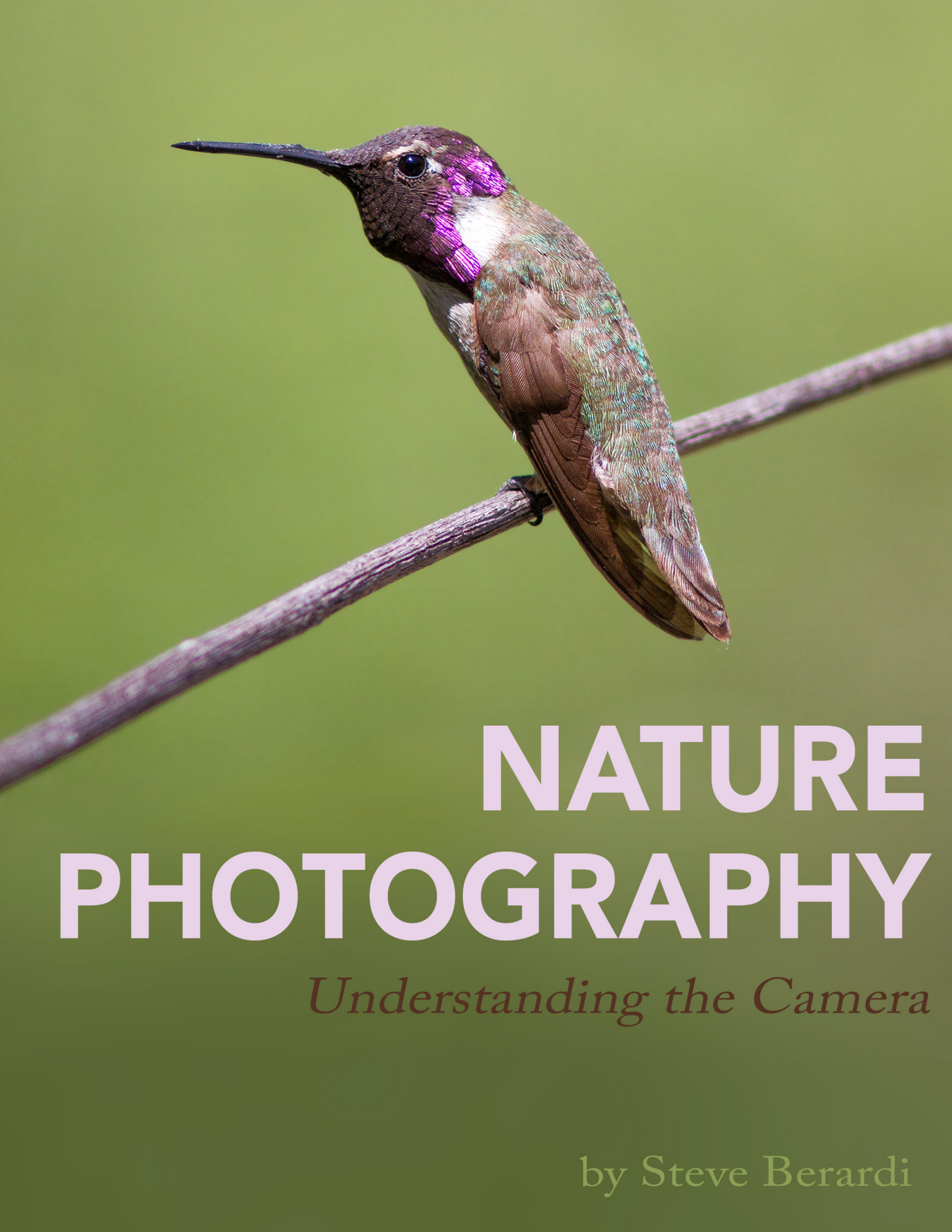


NATURE PHOTOGRAPHY

Understanding the Camera

by Steve Berardi

Table of Contents

Introduction	4
1 — How Does a Camera Work?	5
2 — Aperture	7
3 — Shutter Speed	13
4 — ISO	16
5 — Exposure	20
6 — Focus	32
7 — Depth of Field	42
8 — Sharpness	46
9 — Perspective	53
10 — Light	61
11 — Composition	71
12 — Lenses	79
13 — Memory Cards	85
14 — Accessories	89
15 — Camera Settings	93
16 — Respecting Nature	96
17 — Examples: Bringing It All Together	98
18 — Where to Go from Here	106
About the Author	107

8 — Sharpness

One of the goals of a good photo is to ensure that it's sharp enough. This is especially important for close-ups of things like insects because the extreme sharpness will help emphasize the beautiful detail in these extraordinary creatures.

There are two things that will affect the sharpness of your images: movement of your subject and movement of your camera.

If both your camera and your subject are completely still when you shoot your photo, you'll get a perfectly sharp image. Unfortunately, you're rarely this lucky in nature photography. So let's explore what we can do in these situations.

Movement of Your Subject

One of the most difficult things about photographing nature is that there's very little you can control. Your subject will often move when you don't want it to.

This is most commonly a problem with photographing wildlife, since they're almost always on the move. But it also becomes an issue when photographing things like plants. Even on an extremely calm day, plants will constantly sway in the air.

Here are a few things you can do to deal with the movement of your subject:

1. **Use a faster shutter speed**. The simplest thing you can do is use a faster shutter speed, which helps freeze the action of your subject. How fast of a shutter you'll need depends on how fast your subject is moving, so experiment with a few different speeds.

2. **Wait until your subject stops moving**. You can also just wait until your subject stops moving. This is sometimes an option when you're photographing something like wildflowers (which seem to constantly sway in the air). It may take awhile before the wind dies down or that insect sits perfectly still for a second, but patience is one of the most important skills in nature photography!

3. **Track your subject and use continuous focusing**. When your subject is constantly moving (such as a bird in flight), the best way to get a sharp photo is to track the subject with your camera. Try to keep the subject in the exact same area of the frame as you track it, and turn on continuous focusing so your camera will automatically adjust the focus as you track your subject.

4. **Emphasize the movement**. Another thing you can do to deal with the movement of your subject is to simply emphasize that movement and capture the motion. Remember from the chapter on shutter speed how you can control the amount of movement you capture? Well, sometimes it's nice to get a little blur in your photos that helps show that your subject was moving. This works best when you really emphasize the movement though, so make sure you use a long enough shutter speed to get a good amount of blur.

Hummingbirds move really fast, so emphasizing that movement usually works well, like in the image above. I purposely wanted the wings a little blurry to show movement.

Movement of Your Camera

Another thing that'll result in unsharp photos is movement of your camera. By far the best way to prevent your camera from moving is to use a good tripod. But sometimes you can't use a tripod, so we'll explore a few ways to keep your camera still: with a tripod, improvising a tripod, and handholding your camera.

Using a tripod. Compared to everything else in photography, the tripod seems like the simplest thing to use: just extend the legs, put the camera on top, and you're ready to go! Well, unfortunately it's not that simple. As Ansel Adams wrote in his wonderful book *The Camera*:

"Many photographers casually set up the tripod and use the various tilts and adjustments in a haphazard way. It is preferable, however, to be more methodical in setting up the tripod, if time and situation permit, to provide precise positioning of the camera and the greatest possible stability."

Here's how to use your tripod properly:

1. **Find your composition first**. Since it takes a good amount of time to setup a tripod, it's a good idea to find your composition first and then worry about the tripod. So walk around and explore your subject from different angles. It may help to look through your viewfinder as you do this to help you see exactly what the composition will look like as a photo.

2. **Point one of the tripod legs towards your subject**. Pointing one of the tripod legs towards your subject will give you room to stand between the other two legs (helping to prevent you from tripping over the tripod), and it can help stabilize the camera some more when it's pointed towards the ground.

3. **Keep the center post vertical and perpendicular to the ground**. To ensure the weight of your camera is evenly distributed to all three legs, make sure the center post is vertical and perpendicular to the ground. Using one of those bubble levels that attach to the center post can tremendously help you level the tripod like this. These bubble levels, if they're not already on your tripod, are usually specific to each tripod model so check with the manufacturer.

4. **Avoid using the center post**. The center post is significantly less stable than the three legs spread out, so only use the center post as a last resort or for very minor adjustments (a few inches). This will often cause some frustration in setting up your tripod to that perfect height, but just remember that it's helping you get the sharpest image possible.

5. **Use an L-bracket for short lenses**. The "L" bracket is a special kind of plate that attaches your camera to the tripod head. It's shaped like an "L" and allows you to mount your camera in portrait orientation while still keeping the camera at the center of the three legs. Here are a few photos that illustrate the difference between the L-bracket and a standard plate:

   The L-bracket has two big advantages: it keeps the center of gravity where the tripod can best support it (at the center of the three legs), and it gives you a few more inches of height when you're shooting in portrait orientation (these few extra inches can certainly make or break a photo!).

6. **Use a tripod collar for long lenses**. Since big heavy lenses will often shift the center of gravity of your camera, it's important to use a tripod collar that evenly balances the weight between your camera and lens. Without one, you'll surely notice how your camera has a tendency to slowly shift down after you lock the tripod head in place.

7. **Hang a camera bag or heavy object from the center post for extra stability**. If you find yourself in some super windy conditions, it might help to add some more weight to your tripod by hanging something (like a camera bag) from the center post. Many tripods already have a hook in place, but if yours doesn't, then check to see if you can just screw in a hook from a hardware store. Be careful with this method though: if your camera bag is shaking a lot in the wind and hitting the tripod legs, you might actually lose stability. In extremely windy conditions, you might also want to try holding down the tripod with your hands.

When I shot the photo above, it was extremely windy. So windy that if I hadn't held down my tripod, it would've been knocked down by the wind!

Although setting up your tripod may seem like a slow and tedious process, it's important to do it carefully to ensure you get the sharpest image possible. Ensuring that your tripod is in a stable position will also help prevent it from toppling over and damaging your camera and lens.

And finally, the more time and care you take in setting up your tripod, the more you'll be forced to concentrate on your composition. Knowing that it's going to take you a long time to set up that tripod, you'll be more careful about what composition you choose.

Improvising a tripod. When you can't use a tripod, try to improvise with the objects around you. The goal is to keep your camera steady, so look around and see if there are any objects (such as trees or rocks) that you can use to rest the camera on or lean your body against. Any amount of support can help you get sharper photos!

Handholding your camera. When you're stuck handholding your camera, there are some techniques you can use to help stabilize it:

1. **If you're standing, keep your elbows in and rest them against your body**. This helps give your camera some extra support, especially when using long lenses.

2. **If you're squatting, rest your elbows on your knees**. This gives your camera extra support while you're squatting.

3. **Don't tense up**. Keep your hands firm, but don't make them too tense because that will only cause the camera to shake.

4. **Hold long lenses at their center of gravity**. When holding a long lens, one hand should be on the camera, and the other hand should be right under the center of gravity of the lens (which is where the tripod collar is attached).

5. **Press the shutter button halfway first**. To prevent the camera from shaking too much, it helps to press the shutter button halfway first, pause for a brief moment, then press it all the way down. Also, press it softly—if you apply too much pressure, it'll shake the camera.

6. **Shoot a bunch of photos in a burst**. To help increase your chances of getting a sharp photo, enable continuous shooting on your camera and hold down the shutter button until you take at least three shots.

7. **Hold your breath while pressing the shutter**. If you watch closely, you'll notice that the camera moves a little as you breathe, so to stop that movement, hold your breath while pressing the button.

Relative vs. Absolute Sharpness

In nature photography, sometimes it's easy to fall into the trap of thinking that everything needs to be as sharp as possible, as if sharpness were the most important aspect of a nature photo. Although sharpness does matter, it's important to understand that relative sharpness is much more important than absolute sharpness.

Absolute sharpness is about making your subject as sharp as possible, within the limits of your camera and lens. On the other hand, relative sharpness is about making your subject as sharp as possible *relative to other elements in that image*.

For example, here's a photo with a lot of absolute sharpness:

Everything in this photo was perfect for making that dragonfly as sharp as possible: I positioned my camera so its sensor was parallel to the dragonfly's body, I used one of the sharpest apertures of the lens, I waited until there was a break in the wind to keep everything still, I used a tripod, I kept the shutter speed fairly fast, and I shot a bunch of photos in a burst. The result? A very sharp dragonfly.

Here's a photo with not much absolute sharpness but a decent amount of relative sharpness:

The sage branch in the center of the frame isn't nearly as sharp as it could be. But relative to the background, it's sharp enough to stand out and give the perception that it's sharp. It's also just a little more in focus than the branches on the sides of the frame, making it stand out more. So it's not as sharp as possible, but I would say it's *sharp enough*.

I think absolute sharpness is something great to strive for, but if you overemphasize it, it can really get in the way of your creativity and prevent you from creating good images.

For example, maybe you once chose not to photograph a butterfly because you couldn't get in a position that made your camera's sensor parallel to the body of the butterfly (while also having a good background from that position). In that case, you could've just tried photographing the butterfly from the good background perspective and sacrificed a bit of sharpness.

Sometimes you're lucky and can capture your subject with a lot of absolute sharpness *and* still have the artistic composition you were hoping for, but don't let a little sacrifice in sharpness stop you from capturing an otherwise good photo.

The thing to keep in mind about sharpness and focus is that the viewer will usually look to the sharpest part of the image first. They don't care too much about absolute sharpness—they just care about what's sharpest relative to everything else in the image (and it could be that everything is sharp too, like in a landscape). There's a certain point, of course, where things would be considered "blurry," but I think you know what I'm trying to say here.

Things to Remember

- Two things affect the sharpness of your photos: movement of your subject and movement of your camera
- To help battle the movement of your subject, you can use a fast shutter speed, wait until it stops moving, track your subject, or just emphasize the movement in your photo
- To help keep your camera still, you can use a tripod, improvise a tripod, or hold your camera carefully
- Relative sharpness is much more important than absolute sharpness

Painted Lady Butterfly on a Desert Sunflower

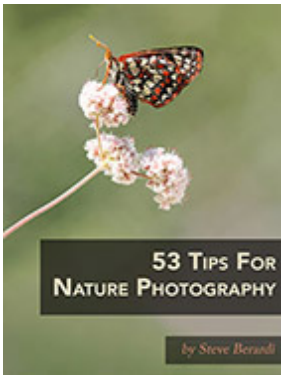
Camera	Canon 5D Mark II
Lens	Canon 300mm f/4L with 1.4x teleconverter
Focal Length	420mm
Aperture	f/8
Shutter Speed	1/1000
ISO	400

Photographing butterflies is a combination of luck and patience. In order to get this photo, I sat down near a large group of desert sunflowers and made sure a lot of the flowers had good backgrounds in case a butterfly landed on it. Then I just waited until a butterfly landed on one of those flowers with the good backgrounds. I think it took about 30 minutes of waiting. There were a lot of painted lady butterflies flying around that day, so I didn't have to wait too long. Once the butterfly landed, I waited until its wings were parallel to my camera's sensor in order to maximize sharpness. I used an aperture of f/8 because I needed some depth of field in the body of the butterfly, and the background was really far away so I was able to get away with a medium f-number. Since butterflies are constantly moving, I wanted a fast shutter speed, so I used ISO 400. I used a tripod for this shot, but I kept the ballhead loose—basically I just used the tripod legs for a little bit of support. I like using the tripod this way when photographing butterflies or other insects because it allows you to quickly move the camera around while also having some support.

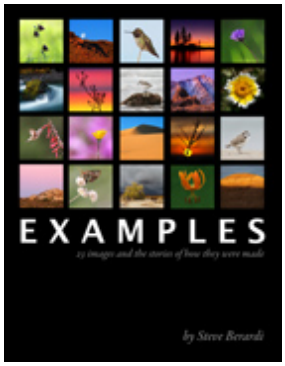
About the Author

Steve Berardi is a nature photographer, software engineer, and founder of PhotoNaturalist—a blog on nature photography with over 16,000 subscribed readers. You can usually find him hiking in the beautiful mountains and deserts of southern California. His photos have been used by *Nature Photographer Magazine*, the Sierra Club, and the National Wildlife Federation. He's also written numerous articles for *PhotoYou Magazine* and the Digital Photography School.

More books by Steve Berardi:



53 Tips For Nature Photography



Examples: 23 Images

Wildflower Photography

13 Tips For Wildflower Photography

“The camera is an instrument that teaches people how to see without a camera.”

—Dorothea Lange