



Creating Depth Maps

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In this lesson, we're going to learn how to create depth maps. A depth map is a grayscale image that describes the distance between various objects in the scene and the camera lens. If we create this image such that far away objects are bright and near objects are dark, then we can use that information to blur the photograph and simulate a narrow depth of field.

In a previous lesson (Blurring with Depth Maps), we worked with images that already had depth maps attached to them, where we simply modified them to improve them. Those images were captured on an iPhone using the Portrait Mode setting, which saves the image in the HEIC file format. This type of file provides us with the depth map image that we could start with.

If we use our own image that was not captured on an iPhone, there will be no depth information embedded in the image and we will therefore need to create the depth map from scratch.



ABOVE LEFT: The original image.
ABOVE RIGHT: This is the grayscale depth map that will be used to blur the image.
LEFT: After the depth map was applied, the light areas became blurry and the dark areas remained sharp.

Create the Depth Map (Timestamp 4:25)

When we create a depth map, we are essentially creating a grayscale image where the areas we want to be sharp will be darker in tone and the areas we want to be blurry will be lighter in tone. White parts of the depth map will be the blurriest areas of the image and black parts of the depth map will be the sharpest areas of the image. The grayscale depth map will ultimately need to end up in the Channels Panel, but it's much easier to create this image using layers, in the Layers Panel.

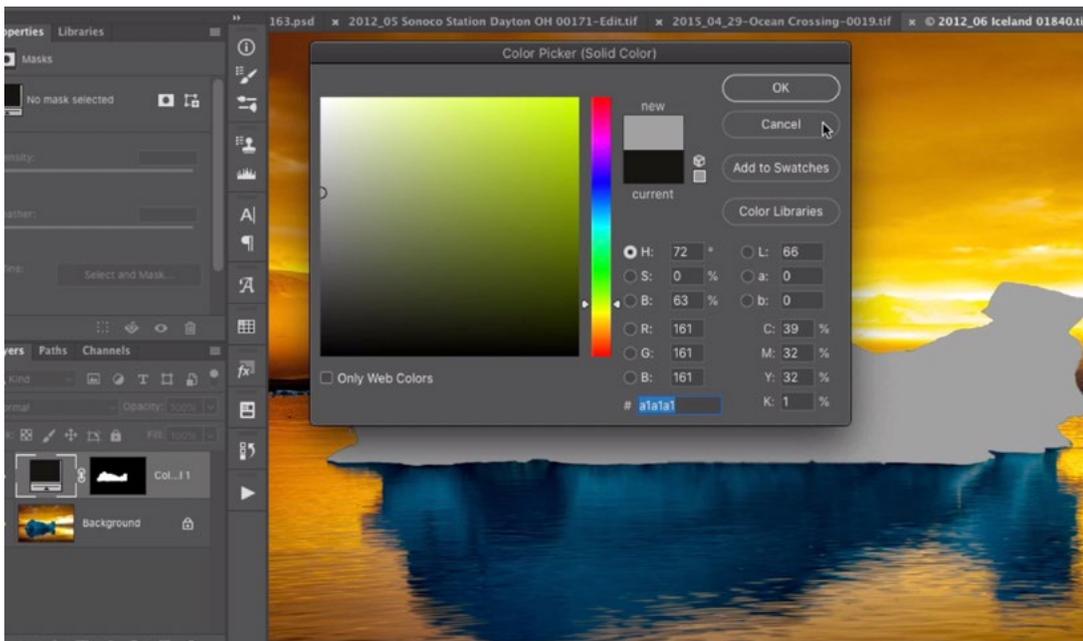
When creating depth maps, it's important to have a good understanding of the selection tools in Photoshop. You will need to make an accurate selection of each area in order to assign the area a particular tone. I often times use a combination of selection tools in order to isolate the various areas in my images.

In the video example, we have an image of an iceberg. We want the iceberg and the water in the foreground to be in focus. The landscape in the distance, behind the iceberg, should be blurry. We'll start by making a selection of the iceberg. We could use any selection tool, but we'll start by clicking on the Select menu and choosing Subject. **A selection was made around the iceberg.**



This will cause Photoshop to automatically try to determine where the subject is and make an initial selection of it. In the example image, it did a decent job, but we'll need to further refine the selection by deselecting some parts of the water that became selected. We'll activate the Lasso Tool and hold down the Option key (Alt on Win) while dragging out a shape around the areas that should not be selected. By holding down the Option key, we are telling the tool to subtract from the selection instead of add to it.

We will fill this selection with gray, but we want to make sure that we are working on a new layer (and not the image layer). We'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Solid Color from the pop-up menu. This will create a Solid Color layer above the image layer and the Color Picker will appear, prompting us to choose a color. We'll end up changing this color later, but for now, we'll click on a light shade of gray and then click OK to exit the Color Picker. In the end, we'll end up changing the shade of gray to match the gradient that will be placed underneath it.

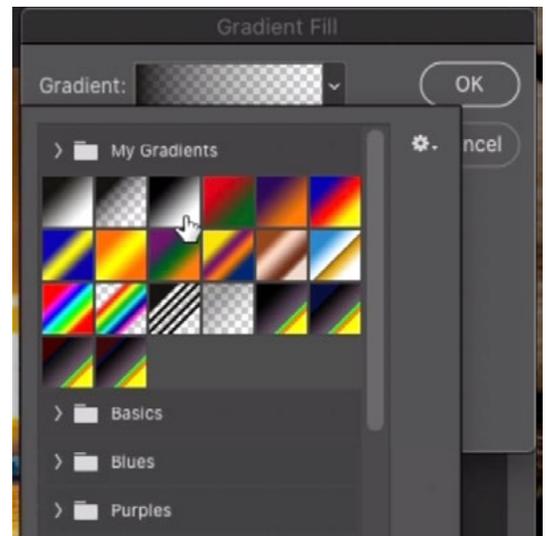


With the active selection of the iceberg, we are creating a solid color layer and choosing a shade of gray for the layer. The selection is applied to the layer mask, limiting the color to the iceberg.

Next, we want to create a gray gradient that starts at the bottom of the frame and ends at the shore line in the distance. This gradient will be used to tell Photoshop that the shore line is farther from the camera. We'll start by creating a selection of the area, as this will limit where the gradient will be placed. In the video example, we're using the Lasso Tool to draw a selection around the water.

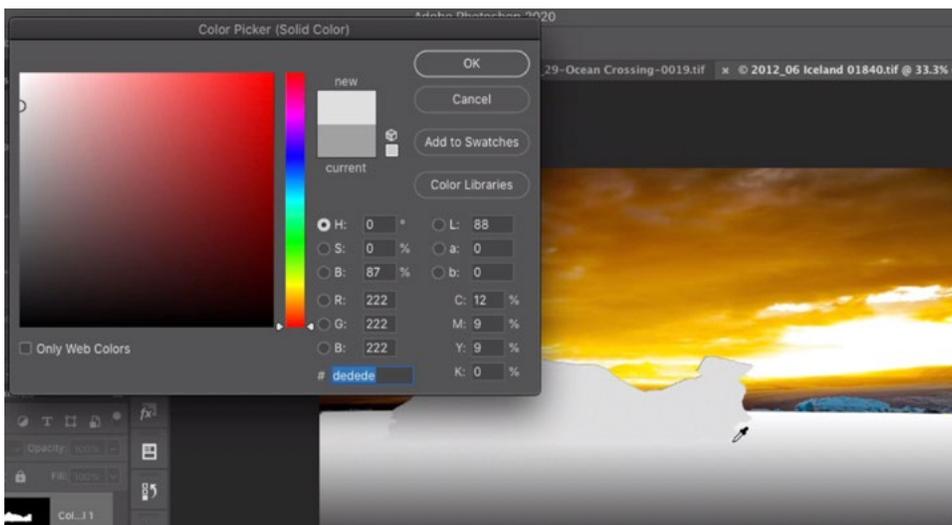
Lasso Tool tip: The Lasso Tool is used to make freeform selections, but there is a way to temporarily make straight lines as well. When using the Lasso Tool, hold down the Option key (Alt on Win) after clicking the mouse button and it will switch to the Polygonal Lasso Tool for the time the key is held down.

The gradient will be placed on a new layer, so with the selection active, we'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Gradient from the pop-up menu. The Gradient Fill dialog will appear and this is where we'll specify the type of gradient we want. We'll click on the little down-pointing arrow to the right of the gradient bar and we'll select the black-to-white gradient. We'll click OK to exit the dialog and the gradient will appear on the image. Because there was an active selection, that selection is applied to the layer mask attached to the Gradient Fill layer, limiting the gradient to the area that we had selected.



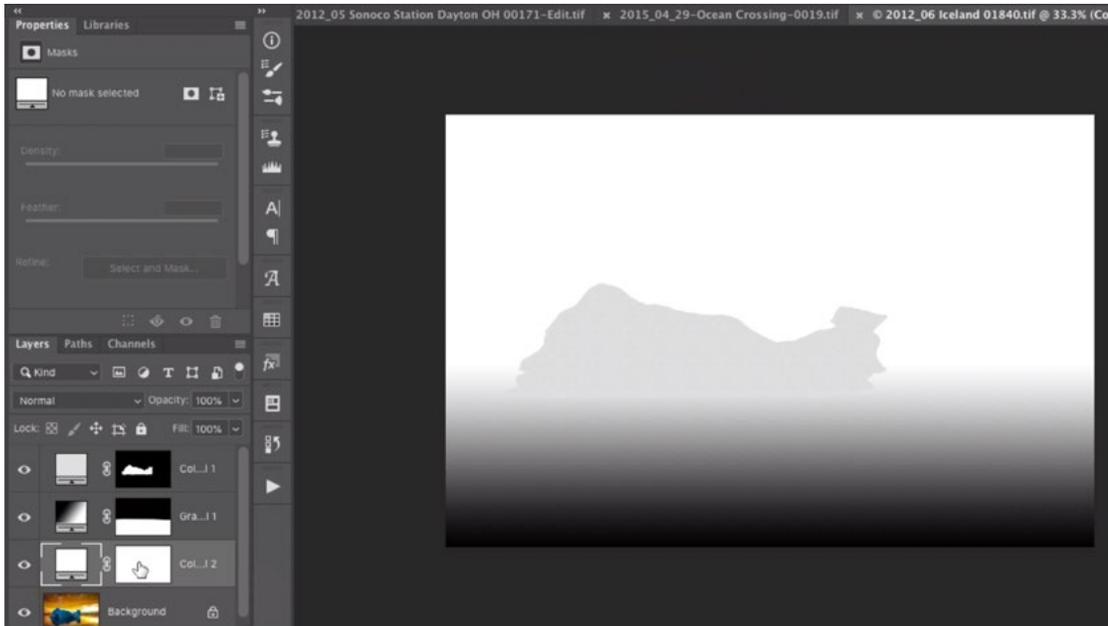
A Gradient Fill layer is being created for the water and we are choosing the black to white gradient.

We'll drag the iceberg layer above the Gradient Fill layer in the Layers Panel. We want to make sure that the iceberg's shade of gray is appropriate. It should appear to be the same distance from the camera as the water that it's sitting in. We'll double-click on the thumbnail for the Color Fill layer in order to call up the Color Picker again. This will give us the eyedropper tool and we'll use it to sample the shade from the water directly beside the iceberg. The iceberg layer will take on that shade. We can click OK to exit the Color Picker.

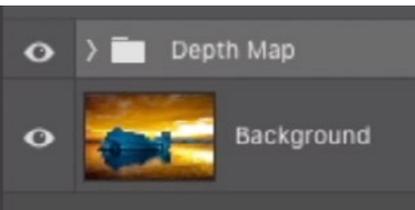
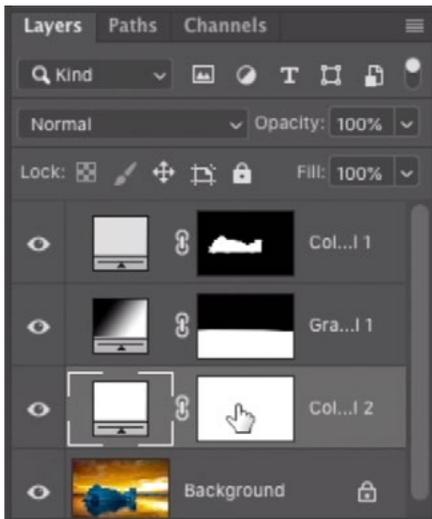


The shade of the iceberg layer is being changed to match the shade of the water it's sitting in.

The top part of the image is the area that should appear to be the farthest from the camera, so we want to make that area white. We can create an entire new white layer for this so we'll click on the Adjustment Layer icon at the bottom of the Layers Panel and again choose "Solid Color" from the pop-up menu. When the Color Picker appears, we'll choose white and then click OK. We just need to drag this new white layer to the bottom of the layer stack so that the foreground and iceberg layers are visible above it.



We created a completely white layer and placed it at the bottom of the layer stack.



We cleaned up the Layers Panel by selecting all of the depth map layers and placing them in a folder.

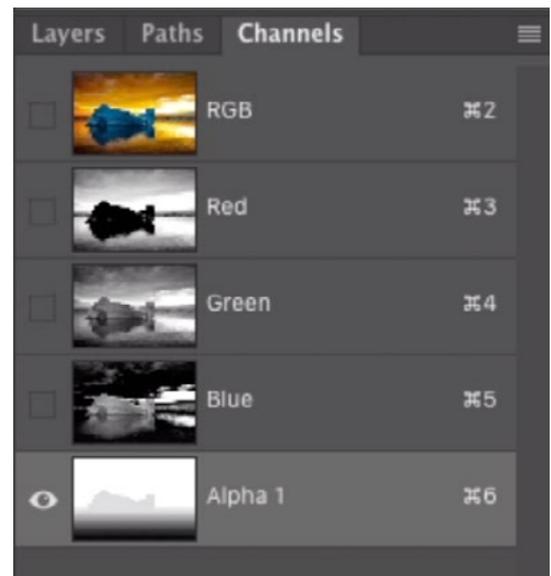
I like to tidy up the Layers Panel at this point, so we'll select all three of these depth map layers and we'll click on the folder icon at the bottom of the Layers Panel. This will place all selected layers into a folder, or group. We'll rename the group to "Depth Map."

Copy the Depth Map to its own Channel (13:54)

We now need to take this depth map we've created and get it into the Channels Panel. This is how the Lens Blur filter will use it to blur the image. We'll click on the Select menu and choose All. This will make a selection of the entire document. Then, we'll click on the Edit menu and choose Copy Merged. This will select everything that's visible on the screen. (If we simply chose the Copy command, it would only copy content from the layer that's active.)

We can now hide the visibility of the depth map layer group so that we're viewing the original image again. We'll open the Channels Panel, which is usually grouped with the Layers Panel. We'll click on the New icon [+] at the bottom of the Channels Panel to create a new channel. With this new channel active, we'll click on the Edit menu and choose Paste. The copied grayscale depth map will now appear in this new channel. We don't need the selection anymore so we'll click on the Select menu and choose Deselect.

We'll return to the main view of the image by clicking on the name of the topmost channel (RGB) and then we'll return to viewing the Layers Panel.



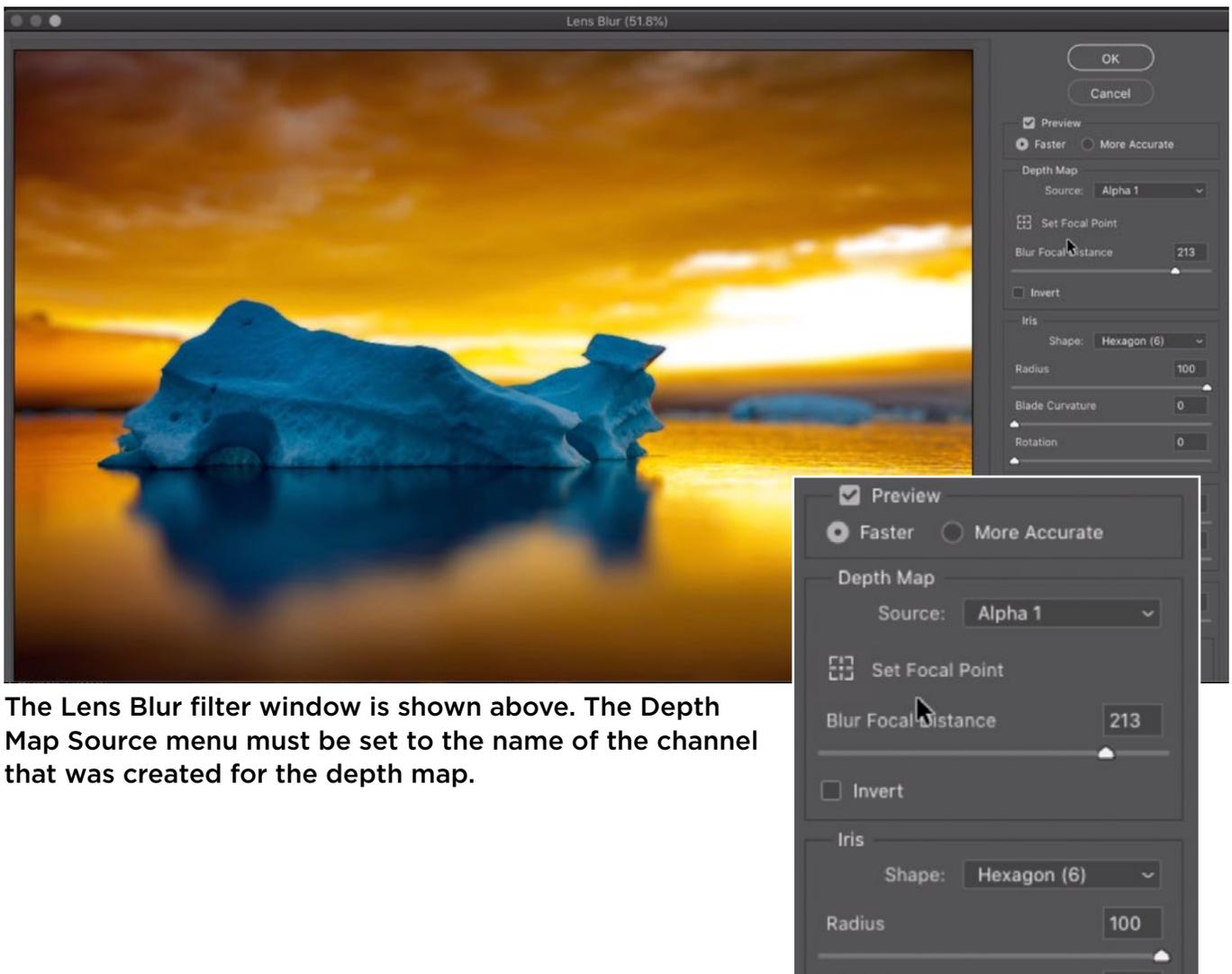
The depth map was pasted into a new channel.

The Lens Blur Filter (15:53)

Back in the Layers Panel, we need to make sure that we're working on the image layer, so we'll click on its thumbnail to make it active (if necessary). If you'd like to work in a non-destructive fashion, you can duplicate this image layer and work on the duplicate. This way, the original image layer remains untouched at the bottom of the layer stack. Duplicate a layer by using the keyboard shortcut Command+J (Ctrl+J on Win).

Now, we'll click on the Filter menu and choose Blur > Lens Blur. The Lens Blur window will take over the screen, and the settings will appear on the right side. There is a Depth Map category and we want to make sure the Source menu is set to the name of the new channel we just created. Then, we'll simply click on the iceberg to tell the filter what area should be sharp. The filter will look at the tone (within the depth map) of the area we clicked on and it will make all areas of that same tone sharp. When we click on the picture, the "Blur Focal Distance" slider will automatically be repositioned. After setting the blur distance, we can use the Radius slider to determine how blurry the image will become.

Note: If nothing happens when you click on the picture, it likely means that the "Set Focal Point" setting was turned off. It should be on by default.



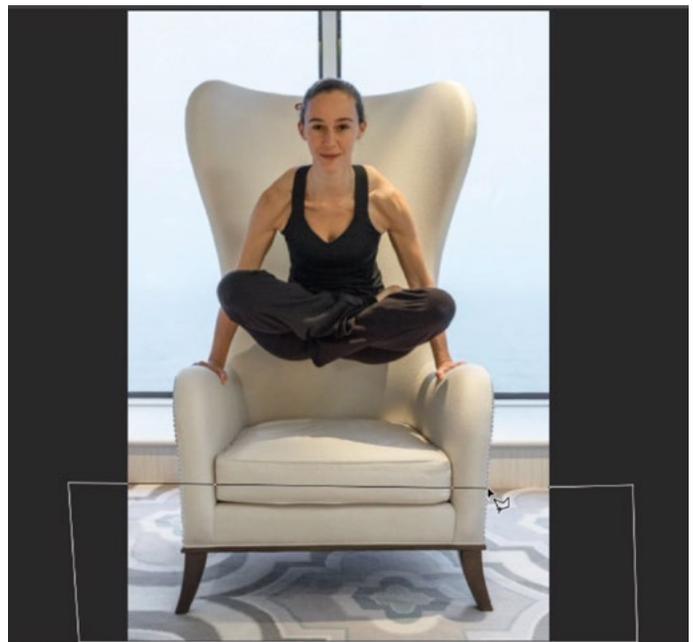
The Lens Blur filter window is shown above. The Depth Map Source menu must be set to the name of the channel that was created for the depth map.

Creating More Complex Depth Maps (19:57)

The more complex the image is, the more complex the depth map will be. When there is a lot going on in an image, we'll need to spend more time creating detailed selections and filling them with the appropriate shades of gray that will be used to blur the picture.

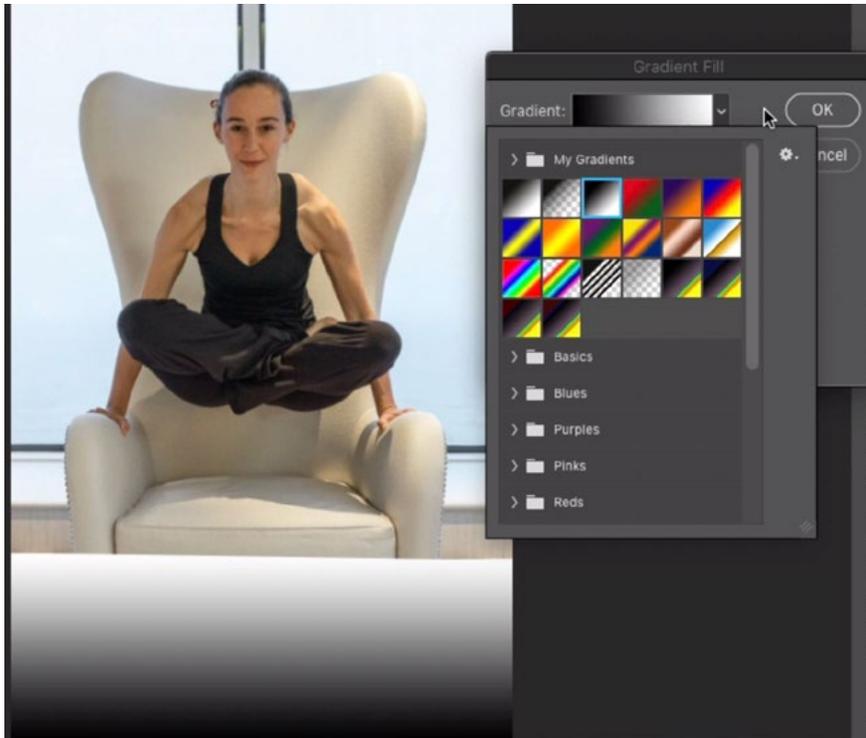
Let's look at an example. In the next image, there are multiple elements that are all different distances from the camera. To create the look of a shallow depth of field, each element will need to be a different shade of gray so that Photoshop knows how to blur each area. The wall behind the chair is the farthest thing from the camera, so that wall will be white in the depth map. The front of the chair (and Karen, in the chair) will need to be darker than the back of the chair. This will ensure that the front is sharper than the back. The floor will need to be dark where it is close to the camera and then fade to white as it moves away from the camera. We'll create a separate color or gradient layer for each area so that we can define the shade and therefore the blurriness of each element.

Create the floor layer The floor leading up to the wall will start out dark (because it's close to the camera) and then fade to white in the area where it meets the wall. We can use a Gradient Fill layer to achieve this. We'll make a selection of the floor area using the Polygonal Lasso Tool. It's ok that the selection includes part of the chair because this gradient layer will go beneath the chair layer. We'll then click on the Adjustment Layer icon at the bottom of the Layers Panel and choose "Gradient" from the pop-up menu. The Gradient Fill dialog will appear, we'll choose the



The Lasso Tool is being used to create a selection of the floor area.

black-to-white gradient and then click OK. Because there was an active selection, the mask attached to the gradient layer will limit the gradient to the area that was selected, which is the floor.



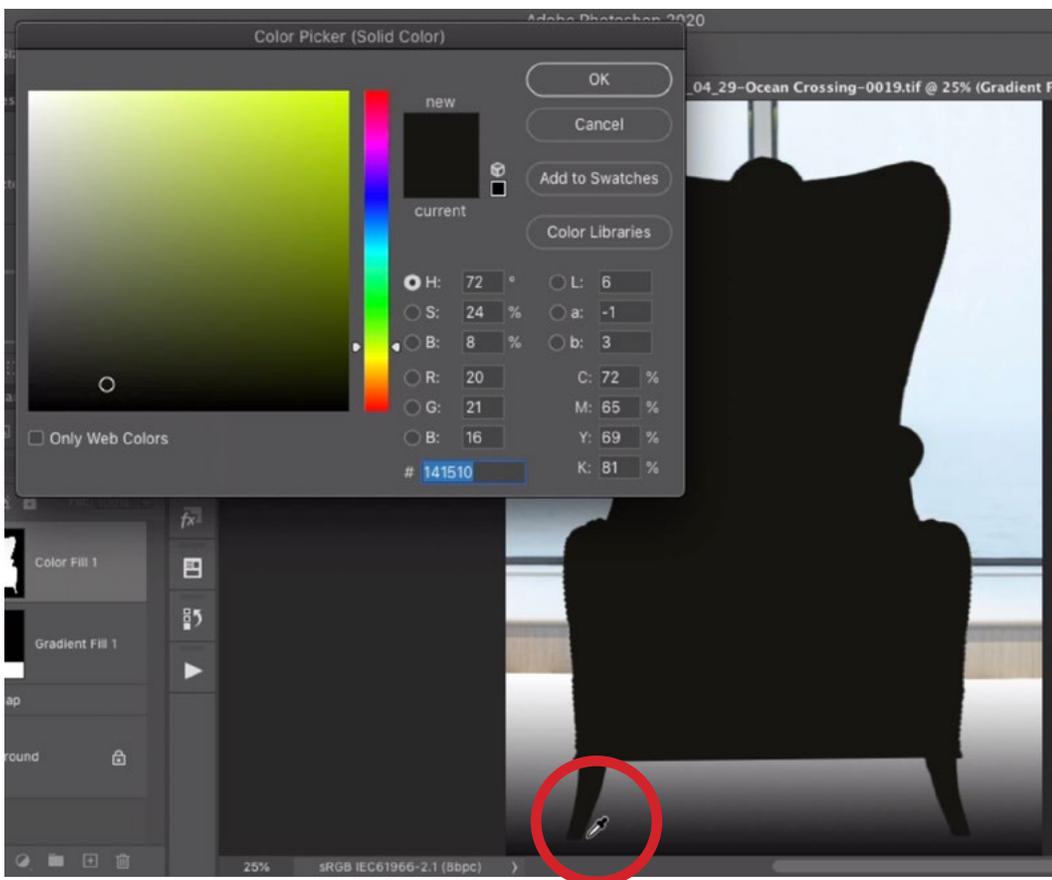
A selection was made of the floor and we are creating a Gradient Fill adjustment layer, choosing the black to white gradient.

Creating the chair layer The chair in this image will need to be a different shade of gray and we will place it on its own layer. In order to see the entire chair so that we can make an accurate selection, we'll turn off the visibility of the gradient layer we just created.

We'll create an initial selection by using the Select Subject command, but we'll need to make sure the image layer is active in order for that feature to work. With the image layer active, we'll click on the Select menu and choose Subject. This will cause Photoshop to look at the image and try to determine what the subject is. Sometimes it does a great job. Other times it doesn't. In this example, it selected parts of the chair but not others. We'll just use this as a starting point, and we'll use other selection tools to finish refining the selection.

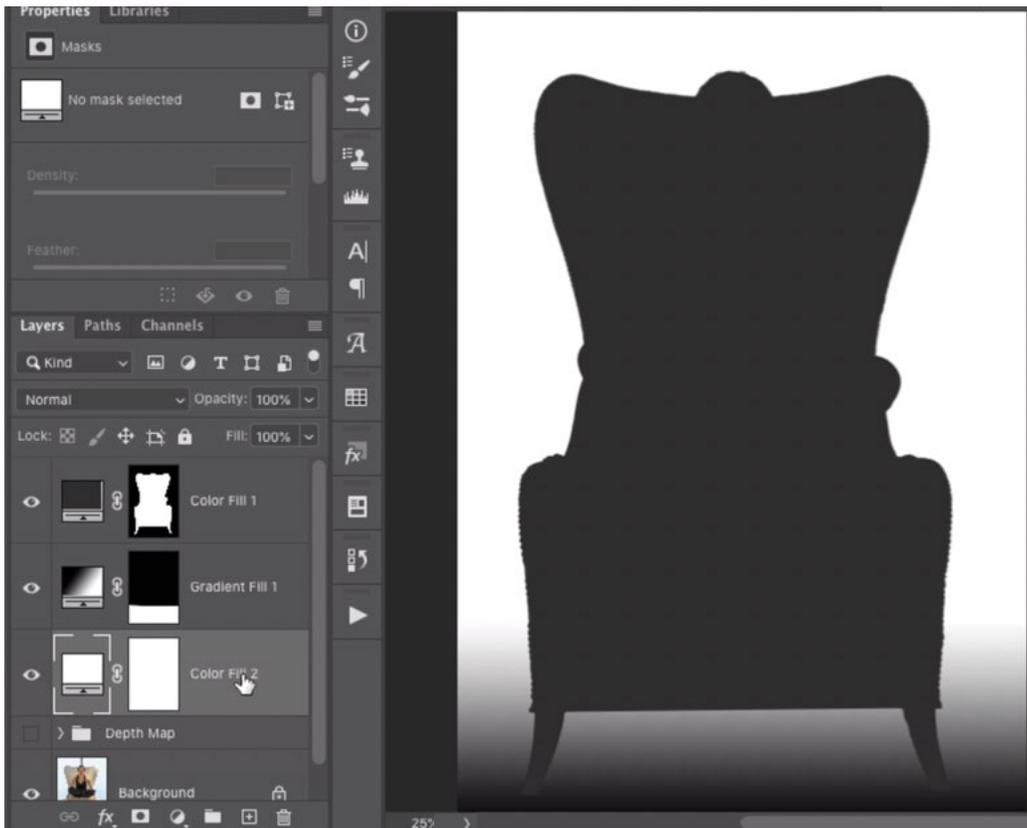
When creating more complex depth maps, it will often times be necessary to combine selection tools in order to isolate certain objects or areas. In this case, we used a combination of the Select Subject command, the Lasso Tool, the Object Selection Tool and the Quick Selection Tool.

Now that we have the selection made, we can turn on the visibility of the other depth map layer that we had created (the gradient layer). This chair selection will become its own color fill layer so we'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Solid Color. The Color Picker will appear, prompting us to choose a color for this layer. The front of the chair should be the same distance from the camera as the part of the floor it's sitting on, so it will need to be the same shade of gray. We'll use the Color Picker eyedropper to click on the floor gradient, next to the base of the chair. This will change the solid color layer to that shade of gray. We'll click OK to exit the Color Picker.



A selection was made of the chair and that selection is being applied to a new solid color layer. We are sampling the color from the area of floor that's beside the chair.

Create the wall layer The wall in the back is the farthest thing from the camera, so it will be white. We'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Solid Color from the pop-up menu. The Color Picker will appear, we'll choose white and then click OK. This will fill the entire layer with white so we'll drag this layer beneath the other depth map layers in the Layers Panel.



A solid white layer was created for the wall in the background. It was placed beneath the other depth map layers in the Layers Panel.

Refine the chair At this point, we have the floor becoming lighter and lighter (therefore more and more blurry) as it moves away from the camera. The wall in the back is totally white, which means it will be the blurriest area. The chair (and Karen) are a dark shade, which means they'll be sharper in the end result. We could stop here and move on to create the blur effect. Instead, we're going to refine the chair area even further.

The front of the chair should be sharper than the back of the chair, so the back should be lighter in the depth map. Additionally, Karen should be darker (sharper) than the back of the chair so that she ends up sharper too.

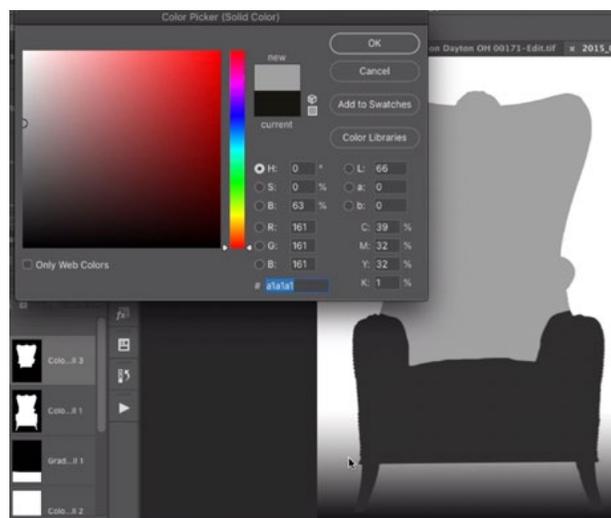
We'll start by making the back of the chair lighter. In order to better see what we're doing, we'll turn off the visibility of the depth map layers so that we're viewing the image layer again. We need a selection of the back of the chair and we can get this by using a selection that's already built into the file. We already have a layer that has a mask that isolates the chair. We can turn that mask into a selection by holding down the Command key (Ctrl on Win) and clicking on the mask thumbnail.

This selects the entire chair, so we just need to remove the selection from the front part of the chair. We'll activate the Lasso Tool and we'll hold down the Option key, Alt on Win (to subtract from the selection instead of add to it) and we'll draw around the front, bottom of the chair.

The back part of the chair now has a selection around it so we can turn on the visibility of the other depth map layers. We'll use the floor layer to determine what shade of gray the back of the chair should be.



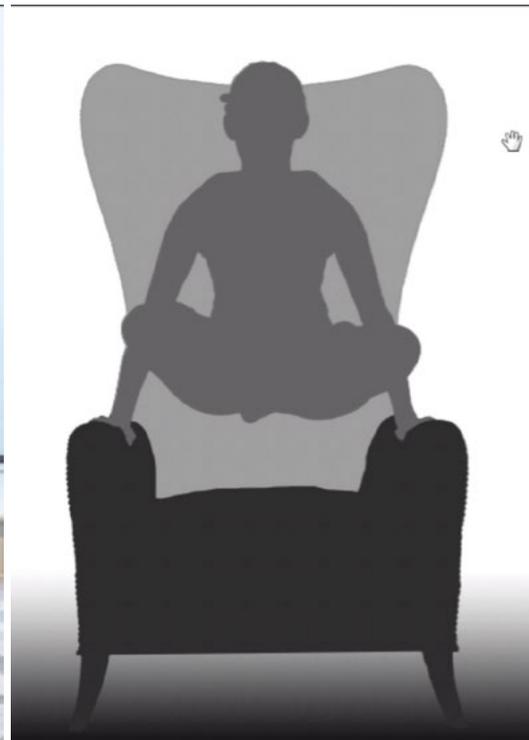
Starting with a selection of the entire chair, the Lasso Tool is being used to remove the selection from the bottom part.



A new Solid Color layer is being created for the back of the chair.

We'll create a new layer for the back of the chair by clicking on the Adjustment Layer icon at the bottom of the Layers panel and choosing Solid Color. The Color Picker will appear, prompting us to choose a color for this layer. We'll use the eyedropper (that will automatically be active) to click and sample part of the floor that is next to the back of the chair. These areas are equal distances from the camera so they should be the same shade of gray. This will ensure that the areas will receive the same amount of blurring. We'll click OK to close the Color Picker.

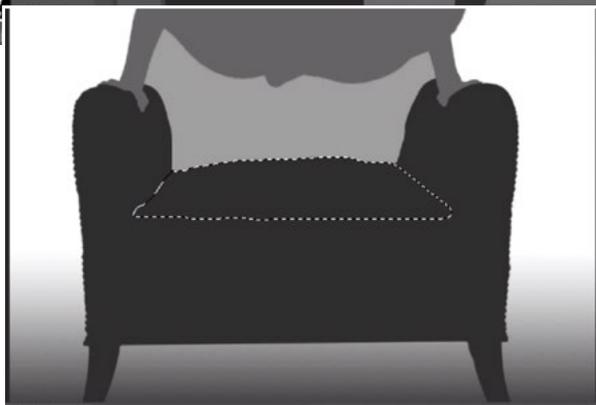
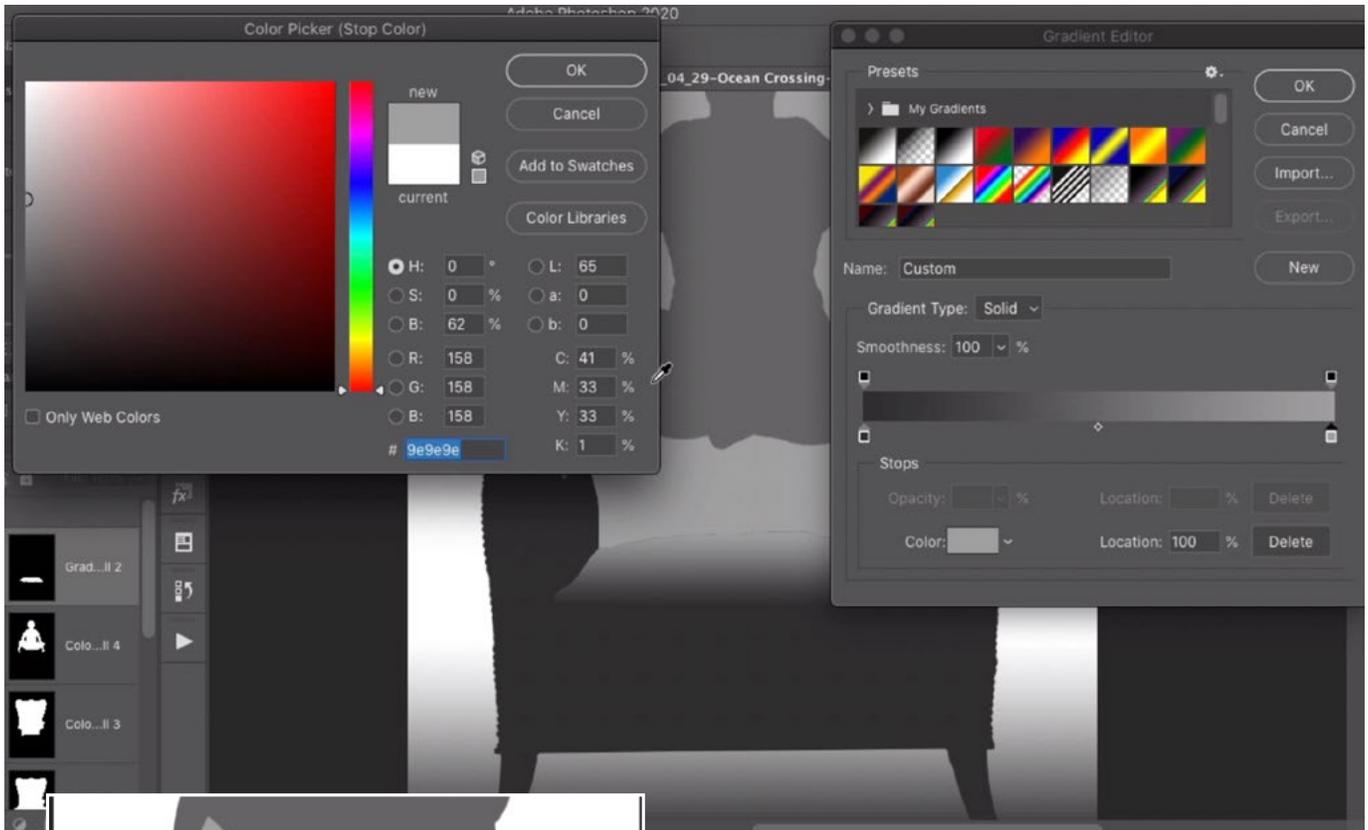
Next, Karen should be sharper than the back of the chair, so we'll need to create a new layer for her that is darker than the shade of the back of the chair. We'll use a combination of selection tools to create a selection of Karen. Then we'll follow the same process that we've been using. We'll click on the Adjustment Layer icon at the bottom of the Layers Panel and choose Solid Color. When the Color Picker appears, we'll choose a shade of gray that is darker than the back of the chair and then we'll click OK. We can always go back and adjust the shade later.



A selection was made of Karen and then a new Solid Color layer was created for her. The color layer was set to a darker shade than the back of the chair.

Next, we will refine the seat of the chair. It should contain a gradient so that it is sharper in the front and blurrier in the back. We'll make a selection of the seat of the chair and then we'll turn on the depth map layers so that we can sample the surrounding shades. We'll create a new Gradient layer and we'll start by choosing a simple black-to-white gradient. We will then need to customize the gradient, so we'll click within the gradient bar in order to call up the Gradient Editor.

At the bottom of the Gradient Editor is a gradient bar that shows you what the gradient is made of. It has color markers beneath it. We can click on these markers to change their colors and therefore customize the gradient. We'll click on the black marker and the Color Picker will appear. The eyedropper will be active and we'll use it to sample a tone from the front of the chair. We'll click Ok to close the Color Picker. Then we'll do a similar thing for the white marker, only this time, we'll sample a shade from the back of the chair. We'll click OK to exit the Gradient Editor.



LEFT: A selection is made of the chair seat.
ABOVE: The Gradient Editor is being used to customize the gradient within the chair seat.

The same technique is going to be used for the inside of each chair arm. I won't detail the process again, but here are a few more tips for refining depth map layers like this:

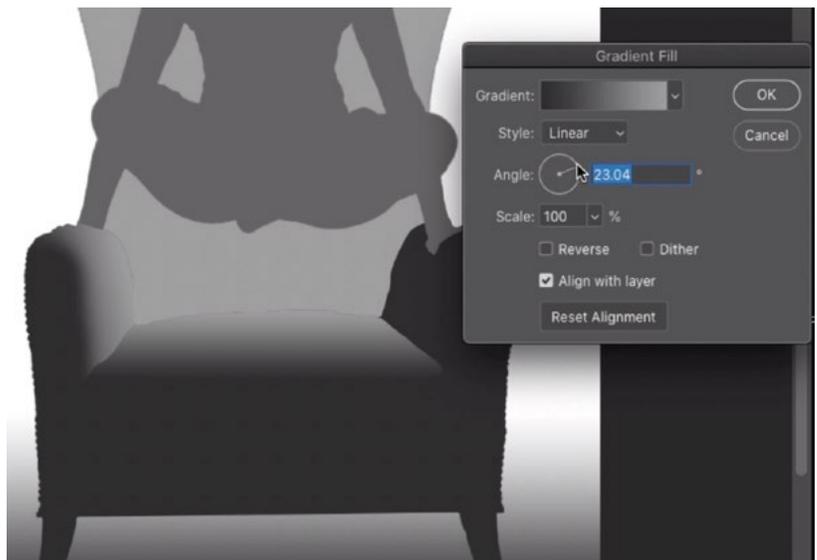
Quick Mask Mode for soft-edged selections

Up until now, we have been making selections and then filling them with a shade. There will be times when you won't want a hard edge, however. When this is the case, you can use Quick Mask Mode to create soft edges. Start with an active selection of the area you want to isolate and then tap the Q key to enter Quick Mask Mode. In this mode, everything that is not selected will have a red overlay. Everything that IS selected will look normal. Here, you can use the brush tool to refine the selection. Painting with black will remove from the selection (adding red overlay) and painting with white will add to the selection. Use a soft brush to get soft selection edges. Tap the Q key again to exit Quick Mask Mode.



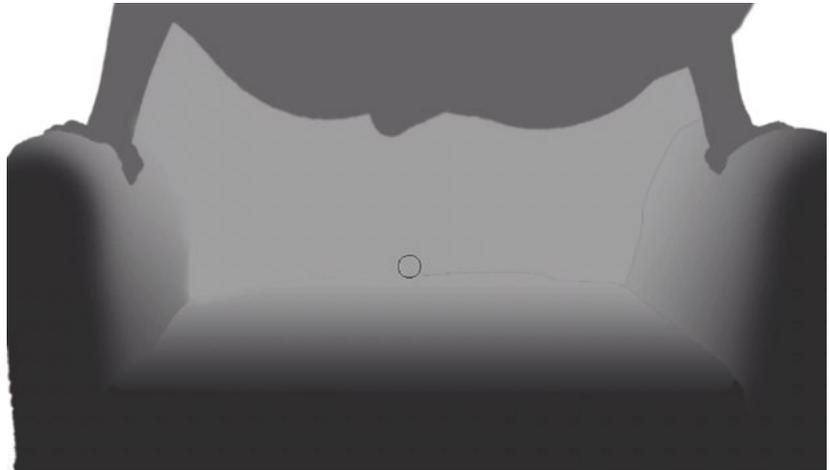
The selection is being refined in Quick Mask Mode. A soft brush is being used to give soft edges to the selection.

Change gradient angle When using Gradient layers to create depth maps, there are a few settings to be aware of in the Gradient Fill dialog. Here, there is an angle setting that can be used to change the angle at which the gradient moves. There is also a "Reverse" check box and this can be used to swap the direction of the gradient.



The Angle setting is being used to adjust the gradient on the chair arm.

Clean up jagged edges When you're finished creating the depth map, you may notice some rough edges where the edges of the different layers meet. You can either use the Brush Tool or the retouching tools to correct this. Create a new, empty layer above all the other depth map layers. Activate the Brush Tool and use a soft-edged brush. With the Brush Tool active, hold down the Option key (Alt on Win) to temporarily access the eyedropper. Click on the image to sample a color from right next to the undesirable seam. This will set the foreground color and therefore the color you'll be painting with. Release the Option key and then paint over the seam.



The Brush Tool is being used (on an empty layer) to paint over the seam between layers.

Alternatively, you could use Photoshop's retouching tools to remove the seam. Just make sure that the tool is set to Sample All Layers (This setting can be found in the Options Bar.)

Clean up the Layers Panel We've created a series of layers that will make up the depth map. We'll select all of these layers and then click the folder icon at the bottom of the Layers Panel. This will place the layers into a folder, or group.

Copy depth map to Channels Panel We now need to get this depth map (as one piece) into the Channels Panel. We'll click the Select menu and choose All. This will create a selection of the entire document. Then, we'll click the Edit menu and choose Copy Merged. We will now turn off the visibility of the depth map group so that we are viewing the original image. We'll open the Channels Panel and click the New icon at the bottom of the panel. With this new channel active, we'll click on the Edit menu and choose Paste. This will paste the selection of the merged layers into the new channel.

There is now a specific channel for the depth map, so we can return to viewing the normal image by clicking on the top-most RGB channel and then returning to the Layers Panel. We'll run the Lens Blur filter on the image layer, but it's nice to duplicate that layer first so that we're working non-destructively. We'll click on the image layer to make it active and then we'll duplicate the layer by using the keyboard shortcut Command+J (Ctrl+J on Win).

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 interface. We need to point the filter to the depth map we just created, so we'll click on the Source menu (on the right side of the screen) and make sure that it's set to the name of the channel we created. Then we'll click on the part of the image we want to be sharpest. This will cause Photoshop to look at the shade of gray that's located in the depth map for the area where we click. All areas containing that shade of gray will become the sharpest parts of the image. We can then use the Radius slider to determine how blurry the non-sharp areas should be.