Dave Morrow's Night Sky Photography Guides

This guide contains PDF copies of my Milky Way, Star Trails & Northern Lights Photography Guides, which can be found on my website.

PDFs allow you to easily take the guides out shooting with you, by downloading them to your phone.

Many photographers have asked for a complete resource, so I also wrote a book on the topic, which goes into even more detail.

Start with this guide & if you want to learn more, download the ebook.

My 170 page eBook, ***Photograph the Night Sky***, teaches every skill, technique and workflow for Milky Way, Northern Lights, Moon, Star Trail and Night Sky Photography.

You Can Download Photograph the Night Sky Here

I also provide Star & Night Sky Photography Workshops & Tours.

Enjoy the Guide & Happy Shooting,

Dave

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Milky Way Photography Guide

Learn Milky Way & star photography with this definitive shooting & photo editing guide, from a pro.

Master the best camera settings, shutter speed, f-stop (controls aperture), and ISO, balancing the exposure triangle for night sky photography.

Step-by-step, easy to follow instructions are **100% actionable for all skill levels.**

Star Photography Camera Equipment

Below I've provided the minimum equipment requirements and some of the best cameras, lenses and tripods for night photography.

For more information on the equipment / brands I use and recommend visit the Night Sky Photography Camera and Lens Recommendations & What's In My Camera Bag pages on this website.

Minimum Requirements

Tripod - For any type of night sky photography, a sturdy, well built tripod is one of the most important pieces of equipment.

A cheaply build tripod will shake / move slightly over the long exposure time required for night sky photography, causing blurry images. I currently use and recommend Really Right Stuff tripods, ball heads and L-brackets.

Camera with Manual Mode Functionality - Manual Mode means you can independently and manually adjust the ISO, Aperture, and Exposure time by hand.

The next few items will extremely improve your milky way photos but are not 100% necessary...

I've Listed them in the Order of Importance (If You're on a Budget ;))

Full Frame / 35 mm Camera: A full frame sensor provides a larger surface area to "capture" the light of the stars and Milky way. Using a full frame camera will help to reduce the amount of noise in high ISO images, in turn providing higher quality RAW files.

The Nikon D810, Sony a7R II, are the best full frame night photography cameras with the D810 being my personal preference due to it's compatibility with the Nikkor 14-24mm lens and tough metal body.

A Wide Angle Lens: I use and recommend an f/2.8 minimum aperture. In short, the smaller the number shown under the "f", the wider the lens can open. This wide opening will allow your camera's sensor to pick up as much light as possible in the shortest amount of time.

For full frame cameras, wide angle lenses between 14mm and 20mm (widest focal length) are recommended.

For crop sensor cameras, wide angle lenses between 10mm and 17mm (widest focal length) are recommended. Apertures of f/2.8 – f/4 are required.

I use and recommend the Nikkor 14-24mm f/2.8 lens for night sky and landscape photography. It is the best wide angle lens currently made for landscape and night photography.

Camera Timer / Intervalometer: Most cameras will take up to a 30 second exposure without a timer. If you would like to capture long exposure images of the night sky, longer than 30 seconds, you'll need a timer.

Amazon has a wide range of timers for all types of cameras. Click Here & Type "Camera Timer" and your camera model into the search bar.

View Night Photography Camera & Lens Recommendations

Planning Your Night Photography Shoot

Free Video Tutorials Included

I created a free video series to walk you through the entire night photography planning process, step by step.

A brief overview of each topic is provided below, but even more detail can be found on the Scouting & Planning for Star, Milky Way & Night Sky Photography Page.

PS: You'll always want to do the scouting & planning prior to arriving at your shooting destination. This is the best way to ensure great results!

Moon Phase, Dark Skies & Weather

Step 1 - Calculate the Moon Phase: Always Check the Moon Phase first. Milky Way Photography is best on or near the night of the New Moon. In most cases you can shoot approximately 1 week before, 1 week after, and on the night of the New Moon. This will change slightly depending on where you live on earth and the time of year. Use Star Date's Moon Calculator for precise results.

Step 2 - Find Dark Skies: Blue Marble Light Pollution Map - 2014 Edition works very well for this. Black areas on the map are great for shooting the night sky, while white areas on the map are light polluted and should be avoided.

Step 3 - Find Clear Skies & Predict the Weather: Aiming for nights with 0-50% cloud cover will yield the best results for Milky Way photos. There are many different methods I use to plan for this. For weather world wide I Use & Recommend MeteoStar. NOAA is the weather planning website I use in the United States.

Watch Video I - Moon Phase, Dark Skies & Weather

Learn The Photographer's Ephemeris & Google Earth

Step 4 - Learn The Photographers Ephemeris (TPE): The Photographer's Ephemeris is a map-centric sun and moon calculator: see how the light will fall on the land, day or night, for any location on earth. TPE also provides precise sunrise, sunset, and twilight times as well as moon rise and moonset times. **Get TPE For:** Desktop | iPhone | Android

Step 5 - Learn to Use Google Earth / Maps: Google Earth is my preferred way to plan for any photography trip or shoot. It's one of the best ways to pre-visualize the topographical layout of a location prior to arriving. Out of all the tools on this page, Google Maps / Google Earth is where I spend the most time. **Get Google Earth For:** Desktop | iPhone | Android

Watch Video II - Photographer's Ephemeris & Google Earth

Locate the Milky Way - Stellarium

Step 6 - Locate the Milky Way w/ Stellarium: Using Stellarium makes it easy to find the location of the Milky Way in the sky.

If you don't know when the Milky Way is visible, the following video tutorial will show you exactly when and how to find it in the night sky.

It shows a realistic sky in 3D, just like what you see with the naked eye, binoculars or a telescope. This is perfect for visualizing and planning precise and effective night sky photo shoots. **Get Stellarium For:** Desktop | iPhone | Android

Watch Video III - Locate the Milky Way w/ Stellarium

Focusing Your Lens - Milky Way & Night Photography

Prior to correctly focusing your lens, it will be impossible to effectively perform any type of night photography. Due to this fact, this section has been placed first.

Upon learning these skills you will be able to move forward and learn all of the other material provided below.

Basic Concepts to Apply While Learning the Section Below:

- Since the stars are very far away with respect to where we stand on Earth, focusing at or near infinity (∞) will provide perfectly sharp photos of the stars, Milky Way & night sky.
- Most lenses have an "∞" symbol on them which is used to mark the approximate infinity focus point. Just because you focus your lens to this infinity symbol doesn't mean it will take a perfectly sharp photo. This proves true for all types of photography.
- Most lenses need to be adjusted slightly more to ensure sharp focus, but "∞" is a great place to start.

Focusing Your Lens at Night - Camera Technique

Here are my favorite photography tips for focusing at night. I've listed them in order from most to least effective:

Method 1: Preset Your Focus Point During the Day

It's much easier to focus during the day than at night, for you and your camera's autofocus software.

Step 1: Set up your camera during the day with the lens you will be using to take your night / low light photos. You can do this at your house, or anywhere else that's easy, it doesn't have to be at the location where you plan on taking your night photos.

You'll want to open the lens to the widest focal length possible. For example, this would be 14mm on a 14-24mm lens.

Step 2: Adjust your lens to focus at infinity, or at a far away horizon. I always like to use my camera's Live View Mode, zoomed in, and focus on the furthest horizon in my composition.

This will ensure that you've focused at infinity. You can also focus by looking through your camera's view finder. This works very well too.

Step 3: Manually make the final adjustments if / as required using the focus ring. I find that Auto Focus usually does very well during the day, but sometimes needs manual input to nail down the final focus in low light.

Step 4: Take some more practice shots at an aperture of f/8 - f/11 and make sure the entire photo is in focus. If it isn't focused, repeat Step 2 and Step 3, until it is. This is your infinity focus point.

Step 5: Using a permanent marker (silver sharpie is easy to see at night), mark both the focus ring, and the barrel of the lens (non-rotating part of lens). Tape works as well, but may fall off over time.

Step 6: You found your infinity focal point for a given focal length. **Remember!** If you change your focal length your focal point will change as well. I shoot all my night sky photos at 14mm to make things easy:)

Camera Settings - Milky Way & Star Photography

If you want to learn more about the photography fundamentals such as shutter speed, ISO, f-stop(controls aperture), the exposure triangle, and more, check out my Photography Fundamentals Tutorial Series.

To be clear and concise on the camera settings for Milky Way & Star Photography, I've provided a quick reference overview list below.

In the sections following this section, detailed explanations are provided for selecting Exposure Time (using the 500 Rule) and ISO Settings.

Here are the Best Camera Settings for Milky Way & Star Photography:

Camera Mode: Manual Mode - This mode allows you to independently and manually adjust the ISO, Aperture, and Exposure time by hand.

Image Format: RAW Image Format

Metering Mode: I find **Matrix Metering** on my Nikon D800 to work the best for night photography. Canon calls this same function Evaluative Metering.

As an experiment, when shooting star photography, I tried all the different metering modes my camera has to offer and Matrix clearly won. You should do this experiment as well and see what works best for your camera setup.

White / Color Balance: For all night photography I use and recommend **Kelvin Values between 4000K-5500K.** More than average I find myself shooting at 4200-4500K. This works best under extremely dark skies with no light pollution.

Selecting a neutral color balance is very important. By neutral I mean that the image color on the back of your camera is as close as possible to what you actually see in the landscape you're shooting. You can adjust this white balance to anything you want on the computer, as I'll show you below.

Shooting in Kelvin Color / White Balance Mode on your camera is the most precise way to target neutral colors for landscape and night photography. Take some practice shots and see which photos have the closest color resemblance to what you actually see out in nature, while you're shooting.

F-Stop / Aperture: I recommend **f/2.8 or your widest aperture value**. I do not recommend shooting at apertures wider (number under f is smaller) than f/2.8. Although wider apertures such as f/1.8 do pick up more light, they are also very hard to focus at night. You'll see the best / sharpest image results using f/2.8.

Focal Length: Approximate **focal lengths of 14-24 mm for full frame cameras and 10-20mm for crop sensor cameras**. Reference the Selecting Exposure Time Section below for complete details on selecting the ideal focal length using the 500 Rule.

The larger your focal length, the shorter your exposure times will have to become per the 500 Rule (taught in next section of tutorial below), so wider is always better. Nearly all of my images are taken at 14mm using a Nikkor 14-24mm f/2.8 lens and a Nikon D810 Camera.

Exposure Time / Shutter Speed: Anywhere from **10-40 seconds depending on your lens**. Reference the Selecting Exposure Time Section below for complete details on optimal settings.

ISO Settings: **ISO settings of ISO2500-6400** are the best camera settings for Milky Way photography. Reference the ISO Settings Section below for complete details on which ISO settings you should use.

In Camera Noise Reduction Settings: The following topic is discussed in further detail in my Simple & Powerful Noise Reduction for Star, Milky Way & Night Sky Photography Tutorial. This tutorial also includes a free Photoshop video showing you my exact noise reduction post processing techniques.

- Long Exposure Noise Reduction Setting - Set to Off
- High ISO Noise Reduction Setting - Set to Normal

View My Latest Milky Way Photos

Exposure Time Settings - Milky Way Photography

The 500 Rule Explained - Night Photography Exposure Chart

Some photographers like to use the 600 rule. I believe the 500 Rule is much more conservative and provides a sharper image for night photography long exposures. The reasoning for this has been provided below.

The 500 Rule is used to calculate the maximum time a photo can be exposed without exhibiting star trails behind each star in the photo.

In turn, you will be able to select an exposure time that will keep your Milky Way photos sharp, without creating star trails. We are only calculating exposure time here… nothing more, nothing less!

A Few Night Photography Tips to Keep in Mind:

- The 500 Rule calculated exposure time is only a function of (depends on) the lens focal length.
- ISO and Aperture do not effect the 500 Rule calculated exposure time or vice versa.
- The 500 Rule is a rule of thumb, not an exact science.

I will cover the aperture and ISO settings below, but first we need to calculate exposure time.

The 500 Rule Equation & Exposure Chart

READ ME! Reference / Download the 500 Rule Chart While Reading the Following Section

The 500 Rule from DaveMorrowPhotography.com						
Focal Length (mm)	Sensor Size Full Frame (35mm)	Max Exp. Length (seconds)	Crop Sensor 1.5X (mm)	Max Exp. Length (seconds)	Crop Sensor 1.6X (mm)	Max Exp. Length (seconds)
8	8	63	12	42	13	39
9	9	56	14	37	14	35
10	10	50	15	33	16	31
11	11	45	17	30	18	28
12	12	42	18	28	19	26
13	13	38	20	26	21	24
14	14	36	21	24	22	22
15	15	33	23	22	24	21
16	16	31	24	21	26	20
17	17	29	26	20	27	18
18	18	28	27	19	29	17
19	19	26	29	18	30	16
20	20	25	30	17	32	16
21	21	24	32	16	34	15
22	22	23	33	15	35	14
23	23	22	35	14	37	14
24	24	21	36	14	38	13
25	25	20	38	13	40	13
26	26	19	39	13	42	12
27	27	19	41	12	43	12
28	28	18	42	12	45	11
29	29	17	44	11	46	11
30	30	17	45	11	48	10
31	31	16	47	11	50	10
32	32	16	48	10	51	10
33	33	15	50	10	53	9
34	34	15	51	10	54	9
35	35	14	53	10	56	9

Since the stars are always moving with respect to us here on Earth, technically the stars in your photos will always have trails, no matter how short the exposure time. The 500 Rule ensures these trails are small and unnoticeable when printing, viewing online, or in any other format.

Step By Step - Calculating the 500 Rule Maximum Exposure Time

Step 1 - Calculate Crop Factor: The Crop Factor for a 35mm or full frame camera is 1. If you're not shooting with a 35mm / full frame camera, first, you will have to calculate your camera's crop factor using the equation below.

Calculate Camera Crop Factor

Crop Factor = 35mm / Your Camera's Sensor Size (mm)

Technical Note: If you don't know what your camera's sensor size is (for the equation below), the instruction booklet that came with it will provide that information. In the case that you don't have the booklet, "Google" your camera's brand and model for more information.

Using the crop factor calculated above and the focal length you will be shooting with, calculate the maximum exposure time your camera can capture, prior to exhibiting star trails.

Step 2 - Calculate Exposure Time: To obtain the maximum exposure time you can shoot, without exhibiting "trails" behind the stars in your photo; take the number 500 and divide it by the focal length you will be shooting at.

You can reference the 500 Rule Chart provided above, and the 500 Rule Equation provided below to perform your calculation.

Calculate 500 Rule Maximum Exposure Time

500 Rule Maximum Exposure Time = 500/ (Focal Length X Crop Factor)

Technical Note: First, Multiply focal length by the crop factor, then divide 500 by the result. This is the correct mathematical order of operations.

If you exceed the calculated maximum exposure time provided by the 500 Rule your picture will exhibit star trails.

Always remember, this is just a rule of thumb. Use the 500 Rule when you are starting out. After experimenting with different exposure times and ISO Settings per the section below you will no longer need to reference the 500 Rule every time you shoot.

Step 3 - Test & Find the Best Exposure Time: Per the 500 Rule, I should be able to shoot a 35 second exposure time maximum (without seeing star trails) at 14mm focal length using a D810 Camera (full frame / 35 mm.).

Although this is what the 500 Rule recommends, I tend to prefer shooting in the range of 20-30 seconds for much sharper images. I found these to be the best results from comparing images of different exposure times and ISO values to see which turned out the best.

Try this experiment yourself and see what works.

You'll learn how to Select ISO Settings in the following section. First let's look at a few example photos all taken with the exact same camera settings, but different exposure times.

Example Photos - The 500 Rule & Star Trails

Provided below are a few example photos showing the correlation between night photography long exposure time and star trails in your pictures.

Keep in mind each wide angle lens handles distortion differently so it's best to check for star trails near the center of your image where distortion is minimal. The more expensive your wide angle lens, the less distortion and sharp image it produces.

The following images were captured using a Nikon D800 and Nikkor 14-24mm lens @14mm.

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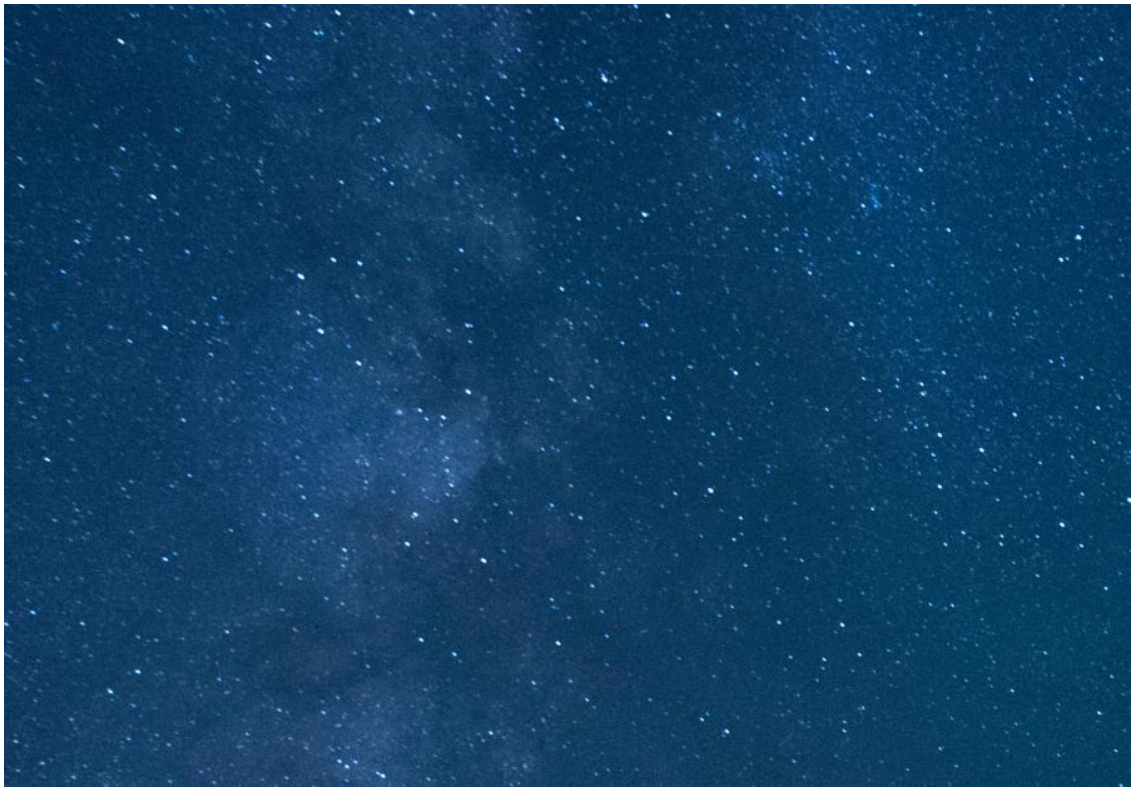
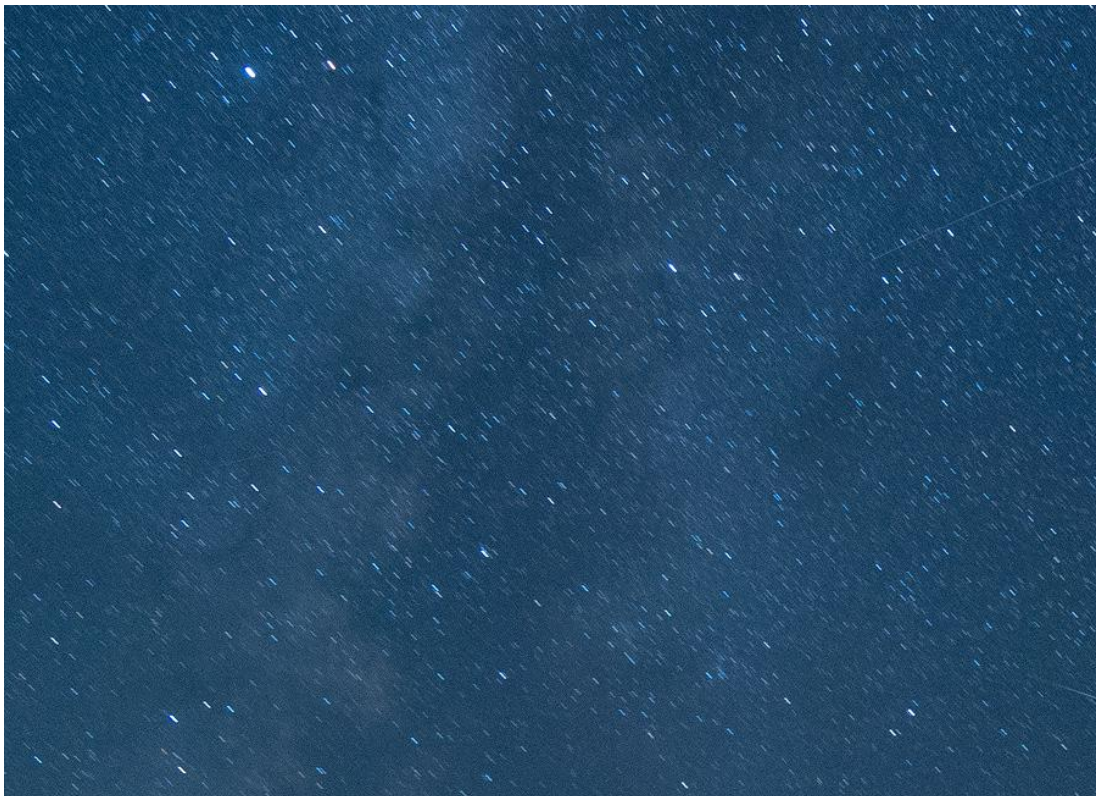
20 Second Exposure Time - Sharp Stars / No Star Trails



50 Second Exposure Time - Short Star Trails



ISO Settings - Milky Way & Star Photography

Now that we have narrowed down all of the other Milky Way Photography camera settings, the only one left is ISO.

ISO is the only destructive / noise inducing setting for long exposure, night photography. This is why we selected exposure time and aperture prior to selecting an ISO setting for our Milky Way photos.

There is no reason to degrade picture quality by increasing ISO (to obtain a brighter image) when you can keep the same picture quality and increase the brightness using a longer exposure or a wider aperture, given your photo is not exhibiting star trails.

Never increase your ISO to obtain a brighter photo prior to increasing your exposure time to the Tested Best Exposure Time found above.

Follow the next steps to select an acceptable ISO setting for your photo. All of your other settings should still be the same, as calculated above:

Step 1: Adjust your camera to ISO800 and take a practice shot. This practice shot will most likely be dark. If it is, move on to step 2.

Step 2: Increase your ISO one stop, or to the next larger value, such as ISO1200. Take another practice shot. Most likely this shot will still be very dark. If it is, move to step 3.

Step 3: Continue to increase your ISO until you start to see the Milky Way very visibly in your photos.

TIP: There is no need to over-expose your star photos. They can be fairly dark just like the night sky that surrounds you. The best method is to match the brightness of your photos to the landscape and stars you're looking at. The camera picks up much more data than is actually displayed on the preview screen. This data can be brought out in post processing.

Step 4: Once the Milky Way is clearly visible in your photos, you have found an ISO setting that works well for the given composition and situation.

Depending on the camera make and model, you may notice a lot of noise in your photo. You may also notice that you have increased your ISO to the maximum setting and the photo is still not bright enough.

Other than adjustments in post processing, there is nothing else that can be done about maxing out your ISO prior to having a bright enough photo. This is where it truly helps to have a full frame camera.

There are many methods to combat this noise using Photoshop. I cover this in my Simple, Powerful Noise Reduction for Star, Milky Way & Night Sky Photography Video Tutorial.

Photo Editing - Lightroom & Photoshop Tutorials

Photo editing / post production is one of the hardest and most rewarding parts of landscape and night photography.

Lightroom and Photoshop are the best photo editing softwares & essential to editing pictures of the stars, Milky Way & night sky.

In the picture editing video tutorials below, you'll learn my unique photography tips for post processing pictures in Lightroom & Photoshop.

Photo Editing - Step by Step

I would highly recommend learning both Lightroom and Photoshop to get the best results for night sky photography.

Lightroom is a powerful photo organizer and RAW image processor.

Photoshop is the best tool for making targeted adjustments using color and luminance channels as well as layer masks.

Step 1: Start to Finish Night Photography Post Processing Video Tutorials

Complete Post Processing Workflow in Lightroom & Photoshop

In the following videos I provide my complete workflow for post processing night sky photos.

I don't use these exact techniques each and every time.

With an in-depth understanding of both Lightroom and Photoshop I'm able to use the What and How Steps per Post Processing Tip 3 (below) to make the exact adjustments needed, on any image.

Moon Light & Star Photo of Mount Fitz Roy - Patagonia

Star Trails Photo from Mount Rainier National Park - United States

Moon Light & Star Photo of the Oregon Coast - United States

Step 2: Simple, Powerful Noise Reduction for Night Sky Photography Video Tutorial

Learn the best noise reduction photo editing techniques and camera settings, for night photography, with this free Photoshop video tutorial and step-by-step guide.

Simple, Powerful Noise Reduction for Star, Milky Way & Night Sky Photography

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Step 3: Before & After Photo Editing

Free Lightroom & Photoshop tutorials plus before / after post production examples, for beginner to advanced photographers.

Post Processing – Before / After: Free Photoshop Tutorials & Photography Tips

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Photo Editing Tips for Lightroom & Photoshop

Provided below are a few of my favorite photography editing tips for Lightroom & Photoshop.

Post Processing Tip 1: Focus only on becoming great at the basics in both Lightroom and Photoshop. When you master the basics, everything else becomes easy. I only use a few basic adjustments along with an in-depth understanding of creating detailed luminance and hand painted masks in Photoshop. This is all I need, and would ever want to use.

Learn the exact attributes of each slider or adjustment tool within both LR and PS. When I say LEARN I mean being able to visualize and explain in detail exactly what each adjustment does to your picture, no matter what the picture. Stop guessing, start creating great images!

If you can write an overview such as the following for each slider or adjustment you use, then you most likely have LEARNED about it:

In Lightroom the "Blacks" slider controls the very lefthand / blacks portion of the histogram. When I increase (slide right) the "Blacks" slider it pulls all pixels in the blacks tonal range towards the mid-tones / grey tonal range. When I decrease (slide left) the "Blacks" slider it pulls all pixels in the blacks tonal range toward pure black.

The "Shadows" slider controls the portion of the histogram just to the right / slightly brighter than blacks. This controls the shadows tonal values of an image.

If I pull the shadows slider to the left (decrease), it in turn pulls all pixels in the shadows tonal range, towards the blacks tonal range in the far left of the histogram. In turn, if I pull this same slider directly the opposite way towards the right (increase), all pixels in the shadows tonal range are pulled towards the mid-tones or 50% grey tonal range portion of the histogram.

Post Processing Tip 2: You don't need too many plugins. Photoshop and Lightroom plugins can be helpful, but they also hinder you from learning the actual programs. Don't use plugins until you master the basics per TIP 1 and understand what the plugin is actually doing.

You can create the exact same looks as a plugin does with an in-depth understanding of the basic Lighroom and Photoshop Adjustments. The goal is to know the look / adjustment you're going for (visualization in your mind), and know the adjustment settings used to create the look you just visualized.

Post Processing Tip 3: Stop and think about each adjustment you're going to make, before you make it. You should always ask 1. What Part of the Photo Do I Want To Adjust (Global or Selective Adjustment), and 2. How Do I Want to Adjust It (Actual Adjustment to Use).

If you perform this simple process with each adjustment, it will eventually become second nature, and lead you to overall improved images.

Photograph the Night Sky eBook Offer

My 170 page eBook, ***Photograph the Night Sky***, teaches every skill, technique and workflow for Milky Way, Northern Lights, Moon, Star Trail and Night Sky Photography.

PDF format makes this eBook easy to take on your next shoot (smart phone / tablet compatible), and the step-by-step instructions guarantee great photos!

It's much more detailed than this pdf, and includes many more tips & techniques.

You Can Download Photograph the Night Sky for 10$

Star Trails Photography Guide

Learn star trails photography camera settings and photo editing, in this step-by-step, easy to understand tutorial, for all skill levels.

Master shutter speed, f-stop (controls aperture), and ISO, balancing the exposure triangle for night sky photography.

Camera Equipment – Star Trails Photography

Provided below are the minimum requirements to start taking star trail photos. View the brands and equipment I use and recommend on the Night Sky Photography Camera and Lens Recommendations & What's In My Camera Bag pages.

Minimum Requirements

Tripod - A well made and steady tripod is very important for star trail photography. Cheap tripods usually shake and vibrate easily, making your pictures blurry. I currently use and recommend Really Right Stuff tripods, ball heads and L-brackets.

Camera with Manual Mode Functionality - "M" or manual camera mode means you can manually, and independently adjust the Aperture, ISO, and Exposure settings on the camera.

Camera Timer / Intervalometer: A timer is essential for star trail photography. In short a camera timer / intervalometer allows you to take multiple, long exposure photos, one after another. Most cameras only allow a 30 second maximum exposure time. Star trails photography will require exposure times much longer than 30 seconds. Click Here & Type "Camera Timer" and your camera model into the search bar.

Fully Charged Batteries: Three to five fully charged batteries. You will be shooting over a time ranging from 30 minutes to 3 hours.

Wide Angle Lens (Optional): Star trail photography is much more forgiving than Milky Way photography. A "fast" (number under the “f” is small) lens is still recommended. The smaller the number under the “f”, the wider the aperture in your lens will open, allowing the most light to propagate through it in the least amount of time. In turn more light will hit your camera’s sensor, providing a higher quality image at night.

- For full frame cameras I recommend wide angle lenses between 14-24mm and f/4 minimum aperture.
- For crop sensor cameras I recommend wide angle lenses between 8-20mm and f/4 minimum aperture.

View Night Photography Camera & Lens Recommendations

Planning Your Shoot - Star Trails Photography

Free Video Tutorials Included

Follow these quick and easy steps to start taking star trails pictures. For more detail on each section / topic reference the Scouting & Planning for Star, Milky Way, and Night Sky Photography Tutorial & Video Series.

Moon Phase & Dark, Clear Skies

Step 1 - Calculate the Moon Phase: Shooting under a 25% to full moon is ideal for star trails photography. This allows the moon to light the entire landscape which provides added foreground detail to your images. Shoot in the opposite direction of the moon, allowing your stars to be the brightest light in the sky. Use Star Date's Moon Calculator for precise results.

Step 2 - Find Dark Skies: Blue Marble Light Pollution Map - 2014 Edition is a great website for finding dark sky locations near you. Areas that are black are ideal for photographing the night sky, were white areas are light polluted and should be avoided.

Step 3 - Find Clear Skies & Predict the Weather: You will want to shoot with cloud cover percentages of 0 - 50% maximum for star trails photography. In video 1 below I teach this technique and provide more insight.

Watch Video I - Moon Phase, Dark Skies & Weather

Learn The Photographer's Ephemeris & Google Earth

Step 4 - Learn The Photographers Ephemeris (TPE): TPE is a great tool / app for planning moonset and moonrise times and locations for star trails photography. Learn how to use it in the video below. **Get TPE For:** Desktop | iPhone | Android

Step 5 - Learn to Use Google Earth / Maps: Google Earth / Maps is the best way to plan your shooting location, prior to arrival. Learn my exact techniques for photography planning with Google Earth in the video below. **Get Google Earth For:** Desktop | iPhone | Android

Watch Video II - Photographer's Ephemeris & Google Earth

Focusing Your Lens - Star Trails & Night Photography

You can use the same focusing methods for all kinds of night photography. I provide the best focusing techniques for night photography in my Milky Way Photography Tutorial linked below.

Click & Learn to Focus at Night

Camera Settings - Star Trails Photography

To be clear and concise on the camera settings for Star Trails Photography, I've provided a quick reference overview list below. In the sections that follow I'll explain the most important settings in more detail.

Here are the best camera settings for star trail photography:

Camera Mode: Manual Mode - This mode allows you to independently and manually adjust the ISO, Aperture, and Exposure time by hand.

Image Format: RAW Image Format

Metering Mode: I find **Matrix Metering** on my Nikon D800 to work the best for star trails photography. This is Evaluative Metering for Cannon. Test your settings to find the best fit.

White / Color Balance: Kelvin Values between 4000K-5500K work well for night photography. You'll want the color balance seen on the back of your camera (image review) to be as close as possible to what you see in front of you (the landscape / night sky). A neutral color balance such as this captures the best data for photo editing. You can adjust the color balance to anything you want, while editing star trails photos, as taught below.

Aperture: Aperture **settings of f/2.8 – f/5.6** work well. The aperture setting is not as important in star trail photos as in Milky Way photos. You can experiment to see what works best. I prefer to shoot at f/2.8-f/4 for star trail shots.

Focal Length: For star trails **any focal length will work**. The larger the focal length (zooming in with your lens), the longer your star trails will appear over a shorter amount of time (Reference - Selecting Exposure Time for Milky Way Photography).

If you don't want to wait around all night to capture a star trail scene, a zoom lens will be your best choice. If you're interested in capturing a full, wide angle star trail

scene showing a long star trail transition across the sky, a few hours will be required.

The best way to see this in physical form is to go out and try some test shots in the field. This will show you how different lenses or focal lengths exhibit different star trail lengths over a given period of time. Another good reference is the 500 Rule Chart & 500 Rule Equation which will show the direct correlation between star trails and focal length in a mathematical manner.

Exposure Time / Shutter Speed:

Full Frame Camera: 30 – 60 seconds works well to capture star trails per Method 1 as described below. The longer the exposure the more "far away light" your camera will capture.

A longer exposure picks up more light at a greater distance from our planet. In turn you will see stars that you wouldn't have with a shorter exposure time.

On the other hand, light sources closer to our planet will appear even brighter at longer exposure times. This applies for any type of night photography. Using a longer exposure will allow you to keep your ISO low, reducing noise, and providing a higher quality image.

Crop Sensor Camera: 30 - 120 seconds works well when shooting per the instructions provided in Method 1 below. Since crop sensor cameras don't handle high ISO as well as full frame cameras, the exposure time may need to be increased. Don't be afraid to try out 120 second exposures and see how they work using a lower ISO and in turn providing higher overall image quality.

Reference the Exposure Time Settings Section below for complete details.

ISO Settings: ISO settings for star trails photography depend on how much ambient light (moon / light pollution) is present in the scene you are shooting.

It works well to shoot star trails when the Moon is visible in the sky. Make sure to shoot in the opposite direction of the Moon. The Moon light allows you to capture well exposed star trail shots while keeping your ISO fairly low. Try starting at ISO 300, increasing as required to approximately ISO 800. Increase your ISO until your image is correctly exposed.

Night Photography Tip: If your shot isn't bright enough, and you can still increase your exposure time, always do this instead of increasing your ISO too far beyond 800.

ISO is the worst case method of increasing the brightness of your star trail shots since it is the only setting that degrades image quality. For those of you shooting with a crop sensor, it's best practice to stay within the range of ISO 160-500.

Trying higher ISO values such as 800 will never hurt. It's all about getting a nice exposure, without much noise.

In Camera Noise Reduction Settings: Reference my Simple & Powerful Noise Reduction for Star, Milky Way & Night Sky Photography Tutorial for complete details on why I choose each of the following settings:

- Long Exposure Noise Reduction Setting - Set to Off
- High ISO Noise Reduction Setting - Set to Normal

Exposure Time Settings - Star Trails Photography

I highly recommend Method 1 for the best quality of star trail photos. Method 2 can also be used but degrades the photo quality as described below. The following

section discusses both Method 1 and Method 2, but goes into much more detail for Method 1 since it is preferred and recommended.

Method 1 - Stacking Star Trails Photos

Preferred Method

The preferred method for capturing star trail photos involves using multiple exposures, each capturing small star trails over an elapsed period of time. The star trail camera settings for each of these overlaid exposures is exactly the same. The only thing that changes is the position of the stars relative to the Earth.

Next, each of these night photography images can be batch processed in Adobe Lightroom or Adobe Camera RAW then imported into Photoshop and processed as described in the Star Trails Post Processing section below.

Why is Stacking Star Trails Images the Best Option?

Using multiple exposures will allow you to keep your exposure time and ISO fairly low, in turn reducing noise. Almost all cameras, when pushed to take very long exposures (3+ minutes) start to exhibit what is known as long exposure noise.

Many cameras have a Long Exposure Noise Reduction setting (L.E.N.R) on them which works well, but not quite as well as using the Multiple Exposure Method 1. The L.E.N.R settings are discussed in more detail in the Method 2 Section directly below.

Selecting the Number of Exposures - Star Trail Photography

All of the topics covered in the following section are used for shooting with the Method 1 (Preferred): Multiple Exposures skill set since it achieves the best quality photo.

Since your location on Earth, your lens and camera model, composition, and the desired effect (long or short trails) will directly effect the number of exposures required, it is impossible to provide a chart showing the exact settings as was done with the 500 Rule for Milky Way Photography.

The only real way to perfect this skill set is going out and taking practice shots until you get the desired results. The number of exposures required for star trails directly correlates to the percentage of the composition that is taken up by the night sky.

Night Photography Tips: For example, if your composition is half sky and half foreground, then your stars would have to move across half of your photo to produce star trails across the entire sky.

If your composition is only ¼ night sky, and ¾ foreground, then the stars only have to move across ¼ of your photo. In turn this requires less elapsed shooting time and a smaller number of exposures.

Calculate Shooting Time - Star Trail Photography

Method 1: PhotoPills provides a nice tool within their application that will allow you to calculate the elapsed shooting time required to capture star trails for a given composition.

Method 2: Another option is to set your camera up using a timer and let it run for 3-4 hours. No matter your composition, this method will capture enough single

exposures to produce some nice star trails. Most likely you will have more photos than required. These can be discarded later on.

Method 3: Trial and Error – After taking multiple star trail images with different lenses and compositions you'll start to get a good idea of what works and what doesn't. This proves to be the best overall method for perfecting star trail photography. This is the method I use most often.

Camera Timer Settings - Star Trails Photography

I highly suggest using a camera timer or intervalometer. Otherwise you will be pushing the shutter button again and again for hours. Some cameras have an interval timer mode built into them, this works as well.

After calculating the elapsed shooting time per the steps above, adjust your camera timer to mimic these settings. Input the following settings into your camera timer / intervalometer.

Star Trail Exposure Time: The length of each exposure. For example, you may choose an exposure time of 36 seconds.

Time Between Each Exposure: I would suggest using 1 second between each photo. For example, if the time between exposures was 1 second, your camera will take a photo, wait 1 second, then take the next photo. This will continue until your elapsed shooting time (described below) has ended.

Elapsed Shooting Time / Total Number of Exposures: The total length of time that your camera will be taking photos or the total number of photos you would like your camera to take. Since these are dependent on one another and the time between each exposure, only one needs to be input into your camera timer. For example, you may want to take 100 exposures at 30 seconds each, with 1 second between each shot.

Reference the Photo Editing - Lightroom & Photoshop Tutorials Section below for complete details on how to edit / blend these images together.

Method 2 - Single Exposure (Second Best Option)

Another method to photograph star trails is a single long exposure, captured over a few minutes of elapsed time. In most cases single exposure star trails won't be able to transverse the entire composition of the photo. Instead, these star trails will resemble long streaks of light in the sky.

Follow these steps to try this method:

- You will need to turn on your camera's Long Exposure Noise Reduction setting. Find this setting by looking in your camera instruction manual or online. Not all cameras have this setting, but nearly all full frame cameras do.
- After doing so, focus your lens per the steps in the Focusing Your Lens at Night Section.
- Next, select your composition and try an exposure time of 3-4 minutes with an ISO of 600-800 and take a picture.
- If your picture is too dark, increase the exposure time. If your trails aren't long enough, increase the exposure time. This is all personal preference.
- Increase and decrease the ISO as required if there is too much noise in the photo.

Method 2 is all about trial and error, finding which settings work best and which don't. Eventually you will start to see photos you like! That being said, USE METHOD 1 if at all possible:)

Photo Editing - Star Trails Photography

Lightroom & Photoshop Video Tutorials

Now that you learned how to take star trails photos, it's time to post process / edit your pictures.

I've created a free video tutorial showing you the quick and easy steps for creating star trails in Lightroom and Photoshop using Method 1 as described above.

Watch the Star Trails Photo Editing Tutorial

Northern Lights Photography Guide

Learn the best northern lights camera settings (f-stop, shutter speed, ISO), planning tools, photo editing tricks & photography equipment, with this step by step guide, from a pro.

Master the exposure triangle for northern lights & night sky photography.

Northern Lights Photography - Planning

Planning ensures you don't waste night after night hoping to get some shots of the northern lights. Use the following steps & start creating great photos. If you want to learn more about this topic I've also linked a free video series below.

Scouting & Planning for Star, Milky Way & Night Sky Photography Page

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Step 1: Find Dark Skies

The easiest way to find an area with dark skies is to check the Blue Marble Light Pollution Map which is a Google / NASA collaboration.

The black areas are free of light pollution, while white and grey areas have high light pollution. Shooting in dark areas will provide the best results, most vivid colors & detail.

Blue Marble Light Pollution Map »

Step 2: Find Clear Skies

Next, it's time to find clear skies. You can photograph the aurora on partially cloudy nights, but the results won't be quite as good as nights with 100% clear skies.

Check the local weather and find a night with cloud cover between 0 and 20%.

MeteoStar Weather Satellite Imagery Maps of the Northern Hemisphere work very well for showing cloud cover conditions on a macro level. You will need to use the IR (Infrared) setting on their website to view the cloud cover at night.

Unlike visual (VIS) satellite images which can only be used to view cloud cover during the daylight hours, IR satellite uses cloud temperature readings to watch cloud movement and cover.

If you're not well versed in IR satellite imagery, the How to Read a Satellite Image Post will be very helpful!

If you want to take your photography planning to the next level, learning this information is really going to help! It's also quite interesting.

NOAA's Geostationary Satellite Server also provides some great resources!

Step 3: Check the Aurora Activity

Next, check the aurora activity for the night of your shoot. There are many different resources for checking aurora activity, which all depend on your location.

Usually it's best to aim for nights with KP-index of 2 or greater, otherwise you really won't see much aurora in the sky.

The aurora activity index (**Kp-index**) ranges from 0-9 with 0 being the lowest amount of activity and 9 being the greatest. Kp-index ratings of 5 or great are considered a storm.

Provided below are a list of great websites which will help you to learn more about aurora activity as well as get the current forecast:

- **Space Weather Live OVATION Auroral Forecast :** A really nice visual website which provides the current aurora forecast as well as other interesting facts which will help you to capture a photo of the Northern Lights.
- **NOAA POES Auroral Activity Website :** This site provides aurora forecast predictions as well as basic information which will allow you to be better informed prior to going out on your shoot.
- **Iceland's Vedur Aurora Forecast:** If you're going to be shooting in Iceland this is the site for you. You can also use the aurora activity predictions from this website when visiting Norway, Sweden, Greenland, or anywhere else in the close vicinity. Obviously it will be most accurate when shooting in Iceland.
- **Space Weather Aurora Forecast :** Another great website with a broad overview of the aurora forecast for a multi-day time frame. Space Weather's website is worth spending some time visiting!

Northern Lights Camera Equipment

Below I've provided the minimum equipment requirements and some of the best lenses, tripods & northern lights cameras.

For more information on the equipment / brands I use and recommend visit the Night Sky Photography Camera and Lens Recommendations & What's In My Camera Bag pages on this website.

Minimum Requirements

Tripod – A sturdy tripod that doesn't shake or slip over a 10-20 second exposure. Many low quality tripods produce terrible image quality due to movement creating out of focus images.

Camera with Manual Mode Functionality – Manual mode allows the independent camera setting adjustments of ISO, F-stop, and shutter speed.

Recommended Gear

Full Frame / 35 mm Camera: Full frame cameras provide better overall image quality with lower noise, when shooting in low light situations.

The Nikon D810, Sony a7R II, are the best full frame northern lights photography cameras.

A Wide Angle Lens: A wide angle lens allows you to capture vast landscapes with the northern lights overhead.

When selecting a wide angle lens, ensure minimum f-stop values of f/2.8-f/4, with f/2.8 being recommended.

Shooting at f/2.8 produces a very wide aperture opening, in turn, allowing more light to hit the image sensor over a standard exposure time. This is taught below.

How to Focus Your Lens at Night

Prior to correctly focusing your lens it will be impossible to effectively perform any type of night photography. Due to this fact, this section has been placed first.

Upon learning these skills you will be able to move forward and learn all of the other material provided below.

Since the stars & Northern Lights are very far away in respect to where we stand on Earth, we can focus at infinity or very close to it, and capture perfectly sharp photos of the night sky.

Most lenses have an “∞” symbol on them which is used to mark the approximate infinity focus point.

Just because you focus your lens to this infinity symbol doesn’t mean it will take a perfectly sharp photo. This proves true for all types of photography.

Most lenses need to be adjusted slightly more to ensure sharp focus, but “∞” is a great place to start.

After spending a few nights out shooting the aurora you will be able to narrow down the best ways of focusing which work for you.

I have 5 different methods, provided below, which I currently use to focus at night depending on the situation which I'm shooting.

It's great to have a "bag of tricks" for each of your photography skill sets, this way if you ever run into trouble, you can pull out one of these tricks without ever skipping a beat.

Experimentation and practice are key to finding out what works and what doesn't!

There are a few different options for focusing at night. Each of these methods work well for any type of night photography and some also work for landscape photography.

Method 1: Preset Your Focus Point During the Day

It’s much easier to focus during the day than at night, for both you and your camera’s autofocus software.

Since focusing is one of the hardest parts of night / low light photography, getting this step out of the way during the daytime is always best practice.

Follow these easy steps to get started:

1. Set up your camera during the day with the lens you will be using to take your night / low light photos. You can do this at your house, or anywhere else that's easy, it doesn't have to be at the location where you plan on taking your night photos.
2. Adjust your lens to focus at infinity, or at a far away horizon. I always like to use my camera's Live View Mode, zoomed in, and focus on the furthest horizon in my composition. This will ensure that you've focused at infinity. You can also focus by looking through your camera's view finder. This works very well too.
3. Next manually make the final adjustments if / as required using the focus ring. I find that Auto Focus usually does very well during the day, but sometimes needs manual input to nail down the final focus in low light.
4. Take some more practice shots at an aperture of f/8 - f/11 and make sure the entire photo is in focus. If it isn't focused, repeat Step 2 and Step 3.
5. Now your lens is focused at infinity.
6. Using a permanent marker, mark both the focus ring, and the barrel of the lens (non-rotating part of lens). Tape works as well, but may fall off over time.

This is a reference point that you will be able to use when returning to shoot at night or in low light. I've personally marked my lens using a silver Sharpie, allowing me to see the mark at night without using a headlamp or light.

Focus Methods 2-5 Are Included in My Full Length Ebook

It's much more detailed than this pdf, and includes many more tips & techniques.

Download Photograph the Night Sky

Camera Setup & Basic Settings

Now, learn how to photograph the northern lights with a dslr or mirrorless camera.

Since the aurora is dynamic and constantly moves through the sky your camera settings (ISO & Exposure Time Only) will also need to be dynamic and change as time passes.

Prior to selecting shutter speed, aperture & ISO, the basic camera setup must be performed. These settings are provided below, followed by exposure settings for northern lights photography.

Image Format »

Use RAW Image Format for all of your photos. This gives you maximum control & margin for error.

Metering Mode »

I find Matrix Metering on my Nikon D800 to work the best for night photography. Canon calls this same function Evaluative Metering.

As an experiment, when shooting star photography, I tried all the different metering modes my camera has to offer and Matrix clearly won. You should do this experiment as well and see what works best for your camera setup.

Color / White Balance »

Shooting in RAW image format, as denoted above, you can always change your white balance settings when you get back home to edit your shots.

I like to adjust white balance in the field as well to give me an idea of what the shot will actually look like when I get home. This also provides the most accurate histogram while reviewing your photos in camera.

For night / aurora photos it's best to shoot in "K" or Kelvin Mode. Try shooting at Kelvin values of 2800 - 4000 for your aurora and night sky photos.

Aperture Settings - Northern Lights Photography

f/2.8 is the best aperture setting for northern lights photography. F-stops values of f/3.5 or f/4 also work well for photographing the aurora.

I don't recommend opening your aperture any wider than f/2.8. With very wide apertures it becomes hard to focus at night, over the entire depth of field.

The key is allowing the most amount of light to hit your camera's sensor in the least amount of time, in turn maintaining a lower ISO, inducing less image noise.
Reference: Noise Reduction for Night Sky Photography Tutorial

If the photo is not completely focused, over the entire depth of field, use my Focus Stacking Techniques provide in a free YouTube Video Tutorial to obtain overall sharp focus in your images.

Shutter Speed & ISO Settings - Northern Lights Photography

The following section will teach you how to photograph the northern lights for beginners, providing basic methodology and camera technique.

I grouped shutter speed & ISO together due to the fact that you'll need to change them both at the same time, since they directly reflect on one another.

After a few hours of photographing the Northern Lights using the skill sets provided below you will easily be able to adjust both of these settings simultaneously, obtaining great results.

Ask yourself the following questions to determine the camera shutter speed and ISO settings for northern lights photography.

Question 1: How Quickly is the Aurora Moving Through the Sky?

With high level aurora activity the Northern lights can move through the sky very quickly.

To capture all of the nice color and detail in this scene, without your photo looking like a "blob of color", you'll need to shoot at a much shorter exposure time than if the aurora was slowly moving through the sky.

Think about it this way... If the aurora is moving very quickly through the sky, and you take a photo at a 30 second exposure, then instead of seeing the instantaneous view that your eyes see, your camera will actually pick up the entire movement of the aurora through the sky over that 30 second time frame.

The details and colors will become the average of the 30 second exposure for each pixel. As seen with long exposures of water or cloud scenes, all of the color and movement mixes together.

This is not the goal for photographing the Northern Lights, we want, vivid color and nice detail.

Best Shutter Speed for Northern Lights Photography: Keeping your shutter speed / exposure time between 5-25 seconds will work very well for shooting the northern lights. When the aurora is moving quickly, try 5-7 second exposures, when it's not moving as quickly try 10-25 second exposures.

You can increase or decrease these times as you see fit, they are just rules of thumb!

Question 2: How Bright is the Aurora in the Sky?

This tutorial assumes that you are already well versed in the basic technical aspects of the photography histogram. If you would like to brush up on your histogram knowledge prior to reading the rest of the tutorial, Ken Rockwell's Website provides some great explanations for both Color Histogram and Luminance Histogram. I will refer to each below!

Since the aurora changes color, speed, and brightness all throughout the night, you'll also need to constantly adjust your camera settings to match this dynamic situation.

All of the other settings have now be adjusted. It's time to select an ISO value.

Increasing the ISO settings allows the camera to correctly exposes the image, with less overall scene lighting, at the cost of noise. *Provided that none of the other settings are changed.*

1. Start out shooting with an ISO of 400-800 and take a practice shot.
2. After doing so, if your practice shot wasn't bright enough, increase your ISO to approximately 1200 and take a practice shot.

3. If the photo still isn't bright enough, continue to increase your ISO until it is. I usually shoot in the ISO range of 800-4000.

Always keep in mind that your image should not be (in terms of the histogram) correctly exposed, you are shooting at night, so the image can also be dark.

You can bring out nearly all of this dark detail in Photoshop. Always watch your histogram to make sure you're not losing any dark detail off of the left-hand side.

You will also want to make sure that you're not "blowing out" any highlights, meaning the histogram isn't dropping off the right hand side.

Let's look at and analyze a few example images so you can see exactly what I'm talking about.

The following images are straight out of my camera (RAW Files), and exported to JPEG format for display. This is how the images looked on the back of my camera screen after taking them.

Image Example 1 - Overexposure

Camera Settings: 10 Seconds, f/2.8 ISO2500

When you're taking photos of the aurora it's very important to watch your Color Histogram, even more than your luminance histogram. It is very easy to "blow out" or overexpose the Green Channel, which makes your photo lose color and detail. This can be seen as circled in RED in the **Example 1** image above.

When photographing the Northern Lights it's always better to underexpose the photo as not to blow out the green channel.

You will also want to watch the Luminance Histogram to make sure you're not blowing out or overexposing the photo as a whole.

Image Example 2 - Correct Exposure

Camera Settings: 10 Seconds, f/2.8, ISO2000

The image seen above is what most would call well exposed. All of the color channels and luminance channels fall within the left-hand and right-hand bounds of the histogram, meaning we're not losing any detail in the dark areas or blowing out in highlights in the light areas.

By all means this photo would work very well when going home to edit it as I'll teach you below.

Can we improve this image? YES! This image can easily be improved upon. I'll show you why in the next example.

Image Example 3 - Optimal Exposure

Camera Settings: 10 Seconds, f/2.8, ISO1000

Most photographers would say this image is underexposed, and much too dark. I disagree! This is exactly the image I was looking to capture.

The aperture was at it's widest possible setting allowing the most amount of light to be captured by the camera's sensor in the least amount of time.

The exposure time of 10 seconds was the longest I could go, while still keeping nice detail in the Northern Lights.

I also managed to drop the ISO by half (compared to Example 2) from 2000-1000 which will keep the noise in my image much lower, allowing the photo to easily be printed full size after post processing.

Looking at the color and luminance histograms to the right-hand side of the photo we can say that no dark details were lost off of the left-hand side of the histogram, and no highlights were overexposed on the right-hand side of the histogram. Perfect!

Why is this the Optimal Image?

5 Years ago, this image would have been too dark, and Example 2 would have been preferred! The new full frame digital cameras made by Nikon & Sony can recover 3-4 stops of light from most images.

This means that you no longer have to "bracket" photos, taking multiple exposures of the same composition to compensate for dynamic range.

The only time you would need to bracket photos would be for cases where the scene being captured had a dynamic range of greater than 3-4 stops. This is rarely the case for landscape photos, and NEVER the case for night photos.

Watch the video in the following section to see what I mean.

Test Your Camera's Dynamic Range

I would recommend that everyone does the following test. You can see a quick overview in the video below. Below the video a step by step guide is provided.

If you need an extra exposure to create an overall better quality photo, by all means take it! If you decide the second exposure isn't necessary, no problem. They key is knowing the limits of your camera setup.

Step by Step Guide

1. Take your camera outside on the next sunny day, and take a shot directly into the sun. Also include a landscape or subject in the foreground.
2. Expose the photo for the sun only, ensuring it isn't blown out. The rest of the photo will appear very dark / or even black in your preview screen.
3. Take this photo, and load it into Lightroom or any other RAW file processor.
4. Using the Exposure / Brightness adjustment slider, increase the brightness of the entire photo until you start to see the image degrade in the darkest areas of the photo. This image degradation will come in the form of noise, or a slightly magenta/green color cast.
5. At this point, check your exposure slider to see how many stops of brightness you have increased this photo.
6. Make a mental note of this value.
7. Now you know how much detail / data you can pull out of a single RAW file!

Bracketing and taking multiple exposures makes photography much more complicated when it isn't necessary!

Next time you're out shooting, just expose for the brightest parts of the scene, you now know how many stops you can recover in post processing! When in doubt, take an extra shot, increasing the exposure by the number of stops which you calculated above.

This method cuts down on the number of photos you need to take, and makes life much easier all around when shooting and editing your photos!

Less digital storage space, more efficiency, overall better photos!

Final Words of Advice - Northern Lights Photography

The only guaranteed way to become good at anything is trying it for yourself and seeing what works. That being said after a few nights practicing the provided skills under the night sky you will easily grasp all of the concepts.

Always remember you should never increase the ISO to obtain a brighter image prior to opening your aperture to the widest possible value (f/2.8 works great), and dialing in the maximum exposure time while still maintaining nice detail in the Northern Lights.

Increasing ISO degrades image quality, adjusting aperture and exposure time do not!

Photo Editing - Northern Lights Photography

Now that you have captured some awesome images of the Northern lights it's time to edit those images in Lightroom (or Adobe Camera RAW) and Ph0toshop! I've provided another tutorial on this topic which includes a free video, click the link below to watch.

[How to Edit / Post Process Your Photos in Lightroom & Photoshop »]