

Michigan Aurora Chasers



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A Beginner's Guide For Aurora Chasing

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Auroras and Predicting

What Are Auroras

The northern lights, or aurora borealis, are a natural phenomenon found in the Northern Hemisphere, especially the closer one gets to the North Pole. The light effect happens when the sun drives solar wind away from itself, causing high-energy particles to strike the Earth's magnetic field. When these particles collide with oxygen in the Earth's atmosphere, they produce red or green lights when they collide with nitrogen, the light produced is green and purple. In Michigan, usually they are not seen in color with the naked eye but as a white/grey area in the sky. There may be movement or not. It appears almost like a diffused cloud or fog.

Forecasting Auroras

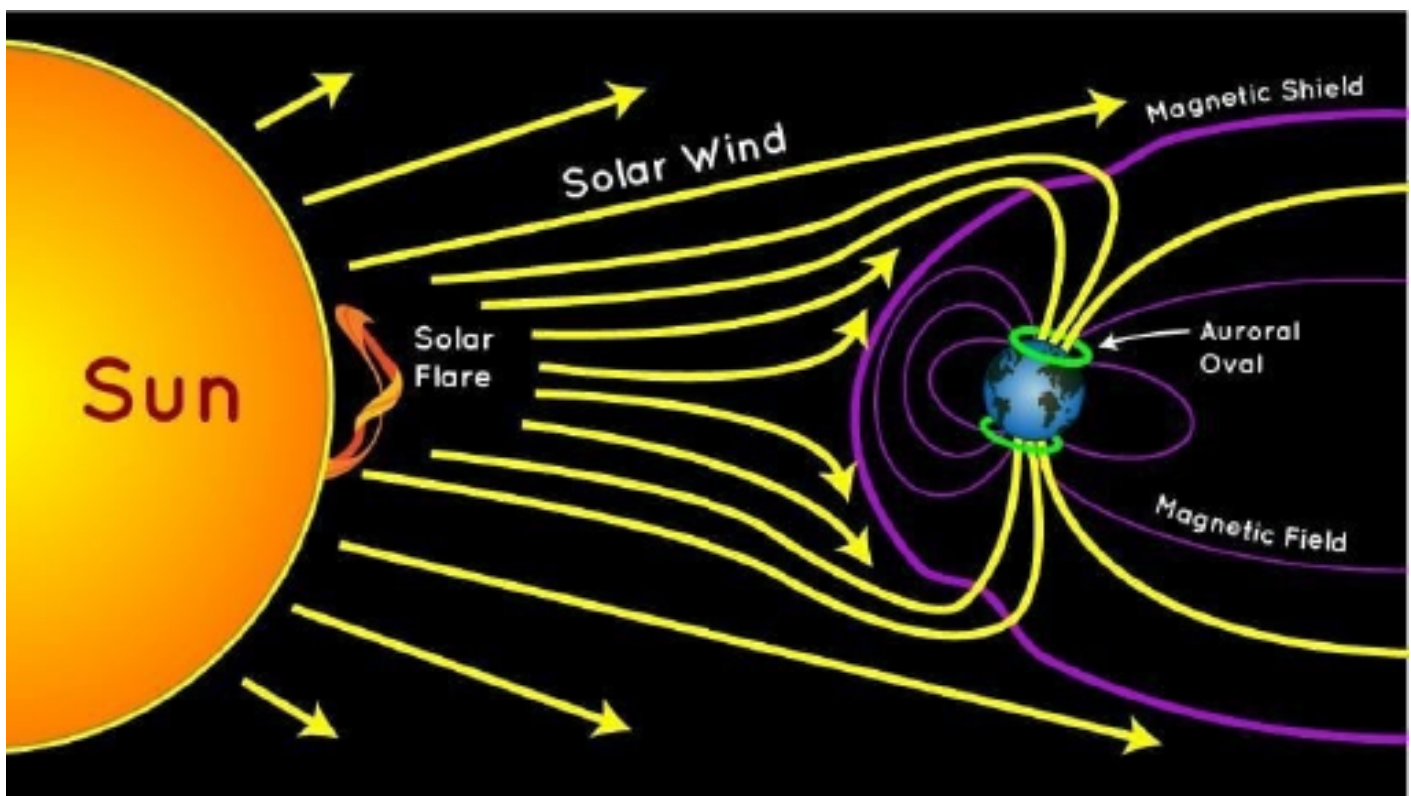
There are many websites and apps that offer data on solar wind speed, density, geomagnetic activity: Bz Rate, and storm intensity Kp and convert it into an “aurora forecast”. Many offer 3-day forecasts but the following is the basics you should know. Also, see important notes below for more information.

Bz measures the polarity of magnetic field. A negative (southward) Bz value is more favorable for seeing aurora as a northward polarity will deflect most of the solar wind particles that create the aurora to begin with. The lower the number the better.

K and Kp measures storm conditions. Kp means you are looking at a planetary average of activity over the previous 3 hours. The 3-hour average does not necessarily indicate strong activity in the future. K is the same measure given in real time, not an average. The best chance of visible Aurora in Michigan, look for need storm conditions of K5, K6 or K7 (also known as G1, G2 and G3 Storms). Aurora can often be seen in the Upper Peninsula at a K-index of 4 (or K4), which is below storm levels.

Solar wind density: the amount of solar particles in the wave generated by the Sun. Generally $\geq 10 \text{ p/cm}^3$ is ideal, but this doesn't have to be exact. The higher the number the better

Solar wind speed: the speed at which the particles from the sun are traveling. Again, the higher the number the better.



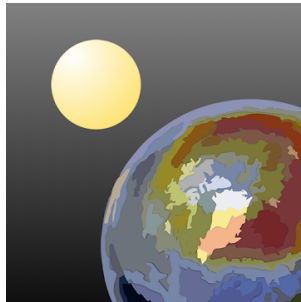
Apps and Websites

Ovation Model Website: <https://services.swpc.noaa.gov/images/aurora-forecast-northern-hemisphere.jpg>

Space Weather Prediction Center Website: <https://www.swpc.noaa.gov/>

Dark Skies Finder Website: <https://darksitefinder.com/maps/world.html#6/41.038/-88.027>

Mobile App: SpaceWeatherLive



My Aurora Forecast

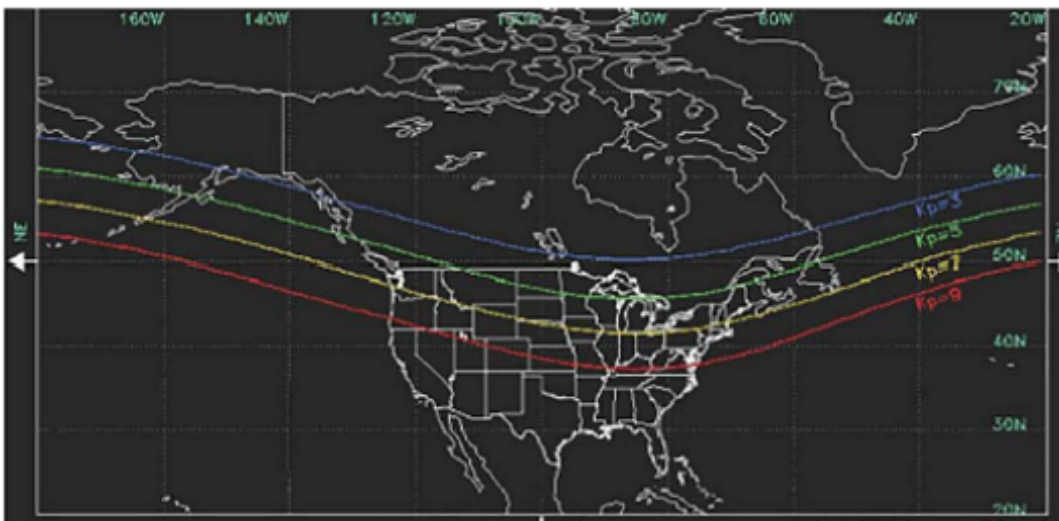


Mobile App: Aurora Alerts



Some Important Notes:

1. Higher Kp does not necessarily mean higher chance to see the lights. It simply corresponds to how strong geomagnetic activity is
2. The Kp is the same for the entire hemisphere, it is not different in different cities. It is an average over time and not a real time measurement.
3. If you are at lower latitudes, you generally need a higher Kp to see the lights.
 - a. Example: You need a Kp 4-5 to see them in the Kewaunee whereas you would need a Kp 7-8 to see them in Ohio.
4. They may be visible at lower Kp in certain cases, since Kp does not tell the whole story.
5. Light pollution, even in the form a very bright full moon, can ruin your chances to see the lights!
6. Even with the right aurora forecast, weather conditions, unobstructed northern horizon, etc. sometimes you still will not see them.
7. Aurora hunting at this low of a latitude requires patience and persistence.



Check your weather forecast! Make sure it is clear or mostly clear. You won't be able to see the lights if it's cloudy. This includes high clouds and fog as well.

Websites and App

NOAA Cloud Cover: <https://www.bing.com/search?q=noaa+weather&cvid=deca8931c1024ab1801ffbf01b726065&aqs=edge.1.0l8j69i65.3530j0j9&FORM=ANAB01&PC=DCTS>

Mobile App: Clear Outside



Locations

Michigan locations: Glenn Arbor, Whitefish Point, Munising area, Grand Marais, Au Train, Mackinaw City, Cross Village, Torch Lake, McGulphin Point, and Port Austin are a few locations to try. Website for Dark Sky Park locations: <https://www.darksky.org/our-work/conservation/idsp/parks/>

Head out near the times that corresponded with the high Kp and clearest skies, look north, and hope for the best! Be sure to bring warm clothes, a blanket, food/snacks, an emergency kit, etc. and let someone know where you'll be especially if you are going alone. The aurora is notoriously difficult to plan to see because there are so many variables involved. Even when everything looks like a go the lights do not show. Patiences and persistence is the name of the game when you are chasing the northern lights.

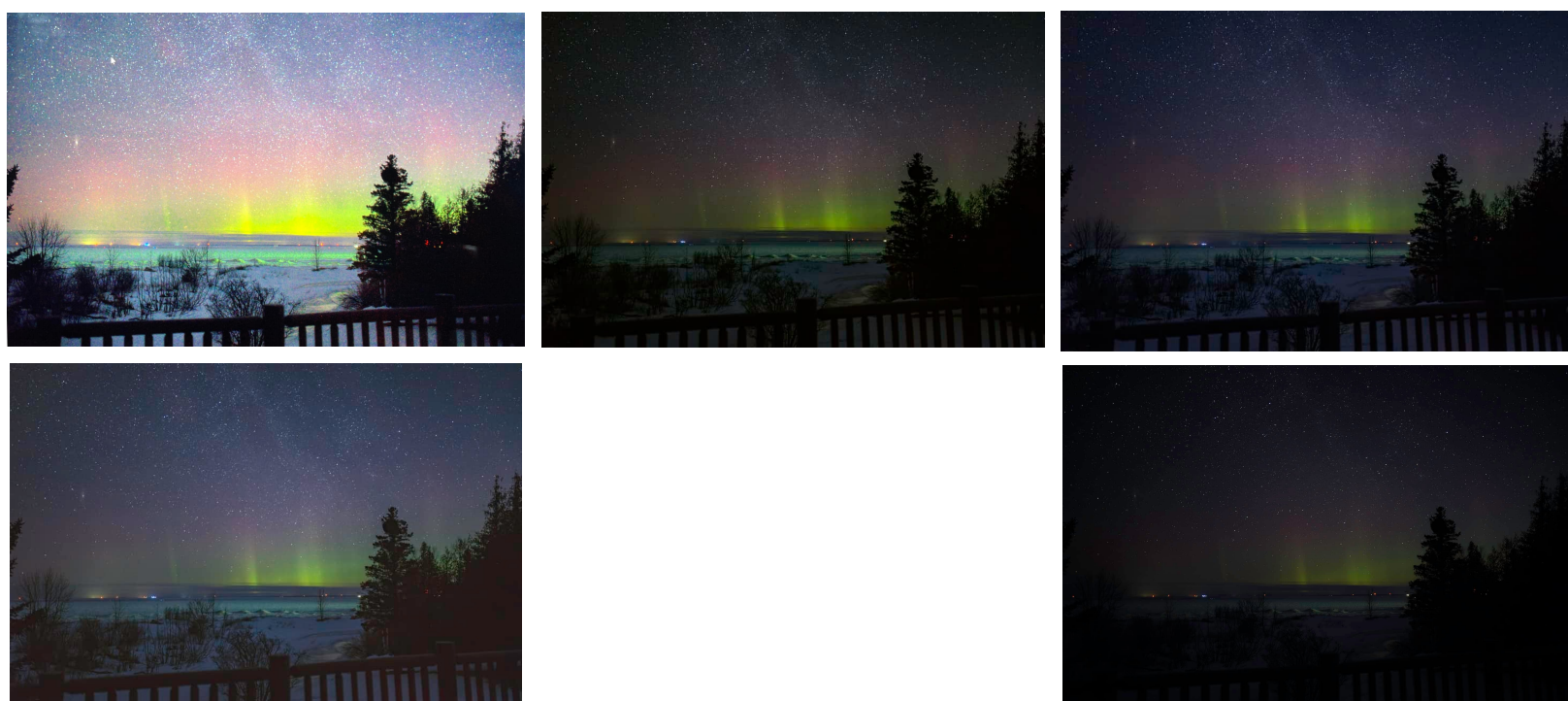
Equipment

- Any camera that can take long exposures will capture the lights. However Digital cameras with full sensors will capture the best with cell phones capturing the least as they have limited sensor size. Crop sensor digital cameras are a good affordable option. Think the smaller the sensor the more noise potential in the image and the less information the camera can capture. More info and less noise makes for the best picture.
- The lens is probably the most important piece to consider. You want to have a fast lens that can capture with the lowest light. F3 or below with F1.2 the best. You can shoot at higher F stops but your results will vary with the strength and movement of the storm producing the lights. Aspect is a matter of taste but a wide angle lens of 12 to 14 mm is good all the way up to 35 mm. Wide angle lenses allow you to take longer exposures without introducing star trails into your images. The bigger the mm's the shorter the exposure time to avoid star trails.
- A good stable tripod is really a must to get nice clean shots of the auroras.(that isn't to say you can not get a good shot without one but it takes a lot of work.)
- Remote trigger and better still one that allows for setting up sequenced shots: Intervalometers.
 - for cell phones: [click here](#)
 - for cameras, as an example please look for one that has the correct cable connection for your camera: [click here](#)

- Red filtered flashlight. Red light protects your night-vision while allowing you to see around you

Seeing the Auroras With Your Eyes Only

In Michigan seeing the auroras with you eyes is not ever going to be as vivid as what a camera catches. Most times you will see a light hazy/cloudy patch in the sky. You may see pillars of white or a shimmering effect. Depending on your eye sight and strength of the storm you may see faded colors. Understand that images you see on-line of the auroras are seldom what you see with your eyes. Here are several images of the same picture of an aurora outside Mackinaw City. All images other than RAW had noise removed and sharpened. The first is an example of the RAW image. Second, just has light pollution removed. Then there is a Lightroom edit, a Photoshop Edit and finally the JPEG output directly from camera. You can tweak images to produce any type of image you wish to create.



Settings

- When using a tripod make sure to have stabilization off.
- Shoot in RAW if you plan on editing pictures
- Manual focus
- Your camera should be in Manual Mode: Aperture set to its widest opening and Shutter should be set to bulb if using a remote trigger. If not using a remote trigger Shutter speed will vary.
- ISO will vary. This depends on the brightness of the northern lights, but an ISO between 800-2500 is usually best. Go for 800 if the aurora is extremely bright, then up it to allow more light in as needed. The higher the ISO, the more your camera sensor will amplify the light. As you up the ISO, noise is created, which you will see in the image as a grainy digital degradation. Shooting as high as 3600 at night is possible and results vary with your type of sensor and camera. Shooting RAW allows you to capture the maximum data per shot then later adjust any noise or other issues in post processing.
- White balance is really a personal choice, in line with your style. As a rough guide, daylight setting will produce pics with more yellowy greens. Tungsten settings reduce light pollution glow and give a cooler blue/green scene. Both can be cooled down or warmed up in post processing

- **Shutter Speed:** It depends on how active and bright it is – you don't want to wash out the whole scene by overexposing a shot. Try shorter exposures of 3-8 seconds for brighter, fast-moving displays and longer exposures, around 8-20 seconds, for not-so-bright, slow moving, auroral arcs.

HOW TO PHOTOGRAPH THE NORTHERN LIGHTS

WHAT YOU WILL NEED



A digital camera

Capable of making long exposures (manual settings) we are talking 5 – 30 seconds.



A wide angle lens

12 – 35mm, f/4.0 or faster (faster lens, better images). Remove filters like UV filter.



A steady tripod

Necessary because of a long exposure time and it can be windy where you are photographing.



A remote control

If you don't have one you can use self timer release; most cameras have that.



A memory card

With plenty of storage space.



Fully charged, fresh battery

Old batteries tend to die in cold weather.



A small flashlight

So you can see what you are doing.

1 Set the camera and lens on M (manual), not A (auto)

2 No flash

3 Use tripod or have it securely propped up somewhere

4 Set camera to lowest f-setting (biggest aperture)



5 Set focus to infinity (sometimes symbolized as a mountain or sideways 8, this is the opposite of macro)

6 Set the shutter speed to 15" (15 seconds)

7 If you want, you can put the self timer on 2 seconds (that way the photograph won't shake at all when you press the button)

CAMERA SETTINGS


General settings for Northern Lights:

ISO 1000 F4.0  20 Sec MF/∞ WB  0

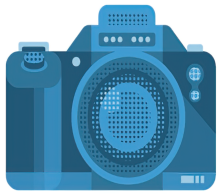
Moderate, slow moving lights:

ISO 800/600  30 Sec

Bright, fast moving lights:

ISO 1600/2000  1-5 Sec

The Northern Lights



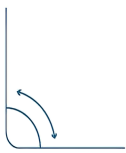
Camera

or



Smartphone

1 The Placement



The right angle



Use a tripod

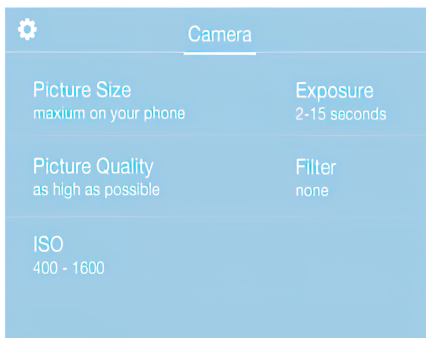
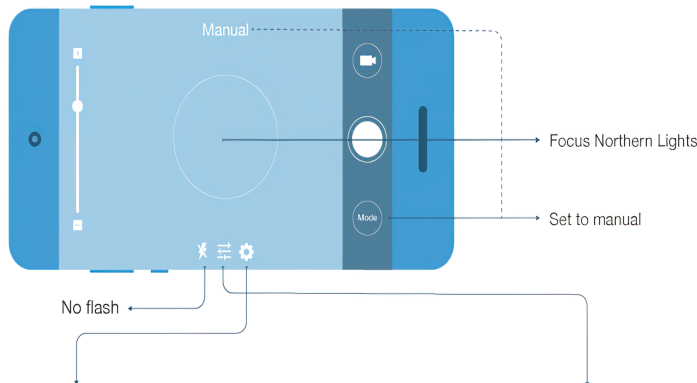


Don't be shaky

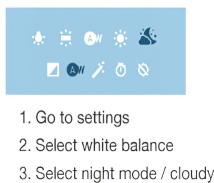


Landscape mode

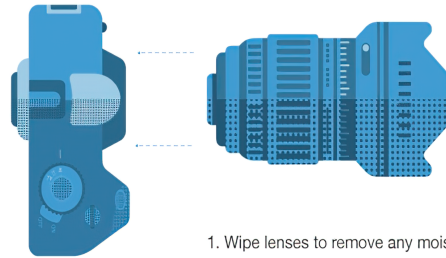
2 Manual Phone Settings



If possible, check these options.

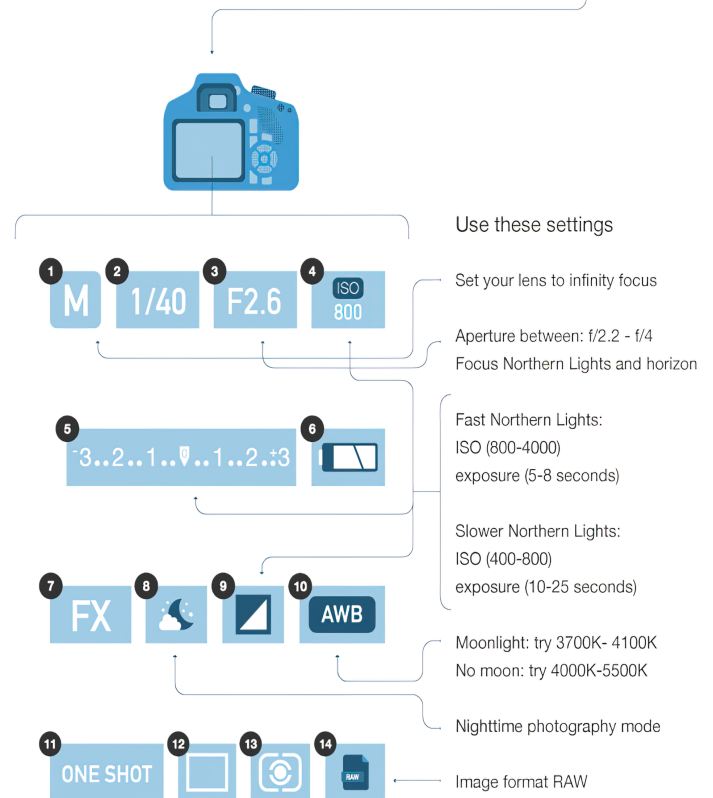


1 Prepare Camera



1. Wipe lenses to remove any moisture
2. Use a wide angle lens if possible
3. Keep it stable (with a tripod)

3 The Correct Setup



- | | | |
|--------------------|----------------------------|--------------|
| 1 Shooting mode | 4 ISO speed | 7 Effects |
| 2 Shutter speed | 5 Exposure level indicator | 8 Night mode |
| 3 Aperture setting | 6 Battery level | 9 Exposure |
| 10 White balance | 13 Metering mode | |
| 11 AF mode | 14 Image format | |
| 12 Drive mode | | |

3 App Tip



Link: <https://goo.gl/kdeOtd>

Use QR code

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HOW TO PHOTOGRAPH THE NORTHERN LIGHTS

CAPTURE THE ATLAS

PHOTOGRAPHY • TRAVEL • ADVENTURE

Prepare your equipment: Check you have extra batteries and lower the brightness of your LCD screen so you don't underexpose your images.



Set the focus on your lens. Do it before the Northern Lights session, so you don't forget this step once the show has started.



Shoot in RAW so you can capture as much information as possible in your camera.



Use the largest aperture in your lens so you can capture as much light as possible.



Keep in mind the composition. Try especially with elements where you can find reflections like water, ice or snow.



Always check the histogram. Make sure that the exposure is correct. The brightness of the Aurora in the screen can trick your eye.



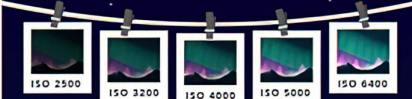
Mount your camera and tripod correctly. Make sure it is stable to avoid any trepidation, especially under windy conditions.



Start looking towards the North. Usually the Northern Lights start being active from the North, although you should keep your eyes wide open since they can show up at any point.



Set an ISO as high as possible considering the limitations of your camera. This way, you'll freeze the Northern Lights movement.



Change the shutter speed according to the Northern Lights activity.

Low intensity Aurora:
8"-25" exposures



Medium intensity Aurora:
3"-8" exposures



High intensity Aurora:
1/2" - 3" exposures



Download the complete guide and follow us on:

capturetheatlas.com

@capturetheatlas

Nighttime Etiquette

Please be considerate of dark sky areas with your headlights and flashlights. Try to arrive early to avoid using your headlights and getting a lay of the land. Use red filters on flashlights and electronic devices with bright screens. Even your digital cameras have bright screens that could be an issue if you are in a crowded location. It takes about 20 to 30 minutes for your eyes to acclimate to the night sky and get your best night vision. It takes only a few seconds of bright lights to reset the process. Also, consider where you are at: a public location or around private property. Know how your vehicle's lights behave and how to control them prior to arriving at your location. Brights on cars illuminate a large area and can bounce around a lot ruining a person's exposure. No one expects people to drive without their lights on but with enough foresight and respect for others a lot of the stray bright illumination can be avoided. Arriving early enough to avoiding using your lights or shutting down your lights once you have parked. Also, know the difference between a public location or a private neighborhood to dictate how to behave with noise and lights. When an area increases in volume of traffic and/or people 5 to 10 times what it normally sees, it can become an issue real fast. Don't assume that because you do not see a person on a beach or in the area you are at that no one is there. Often times, they are at a higher elevation or farther back from spots to get a shot that has interesting foreground with the auroras. Let's have fun and get the shot of the lights but being respectful of others trying to do the same.

For apple devices [click here](#) to see how to make your screen nighttime viewing safe

Resources

<https://www.space.com/how-to-photograph-the-aurora>

<https://spacetourismguide.com/aurora-photography-tips/>

<https://www.wedreamoftravel.com/photographing-aurora-photography-guide/>

HOW TO Photograph the Northern Lights / Auroras 2022 - YouTube

5 Rookie Mistakes and How to Avoid Them - Northern Lights Photography Tips - YouTube

What Camera Settings to Use When Photographing the Northern Lights - YouTube

Photograph Northern Lights with ANY Camera - YouTube

STEP-BY-STEP -- How To Photograph The Northern Lights - YouTube

An Introduction to Aurora Forecasts - YouTube

Best App to Predict the NORTHERN LIGHTS? - Tutorial for BEGINNERS - YouTube (rabbles a lot but gives an overview of apps)

F.A.Q.

by MELISSA F. KAE LIN

Q: What if I'm confused and don't know where to start?

A: The easiest way to start is to watch for live sightings on social media or use the Ovation Model, which maps out Aurora activity. When the map lights up with yellow, orange or red, it's go time! That means conditions are active and the chance of Aurora is high! A green oval indicates common Aurora activity, which may not be strong enough to reach most of the U.S.

Q: When can I see the Northern Lights?

A: It varies. In general, the best times to see the Northern Lights are during the peak season of September to April, and in the two hours before and after local magnetic midnight (nearly the same time as midnight). However, the Aurora can be viewed year-round.

Q: Where can I see the Northern Lights?

A: The farther north you travel, the better your chances of viewing Aurora. The Northern Lights can occasionally be viewed in every part of Michigan, but the visibility depends on the strength of the geomagnetic storm. The darkest area outside of large cities (the country or large lake) with an unobstructed view of the northern sky and horizon is best.

Q: How strong does the Aurora need to be for me to catch it at my latitude?

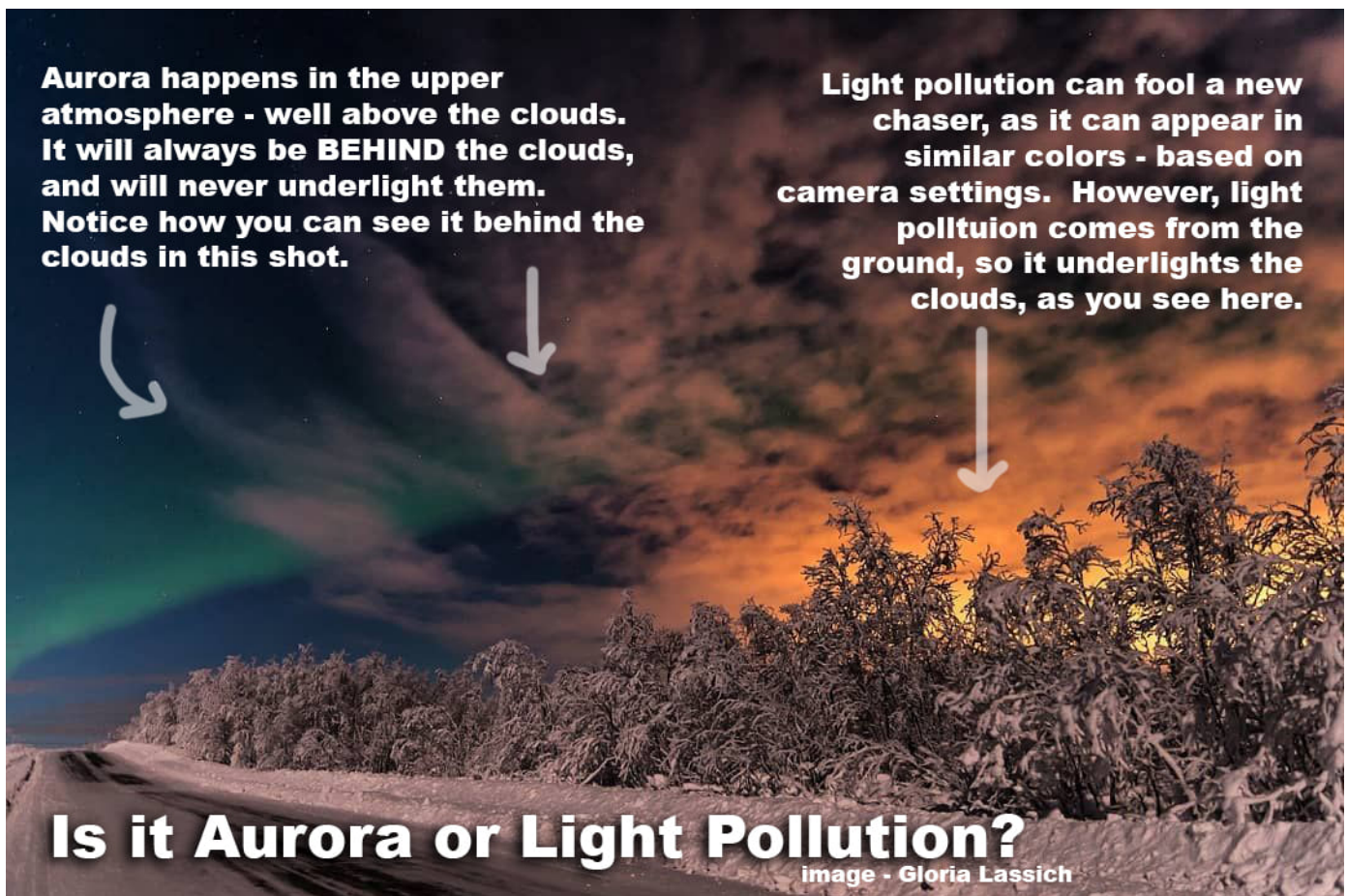
A: For the best chance of visible Aurora in Michigan, look for storm conditions of K5, K6 or K7 (also known as G1, G2 and G3 Storms). Aurora can often be seen in the Upper Peninsula at a K-index of 4 (or K4), which is below storm levels. When you see a “p” after the K-index, or Kp, this means you are looking at a planetary average of activity over the previous 3 hours. That’s why so many apps seem to get it wrong. The 3-hour average does not necessarily indicate strong activity in the future. K is the same measure given in real time, not an average.

Q. Can I see the Northern Lights with the naked eye?

A: Yes, you can! But this depends on the conditions. Camera lenses are more sensitive to light than the rods and cones in the human eye, and a camera will pick up more color than we can see at night. Sometimes, what is visible on camera CANNOT be seen with the naked eye. More often, Northern Lights CAN be seen with the naked eye, especially in locations that are truly dark and far north.

Q. Can I see the colors without a camera?

A. Yes. However, this depends on the strength of the display. The colors can often be seen with the naked eye during strong storms in the U.S., and it's very common to see brilliant colors in the Arctic Circle. During weaker storms or in areas of heavy light pollution, the Aurora may first appear like white or gray clouds. Let your eyes adjust to the dark, and the colors will hopefully reveal themselves. Remember that camera equipment and editing software allows photographers to bring out more vivid color than most people witness in the average display. Every display is different, though, and there are many exceptions!



Marybeth Kiczenski

Finding Clear skies: [Click Here](#)

SOURCES

<https://ktfgzi.wordpress.com/2019/03/22/my-quick-guide-to-aurora-hunting-for-beginners/>

<https://www.tourradar.com/days-to-come/how-to-photograph-northern-lights/>

<https://www.swpc.noaa.gov/content/space-weather-glossary>

<https://kaelinart.com/2022/02/21/a-simple-guide-to-aurora-forecasting-in-the-u-s/>

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