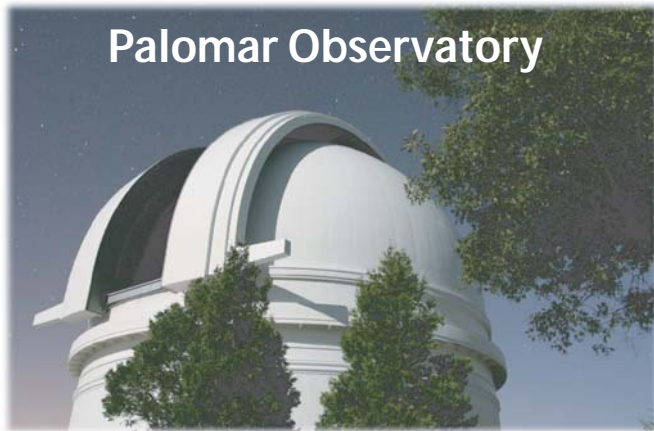


# Good Lighting and Poor Lighting



Palomar Observatory

**You can help preserve the beauty of the night sky:** Our choice of lighting fixtures affects our ability to enjoy the night sky. In most cases, all we need to do is aim our lights, which in turn provides better safety and security. This brochure describes how our lighting choices can improve personal safety and security while preserving the night sky for scientific research as well as for our own enjoyment.

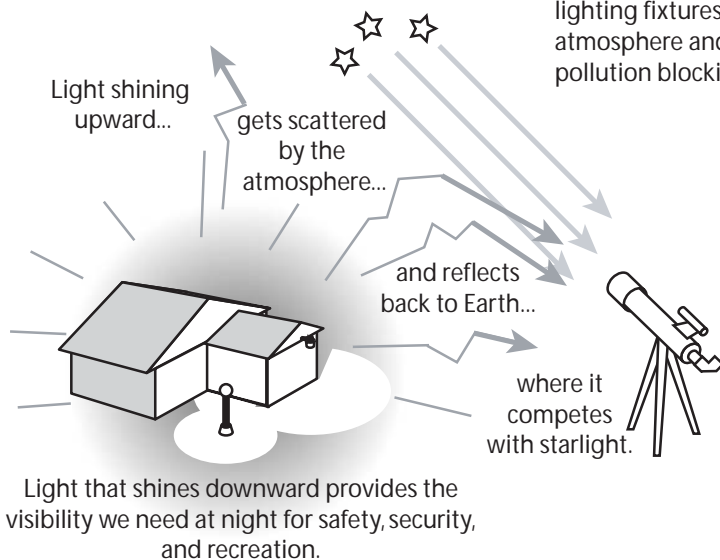
**A message from Palomar Observatory:**

"The Palomar Observatory's astronomical research is threatened by light pollution from Riverside and San Diego Counties. Good lighting at your home can help preserve the nighttime skies for everyone."

Scott Kardel, Palomar Observatory

## What causes sky glow?

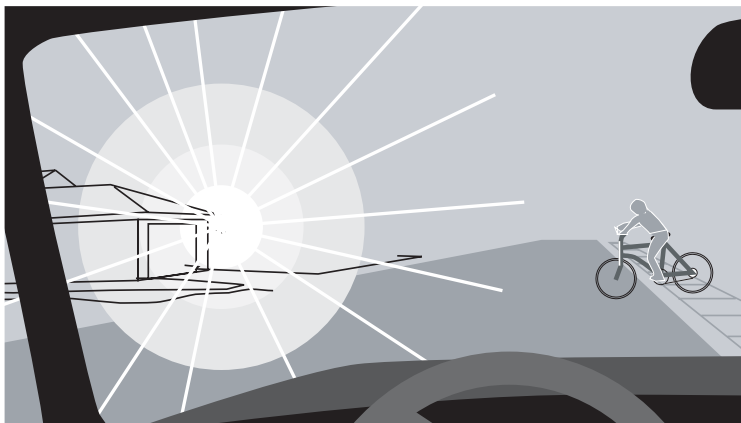
The scientific community and lighting regulations often use the term "light pollution." Light pollution is the unused portion of light from poorly aimed lighting fixtures that shines up and sideways. This light is scattered by the atmosphere and reflected back to the ground as sky glow. This sky glow is light pollution blocking our window to the universe.



## How you can help Palomar Observatory

- Aim your lights downward onto your property.
- Use low-pressure sodium lights where you do not need white light.
- Use lights with reflective covers that aim light downward, especially if you need bright light.
- Use motion or proximity activated security lights.
- Turn off unneeded lights.
- Use dim or low pressure sodium lights in decorative features.

## Bright, unaimed lights create glare, which is a safety hazard

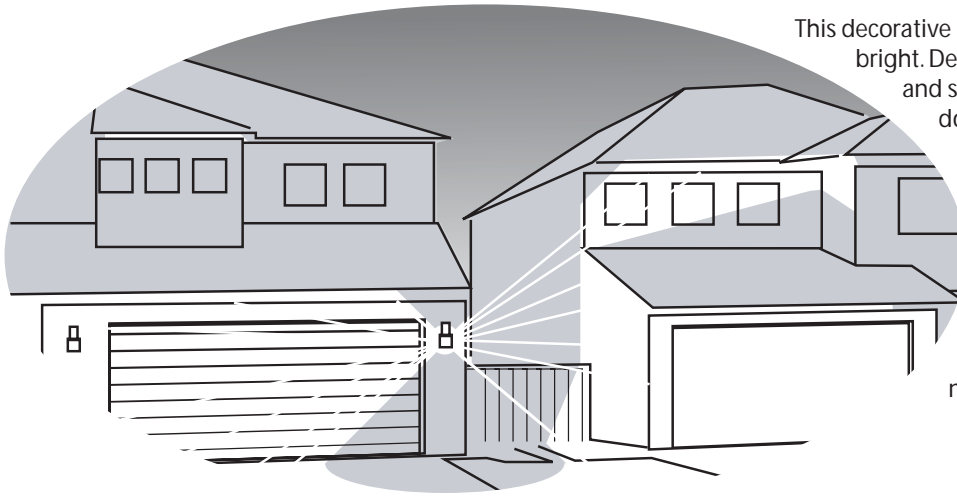


This unaimed 175-watt mercury vapor light gives a false sense of security. The intensity of the white light overwhelms a driver's ability to see well at night. In my case, I couldn't see a child about to enter the street on a bicycle. Fortunately, the child's parent was under the light waving to the child. I slowed and missed the child because I saw the parent's gesture, but I could not see the child until he or she was in front of my car.

Using a cover that aims the light downward would preserve the safety and security function while eliminating the glare hazard as well as the light pollution.

John Garrett, Temecula Valley Astronomers

Poorly aimed, overly bright lights impair your neighbor's ability to see and exposes them to the outside.

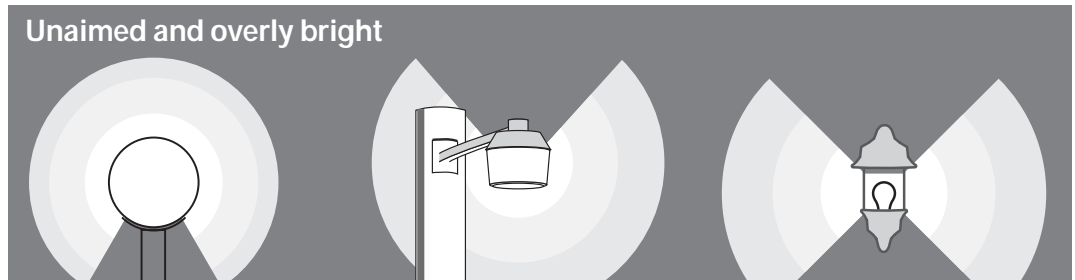


This decorative light is equipped with a bulb that is too bright. Decorative lights often lack proper aiming and shine as much light upward as downward. Because of this design, they make poor flood lights. Here, a decorative light shines into a neighbor's window, putting the neighbor at a disadvantage should he or she need to look out at night: The direct glare from the bulb makes seeing difficult; and the direct light on the window means the neighbor can be seen from the street.

## Good vs bad lighting design

### Bad lighting:

- Wastes energy
- Creates light pollution
- Creates glare
- Obscures the view of stars
- Disrupts sleep cycles



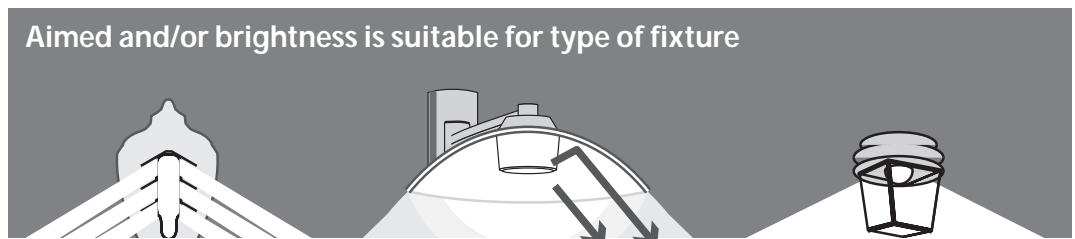
There is nothing wrong with decorative lights, except when they are used as flood lights. A globe light shines more light upward than downward, creating more light pollution and glare than usable light.

A typical mercury vapor yard light uses power (which is energy and money) to compensate for poor design. Much of the light shines up and sideways where it creates glare and light pollution.

Many decorative lights are modelled after old-fashioned gas-burning lamps, which were never bright enough to create glare. The old lamp design with modern high-wattage bulbs creates mostly glare and light pollution.

### Good lighting:

- Is energy efficient
- Shines only on the intended target
- Preserves nighttime visibility
- Is only as bright as needed



Old fashioned decorative lights can use low-pressure sodium (or yellow-light) bulbs. Some manufacturers make bulbs with louvres that aim the light downward, converting old-fashioned lamps into effective lights.

A simple hood prevents light pollution and glare by blocking the light that shines upward and outward. If the hood has a reflective inner surface, it will reflect the light lost as glare or light pollution to the effective lighting zone, providing more light for the energy (and cost).

Any decorative fixture with its bulb in the top will minimize glare and light pollution by directing light downward.

### For more information

The International Dark-Sky Association provides information about night-sky-friendly lighting.  
On the Web: [www.darksky.org](http://www.darksky.org)