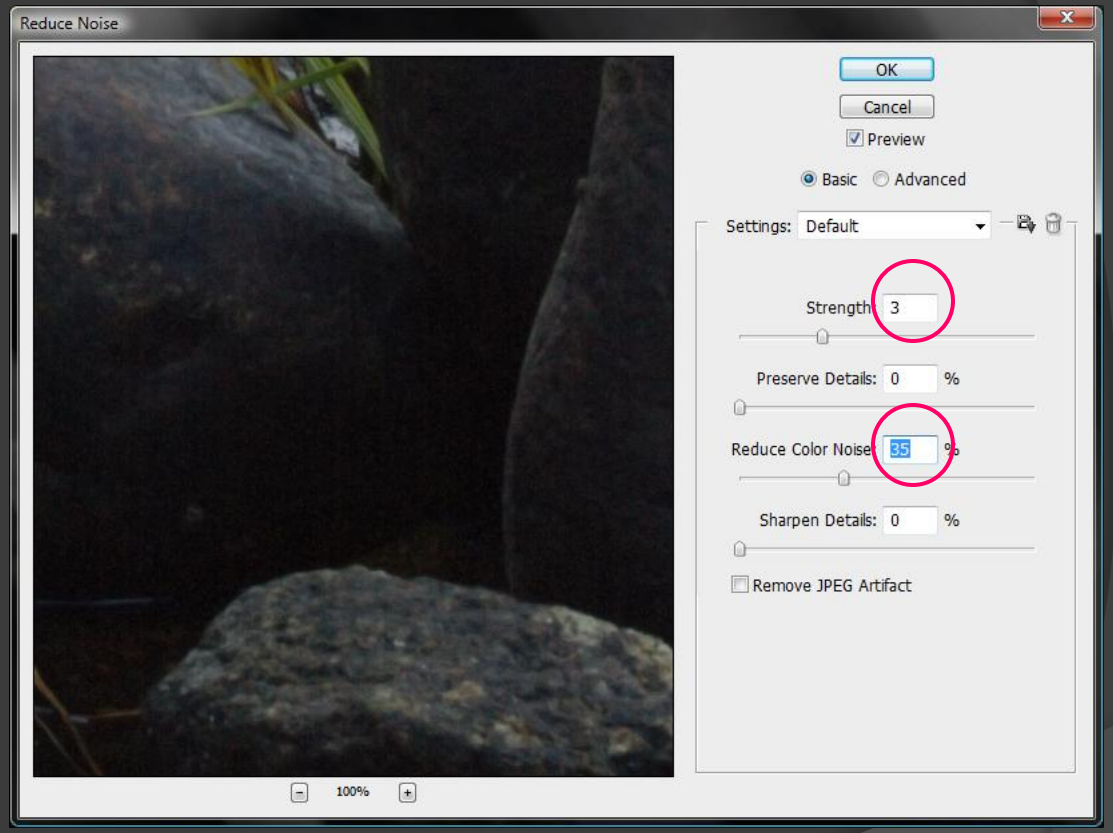

(Reduce Color Noise is disabled when working on a single channel)

# Reducing excessive noise



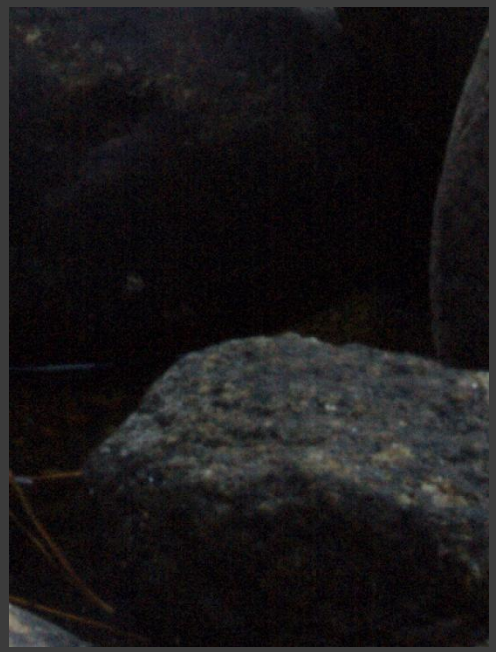

With the image shadow selection still in place, choose all (RGB) channels and again bring up the “Reduce Noise…” filter

Use Strength of 3 and Reduce Color Noise setting of 35 to suppress color noise in this rather noisy example

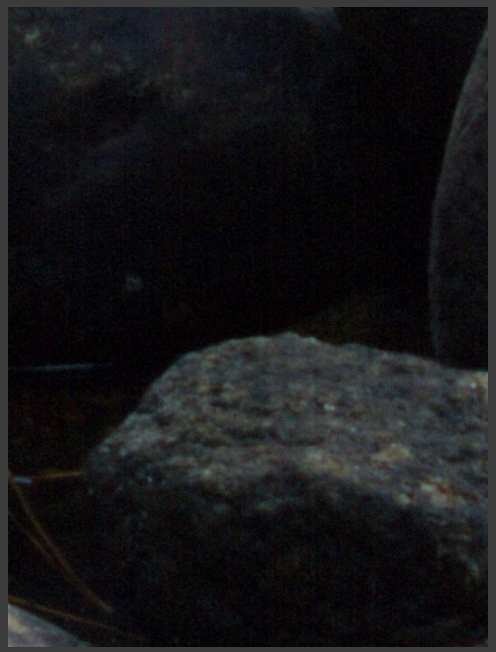



Typical settings are Strength = 0 or 1; Reduce Color Noise = 25
Preserve and Sharpen Details remain at 0

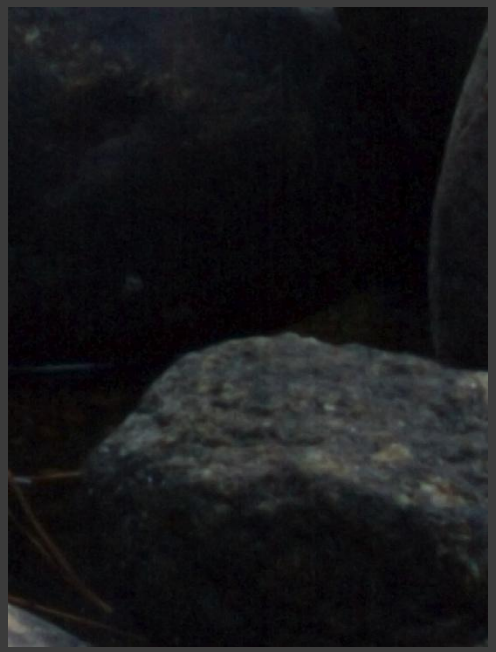
# Reducing excessive noise



Before



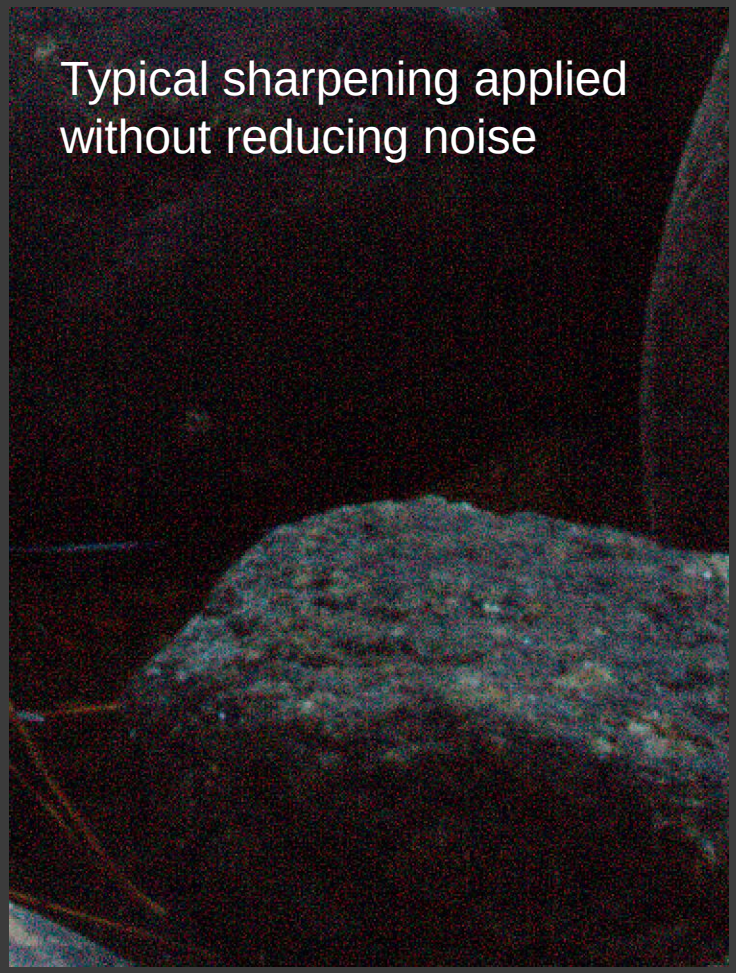
Reduce RED

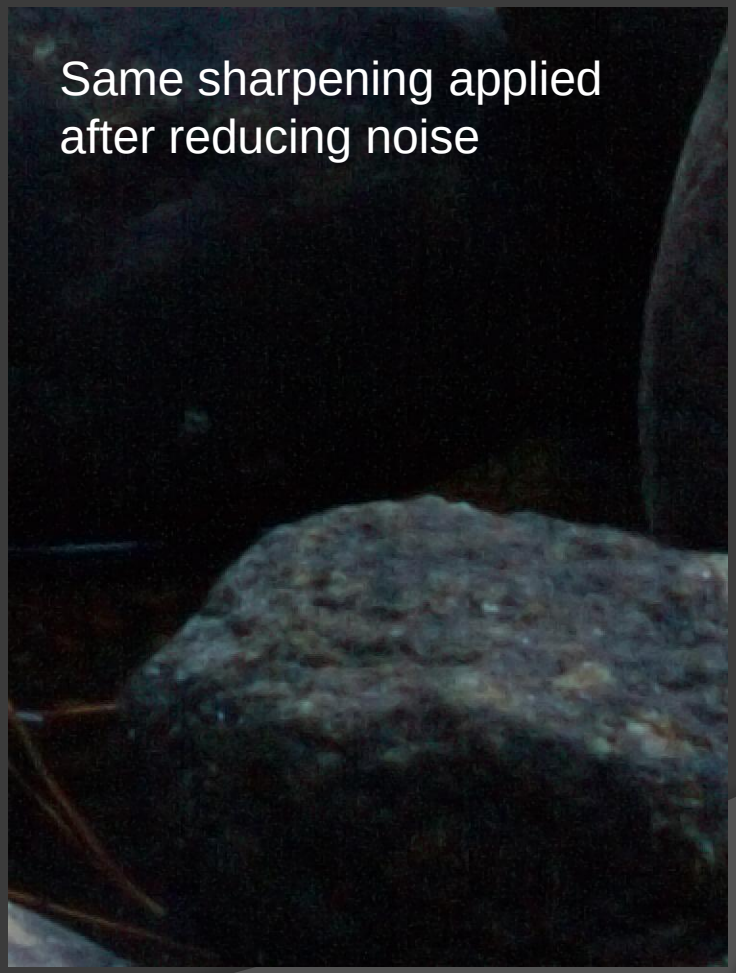


After

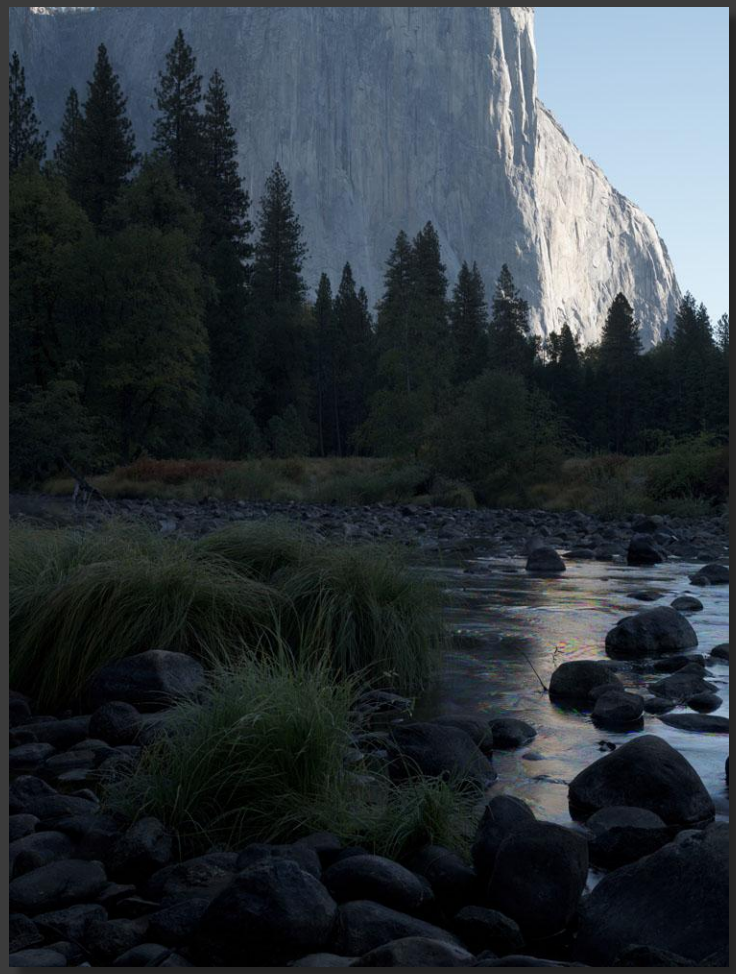
Examples shown at 200% magnification
Sharpness will be restored separately using Unsharp Masking

# Reducing excessive noise

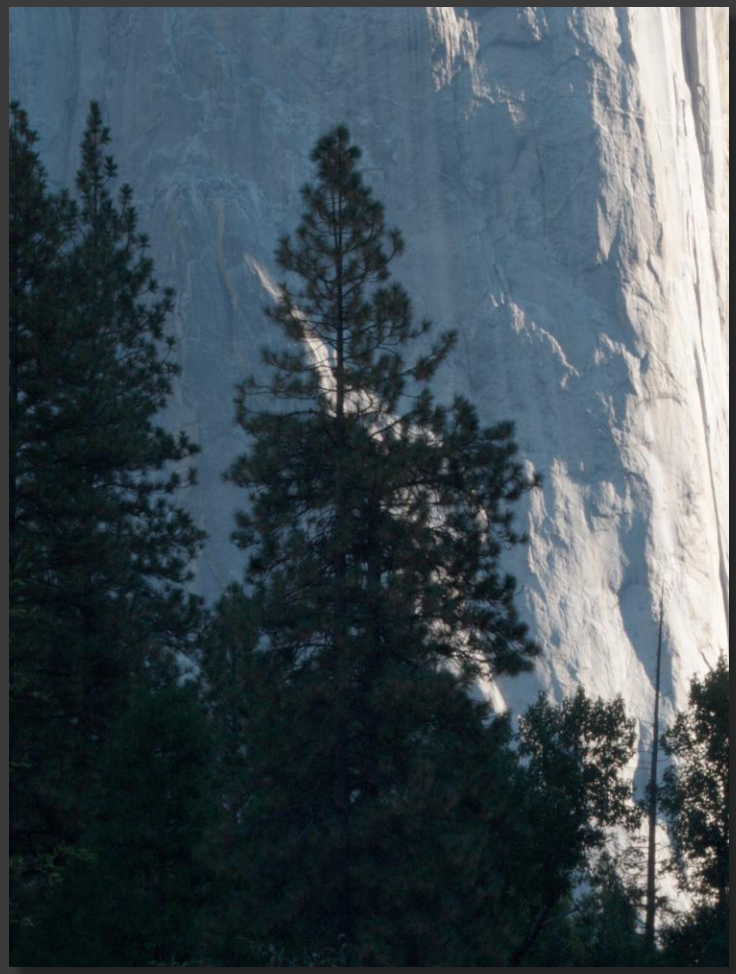


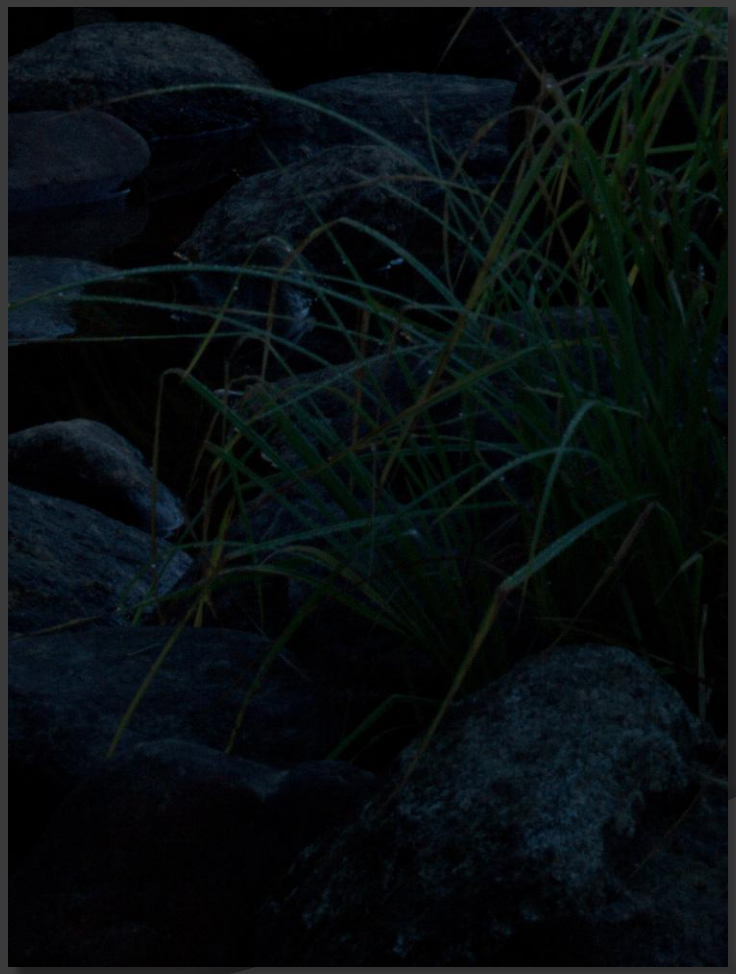



# Finished eXtreme makeover

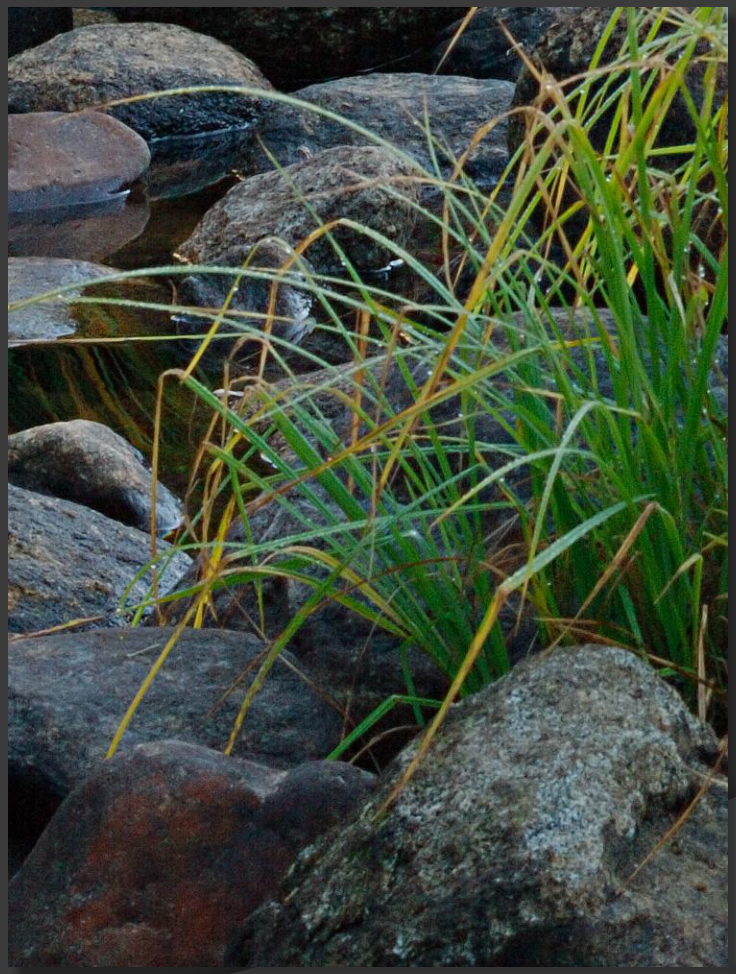


# Details from original image



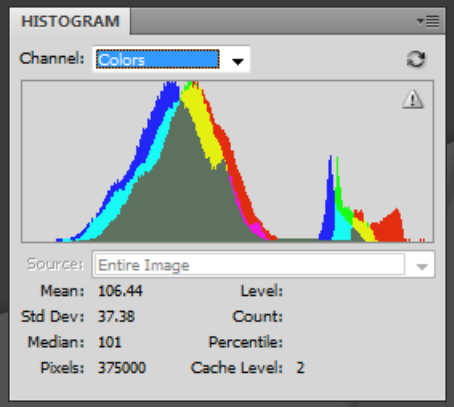


# Details from finished image

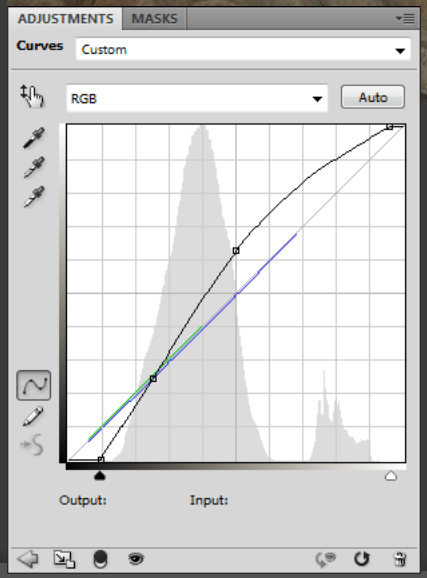


# Death Valley, January 2009

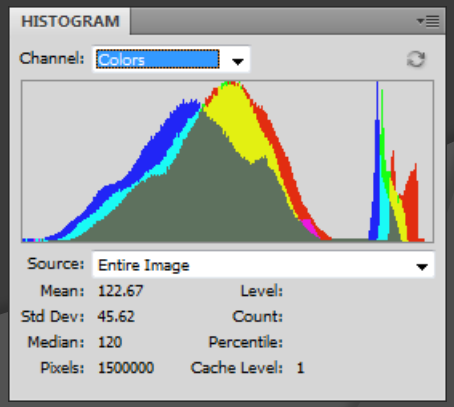
The rising sun skims the distant mountaintops of the Panamint Range while the badlands around Zabriskie Point are lit only by the changing skylight. The right side of the sky was overexposed (clipped) in the original scan using a 6-stop Tone curve, so the raw image data was re-retrieved using a 10-stop Tone curve to recover highlight detail.



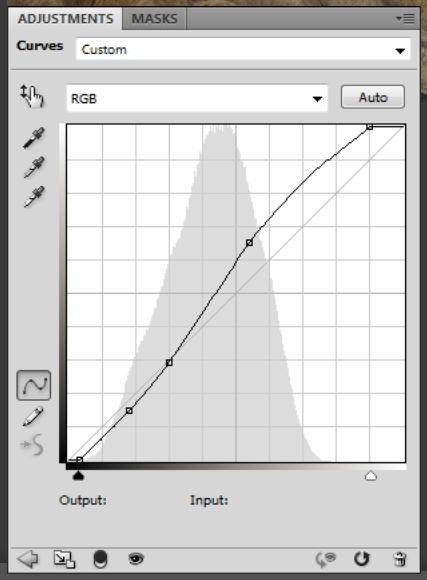
# Modifying the image



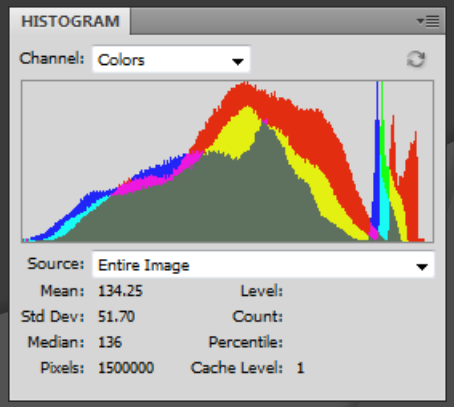

An unmasked Curves layer expands and lightens all image values, increasing contrast in the darker tones and reducing contrast in the highlights



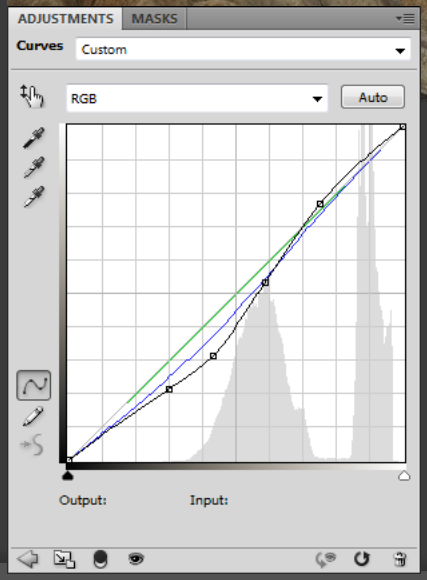
# Modifying the image



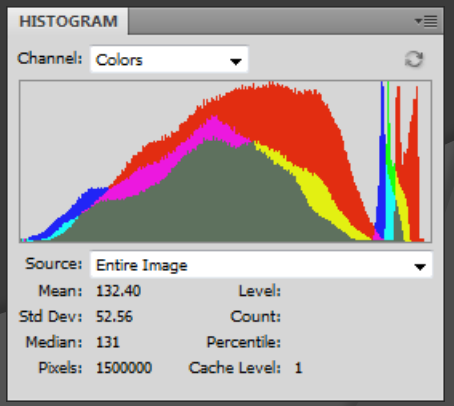

A precisely-masked Curves layer boosts foreground contrast without affecting the distant view.



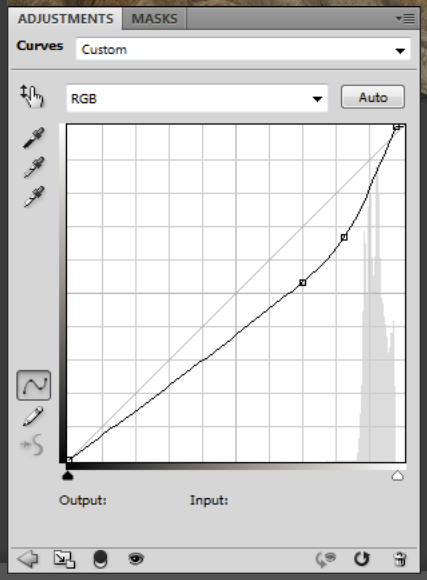
# Modifying the image



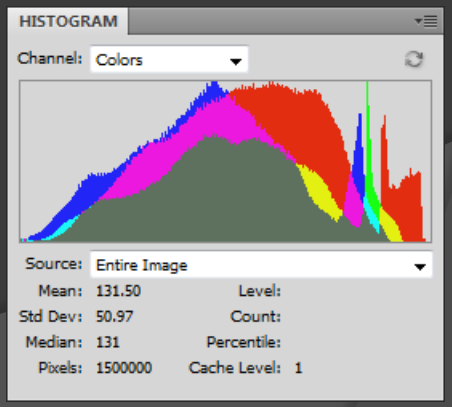

Inverting the previous mask on another Curves layer darkens only the distant mountains and valley.



# Modifying the image



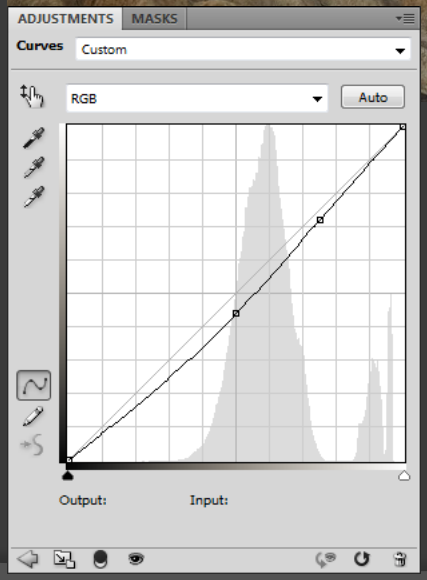

Another precisely-masked Curves layer recovers contrast in the sky. Note the mild gradient in this mask.

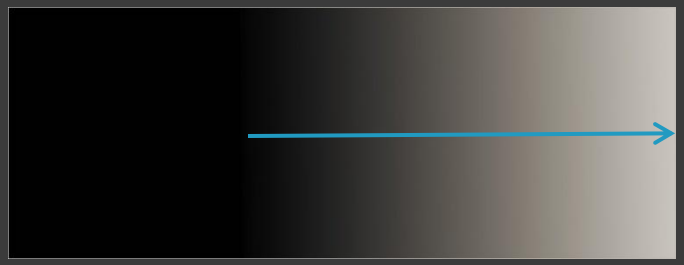


# Modifying the image

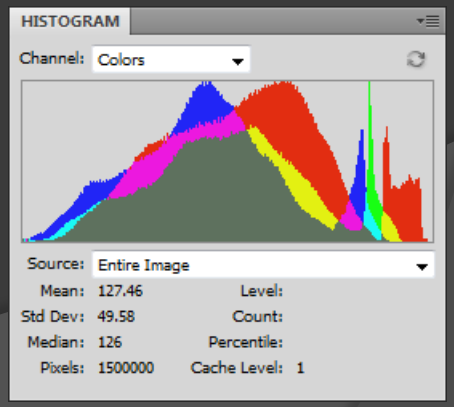
At this point, there is an obvious darker-to-lighter transition across the image caused by the rising sun increasing the indirect light on the ground during the few minutes of time required to scan this scene from left to right.

# Modifying the image

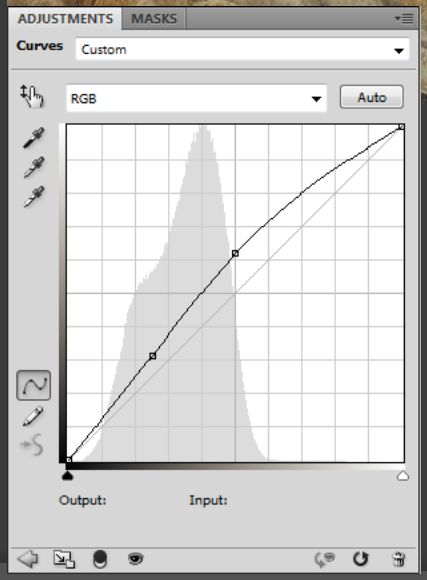


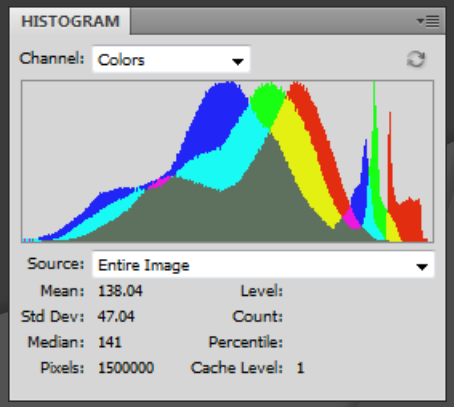
A black-to-white gradient mask is used to gradually darken the right side of the image.



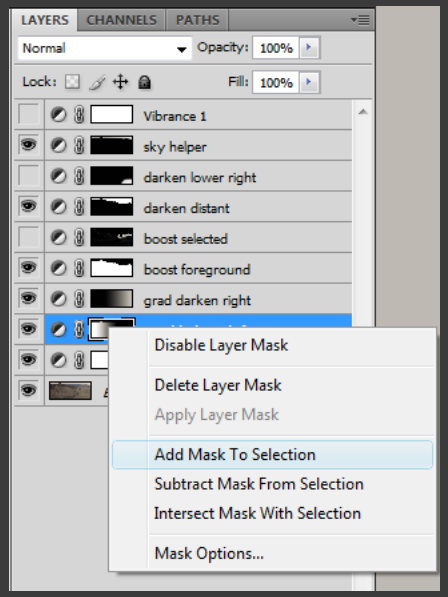
# Modifying the image

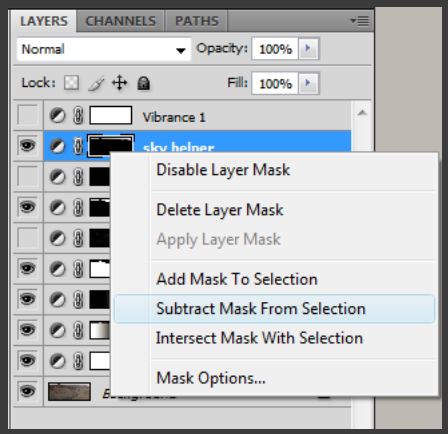



Another black-to-white gradient mask is used to gradually lighten the left side of the image.



# Mask & Selection Math



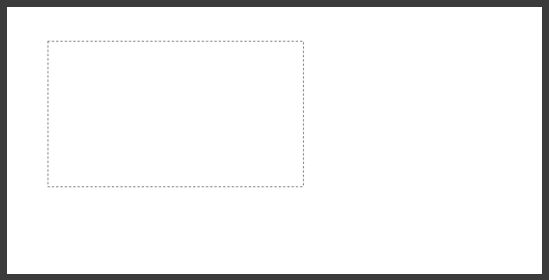

To remove the sky from this mask:

1. Add the original gradient mask to (no) Selection
2. Subtract the existing sky mask from Selection
3. Delete gradient mask from grad lighten left Curves layer
4. Add layer mask to grad lighten left Curves layer (uses existing selection)

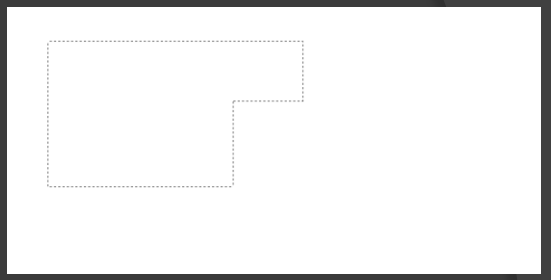
Original gradient mask included the sky, which became too bright after the adjustment.

# Mask & Selection Math

mask one

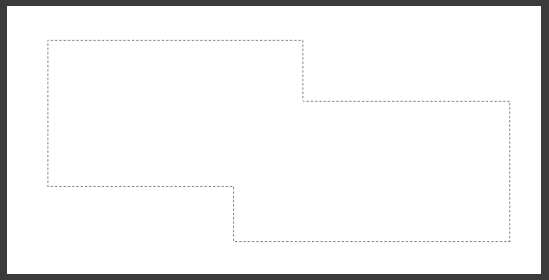


add mask one to (no) selection

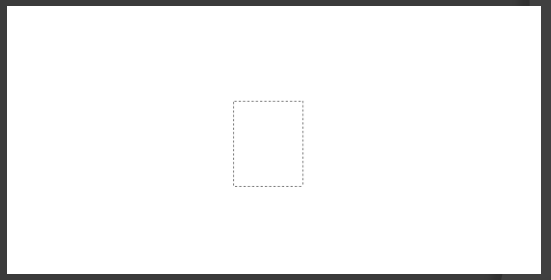


subtract mask two from mask one
(mask one NOT mask two)

mask two



add mask two to mask one
(mask one OR mask two)

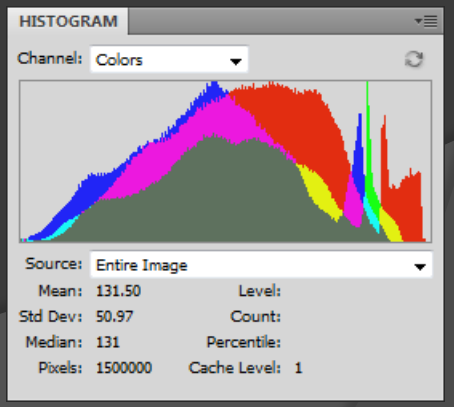


intersect mask two with mask one
(mask one AND mask two)

All math (logic) is done using existing masks with the current selection.
All math (logic) operates on grayscale (0 to 255) values, not just white.

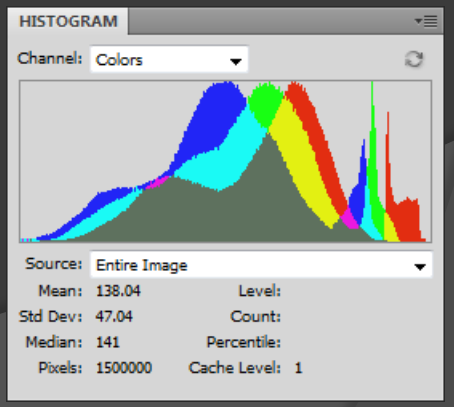
# Modifying the image

BEFORE two gradient mask Curves adjustment layers

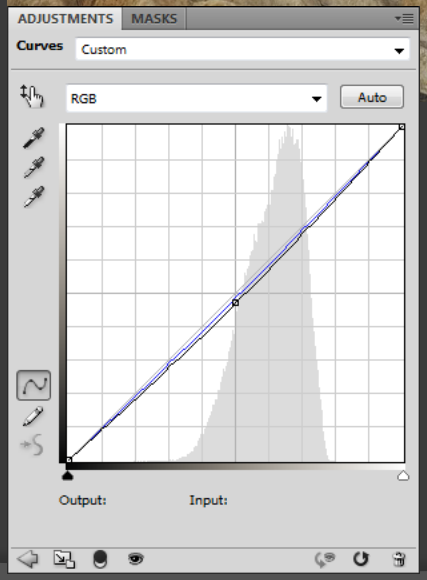


# Modifying the image

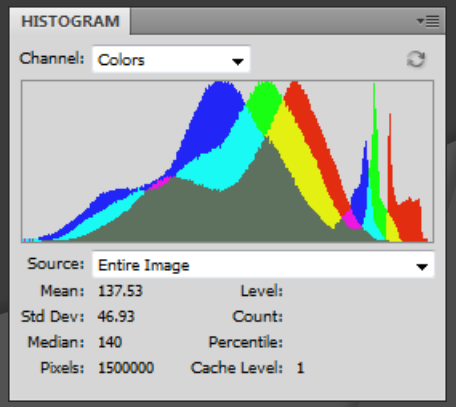
AFTER two gradient mask Curves adjustment layers



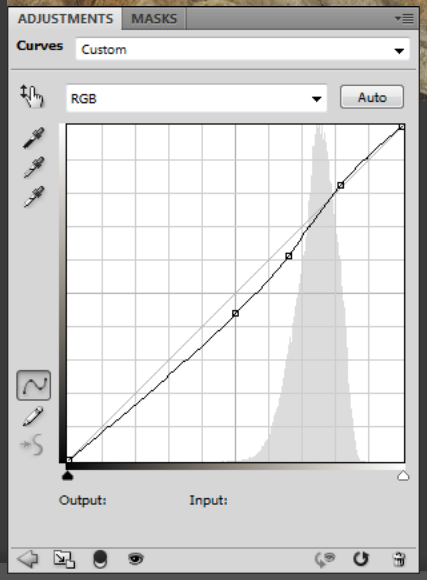
# Modifying the image

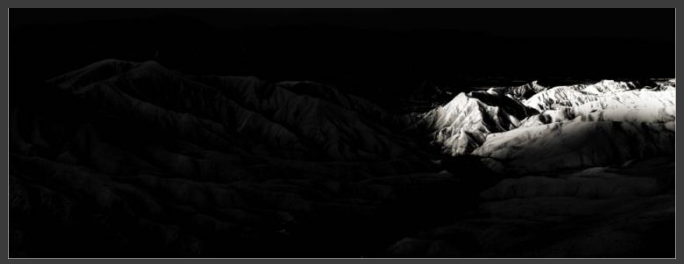



The lower right corner is darkened slightly to bring the eye back into the picture

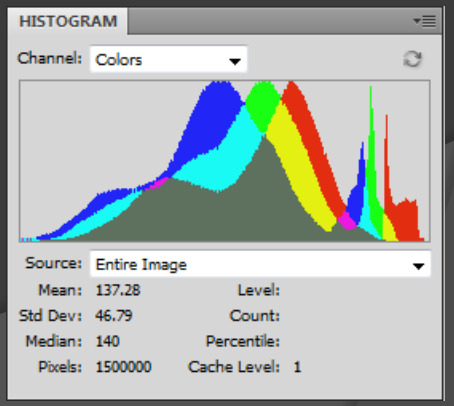


# Modifying the image

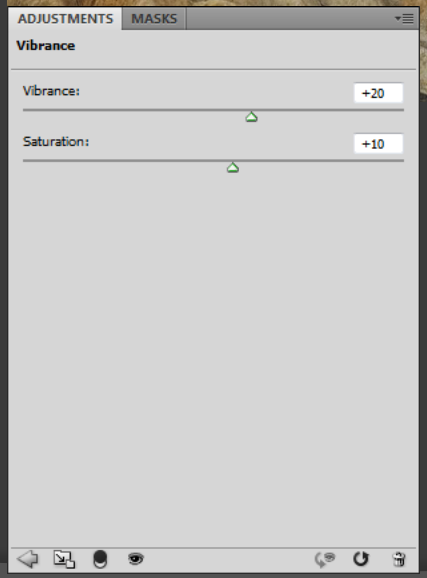


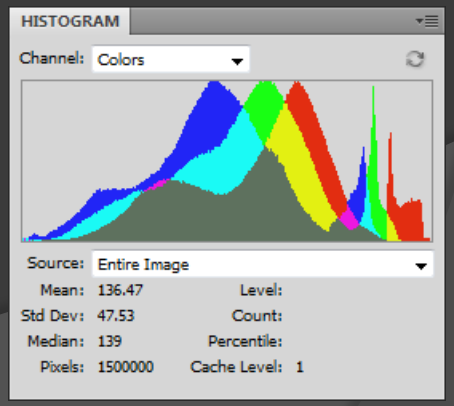
The middle right area is slightly boosted in contrast to bring out more detail



# Modifying the image




Finally, an unmasked Vibrance layer boosts color saturation in the entire image.



# Before and After

# But not quite done...

- Even though this image was captured using 1/60 sec Line Time and ISO 1200, and then boosted considerably, image noise wasn't too bad
- However, the distant parts of the scene weren't quite in optimum focus, and looked slightly softer than the near parts, probably from using an aperture of f-11 with insufficient depth of field

# Finishing steps

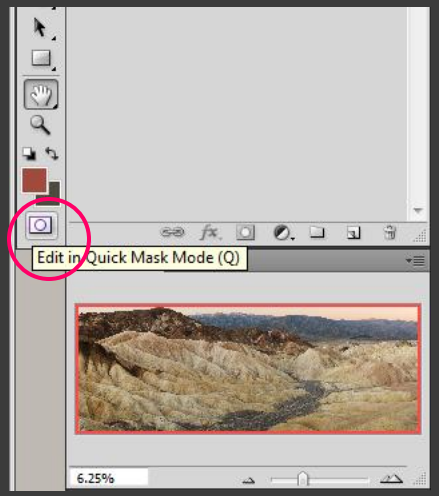
- Flatten image layers
- Reduce Noise everywhere (no selection)
  - Strength 1; Reduce Color Noise 25
- Unsharp Mask (HVLR “capture usm”)
  - 150%; Radius 0.9*; Threshold 1
- Unsharp Mask (LVHR “output usm”)
  - 20%; Radius 7.0; Threshold 1
- Distant areas still looked slightly soft…

*Up to Radius 0.9 after Reduce Noise Strength 1; typically Radius 0.7 without Reduce Noise

# Fixing minor focus errors

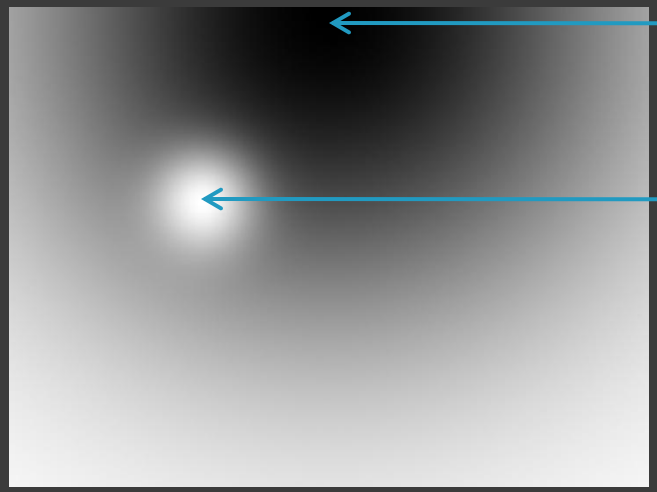
- A third, aggressive Unsharp Mask is applied to only the out of focus area(s)
- All distinct edges (e.g., skyline) must be excluded to avoid unwanted “borders”
- Any residual noise must be suppressed first to avoid unwanted exaggeration
- A hand-drawn selection is used to isolate the area(s) that need fixing

# Using Quick Mask mode




1. Enter Quick Mask mode (button “depresses”)
2. Choose black foreground color
3. Use soft-edged Brush to paint over desired area(s)
4. Painted-over areas become tinted red (amount of red depends on brightness of original area)
5. Choose white foreground color
6. Use smaller soft-edged Brush to clean up edges
7. Exit Quick Mask mode
8. Invert Selection to select desired area(s)

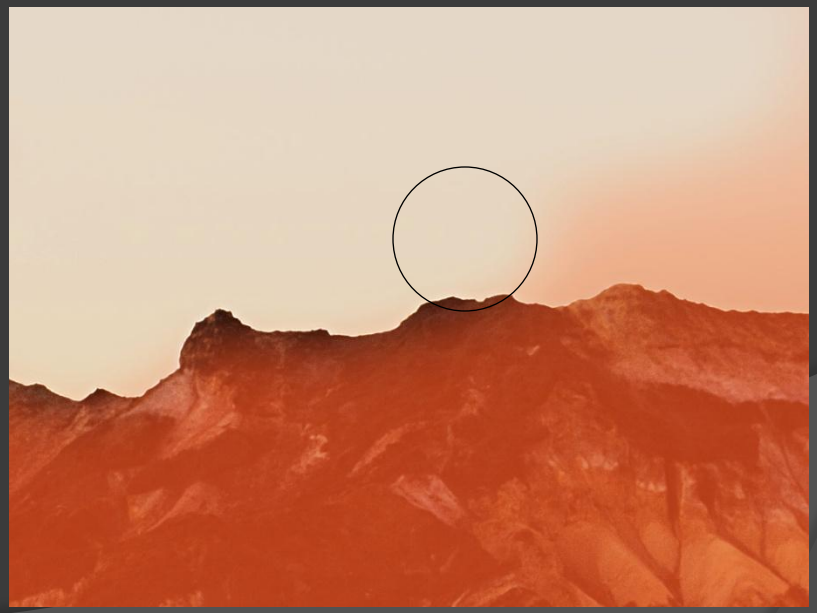
# Using Quick Mask mode



Size 1500; Hardness 0% (black)

Size 250; Hardness 0% (white)

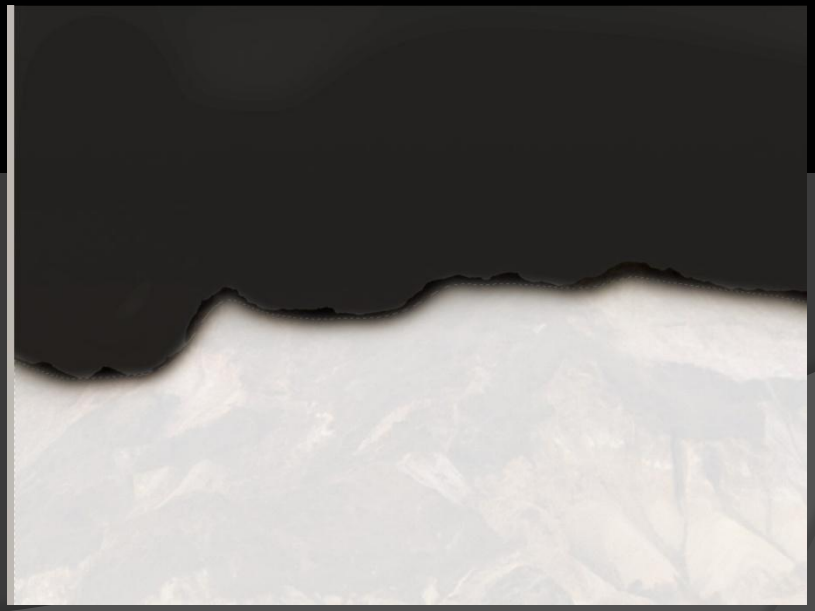
Smaller brushes have tighter softness gradients than larger brushes (above). After painting over the desired areas with a large soft black brush, clean up any “overspray” with a smaller soft white brush, ensuring that any distinct edges are not painted (right).



# Using Quick Mask mode

After exiting Quick Mask mode and Inverting the resulting Selection, “crawling ants” outline the selected area(s) that will be affected by the third Unsharp Mask operation. Note that selection is just inside the distinct skyline edge to exclude the edge.

# Using Quick Mask mode



This is how the third Unsharp Mask selection would appear as a mask. The skyline edge of the selection is just inside the skyline and fairly abrupt, while the lower edge of the selection is much softer, for a gradual transition (mask detail at right has been composited to show skyline).

# Fixing minor focus errors

After typical noise reduction and sharpening (HVLR + LVHR USM)

# Fixing minor focus errors

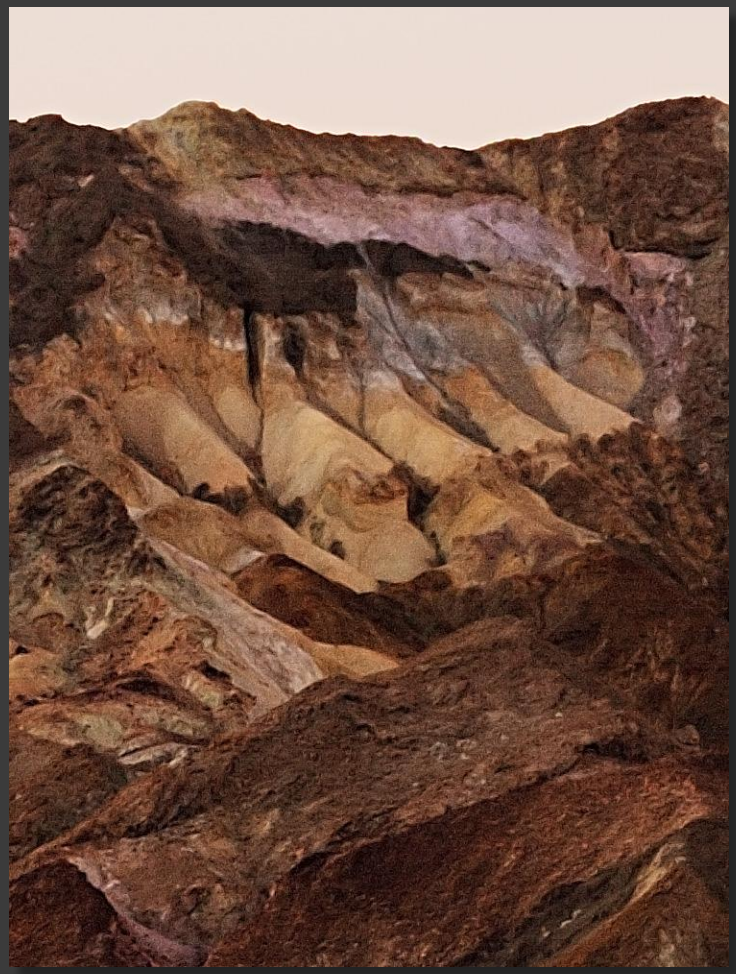
After 2nd selective Reduce Noise (Strength 2; Reduce Color Noise 0) and 3rd selective Unsharp Mask (120%; Radius 1.0; Threshold 1)

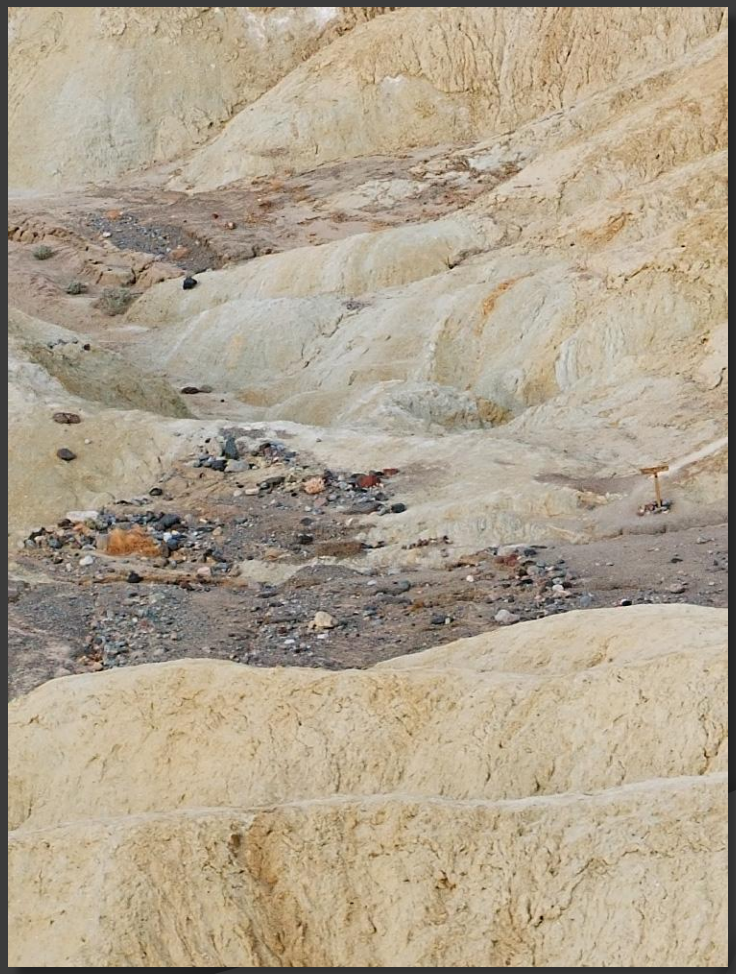
The selection mask created for this repair was Saved as a separate .psd image in case it might be needed again

# Finished eXtreme makeover

# Details from original image

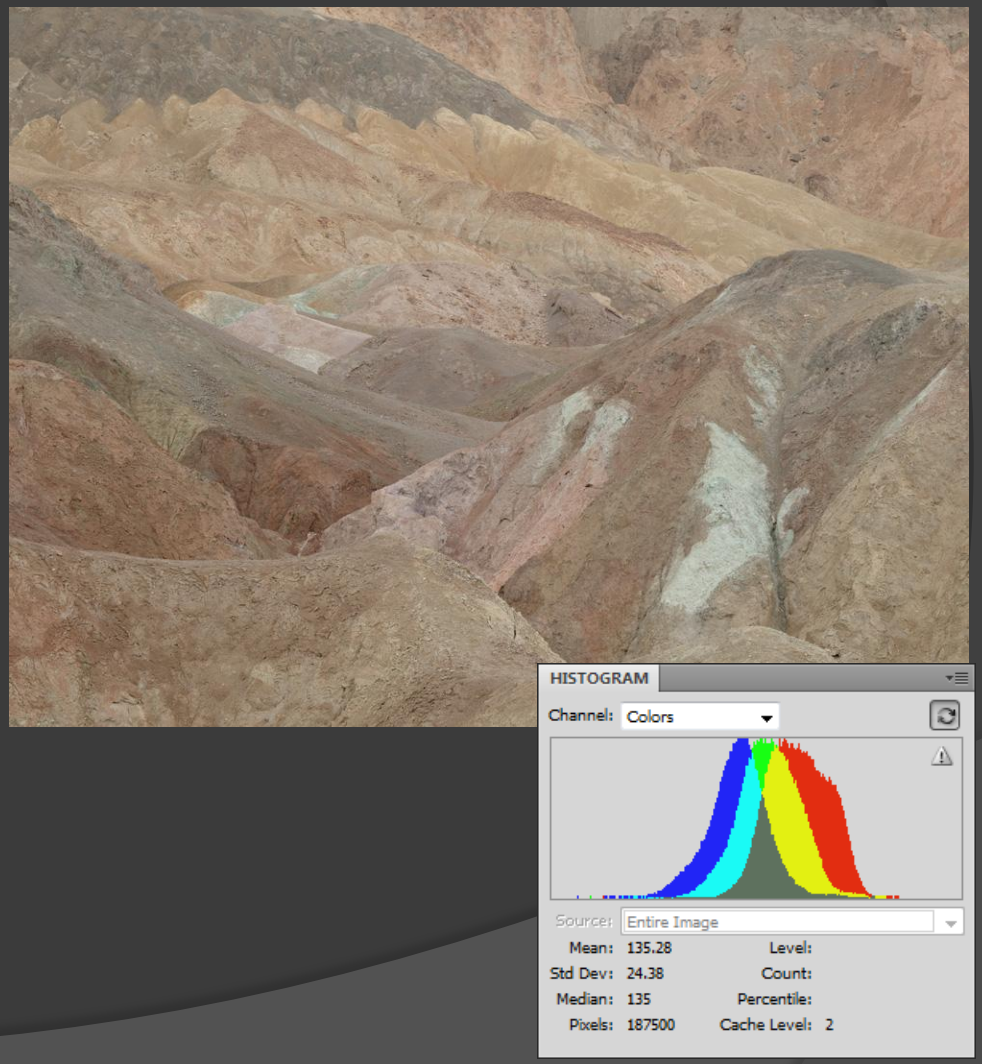
# Details from finished image





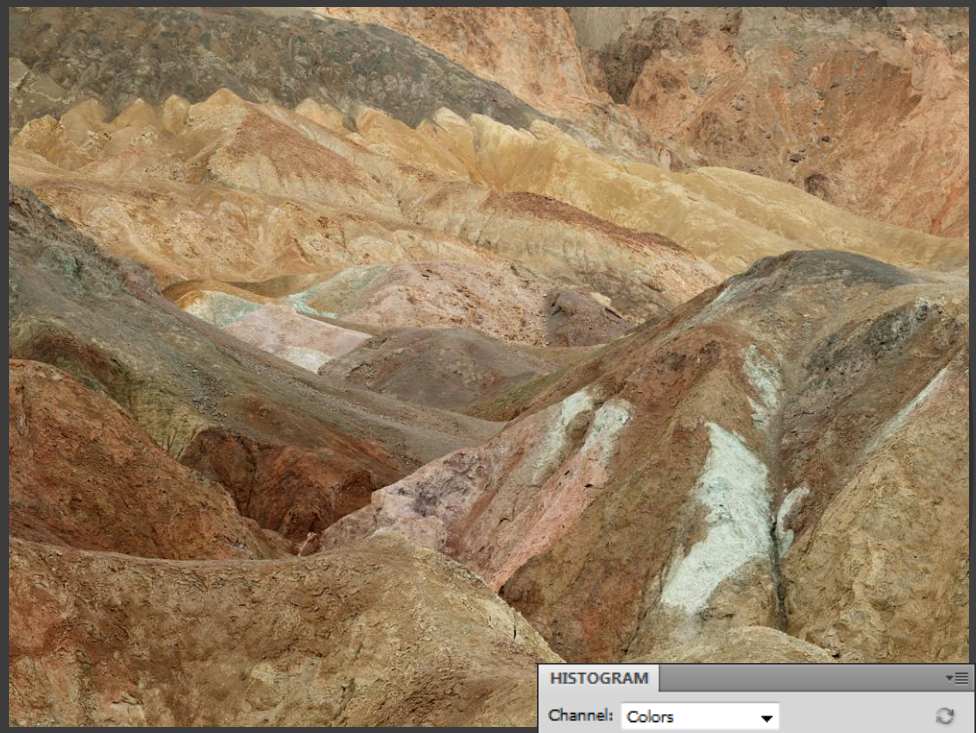
# Death Valley, January 2010

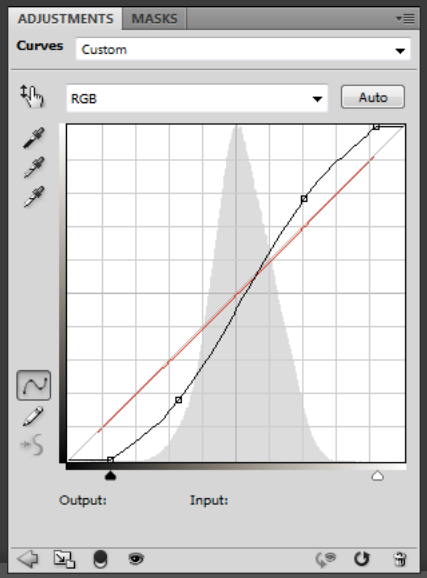
Heavy overcast morning sky produces very flat lighting without shadows that yields a dull-looking image, even when using a 6-stop Tone curve.

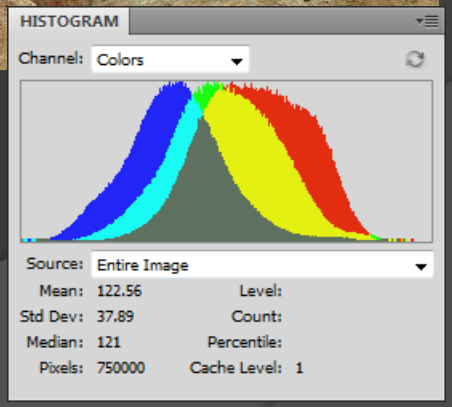


# Death Valley, January 2010

An unmasked Curves adjustment layer increases overall image contrast beyond what I actually saw, but just as I had envisioned.

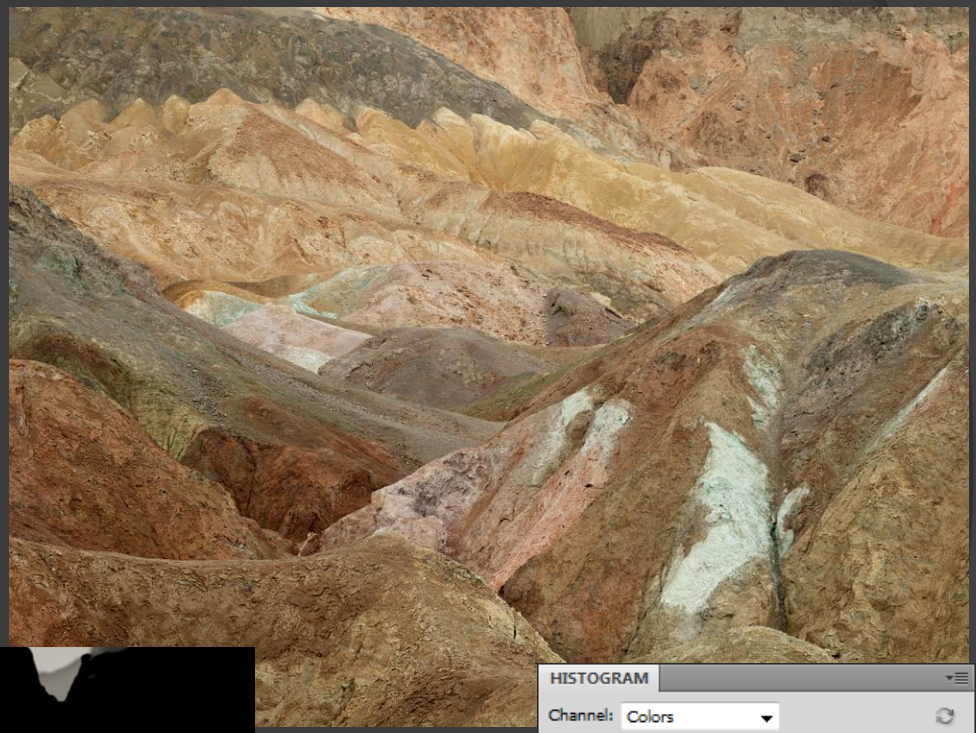


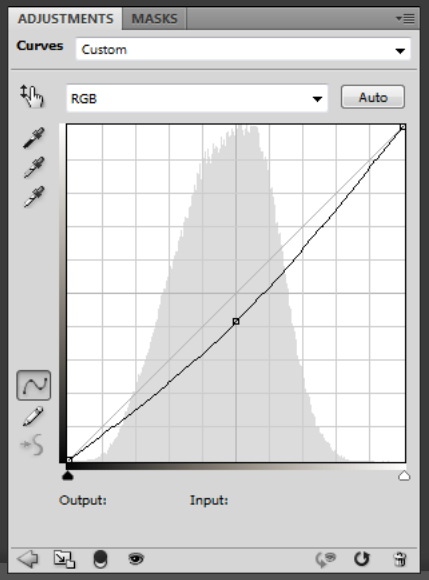


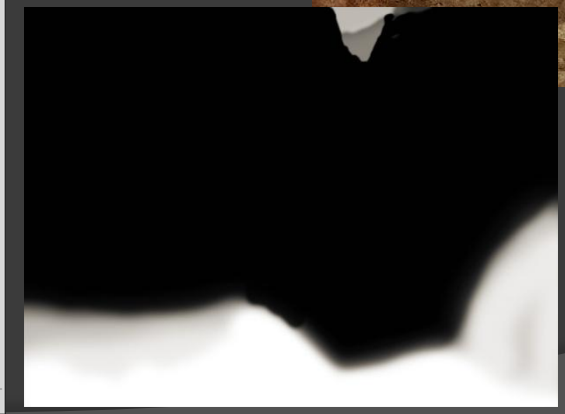



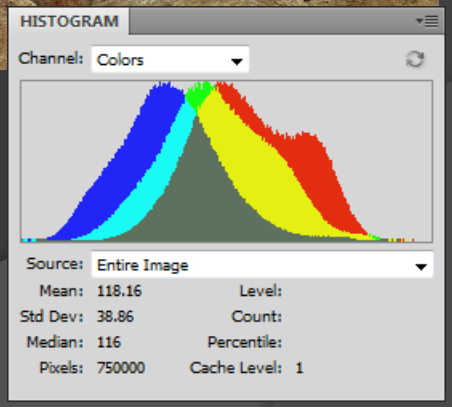
# Death Valley, January 2010

A masked Curves adjustment layer selectively darkens the foreground and distant canyon. The mask was first filled with black using the paint bucket tool, and then hand-painted white using soft-edge brushes.



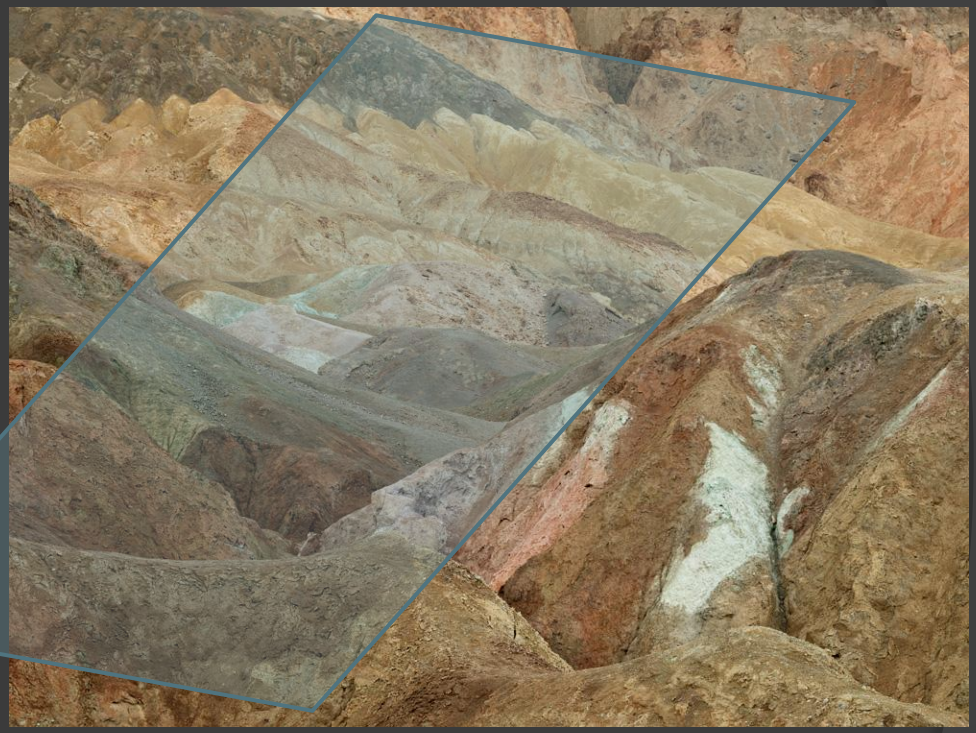




# Death Valley, January 2010

Only the preceding overall Curve and selective Curve adjustments were used to modify this image. However, the gray-topped mound of earth at center right didn't quite fit within the available depth of field of my 210mm lens at f-11 after adjusting camera movements to optimize the plane of focus…



# Using surgery to repair focus

Fortunately, I had also captured the same scene a few minutes earlier using a 135mm lens that provided more depth of field at f-11, and kept the entire mound in focus.  Of course, the mound in this 135mm image is smaller than in the 210mm image…

# Using surgery to repair focus

To check whether the 135mm image section would be sharper than the 210mm image section after the 135mm section was magnified to match the size of the 210mm section, a visual comparison was made.  Here is part of the 210mm image at 100% magnification in Photoshop.

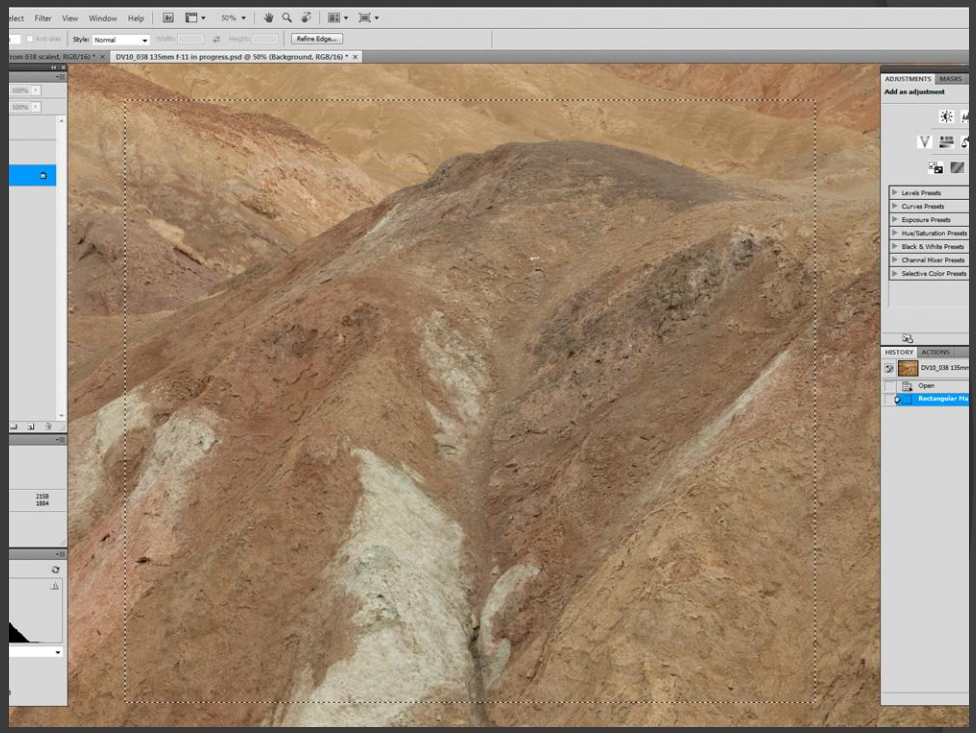
# Using surgery to repair focus

Here is the same section of the 135mm image shown at 150% magnification in Photoshop. These are screen captures taken directly from Photoshop.

The magnified 135mm section is still sharper than the 210mm section, although there is also some perspective difference between the two sections.

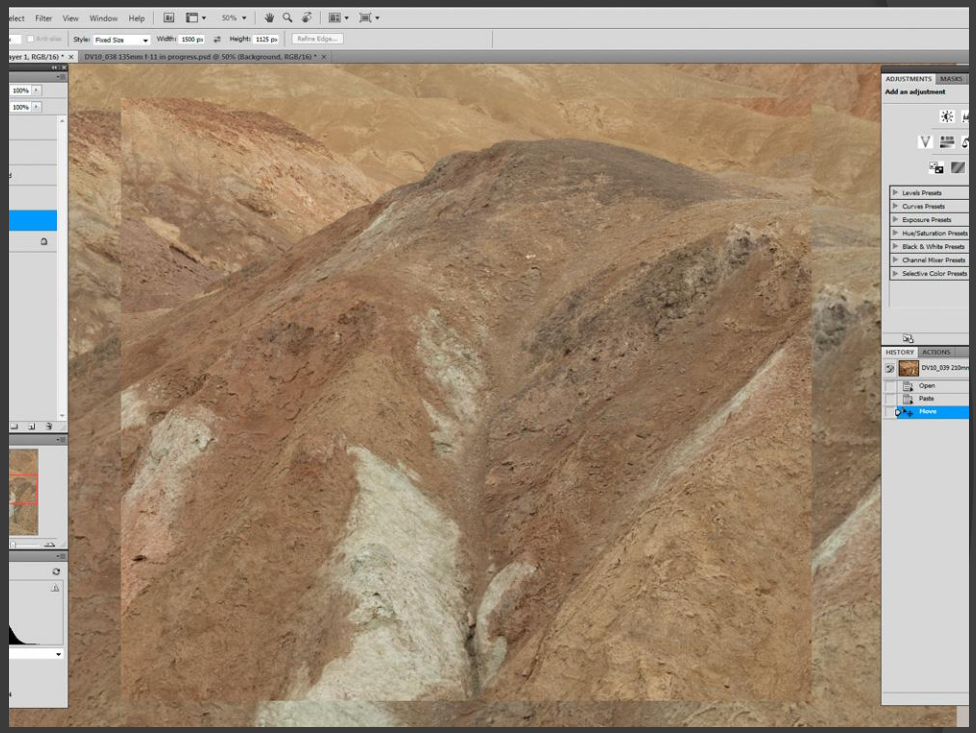
# Using surgery to repair focus

After confirming improved focus in the 135mm image, the desired section of this image is selected and Copied.



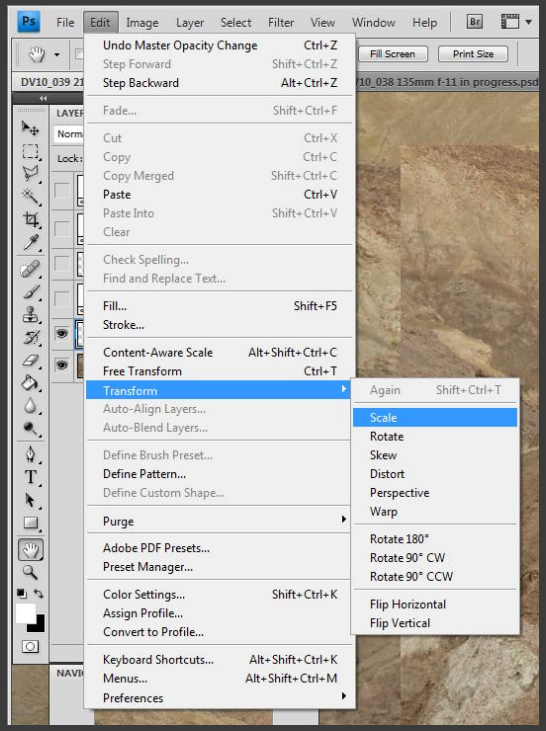
# Using surgery to repair focus

After choosing the Background layer in the 210mm image, a Paste command will add the section copied from the 135mm image as a new layer on top of the 210mm image. Use the Move tool to drag the 135mm image section into approximate position (it's still smaller than needed, so won't fit properly).



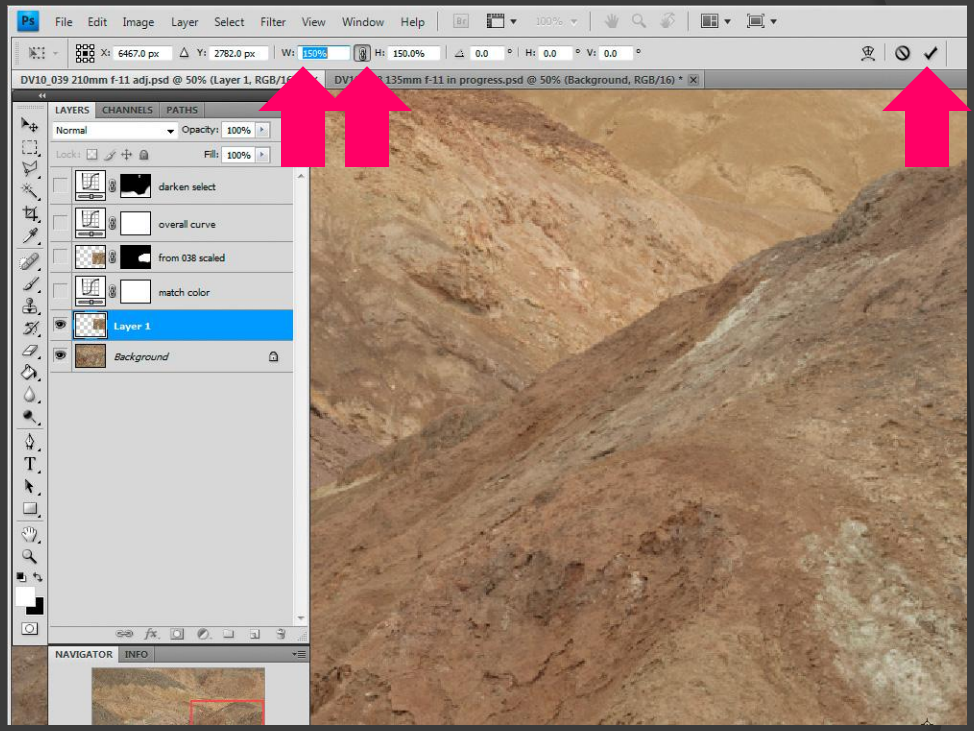
# Using surgery to repair focus

Now choose the newly-Pasted layer, and then use Edit>Transform>Scale to magnify the 135mm section. In this case, a magnification of 150% is used (same as the screen magnification used earlier).



# Using surgery to repair focus

Enter the desired magnification in the Width field, and click the “lock” button to force the Height to this same magnification (or enter the same magnification in the Height field). Remember to click the checkmark button (at right) to complete the scaling process.



# Using surgery to repair focus

Temporarily change the Opacity of the Pasted and Scaled image layer to 50% to facilitate aligning this layer with the underlying image. Identify some feature(s) near the center of the affected area to align. Use the Move tool to align the pasted and scaled image feature(s) with the underlying feature(s).

# Using surgery to repair focus

After aligning the pasted and scaled layer feature(s) with the underlying image feature(s), the edges of the added layer may not line up perfectly with the underlying image, as in this example.

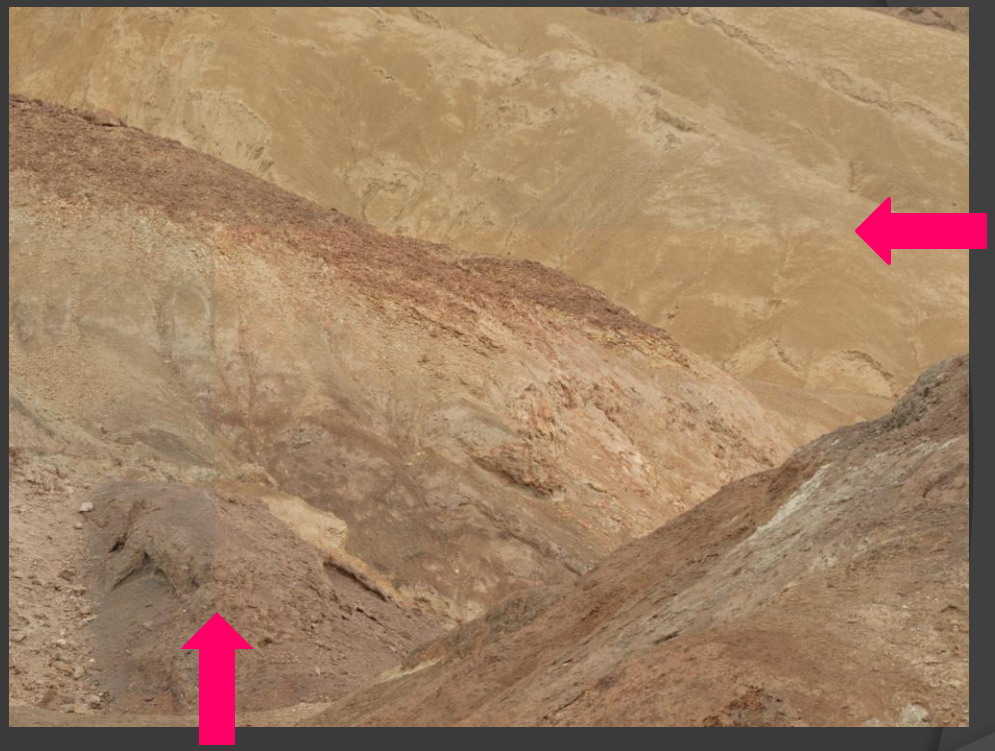
Use Edit>Transform>Distort to drag each corner of the pasted and scaled layer to align the edges of the desired region.  It is not critical that the center remain perfectly aligned, but the edges of interest should be aligned as carefully as possible.

# Using surgery to repair focus

After dragging each corner of the pasted and scaled layer to align the important edges of the two images, click the checkmark button to accept the Distort changes.  Here the pasted, scaled, and distorted image is still at 50% Opacity to show the overall alignment.

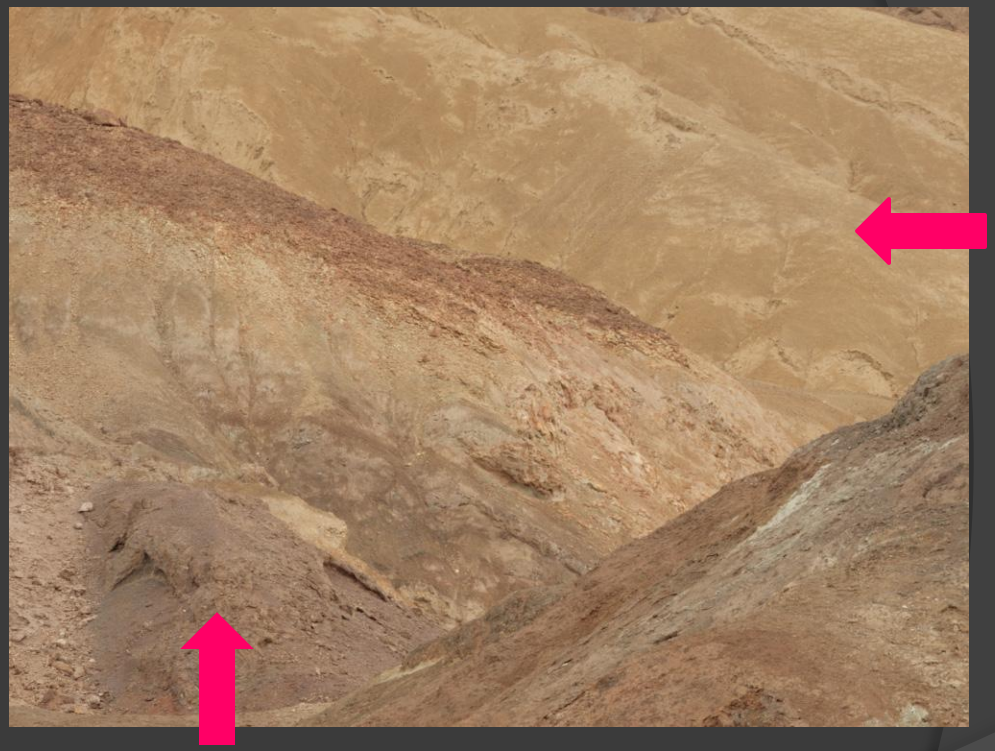
# Using surgery to repair focus

Now return the pasted layer to 100% Opacity.  In this case, a slight color balance difference between the pasted layer and the underlying image was observed.



# Using surgery to repair focus

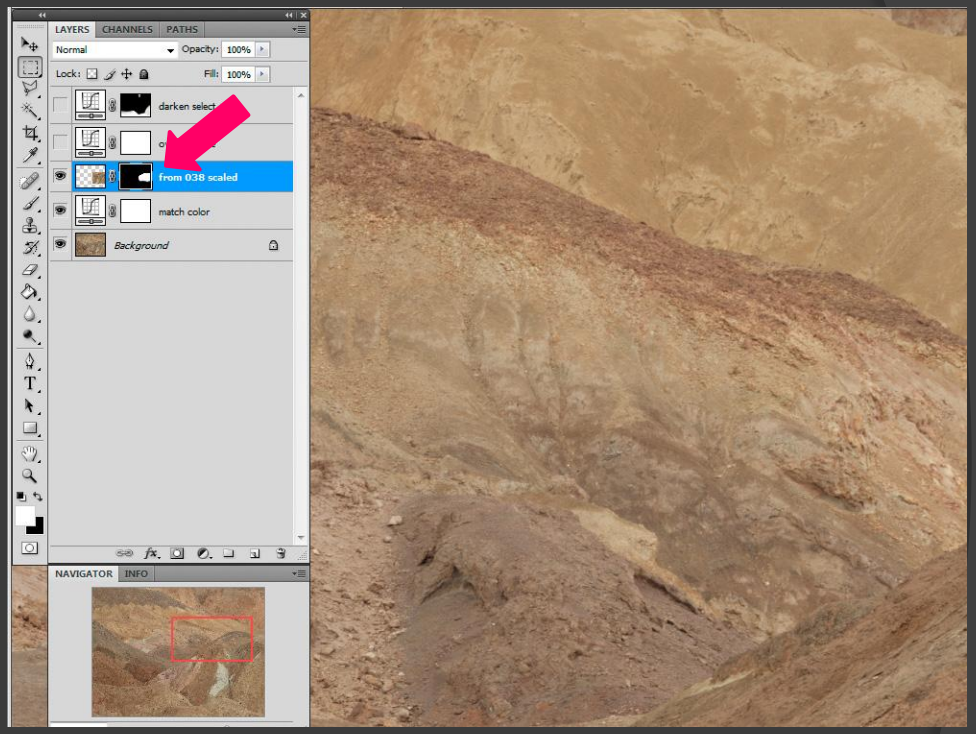
Make a new Curves adjustment layer in between the base image layer and the pasted, scaled and distorted image layer.  Adjust the color of the base image to more closely match the color of the pasted image.
In this case, the base image needed to look warmer, so the Curve adjustment was
R 128 > 130
G 128 > 126
B 128 > 126



# Using surgery to repair focus

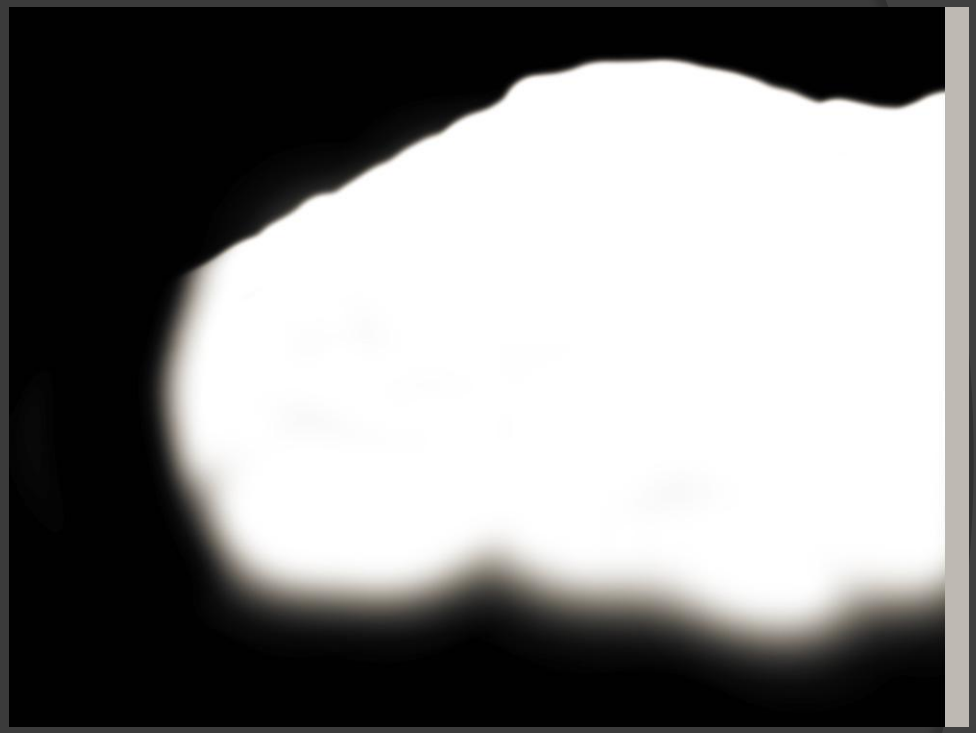
Finally, choose the pasted, scaled, and distorted layer and then click the “Add Layer Mask” button to add a mask to this layer.  Click on the mask icon to make the mask active (shown by a frame around the mask icon).

Fill the mask with black using the paint bucket tool.  Then paint the desired area of the mask white with a soft-edge brush, and clean up any “spills” with a smaller black brush.



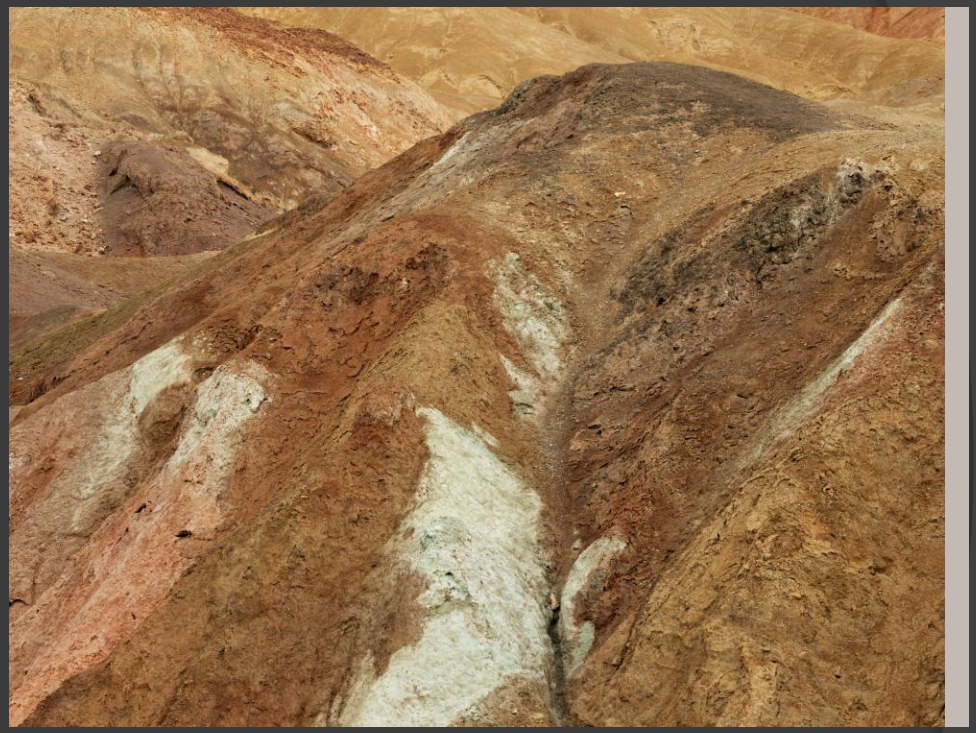
# Using surgery to repair focus

Here is the finished mask for the pasted, scaled, and distorted “focus repair” layer. The mask has a more distinct edge along the top of the gray mound, and a softer edge at the side and bottom.



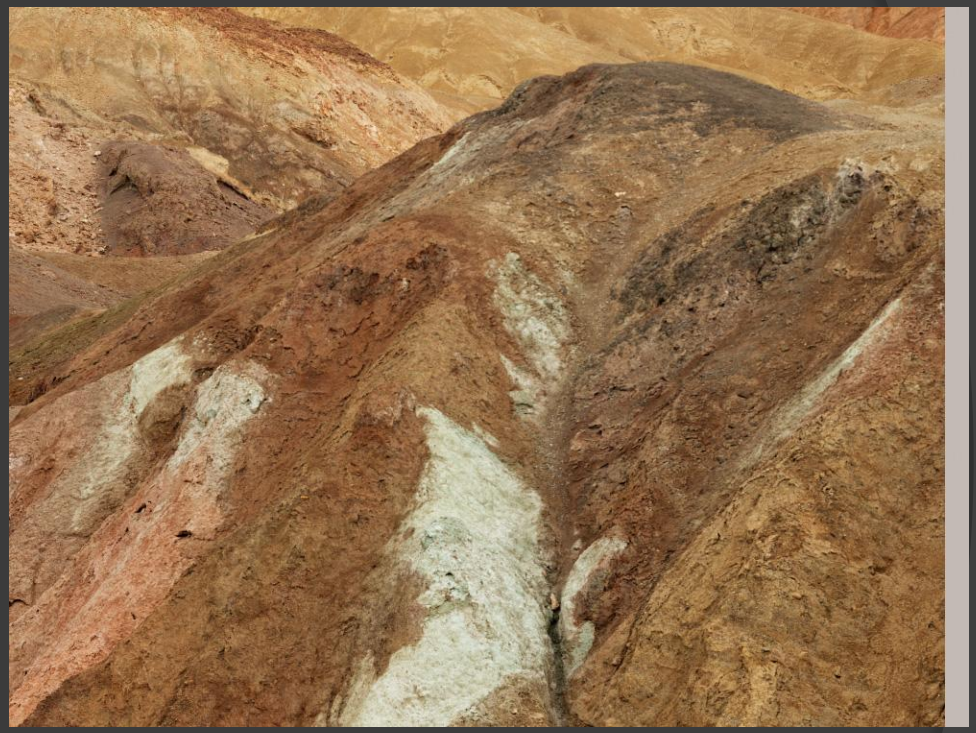
# Using surgery to repair focus

Here is the finished image with the masked focus repair layer turned on (visible).



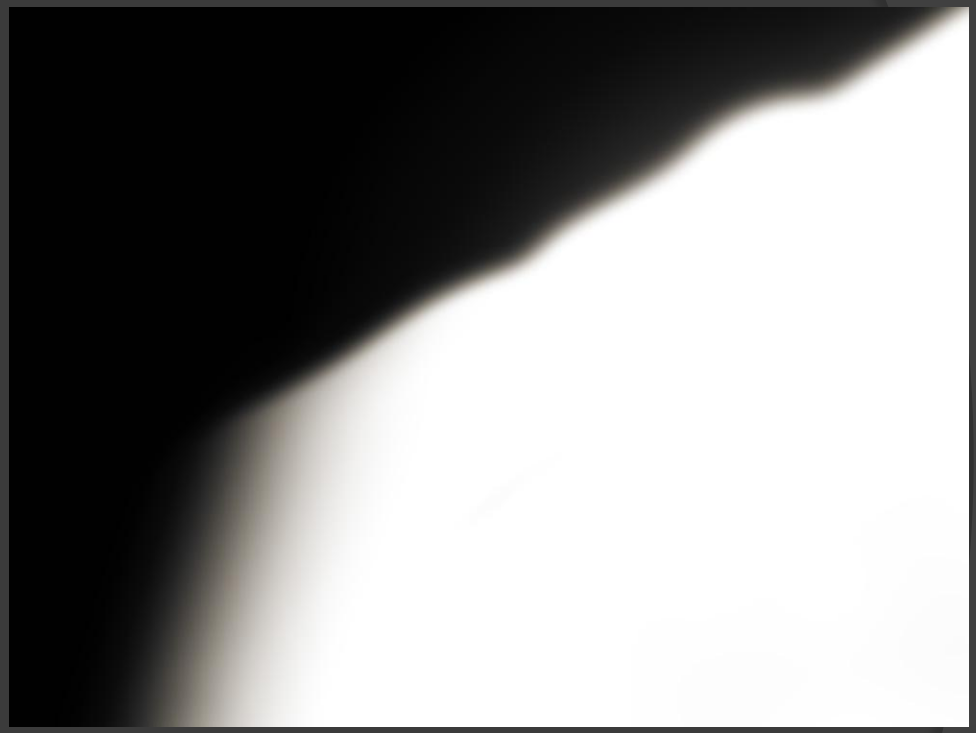
# Using surgery to repair focus

Here is the finished image with the masked focus repair layer turned off (not visible), so the underlying image shows.



# Using surgery to repair focus

Here is a section of the finished mask for the focus repair layer shown at 100% magnification.



# Using surgery to repair focus

Here is the same section of the finished image at 100% magnification with the masked focus repair layer turned on.

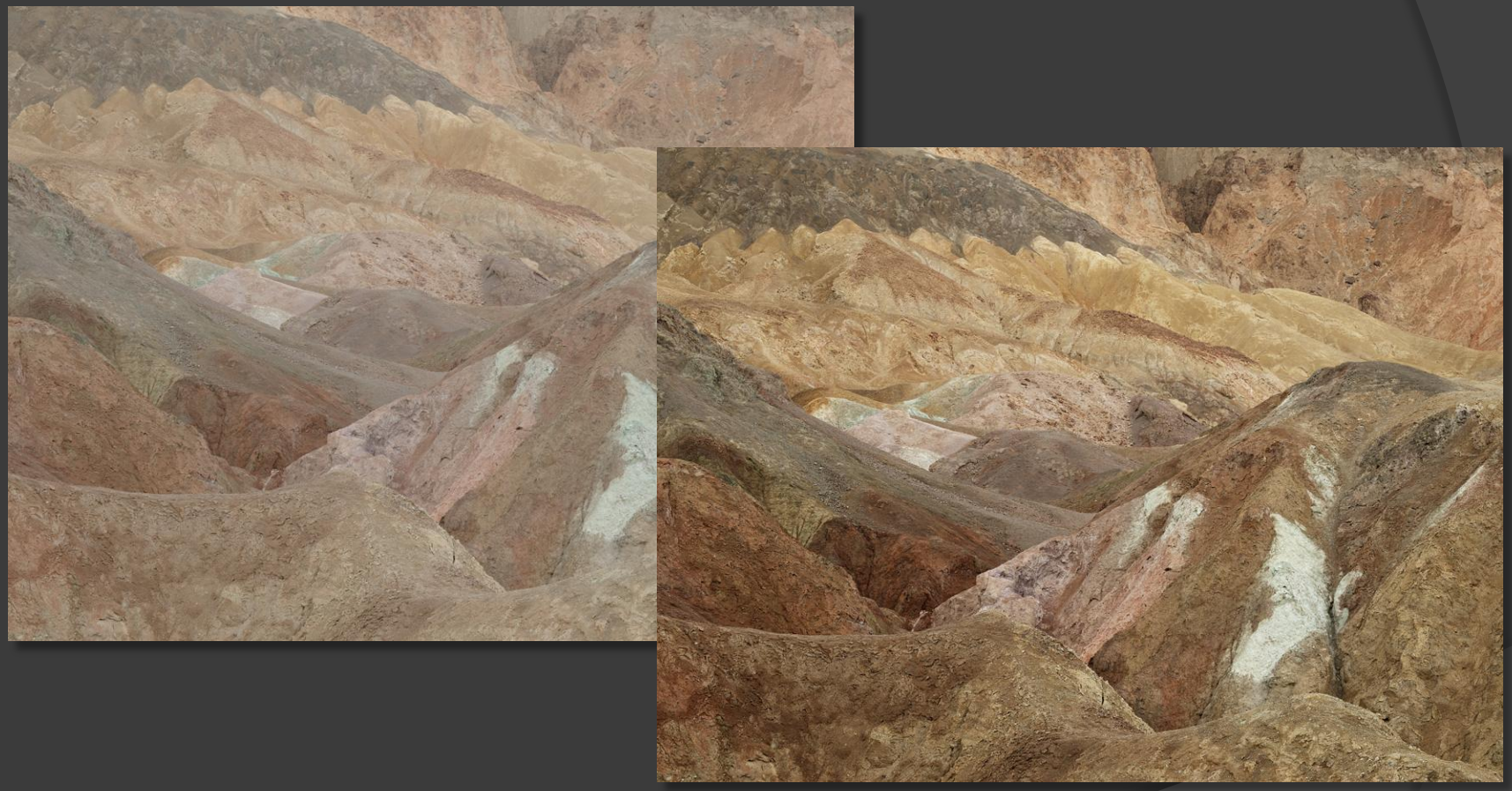
# Using surgery to repair focus

Here is the same section of the finished image at 100% magnification with the masked focus repair layer turned off, so the underlying (out of focus) image is visible.

# Finishing steps

- Flatten layered image
- (No noise reduction needed)
- HVLR Unsharp Mask 150% 0.7 Radius
- LVHR Unsharp Mask 15% 7.0 Radius

# Finished eXtreme makeover



# Before / after detail

# Legal disclaimer

- It is always best to wait for absolutely perfect light and never make any exposure or focus errors
- However, even when things don’t go exactly as planned, it is often possible to repair adverse lighting and/or modest errors in exposure or focus
- Examples shown are suggestions – your mileage may vary

# Check out Mike's new book!