Adobe Photoshop 7.0

Digital Imaging Essentials - by Julieanne Kost
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Before you ever even open your digital images in Photoshop, three important guidelines can help you achieve the best results:

1. First, capture the image you're trying to communicate—this is often easier said than done!
2. Select the image with the best exposure and tonal range. As a general rule, if the detail isn't there in the original, it's very difficult to create it.
3. Get the best scan possible (if you're' capturing the image on film), or the highest quality capture or conversion of the original file (if you're capturing the image from a digital camera). Regardless of the quality of the original, if the scan or processing of the file doesn't contain the information, you'll have to get it elsewhere or create it yourself. In other words—garbage in, garbage out!

After you've done your best to capture and acquire an image, there are still steps that can and should be made in Photoshop to adjust, correct, and manipulate the image, including:

- Rotating and correcting perspective distortion if necessary
- Cropping the image
- Defining the document size, print size, and image resolution
- Adjusting the tonal range and color of an entire image
- Adjusting the tonal range and color of selected areas of an image
- Correcting minor imperfections
- Saving the image in the appropriate format
- Sharpening the image for print

Step 1: Correcting Scans and Distortion

After scanning or capturing your image, start the correction process by fixing uneven scans or distorted capture. By distorted, I mean anything from an uneven horizon to perspective distortion created by the camera lens.

- To rotate an image select the image in the File Browser and choose Rotate from the fly out menu, or click the rotate icon at the bottom right of the thumbnail pane. This will automatically rotate the image when opened in Photoshop
- To straighten an image that has been scanned or captured at an angle, start by selecting the measure tool (one of the nested tools under the eyedropper) from the toolbox.
- Using a reference point in the image, such as the base of a building or the horizon, drag the measure tool along the point of reference and then choose Image > Rotate Canvas > Arbitrary.

The Rotate Canvas dialog box automatically displays the measurement value in the Angle field and selects the Clockwise or Counterclockwise option (depending on the direction of the measurement).

Note: If you're attempting to adjust a layer instead of a Background, use the measure tool in the same way, then choose Edit > Free Transform > Rotate. Photoshop automatically rotates the selected layer by the correct amount.

Photoshop can also automatically correct for perspective distortion in an image. For example, if an image was captured using a 35mm camera, you may need to correct for parallax, which can be done either by using the crop tool's Perspective option or manually.

Correcting parallax with the crop tool

- To make a correction using the crop tool, start by dragging a crop marquee. On the Options bar, deselect the Shield option (to make it easier to see the image) and then select the Perspective option.
- Drag the corner handles to align them with a reference point in the image (around a door or building for example), then drag the handles at the center of the marquee to enlarge the crop marquee to incorporate the areas of the image you want to retain.

When the marquee is positioned the way you want it, click the Check button in the Options bar or double click inside of the marquee to apply the correction.

Note: This option is used to correct perspective, not to distort an image. If the perspective defined by the crop marquee doesn't exist in reality, the correction will not work.

Correcting parallax manually

To correct an image's perspective manually, use the Edit >Transform > Distort command.

- First, if you're working with a Background, select the entire image or the portion of the image you want to correct.
- If you're working with a layer, select the portion of the image you want to correct. Or, to effect the entire image, select nothing.

To help you straighten the image, you can drag guides out of the ruler areas onto the image or use a grid.

- Choose View > Show Rulers and drag out the desired guides

from the ruler area.

- If you prefer a grid to guides, choose View > Show Grid.

Choose Edit > Transformation > Distort. Drag the transformation handles inward to straighten the image; then click the Check button in the Options bar or press Enter to apply the transformation.

Note: To increase the speed at which Photoshop performs transformations, double-click the Background in the Layers palette and convert it to a layer before transforming the image.

Step 2: Cropping the Image

After correcting an uneven scan or an image's perspective, it may be necessary to crop extraneous information.

From the tool palette, select the Crop tool (be sure that the Perspective option is deselected in the Options bar), and then drag a marquee around the area you want to retain. Click the Check button or press Enter to crop the image.

Note: To constrain the crop to a specific size and/or aspect ratio, you must enter the crop options before drawing the crop marquee. To save the entered values, click the Tool Presets icon in the Options bar and click the New Tool Preset icon. This will allow you to use the Crop tool preset at another time without having to re enter the numeric values.

Step 3: Defining Document Size, Print Size, and Image Resolution

After you've made basic corrections, it's time to resize or redistribute the pixels in the image using the Image Size dialog box.

- Choose Image > Image Size.
- At the bottom of the Image Size dialog box, deselect the Resample Image option so that pixels cannot be added to or deleted from the image; they can only be redistributed.

Changing the resolution of the image *automatically* changes the print size of the document. Increasing the resolution (adding more pixels per inch) automatically decreases the document size, while decreasing resolution automatically increases the document size.

- In the Document area, enter the desired width and height. One of three results occurs: You have the perfect amount of information, too much information, or too little information.

As a general rule, if you're outputting to an inkjet printer, you'll need between 250 and 360 pixels per inch (ppi) at the desired output print dimensions. As the print size increases, you can get away with lower resolution, because the viewing distance increases. However, the best option (because quality expectations vary) is to take the time to print the image at various resolutions to determine which produce the quality you want.

If you are outputting to a printing press, you'll need approximately 1.5 to 2 times the line screen of the press. In addition, there are several other things to consider before printing, which are beyond the scope of this project. Be sure to talk with your printer before starting any print project.

- After entering width and height in the Document area, look at the image resolution. If the resolution is sufficient for the desired document size, you're ready to print. If the resolution is insufficient for the desired document size, the best option is to rescan or recapture the image with more samples per inch. If this isn't an option, you'll need to resample the image in Photoshop.
- To resample an image, select the Resample Image option at the bottom of the Image Size dialog box. This option adds more pixels to your image based on a calculation of the information already in the image file.

Bicubic interpolation is the best resampling option, as this calculation considers the greatest number of pixels while creating new ones.

- With the Resample Option selected, increase the resolution as desired.

Note: To check the percentage of pixels being interpolated, change the width or height unit of measurement from Pixels to Percentage in the Pixel Dimensions area of the Image Size dialog box.

- If the image resolution is higher than necessary, you can either print it (which may or may not use the additional resolution and can take longer to print) or check the Resample Image button and enter a lower resolution.

Notice that after making a change to the resolution (increasing or decreasing it) using the Resample Image option, Photoshop calculates the new file size at the top of the Image Size dialog box. When decreasing resolution (sampling down), information is discarded, resulting in a smaller file size. When increasing resolution (sampling up), information is added, resulting in a larger file size.

Note: If you're not sure of the final output size, leave the file as large a possible and then resize it as needed when outputting it.

Step 4: Adjusting the Tonal Range and Color of an Entire Image

Now that your image is the size you want, you're ready to make any necessary tonal and color corrections to the entire image. Although Photoshop offers a variety of ways to make adjustments, this technique demonstrates the use of Adjustment layers. Adjustment layers are actually layers with a set of mathematical instructions that sit on top of the image, allowing you to experiment with color and tonal adjustments without permanently modifying the pixels in the image. Of course, when you print the image, the adjustments are applied to the printed output.

Adjusting Levels

Start by setting the black and white points in the image to ensure that the image information extends the entire dynamic range.

- Choose Layer > New Adjustment Layer > Levels.

A histogram (the graphical representation of the colors and tonal values in the image) displays the tonal values specific to

the image. For example, if the image is of a polar bear in the snow, most of the pixels are displayed at the right side (lighter areas) of the histogram. If the image is of a back cat at night, most of the pixels are displayed at the left side (darker areas) of the histogram.

If appropriate to the image, and if the histogram doesn't already extend the entire dynamic range from black (0) to white (255), redistribute the values using the sliders in the input area.

- Move the black triangle in the Input Levels area to the right until it is positioned under the first pixel data in the histogram.
- Move the white triangle to the left until it is positioned under the first pixel data in the histogram.

Note: It is possible to change the values of the midtones in an image using the gray gamma triangle in the center of the histogram. However, using a Curves Adjustment layer (which will be discussed later in this paper) will give you more control in the highlights, midtones and shadow areas.

If there are values in the highlights or shadows you don't care about retaining, you can slide the triangles in a bit more. However, keep in mind that any values to the left of the black triangle or the right of the white triangle will be remapped to pure black or pure white (containing no detail).

If your image contains a color cast, you can select the individual channels and set the black and white points for each channel rather than manipulating the composite of all the channels. Depending on the image, this can neutralize the highlights and shadow areas of an image. However, keep in mind that it may also remove desirable color casts from an image, changing the entire mood of the image.

You can also use the black and white eyedroppers to click on a specific value in the image to remap it to black or white. Not only will this affect the dynamic range of the image, it will also change the color balance depending on the area targeted. When you're first getting started with Levels, you may accidentally select (click) the wrong black or white point, causing a loss of detail in the image, but because you're using an Adjustment layer, you can always start over. In fact, it's a good idea to experiment with the eyedroppers to see exactly what happens when you select incorrect areas. In addition, you can reset the values in the Levels dialog box by holding down Option (Mac)/Alt (Win) and clicking Reset. Double clicking on the eyedroppers displays the Color Picker allowing you to change the target values of the eyedroppers if desired.

The middle eyedropper in the Levels dialog box, called the Gray Balance eyedropper, can eliminate a color casts in an image.

- Select the eyedropper, position it over an area in the image that should be neutral (like a gray card or cement) and click. All the colors in the image are adjusted to neutralize the targeted area.

Adjusting Curves

After adjusting the black and white point in an image, adjust the midtones if necessary.

- Choose Layer > New Adjustment Layer > Curves.

Unlike the single middle slider in the levels dialog box, the Curves dialog box lets you set up to 16 points on a curve to manipulate the tonal and color ranges in an image. To sets points on a curve, simply click on the curve.

To increase the number of grid lines visible in the curve area, Option (Mac) / Alt (Win) click anywhere in the grid area. Increasing the grid lines can be helpful if you are familiar with the zone system and want to break your image into more than four ranges.

Moving your curser over the image area and clicking displays a ball over the corresponding tonal value on the curve, and Command (Mac)/Control (Win) clicking in the image area adds a point on the curve at the targeted value.

- Drag the points on the curve to adjust the quarter tones, midtones, and three-quarter tones of the image. Notice that where the slope of the curve increases, contrast is added to the image. However, where the slope of the curve is decreased, the image can become flat or posterized so be cautious about large movements to the curve.

If desired, you can manipulate the individual channel of an image in the Curves Dialog box. Simply select the channels from the drop-down menu and adjust the curve for each channel.

Note: If you make a drastic adjustment to a curve, the color in the image may also be adjusted, creating an overly saturated image. To limit the curve's effect to only the tonal values in the image, set the curve's blend mode to Luminosity. (If you've corrected individual channels in the image, this will limit their effectiveness.)

Adjusting Color Balance

In addition to correcting color using the Curves dialog box, the Color Balance dialog box works well to remove color casts.

- Choose Layer > New Adjustment Layer > Color Balance.
- In the Color Balance dialog box, drag the sliders to remove the color cast. For example, if an image has a cyan color cast, drag the Cyan-Red slider away from Cyan toward Red.

You can also adjust the Shadows, Midtones, and Highlights individually by targeting them in the Tone Balance area.

Finally, if you are used to printing with a color enlarger, you may want to turn off the Preserve Luminosity option. By default, changing a color in the Color Balance dialog box automatically adds or subtracts opposing colors to maintain the original density of the file. If however, you want to change the file density, as it does when printing with an enlarger, turn off this option.

Note: For more advanced color correction using color samplers and the Info palette see "Color Correction by the Numbers" located on http://www.adobeevangelists.com/pdfs/photoshop/tipsandtricks/CorrectByNumbers.pdf.

Step 5: Adjusting the Tonal Range and Color of Selected Areas of an Image

All the corrections you've made so far have affected your entire image. At this point, it's time to make selective adjustments if necessary.

- Start by selecting the area you want to affect; then choose Layer > New Adjustment Layer and select the type of adjustment layer you want.

When an Adjustment layer is added to an image with an active selection, the selected area is automatically turned into a mask, protecting areas outside the selection from changes.

After correcting a selected area, hard edges may appear around the mask, which can be softened by applying a Gaussian blur to the selected area.

- With the adjustment layer selected in the Layers palette, choose Filter > Blur > Gaussian blur and add a blur to the mask.
- Click the Preview option and increase the Radius slider until the edge is no longer visible.

Step 6: Correcting Minor Imperfections

After I've made tonal and color corrections globally and to selected areas as necessary, I typically remove imperfections such as dust and scratches in the image. Often, these types of imperfections aren't visible until overall corrections are made. For example, imperfections in dark shadow regions or bright highlights may not appear until the overall corrections are made.

Using the Dust & Scratches Filter

The first and probably easiest way to remove small annoying pieces of dust and scratches is using the Dust & Scratches filter. This filter can be run on the original image, or you can create a duplicate by choosing Layer > New > Layer Via Copy.

I would suggest creating a copy even though it doubles the file size, because the Dust & Scratches filter does permanently change the image and may cause less than desirable results if you don't fine tune the filter's options. First, be aware that you may lose fine detail in your image if you use this filter, because Photoshop is unable to discern between a speck of dust and a small freckle or piece of dirt that may be essential to your image. One way to test the filter and avoid eliminating a potentially important detail is to select a "less important" area of the image (perhaps an out of focus background or large area of sky) and apply the Dust & Scratches filter.

- Choose Filter > Noise > Dust & Scratches.
- Click Preview in the dialog box, set the Radius slider to 1 and the Threshold to 0, and then start dragging the Radius slider to the right until you no longer see the dust or dirt.
- Then, set the Threshold slider as high as possible without reintroducing the dust or dirt.

Note that if you stop after adjusting the Radius slider without adjusting the Threshold slider, you'll loose significantly more detail from the image.

Using the Healing Brush, Patch Tool, and Clone Stamp

For more stubborn areas, I use the healing brush and patch tool, which work well because you can quickly remove unwanted objects without having to do a lot of color matching. For detailed information about using the healing brush and patch tool, see the "Photoshop 7.0 Tutorial" pdf file on http://www.adobeevangelists.com/pdfs/photoshop/tipsandtricks/ps7tutorial.pdf.

Where unwanted areas become larger, or when you need to replace information in one area with other information (such as removing a wire or fence post) the clone stamp is the tool of choice. There are a variety of ways to use the clone stamp tool, you can clone information from one area to another directly on a targeted layer, or to another layer, a mask, or even from one document to another!

Cloning directly on a layer can remove unwanted information, but is a somewhat inflexible method because the area you cover is permanently affected and it's more difficult to get back if necessary. Cloning from one layer to another provides more flexibility, but be sure to check the stacking order of the layers in the Layers palette before cloning, or you may get unexpected results. To clone from one layer to another, select the Clone Stamp tool and do the following:

- Check the Use All Layers option in the Options bar.
- Check and adjust if necessary the position of the layer you're cloning to in the Layers palette. If your document contains Adjustment layers that affect the area being cloned, either turn off the Adjustment layer (so you don't get a double adjustment) or clone to a layer positioned above the Adjustment layers. (Keep in mind that if you later change the adjustments, the cloned area won't match the surrounding areas.)

In previous versions of Photoshop, it was time consuming to constantly adjust the hardness of the Clone Stamp tool when working in finely detailed areas. In Photoshop 7.0 the Healing Brush introduces a way to blend edges without constantly changing a brush's hardness.

- Select the Healing Brush in the toolbox and in the Options bar, set the blend mode to Replace. This setting prevents the healing brush from automatically matching colors, but it will blend the edges in a way that maintains more detail than the Clone Stamp tool.

If you need to patch a large area, it may be easier to use yet another method.

- Select the area you want to replace, move the selection to the area that you want to replace it with, then Copy and Paste it to automatically create a new layer. Using this technique, it's better to select too much information than too little. There may also be times when you will want to copy down through the layer stack. This can be done by choosing Edit > Copy Merged. With the information you need copied, choose Edit > Paste to create a new layer.
- To soften the selection and help blend the edges, either add a feather to the selection before copying it or, after pasting, add a layer mask and paint with a soft-edged brush with black around the edges to hide and reveal information as necessary.

After copying part of an image and moving it, it's likely that you'll need to adjust the tonal values to blend it into the new area.

- Depending on the variation in tone and color, add the necessary adjustment layer and choose Layer > Group with Previous to limit the adjustment to the layer with the copied information on it.

Step 7: Saving an Image

Along the way, you'll want to save the images that you're working on. Before saving your images, consider the following:

- Always use the Save As command and rename files so you don't save over your originals, which you may need to edit in the future.
- Save both layered and flattened versions of your images. Create a naming convention, for example, add an "L" to the end of the layered version of the file and an "F" to the flattened version.
- If you're working with a color-managed workflow, the Save and Save As dialog box let you embed the image's color profile. Retain this layered file in case you need to make adjustments in the future.
- For the maximum flexibility, save files as Photoshop files (PSD), TIFF, or Photoshop PDF to retain their layers. When file size is the most important criteria, (saving to the web or to E-mail for example), use the JPEG, GIF or PNG format.

Step 8: Sharpening the image for print

As a final step, you'll want to sharpen and save your flattened image.

- To decrease file size before sharpening an image you're going to print, choose Layer > Flatten Image, then use the Save As command and rename the file to save the flattened version.
- Choose View > Actual Pixels to display the image at 100%.
- Choose Filter > Sharpen > Unsharp Mask. The Unsharp Mask filter creates the illusion of sharpness by increasing the contrast of edges in the image. Although Unsharp Mask is not a magic wand, it is an important and essential tool, and if you start with an image in reasonably good focus, it will improve it.
- Increase the Amount slider to add contrast to the edges in the image.
- Use the Radius slider to increase the width (or number of pixels on each side of an edge) of the sharpening.

A good rule of thumb for the setting the radius amount is to set the radius to 1 for every 150 ppi used for output.

- Drag the Threshold slider to the right to leave low contrast areas undisturbed while still sharpening the more prominent edges. The Threshold option is a great way to minimize the sharpening of noise or film grain in an image while still being able to sharpen the more dominant edges.

After sharpening your image, choose File > Save As and rename the image. Remember, if you don't rename the image, you'll be saving over your original file.