

MANUAL METERING



This is a discussion on manually metering the camera. Before viewing this, new photographers, should view our “Exposure Lesson”.

Photographers gain the greatest control over ISO, aperture, and shutter speed by selecting the manual shooting mode.



Manual Shooting Mode

The manual shooting mode is the best choice for landscape photography.

1. It allows one to properly meter the subject. (Yes, the camera, in an auto shooting mode, can make mistakes.)
2. It allows one to adjust both shutter speed and aperture for desired creative effects, such as the blurring or freezing of motion.
3. It allows one to control depth-of-field.

If new to manual metering,
we recommend getting out
the camera and making
adjustments as we go
along.

We'll tell you when.

Place camera in the manual shooting mode.



Some Canon cameras require a 2nd switch position to enable the back dial.



Now that we are in the **Manual Shooting Mode** let's learn a little more about the three settings that control exposure and how to adjust them.

What are the three settings that control exposure?

Shutter speed

Aperture

ISO

Shutter speed – The amount of time the shutter is open allowing light to reach the sensor.

It is measured in seconds such as 1", 2", 4"... or fractions of a second such as 1/30 or 1/1000.

The standard, full-stop shutter speed sequence looks like this:

2 sec - 1 sec - 1/2 - 1/4 - 1/8 - 1/15 - 1/30 - 1/60 - 1/125 - 1/250 - 1/500
Slow shutter speed Fast shutter speed

A move from one shutter speed to the next, along the sequence, is a one stop move.

Practically all DSLRs adjust shutter speed in 1/3 stop or 1/2 stop increments.

Shutter Speed Adjustment

Typically the shutter speed is adjusted by spinning a dial on the top or front of the camera near the shutter release button or on the back of the camera.

Pick up the camera and adjust the shutter speed.



Nikon D80 shutter speed dial location.



Canon 40D shutter speed dial location.

Aperture

The aperture is the adjustable opening inside a lens between the glass at the front and the glass at the back.



On SLRs, aperture is measured in "f/stops"; describes the size of the hole.

It is a ratio:

diameter of the aperture
the focal length of the lens



Aperture set at F/4



Aperture set at F/22

What's important to know is - the smaller the number the bigger the hole, the bigger the number the smaller the hole.

Aperture settings are also broken down in stops. A move from one standard aperture setting to the next, along the sequence, is a one stop move; gain or lose stops of light one stop at a time; doubling or halving the area of the hole.

Big opening 1.4 - 2 - 2.8 - 4 - 5.6 - 8 - 11 - 16 - 22 Small

Practically all DSLRs move through this sequence in $1/3$ stop or $1/2$ stop increments.

Aperture Adjustment

Typically the aperture is adjusted by spinning a dial on the top or front of the camera near the shutter release button or on the back of the camera.

Some cameras require a button to be depressed while rotating a dial.

Pick up the camera and adjust the aperture.



The front dial is the aperture adjustment dial for the Nikon D80.



The back dial is the aperture adjustment dial for the Canon 40D.

Note: When looking through the viewfinder the scene is being viewed through the largest aperture available with the lens, not where it is set.

Why?

So that as much light as possible is allowed to pass through the viewfinder while composing.

The aperture stops down to the selected aperture setting when the shutter release is tripped, as the photo is taken.

ISO

Sensor sensitivity; sensitivity of the sensor to light.

Yep, we can adjust this, how cool is that?

A small number such as 50 or 100 denotes low sensitivity to light.

A high number such as 1600 or 3200 denotes high sensitivity to light.

The difference in the standard **ISO** settings is also separated by stops of light and relates back to something called film speed.

The standard, full-stop **ISO** settings are:

100 - 200 - 400 – 800 – 1600 – 3200...
Slow **Fast**
Low Sensitivity High Sensitivity

Practically all DSLRs move through ISO setting in 1/3 stop or 1/2 stop increments.

Generally, slower ISO settings have less noise and greater resolving power; therefore the slowest settings (50 - 200) are often used by landscape photographers.



ISO 640



ISO 3200

ISO Adjustment

Typically the ISO can be adjusted in one of the menus. Sometimes it is adjusted with a button push and dial spin.

Pick up the camera and adjust the ISO.



Nikon D80 ISO sensitivity adjustment.



Canon 40D ISO sensitivity adjustment. Push the button and rotate the front dial.

ISO Auto – Please make sure this is off. The photographer should have total control over what the camera is doing.

Working in Tonal Values

An understanding of tone is required to properly meter a scene with the camera.

So

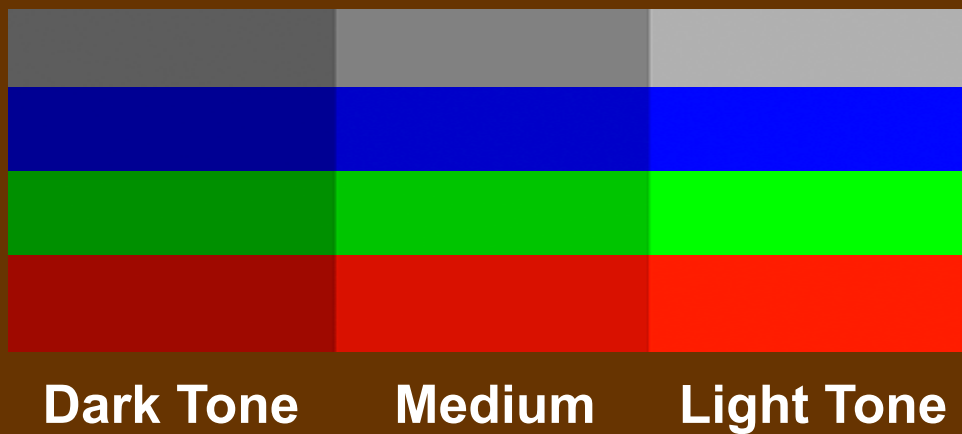
Let's take a moment to discuss tone.

What is "Tone"?

Tone is simply a measurement of brightness; how light or dark something is. It is independent of color.



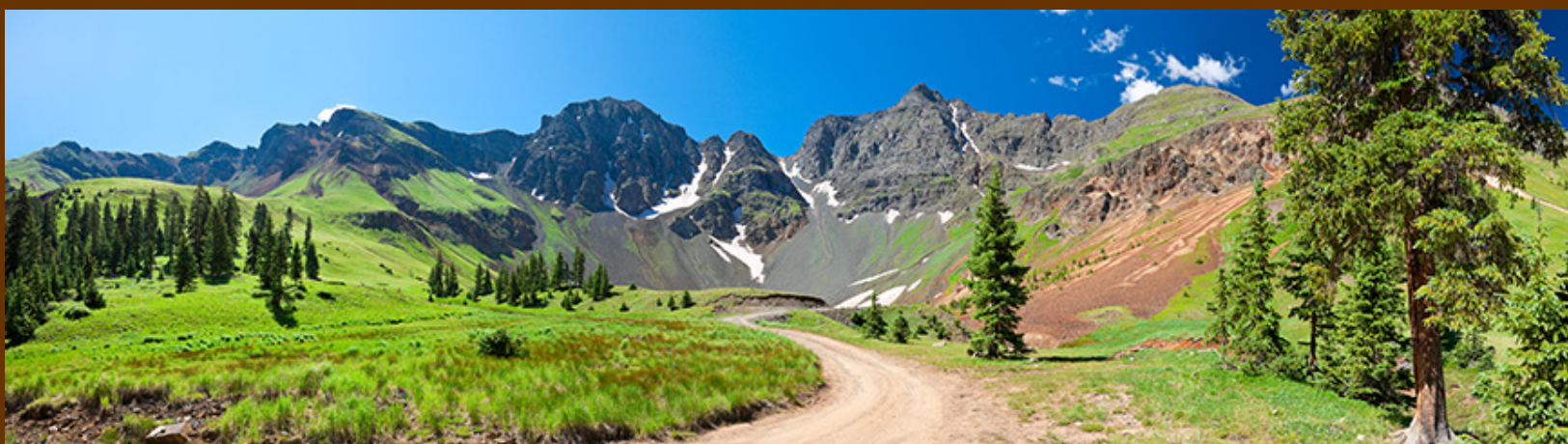
Every color comes in varying tones from light to dark.



We view the vast majority of objects around us because they reflect light.

Some objects reflect a medium amount of light. In photography these objects are called medium tone objects.

Examples of objects that can be a medium tone are the clear blue northern sky, green grass and most dry tree bark.



Objects that reflect more light are referred to as light tone.

Examples of objects that can be a light tone are snow, clouds, aspen trunks and dry dead grass.



Objects that reflect little light are referred to as dark tone.

Examples of objects that can be a dark tone are evergreen trees and some rocks.

As photographers, when we are in the field and observe a scene, we must be aware of the predominant tonality of the scene, or the tonality of the most important element of the composition.

If the subject is a light yellow wildflower, and we want the petals to be captured as light yellow, then the exposure should be determined in such a way as to ensure this happens.



Here's the big trick of metering

Cameras in an auto shooting mode can make the wrong exposure decision for a scene.

Yes, it's true! Cameras can be fooled because of the way they are designed to function.

They sample the light in the scene and no matter how bright or dark the scene is, they adjust the aperture and/or shutter speed and/or ISO so that the scene is exposed as a medium tone.

It's no problem if the scene is a medium tone, but a big problem if the scene is a light tone or a dark tone.



Medium tone scene, no problem.



Light or dark tone scene, big problem.

White Sands Nat'l Monument, the sand does not look white.

Why do cameras work this way in an auto shooting mode?

Well, manufacturers design their metering systems this way because they want the majority of photographs taken with their cameras to be acceptable.

Since most photographs are taken of medium tone subjects, the majority of the photographs are acceptable.

However, we've placed the camera in the manual shooting mode, so we'll be able to make scenes of all tonalities record properly.

How?

By Manually Metering

That's right, we're going to adjust the shutter speed and aperture while watching the light meter to determine the proper exposure settings.



Pick up the camera and look in the viewfinder to identify the light meter. The scale viewed is the readout for the light meter.

The light meter readouts (scales) in most viewfinders do not have numbers. Full stops are denoted by a larger hash mark, the center of the scale is “0” middle.

Now, let's manually meter a scene to record as a medium tone.

Point the camera at something and adjust both the aperture and shutter speed until the light meter indicates a medium tone exposure by settling in the middle; not to the + (plus) side or - (minus) side.

One may have to partially depress the shutter release button to make the light meter appear. If indoors, then several seconds of shutter speed may be required.



Readout from a camera light meter indicating the scene composed will expose as a medium tone. It will be a medium tone regardless of it's actual tone.

If a medium tone exposure can not be reached by adjusting just the aperture and shutter speed, then an ISO adjustment may be required.

When metering a scene always make adjustments to shutter speed and aperture by looking in the viewfinder.

Some cameras allow one to manually meter by looking at the LCD screen on top or back of the camera.

Do not meter in this fashion as it can let stray light in through the eyepiece and skew the metering.

How do we manually meter a light toned scene to achieve a proper exposure?

There are two ways.

1st Way

Let in more light (overexpose).

Example

If the subject is a field of snow, how is it metered?

Simple – get a meter reading for the snow and let in more light than a medium tone (overexpose).



This can be accomplished by choosing a longer shutter speed or larger aperture.

How much extra light is required?

For detail in the snow, open up 1 to 2 stops; for white without detail, open up 2 to 3 stops.

Practice this and discover how the camera works.

In summation, when shooting a light subject, overexposing the photograph will get the proper rendition of the scene.

The images below, of White Sands National Monument, make a great example.



**Metered to 0
A middle tone**



**Metered to +1
overexposed
by 1 stop**



**Metered to +2
overexposed by
2 stops.
Correct exposure!**

Metering was done in the matrix/evaluative metering mode; the camera took measurements from the entire scene to calculate the meter reading.

2nd Way

To manually meter a light toned scene to achieve a proper exposure.

If the same light is falling on a medium tone object, as is falling on the subject, simply take a meter reading of the medium tone object, meter it to a middle tone, then recompose and shoot the subject without any additional adjustments.

Once a portion of the scene has been properly metered, the rest of the scene will fall into the proper tonal range.

Example

If the medium toned grass in front of the barn is metered to make it a medium tone. Then, by doing so, the snowy mountains in the background will properly record as a light tone.

Note: After filling the frame with grass and metering to a middle tone, one would recompose this scene and notice that the metering indicates an overexposure. This is correct, do not readjust, simply take the photograph.



How do we manually meter a dark toned scene to achieve a proper exposure?

There are two ways.

Any guesses?

1st Way

Let in less light (underexpose).

How much should one underexpose?

2/3 to 1&2/3 stops will retain some detail; at two stops or more most detail will blacken out (for printing purposes).

2nd Way

If the same light is falling on a medium tone object as is falling on the subject, simply take a meter reading of the medium tone object, then recompose and shoot the subject without any additional adjustments.

Exposure Settings & Landscape Photography

We've talked about making adjustments to ISO, aperture and shutter speed to control exposure. However, as landscape photographers we usually make adjustments to only shutter speed.

Why?

ISO: We are concerned with capturing fine detail, so our ISO is usually placed very low (100) and not adjusted unless absolutely necessary.

Aperture: Controls depth-of-field (image sharpness). For any particular scene we choose the aperture to give the desired depth-of-field.

A great benefit of digital photography, is that while still on location, we can verify a proper exposure was captured. This is done by replaying an image and viewing it's histogram.

Histograms give accurate exposure information.

To learn more about histograms view our "Histogram Lesson".