

# THREATS TO DARK & QUIET SKIES BY **ARTIFICIAL LIGHT AT NIGHT**

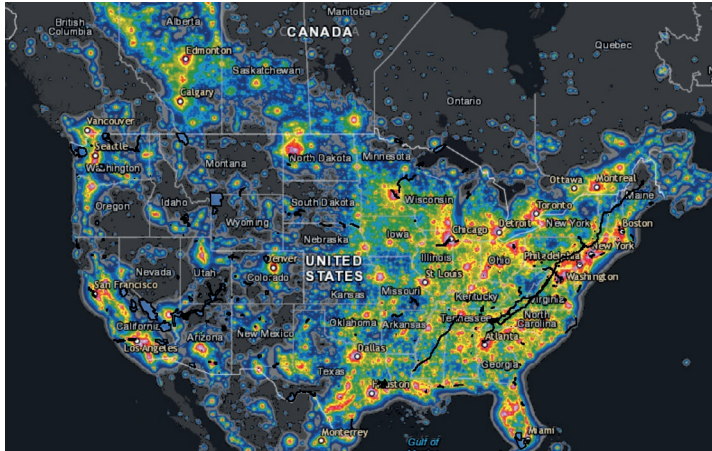


Rapidly growing ground based light pollution around the globe significantly threatens astronomy, human health, the environment, and food production. Mitigating actions are needed.

**Light pollution** is caused by the scattering of light from artificial sources by particles in the atmosphere. This leads to higher than natural sky brightness.

Recent studies show an average 10% year-to-year increase in sky brightness in North America, including in rural areas. **Remote sites are increasingly impacted by artificial light at night.**

Astronomy and the night sky inspires curiosity, community, and storytelling, and encourages people to study science. Almost 80% of the US population cannot see the Milky Way where they live.



Light pollution in urban centers creates a sky glow that can blot out the stars. The brighter the area, the harder it is to see stars and constellations in the night sky. Credit: Falchi et al., Sci. Adv., Jakob Grothe/NPS contractor, Matthew Price/CIRES.



This image illustrates the Bortle scale, which measures the impact of light pollution on the dark skies at a given location. It shows, from left to right, the increase in the number of stars and night-sky objects visible in excellent dark sky conditions compared with cities. Source: skyglowproject.com.

## IMPACTS ON ASTRONOMY

- The International Astronomical Union recommends sky brightness levels be less than 10% above naturally occurring airglow to protect astronomical observatories.
- Only one observatory in the continental US meets this criterion: The University of Texas McDonald Observatory.
- Light pollution levels are already 2% above natural background light levels on Mauna Kea in Hawai'i.
- Future astronomical discoveries depend upon dark and quiet skies.

## OTHER IMPACTS

- Globally we spend at least \$50 billion on energy costs each year to produce light that escapes into space.
- More exposure to artificial, bright, outdoor nighttime light is linked to higher stroke risk.
- Human health impacts of overlighting: depression, obesity, sleep disorders, and cancer risk.
- Impacts on farming and food sovereignty: disruption in seasonal crop growing season and production.
- Ecological issues: plant and pollinator reproductive cycles, foraging and feeding habits, migration and navigation issues, and many other impacts across all taxonomic kingdoms.
- Glare from blue LEDs causes road traffic and industrial hazards.

## WHAT CAN BE DONE?

- Use nighttime friendly lighting: full shielding, no brighter than needed, active controls, and warm colors with minimum blue emission. ([DarkSky.org](https://www.darksky.org))
- Limit artificial lighting at night via curfews and lumens per developed acre or lumens per fixture limitations.
- Adopt lighting zoning (e.g., the city of Flagstaff, the world's first Dark Sky Community).
- Treat light pollution as an environmental issue.

Cover image: Composite image from NASA satellite data showing the night-time glow from city lights. Credit: Adobe Stock.