

# Light Pollution

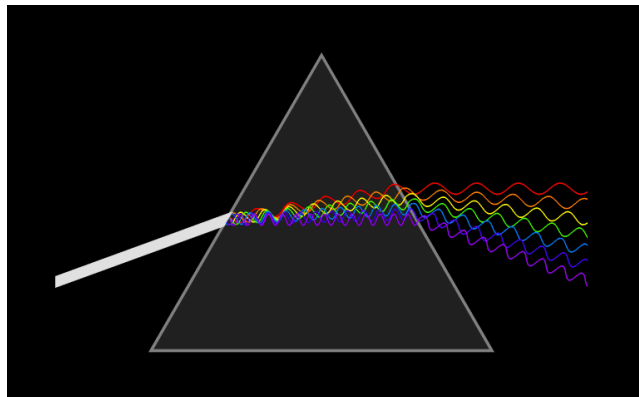


# Light Pollution

Outdoor lighting has been a necessary part of our urban lives. While it has contributed to our safety and has cleared our paths, some unpleasant side effects have arisen. Perhaps astronomers interested in the night sky have experienced it the most. Light pollution is a blanket term that include unwanted disturbances from light sources, be it light trespass, sky glow, glare, over-lighting, and disturbing the wild life .

Sky glow is a real problem for astronomers. The light escaping to the sky prevents observing faint light sources. In 1988 the International Dark-Sky Association (IDA) was founded by David Crawford and Tim Hunter to advocate protection of night sky from unwanted light pollution. Since then regulations are introduced in most countries to tackle these problems .

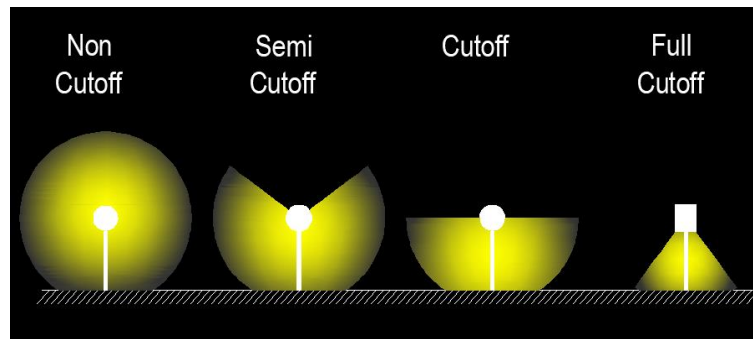
Shorter wavelengths scatter more than longer wavelength. That's precisely why the sky is blue, since blue light has shorter wavelength.



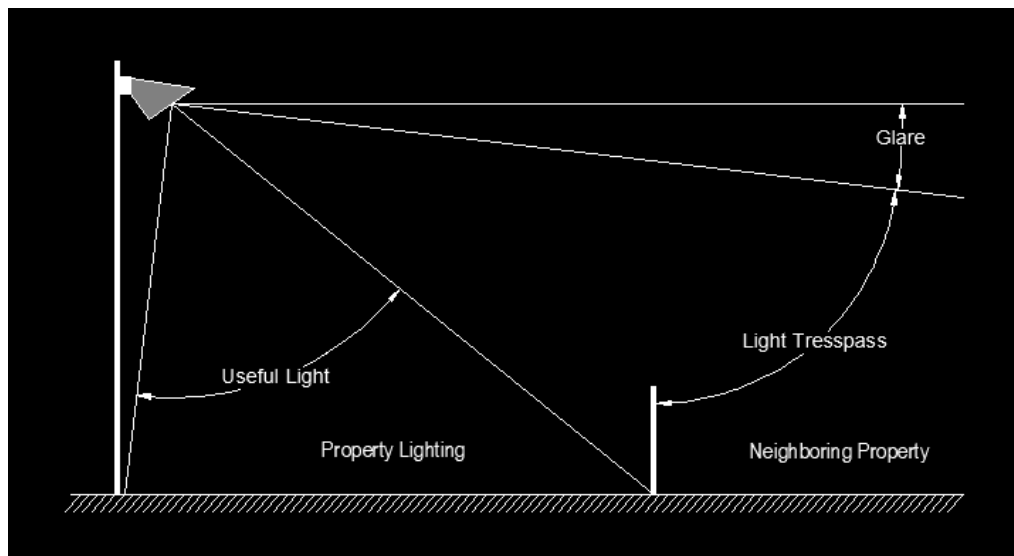
Likewise, the artificial light sources with more blue light contribute more to light pollution, even with the more suitable reflectors and cut-off classifications. Metal halide, blue light LEDs and mercury lights are among the lamps with higher rate of light pollution and glare. On the other hand low pressure sodium lamps have the least light scattering effect and are more suitable to be used in projects where extra care is needed to avoid light pollution.

Although choosing suitable fixtures with reflectors that make light focus on the desired area helps a lot, still the light trespass is a problem, since the eyes are conditioned to the trespassed light and makes night sky observation difficult.

Light trespass is defined as unwanted lighting from a light source intended for a specific area into leaking into adjacent areas. For instance, it could disrupt a neighbor's sleep and privacy or interfere with the activities of nocturnal animals. While Canada does not have any laws against light trespass, local authorities have set up bylaws that address these matters. For instance you could see the bylaws of city of Calgary [here](#), or that of Vancouver [here](#).



Although cutoff fixtures are better than non-cutoff and semi-cutoff fixtures, they still contribute to glare. To avoid light trespass and glare, full cut-off fixtures with suitable shields are recommended. Using dimmers, motion detectors and timers can minimize and reduce light pollution. Below picture shows each problem that an unshielded outdoor fixture could cause.



Although our eyes can adapt itself to a wide range of brightness levels, it can't do it very fast. Glare and over lighting perhaps is most felt by drivers and cyclist. They need to make split second decisions based on visual discernment that can be compromised for about 30 seconds when eyes are exposed to an unshielded light source. This could lead to mishaps that can easily be avoided by selecting suitable fixtures and proper mounting angles.

Light pollution does not just affect our vision. Humans, animals, even blind mammals and plants have other light sensors that regulates metabolism, hormones and sleep cycles. Blue light affects these mechanisms and exposure to artificial blue light can disrupt the balance of life. Choosing suitable lamps and fixtures, setting curfew, timer and shielding light sources can reduce these problems.

## References

[2017 Best Practices for Effective Lighting](#)

[The International Dark-Sky Association](#)

[Light pollution - Wikipedia](#)

[The impact of light source spectral power distribution on sky glow](#)