

Information Provided by the Southern Arizona Section of the International DarkSky Association

This reference card was designed specifically for astronomers and educators. We request that you assist us with our educational mission so everyone understands the reasons and takes action to reduce Light Pollution.

Each Errant Photon Adds to Light Pollution!

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***Please see our sa-ida web site and the IDA
web site for brochures and lots more
information ...***

IT'S SO EASY...

Use the right amount of light for the task.
Use a fixture that only shines light down.
Light only the area that needs lit.
Turn lights On ONLY when needed!

02/14/10

Why Natural Skies Are IMPORTANT!

Astronomy

- Light pollution robs everyone from being able to enjoy, ponder and discover the universe
- Astronomy is a huge business for Southern AZ and is threatened by increasing outdoor lights.
- Two thirds of the world's population can not see the Milky Way due to light pollution.
- Man uses the heavens for navigation purposes.

Wildlife and Plant Life

- Outdoor lights can interfere with wildlife mating, foraging, survival and sleeping habits.
- Lights can attract insects like a magnet and cause their death.
- Pollination tasks can be disrupted.
- Lights near or over water interferes with fish spawning and feeding habits.
- Migrating birds can get disoriented and die.
- Lit up trees deprive birds of roosting areas.
- Their circadium rhythm can be disrupted causing disorientation, stress and fatigue.
- Plants need dark nights for colorful blooms.



Human Health

- Dark sleep is necessary for nightly generation of melatonin which has disease fighting properties.
- Lack of dark sleep can cause your circadium rhythm to get out of sync causing stress and fatigue, like you experience with jet-lag.

Safety

- Lights shining sideways can cause serious glare that can impair vision making it difficult or impossible to see pedestrians, cars and bicyclists.
- More light does not yield more safety, it may actually decrease it.
- Non uniform lighting can cause shadows making it difficult to walk or drive safely.

Some Interesting

Dark Skies Related Facts...

- 1) There are more astronomers and telescopes in Southern AZ than anywhere else in the world.
- 2) The millions of dollars of revenue from the astronomy and optics business in AZ is equivalent to hosting a football Superbowl every other year.
- 3) The mirror lab in Tucson produces the largest (8.4 meters in diam.) and highest quality precision telescope mirrors shipped all over the world.
- 4) Satellite images show light shining upwards from millions of poor light fixtures. The electricity used to create this wasted portion of light is estimated to cost over \$2 Billion per year in USA.
- 5) Saving electricity reduces water use (1 gal/kwh) and reduces Carbon Dioxide (1.4 lbs/kwh) and Sulfur Dioxide, Mercury, and Nitrous Oxide from coal fired plants, 80% of our power generation.
- 6) IDA was started in 1988 by two Tucson astronomers. It has evolved to include the Environment, Ecology, and Safety concerns yielding a growth to over 10,000 members across 70 countries with many active sections..
- 7) Artificial outdoor light has permanent harmful effects on astronomy, wildlife, plant life, and contributes to safety and human health problems.
- 8) Many more crimes are committed during daylight hours than nighttime.
- 9) After about age 45, the human eye begins to require more time to adjust to changing light levels. Momentary blindness occurs (all ages) when levels change quickly. Example: entering a dark movie theater where light levels are drastically different.
- 10) There is no statistical evidence that adding or increasing lighting reduces criminal activity.
- 11) Criminals can easily hide in the shadows of brightly lit areas, especially ones not uniformly lit.
- 12) "Sea Turtle Friendly Light Bulbs" are required in Florida beach areas to give hatchlings a fighting chance to find the ocean instead of condos.
- 13) 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.

Basic Summary of some of the

Outdoor Lighting Codes for Southern Arizona

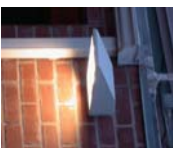
- 1) All Decorative Lighting must be off at 11 PM
- 2) Flood lights to be aimed down at 45° or lower
- 3) No new Mercury Vapor lights allowed
 - No repairs allowed, none turned on after 2010
- 4) Signs must be off 1 hour after business closes
- 5) Restrictive zones near observatories (35 miles)
- 6) Lights over a certain brightness must be shielded
- 7) Unshielded lights are limited based on lot size
 - Most city lot sizes only 2 unshielded lights
 - Holiday lights allowed Thanksgiving to Jan. 1
- 8) Total outdoor light per acre is also limited
- 9) Codes are enforced at time of construction
 - Citizens may report violations at any time
- 10) Sports lighting has 11 PM curfews
- 11) Lighting limits are often based on zoning
- 12) Search lights & laser lights are prohibited
- 13) Codes normally improved about every 4 years



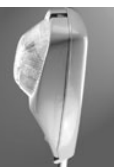
**Flood Lights
Illegally aimed**



**Unshielded
"Very Poor"**



**Full Cut-off
Flat lens**



**Shielded
"Scatters Light Sideways"**



**Shielded
"Scatters Light Sideways"**

**Outdoor Lighting Codes for AZ,
Counties, and Cities are listed on our
web site www.sa-ida.org**