



Advanced Depth Maps

# Advanced Depth Maps

A depth map is a grayscale image that defines how far away various elements are in the scene. The Lens Blur filter can use this image to simulate the look of an image with limited depth of field. Note that there are two other Masters Academy lessons on depth maps that you may want to visit if you haven't already. The first, "Blurring with Depth Maps," is an introduction and works with images that already have depth maps attached to them. The second lesson, "Creating Depth Maps," will teach you how to create your own depth map for a particular image. This lesson is going to cover some more advanced tips and techniques relating to depth maps.

In the previous lesson, "Creating Depth Maps," we used a series of layers to create a pretty complex depth map. All of the layers used to create the depth map were placed inside a group in the Layers Panel. To recap, the lightest parts of the depth map image are the areas that are farthest from the camera and the darkest parts are the areas that are closest to the camera.

In order to apply the depth map to the image, we need to get it into the Channels Panel. With the depth map visible in the document, we'll click on the Select menu and choose All. This will create a selection around the entire image. We'll then click on the Edit menu and choose Copy Merged. (It's important that we choose the Copy Merged option so that the entire image is selected instead of just one layer.) Next, we'll open the Channels Panel and click the New icon at the bottom of the panel. This will create a new channel. With this new channel active, we'll click on the Edit menu and choose Paste. This will paste the entire depth map into this new channel. We can now click on the top-most channel (RGB) to make it active and then return to the Layers Panel. Here, we no longer need the selection so we'll click on the Select menu and choose Deselect.

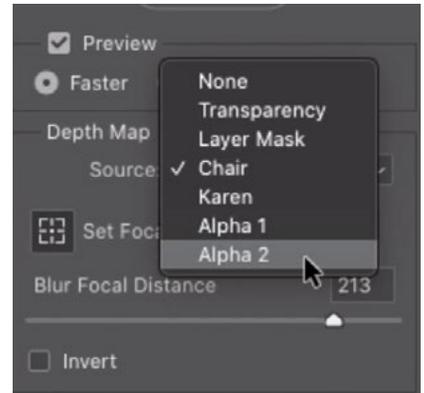


**In a depth map, the lighter the shade, the farther the area was from the camera.**

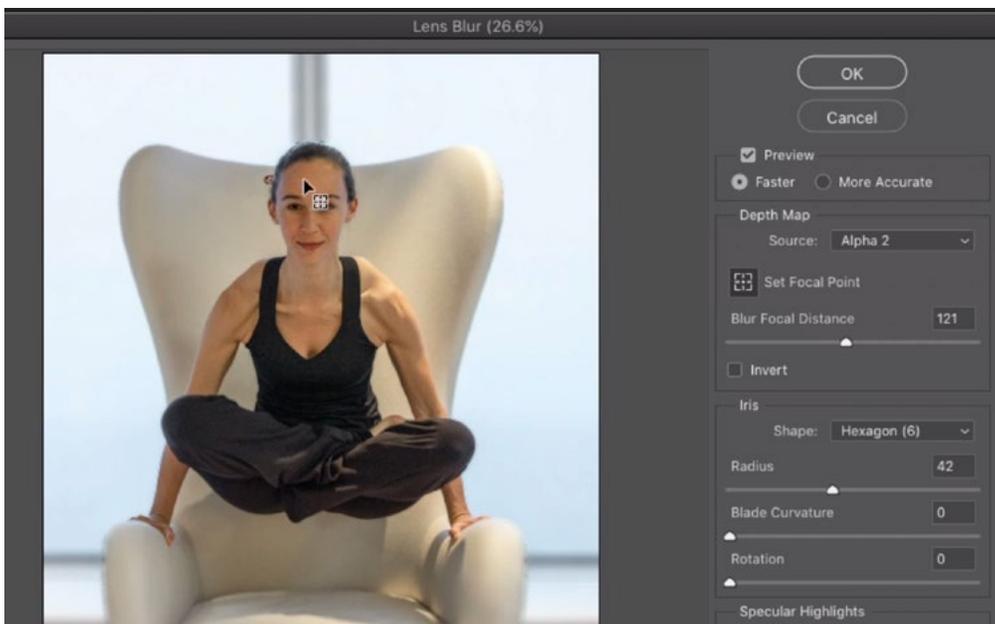
## Apply Depth Map (4:24)

Now that we've got the depth map in the Channels Panel, we no longer need to see it in the Layers Panel, so we'll turn off the visibility of the depth map layer group. We'll activate the original image layer and we'll duplicate it by using the keyboard shortcut Command+J.

With the image duplicate active, we'll click on the Filter menu and choose Blur > Lens Blur. The Lens Blur window will take over the screen. We need to tell the filter to blur the image based on the depth map we created, so we'll click on the Depth Map Source menu and choose the name of the channel we just created. (It will usually be the last item in the menu.) Then, we'll click on the part of the image that we want to be sharp. In the video example, it's Karen's face. This will cause Photoshop to look at what shade we clicked on in the depth map. It will make sure that all areas of that shade are the sharpest parts of the image. Then, we can use the Radius slider to control how blurry the other areas are.



**In the Lens Blur filter, we're using the Source menu to choose the name of the depth map channel.**



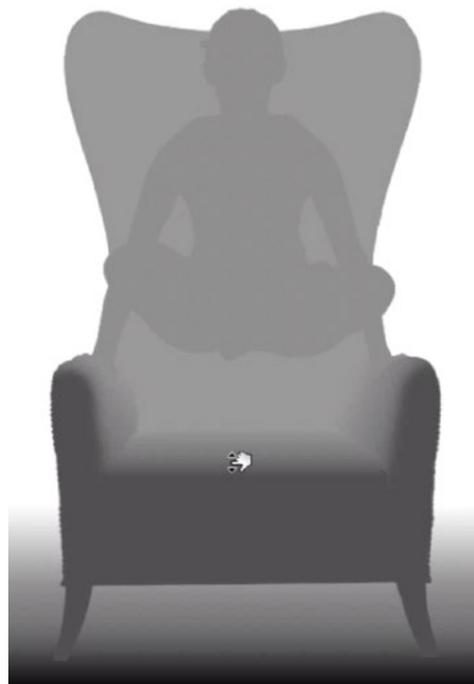
**In the Lens Blur filter, we're clicking on the part of the image that we want to be sharp. Everything of that shade in the depth map will be sharp and the other shades will become blurry.**

## Adjusting the Depth Map using a Curves Adjustment Layer (5:17)

After applying a depth map to an image, you may find that the results are not optimal. Often times, an area is either too blurry or not blurry enough. In the video example image, the back of the chair looks fine, but the front of the chair is too blurry. When this is the case, you'll need to cancel the Lens Blur filter and make changes to the depth map. You could make changes to the individual layers that make up the depth map, but an easier option would be to use a Curves Adjustment Layer.

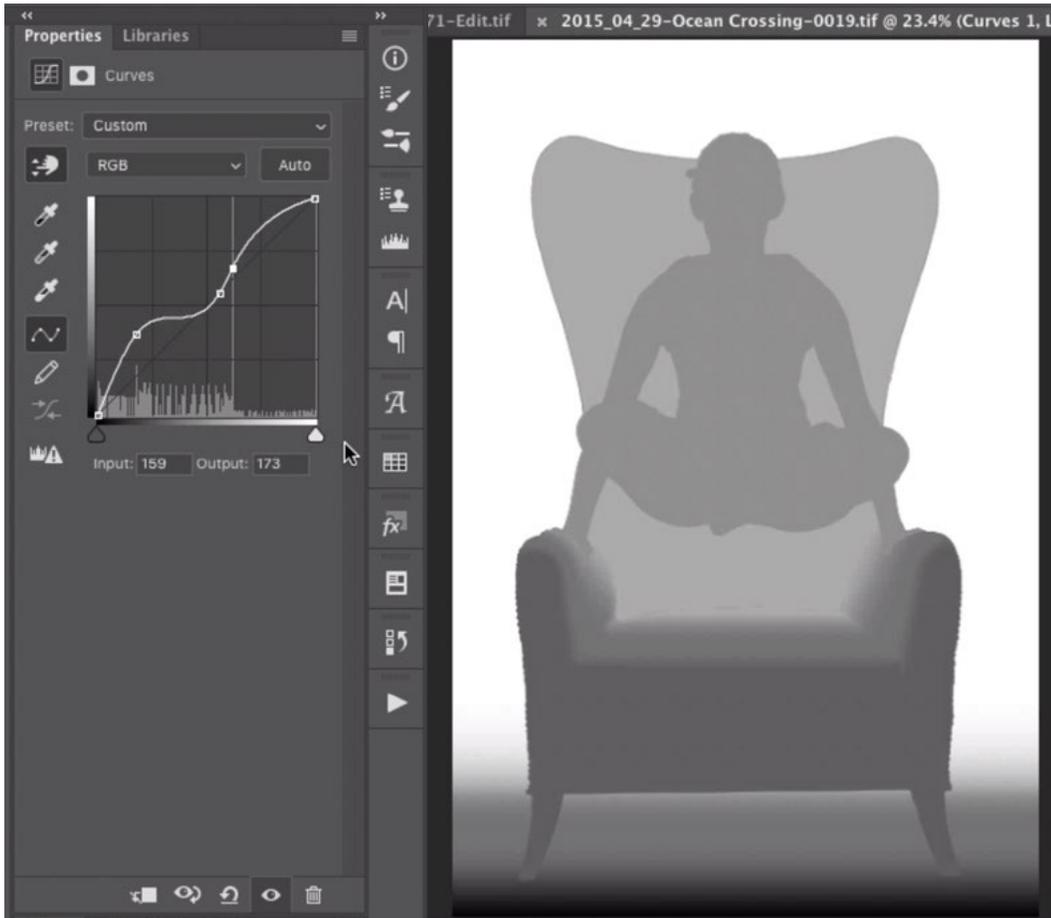
In the video example, we'll make the depth map layer group visible and we'll expand the folder. We'll click on the top-most layer within the folder to make it active. Then, we'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Curves from the pop-up menu. A new Curves Adjustment Layer will be placed above that top depth map layer. In the Curves Properties panel, we need to make sure that the Targeted Adjustment Tool is active. It looks like a little hand icon. With this tool, we can click within the image and it will place a point on the curve, representing that targeted brightness level.

We first want to make sure that the shade where Karen is doesn't change, so we'll click on the image in that area. This will place a point on the curve, locking in the brightness of that area so that it doesn't change. Next, we'll click on the area that we want to change (the front of the chair) and drag up. By clicking and dragging up, we are placing a point on the curve and moving it upwards. This lightens all areas that contain the shade we clicked on. We'll drag up until the area appears almost as light as the area where Karen is.



**A Curves adjustment layer was created and we're using the Targeted Adjustment Tool to click and drag up on the front of the chair. You can see that it's getting lighter.**

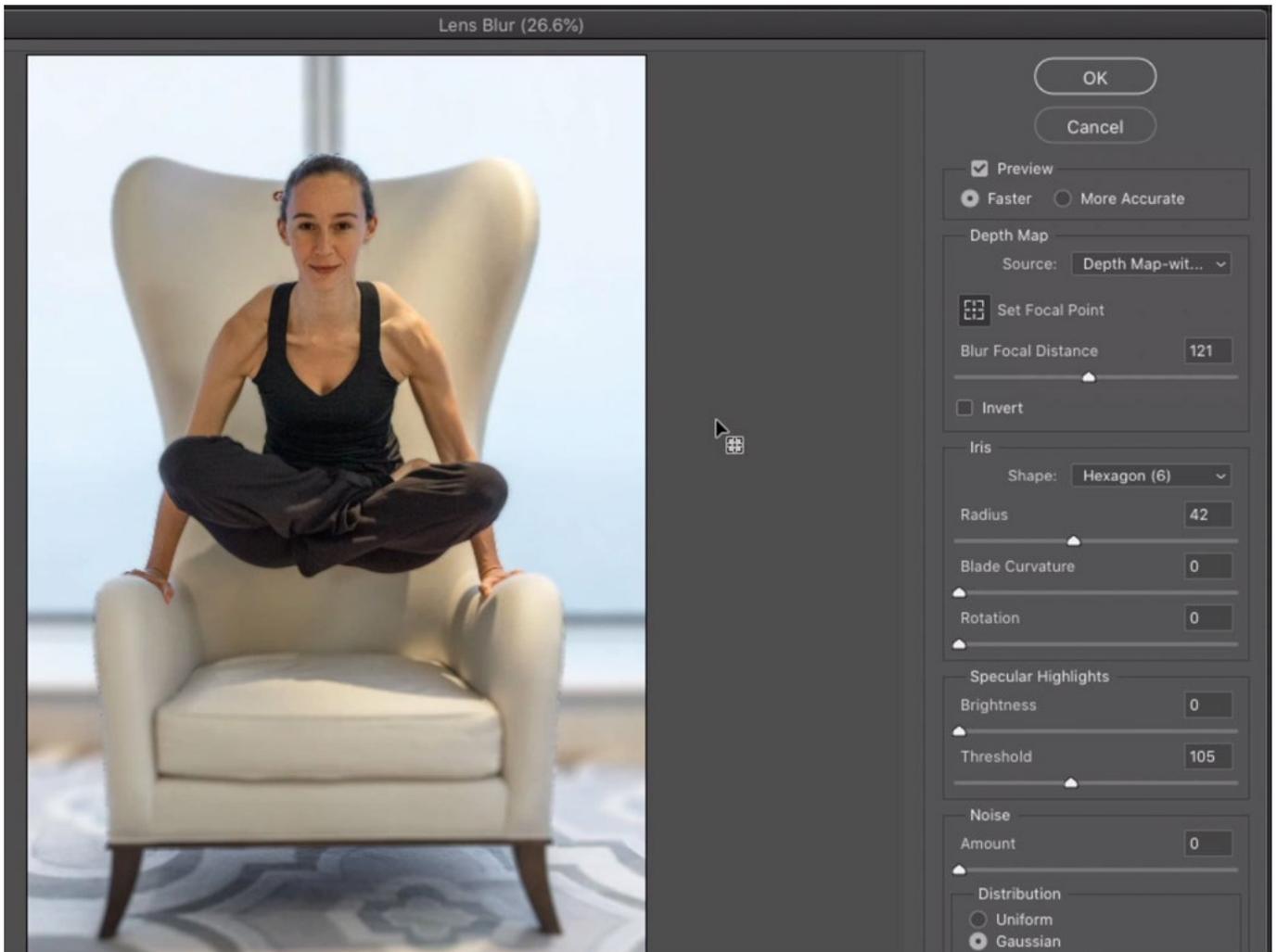
While we're at it, we'll also lighten the back of the chair, which will make it look as if it is farther from the camera. We'll use the Targeted Adjustment Tool to click and drag up on the back of the chair. This will place a point on the curve, representing that tone, and move it up. The back of the chair will become lighter.



**In this Curves adjustment layer, one point was placed to lock in the shade where Karen is. A second point was added to lighten the front of the chair and a third point was added to slightly lighten the back of the chair.**

We've made changes to the depth map, so we need to update the depth map channel to reflect the changes. With the depth map visible in the document, we'll click on the Select menu and choose All. This will create a selection around the entire image. We'll then click on the Edit menu and choose Copy Merged. Next, we'll open the Channels Panel and click the New icon at the bottom of the panel to create a new channel. With this new channel active, we'll click on the Edit menu and choose Paste. This will paste the copied depth map into this new channel. It's also a good idea to rename the channel so that it's easy to recognize within the Lens Blur source menu.

We'll click on the top-most channel to make it active and then we'll return to the Layers Panel. We no longer need the selection so we'll click on the Select menu and choose Deselect. We'll turn off the visibility of the depth map group and click on the image duplicate layer to make it active. Now we'll run the Lens Blur filter again. We'll click on the Filter menu and choose Blur > Lens Blur. The Lens Blur window will appear and we'll use the Source menu to choose the name of the channel we just created. Finally, we'll click on the area we want to be the sharpest, and that's the area where Karen is. Now, the front of the chair is not as blurry and looks more natural.



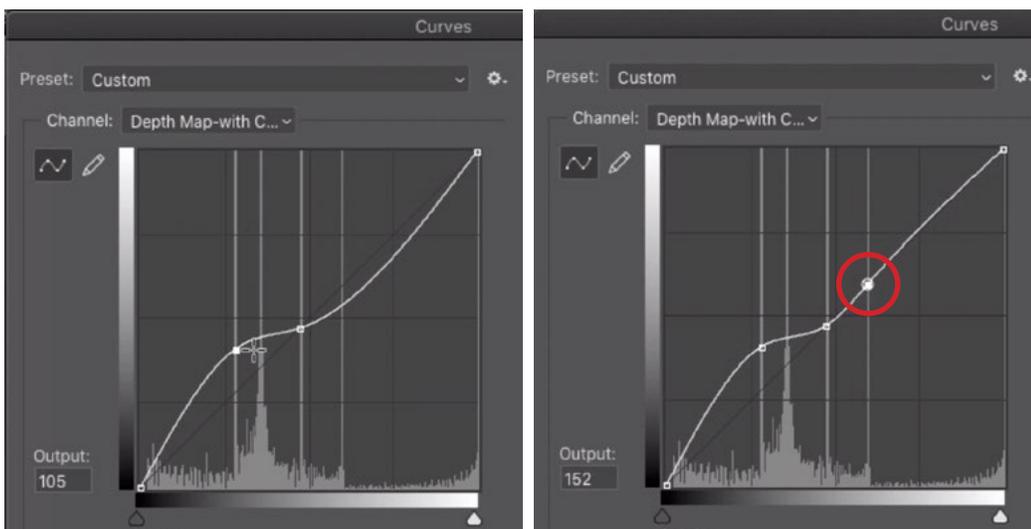
**After the depth map was updated, the Lens Blur Filter was run again and you can see that the front of the chair is not as blurry.**

## Adjust the Depth Map Channel with a Curves Adjustment (11:42)

In the technique above, we adjusted the depth map by using a Curves Adjustment Layer within the Layers panel. We could also adjust the channel directly by using a Curves adjustment in the Channels Panel. With the depth map channel active, you would click on the Image menu and choose Adjustments > Curves. The Curves dialog will appear and you can use the Targeted Adjustment Tool in the same way.

### Limiting Curves Adjustment to Affect Specific shades

When we place a point on the curve and then move that point, it will cause the entire curve line to change shape. This means that all shades will be affected to a certain degree. That's usually not what we want. We usually want to alter a very specific shade (especially with depth maps) while leaving the other tones unchanged. We can achieve this by placing an additional point (or points) on the curve and positioning it in such a way that the curve line returns to its normal diagonal. This point will generally be placed very close to the point that is making the curve line go off track. We can add this point by simply clicking on the curve line in the place we want it to appear. Note that if you try to click too close to another point, it will think that you want to move that point instead of add a new one. You may have to click a little farther away from the point and then drag the new point so that it's as close as is practical.



**LEFT:** The curve points caused the entire curve to change shape, shifting all of the tones in the image. **RIGHT:** A point is placed on the curve and positioned so that it returns the curve to its normal diagonal.

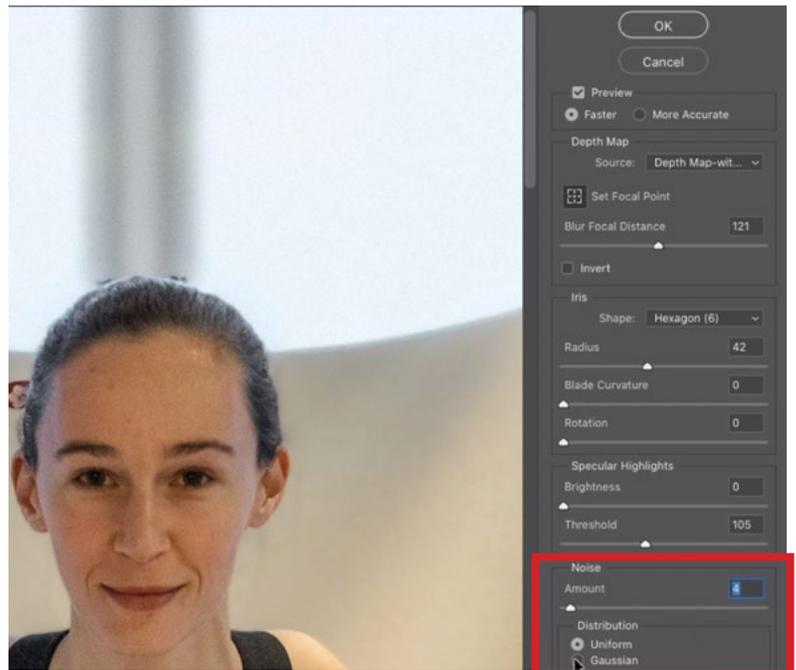
## Adding Noise/Grain to Blurred Area (13:45)

If we use the Lens Blur filter on an image that had a lot of noise, the sharp area will have noise and the blurred area will not. This can cause the result to look unnatural and make it obvious that we added the effect in Photoshop.

The Lens Blur filter has a setting for adding noise to the areas that were blurred. Under the Noise category on the right side of the interface, there is an Amount slider. Zoom in on the image so that you can better see the noise and slowly move up this slider. A low setting will usually add enough

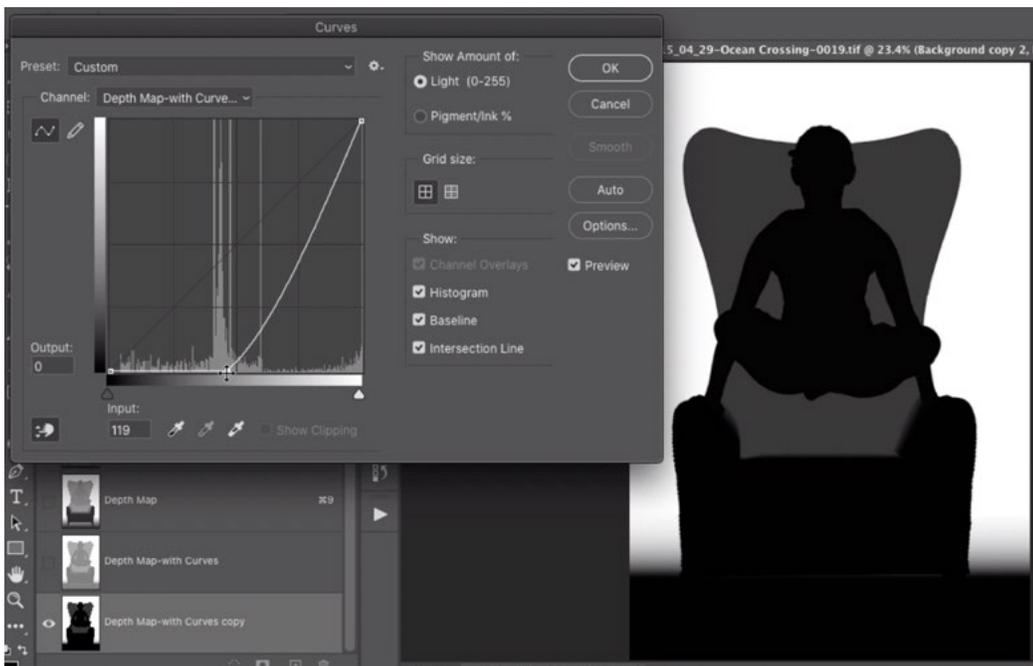
noise to the image. Then, you will need to choose between Uniform and Gaussian (which will create a rougher texture). Experiment with these settings to see which creates noise that best matches the sharp areas in the image.

We can also add noise in Photoshop by means of the Camera Raw filter. Camera Raw has the most sophisticated noise generation algorithm that I can think of. Before opening Camera Raw, we'll need to create a selection that describes where we've blurred the picture. This selection will be in the form of a channel, where the areas that are white will have the noise applied (the blurry areas) and the black areas will not. In order to create this channel, we can duplicate the depth map channel and then modify the duplicate using a Curves adjustment. This adjustment will force areas that should have noise added to become white and it will force areas that should not have noise added to become black.



**In the Lens Blur filter, the Noise settings are being used to add grain into the blurry parts of the image.**

We'll open the Channels Panel and duplicate the depth map channel by dragging it to the New Channel icon at the bottom of the panel. We'll modify this channel so that we can use it for adding noise. We'll click on the Image menu and choose Adjustments > Curves. We'll make sure the Targeted Adjustment Tool is active and we'll use it to click on the area where we DON'T want to add noise. In the video example, that will be the area where Karen is. This area is sharp and therefore already has noise. This will place a point on the curve. We will drag that point all the way down to the bottom of the curve grid, making the area black. Remember, when we apply the noise, black areas will have no noise added.

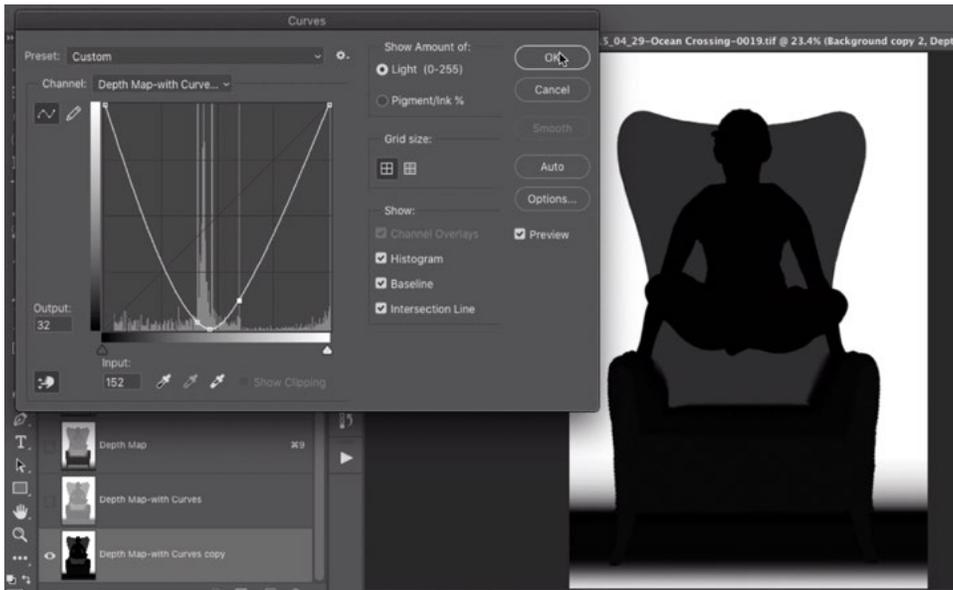


**We're using a Curves adjustment to modify a channel that will be turned into a selection. We used the Targeted Adjustment tool to click on Karen and this placed a point on the curve. We dragged that point to the bottom of the curve, therefore making the targeted area black.**

The background is blurry and therefore, it SHOULD have noise applied. In the channel, the background is already white, and that's what we want (because white areas WILL have noise applied).

The front of the chair and the floor closest to the camera are areas that are currently blurry. They should have noise applied, but they are currently black in this channel. We need to lighten the areas so that the noise will be applied there.

In the Curves dialog, the point in the bottom left corner represents the areas that were originally black in the image. We need to take these areas that used to be black and make them white. We'll do this by dragging that bottom left point all the way to the top of the curve.



**The point on the bottom left corner of the curve was dragged all the way to the top. This took all areas that were formerly black and made them turn white.**

We can further refine the channel by using the Targeted Adjustment Tool to click and drag on areas in the channel. We'll click and drag up on areas that should have more noise and we'll click and drag down on areas that should have less noise. The back of the chair should have SOME noise applied because it's only partially blurry so we'll click and drag up a bit on that area, making it a bit lighter. We'll also click and drag up a bit on the front of the chair. Once we're satisfied with the channel, we'll click OK to exit the Curves dialog.

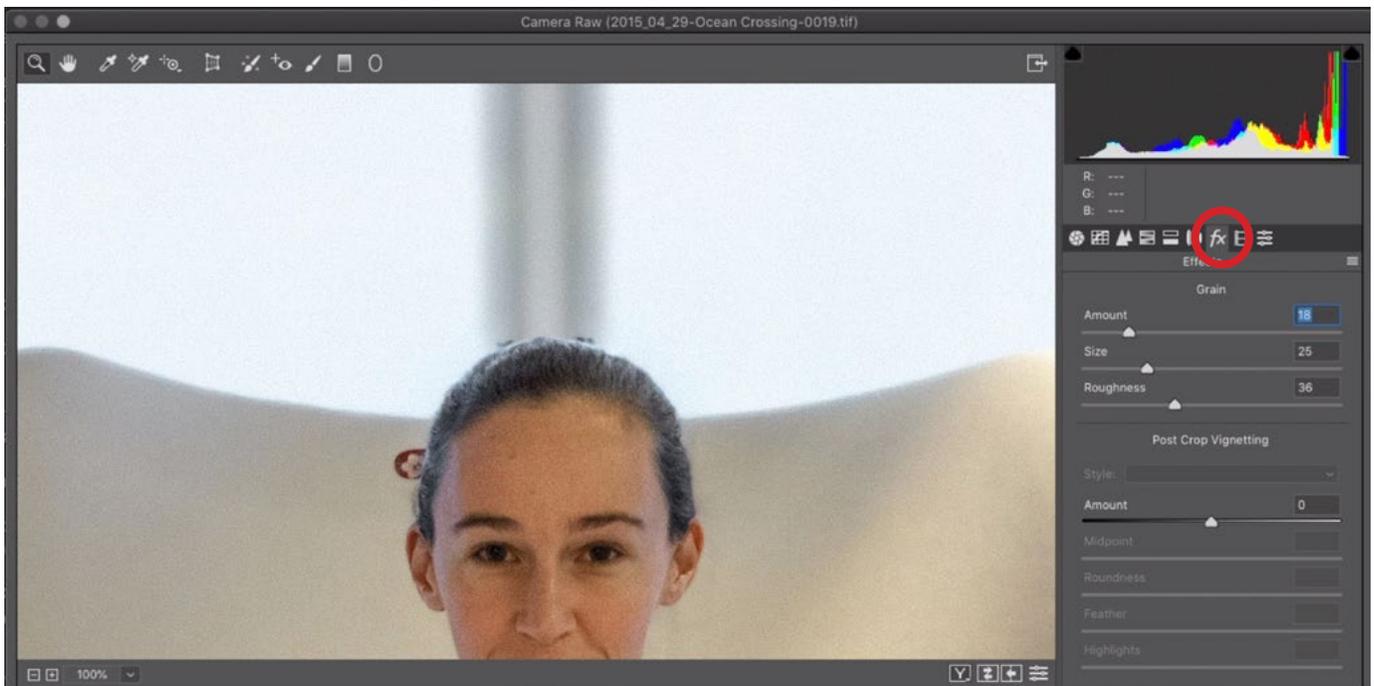
We now need to load this channel as a selection. When we turn a channel into a selection, white areas will be completely selected. Black areas will not be selected and gray areas will be partially selected. We'll load the channel as a selection by holding down the Command key (Ctrl on Win) and clicking on the channel thumbnail. We'll now click the top-most channel to get back to the main image and we'll return to viewing the Layers Panel. We'll make sure the blurred image layer is active, we'll click on the Filter menu and choose Camera Raw Filter.

Camera Raw will take over the screen and all of the settings sliders will appear on the right side. We'll click on the FX icon to open the Effects panel. Here, there is a category of settings for Grain. We'll use the Amount slider to add noise to the image and we'll use the Size and Roughness sliders to define how that noise looks.

NOTE: When we make changes with the Camera Raw Filter, the preview is not going to respect the selection that was active, which means that it will appear that the entire image is being affected. When we click the OK button, that will not be the case. In the final result, only the selected areas will receive the Camera Raw adjustments.

To get a before-and-after view of the effect on the image, we can click on the little icon that looks like three sliders in the bottom right corner of the image window.  Toggling this view will allow us to better match the noise we're adding to the noise that was already existing in the sharp areas of the image.

When we're finished adjusting the noise settings, we'll click OK to exit Camera Raw and return to the main Photoshop interface. Because we had a selection active, the adjustment of added noise will only be applied to the areas that were selected.



The grain settings can be found within the Effect panel (circled) in Camera Raw.

## Use Depth Maps to Create a Miniature Look (25:39)

When we shoot something with a wide angle lens, it is very difficult to get a blurry background. In order to get a blurry background, we need to be shooting at the widest aperture setting and we need to magnify the scene, either by using a longer lens or by shooting very close to the subject. If you have a scene that encompasses a large area, it usually means that it was shot with a wide angle lens. Wide angle lenses don't magnify things, so we're generally not going to get that shallow depth of field.

If we take a wide scene and use a depth map to create a narrow depth of field, it's going to be a bit like a mind trick. Our brains will tell our eyes that we're looking at something that's miniature. In the video example, we have an image of a service station that was shot with a wide angle lens. I applied a depth map to blur the image and the result makes it look as if the building is tiny, as if it's part of a toy train set. Let's look at a how to tackle a few challenges when creating a depth map like this.



Above, you can see the original image, the depth map and the result of the Lens Blur filter.

**Creating the gradient from front to back** With a depth map, the areas of the image that are closest to the camera will be black and the areas that are farthest from the camera will be white. Therefore, the ground, or surface, will have a gradient from black to white. We could create a selection of the ground and then apply a Gradient adjustment layer with a black-to-white gradient, but that will not account for the perspective in the scene and it will therefore not look natural. I ran into this challenge with the service station image.

Here's how we can create a more natural gradient. We'll use the Rectangular Marquee Tool to make a selection around the bottom part of the image. The top end of the selection will determine how far the gradient should extend before it turns white. With the selection active, we'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Gradient. A dialog will appear and here, we'll choose the black-to-white gradient, ensuring that black is on the bottom, and click OK. The selection will automatically be applied to the layer mask attached to this gradient layer and the layer mask determines where the gradient starts and ends



**A gradient layer was created for the ground, but the default black-to-white gradient does not account for the perspective in the scene.**

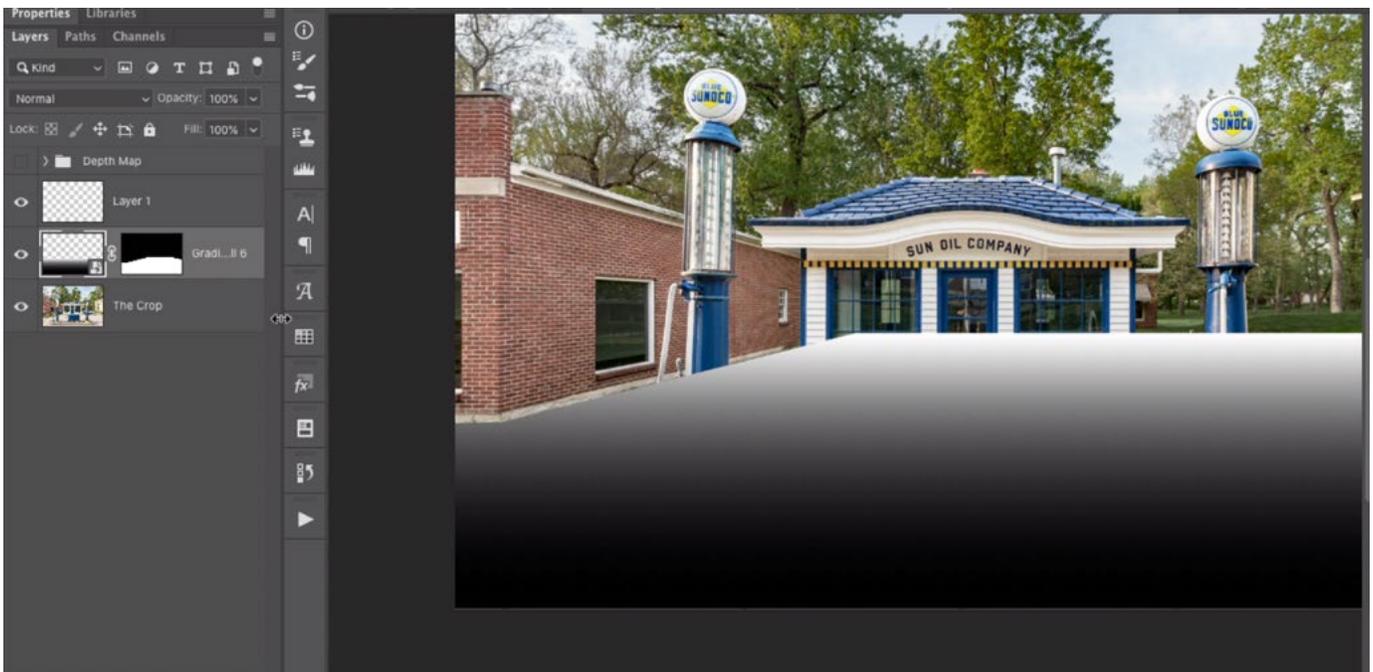
Next, we'll turn this layer into a Smart Object by clicking on the Layer menu and choosing Smart Objects > Convert to Smart Object.

Now, we want to transform this layer so that it matches the perspective lines in the image. We'll click on the Edit menu and choose Transform > Perspective. Transform handles will appear on the layer and we'll drag one of the bottom corners outward, away from the image canvas. We'll drag the corner outward until the edge of the transform box matches the perspective in the image. Then we'll click Return/Enter to lock in the transformation. Now, the gradient will create a more natural blur effect when we apply the Lens Blur filter.



The Perspective Transform command is being used to make the perspective of the gradient layer match the perspective of the image.

Depending on the image, you may need to alter the mask to account for any buildings or objects extending into the scene. In the video example, we had to alter the mask so that the gradient did not overlap the buildings that were extending forward into the scene. These are closer to the camera and should therefore not receive the same blurring effect.



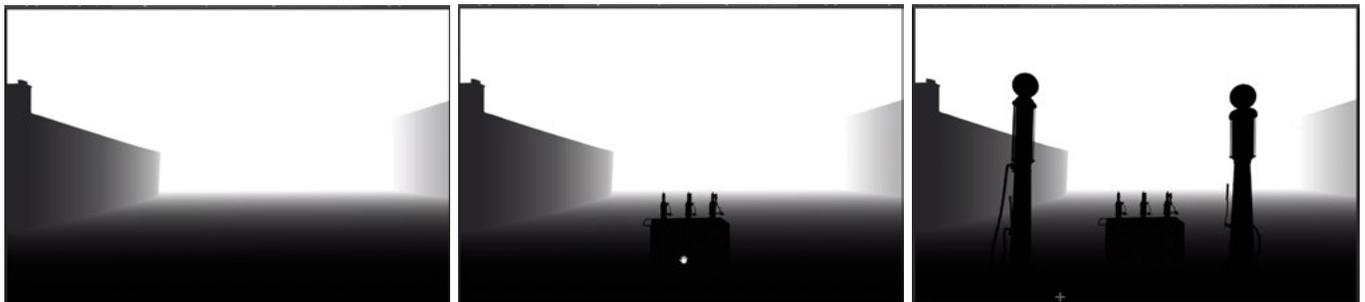
We adjusted the layer mask for the gradient layer so that the gradient did not overlap the building on the left.

## Layer buildup (38:10)

Several layers were used to create the depth map for this service station image. Let's look at the build-up of layers to see how the depth map was created.



- 1: A Gradient layer was created for the ground.
- 2: A Gradient layer was created for the building on the right.
- 3: A Gradient layer was created for the building on the left.



- 4: A Solid Color layer was created for the front face of the building on the left.
- 5: A Solid Color layer was created for the tank and pumps. The shade was chosen based on the shade of the underlying gradient in the area where the tank meets the ground.
- 6: A Solid Color layer was created for the gas pumps. The shade was chosen based on the color of the underlying gradient where the pumps touched the ground.



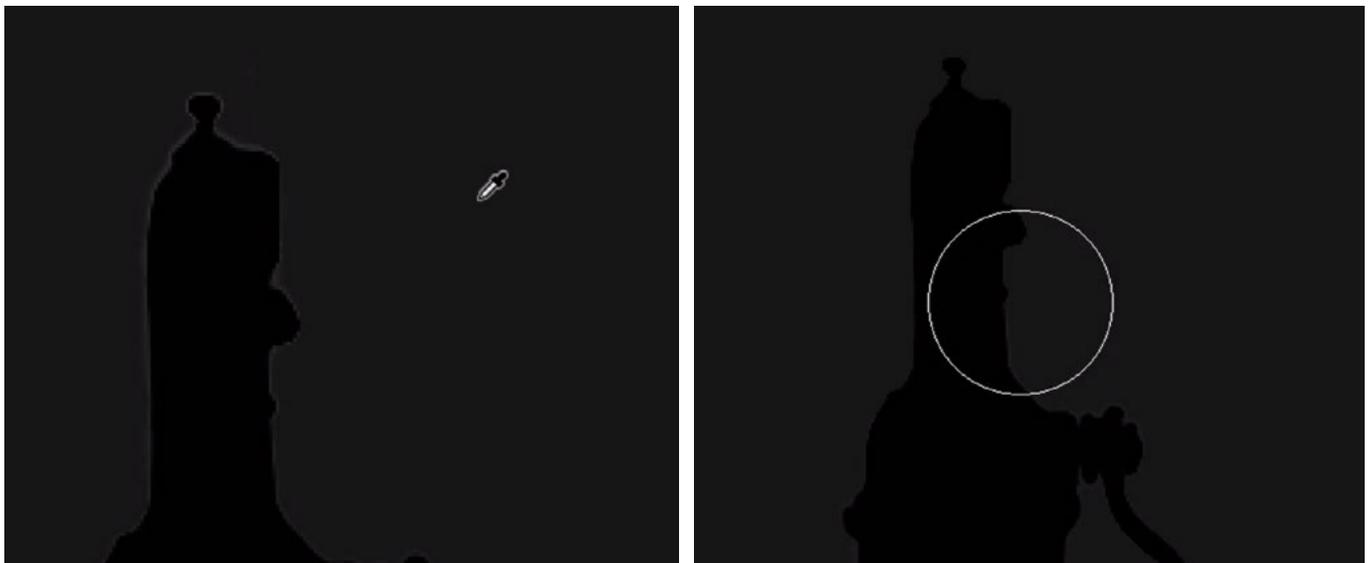
- 7: A Solid Color layer was created for the service station building.
- 8: A Solid Color layer was created for the windows in the buildings. I wanted to blur the area where you could see through the windows, so these areas were assigned a very light shade.
- 9: A Curves Adjustment Layer was used to fine-tune the results.

## Clean up Jagged Artifact (46:00)

After creating a depth map made up of several layers, it's not uncommon to end up with a jagged artifact along the edges between layers. That happened around the edges of the gas pumps in the video example.

We can fix this after copying the depth map layers and pasting them into the Channels Panel. In the Channels Panel, we'll make sure the depth map channel is active and we'll activate the Brush Tool. We want to sample the shade that is surrounding the object with the jagged edge (the gas pump). With the Brush Tool active, we'll hold down the Option key (Alt on Win) to temporarily access the Eyedropper. Holding down this key, we'll click to sample the shade just outside the pump. This will become the foreground color, which is what we'll be painting with.

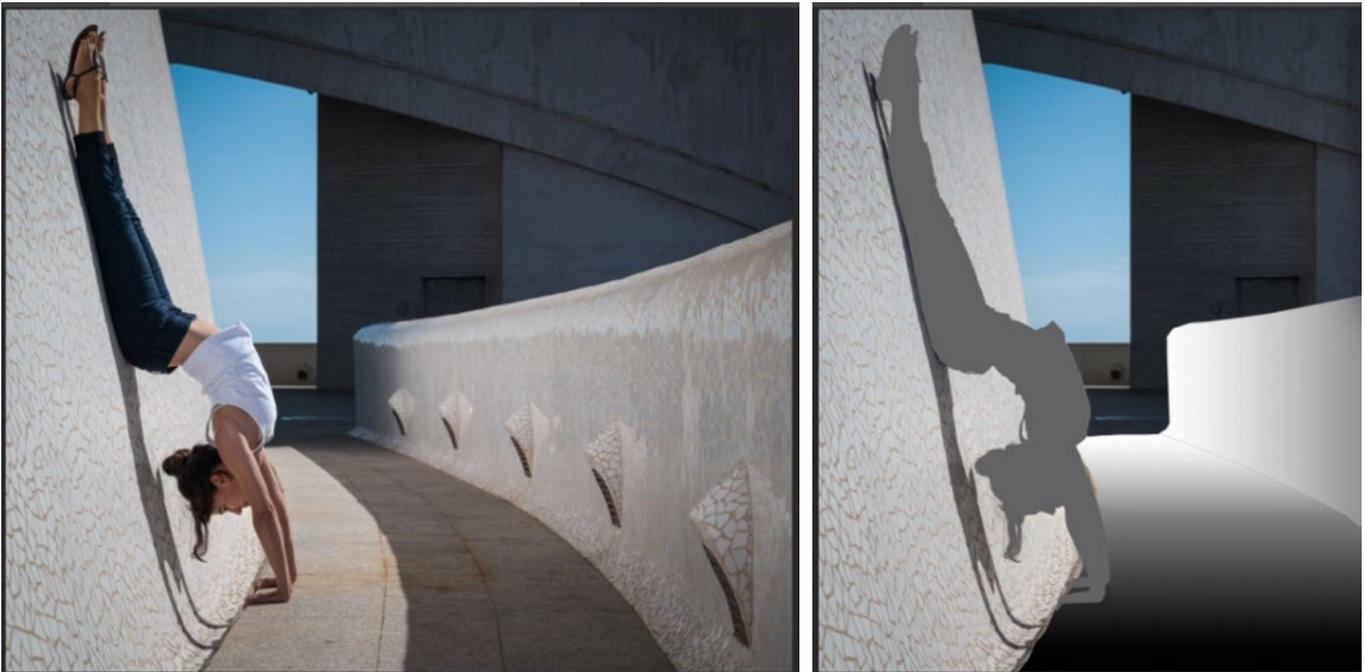
Now we will get a little tricky. In the Options Bar above the image window, we'll use the Mode menu to change the blending mode of the brush to Darken. With Darken mode, the brush will only be able to darken the image. It will not be able to lighten the dark gas pump as we paint over it. We'll use the Brush to paint over the edge of the pumps and the jagged edge will be filled in and therefore disappear.



**LEFT: We're sampling the shade surrounding the gas pumps. RIGHT: We're using the Brush Tool, set to Darken Mode, to paint with the sampled color around the edge of the pumps.**

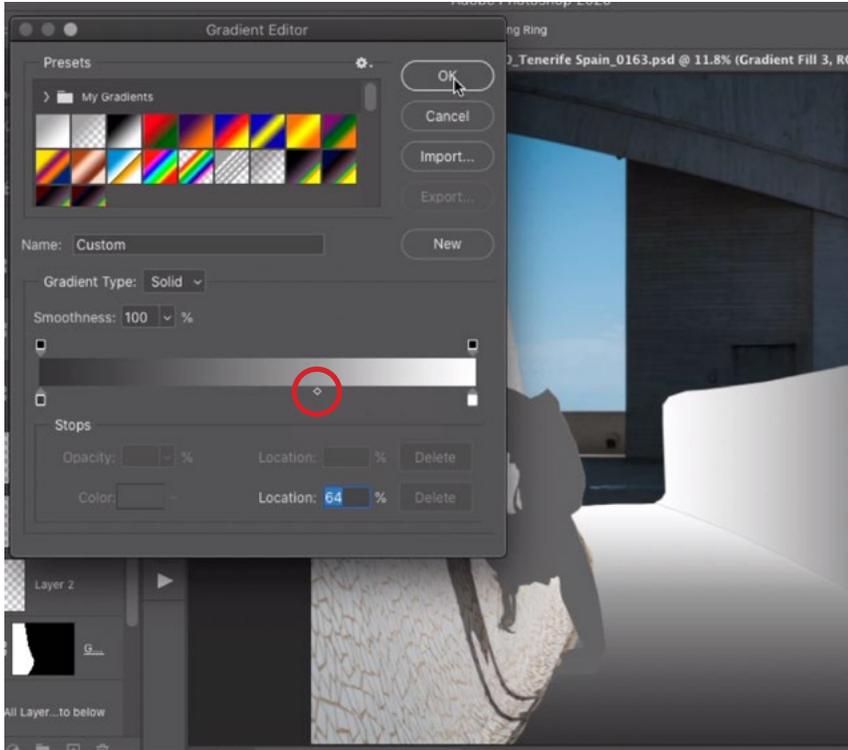
## Adjusting the Depth Map with the Gradient Editor

After creating all of the individual depth map layers, you'll want to inspect the final result for issues. These can often turn up when one object is a different shade from another object that it's touching. If the objects are touching, they should be the same distance from the camera and therefore the same shade. This happened with the example image of Karen doing a handstand. The layer for Karen was one shade of gray, but the concrete where her hands were touching was another shade.



**LEFT: The original image. RIGHT: You can see that the sidewalk layer and Karen's hands are different shades of gray.**

To correct this, I adjusted the gradient layer for the curved sidewalk. I double-clicked on the gradient thumbnail in the Layers Panel to call up the Gradient Map dialog. Here, I clicked within the gradient bar and this opened the Gradient Editor. The gradient bar has little markers beneath it, representing the colors in the gradient. Between these two markers is a little diamond slider that represents the midpoint of the transition. I dragged this slider back and forth, watching the result on the gradient. I ended up positioning this slider so that the part of the gradient where Karen's hands are matched the shade of gray that she was.



**LEFT:** In the Gradient Editor, the slider representing the transition midpoint (circled) is being adjusted so the gradient matches Karen's hands. **BELOW:** Here, you can see the result of the Lens Blur filter.

