

# Dark Sky Monitoring



Information about the Dark Sky Monitoring citizen science program – Updated January 2020

## *Half the park is after dark!*

**What is Dark Sky?** It is a night sky with little or no light pollution. Increasing levels of light pollution over the last few decades have affected the quality of the nocturnal environment, as well as our dark night skies and the ability to see celestial objects.

**What is light pollution?** Light pollution results from the unnatural brightening of the nocturnal environment and night sky due to artificial light at night. Light pollution has caused the sky over cities to become substantially brighter than the natural night sky and it can be detected hundreds of miles away from urban development. As a result, about one-third of the world's population cannot see the Milky Way at night.

**What are the impacts of light pollution?** Life on Earth has evolved under a naturally dark night sky. At high intensities, artificial light at night – especially blue or “cool” light – can disrupt the natural circadian cycle of animals (including humans) and impact sleep patterns. It can also influence predator-prey interactions, foraging behavior in bats, and navigation of nocturnally migrating birds, as well as plants' and animals' ability to sense the changing of the seasons based on daylight length. Light pollution also has a significant energy cost. Outdoor lighting that is excessively bright or does not illuminate the intended area wastes electricity and contributes to climate change by consuming carbon-based energy sources.



*The Milky Way Over Mitten Park, Dinosaur National Monument. NPS/Dan Duriscoe.*

**How can I help?** An important part of solving the problem of light pollution is to have a thorough understanding of its magnitude, and a great way to do that is to measure the brightness of the night sky. CPW is working to document sky brightness in State Parks through the Dark Sky Monitoring citizen science program. By measuring the darkness (or lightness) of the night sky, you can help us identify parks for recognition of their dark sky quality so that astronomers, campers, and nighttime photographers know where to see the Milky Way, escape to true nighttime, and enjoy the natural night sky! Observations take less than an hour and can be made throughout the year in state parks that allow overnight access.

## Dark Sky Monitoring

Dark Sky observations should be made at least one hour after sunset or one hour before sunrise, when the moon is below the horizon. Any amount of light from the moon can greatly affect measurements. If possible, measurements should be taken when the sky is completely free of clouds. Find a safe place to observe the sky away from obstructions like tall trees or buildings. Let your eyes adjust to the dark for at least 10 minutes before beginning your observations. Use a red light or a flashlight with a red film over the bulb to preserve your night vision.

Please choose **one** of the following two methods so your observations do not get double counted in the database. You are welcome to make multiple observations at different locations in one park during one night, but please use only one method per observation.

- **Globe at Night web app ([globeatnight.org/webapp](http://globeatnight.org/webapp)):** Globe at Night is an international citizen-science campaign to raise public awareness of the impact of light pollution. Users estimate sky brightness using a series of star magnitude charts. This method can be used in rural as well as urban areas, as cell service is not required at the time of observation.
  1. If cell service is available while taking measurements, observations can be submitted to the website directly by visiting [globeatnight.org/webapp](http://globeatnight.org/webapp) on a mobile device. Make sure you switch to the nighttime version to protect your night vision! If cell service is not available, star magnitude charts can be printed in advance ([globeatnight.org/5-steps.php](http://globeatnight.org/5-steps.php)), and observations can be written down and submitted online later.
  2. Record the date, time, and specific location of your observation.
  3. Locate the constellation shown on the star magnitude charts. Need help? Practice finding different constellations at [globeatnight.org/finding!](http://globeatnight.org/finding!)
  4. Select the star magnitude chart that most closely resembles the amount of stars visible that night.
  5. Record sky conditions, including cloud cover or sky glow. CPW is interested in understanding how outdoor lighting within the parks is affecting the ability to view the night sky, so please also include comments on sources of light pollution.
- **Loss of the Night mobile app (free for iOS or Android):** Users report on the visibility of individual stars at the time and location of their observation. This method is best for observations of city or suburban skies, as cell service is required at the time of observation.
  1. Turn on Night Mode in advance to protect your dark-adjusted eyesight. Completing the Tutorial before making observations is recommended.
  2. Select “Start observing stars” from the Main Menu.
  3. Hold your phone at arm’s length and follow the red arrow to the first star. When you find the star, select the appropriate button to report whether or not the star is visible.
  4. Find more stars by repeating step 3. Observations of at least 7 stars are considered research quality.

**Questions?** Contact the CPW Citizen Science Technician at [DNR\\_CPWstewardshipCitSci@state.co.us](mailto:DNR_CPWstewardshipCitSci@state.co.us)