25 Tips to Improve Your Landscape Photography

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Legendary landscape photographer Ansel Adams once said, "The landscape is possibly the most difficult subject material to work with; it offers the minimum control of point of view in reference to composition and confronts the photographer with extremes of light and shadow..." In this session I present 25 field tips to help you overcome the inherent challenges in producing effective landscape and nature photographs.

1. **Work close to home.** It is important for you to be able to make good photographs near your home. Remember: If you can't make good photographs close to home, you won't make them in more exotic locations either. Working at nearby locations allows you to return at optimal times for making images, and it involves minimal travel costs. Find a map and locate a state or city park, a nature preserve, or other natural landscape. Visit often.
2. **Capture panoramas.** Our eyes often scan across a scene in order to take in the "big picture." This can be effectively conveyed to our viewers by capturing a series of photos, overlapping each of them by about 30-50%. A level tripod facilitates the process. Use the same manual exposure for each shot and turn off auto white balance. The images can be stitched together by a number of different methods, one of the easiest being the Photomerge utility in Photoshop.
3. **Shoot during seasonal overlap.** Some of the most compelling conditions for nature photography occur when the seasons overlap. Examples include fresh snow on autumn leaves, splashes of early spring foliage on otherwise barren mountainsides, or snow on autumn flowers. Conditions like these are often fleeting so it is important to get out immediately.
4. **Pay close attention to the background when shooting flowers or birds.** In my mind, a clean background is at least as important as the main subject when shooting bird and flower portraits. A distracting background draws attention away from the main subject. One method to simplify the background involves the use of a long lens with a wide aperture. Careful focus is necessary due to the shallow depth of field.
5. **Scout potential locations and return at a favorable time.** It is unusual for me to make a meaningful photograph on the first visit to a new location. Therefore, it is important to scout potential locations in advance and return to them when the light is favorable. It helps to have a list of possible locations close to home so that you can get there quickly.
6. **SLOW DOWN and work a scene from different angles.** When you come upon a scene worth photographing, take some time to study it. Before you

set up your tripod, walk around and determine the best camera position and focal length to use. Don't be content with just one interpretation of the scene. When conditions are good, I will shoot a scene from every conceivable angle.

7. **Bring in the clouds.** I am always on the lookout for interesting cloud formations. They add drama to an otherwise passive scene. I love to shoot on the edge of storms. Shooting at sunrise and sunset can add warm lighting to the clouds, and sometimes the clouds light up with spectacular colors before dawn and after sunset. Let the clouds dominate the scene by placing the horizon line low in the frame.

8. **Shoot for the stars!** The latest digital sensors are excellent for capturing the stars. They can be captured as pinpoints of light or as star trails. For the former, I use a wide-angle zoom lens (14-24mm) at f/2.8 for a 20-30 second exposure at ISO 1600-3200. Try shooting the Milky Way galaxy this way a few days either side of the new moon. For star trails, use a long exposure of 30 minutes or more at f/4, ISO 200. Of course, a sturdy tripod is necessary.

9. **Match the available light with an appropriate landscape.** This is one of the keys to success in landscape photography. For example, when the conditions are misty and overcast I will seek out intimate landscape subjects that look their best under these conditions, namely, forests, waterfalls, and wildflowers. When the weather is clear, I will shoot grand landscapes at sunrise and sunset.

10. **Shoot reflections.** When the conditions are calm, I seek out rivers or lakes, which produce reflections of mountains or dramatic clouds. To generate a symmetrical image place the horizon line in the center of the frame. A two-stop split neutral density filter can help to give more exposure to the reflection, while at the same time holding detail in the sky. The dark portion of the filter is placed over the brighter sky while the clear part of the filter covers the darker reflection. Do not allow the reflection to look brighter than the rest of the scene, as this looks unnatural.

11. **Look for abstract patterns.** Interesting patterns can be found everywhere in the natural world. Usually there will be no main subject in this type of image. Look for ice patterns at the first freeze and get in tight with a macro lens. Random leaf patterns also work well. Use a telephoto lens to extract and isolate distant objects such as receding ridgelines or cloud patterns.

12. **Shoot at the edge of light.** Some of the best lighting for landscape photography occurs both just before and just after sunrise and sunset. The light is warm and much less harsh than that found in the middle of the day, which makes exposures easier. These conditions are often fleeting so you should be on location and set up well before the action begins. Use sidelight to emphasize texture and back lighting to create glowing halos around your main subject.

13. **Use a telephoto lens to isolate portions of the landscape.** Telephoto lenses are not only good for photographing birds and animals, but also for extracting interesting parts of a distant landscape. Lenses in the 100-400mm focal length are useful in this regard. Study the landscape for dynamic

patterns and fill the frame with the most interesting parts. Be sure to use a sturdy tripod to steady the camera.

14. **To add drama, shoot silhouettes.** The current high dynamic range (HDR) methods seek to add detail in the shadows of contrasty scenes, but dark areas with no detail often add power and mystery to an image. With strong backlighting, expose for the bright area of the image, and the dark areas will be rendered as strong silhouettes. Look for interesting foreground elements such as rocks or trees and adjust your camera position so as not to overlap the shapes excessively.

15. **Use a wide-angle lens to emphasize the foreground.** The great landscape master, David Muench, uses this method to perfection. Extreme wide-angle lenses in the 14-20mm range are difficult to use, but can produce striking images with a great sense of place. By placing the lens close to a graphically strong foreground object, its size is emphasized relative to the rest of the scene. A small aperture and focusing at the hyperfocal distance ensure acceptable focus from foreground to background.

16. **Use filters to control difficult lighting conditions.** A polarizing filter not only darkens blue skies, but also removes bright reflections from water and foliage, and it saturates color. A neutral density filter cuts down on the amount of light entering the lens allowing for longer shutter speeds under bright conditions. A split neutral density filter (introduced in tip #10) is useful for controlling exposure extremes, such as a bright sky and darker foreground.

17. **Shoot waterfalls in different seasons.** Waterfalls make great subjects in any season of the year. In spring, the flow is usually the greatest. Include light green foliage for contrast. Autumn color is a great accent to the lesser water flow. Swirling leaf patterns in pools create beautiful color accents with a shutter speed of several seconds. In winter the ice patterns provide strong graphic elements in essentially a monochromatic scene. Experiment with different shutter speeds.

18. **Shoot intimate landscapes.** These scenes, which are somewhere between close-ups and grand vistas, were popularized by the great color photographer, Dr. Eliot Porter. Focal lengths from wide-angle to telephoto can be used for these scenics. Isolating an interesting part of the landscape is the key to success here. Examples include a tight composition of forest and steam, a waterfall, or an isolated portion of a field of wildflowers.

19. **Incorporate the moon into your composition.** Add a romantic touch to your images by including the moon. The crescent moon appears after sunset in the west one to three days <u>after</u> the new moon, and in the east before sunrise one to three days <u>before</u> the new moon. A full moon rises near sunset in the east and sets near sunrise in the west. A useful tool for calculating the position of the moon for a given location at a given time is the Photographer's Ephemeris (www.photoephemeris.com).

20. **Use long exposures to create ethereal effects.** To create soft, dream-like effects, try lengthening your shutter speed. The actual amount depends upon the lighting conditions. Under bright conditions you will need a neutral

density filter to cut down the amount of light entering the lens. Small apertures will also help in lengthening the shutter speed. Good subjects are swirling fog, moving clouds, and moving water. Try different shutter speeds, view the results on your camera's LCD screen, and adjust accordingly.

21. **Shoot under foggy conditions.** I love fog. It simplifies image content and adds a sense of mystery. It also helps in imparting a sense of three-dimensionality, as objects appear sharper closer to the camera and less well defined as distance increases. Clear autumn nights near bodies of water are well suited for fog formation when vapor from the relatively warm water condenses in the cool air. Fog can dissipate quickly as the sun warms the air, so it is important to be on location early. Give additional exposure so that the fog appears light in your image, and, as always, check your histogram to make sure you don't blow out the highlights.

22. **Shoot multiple exposures in contrasty light for exposure blending.** Sometimes the contrast level of a scene exceeds the ability of the digital sensor to capture it. In these cases, make a series of exposures so that the brightest exposure contains sufficient shadow detail, and the darkest exposure contains highlight detail. I usually make the exposures 1 or 2 stops apart. For only two exposures, I combine them manually with layer masking techniques in Photoshop, using the properly exposed portions of each. For three or more exposures it is usually easier to use dedicated HDR software such as Photomatix or Nik software's HDR Efex Pro.

23. **Take multiple frames and blend them later to increase resolution.** When I find a horizontal scene that I want to print very large, I orient my camera vertically and make a series of overlapping shots, moving across the scene horizontally. I overlap the frames by about 30-50%. Later I combine the images in Photoshop using the Photomerge utility. This technique produces a much larger file compared with taking a single, horizontal shot. On the other hand, for a vertical scene, I orient the camera horizontally and shoot in the vertical direction.

24. **In a pinch, Use your iPhone!** The latest round of iPhones offers surprisingly good image quality. For example, the 4S model has 2448 x 3264 pixel resolution, enough for an 8 x 11" print at 300 ppi at native resolution.

25. **Shoot a time-lapse sequence.** One of the joys of digital capture is the opportunity to explore new avenues of visual expression. Time-lapse photography is especially well suited to digital capture. Look for scenes with changing components such as moving clouds, swirling fog, or even shoot the stars over several hour's time. For daylight scenes, make an exposure every three to five seconds, depending upon how fast things are moving. For the stars, use a wide-angle lens at its widest aperture (preferably f/2.8 or faster), focus on infinity, and make a series of 30-second exposures at ISO 3200 over several hour's time. To assemble your movie, use QuickTime Pro, and choose a playback rate of 24 frames per second.

Creating Composite Panoramas
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Capturing the Images in the Field

It is very important to use proper techniques when capturing the images that will be used to compose a panoramic photograph.

- **Use a level tripod.** I can't stress this enough. A level tripod allows you to line the images up properly, thus maximizing the useful picture area. In the example below, frames A, B, and C were not properly aligned. As a result, a significant amount of picture area was lost after the edges were cropped. In this case the final picture area (see dotted lines) was necessarily constrained by the top of frame A and the bottom of frame C. In this example, approximately one-third of the area of each frame has been lost.
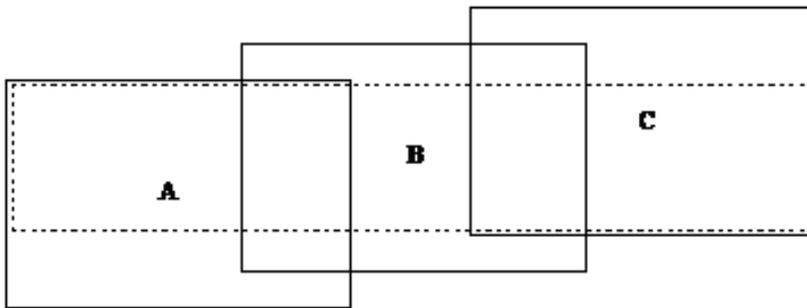
  There are a couple of ways to level your tripod. The easiest and least expensive way is to purchase a bubble level and place it on a flat horizontal surface of your tripod where the legs come together. Adjust the legs of the tripod until it is level. Or, your tripod may have a bubble level built in. Although the camera must be level in the horizontal plane, it can be pointed down or up slightly. To level the camera a two-axis spirit level can be used, which fits on the hot shoe on top of your camera.
- **Use the same exposure for all of the frames.** Set your camera on manual exposure and determine the best overall exposure for the scene. This can be tricky when one frame is significantly brighter than another. For example, when photographing a sunrise or sunset, the light usually falls off rapidly as you rotate the camera away from the sun. In cases like these, it is best to take meter readings of the brightest and darkest frames and average them. When in doubt, bracket exposures throughout the sequence of pictures.
- **Make your exposures as quickly as possible.** This will minimize any changes (such as moving clouds) that may be occurring from frame to frame. It is very difficult to successfully stitch together images where there is a large change of subject matter from frame to frame. I usually shoot a horizontal scene from left to right. First, I find an object that is 30-40% from the right-hand edge of the left-hand most frame. Then, as I rotate the camera to the right, I place this same object 30-40% from the left side of the next frame. It is essential that identical information is

common to both frames. This process is continued throughout the panorama. With practice, a series of images can be exposed within 10-15 seconds. After you begin exposing, do not change your camera position. The camera can be oriented horizontally or vertically. A vertical orientation will require more exposures to cover the picture area resulting in a much larger file, but will allow you more room for cropping the image after it has been stitched together. With the larger file size you will be able to make larger prints. Also, vertical orientation results in less distortion at the corners of the frames when using wide angle lenses making it easier to stitch the images together.

- **Avoid using a polarizing filter with large expanses of sky.** As the camera is rotated throughout the scene, large changes can occur in the sky tones when using a polarizer, making it very difficult to achieve a realistic stitch in the sky area. This is especially true when using wide-angle lenses. A polarizer usually works fine for panoramas when it is being used only to cut bright reflections from foliage.
- **Turn off the auto white balance** when using a digital camera, as it can change from frame to frame.
- **Crop the scene in camera as you expose using the desired focal length.** This will maximize your picture area. However, you should leave room for some cropping after the images have been stitched together.
- **Have plenty of digital storage capacity (or film).** If you bracket exposures and shoot duplicates of a multi-frame panorama, you will consume storage space very quickly.
- **Consider shooting in RAW format as opposed to JPEG.** Even though the JPEG files are easier to store, the larger RAW files contain more information that is useful when optimizing your images in Photoshop.
- **Pay attention to composition and lighting.** Just because an image is longer doesn't mean it will be better. Normal rules of good composition still apply, and, of course, interesting lighting is essential.

Using Photomerge to Create a Panorama in Photoshop CS4 and Photoshop Elements 8

To begin, click on File > Automate > Photomerge… The Photomerge dialog box will appear. You will be given a number of choices for layout options, which include Auto, Perspective, Cylindrical, Spherical, Collage, and Reposition. I usually use Reposition. This method matches overlapping information, but it does not stretch or skew any of the source images. After you have clicked on Reposition, check the box labeled Blend Images Together. You must then click on Browse… and locate the files you want to use to build the panorama. After choosing the files, click on OK and Photoshop will automatically stitch the images together. This may take a few minutes depending upon the number of images you are using, the size of the files, and the speed of your computer. After the panorama has been stitched it is necessary to do some final cropping using the Crop tool. At this point there will be a separate layer for each file used to build the panorama. To finish your masterpiece, optimize the image just like any other photograph using adjustment layers such as Levels, Curves, and Hue/Saturation to adjust white and black points, local contrast, and color saturation, respectively.

The procedure for producing a panorama in Photoshop Elements 8 is quite similar to the one used in CS4. In the Editor select File > New > Photomerge Panorama. In the Photomerge dialog box, choose File from the Use pop-up menu. Click the Browse button

and find the source files. Choose a layout option. These were described above using CS4. Click OK to generate the panorama. Crop and optimize your image.

There are other software programs designed specifically for producing panoramic photographs. Some of these include Panorama Maker 5 Pro (http://www.arcsoft.com/), PanaVue ImageAssembler (http://www.panavue.com/), Panorama Factory (http://www.panoramafactory.com/), and PTGui Pro (http://www.ptgui.com/). An excellent review of the software can be found at http://www.softsea.com/software/Panorama.html. Regardless of your choice of software, with practice you will be able to expand your photographic vision and produce beautiful panoramic images. Good luck and enjoy the ride!

Making Dynamic Landscape Images:
From Conception to Capture to Computer Optimization
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Introduction

In this session I will take you through the entire process of creating an effective landscape image. I will begin with *conception*, which involves exploring a scene to find the most effective way of communicating your vision to your viewer. Next, I will discuss *capture*, the actual process of recording the image in camera. Finally, I will briefly present *computer optimization*, the process of taking the raw file and making adjustments to it in the computer using Adobe Lightroom, Photoshop, or Photoshop Elements. I will discuss conception and capture in general terms, and computer optimization as it applies to a case study.

Conception

When you are first drawn photographically to a scene it is important to ask yourself a couple of questions. What is it that is visually compelling, and how can I best communicate this excitement to my viewer? Take some time to explore the scene before setting up. Think about how you want to use the available light to complement your subject. Consider your choice of camera position. Don't set up your tripod until you decide where you want to place your camera. Walk around and analyze the scene from different angles first. Is the scene conducive to making a grand landscape image or would it be better to isolate a portion of the scene to emphasize your subject? Many beginning landscape photographers make the mistake of including too much information in the frame. Try to isolate the most important part of the scene, including only the material that is necessary to communicate your vision. Think about what focal length to use that would best accentuate your subject. For example, you may be impressed by the water patterns created by waves washing up on a beach. You could show these patterns as part of the whole landscape, emphasizing them with an extreme wide-angle lens by getting very close to them at a low camera angle. Or, if you wanted to isolate only the wave patterns themselves, you could increase your camera-to-subject distance and use a telephoto lens to crop them tightly. The creative choices are yours.

As you investigate the scene you may come to the conclusion that it would be better to return later when a more favorable lighting situation exists. For me, this is most often the case. Whenever possible, I will scout a location first, and then return at a more favorable time of the day or season. This is why it is to your advantage to have a list of potential scenes that are close to your home so that you can get to them quickly when the appropriate lighting conditions present themselves.

Capture

Once you have determined what it is you want to photograph and how you want to present it to your viewer, then comes the nitty-gritty of actually recording the image. You must make decisions about shutter speed, f-stop, and ISO. When shooting landscapes, resist the temptation to put your camera on auto exposure and auto focus. By doing this, you let the camera decide either the shutter speed or f-stop, and the focus point, thereby forfeiting a significant amount of creative control. For example, if you want to shoot a grand landscape scene and keep everything in focus from foreground to infinity, you would not want to place your camera on shutter speed priority. If you did, then the camera would chose an f-stop that complements the chosen shutter speed in order to make a balanced exposure. That shutter speed may or may not translate to an f-stop of 16-22, which would be needed to provide the required depth of field. Furthermore, with the camera on auto focus, you could not be sure that the focus point would be at the hyperfocal distance (focusing approximately one-third of the way into a scene), which is necessary to render the scene in relatively sharp focus from foreground to infinity. In this situation it would be best to choose your f-stop and let the shutter speed fall where it will. However, if you are shooting under windy, low-light conditions this could be a problem in that your shutter speed is to slow to stop the movement. One potential solution would be to increase the ISO so that a faster shutter speed could be used. This is one of the great benefits of digital capture: you can change the ISO setting from frame to frame, which was impossible to do with film.

Capture also involves creative exposure choices. Perhaps you are photographing a scene with a three or four-stop difference between the foreground and background. I often come across this situation when photographing along the Lake Ontario shoreline at sunset, where the foreground is much darker than the sky. One solution is to use a two- or three-stop split neutral density filter, placing the dark half of the filter over the sky to hold back the exposure and the light half over the foreground to open up the exposure. Another solution is to make two exposures (one for the sky and one for the foreground), and combine them together later in the computer using layer masking. The latter option is usually the method of choice if you have objects extending from the dark foreground up into the bright sky. I will discuss this method in more detail in the next section entitled Computer Optimization.

There may be times when you need to use a neutral density filter to cut down the amount of light entering the lens so that you can use a longer shutter speed. A case in point is photographing flowing water under bright conditions. In this situation even when shooting at your lowest ISO and smallest aperture (highest f/stop number), the slowest shutter speed you may be able to muster is 1/15 of a second. This shutter speed is too fast to render the water in a smooth, cotton-candy effect. By using a three-stop neutral density filter, the shutter speed can be increased to ½ second, one which is much more conducive to the desired effect. Addition of a polarizing filter, which is often highly desirable for cutting reflections and saturating color, can decrease the incoming light by up to two more stops. In this example, using both filters together, the final shutter speed would now be two seconds, five stops slower than the 1/15 second that would be required without the filters.

Computer Optimization

   The third variable in the equation for producing an effective landscape photo is computer optimization. It used to be in the days of transparency film that the work was basically done the moment the shutter was released. There was essentially no control over the appearance of the color image during processing (except for push-processing). The color darkroom offered relatively little control over the appearance of the final print compared with today's digital darkroom. An exception to this, of course, was Ansel Adams black and white work, where he exerted control over the entire photographic process from exposure to development of the negative, to the final print. Now, with digital photography, more work remains to be done following exposure. The raw file looks nothing like a Fujichrome Velvia transparency. It must be optimized in terms of color temperature, contrast, exposure, shadow and highlight detail, and saturation. The image processing tools available today in the digital darkroom are phenomenal. While Lightroom and Photoshop do offer some amazing image-editing capabilities, it is still important to start with the very best capture possible. After all, the information must be present in the raw capture if it is to be optimized later. I use the word optimization purposefully, since the very best results can be obtained only when there is a minimal amount of image editing to be done. It is *much* better to get the image right in-camera rather than trying to rescue it later in Photoshop.

   Entire books have been written on how to optimize images using Lightroom and Photoshop. Here, I only have room to discuss briefly one technique that I use quite often. It is a method for combining portions of two different exposures of the same scene. I use it when one exposure is incapable of capturing the entire tonal range of the scene. Imagine a beautiful sunset along the ocean shore with sea stacks on the beach reaching into the sky. If you expose correctly for the sky, the beach elements are much too underexposed. If you expose for the beach, the sky is way overexposed. One possible solution is to use a split neutral density filter, positioning the dark part of the filter over the sky to hold back the exposure and the clear part over the foreground to open up the exposure. However, in this particular case, the filter does not work very well. Because the sea stacks extend from the foreground into the sky, they will look darker in the sky area and lighter in the foreground area, depending upon where the filter's transition line from dark to light is located. A better solution is to make two exposures, one for the sky exposure (SKY) and one for the foreground exposure (BEACH) and combine the best parts of each in Photoshop. Here's how it's done.

1. First, *make sure that you shoot from a sturdy tripod and do not move the camera between exposures.* Expose correctly for the sky. Check your histogram and make sure that no pixels are banked against the right side (overexposed). *Using the same aperture*, vary the shutter speed to make a proper foreground exposure. This time make sure that no pixels are banked against the left side (underexposed). I strongly encourage you to shoot raw files. They contain much more information than jpeg files, allowing you the flexibility of making more significant changes to the raw file later without degrading the image as compared to a jpeg file.

2. Import each raw image file into Lightroom (Adobe Camera Raw or Aperture can also be used), and in the Development module make any needed adjustments to color temperature, exposure, shadow and highlight detail, contrast, color saturation, etc. Export the files to Photoshop as tiff files.

3. Copy the SKY exposure and paste it directly over the BEACH exposure. To do this, click on the SKY exposure and choose **Select > All** (Ctrl+A Windows or command+A Mac), followed by **Edit > Copy** (Ctrl+C Windows or command+C Mac). Close the Sky image. Highlight the BEACH image and click on **Edit > Paste** (Ctrl+V Windows or command+V Mac). At this point there are two layers in the Layers palette, with the SKY exposure (Layer 1) copied directly on top of the BEACH exposure (Background).

4. Click on the SKY layer to highlight it. Then click on the **Add layer mask** icon at the bottom of the layers palette. It's the second icon from the left.

5. Using the **Magic Wand Tool** or **Quick Selection Tool** from the floating palette, select the beach area and any other dark areas to be lightened. After it is selected, "marching ants" will appear around its border. Right click anywhere inside the marching ants and click on **Feather**. Chose a Feather Radius of 1 or 2 pixels and click **OK**.

6. Choose black as the foreground color near the bottom of the floating palette. Click on the **Brush Tool** and choose a medium-sized brush (~150 pixels) with a soft edge, and set the opacity to around 50%. Left click (continuing to hold down the button) and begin to "paint" inside the selected area until all of it has been covered. This action masks over the dark beach in the SKY exposure to reveal the lighter BEACH exposure directly below it. To reveal more of the lighter BEACH exposure, paint again until you achieve the desired lightness. If you make a mistake you can paint with white at 100% opacity to restore the layer mask to its original condition. A useful phrase to remember in this context is "Black reveals (the layer underneath) and white conceals." When you have finished painting, right click inside the selected area using the Magic Wand Tool or Quick Selection Tool, and click on **Deselect** to make the marching ants disappear.

We have now masked over the dark areas of the SKY exposure to reveal the lighter BEACH exposure. At this point you may need to fine-tune the image. To make other adjustments it is wise to use adjustment layers such as Levels (to adjust black and white points), Curves (to adjust local contrast), Hue/Saturation, or Color Balance. You can return to these layers in the future if you decide to make additional changes.

Making Nature Time-lapse Movies: An Introduction
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I. Introduction

We've all seen them: time-lapse movies of flowers opening over time or clouds racing by in a beautiful sky. Now, with the advent of digital cameras and fast home computers, we can make our own time-lapse movies. In this session I will show you how.

Time-lapse photography is a technique in which images are captured at a much slower rate than video, which is normally filmed at 24 frames per second (fps). When a time-lapse movie is played back at a standard speed of 24 fps, relatively long periods of time are condensed into a short video.

The technique has been around for a long time. It was first used back in 1897 by Georges Méliès in his motion picture *Carrefour De L'Opera.* In 1909 Jean Comandon used it to document various biological processes, while in the 1950's Dr. John Ott animated plants with time-lapse photography in his film *Dancing Flowers*. In 1992 Ron Fricke made limited use of time-lapse photography in his stunning documentary film *Baraka*, about which the late film critic Roger Ebert said, "The restored 2008 Blu-ray DVD is the finest disk I have ever viewed, or ever imagined." In 1995 David Attenborough made extensive use of time-lapse in his film, *The Private Life of Plants*, while the popular 2006 BBC documentary series *Planet Earth* shows stunning time-lapse sequences shot from orbiting satellites. Recently, filmmaker Tom Lowe took time-lapse photography to a whole new level in his 2012 epic film *Timescapes*.

II. Field Techniques

A. Choosing a subject

The first question that we should ask is, "What kinds of scenes lend themselves to an effective time-lapse movie?" I always look for movement of some kind. Scenes that do not change over time are not appropriate for this technique. An interesting, static foreground object helps to anchor the scene. Here are some examples that I have shot as time-lapse movies:

- Cloud movement
- Sunrise or sunset
- Moonrise or moonset
- Clearing fog
- Intermittent light (sun or moon) on the landscape
- Melting snow
- Stars

Once you have chosen your subject, you must decide how long you want your movie to be. This requires a little bit of math, so stay with me! The normal playback rate for a movie to run smoothly is around 24 frames per second (fps). If you want your movie to be one minute long (60 sec) that means you must make 1,440 (24 fps

x 60 sec = 1,440) exposures! Now you can see why this was next to impossible to do using a film camera with 36 exposure rolls of film! If you make one exposure every 5 sec, the elapsed time will be 1,440 frames x 5 sec/frame = 7200 sec. Since there are 3600 sec in one hour, the sequence will take two hours (7200/3600 = 2) to photograph. Clearly, you must do some advanced planning.

B. Equipment needed

Here is a list of equipment you will need to begin shooting time-lapse movies:

- A steady tripod. This is an *absolute necessity* for a smooth running movie! Don't even think about shooting a time-lapse sequence without a sturdy tripod.
- A digital camera with a large memory card (16 to 64 GB). The raw files (more about why I use raw files later) from my Canon 5D Mark II camera run about 20-30 megabytes (mb) each. This means that I can record around 1,200 frames (25 mb/frame x 1200 frames = 30,000 mb or 30 gigabytes) on a 32 gigabyte (gb) card.
- A fully charged battery. I get about 3-4 hours use from my battery. For longer time-lapse sequences, additional external power is needed. This is beyond the scope of our discussion here.
- A remote timer such as the TC-80N3 Timer Remote Controller if you are a Canon user. Many of the latest Nikon DSLR's have the timer built in. Without a remote timer you will have to manually trip the shutter for each exposure. Believe me when I say that this gets very old after about 10 minutes!
- Hand warmers. I learned the hard way that over time, especially late at night and early in the morning, dew has a tendency to form on the front lens element, thereby obscuring your view. I solved this problem by placing a couple of chemical hand warmers around the lens barrel, securing them with rubber bands. If you can keep the temperature of the lens above the dew point, moisture will not form on it.

C. Camera settings

In setting up your camera here are some general rules:

- Shoot raw files or high-quality JPEGs. I almost always shoot raw files for two reasons. First, it gives me maximum flexibility in adjusting the color temperature later in post-processing. This is especially important when I shoot star time-lapse sequences. Second, the larger files give me plenty of flexibility for cropping and zooming in, using a "Ken Burns effect." The only time I would shoot jpeg files is if I need to shoot a very long sequence that won't fit on my largest memory card using raw files.
- Do not use auto white balance. Choose a proper color temperature for the scene at hand. Note that this is only an issue if you shoot jpeg files. The color temperature of raw files can be changed during post-processing.
- Use manual focus, and focus on the most important part of the scene. Choose an aperture to give you enough depth of field.

- If you are shooting a scene whose overall brightness does not change significantly, use manual exposure. If you are shooting a widely changing scene in terms of lighting (for example, from pre-sunset to post-sunset), there are two approaches you can make. The first method is to use aperture priority auto exposure. In this case the camera will keep the aperture the same and vary the shutter speed as the light changes. The problem with this method is that slight variations in the exposures throughout the sequence will result in annoying flickering when the movie is played back at 24 fps. This can be fixed later as I will discuss in the post-processing section of these notes. The second method to use under widely changing lighting conditions is to manually adjust the exposures on the fly by changing the shutter speed. This method also results in flickering, which must be fixed later. I have had good luck with the former method.
- Adjust your exposure using a combination of aperture (lens opening), shutter speed (exposure time), and ISO (sensor sensitivity).
- If you are shooting under low light conditions, as when photographing the stars, use a wide aperture (f/2.8 or wider), a long shutter speed (20-30 seconds) and a high ISO (1600-3200). For shooting the Milky Way (one of my favorite subjects) I will shoot at anywhere from f/1.4 to f/2.8 for 20-30 seconds at ISO 1600-3200. Using a wide-angle lens (14-24mm on a full-frame camera) will render the stars as nearly pin points of light in each frame.
- Wait at least one second between frames so that the data can be safely written to the card.
- For cloud time-lapse sequences I make one exposure every two seconds for fast-moving clouds and one every five seconds for slow-moving clouds. I use a playback rate of 24 fps. For a star time-lapse I use 20 to 30 second exposures, with a one or two second break before starting the next exposure. Since fewer exposures will be made in a given amount of elapsed time compared with a cloud sequence, I normally play the star movie back at around 15 fps.
- Consider "dragging the shutter." This refers to using relatively long shutter speeds to smooth the movement in playback. An example of when this is desirable would be waves washing up on a shoreline. If you use a fast shutter speed in this situation (1/125 sec. or faster), the resulting movie will exhibit staccato, stuttered motion in the waves. Using a longer shutter speed such as 1/4 second or longer will render the waves much smoother in playback. If the conditions are relatively bright, you will need to use a neutral density filter to cut down on the incoming light so that you can lengthen your shutter speed. Neutral density filters in the 3-6 stop range work well for this purpose.

III. Post-Processing
After you shoot your time-lapse sequence, it's time to process the images. The images can be edited in several different programs such as Lightroom or Adobe

Camera Raw. I prefer Lightroom for its ease of use and powerful processing tools.
Once edited, the files are made into a movie. There are several options such as
QuickTime Pro, which I will describe below, Adobe After Effects, Premiere Pro, or
Final Cut Pro X for Mac users.

        A. Import and edit images in Lightroom.
First, import your images into Lightroom from your memory card and place them
into a single folder. In this example, I will use 1,271 photos of a rainbow moving
across Niagara Falls taken at 4-second intervals over a 1 hour and 25 minute time
period. Highlight the first image and open it in the Development Module as shown
below. Here, I

made adjustments to Exposure, Highlights, Shadows, Clarity, Vibrance, and
Saturation. Next, I applied these changes to all 1,271 images. To do this, go back to
the Library Module and make sure the first image is highlighted. Hold down the
Shift key, and left click on the last image of the sequence. Click on the Sync Settings
icon in the lower right and the settings from the first image will be applied within
seconds to the remaining images in the sequence as shown below. This saves a
tremendous amount of work. Imagine having to make all these adjustments
manually to all 1,270 remaining images!
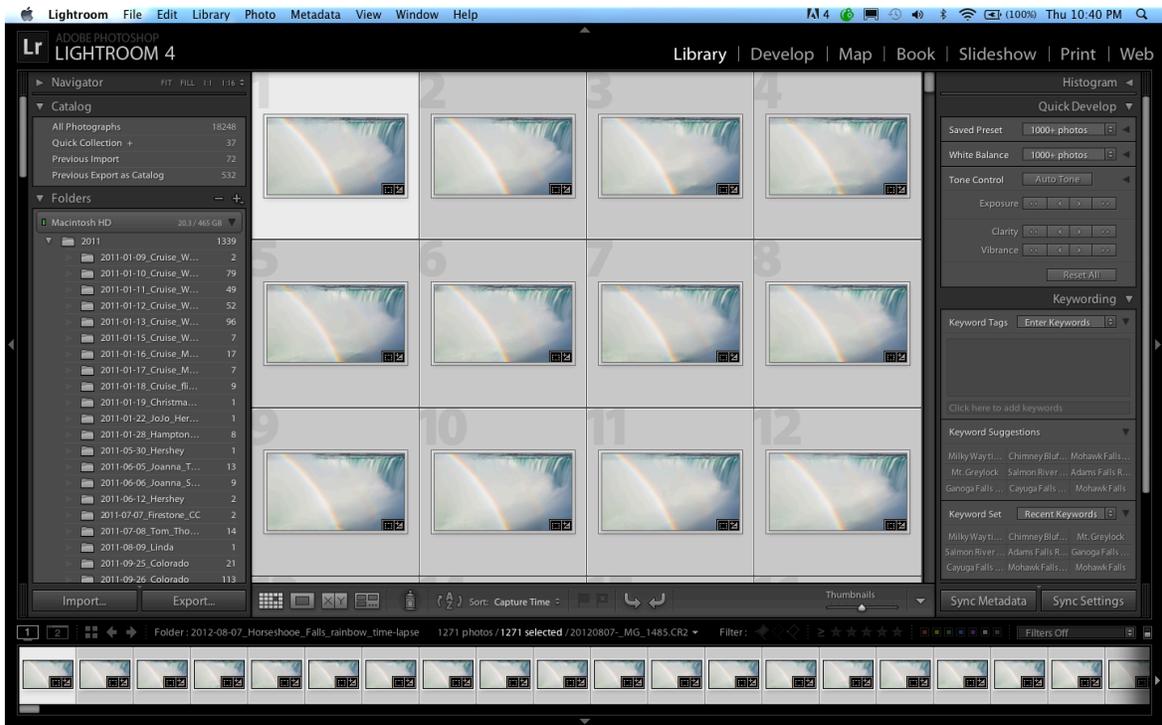
B. Editing images in LRtimelapse

For more complex editing I use a wonderful program called LRTimelapse written by Gunther Wegner (www.lrtimelapse.com). This program is especially useful for removing flicker, and making smooth day to night transitions. Shown below is an overview of the basic LRTimelapse workflow.

First, the images are imported from Lightroom and initialized. Next, a reference area is defined. Third, keyframes are selected. These are frames where, for example, changes in exposure are made. Next, the keyframes are saved in the XMP data. Upon returning to Lightroom, the keyframes are easily identified and modified in the Develop module. After saving the new XMP data, the images are reloaded into LRTimlapse. When the Auto Transition icon is clicked, the program makes a smooth transition of exposure changes (in this example) in all the images between the keyframes. This is extremely powerful in ensuring smooth transitions. If there is flickering present, clicking on the Deflicker icon effectively removes it. Finally, the XMP data is saved once more, and the frames are ready for rendering the time-lapse movie in your favorite software. It is even possible to produce the movie in Lightroom using some of Gunther Wegner's templates available on his website.

C. Making the movie in QuickTime Pro

We are now ready to make the movie using QuickTime Pro. First, export the edited images from Lightroom to a folder. Right click on the first image and choose **Export > Export…** An Export widow appears as shown below.
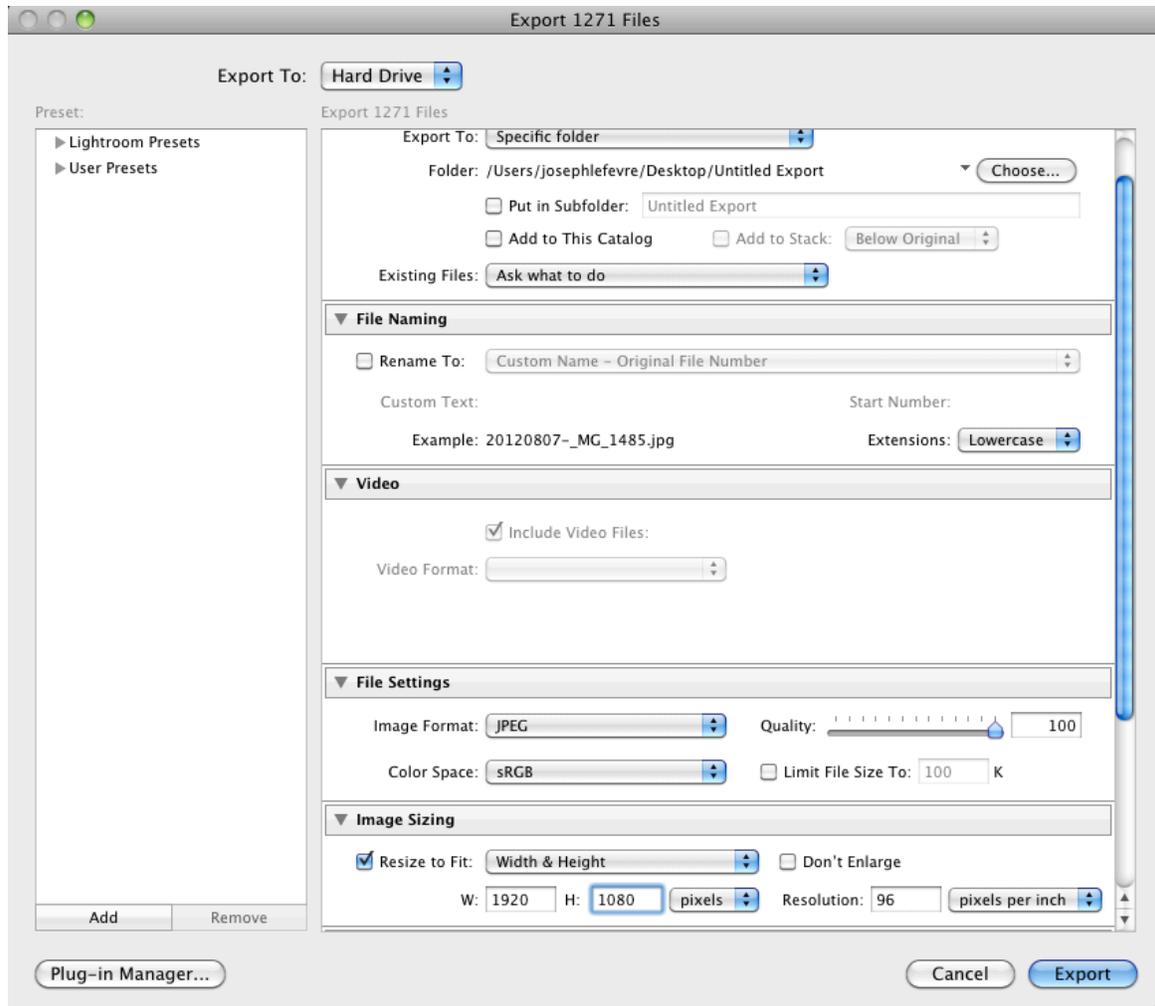
Choose a specific folder to which the images will be sent. In this example, I want to make a high definition (HD) movie, using high-quality jpeg files, which measure 1920 x 1080 pixels. Therefore, for **File Settings** I chose **Image Format: JPEG, Quality: 100, Color Space: sRGB**. Check **Resize to Fit**, and adjust width, height and resolution as follows: **Width & Height W: 1920 H: 1080, Resolution: 96 pixels per inch**. For **Post-Processing/After Export** (not visible in the figure above) choose **Do nothing**. Make sure you *do not* choose Open in Adobe Photoshop. If you do, it will attempt to open all 1271 raw files in Photoshop. Click **Export**. It will take some time for the images to be transferred to your folder depending on the speed of your computer. Go read for awhile…

To make the movie you will need QuickTime Pro. You can purchase it for approximately $30 (http://www.apple.com/quicktime/pro/). To begin, open QuickTime Pro. Choose **File > Open Image Sequence…** Navigate to your folder,

which contains the images in sequential order, click on the first image of the sequence, and then click **Open**. A window entitled **Image Sequence Settings** will appear. Choose a **Frame rate** of **24 frames per second** from the drop down menu, and click **OK**. The program will assemble the movie. After a short time, a window will appear containing the first frame of your movie. To make it fit on the screen, click on **View > Fit to Screen**.

To export and save the movie, click on **File > Export** and a window entitled **Save exported file as:** will appear. Choose **Export: Movie to QuickTime Movie** and click on **Options…** A **Movie Settings** widow will appear.
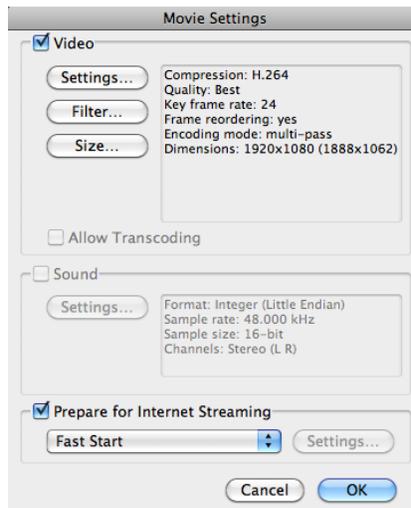
Check **Video** and click on **Settings**. A window entitled **Standard Video Compression Settings** appears.
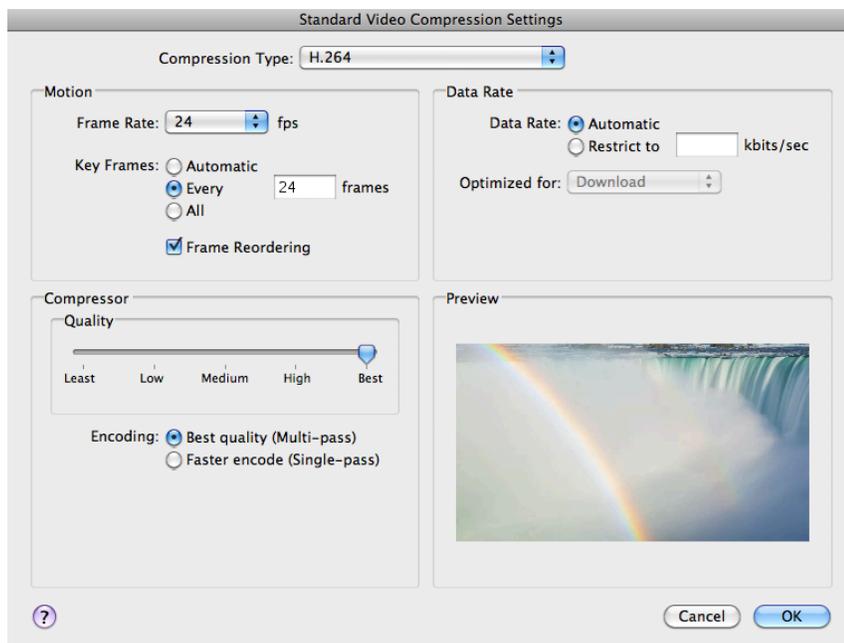
Choose **H.264** for the **Compression Type**, **Frame Rate: 24 fps, Key Frames: Every 24 frames, Data Rate: Automatic, Compressor Quality: Best,** and **Encoding: Best quality**. Then click **OK**. Back in the Movie Settings window choose **Size**, and a window entitled **Export Size Settings** appears.
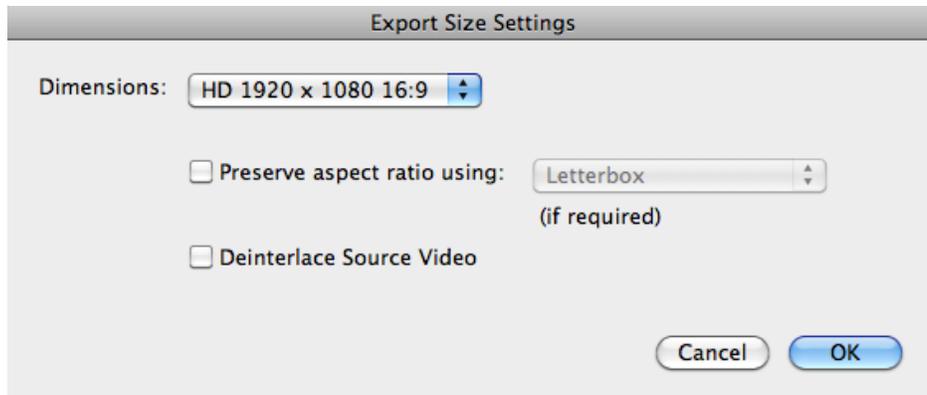
A number of choices are available in the drop down menu. I chose **HD 1920 x 1080 16:9** for the dimensions. Choose **Custom** if you want to specify your own dimensions, then click **OK**. When all these parameters have been chosen, navigate to a folder that you want to save your movie in, enter a name for the movie after **Save as:** in the **Save exported file as:** window, and then click **Save**. The movie will be saved in the folder you have designated. To play it, click on **File > Open File**… and navigate to the folder where you saved the file. Click on the play icon.

To add music to your movie, choose an MP3 music track that is approximately the same length as your movie. Within QuickTime Pro, select **Open File** from the File menu, and navigate to your music file. Once it is open, choose **Edit > Select All** followed by **Copy**. Open your movie and be sure the time cursor is at the start of the movie (00:00:00). From the Edit menu choose **Add to Movie**. The music will now be imbedded in your movie.