

The Problem with Light Pollution

Today, people who live in or near cities have lost much of their view of the universe. This view is often substantially diminished even for people who live in smaller towns and rural areas. The spectacular view of the sky that our ancestors had on clear dark nights no longer exists. The great increase in the number of people living in urban areas has resulted in a rapid increase in urban sky glow due to outdoor lighting, brightening the heavens to such an extent that the only view most people have of the Milky Way or most stars is when they are well away from cities. This excess light in the sky has an adverse impact on the environment and seriously threatens to remove forever one of humanity's natural wonders — our view of the universe.

While this increased urban sky glow brightens the night sky for all of us, and amateur astronomers in particular, it presents a particularly potent threat to professional astronomers. Many advances at the frontiers of astronomy require observations of very faint objects that can be studied only with large telescopes located at prime observing sites, well away from sources of air pollution and urban sky glow. For example, most observations of cosmological interest deal with extremely remote sources: galaxies or quasars at such great distances that their light has traveled for billions of years — sometimes twice the age of our solar system — only to be lost in the glare of our civilization during the last 1/1000 of a second of the journey.

This sky glow that adversely affects the environment and compromises astronomical research is called **light pollution**, for it is wasted light that does nothing to increase nighttime safety, utility, or security. Such wasted light only serves to produce glare, clutter, light trespass and light pollution and wastes energy, money, and natural resources in the process.

The argument that all astronomy can be done from space is not correct; the largest telescopes will continue to be ground-based because it is



Night view from a city, showing the sky glow impact, and artist's rendering of what he saw.

much less expensive. It doesn't make sense to do in space, at much higher cost, what can be done from the ground. There are many things that can only be done in space, and this type of research is and will continue to be in great demand. The experience of nearly four decades of space astronomy is that space research has greatly increased the demand for ground-based telescopes, both large and small. Planning and implementation of several very large ground-based telescopes is well underway. Exciting times lie ahead for astronomy, using present and future ground-based telescopes to complement the telescopes in space.

Fortunately, viable solutions do exist for the problem of light pollution, and control programs are underway now in a number of communities. Outdoor lighting codes and ordinances are essential

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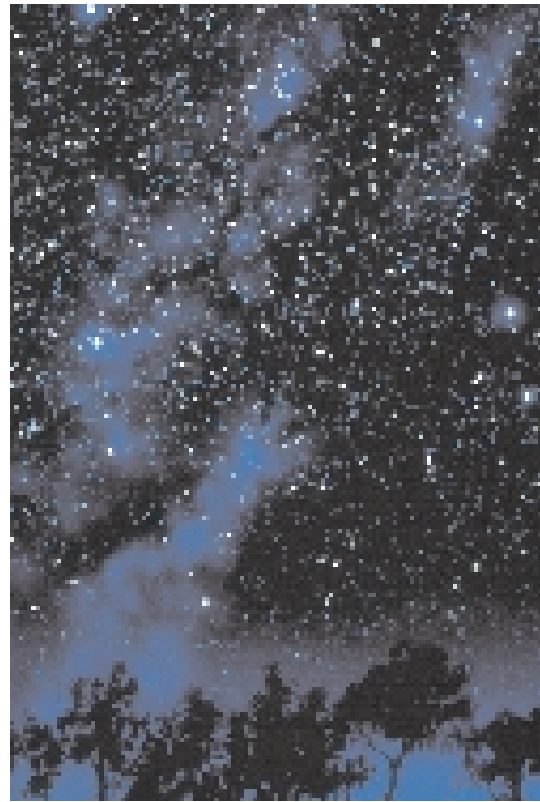
to the long-term success of astronomical research and for the preservation of humanity's view of the universe. There is much more to be done, however, everywhere, and most people are not yet aware of the issue.

Lack of awareness, rather than resistance, is generally the biggest problem in controlling light pollution. Educating the public, government officials and staff, and lighting professionals is a major thrust of our current activities. These efforts have helped. The increase in light pollution near major observing sites is moderating. More can and must be done — locally, nationally, and internationally. Amateur and professional astronomers and many others who are not astronomers are urging better outdoor lighting practices that will benefit us all.

Astronomers are not against lighting at night. They have the same needs for quality lighting as everyone else. They advocate the best possible lighting for the task, with lighting designs that take into consideration all of the relevant factors such as glare control, energy efficiency, and the need for dark skies. Fortunately, everything that is done to minimize light pollution also saves energy, because the efficiency and utility of the nighttime lighting is improved. Everyone wins.

Here are some solutions that minimize light pollution without compromising in any way nighttime safety, security, or utility:

1. Use night lighting only when necessary. Turn off lights when they are not needed. Timers can be very effective. Use the correct amount of light for the need, more is not better.
2. Direct the light downward, where it is needed. The use and effective placement of well-designed fixtures will achieve excellent lighting control. When possible, retrofit or replace all existing fixtures of poor quality. In all cases, the goal is to use fixtures that control the light well, minimizing glare, light trespass, light pollution, and energy usage.
3. Use low pressure sodium (LPS) light sources whenever possible. This is the best possible light source to minimize adverse effects on astronomical activities. LPS lamps are also the most energy-efficient light sources that exist. Areas where LPS is especially good include



Night view at a dark sky site, showing the difference at a dark sky site. Dramatic.

street lighting, parking lot lighting, security lighting, and any application where color rendering is not critical.

4. Avoid development near existing observatories, and apply rigid controls on outdoor lighting when development is unavoidable. Such controls do not compromise safety, security, or utility. Outdoor lighting ordinances and codes have been enacted by many communities to enforce quality and effective nighttime lighting.

All of these solutions to the problem are basically the same:

“Do the best possible professional lighting design for the task. Include all relevant factors such as glare, light trespass, and light pollution.”

All the solutions needed for protecting astronomy have positive fringe benefits of maximizing the quality of the lighting and of saving energy.

We must do what we can, now, to protect the nighttime environment. It is another of the key envi-

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ronmental issues confronting our civilization, one that most men and women are unaware of, however.

The International Dark-Sky Association, a tax-exempt, non-profit, membership-based organization, exists to help overcome this awareness problem and to help preserve dark skies while at the same time maximizing the quality and efficiency of outdoor lighting. Contact us at the address on the front for further information about any aspect of dark skies or energy-saving and effective outdoor lighting.