

Chicago stargazers find more light pollution and wildfires are obscuring the skies

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Some of Drew Carhart's earliest memories remind him of his love of nature. Not just trees, flowers or birds—but the stars, planets and galaxies visible in the night sky.

Fifty years ago, Carhart helped form the Naperville Astronomical Association, which now has two observatories, hosts regular "star

parties" and teaches the community about astronomy and observing techniques.

But, due in part to [light pollution](#) and smoke from Canadian wildfires exacerbated by climate change, stargazing in the Chicago area is in danger. Some researchers estimate that North America experiences a 10% increase in light pollution—or the excessive use of artificial light—every year.

"You can't overstate it—it's like going deaf if you like music," Carhart said. "It's to the point where you can barely do it anymore."

He and other enthusiasts are calling on the city and others to curb light pollution or risk missing out on starry night skies.

Growing up, Carhart said he learned the intricacies of the Milky Way from his suburban backyard in Naperville. But slowly, the 64-year-old said, he watched the stars disappear. If someone were to visit his childhood home today, he said, they could count the number of stars they see on their fingers.

According to light pollution maps, viewing many celestial objects with the naked eye is difficult to nearly impossible in Chicago.

"The light pollution is tremendously worse. Out by Naperville we could see the glow in the nighttime sky of Chicago off in the distance, but it only went a little ways up in the sky," he said. "Over the years we watched it get brighter and then extend overhead and all the way to the other horizon and just take over the sky."

Chicago's streetlights

Anthony Harris, a Berwyn resident and the vice president of the Chicago

Astronomical Society, said it's difficult to see anything other than the sun, moon and planets in Chicago, and it takes longer to drive to more rural places where stars are visible than when he began stargazing 50 years ago. Harris said he believes one of the main culprits is the city's streetlights.

As part of its smart lighting streetlight modernization program, Chicago began switching sodium vapor lights for more energy-efficient LEDs in 2017. Compared with sodium vapor lights, which give off an orange or yellow hue, LEDs emit a bright white light. Many other cities have made this switch as well, although Washington, D.C., paused its transition following complaints of bright lights disrupting residents' sleep.

Since the start of the program, more than 88% of the city's streetlight stock has become LED lights, according to Erica Schroeder, a spokesperson for the city's Department of Transportation. She said the program has replaced more than 289,000 sodium vapor lights.

Schroeder said in 2021 the city cut its energy bill for streetlights in half, saving \$8.7 million. She also said the lights are on track to save \$100 million over 10 years.

ComEd completed its own five-year LED Smart Streetlight program in northern Illinois earlier this year, converting more than 130,000 ComEd-owned streetlights to LEDs. The utility company says the switch prevents more than 67 million pounds of carbon emissions from going into the atmosphere every year.

The U.S. Department of Energy discouraged the production and sale of most incandescent bulbs with new efficiency standards that went into effect earlier this month. Most incandescents will struggle to meet these standards so they won't get stocked in stores, essentially forcing people to switch over to LEDs. Some experts believe this shift will help people

save money and cut carbon dioxide emissions.

But LEDs have their flaws, according to Ken Walczak, senior manager for the Far Horizons program at the Adler Planetarium. Part of Walczak's research involves designing and building instruments to monitor light pollution, including sending a high-altitude balloon into the stratosphere. He said every shining light contributes to sky glow. In major cities like Chicago, when there's a lot of sky glow, it's difficult to see celestial objects.

LEDs emit more blue light, which travels at shorter wavelengths and higher frequencies, than typical bulbs. Walczak said the problem is that blue light scatters more in the atmosphere compared with other colors, creating something akin to a haze or a light fog.

"If you have lights which have a lot of blue in them, that [blue light](#) is contributing a lot to the glow in our night sky," he said.

LEDs have been linked to a range of health issues, including sleep disruption as well as the prevalence of cancer, diabetes and obesity. They've also been found to alter the circadian rhythm and behaviors of animals in Chicago. But the new streetlights have one advantage over older lights, Walczak said. They are focused downward, which reduces glare.

The National Park Service suggests considering whether outdoor lighting is necessary, or if reflective tape or reflective surfaces could be used instead. Other sustainable outdoor light specifications, according to the Park Service, are LEDs at 2700 Kelvin. These lights emit a warm color hue instead of blue or white. The Park Service also recommends purchasing LED bulbs that have the lowest lumens possible—the unit of measurement used to specify brightness—and ones that can accommodate motion detectors or dimmers, which it says can enhance

health and safety.

Schroeder said Chicago's streetlights are managed using a cloud-based monitoring program and network of controller nodes that dictate when the lights turn on as well as their power output, voltage and wattage. She said these features allow the LED fixtures to turn on before sunset and turn off after sunrise.

She added that Chicago uses "soft white" lights, or ones at 3000K and that they are designed to "limit light trespass into people's homes and the night sky."

"The improved nighttime visibility that comes with the whiter, crisper, LED light improves traffic safety for drivers, pedestrians and bike riders," Schroeder said. "This superior visual performance is largely the result of people being able to better distinguish colors at night."

To reduce light pollution in Chicago, Walczak said he thinks the city should only use as much light as it needs. He suggests dimming the streetlights, which he said would also save on energy costs.

But tackling the larger problem goes beyond streetlights, he said.

Referencing a study from 2020 that found only about 20% of a city's brightness can be linked to streetlights, Walczak said regulation or policies surrounding light pollution should be directed toward commercial businesses, such as parking lots or building facades.

"Near me there's a couple gas stations that have blaring very white light that literally shines outward and that's uncontrolled," he said. "If you're a complaining neighbor, like 'Oh my god, this is shining in my bedroom window, I can't sleep at night,' you have no recourse other than the good nature of the business that you're approaching."

Walczak helped found a Chicago chapter of the International Dark-Sky Association, a nonprofit that seeks to preserve the night sky and limit light pollution. He worked with Wheaton to pass a residential lighting ordinance, which requires properties to limit the spread of their light fixtures.

The state Senate also adopted a resolution in May that encourages, but doesn't mandate, that local governments use light fixtures that reduce unnecessary light. State Sen. Laura Ellman, who co-sponsored the resolution, said she felt it was time that local governments take steps to protect the night sky.

"I think we're learning more and more about the importance of the wavelengths of light and their impacts on our health and also the effects of light on flora and fauna," said Ellman, whose district includes Naperville and Wheaton. "With climate change, we want to try to minimize impacts wherever we can."

Canadian wildfires

This summer, light pollution hasn't been the only hurdle for amateur astronomers. Canada is experiencing one of its worst wildfire seasons in history, with [climate change](#) expanding its intensity and frequency. The hazy skies from smoke have not only led to numerous air quality alerts in Chicago but significantly reduced visibility for stargazers.

As of Tuesday, more than 32 million acres of land has burned this year—vastly surpassing the 10-year average of 2.9 million acres. There are currently more than a thousand fires burning in Canada.

Harris, the Berwyn resident, said not seeing the stars at night because of smoke has become the new normal. Getting lucky and having a clear night is a "big deal," he said.

For Moriah Contreras, the smoke has ruined what is typically the best time for astronomers in Chicago. Contreras, 32, of Hyde Park, created the Astronomy Club at the University of Illinois at Chicago. She's also a part of the Chicago Astronomical Society.

"This is when we go out with a telescope and can somewhat reliably depend on the weather compared to the Chicago winter," she said. "It's disappointing when it's a nice day and you have smoke in the air."

Contreras said looking up at the dark skies in southern Nevada where she grew up sparked her interest in astronomy. When she moved to Chicago six years ago, she said the lack of stars was "jarring," and she made it her mission to help fellow students see the night sky despite the challenges.

The club purchased camera equipment and narrowband filters that capture specific wavelengths, sifting through light pollution and haze and making it possible to capture images of nebulae and galaxies in downtown Chicago. Contreras said this equipment can cost thousands of dollars, which is inaccessible to the average person, so she recommends joining astronomy clubs.

For somewhat darker skies Chicagoans can travel to the Palos Preserves, located in southwest Cook County. The International Dark-Sky Association designated the preserve as an Urban Night Sky Place in 2021, or a location near a large urban area that promotes an "authentic nighttime experience" amid lots of artificial light.

"You can see more stars. It's definitely darker—there is light trespass from the city, but we see planets and stars and constellations. It's one of the darkest places within 25 miles of the city," said Mary Busch, a volunteer program specialist with the Forest Preserve District of Cook County.

Harris also recommends visiting the Green River State Wildlife Area, a wildlife restoration area about two hours west of the city. He said a comfortable lawn chair, planetarium app, binoculars and warm clothes are essential supplies for the trip.

Harris' main concern is that future generations will never get to see the Milky Way or stars like he did growing up. He wants people to protect the night sky in the same way they protect Vincent Van Gogh's "Starry Night" painting.

"If you were to whitewash the glass or the painting, you'd obviously be arrested," he said. "But destroying the actual sky, covering up and blocking the view of the [night sky](#) for generations of children, that's no problem."

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