

Vision and blue light

Daylight is composed of the entire spectrum of color. Different types of visible light, seen as colors, have different wavelengths varying from violet to red light. Blue light has the shortest wavelength, and is therefore more easily “scattered” in the atmosphere. Our sky and oceans appear blue because blue light is most easily refracted. Blue light, especially at night, can cause more eyestrain and fatigue than other types of light and may cause halos around objects, because the short wavelength makes it harder for the eye to focus. Just as blue light scatters in the atmosphere, it scatters in our eyes as well, impairing our night vision.

The aging eye is especially vulnerable to eyestrain and loss of night vision. With age, we undergo a natural process that reduces our visual abilities. Issues of contrast, glare, the uniformity of illumination, and the type of light used are all factors that help determine how well we see.

Smart lighting decisions help preserve vision and promote the overall health of the eye.

References:

Chepesiuk, Ron. “Missing the Dark: Health Effects of Light Pollution,” *Environmental Health Perspectives* Volume 117, Number 1, January 2009

Straif, Kurt, Robert Baan, Yann Grosse, Béatrice Secretan, Fatiha El Ghissassi, Véronique Bouvard, Andrea Altieri, Lamia Benbrahim-Tallaa, Vincent Coglianò. “Carcinogenicity of shift-work, painting, and fire-fighting” *Lancet Oncology*. Volume 8, Issue 12, pp. 1065–1066, 2007



Look for the IDA Fixture Seal of Approval to make sure you are buying a true dark sky friendly fixture.

International Dark-Sky Association images may only be used for non-commercial, educational purposes and must compliment IDA's mission to preserve and protect our night skies through quality outdoor lighting.

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The International Dark-Sky Association (IDA), is an educational organization that seeks to preserve the natural night skies worldwide. Light pollution is an increasing problem threatening astronomical facilities, ecologically sensitive habitats, all wildlife, our energy use as well as our human heritage. Light pollution is excessive and inappropriate artificial light. The four components of light pollution are often combined and overlapping:

- **Urban sky glow**—the brightening of the night sky over inhabited areas.
- **Light trespass**—light falling where it is not intended, wanted, or needed.
- **Glare**—excessive brightness which causes visual discomfort. High levels of glare can decrease visibility.
- **Clutter**—bright, confusing, and excessive groupings of light sources, commonly found in over-lit urban areas. The proliferation of clutter contributes to urban sky glow, trespass, and glare.

Lights left on in unoccupied buildings, outdoor lights pointing up to the sky or unshielded lights create sky glow. Visit the IDA Web site at www.darksky.org to learn more about the causes of light pollution and what you can do to keep the skies dark.

3225 N. First Ave. Tucson, AZ, 85719 USA

Phone +1 520 293 3198

Fax +1 520 293 3192

www.darksky.org

ida@darksky.org



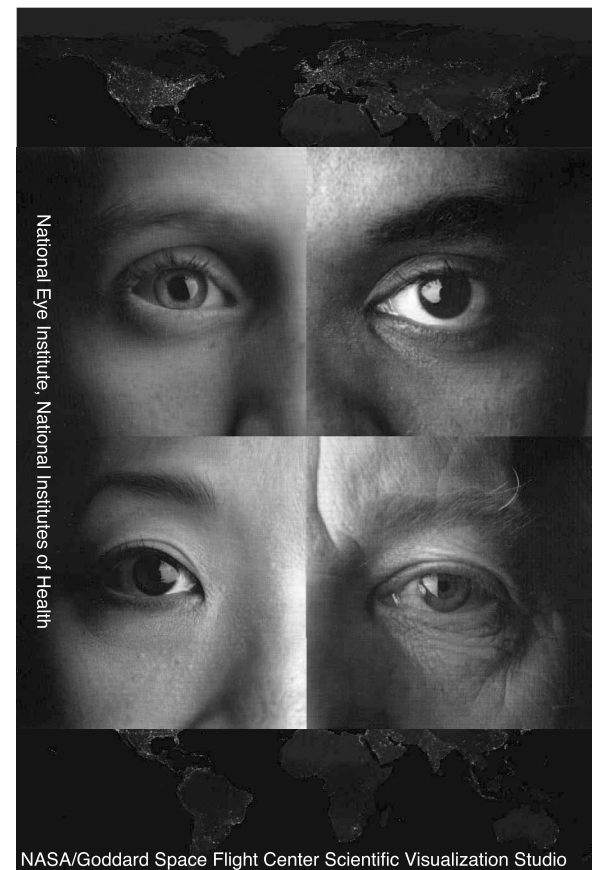
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To preserve and protect the nighttime environment and our heritage of dark skies...

Light Pollution and Human Health



Most people don't know how excessive light at night negatively impacts many areas of human health. This brochure offers an introduction to this treatable problem.

Glare on the eyes

Bright points of light from poorly designed roadway lighting produce a condition known as “disability glare.” Disability glare is so intense it causes us to avert our eyes from the veil of light being scattered across our retinas.



Glaring lights can distress the eyes. The brightest, most visible objects in the area are the lighting fixtures, not the roadways, walkways or parking areas Atlanta, Georgia.

This veil reduces:

- Contrast sensitivity
- Color perception
- Our ability to see contrasts



This condition can temporarily cast everything except the light source into virtual invisibility. Older drivers are especially vulnerable to disability glare, because as we age the eye loses its ability to quickly adjust to changing levels of illumination. Fully shielded roadway lighting reduces this hazard and creates a safe and more pleasant driving experience by distributing the light evenly.

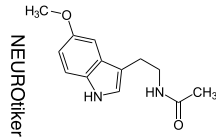
Circadian rhythms



The 24-hour day/night cycle, known as the circadian clock, affects physiologic processes in almost all organisms. These processes include brain wave patterns, hormone production (melatonin), cell regulation and other biologic activities. Disruption of these rhythms can result in insomnia, depression, cancer and cardiovascular disease*.

* Chepesiuk, Ron. “Missing the Dark: Health Effects of Light Pollution,” *Environmental Health Perspectives*. Vol. 117, Num. 1, January 2009

What is melatonin?



Melatonin is a naturally occurring hormone which is released by darkness and inhibited by light. It serves many functions in the human body, primarily regulating the daily cycles of our systemic activities. Reduction or elimination of light at night can help maintain a robust melatonin rhythm. While any kind of light can interfere with melatonin production, the short wavelength, blue portion of the spectrum is the most potent for melatonin suppression in humans.

Sleep disorders



Exposure to the artificially extended daytime of our lighted modern world can lead to desynchronization of our internal rhythms. According to the National Institution of Health (NIH), a shift in our clocks impairs our ability to sleep and wake at the appropriate times and leads to a decrease in cognitive and motor skills.

A good night's sleep helps reduce:

- Weight gain
- Stress
- Depression
- Onset of diabetes

The NIH believes humans function best when they sleep at night and act in the daytime. If outdoor light is shining into your window and disrupting your sleep, we recommend you block out the light or request that the light be shielded for everyone's benefit.

Emerging research

The scientific community is studying the range and complexity of circadian disruption and the role of melatonin suppression from too much artificial light at night.

Scientists are finding an undisputed connection between sufficient sleep and good health. Moreover, they are recognizing the importance of exposure to daylight during the day and darkness at night to maintain a routine circadian rhythm. The World Health Organization now lists “shiftwork that involves circadian disruption” as a probable carcinogen†.

On 15 June 2009, the American Medical Association adopted resolutions that support the reduction of light pollution and glare and advocate for use of energy efficient, fully shielded outdoor lighting. Ongoing research continues to probe the connection between natural darkness and human health.

Solutions

IDA believes that there are solutions to these issues:

- Shield and lower the wattage of all outdoor lighting: homeowners, businesses, and cities.
- Use only the light you need to get the job done.
- Use timers, dimmers, and sensors to darken unoccupied areas. Shut off the lights when you can.
- Keep your bedroom as dark as possible by using blackout curtains when sleeping.



The shielding keeps light on the ground where it is needed.

A shielded light uses less wattage and saves everyone money, reduces our energy use and shrinks our carbon footprint. Work with your neighbors and local government to keep the light on the ground and the skies natural. This is a win-win situation for everyone. You save money while preserving a valuable natural resource.

† Straif, K, et al. *Lancet Oncol*. Vol. 8, Is. 12 pp. 1065–1066, 2007.