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Simple Exposure

Basic Bird Photography Revealed

Newbies to bird photography are often intimidated by the myriad knobs, buttons, dials, and settings that are available on most cameras, and the technical jargon that goes along with them. But 90% of photography is about understanding just three basic principles.

This article unpacks the basic tools of exposure—ISO, shutter speed, and aperture—and discusses exposure compensation, which is easier than it sounds. Once you can manipulate your camera settings, you are ready to take control and determine how your photos look, rather than relying on automated functions that decide for you. This article ends with a few field techniques to make your photos “pop.”

If your photography is primarily for ID purposes, you may be tempted to stick with fully automated settings. But even then, if you do not take control, the camera will over- or underexpose certain shots in tricky light. So, understanding the basics will be helpful, even if it’s just to keep the folks at eBird happy.

The Three Wise Controls

The sensor is the digital hardware that converts the image in the viewfinder into the pixels that comprise your photo, via reflected light. The following three controls affect how that light is processed:

- **ISO:** the apparent light sensitivity of the sensor
- **Shutter speed:** the length of time the sensor is exposed to light
- **Aperture:** the size of the diaphragm that physically controls the amount of light that enters the lens and hits the sensor

All three are related. The crucial thing to know is that if you adjust one of these controls, you (or the camera, if that control is automated) will have to adjust one of the others, or both, to correctly expose the photo. I will discuss this *ménage à trois* relationship after discussing their photographic impacts independently. Also, the values of ISO, aperture, and shutter speed can differ depending on the type of camera and lens you have; what remains unchanged is the nature of their relationship to one another.

ISO

A hangover from the days of film photography, when rolls would typically have 24 or 36 frames, ISO 50 or 100 would be a fine-grain film producing the highest-quality photos with the most vivid colors. ISO 400, 800, or 1600 would be progressively grainier and of lower quality, but because

Steller's Eider in Barrow. I took this photo only three years after I first learned to deal with settings. So, anyone with persistence can learn to take better photos.

Photo © Keith Barnes.



Shot at ISO 6400, this photo of a Coral-billed Ground-Cuckoo is grainy and would probably be poo-pooed by many artsy photographers. I don't care because it's one of the most mystical birds in Asia and remains hidden in the darkest recesses of the rainforest. The only way to get any workable shot was to increase ISO so that the photo was not blurry. *Photo © Keith Barnes.*

this film was more sensitive to light it could be used at higher shutter speeds in darker environments. In digital photography, your ISO setting mimics film, which means that low ISO values produce the best-looking photos and high ISO values produce lower-quality images with digital grain (also called “noise”). However, to use lower ISO, additional light is required, and as the light dwindles, ISO has to be increased to get sharp photos.

Photographers prefer low ISO values, but in the darkest environments you have little choice. I spend a lot of time in Asian rainforests: dark conditions that demand high ISO values. Grainy photos are better than blurry ones. The former can be manipulated in Photoshop®; the latter are destined for the bin. Once your photos start losing sharpness, increase the ISO so that you can increase the shutter speed.

Shutter Speed

Shutter speed may be the simplest of the principles to understand. It is the amount of time

the shutter remains open, and it is measured in fractions of a second. Mostly, we are trying to get sharp images of birds, so we are aiming for fast shutter speed. Because longer, heavier lenses are tougher to stabilize, they necessitate a faster shutter speed to avoid blur. As a general rule, your shutter speed should be as fast as your lens is long. So, 1/300 of a second for a 300mm lens and 1/500 for a 500mm lens. If a bird is motionless, shutter speed can be slower; to freeze an action shot, like a bird bathing, at least 1/1500 of a second is needed. While blur can be used as an artistic tool, doing so successfully requires some experience and purpose. Before delving into that, work on making your images sharp.

Aperture

Aperture is the most complex variable and the most important. It controls your depth of field (DOF); that's how much of your focal point and the immediately adjacent zone

are in focus. Aperture is a crucial creative tool, so take the time to understand it fully. You can present the zone of interest to the viewer, and blur the background and distracting elements. This clean, blurred palette from which the subject pops is called “bokeh.” It is best achieved by controlling both the aperture and either your own or the bird's body position to achieve suitable DOF, and finding an aesthetically pleasing background. More on that later.



The background is what makes this Magellanic Oystercatcher photo (below) interesting. The pleasing rich green mossy background that is blurred lends a pleasing bokeh, controlled by a narrow DOF f5.6. ISO of 200 leads to a high-quality image, and I was able to use a lower shutter speed of 1/640 as the bird was stationary. Because I wanted all the flying Plain-pouched Hornbills to be in focus, I had to increase my DOF in this photo to f16. But because they were flying and I needed a fast shutter-speed, the only way to achieve this was to increase ISO to 2500.

Also, I had to increase the exposure compensation to $+2/3$ (See “Exposure compensation”) to make sure the birds did not appear as dark silhouettes against the bright sky. Photo © Keith Barnes.



Sometimes, though, you want to increase DOF. Maybe there are two raptors fighting, and you want both in focus, or you want an element of the background to be featured prominently. Knowing how to manipulate the aperture to achieve your desired DOF is one of the most impor-

tant things in creative photography.

The aperture is the hole in a physical diaphragm (or iris); its size determines the amount of light that filters into the camera—just like the pupil in your eye. The size of the aperture is measured in f-stops. Counterintuitively, the lower the value, the more open the diaphragm is (the larger the aperture), and the more light is hitting the sensor. But, simultaneously, a larger aperture means a narrower DOF, so blurring on either side of the focal point is at a maximum. Higher f-stop values mean the aperture is narrower and DOF is wider, with more in focus (see Figure 1, next page).

The f-stop values your camera body can execute are determined by your lens. Generally, larger, more expensive prime lenses allow more light in and permit your camera to implement lower f-stop values (this, with a nar-



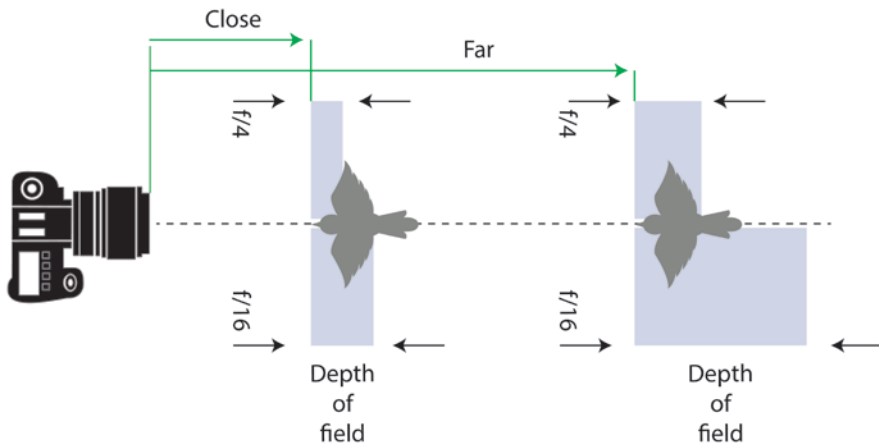


Figure 1 ■ [LEFT] As f-stop values increase, the greater the depth of field (DOF). The farther away your subject is, proportionally, the greater the depth of field is relative to your subject.

prove your photo—for instance, manipulating the aperture—this affects the exposure (the amount of light hitting the sensor), and then either you or an automated setting on the camera has to adjust ISO, shutter speed, or both, to compensate. Figure 2 explains the nature of the relationship between the three, and how it specifically relates to selecting aperture priority (AV on most cameras) or shutter priority (TV on most cameras).

If your photo is too grainy and you decide to lower ISO, reducing the light sensitivity on the sensor, you must do something to let more light into the camera to compensate—either lower f-stop and open the aperture or reduce shutter speed. When there is abundant light, selecting the settings is easy: low ISO for highest resolution photos, high shutter speed to reduce blur and freeze action, and whatever f-stop is required to execute the creative vision. Simple, right? Well, not always. With plenty of light, like in the middle of the day, there are often strong shadows, and much detail on white or black sectors of birds is lost. So it's better to shoot at dawn and dusk, or in overcast weather, when light is soft and delicate. But herein lies the rub. Light is scarce at those times, and compromise is constant, with adjustment in ISO, aperture, and shutter speed necessary in order to get the best results.

SELECTING THE SETTINGS: Aperture and Shutter Priority, and Manual

Most cameras have a dial or button for selecting the shooting mode. Many users choose the auto function and never change it. But let's examine the alternatives. As discussed above, there are three main interrelated variables. Most cameras give you an option to have control over one, two, or all three variables. Even controlling one (and understanding the oth-

AV Aperture Priority TV Shutter Priority

Fixed		Variable		Fixed		Variable	
Low f/5.6	Aperture	100 Low	Shutter Speed	High 1/2000 Freeze Action	Shutter Speed	Low f/5.6	ISO
f/22 High		High 3200		Blurry 1/30 Low		f/22 High	

Figure 2 ■ [ABOVE] By selecting AV, you choose the f-stop value (fixed variable). If you decide to increase the f-stop to increase DOF, this reduces the amount of light hitting the sensor, and you (or the camera, if it is automated) will have to adjust ISO to be higher or reduce the shutter speed to increase the light accordingly. Selecting TV fixes shutter speed. If an action sequence opportunity arises and you increase your shutter speed to freeze the action, this reduces the amount of light hitting the sensor. To compensate, you will either have to reduce your f-stop value or increase the ISO to make sure the sensor is receiving enough light for correct exposure. The opposite applies if reducing f-stop or shutter speed.

rower DOF), which is why serious photographers favor them. But most zooms and bridge cameras range from around f5.6 to f32. The most important thing to remember is how f-stop affects DOF: low is narrow and high is wide, respectively. See Figure 1 to understand how DOF varies according to distance from your subject: At the same f-stop, DOF is greater the farther away your subject is.

LIGHT: Get the Balance Right

This is the crux of the whole article. Compromise. If you change a setting to im-

ers) gives you much more control than just leaving the camera on “auto.”

Aperture priority (AV) • I recommend selecting aperture priority while learning. This controls DOF, the main creative tool. The camera automatically adjusts shutter speed. But always monitor the shutter speed reading, and if it drops below 1/250 second, you might get blur and need to adjust your f-stop down to increase

shutter speed. ISO can be selected either manually or by the camera (auto). If you select ISO manually, always monitor the other settings so that when one of them starts to be non-optimal, you can adjust the ISO accordingly.

Having decided to use aperture priority, what is the best value to choose? There’s no wrong or right answer, but let’s say you are shooting wood-warblers. With small, fast-moving birds, a default of f7.1 is a good start-

As this **Gentoo Penguin** exploded from the surf, I chose to select shutter priority, setting the camera to 1/2500th of a second. Any slower and there would be blur. As the waves broke, the background would rapidly alternate between white and dark blue, making a manual selection of aperture and ISO impossible, so I left them on auto and let the camera do its job, and then after 876 shots I got lucky with this image! *Photo © Keith Barnes.*





ing point. At distances of five yards or more, this will keep almost all of the bird in focus. But if low morning light requires a low shutter speed, then either increase ISO or dial the f-stop to 5.6 to improve your chances of a sharp shot. Just be aware that if the bird moves closer, some portion of it, like the tail, will likely be out of focus even if the head is pin-sharp (Figure 1). If, however, a pair of birds suddenly perched one behind the other, then increasing the f-stop value to f10 would increase DOF, improving chances that both birds are in focus.

Shutter priority (TV) • This setting controls shutter speed, with the camera automatically adjusting the aperture. ISO can be set to manual or auto. I mostly use shutter priority when shooting birds fighting, bathing, in flight, or in an action sequence, and I need to freeze

the action at 1/2500 second or above. This is especially helpful if the light is changing frequently, as when a bird flies between light and dark backgrounds.

ISO • Many bird photographers might argue against this, but I would put ISO on an auto setting and allow the camera to choose while I was learning to master aperture and shutter priority. Why? Well, a grainy photo is better than a blurry one. You can always use software to repair some of the grain, but a blurry shot will get binned. Even in auto mode, keep an eye on the ISO reading; if it gets too high, then either manually select your preferred highest ISO or adjust another variable. Once

you have more experience, start selecting your ISO manually, so you can control the quality of your photos.

Manual (M) • This is for the control freak and purist, permitting selection of each variable. Using manual mode is undoubtedly the best

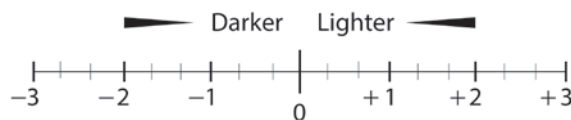


Figure 3 ■ If you have a dark bird against a pale background, like sky or snow, dial exposure compensation to the right (+) to make the subject lighter. If you have a pale bird against a dark background, dial exposure compensation to the left (-) to prevent overexposure and make the subject darker.

Labels: "Auto" underexposes dark birds on light background (**Long-tailed Jaeger**, left). Exposure adjusted $+2/3$ correctly exposes the subject. "Auto" overexposes a light bird on a dark background (**Great White Egret**, right). Exposure adjusted $-1/3$ correctly exposes the subject. Photos © Keith Barnes.

way to learn about the nature of these variables and their impact on photos, but it will initially lead to many over- or underexposed photos and frustration. Rather, explore this option once you have mastered the others. Many very experienced photographers never go manual, as they do not see the need.

Exposure compensation • Everyone has been frustrated when a shot of a bird flying against the sky turns out as a dark silhouette, or a white egret on a dark background is blown out. The reasons this happens are somewhat technical. Most cameras do a good job of measuring the light and selecting appropriate settings when the bird and background are equally lit. But the moment you have a relatively small subject against a contrastingly lit background, the camera botches the exposure on the subject. Essentially, the camera does not understand that you only want the bird exposed correctly and don't really care about the background. Fortunately, a function within the camera can manually override this tendency. It is called exposure compensation and is represented by the bar in Figure 3. By default, it is set to zero. But if you push it up by $1/3$ or $2/3$, it will increase the exposure, making the photo progressively lighter. If a Long-tailed Jaeger is swooping past with a bright sky background and your image is a silhouette, adjust the exposure compensation upward by increments of $1/3$ until the bird is correctly exposed. Unfortunately, learning by how much to adjust is achieved by trial and error, and so, if you are pressed for time, just go up $+1/3$, take five quick shots, go up to $+2/3$, take another five shots, go up to $+1$, and so on. Eventually, you will have a series of photos correctly exposed. Remember, if you have





After watching a **Silvery Grebe** (bottom left) for 20 minutes, I predicted where it would approach the shore closest. I crawled on my belly to the spot and took this intimate photo of the chick on the back. It clearly felt unthreatened. Having watched a frisky male **Red Phalarope** (top left) in Barrow do mating displays I slowly approached and made sure that when it jumped up to display to nearby females, I was ready with a narrow DOF f6.3, high shutter speed 1/2000 to freeze the action, good side lighting, and a nice green background. *Photo © Keith Barnes.*

a pale egret on a dark background, you must adjust downward (-) until the bird is correctly exposed. Experience with your camera will lead you to know intuitively how much of an adjustment to make.

Irrespective of whether you shoot on AV, TV, or M, you should constantly assess the three main variables, including those you have automated. Mentally check that you are getting what you want. Even while photographing the same bird, the light may change and an adjustment may be required. Make sure you regularly review your photos on the back of your camera to get good results.

Now, let's discuss a few basic field techniques to make your photos "pop."

Field Skills

The right approach: Slow and low, that is the tempo • At all times, please obey the ABA's rules and ethical standards. A bird's welfare is first and foremost. Most birds view people as a threat, and rightly so. If you approach a bird, lock eyes on it, and make a direct bee-line for it, it will almost certainly flee.

It's best to behave disinterested. Sit down. Avoid eye contact. If you move closer, walk in a zig-zag pattern or amble slowly. The second a bird gives an alarm call, walks away, or raises any feathers, you are in its space—back off. Patience is best; sometimes, if you make odd noises, an inquisitive bird may approach you.

If you observe a bird long enough, such as

I lay on my belly to get this shot of **White-tufted Grebe**, so I'm engaging the bird at its eye level. With a narrow DOF at f5.6, the bird is in focus, but most of the water is a silvery plain bokeh. With the bird swimming toward me and the symmetry of the head, it makes for an interesting angle rather than a plain portrait shot, and I had to over-expose by 2/3 to make sure the dark subject on a pale background was not under-exposed. *Photo © Keith Barnes.*





Finding a background that contrasts little with the subject and then making sure shutter-speed is above 1/2500th of a second and keeping the subject small in the frame helps with flight photography of this **Parakeet Auklet** in the Pribilofs.

Photo © Keith Barnes.

a loon swimming in a pond, you may recognize that it moves in a pattern. See where it approaches the shore closest and then head to that position while the bird is on the opposite side of the pond. Sit or lay down to be non-threatening and wait for it to circle back. Once successful, wait for the bird to move away to avoid startling it when you stand up.

Birders are attuned to bird behavior, enabling us to get great action shots as we anticipate what a bird will do next. When a roosting egret “poops,” most of us know that next it will fly. Use your knowledge to take interesting photos. Be prepared for that take-off shot. Get your settings right (high shutter speed and desired DOF) to ensure you have the egret frozen and the whole bird in focus.

Plan your shoot depending on where you are going • Dawn and dusk are best for photography, combining peak bird activity with golden light and soft shadows. Once the sun gets too intense (between 9 a.m. and 3 p.m., if there is no cloud), the shadows and highlights are too strong for aesthetically pleasing photos. But for ID or documentation, you can still get perfectly good shots.

If you are planning a specific type of shoot, at a wetland or sea bluff, for instance, check to make sure the conditions are good—that the tide is right and the light will come from the right direction. For ideal, soft warm lighting, a setting or rising sun that is mostly behind you, or at an angle of 25-30 degrees will create subtle side-lighting. The only time to shoot into the sun is for a special artistic silhouette, as all you are likely to get are black shadows of subjects, which would be a disaster if you are hoping for ID pics.

Eye to eye and keep your camera level • The most engaging photos almost always have the bird at eye level. For warblers that are five to six feet up, that's great if you are standing. But for a Killdeer or waterbird, you have to be down on your belly. This achieves two things. It gives you an eye-level shot, but also increases the DOF; much of the messy ground near the bird will be rendered as eye-pleasing blurry bokeh, especially at a low f-stop.

Focus and composure • Here are a few tips about composing. Rules are made to be broken, so these are simply guidelines. If there's more than one bird in the frame, focus on the closest bird, because your eye will be drawn to that subject. If birds are coming into a flowering tree or something similar, select the most photogenic perch with a good background for pre-focusing. With luck, your subject will land there. Focus on the bird's eye and wait for the head to be in a position where there's a glint in

the eye; that's often the most engaging a bird can be. Take care in framing your subject. Put space in front of the bird, and make sure that if it is long-tailed you don't chop off the tail. It is easy to do. Choose uniform, natural-toned backgrounds that are green, brown, yellow, or reddish. Try to avoid the sky, or unevenly lit environments, or those that are very white or black and require exposure compensation. Think about your subject and the orientation of your camera. Landscape works with short-legged horizontal birds like grouse. Portrait works better for herons or tall birds. If shooting near water, aim for perfect glassy reflections; those that are not exact mirror images often look distracting.

Birds in flight • Birds in flight present perhaps the trickiest of all genres of bird photography. Keep your shutter speed as high as possible to avoid blur. The smaller and faster-flying the bird, the higher the shutter

speed required—for instance, 1/800 second for an eagle soaring and 1/4000 second for a hummingbird hovering. Keep the bird small in the frame, as you are more likely to be able to track it and keep it in focus. Remember that most birds fly into the wind. So position yourself with the wind at your back. Also, keep the sun behind you, and check conditions carefully. If you know that you are primarily going to be shooting birds against the sky, like swifts or swallows near a bridge, make sure you adjust your exposure compensation to +2/3 or +1 and fire a few test shots before wasting hundreds of frames. And then, best of luck! Putting the bird in the frame, focusing, and getting the shot are challenging things to do.

These are just a few tips to help you improve your bird photography. I am always happy to give advice, so please feel free to contact me. 🌐