

Light Pollution Causes Harm to . . .

Astronomy



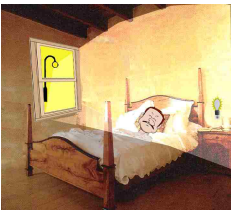
- Natural Skies are Important, should be as created.
- Light pollution robs everyone from being able to enjoy, ponder and discover the universe.
- Astronomy is a huge business for Southern Arizona and is threatened by Light Pollution.
- Two thirds of the world's population can no longer see the Milky Way due to sky glow.
- Man and animals use the heavens for navigation.

Wildlife & Plants



- All living things have circadian rhythms needing cycles of natural light and dark, disrupting them can cause disorientation, stress and fatigue.
- Outdoor lights can interfere with wildlife mating, foraging, survival and sleeping habits.
- Outdoor lights can attract insects like a magnet, causing their death, decreasing populations and food supplies.
- Night time pollination tasks and life cycles of flowering plants can be disrupted.
- Lights near water interferes with fish spawning and feeding habits. Reflections off the water can cause insects to get confused, land on the water and drown. Reflections off metal & glass surfaces can also confuse insects.
- Sky glow can cause migrating birds to get lost over water, become exhausted & die.
- Lit up trees and bushes deprive birds of roosting areas.
- Most plants need dark nights for healthy growth, colorful blooms and reproduction.

Human Health



- Dark sleep is necessary for nightly generation of melatonin which has antioxidant properties to help fight disease. Breast cancer can grow eight times faster with low levels of melatonin. Eliminate all bedroom light while sleeping.
- Lack of dark sleep can cause your circadian rhythm to get out of sync causing stress and fatigue, similar to symptoms when you experience jet-lag. Want to have jet-lag everyday?

Safety & Security

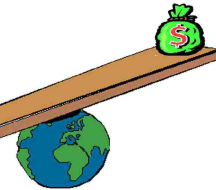


- Glare, basically light in your face, can create dangerous situations by causing your pupil to close when it needs to be open wider to see in low light levels.
- More light does not yield more safety, it may cause harsh shadows where criminals can hide.
- If a burglar has to use a flashlight to see in the dark, he becomes conspicuous. Lights show him what you have.
- Use properly aimed motion activated outdoor lights.

LIGHT POLLUTION



FIX IT



Polluting Wastes More Money than the Cost to Fix It!

The EPA Recognizes Light Pollution as a Pollutant

Information Provided by:
Southern Arizona Chapter
Int'l Dark-Sky Association

PO Box 65162
Tucson, AZ 85728-5162
Web: www.sa-ida.org

Email: sky@sa-ida.org

We are available for Presentations!



International Dark-Sky
Association Headquarters
Since 1988

Web: www.darksky.org
Email: ida@darksky.org
Office: (520) 293-3198

Please see our web sites for more information and brochures ...



11/29/11

**Light
Pollution
Impacts
Our
Environment**



**Astronomy
Health
Wildlife
Plant Life
Safety**

Some Interesting Dark Skies Related Facts...

Light Pollution is in the form of: **Sky Glow** (light going upwards), **Glare** (blinding horizontal light in your face), and **Light Trespass** (light spilling off your property).

This satellite image shows upward light from millions of poorly designed light fixtures. This wasted electricity is estimated to cost over \$10 Billion annually in USA.



Bad outdoor lights affect astronomy, wildlife, plants and safety. They contribute to human health problems, dark sleep is essential to generate melatonin (fights disease, especially cancer).

As you age, the human eye requires more time to adjust to changes in light levels, reduced vision occurs while the eye adapts. Examples: Entering a movie theater; leaving a gas station under a bright canopy, then entering a dark street.

There is no statistical evidence that adding or increasing outdoor lighting reduces criminal activity. Most crimes are committed during daylight hours.

There are more professional and amateur astronomers and telescopes in Southern AZ than anywhere else in the world.

The hundreds of millions of dollars of revenue from the astronomy and optics business in Southern AZ is equivalent to revenue from hosting the Superbowl every 2 years.

The mirror lab in Tucson produces the largest (8.4 meters in diam.) and highest quality precision telescope mirrors that are shipped all over the world.



Light traveling horizontally or at an angle can be a hundred times more harmful to an observatory within 100 miles than light going straight up. Angled light hits many more airborne particles, causing sky glow, than light heading straight up through the atmosphere (10 miles).

Dark-Skies was started in 1988 by two Tucson astronomers. It has evolved to include topics listed in this brochure and has grown to over

11,000 members across 70 countries with many active chapters.

Save Energy, Water, Coal & Reduce Air Pollution: If all Arizonans changed out 4 incandescent 60 watt lamps to energy efficient CFLs and turned their porch light off before bedtime and on only when needed, we could save 850 Million kwh of electricity (costs \$85 Million), 6.7 Billion gallons of water, 530 Thousand tons of coal and Thousands of tons of pollutants from mercury, sulfur dioxide, and nitrous dioxide.

Simplified Outdoor Lighting Codes for Southern Arizona



Flood lights must be aimed downward at 45° or lower.

Total Lumens allowed are limited by "Developed Acres" and zoning.



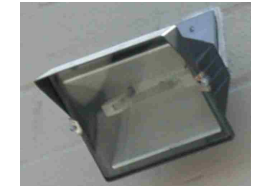
An "Excellent" Fully Shielded fixture shining all it's light



Unshielded Lumens are limited by "Developed Acres". Most city lots would allow only 2 lamps.



Lights over 3000 Lumens (about 175 watts of incandescent light) must be fully Shielded.



Non-residential unshielded lighting must be turned off

Additional Outdoor Lighting Codes

- Holiday lights allowed from Thanksgiving to Jan. 1, to be off by 11 PM.
- Sports lighting has 11 PM curfews, search lights, if allowed, to be off by 10 PM.
- More restrictive zones exist near observatories, within a 35 mile radius.
- Mercury Vapor lights may not be used at all (AZ law effective Jan 2011).
- Signs must be turned off within one hour after the close of business.
- LED, LCD, Plasma and similar signs limited to 200 nits after sunset.

Codes are enforced at time of construction plans approval and installation. Citizens may report subsequent violations at any time to Development Services.

Outdoor Lighting Codes are normally revised about every four years. Southern Arizona Counties and Cities each have their own specific codes.

Please Practice "Responsible" Outdoor Lighting...

Use the right type and amount of light for the task, use only in areas needed. Use fixtures that only shine light downward, the bulb should be hidden from view. Turn on outdoor lights only when needed, use properly aimed motion sensors.

Keep your outdoor light on your property, avoid light trespass.

Use Energy Efficient light bulbs to save energy as well.

Please share this information with others so they understand the importance of helping to reduce Light Pollution!