Skyline Images

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Sharpness

One of the more common things my students ask is how to ensure that their images are sharp where they want them to be.

There are two categories of problems with sharpness; stabilization and focus.

Stabilization

Your body moves and vibrates. No matter how still you are, you're not really still. One solution to this problem is to stabilize your camera with a tripod. I the absence of high winds, a sturdy tripod provides a steady platform for your gear. The tripod itself needs to be on a steady platform. Remember that boats, bridges, and tall buildings, for example, can move.

But you say, thinking you'd rather not lug a tripod around; lots of people get great shots hand holding their cameras. That's mostly about shutter speed.

On average, we humans can hold a camera steady enough to avoid "camera shake" if the shutter speed is at least as fast as the reciprocal of the focal length. This rule is simpler to understand than it seems. For example, with a 50mm lens you'd want to set your shutter speed at 1/50 or faster, while the magnified vibrations of a 200mm focal length would require a shutter speed of 1/200 or faster.

That being said, you might want to experiment to see where you fall in relation to the average. Age and health factors can play a part, and there are some things which will stretch your ability to hand-hold the camera successfully at slower shutter speeds.

Body position: it is helpful to stabilize your camera by placing your elbows at your sides, on your knees, or on a wall or other stable structure. More suggestions for holding your camera steadily are here; http://digital-photography-school.com/how-to-hold-a-digital-camera.

Lenses with image stabilization (also called vibration reduction) can allow you to produce a steady shot at significantly slower shutter speeds. Lenses vary in this regard.

Even your finger pressing the shutter can render your image blurry. Using a slow, steady squeeze can be helpful. Another trick is to use burst mode, shooting 3-5 images in quick succession. Generally, the ones in the middle are steadier then the first and last since depressing and releasing the shutter can introduce more movement.

Still, sometimes you'll need a tripod to create an acceptably sharp image. There are a couple of techniques that will help you to further steady a tripod-mounted camera. First, during longer exposures, the movement of the mirror in a DSLR can create enough vibration to soften your image. Fortunately, you can choose "Mirror lock up" in the camera's menu to solve this problem, and the camera will swing the mirror up before making the exposure. Second, there are ways to avoid the vibration resulting from pressing the shutter button. Ideally, we use a cable release, which is a cord (plugged into your camera) that essentially has a shutter button on the end. If you forgot your cable release, you can also use the two second timer function on your camera. Two seconds is generally long enough to let the vibration from your finger settle down.

Remember also that a camera strap in the wind can really jerk your camera around. Speaking of wind, many tripods have a hook to hang something (often your camera bag) from it to dampen the vibration.

Focus

There are a number of ways to achieve the focus you desire in an image. I'll talk about several of them here. I'll assume that you're comfortable with the concept of depth of field. If not, you'll want to educate yourself on that topic in order to fully understand this one.

Clearly, the simplest technique is using your camera's autofocus function. Many cameras will decide what they think should be in focus in their most automatic mode. Others give you the option to tell it where in the frame you'd like it to focus. Continuous autofocus is especially helpful when working with moving wildlife, sports, and kids. In this mode, the camera will focus on the subject you're following, even when its distance from you changes.

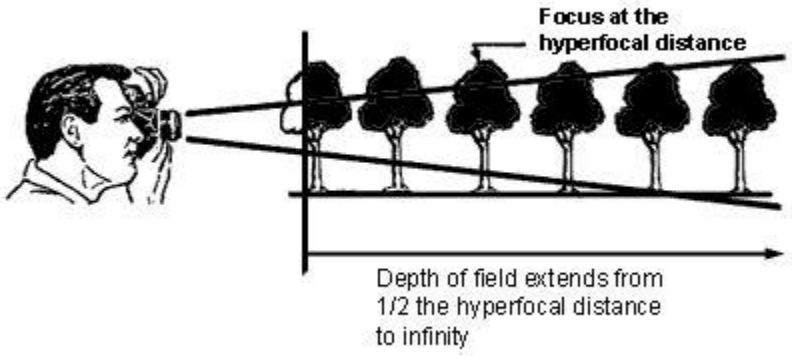
A side note; many DSLR cameras allow the user to uncouple the autofocus function from the shutter by assigning focus to another button. Many photographers call this "Back button focus." I'm a big proponent of that. It allows you to meter and focus on different parts of the scene. It also avoids the common mistake of accidentally leaving autofocus turned on when you thought you were focusing manually. If you do this, you'll lose your meticulously focused set-up when you hit the shutter button.

When shooting landscapes, I suggest using a tripod and carefully manually focusing the scene. Don't rely on what you see in the viewfinder, but rather use one (or a combination) of these two techniques.

First, you can compose the image on the live view screen and zoom the view to evaluate the focus. Many cameras have a 'depth of field preview' button. Depressing this and scrolling through the zoomed scene will help to see whether you are in focus and whether you need to stop down the lens for greater depth of field. The biggest weakness of this method is in low-light situations. Before the sun comes up, for example, using depth of field preview my render the live view so dark that you can't see well enough to

focus. A work-around (which is admittedly cumbersome) is to make the image, and zoom it in playback to check focus. After this you can adjust and repeat.

Another technique, which is essential to master, incorporates the hyperfocal distance (HFD). The HFD is the closest distance you can focus in order to extend sharpness from half that distance to the horizon. The distance is specific to the camera, focal length, and aperture you're using. Bear with me; this is not so difficult.



When you first start using this technique, you'll use tables. I find an app called DOFmaster to be the simplest way to have the information at my fingertips. In practice, you'll start to remember the HFD combinations that you use commonly.

For example, using A camera with a full-frame sensor
An aperture of f/16
A focal length of 24mm

The table tells me that the HFD is 4.02 feet
This means that if I focus at 4 feet, everything from 2 ft to infinity will be in focus.

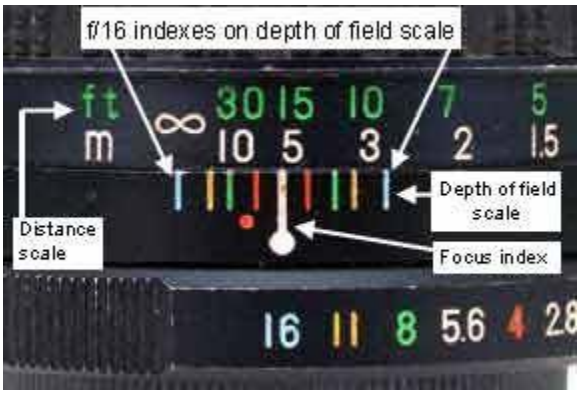
As you experiment with the tables, you'll see that depth-of-field is dependent on focal length. Wide – angle lenses have greater DOF than telephotos.

There are a couple of (somewhat less precise) shortcuts. First, you can choose a combination of settings which maximize your depth of field and leave them alone. This is especially useful for situations where the light will be plentiful, and you want to be able to shoot quickly without changing settings. This method works well in street photography. I call it the instamatic method, because that's how the inexpensive Kodak camera of the 1960s and 70s allowed you to shoot in these situations without focusing.

Second, you can focus one-third of the way into a scene. As you would guess, this technique works best with a small aperture and wide angle lens.

For the third short-cut, I give credit to Arizona Landscape Photographer LeRoy DeJolie. Some of his students call this the "Fingernail Method." He suggests that you focus first on the nearest object in the frame, and hold that spot with a thumbnail in the groove (in the focusing ring) at the top of the lens. Now rotate the ring to focus the farthest object and hold that place with the other thumbnail. Ideal focus will be exactly at the midpoint between the two.

Similarly, if your lens has a Depth of Field scale, you can estimate HFD using it.



Here's more information about HFD; http://www.dofmaster.com/hyperfocal.html#methods

Aperture and Diffraction

One other thing about sharpness bears mentioning. When you stop down your aperture to the smallest diameters (f/20 and f/22 on many lenses), you often lose sharpness compared to larger apertures. The reason for this is that the light diffracts (bends) around the blades of the lens iris and become less focused. The lesson here is to use these apertures only when there's a good reason to do so.

Exercises:

1. Test yourself at various shutter speeds and with different body positions and lenses. See how far you can push it and still have a sharp image.
2. Practice with hyperfocal distance. Download the images and confirm that they are in focus.
3. Compare the hyperfocal distance method with the shortcuts. Do they work?