



# Milky Way Photography

Planning and Creating Unique Images

Tim Griffin

John Mattarella

Eastside Camera Club







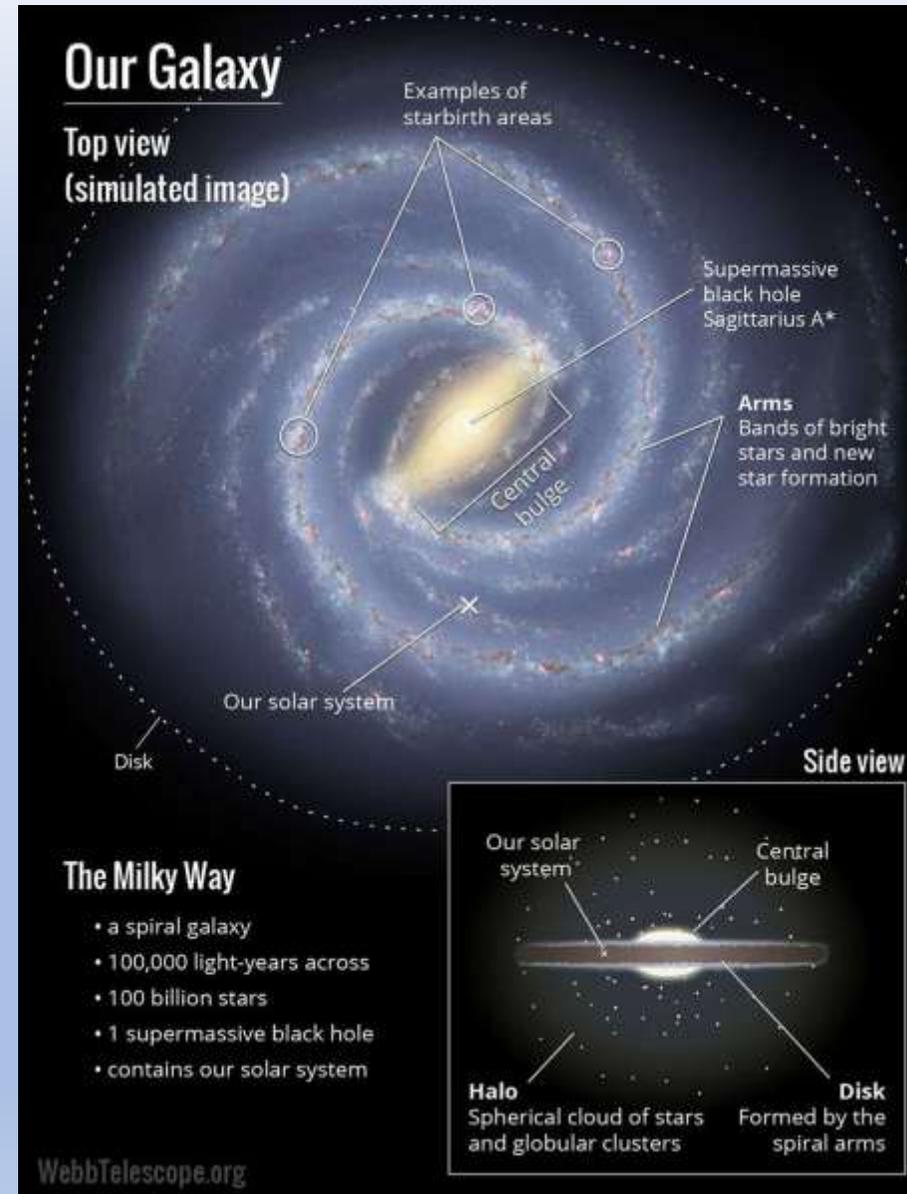
## What to Expect From This Presentation

- How planning your MW photo shoot using selected tools and resources is essential in your success. (**Milky Way Calendar, Google Earth, Photo Pills, Clear outside, Light Pollution Map**)
- What is the Milky Way
- Understanding light pollution and how it affects astro photography. (**Bortle Scale**)
- What photography gear and other equipment is essential for MW photography.
- Camera settings and calculate exposure.
- How to focus on stars.
- Simple Compositions using rules of photography. (Rule of thirds, Lead in Lines).
- Techniques used to enhance MW imagery. (stacking, foreground composites).
- Basic Post processing in LR and PS.
- Resources. (Dan Zafra)

## Just what is the Milky Way

The Milky Way is our home galaxy, a barred spiral galaxy containing billions of stars, gas, and dust, shaped like a flat disk with spiral arms and a central bulge, where our Solar System resides in one of the arms, about two-thirds out from the center, appearing as a hazy band of light across the night sky from Earth.

It's roughly 100,000 light-years across, orbits a supermassive black hole at its core, and takes our Sun about 250 million years to complete one revolution





## What is Milky Way and Night Sky Photography.

A successful photo of the skies at night will bridge the technical constraints of creating it with the artistic thought process to bring it to life.

A mistake struggling night photographers will make is focusing only on one or the other.



16mm f/2.8 ISO 3200 15 sec



What does it take to capture the Milky Way?

Photographing the Milky Way involves using a wide, fast lens on a tripod in a dark location, setting manual focus to infinity on a bright star, using a wide aperture (f/2.8 or lower), a high ISO (3200-6400), and a shutter speed around 20 seconds (using the 500 Rule), and triggering with a timer or remote to capture the galaxy's core with minimal light pollution and moon interference.



14mm f2.8 ISO 6400 30 sec



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**No, Sweat !**



14mm f2.8 ISO 6400 30 sec





# Timing

Milky Way Season is from May to November in the Northern Hemisphere.

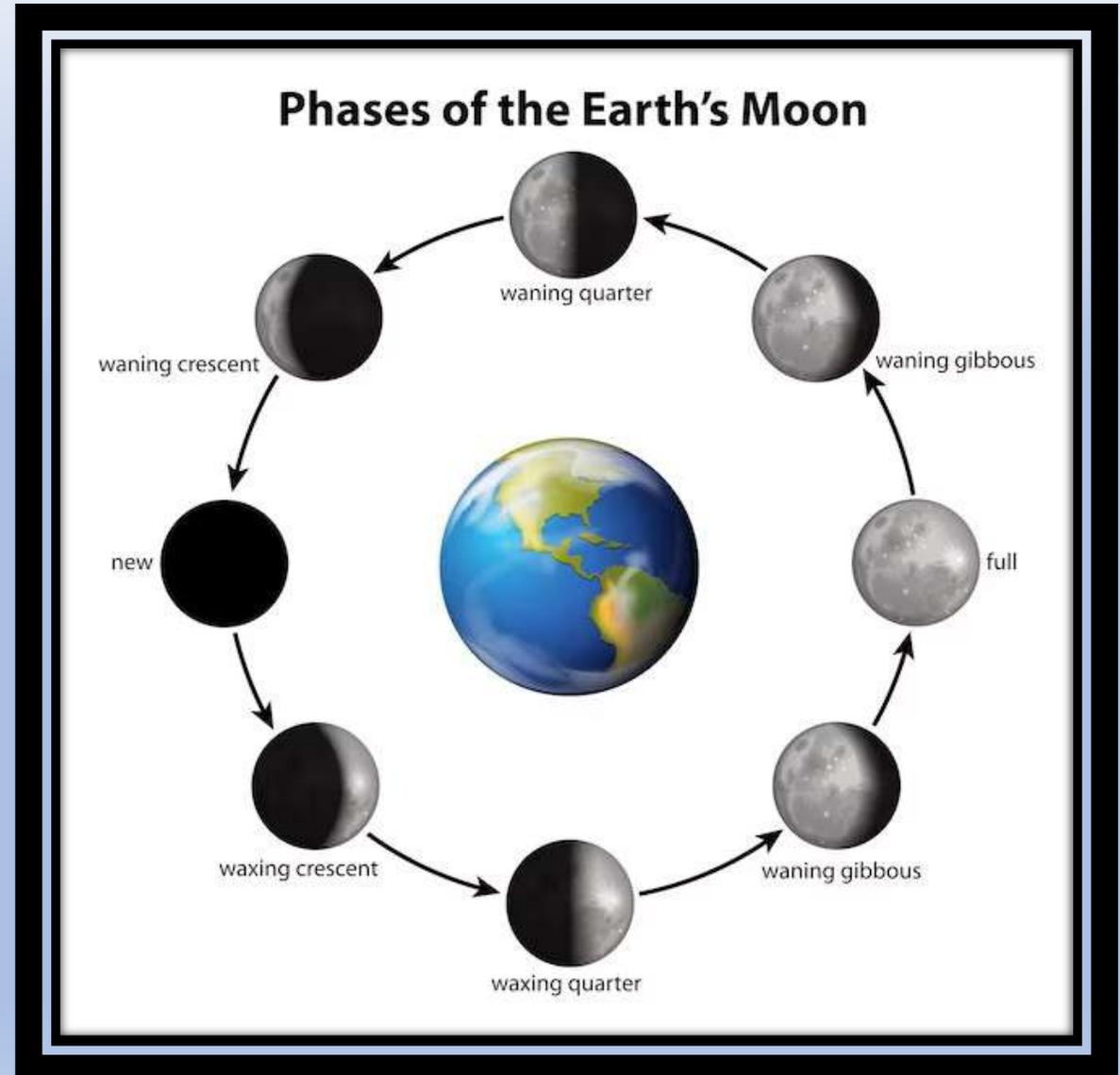
Following the moon phases is important. As close to new / no moon gives you the best chance.

Northern Hemisphere; **Southern Sky**

**Spring**(March-June) East-Southeast

**Summer**(July-August) High South

**Fall**(September-October) Southwest





## 2026 MILKY WAY CALENDAR-EAST COAST USA (42 degrees Latitude) [capturetheatlas.com](http://capturetheatlas.com)



Best days to photograph MW



Days where MW is **ONLY visible** for a short time



Days where the MW is **NOT visible**

Date	Moon			Sun		Milky Way			Galactic Center Visibility			Galactic Center Position
	Illumination	Moonrise	Moonset	Sunset	Sunrise	Start	End	Hours	Start	End	Hours	Average elevation
3-Jan	100%	17:07	8:56 +1	16:53	7:38	-	-	-	-	-	-	-
10-Jan	45%	1:17 +1	11:21	17:00	7:36	-	-	-	-	-	-	-
17-Jan	0%	7:47 +1	15:52	17:08	7:33	-	-	-	-	-	-	-
24-Jan	45%	10:38 +1	23:53	17:17	7:29	5:29	5:51	0:22	5:29	5:51	0:22	Arch (15°)
31-Jan	100%	15:58	7:26 +1	17:26	7:22	5:01	5:46	0:45	-	-	-	-
7-Feb	65%	0:07 +1	9:44	17:34	7:15	4:33	5:39	1:05	-	-	-	-
14-Feb	5%	6:19 +1	14:42	17:43	7:06	4:06	5:31	1:25	4:06	5:31	1:25	Arch (15°) - Arch (30°)
21-Feb	30%	9:10 +1	22:58	17:52	6:56	3:38	5:22	1:43	3:38	5:22	1:43	Arch (15°) - Arch (35°)
28-Feb	90%	14:55	5:56 +1	18:00	6:45	3:11	5:12	2:00	-	-	-	-
7-Mar	80%	23:56	9:35 +1	19:09	7:34	3:43	6:01	2:17	-	-	-	-
14-Mar	15%	5:48 +1	14:32	19:17	7:22	3:16	5:48	2:32	3:16	5:48	2:32	Arch (15°) - Arch (45°)
21-Mar	15%	8:44 +1	23:01	19:24	7:10	2:48	5:36	2:47	2:48	5:36	2:47	Arch (15°) - Arch (45°)
28-Mar	80%	14:57	5:25 +1	19:32	6:58	2:21	5:22	3:01	-	-	-	-
4-Apr	90%	22:46	8:06 +1	19:40	6:47	1:53	5:09	3:15	-	-	-	-
11-Apr	30%	4:14 +1	13:22	19:47	6:35	1:26	4:59	3:29	1:26	4:14	2:48	Arch (15°) - Arch (45°)
18-Apr	5%	9:30 +1	23:58	19:55	6:24	0:58	4:31	3:42	0:58	4:31	3:42	Arch (15°) - Arch (50°)
25-Apr	20%	14:01	3:54 +1	20:03	6:14	0:31	4:28	3:56	3:54	4:28	0:33	Arch (50°)
2-May	100%	21:39	6:40 +1	20:10	6:04	0:03	4:14	4:11	-	-	-	-
9-May	45%	2:39 +1	12:18	20:18	5:56	2:36	4:32	4:26	2:36	4:39	3:03	Arch (15°) - Arch (50°)
16-May	0%	5:55 +1	20:51	20:25	5:49	2:08	4:30	4:42	2:08	4:50	4:02	Arch (15°) - Vertical (60°)
23-May	55%	13:01	3:20 +1	20:32	5:43	2:24	4:30	4:59	2:20	4:40	1:19	Arch (55°) - Vertical (70°)
30-May	100%	20:33	5:19 +1	20:38	5:39	2:24	4:32	4:47	-	-	-	-
6-Jun	65%	1:05 +1	11:10	20:43	5:36	2:23	4:26	4:32	2:23	4:30	2:11	Arch (35°) - Arch (50°)
13-Jun	0%	4:33 +1	19:41	20:46	5:35	2:23	4:23	4:23	2:23	4:23	4:23	Arch (35°) - Vertical (80°)
20-Jun	35%	11:58	0:45 +1	20:49	5:36	23:02	3:23	4:20	0:45	3:23	2:37	Vertical (60°) - Vertical (85°)
27-Jun	95%	19:26	4:01 +1	20:50	5:39	23:02	3:26	4:23	-	-	-	-
4-Jul	75%	23:30	11:13 +1	20:49	5:42	22:59	3:29	4:22	22:59	3:30	0:31	Arch (50°)
11-Jul	5%	3:14 +1	18:33	20:46	5:47	22:53	3:28	4:44	22:53	3:38	4:44	Arch (50°) - Vertical (80°)
18-Jul	30%	11:57 +1	23:08	20:42	5:53	22:45	3:10	4:25	22:08	3:10	4:02	Vertical (60°) - Vertical (80°)
25-Jul	90%	18:15	2:46 +1	20:36	5:59	22:35	2:43	4:07	-	-	-	-
1-Aug	90%	21:57	10:12 +1	20:29	6:06	22:23	2:15	3:52	-	-	-	-
8-Aug	15%	7:03 +1	17:29	20:20	6:13	22:11	1:58	3:37	22:11	1:48	3:37	Vertical (65°) - Vertical (80°)
15-Aug	20%	10:46 +1	24:31	20:11	6:20	21:59	1:50	3:23	21:57	1:30	3:23	Vertical (65°) - Vertical (80°)
22-Aug	75%	16:59	1:32 +1	20:00	6:27	21:44	0:53	3:09	-	-	-	-
29-Aug	95%	20:23	9:10 +1	19:49	6:35	21:30	0:25	2:55	-	-	-	-
5-Sep	30%	1:00 +1	16:18	19:37	6:42	21:16	23:58	2:42	21:16	23:58	2:42	Vertical (75°) - Vertical (80°)
12-Sep	5%	9:35 +1	19:55	19:25	6:49	21:02	23:30	3:28	21:02	23:30	3:28	Vertical (75°) - Vertical (80°)
19-Sep	60%	15:39	0:19 +1	19:13	6:56	20:48	23:03	4:14	-	-	-	-
26-Sep	100%	18:49	8:06 +1	19:01	7:03	20:35	22:35	5:00	-	-	-	-
3-Oct	45%	0:04 +1	15:06	18:49	7:11	20:23	22:08	5:44	20:23	22:08	5:44	Vertical (85°) - Vertical (80°)
10-Oct	0%	8:25 +1	18:20	18:38	7:18	20:11	21:40	6:29	20:11	21:40	6:29	Vertical (85°) - Vertical (80°)
17-Oct	50%	14:50 +1	23:08	18:27	7:26	20:00	21:13	7:12	-	-	-	-
24-Oct	100%	17:13	6:58 +1	18:16	7:34	19:50	20:45	8:04	-	-	-	-
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14-Nov	35%	12:19 +1	20:59	16:52	7:00	-	-	-	-	-	-	-
21-Nov	90%	14:36	4:46 +1	16:46	7:08	-	-	-	-	-	-	-
28-Nov	75%	21:14	11:56 +1	16:45	7:16	-	-	-	-	-	-	-
5-Dec	5%	5:16 +1	14:17	16:41	7:23	-	-	-	-	-	-	-
12-Dec	20%	10:47 +1	19:53	16:41	7:29	-	-	-	-	-	-	-
19-Dec	75%	13:01	3:36 +1	16:43	7:34	-	-	-	-	-	-	-
26-Dec	85%	20:10	10:23 +1	16:47	7:36	-	-	-	-	-	-	-





# Planning

Planning ahead is the single most important step.

This type of shooting has many factors that need to be considered.

Some of which are out of your control.



## Steps to Planning.



1. Track the phases of the Moon.
2. Find location with low Light Pollution
3. Check for Milky Way position
4. Watch the weather
5. Prep your equipment.
6. Prepare yourself for the weather and to be on location throughout the night.



## Apps that will help with planning at home and in the field

Sky view

Plan it Pro

Stellarium

Milky Way Calendar

Google Maps

Clear Outside

Light Pollution Map

Aurora Alerts

Photo Pills

The Photographers Ephemeris



# How to Plan Your Milky Way Photo Shoot

## *Planning is essential...*

Plan from home using recommended tools and resources:

- \* **Milky Way Calendar;** Best dates, moon activity, MW position, galactic core (*capturetheatlas.com*)
- \* **Google Earth;** virtual scouting of locations in 3D using "Satellite," view.
- \* **Photo Pills;** virtual visualization of MW/Galactic core position at planned time, date and location.
- \* **Clear Outside;** forecasts cloud and weather conditions in selected area in real time and future
- \* **Light Pollution Map(LPM);** displays light pollution in selected area
- \* **Stellarium Mobile;** visualizing night sky and constellations
- \* **The Photographers Ephemeris (TPE);** mapping light and planning landscape compositions

*“A goal without a plan is just a wish.” - Antoine de Saint-Exupéry 7*

# Photo Pills Planner





# Using Photo Pills in Planning Your Shoot



## Download PHOTOPILLS App on your phone

- Tap, "Planner," (upper left icon)
- Tap, "More," (lower right hand corner)
  - Insert Date (future or "Now")
  - Check box
- Tap, (+) box( lower right second icon)
- Tap, **RED** highlighted PIN
  - Move (**X**) to planned location, double tap (**X**) to move **RED** PIN into planned location.
- Move Time/Date Bar (bottom of app) This will change time and date map from daytime to nighttime and the Milky Way into the planned location.
- You may also tap the Galactic Icon (left upper corner) moving the Milky Way through the time and date zones showing **Azimuth** and **elevation** of the Milky Way structure. ( coordinates that define position of MW in sky as viewed from a particular location at a particular time).
- Tap the Paper icon (3rd icon left bottom) to change the type of map from standard to \*hybrid(detailed topography).
- On location use, Night AR (augmented reality) to view how the Milky Way appears in the scene.
- Tap the "Save," icon to save your plan.

17 DEMO.

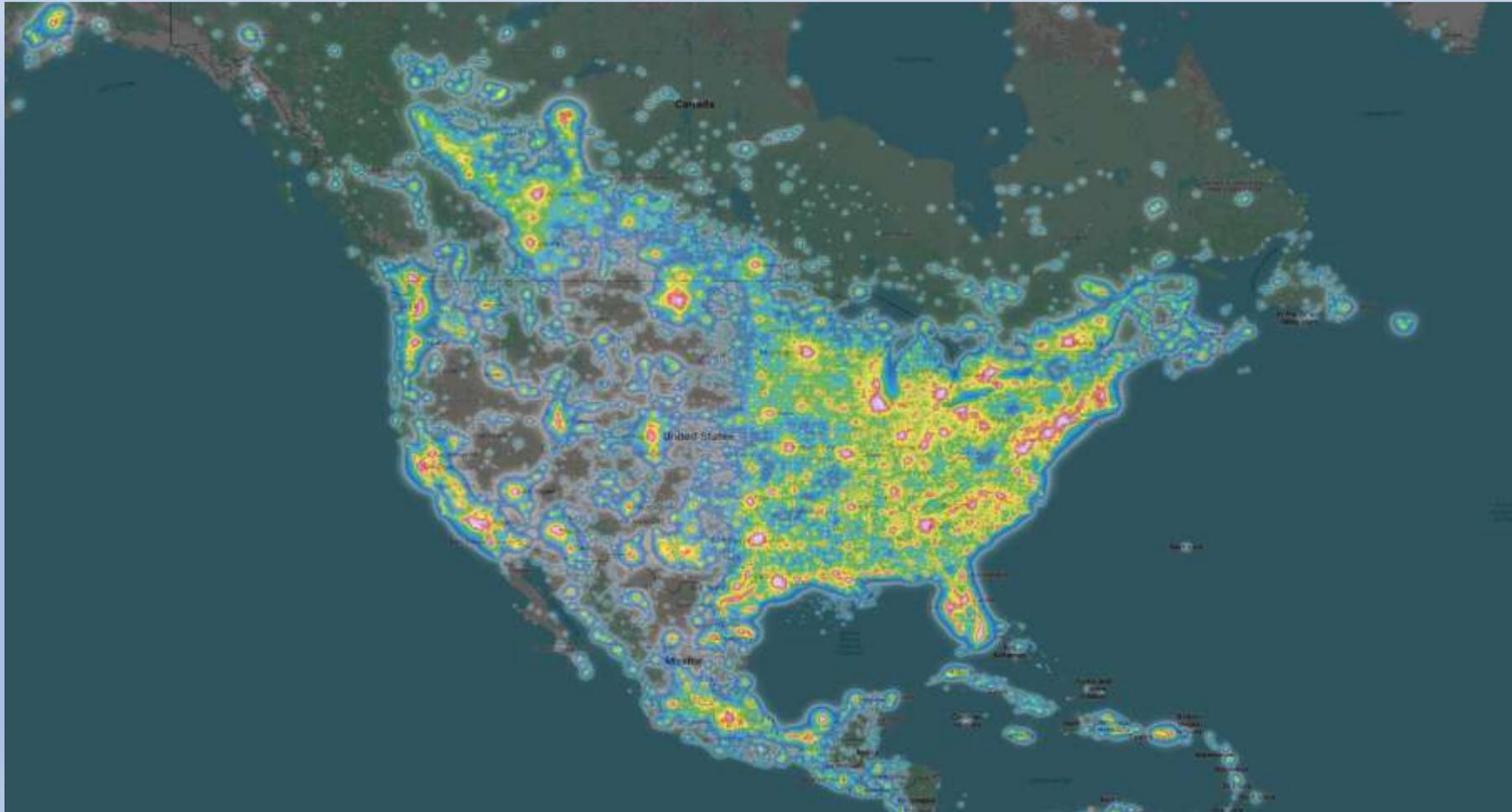
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## What is Light Pollution and How it Affects MW Photography

- The excessive, misdirected or inappropriate use of artificial outdoor lighting, which alters natural darkness and obscures the night sky. (controversial) 4 types, Skyglow most significant impact.
- Skyglow, dome of light over urban areas caused by light scattering in the atmosphere making stars harder to see.
- Hides stars and celestial objects diminishing our connection with the universe.

## Light Pollution(NASA)





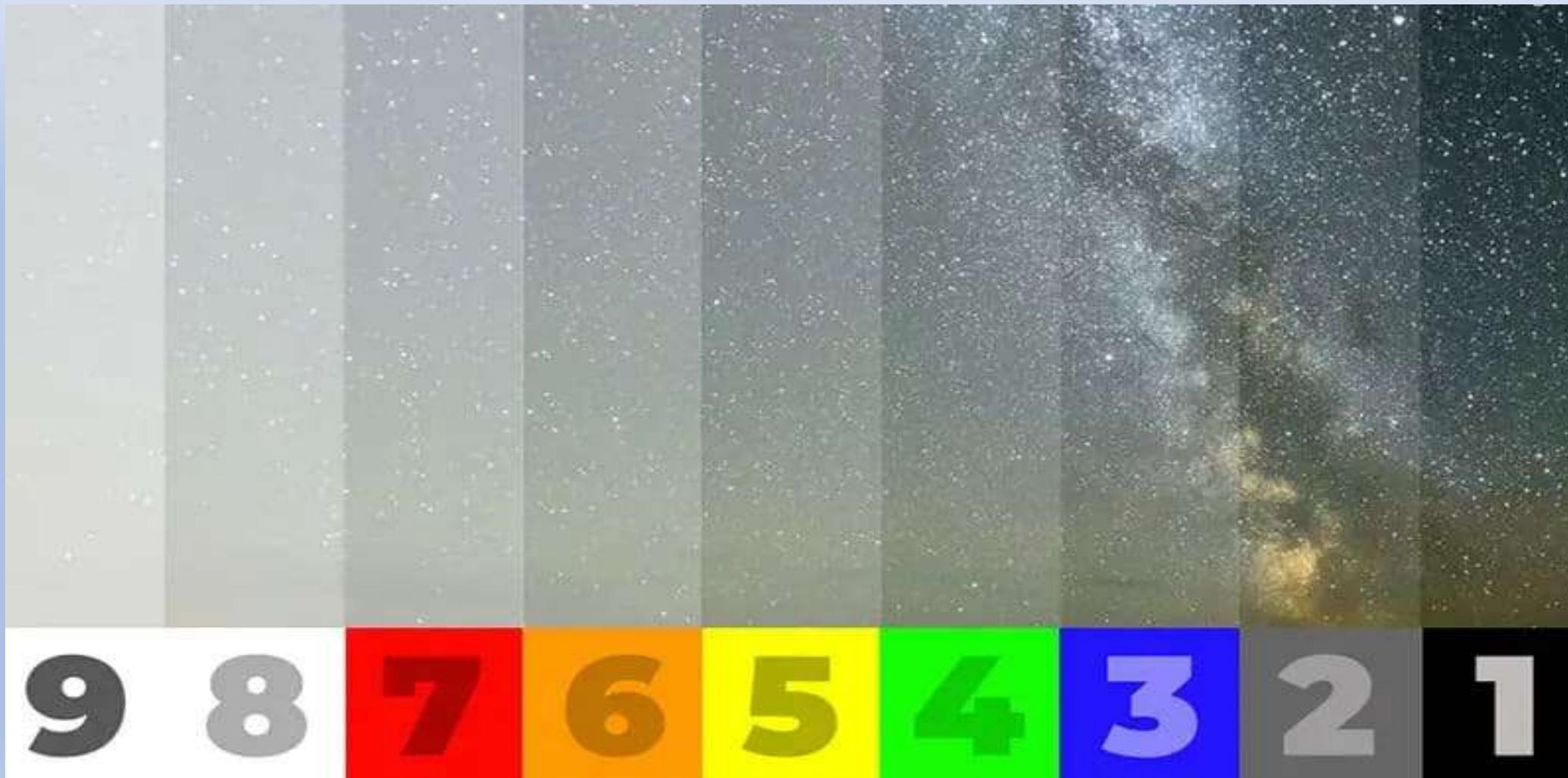
# What is the Bortle Scale and How to Use It

- 9 point system used to measure light pollution in the night sky
- Allows photographers to identify the quality of the night sky in a specific location
- Scale of **1(Excellent dark sky sites) -----> 9 (inner city sky's with severe light pollution)**

Ideal Range

	Limiting Magnitude	Sky Description	Milky Way	Astronomical Objects	Zodiacal Light / Constellations
}	1	Excellent, truly dark-skies.	MW shows great detail and light from its centre casts shadows on the ground.	M33 (the Triangulum Galaxy) is an obvious object.	Zodiacal light has an obvious colour and can stretch across the entire sky.
	2	Typical, truly dark skies.	MW shows great detail and has veined appearance.	M33 is visible with direct vision, as are many globular clusters.	Zodiacal light bright enough to cast weak shadows after dusk and has an apparent colour.
	3	Rural sky.	MW still appears complex, dark voids and bright patches and meandering outline are all visible.	Brightest Globular Clusters are distinct, but M33 is only visible with averted vision. M31 (the Andromeda Galaxy) is obviously visible.	Zodiacal light is striking in Spring and Autumn, extending 60 degrees above the horizon.
	4	Rural / suburban transition.	Only well above the horizon does the MW reveal any structure. Fine details are lost.	M33 is a difficult object, even with averted vision. M31 is still readily visible.	Zodiacal light is clearly evident, but extends less than 45 degrees after dusk.
	5	Suburban sky.	MW appears washed out overhead and is lost completely near the horizon.	The oval of M31 is detectable, as is the glow in the Orion Nebula.	Only hints of zodiacal light in Spring and Autumn.
	6	Bright, suburban sky.	MW only apparent overhead and appears broken as fainter parts are lost to sky glow.	M31 is detectable only as a faint smudge; Orion Nebula is seldom glimpsed.	Zodiacal light is not visible. Constellations are seen and not lost against a starry sky.
	7	Suburban / urban transition.	MW is totally invisible or nearly so.	M31 and the Beehive Cluster are rarely glimpsed.	The brighter constellations are easily recognizable.
	8	City sky.	Not visible at all.	The Pleiades Cluster is visible, but very few other objects can be detected.	Dimmer constellations lack key stars.
	9	4.0 at best	Inner city sky.	Not visible at all.	Only the Pleiades Cluster is visible to all but the most experienced observers.

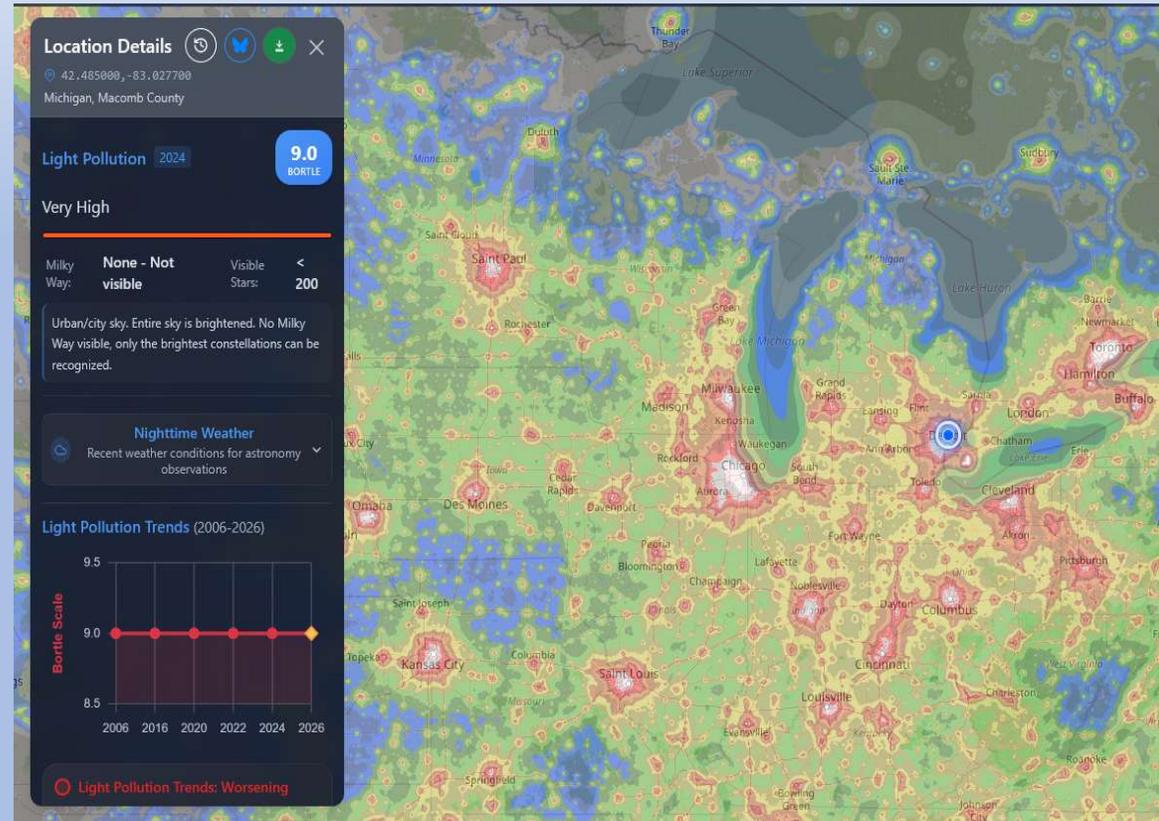
# BORTLE SCALE in relationship to viewing the stars

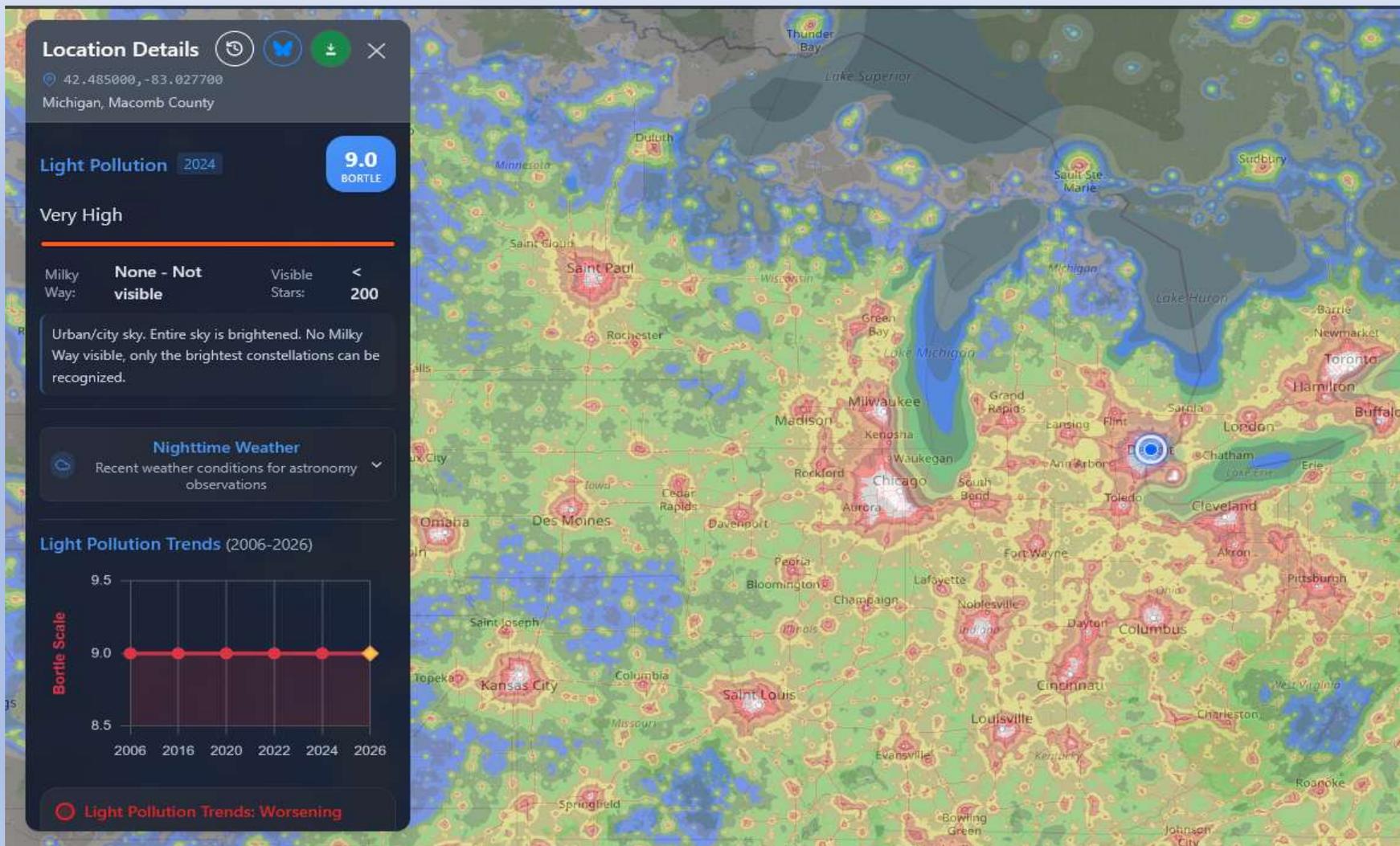


Explore the most accurate 2026 light pollution map web app.

Check Bortle Scale to discover the best dark-sky, Milky Way, and aurora spots near you.

<https://lightpollutionmap.app/>





## Locations in Michigan

Michigan Dark Sky Parks; a dedicated protected night sky

Headlands, Emmet County

Dr. T.K. Lawless, Cass County

Keweenaw International, Copper Harbor

Michigan Dark Sky Reserves; more expansive area containing  
a core of dark sky protected by a peripheral buffer.

Wilderness State Park, Emmet County

Thompsons Harbor State Park, Posen

Rockport State Park, Alpena

Negwegon State Park, Alcona County

Port Crescent State Park, Port Austin

Lake Hudson Recreation Area, Clayton

International dark sky sanctuaries in Michigan

Beaver Island State Wildlife Research Area International Dark Sky Sanctuary



## How dark is dark enough?

"True dark" in the night sky refers to the absence of scattered sunlight and artificial light pollution, revealing the natural, faint glow of the atmosphere (airglow) and cosmic background.

It is not a perfect black, as the sky still emits faint light, but it allows for maximum stellar visibility.

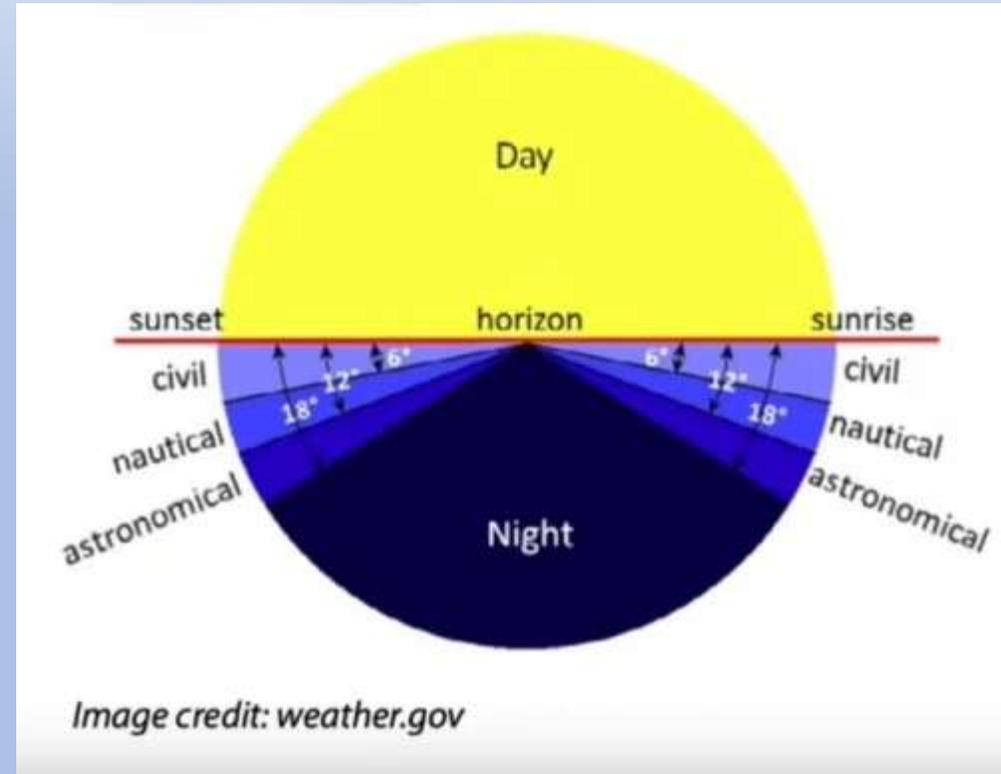


14mm f 2.8 ISO 6400 20 Sec

As the sun sets below the horizon it is measured in degrees.

At certain points, it is still reflecting light back up into the atmosphere.

This reflection will have the effect to wash out the stars in your image.

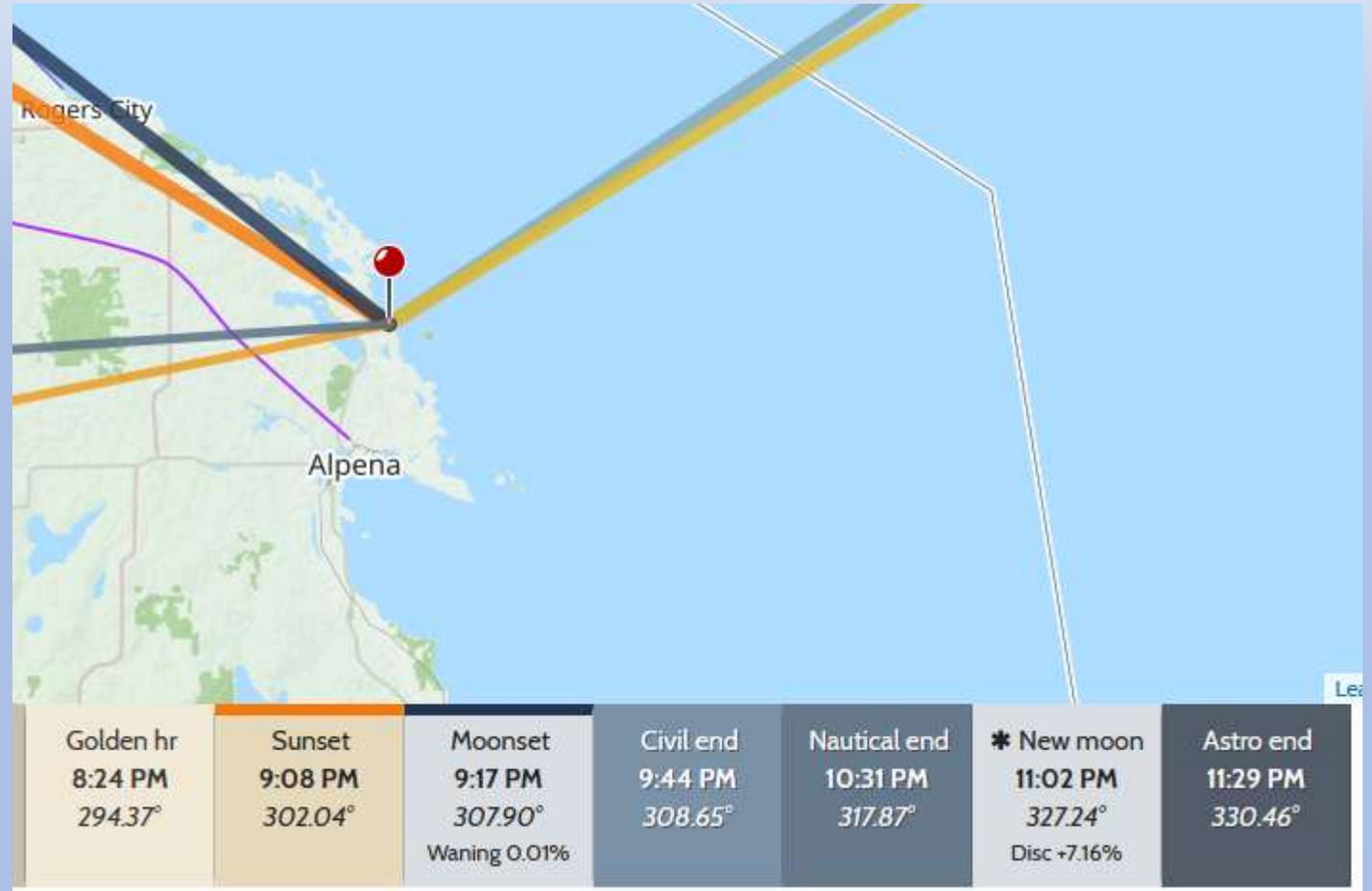




Civil Twilight: Begins just after sunset, The colors of the sky change rapidly. Near the end of civil twilight bright stars will now begin to appear in the sky.

Nautical Twilight: The sky begins to darken and a dark blue hues and more and more stars become visible in the sky

Astronomical Twilight: The sky is mostly devoid of sunlight and most of the stars become visible. At the end of astronomical twilight it is finally full dark and the Milky Way will begin to come into view



Natural Airglow: Even in the darkest locations, the atmosphere itself glows due to chemical reactions involving oxygen and nitrogen, producing faint, natural light.



14mm f2.8 ISO 5000 20 Sec





# Equipment

## Camera and Lens

Camera: you will need a camera that allows full manual exposure control of aperture, shutter speed and ISO. You also want the camera to be able to focus manually, since focusing at night will surely be a challenge for any autofocus system.

A Fast Lens – if you use an interchangeable lens camera, I would recommend to use a good, fast-aperture wide-angle lens (ideally in the f/1.4 – f/2.8 max aperture range).

If you have a slow lens or you need to stop down your lens to get the maximum sharpness, you will have to crank up the ISO, which will result in grainy photos. That's why a fast lens is an ideal choice



## Tripod and Remote shutter Release

A Sturdy Tripod – you will be shooting long exposures (15 seconds and longer), so a sturdy tripod is a must-have.

You do not want a flimsy tripod that will shake like crazy during the exposure, especially if there is light wind.

A Shutter Release is required because of the long shutter time. Just pressing the shutter on the camera will add movement in your image.

If you don't have a remote release, then use the self timer built in to your camera.







## Camera Settings

Whenever doing any type of night photography, you should always be shooting in full manual mode, as there is simply not enough light for your camera's meter to calculate the right exposure.

This means that you need to turn off Auto ISO first, then set aperture to the maximum aperture of your lens.

Then set the length of the exposure / shutter speed based on the "500 Rule or NPF Rule" (typically between 20 to 30 seconds).

Followed by ISO (which I would set to 1600 as the base and move it up or down as needed). Once the base exposure is calculated, any exposure adjustments would be via ISO in steps.

If you cannot clearly see the Milky Way in your shot after you take your first shot, you will need to raise the ISO.

Since you are shooting RAW, white balance does not matter.



You will want to be able to adjust the 3 major settings in your camera in the dark and without a flashlight.

Exposure Mode set to Manual

Manual Focus or Back Button

Aperture

Shutter Speed

ISO



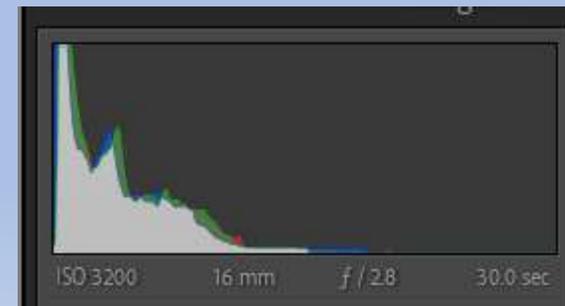


# Calculate Exposure

The key to good exposure in Milky Way or any astrophotography is having a fast enough shutter speed to not have star trails, but enough light to correctly expose the image.

This is accomplished by calculating the best exposure using one of two methods.

The 500 Rule is the most common, but the NPF rule has been shown to be more accurate with the newest sensors.





Base exposure for good results anywhere as long as you are in a Bortel rating of 3 or less.

20 to 30 seconds

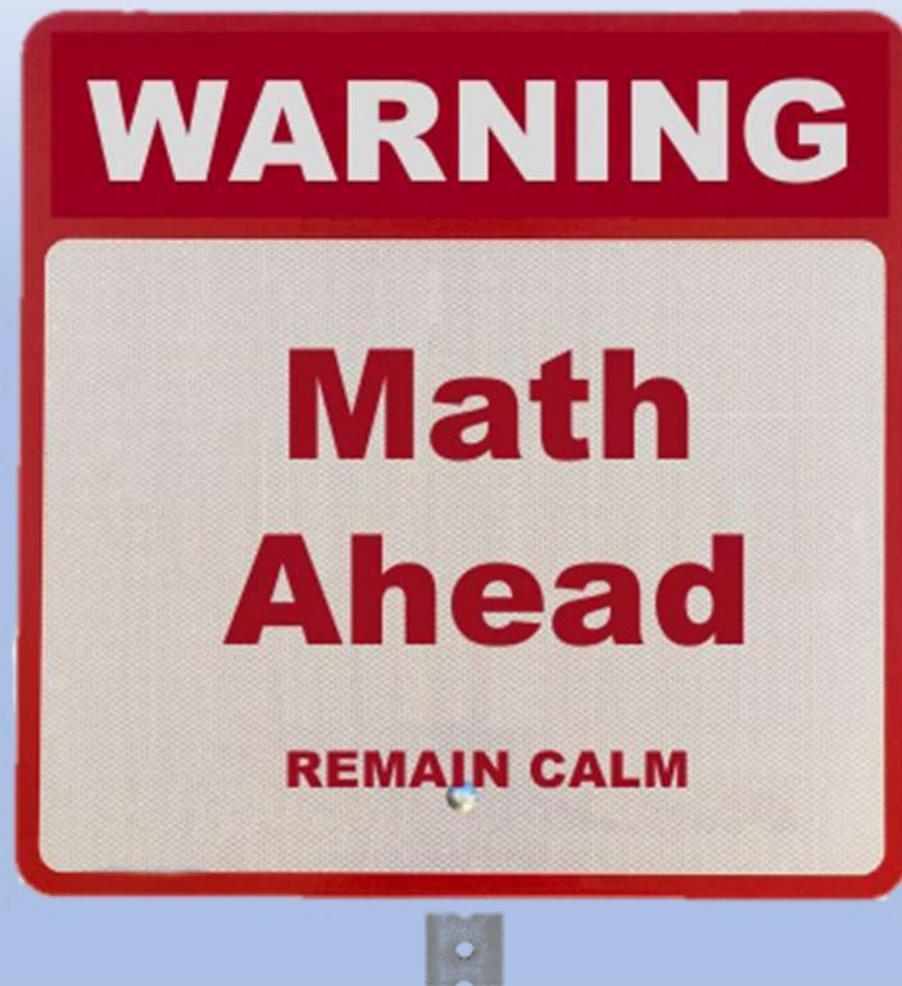
f/1.4 to f/2.8

ISO 3200 to 6400

**If your images are very bright then you have to much light pollution.**



f/2.8 ISO 3200 15sec 16mm



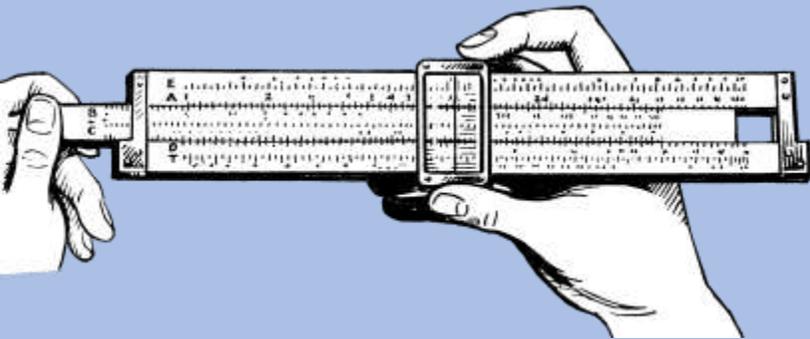
The 500 Rule calculates the maximum exposure time (in seconds) for sharp, untraced stars in untracked astrophotography by dividing 500 by your lens's focal length. For crop sensors, multiply the focal length by the crop factor (1.5x or 1.6x) first.

Divide 500 by the focal length of the lens that you're using.

So, if you have a 24mm lens on a full frame camera, you will set your shutter speed to 20s ( $500/24=20.83$ ).

If you're working with a crop-sensor camera be sure to account for the crop factor (typically 1.5 for Nikon and Sony, 1.6 for Canon) before using the 500 Rule or NPF Rule.

TIP: Calculate all these at home and make a small cheat sheet to take with in the field



## BASE EXPOSURE: 30" F2.8 ISO 3200

SHUTTER SPEED: 30"  
APERTURE: f4  
ISO: 6400

SHUTTER SPEED: 20"  
APERTURE: f4  
ISO: 12800

SHUTTER SPEED: 15"  
APERTURE: f2.8  
ISO: 6400

SHUTTER SPEED: 15"  
APERTURE: f2  
ISO: 3200

SHUTTER SPEED: 15"  
APERTURE: f1.4  
ISO: 1600

SHUTTER SPEED: 8"  
APERTURE: f1.4  
ISO: 3200



These are the exposures for my 3 lenses.  
Using the 500 rule.

15 mm f/2.8

24-105 mm f/4.0

50mm f/1.4

Base Exposure f2.8 30sec 3200 ISO

Lens	Base EXP		Aperture	Shutter	ISO
15mm	2.8	30"	2.8	30"	3200
24mm	4.0	20"	4.0	20"	12800
35mm	4.0	15"	4.0	15"	+ - 8500
50mm	1.4	10"	1.4	10"	600

My exposure cheat sheet

A more complex formula for calculating shutter speed at night is called the NPF rule. Here's the formula:

$$T[\text{sec}] = ((35 \times N) + (30 \times P))/F$$

t = Recommended shutter speed

k = Multiplication factor

N = F-number

f = Lens focal length (millimeters)

p = Pixel pitch (micrometers)





The NPF rule calculates the maximum shutter speed for sharp, untraced stars in astrophotography, accounting for aperture, pixel pitch, and focal length. It is more accurate than the "500 Rule" for modern high-resolution sensors.

The NPF stands for

N = aperture (it's the official notation of aperture in optics),

P = pixel density, the distance between the pixels on the sensor, also called pixel pitch,

F = focal length.

With these variables you can calculate the maximum shutter speed in seconds by using the following formula:

$$T[\text{sec}] = ((35 \times N) + (30 \times P))/F$$

If you want to use this rule, you need to know the pixel density of the sensor first. This can be calculated by dividing the width of the sensor by the amount of pixels, multiplied by 1000 micrometer ( $\mu\text{m}$ )



### Calculate Exposure with NPF rule

Canon R6 Mark II Camera with 16mm f/2.8

$$T[\text{sec}] = ((35 \times N) + (30 \times P))/F$$

$$17.37\text{sec} = ((35+2.8)+(30*6.00))/16$$

Base exposure = 17 sec f/2.8 ISO 3200

The NPF rule provides a formula, but you often pair it with high ISO settings (e.g., 1600-6400) and wide-open apertures to get a well-exposed photo.

Because the NPF rule focuses on preventing motion blur by limiting exposure time, a higher ISO allows the camera to gain more light sensitivity to compensate for the shorter shutter speed, often used with f-stop settings around 2.8 or lower.

The key is to memorize this as soon as possible. Once you do, it just takes some quick mental math to get sharp photos every time.



### Calculate Exposure with NPF rule

Canon R6 Mark II Camera with 16mm f/2.8

$$T[\text{sec}] = ((35 \times N) + (30 \times P))/F$$

$$17.37\text{sec} = ((35+2.8)+(30*6.00))/16$$

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The NPF rule provides a formula, but you often pair it with high ISO settings (e.g., 1600-6400) and wide-open apertures to get a well-exposed photo.

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The key is to memorize this as soon as possible. Once you do, it just takes some quick mental math to get sharp photos every time.

Ok, I'm kidding! This calculation is built into a many of the astrophotography apps, like PhotoPills, Pin Point Stars, and a few others. You'll need to input some of the variables on your own, but once you do, the app will tell you the optimal shutter speed without any calculations required on your end.



Shoot raw - you will need to do some post-processing so make sure you get as much image info as possible by shooting raw.

Use live view - this makes it a lot easier to compose your shot as often you won't be able to see anything through the viewfinder.





# Focusing

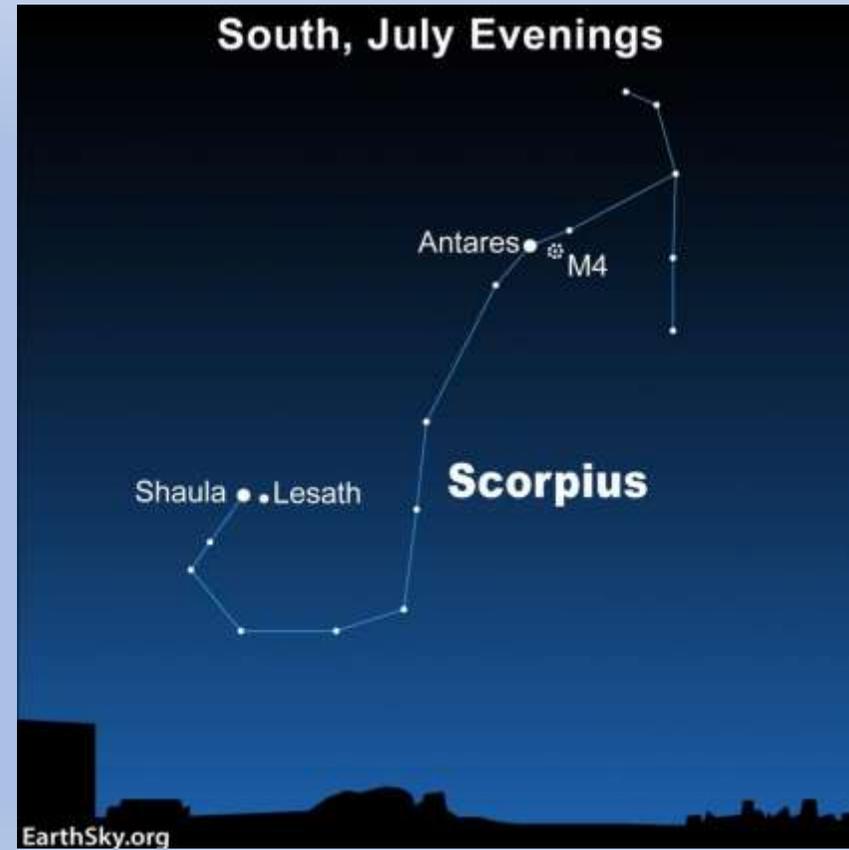
As with all types of photography, focusing to achieve sharp images is paramount. When going out for astrophotography it becomes much more difficult to achieve.

With cameras having great autofocus systems, focusing during the day is very easy and returns good results.

Autofocus will not work at night. Autofocus systems rely on contrast in the image to achieve focus. Night skies will not have that contrast.

That means you will need to manually focus your images

The star, Antares, is one of the brightest in the sky. This is a good choice to use for setting focus.





If you look at your lens where it shows on the distance scale for focus you will see at one end a Figure 8 laying on its side. This is the symbol for Infinity.

Now you might think that just setting your lens focus to that point is going to give you the sharpest image since stars and the Milky Way are way past where we can focus.

This point of Infinity focus on our lens is probably not the sharpest point for Infinity.



# FOCUS STEPS OVERVIEW

**NO MATTER THE TECHNIQUE, START WITH THESE SAME 4 STEPS:**

## **Step 1.**

Set lens and camera to Manual focus (make sure VR/IS is off)

## **Step 2.**

Set lens to infinity. If you don't see any stars at first it is because they are completely out of focus or your screen/lens is unable to.

## **Step 3.**

Set your ISO to it's highest ISO.

## **Step 4.**

Take a test photo and zoom in on your playback image to check for focus.

***YOU MUST ZOOM IN on the LCD image.*** Everything looks in focus when it is small!

Most mirrorless or modern DSLR camera models offer a function called “focus peaking,” which is a manual focusing aid that will turn the stars in a custom color (such as red or blue) when they are in focus.

Using this tool is one of the best tips to capture sharp photos of the Milky Way!

After focusing, don’t forget to take a test shot (you can use a higher ISO to do it faster) and see if your stars are perfectly sharp. If they aren’t, repeat this step again until they are in focus.





## Canon Focus Peaking

- 1) Access the Menu: Go to the camera's shooting menu (often the red tab) and locate MF Peaking Settings.
- 2) Enable Peaking:
- 3) Turn Peaking On
- 4) Adjust Intensity & Color: Select the detection level (high/low) and color (red is common).
- 5) Activate Manual Focus: Switch your lens or camera body to MF.
- 6) As you turn the focus ring, a colored highlight will appear on the sharpest areas of your image.

## Nikon Focus Peaking

- 1) Access Menu: Press the Menu button and navigate to the Custom Settings Menu (pencil icon).
- 2) Locate Setting: Select d10 (Peaking Highlights) or similar, depending on model.
- 3) Enable: Select Peaking Level and choose a sensitivity: 1 (Low), 2 (Standard), or 3 (High).
- 4) Color: Select Peaking Highlight Color to choose the best color for your scene (e.g., red or blue for high contrast).
- 5) The camera will now show color highlights on sharp edges while in manual focus mode (or when turning the focus ring on Z lenses).



**Choose the Right Star:** Start by finding a bright star in your composition. Brighter stars create more contrast, making focus peaking more effective. If possible, look for stars near the edge of the frame, as this is where any focus issues will be most noticeable.

Use focus peaking in conjunction with my camera's magnification feature. This allows you to see the focus peaking with incredible precision.

Slowly rotate the focus ring back and forth, watching the focus peaking highlight appear and disappear. The point where the peaking is strongest and covers the largest area of the star is usually the sharpest focus.

**Verify with Multiple Stars:** After you think nailed the focus, check a few other stars in different parts of the frame. This helps ensure consistent sharpness across the entire image.

**Take Test Shots:** Even with focus peaking, always take a few test shots and review them at 100% magnification. This final check has saved many of my shooting sessions from slight focus errors.



## Are you ready ?

- ✓ **Weather**
- ✓ **Found a good location with a Bortle rating of 3 or less.**
- ✓ **Checked the location in one of the sky apps for Milky Way timing.**
- ✓ **New Moon.**
- ✓ **Camera and gear ready.**
- ✓ **Non-photo gear ready.**

**Time to get in the car and go capture the Milky Way**



Time to hit the road.

Wasn't sure what gear to bring!

I might have over packed!



On site scouting at daytime to find powerful compositions.

Note dangers hard to see at night.

Identify sources of light pollution.

Will there be locked gates to the area? Can I access the area after dark?

Plan your composition. Easier in the daytime.



24mm f/20 ISO 200 1/15 sec



So, when you get to your location, how do I know where to look for the Milky Way?

In the Northern Hemisphere, it will be found between the constellations of Sagittarius and Scorpio.

This why having a sky app Photo Pills or Stellarium is useful.





## **Something to keep in mind out in the field.**

It will take 20 to 30 minutes for human eyes to fully adjust to the dark after leaving bright light.

While pupils dilate within seconds, the chemical process in the retina—specifically the regeneration of rhodopsin in rod cells—requires about 30–45 minutes for maximum sensitivity, though significant improvement occurs within the first 10 minute.

This is a main reason you want to be able to adjust your camera in the dark , without using a flashlight. A red filter on a flashlight can reduce this, if necessary.



# Composition

Composition is a way of guiding the viewer's eye towards the most important elements of your work, sometimes – in a very specific order.

On the other hand, a bad composition can ruin a photograph completely, despite how interesting the subject may be.

A poorly judged composition is also not something you can usually fix in post-processing, unlike simple and common exposure or white balance errors.

Rule of Thirds

Leading Lines

Diagonals



14mm f2.8 ISO 6400 25 Sec



Think about a foreground element to give your image a start. Then use other techniques to draw the viewer to the main subject.

In this case the Milky Way.



16mm f/2.8 ISO 3200 20 sec



If you have a foreground object in your shot, you obviously want both the foreground and the stars to be in perfect focus. Since you are shooting at wide open aperture, how do you achieve that?

Well, the answer is in a technique called “focus stacking”, except you are probably going to take two images or more images, with one focused on the sky and the other focused on your foreground.

Then you use a blending technique in Photoshop to merge the two shots into a single composite, with perfect focus on both.



# Post Processing

Processing your images is the last step to capturing the Milky Way.,

It is safe to say, that you will never get a great image straight out of the camera.

This can be accomplished with any good editing program.

May use advanced techniques using photo stacks, panoramas or foreground composites with lower ISOs.

Photoshop can be used reduce stars.





14mm f2.8 ISO 6400 25 Sec

Post processing is where your astrophotography comes to life...

## Basic Post-Processing in LrC

Post processing is where your astrophotography comes to life...

### In LrC...

1. Lens corrections:
  - Remove Chromatic Aberration
  - Enable Profile Corrections
2. Increase Exposure (moving histogram towards middle)
3. Decrease **Highlights**
4. Decrease **Shadows**
5. Increase **Contrast**
6. Increase **Whites** (min)
7. Decrease **Blacks** (min)
8. Balance cool and warm colors
  - Increase **Vibrance** to 100%
  - Increase **Saturation** to 100%
  - Increase **Temp** (push temp to right)
  - Decrease **Tint** (push to left)
  - Bring back Saturation and Vibrance to zero
9. Local adjustments, Select **Sky Mask**
  - Increase **Dehaze** (push to right), Increase **Texture**, Increase **Clarity**
  - Create second sky (**Sky 2**) mask, Invert Layer and cool down to match color tones in sky
  - Create **Radial Mask**, place over MW core, Increase **exposure, contrast, whites and saturation**, Decrease **blacks**
17. **Denoise** in LR or other app.
18. May use advanced techniques using photo stacks, panoramas or foreground composites with lower ISOs. May use PS to reduce stars.

Post processing is where your astrophotography comes to life...







# Northern Lights

Photographing other of events in the sky like Northern lights or meteor showers we'll use a lot of the same techniques and settings that we've shown here for the Milky Way.

When we talk about photographing the Northern Lights just like Milky Way shots planning is key. We don't know when the Northern Lights are will show in our area or even if the weather is going to cooperate.



24mm f/4.0 ISO 640 10 sec

Northern Lights are going to be in the northern sky, so you'll want to have scouted out a couple of locations that will give you good foreground with nice access to the northern sky.

Many of the apps we've talked about have tools in them to help you with Northern Lights.

There are also other apps that you can sign up for and receive alerts on your phone when conditions are looking promising.



Aurora Alerts App



This image shows the importance of scouting ahead of time for good locations.

When an astronomical event is about to happen, you have a good plan on where to go.





## Review

To review, probably the single most important part of astrophotography in general, but specifically Milky Way photography is pre planning before you even head out to a location.

Timing

Location

Camera settings

If you don't plan There is a very good chance you'll spend a lot of time with poor results.



Thank You