

# IMPROVE YOUR HDR PHOTOGRAPHY

By Jim Harmer

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## **Chapter Zero: A Brief Introduction**

Dear Reader,

The first chapter of this book is a catch-up for anyone just starting in HDR photography. All subsequent chapters cover more advanced topics of HDR. Experienced HDR photographers can simply skip the first chapter and get into the more advanced tips and techniques starting in chapter two. This book was written because there are simply too many basic how-to-make-an-HDR tutorials online, and extremely few resources for mastering this exciting form of art. This book will give any photographer useful tips for improving your HDR photography.

Photography is beautiful because it often places me in locations that only God has touched—no telephone poles, no cars, no laptops, and definitely no Twitter. As you capture life in bracketed sequences of varying exposures, remember the Creator of the beautiful scenes you record.

Regards,

Jim Harmer

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## **Chapter One: A quick catch-up lesson for first-time HDR photographers**

High dynamic range photography is by no means a “new” invention, but it was only popularized recently and has completely overtaken the photographic industry. There always seems to be a fad in photography that lives and dies overnight (remember the soft focus fad?), but I personally believe that HDR is here to stay. High dynamic range is a technique in which the photographer takes at least 3 images of the exact same scene--one over exposed, one properly exposed, and one under exposed. Then, the photographer blends those images together in order to capture a larger range of detail in both the highlights and shadows. HDR photography is a little tricky, but if you pay attention to this page, you can create images that will undoubtedly draw the attention of all your friends and family.

When an HDR image is created, the tonemapping process can make the resulting image look painterly or grungy; however, with a little know-how, this negative effect can usually be

remedied. The photographer has great latitude in deciding how realistic-looking the ultimate image will be.

HDR has been overdone for too long. When beginning photographers first try HDR, they seem to overdo the HDR effect in every situation. Don't let this be you! Your images will look much cleaner and impactful if you give it a more realistic look.

This chapter is a catch-up for beginning HDR photographers to understand the basics, but the next chapter will speed things up with more advanced information.

### **What is Dynamic Range Anyway?**

When you look out the window in the middle of the night, you can see the streetlights, but most of the scene is too dark for your eye to determine what is there. On the opposite end of the spectrum, when an oncoming car has bright headlights turned on, it is difficult to see the windshield or the driver of the car. Although you experience situations where your eye cannot render detail in a scene because of the light levels every day, you may not have known that this is called dynamic range. The human eye has a dynamic range of approximately 12 stops of light (a "stop" of light is a measurement of the amount of light). If the pupil is given a minute or two to adjust to an unusually bright or dark scene, it can capture even more than 12 stops of light.

You have probably run into dynamic range problems with your photography as well, even if you weren't aware that it was called dynamic range. Have you ever taken a picture outside at noon and found that the sky behind the person you were photographing was a bright white instead of showing the clouds in the sky? This is also a dynamic range problem. Modern DSLR cameras can only capture approximately 5 stops of dynamic range.

What this means is that even though your human eye can render detail in a scene with a great variance in light levels, your camera will not have this capability. Recognizing this problem, high dynamic range photographers take three images of varying brightnesses, and then blend the three pictures together to capture a greater dynamic range.

### **The Step-by-Step Approach to True HDR**

Step 1: Find a scene that you'd like to shoot in HDR. The type of scene that typically produces the best HDR result is one in which one exposure cannot capture the entire dynamic range. For the purposes of this tutorial, we'll use the hypothetical situation of a sun setting over a mountain

lake which is surrounded by pine trees. This is a good scene for an HDR because the sun is extremely bright and the area under the dense trees is quite dark—too much dynamic range for one image to capture.

Step 2: Put your camera on a tripod. Because you'll be taking three images of the same scene, any movement of the camera as the separate images are taken will prevent you from layering the photos one on top of the other on the computer. It is possible, but extraordinarily difficult to get professional HDR results without the camera mounted on a tripod. Keep in mind that nothing in the scene can move as the images are captured. If the pine trees are blowing in the wind, their position will change between the three images and produce a strange-looking effect called "ghosting." If something is moving in the scene, you'll have to change your tactic and use the pseudo-HDR technique described below.

Step 3: Turn on auto-exposure bracketing. If your camera has this feature (as almost all DSLRs do), it will allow you to automatically take three or more exposures at varied exposure levels. In our mountain lake landscape example, one image should be taken that is over exposed by two stops, one image that is correctly exposed, and one image that is under exposed by two stops. The camera should be set camera to take these three pictures in rapid succession so we only need to press the shutter button once. Consult your camera's manual on how to set auto-exposure bracketing, because it varies between camera models. Also, make sure to look for exposure bracketing in your manual and not white balance bracketing or flash bracketing. If your camera does not have auto exposure bracketing, you can just put the camera on manual mode and vary the shutter speed so you have one image that is too bright, one that is correctly exposed, and one that is too dark.

Step 4: Load the images onto your computer but do not edit the individual images in any way yet.

Step 5: Open the 3 images in an HDR processing program. Once the images are blended into an HDR file, you won't see any difference at all because almost all current computer monitors are incapable of properly displaying it. If you don't have an HDR processing program, go to [www.hdrsoft.com](http://www.hdrsoft.com) and download the program called Photomatix. They offer a free trial if you'd like to test it out before buying. There are other programs available, but Photomatix has consistently outperformed the other programs for several years. Once you download the

program, click “Generate HDR Image” and then choose the three pictures you want to blend together. The process will take approximately 30 seconds depending on the speed of your computer.

Step 6: Make the proper tonemapping adjustments to the image in HDR processing software. This is a trial-and-error process. Each adjustment dial has a specific purpose, but the results of each are readily visible. So an easy way to learn is by simply playing with the settings.

Step 7: Click File > Save As. Save the tonemapped file as a jpeg. At this point, you may be happy with the image and you can quit, but I usually receive better results when I take the tonemapped image into Photoshop and blend the HDR with one of the original single images. More on this blending technique later.

### **What Software Do I Need to Create an HDR Image?**

You need specialized software in order to make an HDR image. The software blends the three or more images together and allows the image to be tonemapped for easy viewing. There are four main options for HDR processing software:

#### **Photomatix**

I have never met a professional HDR photographer who uses anything other than Photomatix. Photomatix is created by a company called HDRSoft. Although other programs are improving, Photomatix has tonemapping capabilities unlike any other program. When I created my first HDR, I first tried four other programs and simply couldn't get the image to look right. Then I switched to Photomatix and suddenly the process was simple and I produced beautiful shots. Photomatix costs between \$40 and \$100 depending on which version you purchase.

#### **HDR Effex Pro by Nik Software**

I was very impressed with this program when it was released. It offers unique controls which are useful for HDR photographers such as localized adjustments with sliders as well as superior presets; however, in my opinion, the tonemapping process is still imperfect and I often feel limited in the results I can create using HDR Effex Pro. HDR Effex Pro is a good option for photographers who want simplicity in an HDR program, but may not be the best option for serious HDR photographers.

## **Photoshop CS5**

Photoshop has the ability to produce HDR images, but the software was not usable until Photoshop CS5. CS5 has greatly improved its ability to produce HDR images, but it lacks the wide range of tonemapping controls offered by Photomatix. In my opinion, Photoshop is still not a viable HDR processing solution for serious HDR photographers.

## **Qtpfsgui**

No, that's not a typo. Qtpfsgui is a free program which allows users to create HDR images. Unfortunately, this program is difficult to use and does not compare, in terms of quality, with Photomatix; however, if you're just dying to try HDR and you can't lay down the money for Photomatix or Photoshop CS5, it may provide an alternative.

## **Pseudo-HDR**

A significant limitation to HDR photography is that the photographer must take 3 or more separate images of the same scene, which precludes using HDR in situations where something in the image will move during the capture of the three photos. Fortunately, pseudo-HDR photography allows photographers to take HDR images even in situations where something in the frame moves. A true HDR, where three or more images are taken, is ideal because the separate images allow for detail to be captured even in the brightest and darkest areas of the picture; however, photo editing software allows a photographer to take one image and change the brightness or darkness of the image to create three separate images. If the photographer shoots in RAW, the photo file contains approximately one stop of light information that is not being used in the final image. JPEG files do not carry extra light information, so changing the exposure of a JPEG after the fact will always produce noise and irregularities in the image.

To create a pseudo-HDR, the photographer takes one image into Photoshop or Lightroom and saves it in three different settings: one in which the exposure has been reduced to produce a dark image, one where the exposure is correct, and one image where the exposure has been changed in Photoshop to make the image brighter. Each of the files are saved out as TIFF files (not JPEG, because a JPEG image is compressed and detail will be lost). After this step, the photographer brings the three images into HDR processing software and follows the normal steps to create an HDR.

While pseudo-HDRs are not as ideal as true HDRs because the single image which is saved out at different settings will not have as much detail in the brightest and darkest areas of the image, it is a good way to get the HDR “look” in situations where it is not possible to take three images of the moving scene.

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## **Chapter Two: HDR Post-Processing**

If you skipped Chapter One, or slept through it, you might be surprised when I say that this chapter will only cover HDR post-processing using Photomatix software, rather than Nik, Photoshop, or other options described above. The answer is that after extensive use, testing, and polling, I have rarely found a serious HDR photographer who uses anything other than Photomatix to process HDRs. It is the industry standard and, in my opinion, head-and-shoulders above the competition in terms of the results it achieves. However, if you use a different HDR processing option, you will still pick up many of the fundamentals in this chapter.

### **HDR Post-Processing in Photomatix**

By this point in the book, all of you should know how to create a basic HDR photo, but perhaps your tonemapping skills are still somewhat unpolished. This chapter will help with that by explaining how each slider and setting in the tonemapping process will affect image quality.

Every HDR program will offer a different set of tools to tonemap an HDR. In this explanation, we will focus exclusively on the tonemapping process in Photomatix. The reason for this choice is that Photomatix is the most-used HDR program and, in my opinion and in the opinion of most HDR photographers, the best program available. If you use another program, you will likely find that much of the information in this chapter is still applicable.

### **Preparing to Tonemap**

Before tonemapping, the photographer needs to load the bracketed photos into Photomatix. What should be loaded, a RAW file, a TIFF, or a JPEG? All of these file types are accepted in Photomatix, but the best answer is a TIFF. A RAW file captures the most information in a scene, so that is what we should shoot in the camera; however, RAW files cannot be tonemapped



directly. They must be changed to either a TIFF or JPEG first, and then the new file is tonemapped. If you load the RAW file directly into Photomatix, the software will--behind the scenes--create a TIFF out of the RAW file and then allow you to tonemap the TIFF. Photomatix generally does an acceptable job of converting a RAW to a TIFF, but not as good as Photoshop, Lightroom, or the proprietary software by your camera manufacturer that came on a DVD with your camera. If you're fanatical about image quality, first open up each of the photos in the HDR sequence in either Photoshop, Lightroom, or the software that came with your camera, then save out a copy of the RAW file as a TIFF. Then load those TIFFs into Photomatix for tonemapping.

At this point, eagle-eyed readers have probably noticed that, although this chapter is titled "Tonemapping Like a Pro," we haven't actually discussed tonemapping yet. Don't give up yet. We're getting there, but there are a few tips that are important to cover as we get there if you want to get the best image quality.

The next box to appear in front of your quizzical eyes gives options for aligning source images, reducing noise, de-ghosting, and reducing chromatic aberration. The "Align Source Images" button should always be left checked. While some of the settings in Photomatix should not be used unless the photographer knows there is a problem to be fixed, this feature is very accurate in aligning the images. I personally see no down-side to always leaving this option checked as a simple belt-and-suspenders approach to ensuring that the wind (or the photographer...) has not bumped the tripod while the HDR sequence was being recorded. I have not noticed any difference between the "by Correcting Horizontal and Vertical Shifts" option and the "by Matching Features" option. Both methods seem to perform equally in my eyes.

The "Reduce Chromatic Aberrations" button can be a helpful setting. What exactly are chromatic aberrations? It is an oddly colored thin line on the edge of any object in the image where there is deep contrast between the object and the background. Chromatic aberration is not a problem with the camera, but a fault in the lens. High-end lenses use specialized elements (pieces of glass) in the lens to combat this phenomenon, but the problem still persists on many images. Chromatic aberration generally cannot be seen on an image from afar, but if the photographer zooms in to a 100% view of the picture, the problem is usually obvious. This will

affect your image if it is going to be used very large on the web, or if printed out in a size larger than 8 X 10". For smaller versions, the problem is usually not noticed.

The "Reduce Noise" feature on the same page in Photomatix is always a question mark. The benefit to using this feature is that it is conveniently placed. By simply checking one box and choosing what percent strength should be used, Photomatix will reduce the noise on all three images before processing; however, Photomatix does not reduce noise nearly as well as the latest versions of Photoshop/Lightroom, nor the many third-party noise-reduction plugins such as Noise Ninja or Nik Define. So this option is a personal choice. For maximum image quality, reduce noise on the source images in a different program before bringing the photos into Photomatix. For convenience, simply reduce noise in Photomatix. No matter which option you choose, it is always preferable to reduce noise on the source images before bringing the photos into one HDR file, because the noise will be randomly placed on all three images and not uniform.

The third major option on this screen is whether to reduce ghosting. Ghosting is a strange ghost-like look on an image or parts of an image which is caused by items in the scene moving as the three or more images in the HDR sequence are shot. If you know that nothing moved in the picture (for example, you shot a brick wall), then obviously there is no reason to choose this option; however, if anything has moved significantly in the photos then this setting will greatly improve the resulting HDR. The best option is to choose the semi-auto method. This will bring you to a new screen which allows you to select which areas in the photo are ghosted, so that the de-ghosting will only affect the problem areas. On this new screen, simply click and drag a circle around the ghosted areas, then let off the mouse and right click inside the circle you made. Choose the option, "Mark as ghosted area." Multiple ghosted areas can be selected.

Many photographers skip over the box in Photomatix that reads, "Show intermediary 32-bit HDR file." This is un-checked by default in Photomatix 4.0 because the 32-bit file will show is a really strange-looking picture since it is not yet tonemapped. Our computer screens are not capable of showing this 32-bit file correctly, so we have to tonemap the file for it to look correct; however, this is a valuable box to check. By showing the intermediary 32-bit HDR file, photographers can go to File-Save As to save out a copy of the .hdr file after aligning, reducing noise, and de-ghosting. This is valuable for when the photographer wants to tonemap two

different versions of a scene, and then blend the two versions together in Photoshop. On most of the HDR photos I create, I process at least two or three different tonemapped HDRs and then blend them together in Photoshop so that I can use the best tonemapping settings from all of the versions.

When saving out the intermediary 32-bit HDR, Photomatix will present you with three possible format choices: .hdr, two different types of .exr, and floating point .tiff. Just take my word for it, you want to save the .hdr file. While the .hdr file is not as widely accepted by digital image editing programs as .tiff, Photoshop, Lightroom, Photomatix, and many other industry-leading software makers support it.

### **Tonemapping in Photomatix**

Wahoo! We're to the point where we can discuss tonemapping. For many of you, this may have been the primary reason why you chose to purchase a book about HDR photography.

Tonemapping is actually a fairly simple procedure, but understanding exactly what each slider does will greatly improve your image quality and prevent common problems.

When tonemapping HDR photos, photographers should generally create an HDR that looks slightly more over-processed and painterly than you like. Later, after tonemapping the HDR, the over-processed photo can be made more realistic in Photoshop. This allows photographers to take full advantage of the HDR process while still achieving realistic results.

The first item of business when your photo reaches the tonemapping page in Photomatix is to check the presets. The presets in older versions of Photomatix were mostly useless, but in Photomatix 4, the presets are a time-saver. Under your photo, you will see a film strip of several versions of your photo. Simply click through these presets until one of them looks similar to the photo you would like to create. This is a good starting point for your tonemapping.

Now you can start using the sliders on the left side. While all of the sliders have some utility, most of the time you will only need to adjust the first five sliders. The rest of the sliders can be helpful in certain limited situations, but generally Photoshop accomplishes the other settings as well or better than Photomatix.

## **The Fabulous Five Settings**

The first setting on Photomatix's tonemapping page is "Strength." The strength setting affects the amount of both local and global contrast enhancements in the photo. The more you push the slider to the left, the more raw and natural the photo will look. If the strength is put on the right, in the 50 - 100 range, the photo will look more like the processed HDR that we are trying to accomplish. A good general rule is to start with the strength set to 90 and then see if any adjustment needs to be made. Keep in mind that pushing the strength all the way to the right (in the 95 - 100 range) can have the negative effect of introducing grain into the photo.

The next setting is color saturation. The amount of saturation in the photo depends entirely on the photographer's preference. I generally prefer heavily saturated colors, so this setting is generally pushed to the right when I tonemap HDR images.

The luminosity setting affects the brightness of an image. Photographers should take great care in adjusting this setting. Any adjustment of luminosity more than a minimal bump in one direction or the other can destroy the quality of the photo. Pushing luminosity to the right will brighten the image, while moving the luminosity to the left will have the opposite effect. If you are unsure whether the luminosity needs to be changed, leave this setting at the default.

Next is the micro-contrast setting. Micro-contrast is the differentiation between fine details in an image that are only slightly varied in contrast from fine details in the surrounding area. In a general sense, this means that micro-contrast affects the contrast in the mid-tones of the photo and gives the appearance of sharpness in the photo.

By far, the setting which has the greatest impact on the look of an HDR is the smoothing setting. There are two ways to input a smoothing setting in Photomatix. The first is to use the default slider. The second method, which is the method which I feel produces the best results, is to select the "Light" mode check box and select one of the settings from that menu. The light mode produces less realistic results, but gives a pleasing look to the image. In either smoothing mode, a lower value (to the left) will create a more surreal look, whereas a higher value (to the right) creates a more realistic look. If you select a low smoothing mode (to the left), the tones in the image will be spread. This is a powerful tool for landscape photographers in working with clouds. Choosing a low smoothing mode value will deepen the darker tones in clouds or in the sky and brighten the lighter tones. This creates dramatic clouds unlike any other photographic

tool. While the smoothing setting is handy for increasing the drama in a photo, it also creates halos around hard lines (like roofs or buildings). Haloing is discussed in greater detail later in the book.

Note that the slider mode for adjusting the smoothing setting is only in version Photomatix version 3.2 and above.

### **The “Other” Tonemapping Settings**

All sliders after the first five in Photomatix accomplish image enhancements which can also be performed in Photoshop. Also, for each of these settings, Photoshop gives the photographer greater control in adjusting these settings. For this reason, the remaining Photomatix tonemapping settings will only be covered briefly for your information.

The white and black point settings control what portions of a photograph’s brightness levels are clipped as being completely white or completely black. Rather than adjusting this setting in Photomatix, it is recommended that this setting be adjusting using Photoshop’s levels and curves tools, which can adjust this setting with greater precision.

Gamma adjusts the brightness of the midtones in a photo, but creates significant noise as it does so. This can be adjusted with more precision using Photoshop’s curves and levels adjustments, where noise will not be added to the photo.

The highlight saturation and shadow saturation settings adjust the richness of color in the highlights and shadows. Photoshop can adjust this setting, but it is inconvenient to do so; however, I have honestly never run into a situation where I felt it necessary to adjust this setting. Most of the time that I run into a photo that needs less saturation in the highlights, I end up processing another HDR just for the highlights (like the sky) anyway, and then I blend the HDRs together in Photoshop. This obviates the need for this setting and produces better results.

Not surprisingly, the micro-smoothing setting does the opposite of the micro-contrast setting. The only practical benefit to this setting is to use it for noise reduction. Reducing the local contrast can reduce noise, but with the loss of fine details in the image. In my experience, other noise reduction tools perform this function with greater protection of fine detail than the micro-smoothing setting. Photoshop CS5, Lightroom 3, Noise Ninja, and Nik Dfine are all excellent options to reduce noise and all of them perform better than the micro-smoothing setting.

Highlight smoothing and shadow smoothing do the same thing as micro-smoothing, but only on the highlights or shadows. This is another common way to reduce noise in HDRs, but it is not recommended. There's no need to smudge the life out of the shadows just to reduce the noise.

If you use the tone compressor tonemapping mode, you will also see settings for color temperature. This is simply a white balance adjustment. It makes no difference whether you adjust it in Photomatix or later in Photoshop.

### **Tips for Adjusting Tonemapping Settings**

With so many sliders in Photomatix, it can be daunting to know what to adjust and what to leave at the default. Hopefully the explanation of each slider will aid you in understanding what each slider does to the resulting photo. In addition to this explanation, there are a few more tips that you should be aware of when making adjustments in the tonemapping window.

First, as soon as a photo is displayed in the tonemapping window, a histogram pops up.

Whenever we get a pop-up on the computer, we are trained to immediately annihilate it with the little "x" at the top-right of the window. In this case, however, you will want to leave the histogram on your screen. The histogram provides you with a visual representation of what each slider is doing to affect the image. The histogram shows each brightness level in the image and displays how much data is found at each brightness level. The data toward the right of the histogram represents bright pixels, and the data toward the left of the histogram represents dark pixels. When any portion of the graph touches the edge of the graph, it means that the pixel is either completely white or completely black depending on what side it touches. Having this information at your disposal allows you to have a better understanding of what each slider does. For example, you can know when a slider is affecting the contrast in the image because the histogram will spread toward both ends of the the graph. If you choose to adjust the white or black point, you will be able to see how much data is being clipped on either end of the graph.

You may find that you end up making the exact same changes to most of your HDR files.

Tonemapping is a matter of personal taste, so you will eventually know what settings will make the file look like the type of image you enjoy. To save yourself time in tonemapping, you can save a preset of your settings for later use.

### **What About that Exposure Fusion Stuff?**

Many photographers often wonder what the exposure fusion method in Photomatix does different than the traditional tonemapping method, and if exposure fusion has any utility. For those of you who are technically minded, you will be interested to know that exposure fusion works by using a weighted average algorithm which effectively chooses the highlight details from the underexposed image and the shadow details from the overexposed image. Because exposure fusion uses simpler algorithms than the traditional tonemapping method, the resulting images are usually less noisy; however, in practice, the exposure fusion method rarely produces the stunning “HDR look” that most HDR photographers desire to achieve. This method can be useful, however, when a photographer wants to create an HDR image that looks completely natural and unprocessed.

### **Why are my tonemapped images so noisy?**

Believe it or not, your images may not be noisy at all. I know what you’re thinking, “No, they are. I can see the grain on the tonemapped photo. It’s definitely noisy.” You’re right and wrong at the same time. Allow me to explain why the image may not be noisy.

Noise and grain are not the same thing. Noise is captured in the camera when stray electric signals are misconstrued by the camera as being light. The same thing happens when you use an old-school audio cassette. If the sound is quiet, you turn up the volume on the cassette player, and when you do so, you hear fuzz along with the sound of the voice on the recorded audio cassette. This occurs because the player confuses stray electric signals as being the source sound.

Sometimes you can capture perfectly noise-free and clean digital source files by using ISO 100 and short shutter speeds, but when you process the HDR, the result is a very grainy image. Is the grain caused by the camera confusing stray light signals as light? No. This grain didn’t exist on the source images at all. This grain is caused by Photomatix when you tonemap the HDR file improperly.

There are many sliders which, if used to too great an extent, can cause grain on the image even if the source files were perfectly noise-free. Your secret weapon for combating excessive grain in your HDR images is the 100% preview. Simply click on any area in the large preview of your image while in the tonemapping window and you will see a loupe appear which shows a

zoomed-in view of a small portion of the image. That 100% view will always have some amount of grain when tonemapping, but the key is to keep the grain to a manageable level.

The first and foremost setting to manage is the smoothing setting. Choosing Max or High will produce significantly less noise than Min or Low.

The second most important setting is the strength setting. While a high value produces that stunning HDR look that we are searching for, it also adds to the amount of noise in the photo. Lowering the strength also lowers the amount of compression in the photo, which affects the amount of grain.

Luminosity and gamma are both tools which affect the brightness of the image. As was discussed above, it is best to leave these settings where they are or, if necessary, only adjust them slightly, to reduce the grain. Generally, it is best not to touch these settings at all and adjust the brightness in Photoshop.

The last setting which significantly affects the grain is the micro-contrast. The micro-contrast accentuates fine details, but it also adds to the amount of grain in the image. Like most of the settings in Photomatix, this setting is a trade-off between detail and grain.

There are other settings which can affect the grain in an image, but they have less impact on the amount of grain than the settings mentioned here. To know which settings can also affect the grain in the image, refer to the tip above about using the loupe view to carefully monitor the amount of grain as you tonemap.





### **Chapter Three: Black & White HDR Photography**

You might be wondering why I put a chapter about black-and-white HDR photography so early in the book. The answer is that it is one of the best ways to start out in HDR. When converted to black-and-white, many common mistakes that amateur HDR photographers make are covered up when the file is converted to black-and-white. Also, if you have not yet had your first successful HDR photo, then your luck will probably change when you try a black-and-white HDR.

Many of the most stunning black-and-white images I've ever seen were HDRs. Black-and-white photography allows the viewer of photographic works to dismiss one of her eye's most prominent senses—color. Removing this crutch, a photographer's work must stand on its own two feet. Those feet, in this case, are composition and contrast. HDR will bring out the details in the highlights and shadows of an image. This is especially important in black-and-white, where any loss of detail turns to a black abyss or a distracting white patch.

The first step in shooting black-and-white is to ask why. If there is no reasonable purpose for removing color, your photo will most likely be stronger in color. This is not to say that black-and-white is a last resort, but rather to emphasize that most people enjoy color photos in many circumstances.

There are good reasons to choose black-and-white. One perfect use of black-and-white is to simplify a shot with many distracting elements in it. Another use of black-and-white is in a photograph with fine detail and high local contrast throughout the scene. For example, if you are photographing a pine tree in front of a lake, the tiny needles of the tree may be a compelling subject, but would otherwise become lost in a sea of deep green if the photo were shown in color. On the other hand, a black-and-white photo of a desert may not be as amenable to black-and-white in some instances because there is less detail in the scene. These generalized principles of black-and-white photography are mentioned for your reference and because they are principles that I consistently observe as being violated in the photography I see on a day-to-day basis. But what about HDR? What tips can you apply to your HDR photography to improve black-and-whites?

### **Six Black-and-White HDR Tips**

Tip #1: Viewers of photography can spot an over-done HDR from a mile away. In black-and-white photography, however, the viewer is seeing a scene that he or she has never experienced. People don't see in monochrome, so the photo is not expected to look natural. For this reason, it's generally acceptable to slightly increase the strength of the HDR effect in black-and-whites in order to highlight fine details without making the viewer nauseous.

Tip #2: Black-and-white photos almost always improve by including some tiny portion of the photo that is pure white and some tiny portion of the photo that is pure black. In essence, this involves stretching the spectrum of dynamic range to emphasize variation. This can easily be accomplished with Photoshop's levels and curves tools.

Tip #3: Black-and-white HDRs require using Photoshop curves every time. HDR is capable of capturing the sky between clouds in a way that traditional photography cannot. Highlight this fact by turning down the brightness of the plain sky between the clouds to a near-black. This adds incredible drama to any landscape and the HDR process will protect the surrounding clouds from being effected by this edit.

Tip #4: Crop in slightly more than you are accustomed. Landscapes with color are often wider to show the change in colors in the sky. In black-and-white, color is no longer an issue. Cropping in a little tighter than normal will allow for finer details to be shown. For example, shooting a lake with trees around it from afar will not afford any tiny detail in the trees because it is too far

away. They will simply appear as triangle shapes. Since black-and-white is about highlighting fine detail, cropping in a little tighter will bring out the tiny details in the landscape you are photographing.

Tip #5: If you want to shoot in black-and-white but can't find a good foreground element with fine detail to include in the landscape, use the widest-angle lens you have and include the ground in the landscape. This technique will not only draw the viewer into the photo by making him or her feel as though he or she is standing there on that ground, it will also give you a great foreground element with fine detail to record in HDR. Whether it be dirt, gravel, grass, a road, or anything else, the ground will always have fine detail when you're outside.

Tip #6: Especially with HDR black-and-whites, never convert to black-and-white by desaturating the image. This will destroy the fine detail that you worked hard to record. The proper method for converting to black-and-white in Photoshop is to simply use the black-and-white filter under the layers palette. Also, you may consider using Nik Silver Effects Pro. While this software is expensive, it will convert your color photos into black-and-whites unlike any other program in the world (and I'm not getting paid to say that). I can generally tell when I see a photo that was processed with Silver Effects Pro. They stand out in a way that I have never succeeded in re-creating in Photoshop.

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## **Chapter Four: Creating Clean HDR Photos**

I am personally fanatical about image quality. I think this comes from my (admittedly limited) experience in stock photography. Micro-Stock photography means shooting images which can be purchased by companies or organizations to use in their advertisements. To sell micro-stock photography, the images must be accepted by eagle-eyed editors who either accept the images or, more often, reject the images from being included in their databases. If there is any minor flaw, no matter how minimal, the editors reject the image.

Having shot micro-stock I have become aware of how several seemingly minor problems in an image can end up destroying the clean look of a photo. If, on first glance, the following topics seem unimportant to you, consider the fact one tiny mistake might not destroy the image, but several little mistakes often combine to create HDR images which are noisy, grainy, and unnatural. Learning to follow these fundamentals will aid you in creating clean HDR photos, and your viewer will be able to focus on the scene rather than the technical errors that distract them.

### **Lens Imperfections**

HDR processing is still somewhat primitive. The process can create beautiful photos, but will also add noise, halving, accentuated vignetting, and chromatic aberration. To minimize these negative side-effects, edit each photo in the HDR sequence before processing them into an HDR.

On each of the three or more exposures, use Photoshop to reduce chromatic aberrations and remove noise, then combine the photos to make an HDR and tonemap. These basic edits, noise and chromatic aberration removal, are the only two edits that should be done to the photo before processing the HDR. If color saturation, contrast, or any other number of edits are made to the image prior to HDR processing, the resulting HDR photo will over-accentuate these changes.

HDR will emphasize any detail it sees. This includes dirty lenses and sensors. When shooting HDR, carefully check for a dirty camera before shooting. An easy way to tell if your camera/lens is dirty is to slightly under-expose a piece of bright white paper and use a high aperture. At a low aperture, often dirt is not visible on the final image, but high apertures such as those used in landscapes will show dirt or dust more prevalently.

### **Mitigating the Halo Effect**

Halos are a way of life for HDR photographers who enjoy the nauseating look of over-processed HDRs. Nevertheless, this subject deserves the attention of any HDR photographer because all (and I mean all) HDR images have halos—even if the effect is only slight. Eliminating halos is one of the more difficult post-processing techniques for photographers to accomplish because HDR makes halos a part of every aspect of the image even if they aren't readily visible. The following techniques will at least aid you in minimizing the effects of halos when they become noticeable. Haloing is usually most noticeable around a large subject in the photo such as a statue, the horizon line, or a mountain ridge.

When processing an HDR, carefully monitor the threshold setting. This setting improves the contrast in the image, but it is also largely responsible for the presence of the halo effect because it emphasizes the contrast between a dark and light subject by creating a halo around the dark subject. A high threshold value will improve the local contrast in the image, but also increases the presence of halos. Also keep in mind how the radius value impacts the threshold. The radius value controls the distance between local contrast adjustment and global contrast adjustment, and is therefore determinative in what the threshold value will affect.

### **Eliminating the “Flat, gray Look”**

HDR processing has many negative side-effects on pure image quality. One of those side-effects is washed-out, flat, and gray-looking mid-tones. Capturing shadow and highlight detail in scenes with high contrast often produces this flatness and gray-cast in the mid-tones of the image. This

is caused by the tonal compression resultant in the HDR processing and reduces local contrast. To eliminate the gray look, first go to the threshold settings and try to increase the value without creating too significant of haloing. This will usually help slightly, but not fix the problem entirely.

The way to change this is by performing a curves adjustment. This will change the overall tonal range of the photo—eliminating the washed out look. In my personal experience, I have seen that almost every HDR image benefits from levels and curves adjustments.

### **Ghosting**

Ghosting is a negative effect that is shown in true HDR images where something in the scene moves between the shots. Ghosting is always a problem when shooting HDRs of objects that move even slightly: trees blowing in the wind, moving clouds, ripples on water, etc. The obvious solution to this is to shoot a pseudo-HDR where only one shot is used; however, there are other ways that photographers can minimize the effect of ghosting which may allow for true HDR to be shot in more situations.

One way to reduce or eliminate ghosting is to get a fast camera and a fast memory card. Some of the delay between photos may be caused by the slow processing power of the camera. Similarly, if a knock-off, slow memory card is used, the camera may have to wait for it to write the data to the card before it can shoot the next shot. Therefore, using a fast camera and memory card can reduce ghosting in some situations by allowing the camera to take the pictures closer together.

The single best technique for reducing minor ghosting in an image is to use a professional tripod. No, your \$100 tripod is not a professional tripod. I learned this lesson while shooting an old truck in Utah in low-light with a fairly long lens. I was still beginning my journey as a photographer and I had a \$100 tripod and thought I was set. As I watched the camera shoot, I could physically see the camera vibrating from the mirror flipping up and down rapidly. When I looked at the images—sure enough! The images were not sharp and there was some ghosting around the edges of the car. This minor ghosting can make a tremendous impact on a photo by making hard edges blurry.

A proper professional tripod for HDR will hit you in the wallet, but is irreplaceable in terms of getting sharp and ghosting-free images. Reputable companies such as Manfrotto, Induro, or Gitzo (as well as several others) will consistently produce solid tripods. However, even these

companies make some lower-end tripods that probably won't produce solid stability for your DSLR. The ballhead is equally as important. When purchasing a ballhead, look for a name-brand that you trust and recognize you're your gear should only weigh half of the advertized "maximum weight" the ballhead can support. Ballhead manufacturers typically exaggerate how much weight their ballhead can support. A solid professional tripod and ballhead are the most important pieces of gear you can buy to improve your DSLR's image quality.

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## **Chapter Five: HDR Portraiture**

I doubt that there are many photographers who enjoy HDR photography more than I, but I rarely see HDR portraits that I can stomach. Almost every attempt at the technique results in a dirty-looking face with cartoon-like features on a beautiful model. It simply does not look right. I believe that I'm not alone in the opinion that HDR portraits just don't cut it; however, there are a select few HDR portraits that seem to work well. I spent a long time one day trying to figure out why some HDR portraits were so compelling and others were so nauseating. The key will unlock an important foundational principle for your study of HDR.

HDR is an effective photographic technique because of the way it brings out fine detail and contrast. Skin, however, is fairly smooth. HDR accentuates tiny details in the skin such as wrinkles, pores, blemishes, etc. For this reason, most people don't want to see images of themselves in HDR. However, HDR portraits do have their place. You have undoubtedly seen a captivating photo of an old man in a third-world country in HDR with the heavy wrinkles in his face darkened. Notice that HDR images such as this are captivating because it is the detail and contrast that makes the image captivating.

Suppose you are shooting a beautiful model and you would like to use HDR. You now know the HDR effect will make her skin look coarse and any blemishes will be accentuated. Are you out of luck? No. The answer is simply to mask in the model using the correctly-exposed photo. This will show the model from the non-HDR photo and the background in front of and behind the model will be in HDR. By doing this, you will achieve smooth skin and still be able to use HDR as an artistic choice on the background.

Some images are more suitable for HDR than other images. If a photographer simply shoots a traditional portrait in bracketed exposures and processes the file, it will often produce an unflattering portrait. Other than the reason already mentioned, another important consideration is that portraits almost always include shallow depth-of-field.

Photos with shallow depth-of-field are generally not as amenable to HDR. The quality of the creamy blur created in images with shallow depth-of-field is called bokeh (generally pronounced "boh-KAY"). The principle underlying short depth-of-field is that de-emphasizing distracting elements in an image focuses the viewer's eye on only the most important area of the photo; the HDR effect produces the opposite effect. HDR accentuates detail in every area of the image.



This conflict between the fundamental purpose of short depth-of-field and HDR can destroy an otherwise beautiful photo. It would be an exaggeration to say that no photo with short depth-of-field can be enhanced with HDR, but this is a strong general rule. To prove the point, look through a collection of HDR photos online for fifteen minutes and you'll quickly see that short depth-of-field is rarely used successfully.

In HDR portraiture, if an image is shot with short depth-of-field, it will almost universally produce an ugly bokeh because the HDR process will attempt to increase the contrast and detail in a portion of the image that has little detail. The answer to this problem is generally to avoid short depth-of-field entirely. This is an important consideration when choosing locations for HDR portraiture. Shooting a model outside in nature where the scene is as important as the model will produce better results than shooting the same model in a building with distracting elements that would normally be controlled with depth-of-field.

Because HDR portraiture generally should not contain short depth-of-field, solid composition is vital to any HDR portrait photographer because the emphasis on focal point of the image must be achieved by means other than short depth-of-field.

### **Quick Tip!**

Any HDR photographer knows that HDRs should always be shot on a tripod; however, sometimes even a sturdy tripod won't keep the camera steady for a long exposure. For example, tripod legs often shift on sand at the beach or on wet dirt near a lake. When shooting on a shifty surface such as sand, bring three plastic saucers to put under the tripod feet. This will spread the weight of the camera gear and tripod and give you a more solid footing for long exposures that are often required in HDR photography.

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## **Chapter Six: Proper Exposure for HDR (Trickier than you might think!)**

In photography, a histogram is a graph showing a visual representation of the brightness levels in a photo. Most DSLRs are capable of displaying a histogram of the brightness levels in a photo. Photographers use the histogram on their DSLRs to determine if any area of the photo is under or over-exposed. Generally, photographers want a histogram that does not touch either end of the graph and that leans slightly to the right; however, if your histogram looks the same for an HDR photo as it does for a traditional image, you are doing it wrong. This is one of the most common mistakes made by advanced amateur HDR photographers, and it causes significant problems in the resulting HDR photo. While many photographers leave exposure to chance and simply choose the auto exposure and then bracket one photo to two stops over-exposed and another photo to two stops under-exposed, better results can be obtained by paying a little more attention to the exposure of the photos.

Some background information is necessary before moving on to what an HDR histogram should look like. Cameras, unlike humans, record information linearly. When a human sees nine candles and a tenth candle is added, the room does not appear to be 1/10th brighter to our eyes. That's good news for us, because we would go blind if we walked into a room with too many candles in it. The same principle is true of all human senses. For example, if one person is shouting in a football stadium, it will not be twice as loud to us if another football fan starts shouting.

Otherwise, we would go deaf if we walked into a football stadium full of screaming fans. Cameras, on the other hand, record information linearly. They simply record how many photons are present. When a camera sees nine candles and one is added, the image is 1/10th brighter.

What does this mean? Well, a 12-bit RAW file can record 4,096 light levels. If you take a photograph of a scene with 6 stops of dynamic range, half of the light levels will be used to record the first stop of light, half of the remaining light levels will be used to record the second stop of light, etc. This means that the last stop of light only has 56 light levels remaining to record it. The low number of light levels recorded produces shadows that are inaccurately recorded and the noise in the dark areas will be greatly accentuated.

Noise is one of the most difficult problems with HDR photography. By correctly exposing the dark images in a bracketed sequence, the noise levels in the shadows can be minimized. This can substantially impact the quality of a photo.

For a traditional photo, photographers err on the side of the clipping shadows rather than highlights. Also, highlight information is given special attention so that it can be recovered in post processing if lost. Therefore, a histogram should lean slightly to the right of center for a traditional photo. Because the camera exposes linearly, the most information will be captured with a histogram leaning to the right.

In HDR, the name of the game is information. Suppose you choose to shoot a picture of a river on a sunny day. The first picture taken, the correct exposure, should have a histogram identical to a histogram for a traditional photo. The histogram should lean to the right as much as possible without actually touching the right side of the graph. The second photo, the under-exposed picture, should contain most of the information on the left side of the histogram, and no portion of the graph should touch the right side. The third picture, the over-exposed image, should contain the most of the information on the right side with no portion of the graph touching the left side.

By giving the highlight and shadow shots more information in your HDR photography, noise will be reduced and finest details in the highlights and shadows will be given greater detail—which is the whole point of HDR. Many photographers employ exposure bracketing when shooting for HDR and assume that the dynamic range is covered automatically, but the reality is that many scenes have a greater dynamic range than expected. Carefully employing the

exposure techniques discussed in this chapter will dramatically increase the number of “keeper” photos from any given shoot.

Using this information about proper HDR exposure, photographers need to check the histogram and ensure that the highlight and shadow shots have “humps” toward the sides of the histogram. Also, the dark shot should never clip any highlights and the light shot should never clip any shadows. If the hump is off to the wrong side, consider changing the exposure slightly or reshooting that shot in manual mode with a slightly different shutter speed.

### **How many photos are needed in an HDR sequence?**

Photographers have debated for years how many photos are necessary for an HDR sequence. Some advocate use three images, others five, still others seven or nine. The truth is that the determination depends entirely on the dynamic range of the scene. Scenes with a greater dynamic range require more shots. How can one know if he or she has covered the entire dynamic range? Turn on the histogram and check to see that the bright photo does not clip any shadows, and the dark shot does not clip any highlights.

I have found through personal experience that most landscapes can be captured with three images. Having extensively tested 5 and 7 shots in HDR sequences, I have not personally seen a benefit to the technique in most situations. It seems that 95% of all HDR sequences will accomplish professional results with only three exposures which are spread by two stops. However, if you having trouble with noisy HDR images, try shooting more shots so you’ll have more information in the darker regions of the photo.

### **Quick Tip!**

Though it may seem ironic to mention in an HDR photography book that HDR is not always necessary, you should be aware that a graduated neutral density filter can often allow a photographer to cover the dynamic range of a scene without any post-processing or bracketing. For example, if you’re shooting an image of a mountain range an hour before sunset, the mountain will be much darker than the sky. A graduated neutral density filter will darken the sky and leave the mountains untouched. Therefore, it is a natural method of capturing a scene with high dynamic range in one photo without any post-processing. Sometimes, however,

photographers still prefer using HDR in such situations because they prefer the effect, but they shouldn't feel compelled to do so because a graduated neutral density filter offers another alternative. Not sure what a graduated neutral density filter is? If you've ever been in a car, you already know. Windshields have tinting at the top that fades to clear. This is exactly what a graduated neutral density filter does.

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## **Chapter Seven: Combining Multiple HDR Images to Create Panoramas**

Stitched panoramic images really impact viewers. Viewers of photography are used to seeing only a small part of a scene, so it is refreshing to see a picture which provides a wide angle view. The wide angle captured in a panoramic image is similar to what we are capable of seeing with our natural eyes. The wonder of a panoramic image is multiplied when HDR is used. Because the brightness of the sky changes somewhat drastically in wide panoramas, traditional photographs of panoramas often end up with a washed-out sky in part of the image. HDR is capable of easily handling a higher dynamic range, so a properly-exposed HDR image of a panoramic sky will not perpetuate the undesirable change in sky brightness to such an extreme degree. In fact, most panoramas will benefit from the HDR process for this reason.

Many panoramas only include a narrow (yet wide) slit of a landscape and ignore the higher clouds when photographing during the golden hours. By extending the panorama to include the higher clouds and portions of the sky, more dynamic range is introduced into the image and a

better photo will result. The panorama can be extended by shooting each shot vertically or making multiple rows of images.

Panoramic images are difficult to take because several images must be matched together without any seams or distortion. HDR adds significantly to this problem for several reasons: (1) the time delay in taking three images of each section of the photo adds to the probability that items in the scene such as clouds will move and create seams between the photos, (2) the file created by an HDR panorama can be quite large and will often crash the photographer's computer during post-processing, and (3) merging the stitched bright, dark, and normal exposures into 3 files will often produce differences in how the computer renders distortion correction and other parameters and therefore the three images may not merge easily.

When shooting HDR panoramas, use manual mode and do not vary the exposure between shots. If the exposure is altered in different sections of the panorama, that section will not fit in with the rest of the panorama—resulting in one panel of the image being brighter or darker than the rest of the image. This is especially important in HDR, where a slightly different exposure can drastically impact the resulting HDR.

The sheer number of photos taken in a true HDR landscape can sometimes make post-processing difficult. One tip to help identify when a sequence of an HDR panorama begins is for the photographer to take a picture of his or her hand or the ground to signal that the next shot will begin the HDR panorama sequence. Similarly, end the sequence with a shot of a hand or the ground. Applying this tip will help you know what images belong to the HDR panorama when you start post-processing.

When creating a true HDR panorama in which 3 or more shots will be taken of each section of the panorama, one must be extremely cautious not to miss any small slit of the scene. Otherwise, the dark and normal exposure may be on but the bright exposure could be missing part of the scene—ruining the HDR panorama. Photo-stitching software needs to overcome three main hurdles: the natural curvature of an ultra-wide scene, lens vignetting, and possible movements in the scene. While software can overcome these problems to some extent, you can adapt your photography to produce better results. One technique is to zoom in slightly when taking each image so that the vignetting and distortion is lessened.

## **8 HDR Panorama Tips**

#8. Move quickly. Clouds are moving, water is moving, trees are blowing, etc. Prepare everything and plan the shot before setting the sequence into action. Failing to move quickly will produce ghosting in the clouds or other moving objects.

#7. Purchase Photoshop CS5. The inevitable problem with panoramas is that the photographer inadvertently misses one small area of the scene as he takes the different pictures to be stitched together. Photoshop CS5 comes with a technology called content-aware fill which is absolutely incredible at filling in the missing pieces of a panorama.

#6. Most panoramas cover an area that is simply too skinny. By shooting multiple shots in portrait (with camera oriented up-and-down) orientation, you'll get more of the scene above and below the horizon line and you won't have to worry as much about moving up or down as you shoot the different shots. This will also catch more of the upper clouds and increase the dynamic range in the scene—making it especially amenable to the HDR process.

#5. As you rotate the camera along an axis on your tripod to photograph the different areas of the scene, keep in mind that the axis point around which you rotate must be correct. The correct point around which the camera should rotate in order to take a panorama is called the entrance pupil. Some photographers erroneously call this the nodal point, which is something else entirely. Your camera should be mounted on the point of the entrance pupil so that distortion in the image is minimized. This is particularly important when taking HDR images because any distortion in the images will prevent you from merging the three shots into an HDR file because they will not line up equally. Remember, rotate the camera along the entrance pupil and don't rotate your body with the camera. You can look up technical specifications of your lens online to find the location of the entrance pupil, but a general rule is that it is located  $\frac{3}{4}$  the length of the lens from the front element.

#4. Think about what photo stitching software has to do. The software must find which pixels on multiple images roughly resemble the same pattern and then match the two images together. You'll find that your software will correctly stitch the scene together if you overlap each image by about 20% in most situations, but HDR images should not be overlapped any more than absolutely necessary. Overlapping too much gives the software too much play in which picture to take for which part of the photo. Therefore, the correct exposure may take from one section on

the first panorama, but from another section in a later panorama. Then when the three stitched images are put together in HDR processing software, they will not be stitched together the same way, which can increase ghosting. For HDR, only overlap as much as absolutely necessary to allow the photo-stitching software to place the photos together.

#3. Vignetting is always a problem—especially on full-frame cameras. When the HDR files are merged together, the brighter exposure will accentuate the darkened edges of a photo more than the dark image will. HDR processing software interprets this as detail and will bring out the vignetting in the finished product. To mitigate this problem, run the file through the vignette removal tool in Photoshop before merging any of the photos into a panorama. Each image used in the panorama will require this adjustment if a lens with heavy vignetting is used. On many lenses, this will not be necessary.

#2. I've seen too many HDR panoramas in which photographers throw composition out the window. Just because your image is wide and covers a large dynamic range does not minimize the importance of good composition. Remember that almost all photographs need a clear subject in the foreground, a visible mid-ground, and a compelling background. Skip this fundamental at your photo's peril.

#1. Don't forget vertoramas when the lighting is less interesting. By combining multiple images which cover the vertical axis rather than the typical horizontal panorama, you will capture the sky and ground and create an image with high dynamic range. Give it a shot!

### **Quick HDR Tip!**

Polarizers aren't just for cutting through reflections in water and darkening skies, they also take the reflection off leaves—reducing the ugly mid-day glare on plants.

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## **Chapter Eight: How to Use Filters in HDR (not the same as traditional photography!)**

Before digital image editing, filters accomplished many tasks which could not be recreated in any other way, but in today's world, there are only three common filters: the neutral density filter, the circular polarizer, and the UV filter. A fourth argument could be made for the graduated neutral density filter, but it is generally not as important.

### **The UV Filter**

When you go to the camera store to buy a new DSLR, the store clerk will convince you to buy a UV filter. Because filters are not curved like the elements inside the lens, filters greatly increase the likelihood of getting reflections of sunlight bouncing around in the lens--causing lens flares. Cognizant of this fact, many photographers continue to use a UV filter, but this is a big mistake for HDR photographers.

Remember that HDR is all about picking up on any tiny bit of detail in a photo and accentuating it. Therefore, what might be a minimal lens flare on a traditional lens can be distracting in an HDR photo. For this reason, the UV filter simply isn't an option for the HDR photographer even if it can be tolerated in traditional photography. The best way to mitigate stray light from entering the camera and also to protect the lens is a simple lens hood.

Also, remember the section we covered on removing the “flat, gray look” from HDR photos? Essentially, that means adding contrast to HDR images. Using a UV filter makes the “flat, gray look” even worse because it removes contrast.

### **The Polarizer**

The polarizing filter is inarguably essential for the photographers; however, it introduces a few pitfalls for the HDR photographer. To introduce this issue, let’s take an example. You’re out in the middle of the day doing landscape photography (I know, I know... not ideal). You’d like to take some photos of the beautiful white cumulus clouds amidst the deep blue sky over a majestic mountain ridge. Without thinking, any landscape photographer would immediately reach for a polarizing filter in order to deepen the blue in the sky and brighten the fluffy clouds.

There’s a problem, though. If this scene is to be shot in HDR, the polarizer could jeopardize the photograph. Because the polarizer will brighten the white clouds relative to the sky, it often leads to slightly clipped highlights. That’s generally acceptable if it’s slight enough because the trade-off of having the contrast between the white clouds and the deep blue makes up for the minor highlight loss. If you haven’t noticed this clipping before, look at a dozen photos taken with a polarizer. You’ll see that many have clouds that just slightly clip the highlights. The HDR process is already capable of deepening the blue sky and brightening the cumulus clouds. HDR will allow for this contrast by taking a bracketed sequence of photos at various exposures. There is no need for a polarizing filter in this situation and it actually works against you by removing the detail in the highlights. Remember, the name of the game in HDR is collecting every bit of information in the scene and preserving it for the editing process. With HDR, however, the brightness of the clouds will be brought down slightly to show greater detail. If any highlights are even slightly clipped, the clipped spots will stick out like a sore thumb on the darkened HDR clouds. All this means is that HDR photographers must take special care to watch for clipped highlights when shooting with polarizing filters.

Using a circular polarizer on a rainbow will not produce the result you want. In fact, it will make it entirely disappear! Rainbows are made of the glare from water and polarizers cut through the glare on water; however, one lesser-known fact about a polarizer is that if you spin the filter all the way out to where there is no polarization, it will actually increase the colors in the rainbow. You can use the same trick when shooting the reflections on water. To strengthen the reflection,

spin your polarization the opposite direction as usual. Give it a shot! Just make sure that the polarization is turned all the way out.

### **The Neutral Density Filter**

Generally, photographers are fighting for the fastest lenses and the highest ISOs in order to get more light on the sensor. Paradoxically, HDR photographers often need a neutral density filter to lessen the amount of light allowed to enter the lens. Most higher-end DSLRs allow photographers to shoot at shutter speeds of up to 1/8000; however, lower-end DSLRs such as Canon Rebels usually only have a maximum shutter speed of 1/4000. This is useful for taking the dark shot in an HDR sequence of a bright scene such as a beach. Often a sunny day at the beach or at a lake will require shutter speeds of 1/8000 or a second or faster even when using a high aperture.

The photographer's job in taking HDR photographs is simply to stay out of the way of killing the fine detail in an image. Having explained when a polarizing filter is not appropriate, there are undoubtedly occasions when polarizers are golden for HDR photographers. One such situation is shooting through the glare on water. All advanced photographers know that polarizer allows a photographer to shoot through the glare on water, but what you may not have realized is the power of HDR for this situation. Shooting through anything—water, a window, or a cheap UV filter—will decrease contrast and saturation. The HDR process counteracts this negative effect by accentuating contrast and detail.

### **Quick HDR Tip!**

**SLOW DOWN!** I once spent a whole morning paddling all over a lake trying to catch some fish--no luck. Exhausted, I pulled myself onto the shore and sat down for a while to catch my breath. I watched a fly fisherman on the other side of the small lake. He walked around turning over stones and studying the bugs underneath them to determine what the fish were eating. Then, he changed flies and walked around the bank as he carefully scanned the water to find the fish and looked for good fish holes. When he finally cast his line in the water, he caught a fish on the first cast. I watched him repeat this lengthy process three or four times in different areas, catching fish in each one. Unlike wedding or sports photographers who need to get several good images of each shoot to sell to a client, HDR photographers rarely have this type of pressure. If

you go out and get two or three portfolio-quality images in a single shoot, you're doing extremely well. Think about it, if you could take one image each time you go out shooting that is good enough to put in your portfolio, your portfolio would be HUGE after a few years! There is no need to hurry. Pick your shot and don't leave until you've captured the image just as you imagined. HDR is, by nature, a careful process requiring extra thought and planning.

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## **Chapter Nine: Night HDR Photography**

Night photos always impact viewers of photography because the lighting is out of the ordinary—creating visual interest. I rarely see a night photo that doesn't immediately convey some type of mood. This is compounded when the HDR technique is used.

HDR night photography creates several technical problems for photographers to overcome. The first problem is that many night scenes do not have high-contrast lighting. This means that the HDR process will generally not have quite as much impact as it would otherwise. Photographers can easily overcome this issue by including the light source in their HDR night photography.

Often the light source will be the moon, but the landscape may also be illuminated by streetlights

or stars. Simply including the light source in the image will transform an average HDR into a beautiful photo by putting more emphasis on the dynamic range in the scene.

With the light source included in the HDR, photographers commonly make the mistake of failing to include the full dynamic range in the exposure bracketing sequence. No time is more important than night time to check the histogram. Suppose you're photographing a cityscape at night. Because photographers generally choose a long exposure at night and simply bracket the shots by two stops, there usually isn't a shot that is dark enough to correctly expose the street lights in the cityscape. In post-processing, the HDR software tries to make sense of the blown-out highlights and then blends them in with the rest of the photo, but generally cannot do so properly. This results in what some HDR photographers call "plasma burns" on the light sources.

The first way to mitigate these plasma burns is to simply cover the entire dynamic range with the exposure bracketing sequence. The second is simply to mask in one of the single shots into the final HDR photo to cover up the plasma burns. While it is important to cover the lower end of the dynamic range in the exposure bracketing sequence, it is even more important to cover the upper end.

The number one most common mistake I see in night landscapes is that the photographer became impatient and did not expose the scene for a sufficient amount of time. Night images do not have to, and generally should not, look overly dark. Remember, the quality of light is what makes a night landscape beautiful—not the lack of light. Further, this makes night landscapes more amenable to HDR because it allows the camera to capture all of the detail present in the scene. HDR is about sucking in all of the information in a scene. The information in the landscape often includes tiny details such as stars. Applying too strong of an HDR effect to a landscape with stars usually produces dark haloing around each little star when viewed close-up. The haloing can be mitigated by reducing the threshold setting (discussed in a later chapter).

There is one natural "halo" that you might want to keep. When shooting night moonscapes, taking one of the bracketed shots far brighter than normal will result in a ring of light around the moon. Some night photographers do not like the light around the moon to show and prefer the moon to be a perfect circle with stark black immediately surrounding it. This is largely a matter of taste, but advanced photographers should be aware of this option.

In addition to haloing, noise is a difficult problem for night photographers. Noise shows up more prominently when placed on a dark background, and the HDR processing always increases the noise levels in the scene. The key to mitigating noise is to ensure that the dark shot has enough information in the shadows. Remembering the chapter on exposure, the dark shot needs enough light levels for the shadows to record them accurately for there to be less noise in the image. Another way to reduce noise is to run each image through noise reductions software before processing the HDR.

### **Quick HDR Tip!**

It's very important that your focus be dead-on, and focusing in lowlight situations is difficult because the camera cannot properly assess contrast. If you're not confident in your ability to manually focus, consider bringing a laser light with you. Simply point the laser light where you want to focus and then focus on the laser. This is often enough contrast for your camera to autofocus at night.

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## **Chapter Ten: Using Texture to Highlight the Strengths of HDR**

Understanding this principle of texture can greatly improve your HDR photography. Let's suppose you're put in a situation to photograph a landscape in the middle of the day with no clouds in the sky. This is a photographer's worst nightmare. What's an HDR landscape photographer to do? The answer is to look for texture—anywhere. Texture is compelling even during the middle of the day because it will cast interesting shadows to the sides of the rough edges. Perhaps it will be the decaying side of an old barn, or a rusty car, a tree trunk, the ridges on a seashell, or a patch of gravel. This texture will be accentuated through the HDR process and will create visual interest in an otherwise boring scene.

You can highlight that texture by placing it on one of the thirds of the photo and you're sure to improve the landscape even in a difficult shooting situation. Texture is one way of increasing contrast in the image, but there are other methods which are equally valid.

Light also creates visual contrast in a scene. Let's suppose you're shooting an old rusty truck in a rustic field. If the car is a light color such as yellow or white, the light that hits the car will not create much contrast because the white light will hit a light colored object. Photographing that same scene with a dark-colored car will create much more contrast because the light which hits each part of the truck will be white on dark. Last, look for contrast. Many times the contrast will be based on light and shadow, but visual contrast can also be created by variations in color or fine detail. Remember, HDR is about contrast and the collection of information.

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## **Chapter Eleven: Shooting HDR Images that Include the Sun**

Another way to create visual interest in a daylight scene is to use the high dynamic range to your advantage. No scene will have a greater dynamic range than one in which the sun is part of a landscape, and no scene will be more difficult to expose correctly than one with the sun in it.

Because the sun is so bright, a scene with the sun in full view will almost always require an extremely short shutter speed. While it is quite difficult to correctly expose a landscape with the sun in it, the benefit is often a captivating scene with high contrast—perfect for HDR. There are two basic techniques you'll need to employ in order to use the sun in your landscapes. First, look for something to block part of the sun—something for the sun to peak around. For example, you could capture the sun just at the moment it peaks over a mountain, or through the branches of a tree, or even through thick cloud cover. This technique reduces how much sun is showing in the image—making it far more manageable to expose in the landscape.

Even employing this first technique, you'll find that a large white area will exist around the sun. This will wash out a significant portion of the sky and destroy the colors in the clouds that you're trying to record. Capturing one exposure far underexposed can help your HDR processing software to eliminate this white area around the sun, but is unlikely to fix the problem entirely. The answer? Photoshop's liquefy tool. Simply go to Filter > Liquefy, and then squish the sun and white portion into a smaller portion of the photo. Generally the photo will still look natural



and a smaller portion of the sky will be washed out. Now that you have the scene properly exposed you need to warm the tones in the image. The sun's light is such an intense white that it dominates the colors in the scene. Most sun images require a warm white balance. Consider setting your white balance to cloudy, or simply change the RAW file's white balance in Photoshop afterward. The warm tone will give the appearance of a soft glow rather than a blinding beam of the light.

No matter what you do, the sun will activate your blinkies (photographers should really come up with a more technical term for "blinkies." This is a setting in DSLRs which will make any part of a photo that is entirely white flash and blink to indicate that the highlight is clipped. Check your camera manual for how to turn this setting on) and touch the right edge of the histogram. There simply is no way to realistically expose the sun correctly on a DSLR; however, watch your histogram carefully and review the photos with your blinkies turned on to determine how much sun area around the sun also has clipped highlights. Getting the area immediately around the sun to be properly exposed is the key to good HDR landscapes with the sun in them. With the bright sun in the image, you're almost sure to get some amount of lens flare.

Lens flare is often a desirable look because it connects the foreground and the background. The sun is in the background, but the reflection of the sun is on the lens. A sun in a photograph can make the scene seem cohesive and serene; however, you need to be equipped with information of how to control the amount of lens flare in the picture.

The best practices for mitigating lens flare are (1) using a lens hood, (2) not using any type of filter, and (3) strategically placing the sun in the image. Lens flare will increase in size if the sun is placed off toward the edges of a photo. The least lens flare will be when the sun is placed exactly in the middle of the shot. One tip to achieving a sun image with only minimal lens flare is to shoot a panorama with the sun directly in the middle of one image and another image off to the side. Then, stitch the two photos together and crop the resulting image so the sun is placed according to the rule of thirds.

### **Quick HDR Tip!**

How do you know when you've applied just the right amount of HDR effect to an image so that it isn't over-processed? The key is to look at the final image as if you'd never seen it before and ask yourself if you would immediately know it was an HDR. If you would, back off just slightly.

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## **Chapter Twelve: Shooting HDR Photography in Daylight**

When caught shooting during the middle of the day, many landscape photographers just give up until the golden hours come around again. While this is often necessary for traditional photographers, HDR photos shot during the middle of the day are often stunning—if you employ these tips.

Focus on the clouds. One of the only areas with interesting light in a sunny scene is the clouds, because they are backlit and diffuse the bright light of the sun. Having reviewed thousands of photographs from beginning HDR photographers, I can conclusively state that the clouds are the most difficult area for them to properly expose. The key to shooting clouds is the histogram. Most HDR sequences of clouds I see from other photographers don't include an underexposed

image that is dark enough to capture the shadows properly. Because many clouds often have large patches of area with little or no detail, losing any information in the clouds will destroy the photo. Also, when shooting bright white cumulus clouds, consider shooting five or more exposures. Because most clouds have a low dynamic range and little visible detail, losing any information can drastically reduce the amount of detail captured by the HDR.

Remember, when shooting clouds to go darker than you might otherwise think and check the histogram. The underexposed image in the HDR sequence cannot have any highlight clipping at all. Properly exposed clouds—especially on overcast days—can look incredible in HDR. The amount of information recorded in the HDR process allows the photographer to bring out that detail in post-processing. When people see your overcast HDR images, the clouds will often look dark and ominous because they contain more detail than one is accustomed to see.

While many clouds produce beautiful HDR images, other types of clouds will not produce aesthetically pleasing shots. These include some cirrus and nimbostratus clouds. Oftentimes these cloud types are a plain gray sheet of clouds high above the ground. Because there isn't much detail in the plain-color clouds of this type, the photo will look weak. This is especially true in HDR where the key is bringing out as much detail as possible. On days where the clouds are a plain-colored gray sheet, consider cutting the sky out of the image. Try shooting from a high perspective look down at your subject. The high clouds will not be in the image, and they will act as nature's diffuser to soften the light on your subject.

Photographing clouds comes with one more issue--ghosting. I photographed a large Christian cross on a rocky ridge in Boise, Idaho for about an hour one morning. After returning home to process the HDR images, I quickly realized a major mistake. I had photographed the large cross with a long telephoto lens because I wanted the look of compression in the image to make the clouds feel as though they were right up next to the cross. I was also on top of a somewhat high mountain. The combination of these two factors meant that the clouds had moved somewhat quickly through the scene as I shot the bracketed sequence. I could not process any of the HDRs because the changing position of the clouds in the three images produced significant ghosting. Fortunately, I was able to save the shoot by producing pseudo-HDRs, but I learned a lesson the hard way about HDR and clouds. If you're shooting clouds in HDR, be conscious of the length of your lens. If using a long lens, any movement in the clouds will produce profound ghosting in

some conditions, but using a wide-angle lens usually will not create the same problem because the relative movement of the clouds is reduced.

Keep in mind the speed at which the clouds move. During the golden hours, the light is soft and diffused—diminishing the contrast in the landscape. For this reason, it is not necessary to include as much information in shooting the HDR sequence because only a few stops of light are required to hold the information in the scene. During the middle of the day, this is not the case. Generally, I shoot daytime HDR sequences with five exposures spread two stops apart. During the golden hours, I generally shoot only three exposures spread by two stops. Using five exposures allows a photographer to catch the brightest detail in the clouds as well as the dark shadows underneath a tree or a rock.

Other than simply shooting more exposures, another way to capture the dynamic range more easily is to use a graduated neutral density filter. This will allow the photographer to dampen the brightness of the sky, and still allow as much light as possible from the bottom-half of the landscape. This is a good option for Canon photographers who cannot shoot a five-exposure HDR sequence of images as easily as Nikon photographers because most Canon cameras only allow for three exposures in an exposure bracket.

### **Quick HDR Tip!**

HDR is all about expanding the dynamic range, but that doesn't mean that even the darkest shadows under a rock on a hot day have to be fully exposed. Next time you shoot a landscape with a naturally deep shadow, consider allowing that shadow to be clipped. In some situations, it is more natural-looking.

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### **Chapter Thirteen: Obtaining Good Color in HDR Photos**

HDR is capable of increasing the color in an image unlike any other process. When processing an HDR, the software is more likely to grab bold colors because it interprets them as detail. If you have not yet noticed this, try processing an HDR with the saturation or vibrance on one of the exposures turned up. The resulting HDR will have strange coloration coming from the increased boldness of color on the one photo. The HDR processing engine will over-emphasize this increase of color in the one image.

Color matters. We've all seen over-saturated landscapes from beginning photographers who bludgeoned their photograph with the saturation and vibrance tools rather than actually recording good color. I don't mean to insinuate that those controls are bad, but that they are often abused. One way to give selective colors in your photograph a punch of color is to de-saturate the other colors in the scene slightly. If you're wary about using this technique, you haven't tried it. I will often create a sepia version of an image and layer it on top of the original full-color image and then mask in the sepia image with low transparency. I will place the sepia tones over parts of the area with little color, and then mask out the sepia tones over the area of the photo where I want the color to stand out. This method is effective because it makes the area of color stand out from a dull background.

Shooting landscapes that are washed out by the brightness of the sun will often produce much more color in HDR because the underexposed image in the HDR sequence will include the color information without being washed-out by the sun's brightness. I was once shooting a sunset in Naples, Florida when I suddenly had to cut the shoot short in order to attend to other matters. The sun had not yet dipped low enough to produce bright colors, so I thought the shoot was ruined. I took a three-exposure sequence as a last-ditch effort and was shocked at how much color came out of the scene in post processing (with a little help of the saturation and vibrance controls on the HDR file).

When photographing sunsets, photographers often choose to make foreground objects a silhouette instead of maintaining detail. Clearly, HDR will ruin silhouettes by attempting to capture detail in the foreground object. However, this can easily be fixed by masking in the under-exposed image, or using exposure compensation to under-expose the image by one or two stops. Because the overall HDR will be one or two stops darker, none of the three images will provide information to expose the silhouetted object.

### **Quick HDR Tip!**

Suppose you're photographing a dark object such as a jagged rock during the day. The sunlight that hits the rock will create contrast on the rock because the reflection of the sun will be white and the rock is black. If you were photographing a light rock, such as sandstone, there would be little contrast in the scene because both the light and the stone are white. The white light would hit the white or tan rock and there would be little evidence of the light. The lesson to learn from this scenario is that choosing the color of the subject you will photograph can significantly change the resulting HDR. If you want to accentuate light reflections on something in your scene, choose something dark for it to reflect off of. This is an important lesson for photographers interested in shooting cars. Choosing a dark-colored car will produce beautiful reflections and contrast. Shooting a white or light-colored car will usually not produce a high-contrast image.

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## **Chapter Fourteen: Post-Processing Effects**

HDR post-processing is a matter of taste. Some people prefer one “look” while other prefer other methods. Often the best way to learn HDR post-processing is simply to change the sliders in Photomatrix in different combinations to see what effects can be created. Don’t be afraid to make a mistake—try something new! These few tips will help to give you a few new tools in your HDR post-processing tool belt.

### **The “Dreamy Look”**

You may not have recognized it before, but you’ve undoubtedly seen this effect before. Trey Ratcliff, the famous HDR photographer, uses this look often in his work. The dreamy look is created using a blurry layer set to “overlay” and a low opacity. This look is perfect for soft landscapes or portraits where the focus is on the natural beauty and color of the scene rather than the hard detail that HDR usually brings. This look is especially effective in images with fog, early morning images of a sunrise, or photos where shape takes prominence over subject (such as rolling hills). My general rule is that if the landscape could be described as “delicate” then you have a candidate for the dreamy effect.

When processing the “dreamy look,” HDR photographers must first entirely process the HDR and get it to the point that it would be ready to post online before taking any other steps. Then, copy the background layer so there are two identical layers of your HDR. With the duplicate layer selected, go to Filter > Blur > Gaussian Blur. The amount of blur that you put on the layer is really a matter of taste, but it should be somewhat strong or the end result will look like a mistake rather than an intentional choice of style.

Then, change the blending options of the blurry layer to “Overlay.” Overlay is generally the best option, but I’ve also had success with “Soft Light” and “Multiply” depending on the situation. Now change the opacity of the blurry layer to your taste. I usually go to what I think is too slight and then add a little bit. The idea isn’t to smudge the beautiful landscape into indecipherable splotches, but to add a slight mood to a delicate landscape.

### **Dodging and Burning**

HDR doesn’t exempt photographers from dodging and burning. For some reason, many photographers miss the opportunity to create impactful drama in a landscape by failing to dodge and burn. This is a mistake that I consistently see in the HDR photography. HDR will allow the photographer to capture detail where otherwise the photographer would not be able. Perhaps it is for this reason that photographers are hesitant to dodge and burn—a fear of losing highlight or shadow detail. This is rarely the case in HDR if the dodging and burning process is done skillfully and with restraint. In fact, HDR photography is especially suited to dodging and burning for this reason—the highlights and shadows are stronger, and are therefore less likely to be destroyed through excessive dodging and burning in a specific region of the image.





### **Alternative processing**

While most of the HDR photos you shoot will look great with normal HDR processing, some shots are more conducive to a simpler method. For example, imagine a night photo of a well-lit tent in a dark forest with pine tree silhouettes and the moon and stars above the camping scene. Suppose we shoot this with a 3-shot bracketed sequence. When processed as an HDR, it probably won't look quite right. The bright tent will have significant haloing around it since it is on a dark background and the colors will be unnaturally bright. An alternative to traditional HDR in this situation is simply using Photoshop to mask in one image for the sky, one image for the tree silhouettes, and one image for the tent. Is this still HDR? Of course it is! It is a post-processing method which allows for an expanded dynamic range. You'll find some shots that simply don't lend themselves to HDR. When you do, consider this low-tech method of shooting HDRs.

### **When to choose traditional HDR, and when to choose exposure blending**

I think most photographers see the “exposure blending” option in Photomatix and are curious as to what it is and when it should be used. In fact, you’ve probably tried exposure blending before and were puzzled by the results. I personally do not often use exposure blending. I generally see better results by processing my images in the traditional HDR processing engine; however, there are times when exposure blending can process an image far better than the traditional HDR processing engine. Exposure blending eliminates or at least greatly reduces the painterly look of over-processed HDR images. It also eliminates halos and reduces the noise level in the image.

Exposure blending leads to much more natural-looking photos. For this reason, some HDR photographers use it as the default. Exposure blending is generally more amenable to scenes in which one area is far brighter than the rest of the scene. One example would be a sunrise over a wooded area. The sky will be very bright, but the trees will be dark with heavy shadows. This situation is ideal for exposure blending and will not produce the painterly effects that traditional HDR would. In contrast, traditional HDR processing is more amenable to landscapes with highlights and shadows scattered throughout the scene.

Masking in multiple non-HDR images can be an effective way to produce a natural-looking photo, but the same principle applies in circumstances where different regions of the HDR require different HDR processing. Consider processing 2 or 3 HDR versions of the same shot and then masking the completed HDRs together in Photoshop. For example, suppose that you’re shooting an HDR portrait of an elderly woman standing near a window. If the window area looks better with a more surreal HDR look, then process one HDR to give it this effect. Then process another HDR for the face that has a more natural look. Then process another HDR for the room and walls that includes “punchier” colors. Last, bring the three HDRs into Photoshop and mask them together. This is really just the same process as the tent example mentioned previously, but all of the masked-in photos are HDRs.

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## **Chapter Fifteen: HDR Landscape Photography**

Landscape photography is a great way for HDR photographers to learn the art because the subject doesn't move and strict adherence to basic principles of exposure, composition, and lighting will yield accentuated results. You will be tempted when you begin taking HDR landscape photographs, to place more emphasis on the subject than the light. For some reason, HDR photographers often throw good lighting principles to the wind and only pay attention to the post-processing. Remember that no landscape photo will look as good in bland mid-day light as it will during the golden hours. Professional landscape photographers wake up long before sunrise, get in position, and wait for the light to grow. One hour after sunrise, the beautiful morning light will dissipate and landscape photography will have ended until an hour before sunset.

While most landscape photos are best suited to morning or evening light, photographers can still take beautiful mid day images. The key to getting great bright-light landscape images is a circular polarizer (discussed earlier). A circular polarizer is an absolutely indispensable part of a landscape photographer's gear bag.

Remember that beautiful landscapes still need solid composition. The web is full of bland waterfall images in which the waterfall is placed exactly in the middle of the frame, no foreground elements are used, and the background is not given proper treatment. The easiest way

to make an average landscape photo great is to place something in the foreground--a tree, a bush, an interesting rock, a stream...anything. This will add depth and visual contrast to the image, as well as giving the viewer a sense of place.

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Take care when focusing a landscape image. Most landscape images require that the entire image be in focus. This is especially important in HDR, where out-of-focus regions of the image are not aesthetically pleasing. To accomplish this maximum depth-of-field, focus one-third into the scene. For example, if you're taking a photograph of the sunset over a lake and the horizon line is in the middle of the image, one should focus down in the water.

### **QUICK HDR TIP!**

While most landscape photos are taken with a wide-angle lens, don't forget to try a longer lens in some situations. Longer lenses compress distances and can produce a unique look to landscape photos.

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