

Light Pollution in Rural Areas

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Light pollution is excessive illumination that extends beyond where it is needed or wanted and it can be more than just a nuisance for neighbours. Light pollution is a relatively new form of environmental contamination that was first recognized by astronomers in the 1970's and is now widely recognized for its impact on the environment and human health. It changes the wildlife habitat and it can even impact our physical and emotional health. This article will raise your awareness of light pollution. It will also suggest simple ways to minimize its effect on our environment.

Outdoor lighting has been driven by cheap energy and a fear of the night. Energy is no longer cheap and much of this fear is misplaced. We illuminate our grounds for security and to show off our property. With our property on display throughout the night, vandals and thieves can freely do their evil deeds without being encumbered by a flashlight. With the property owner and neighbours asleep, no one will raise an alarm until the morning when it is too late. Light is only useful when there are people around to see it.

In catering to this fear, we are inadvertently contaminating the natural environment. If we are to be good stewards of the land and water, we must understand that even light can be dangerous. But unlike air and water pollution, light pollution is easily reduced.

Nocturnal Lighting and Health

Our active daily lives result in physical damage to our skin, muscle and other tissues that must be repaired. The scheduling of these repairs is governed by our internal body clock – the circadian rhythm that is kept in sync with our daylight activity by detecting the day-night contrast in lighting.

Our bodies enforce this repair by releasing the hormone melatonin into our blood and putting us to sleep. It takes about 3 hours for most of this work to be completed - longer if we have more extensive damage. The best time for these repairs is in the early part of the night. My grandmother used to say that the hours of sleep before midnight were the most beneficial. She seems to have been right. If repairs are delayed by artificial lighting they may not be completed.

Our minds also require a bit of a clean up. Think of your desk at work at the end of a busy day. Papers and notes are scattered about. These have to be organized and filed so they can be easily found the next day. Without this re-organization – we would have a very confused work world. It is the same with our minds. Our daily memories have to be compressed and filed so they can be quickly recalled when needed. This also requires sleep in a darkened room.

Wildlife



Contamination from Single

Scotobiology is the study of the ecological dependence on darkness. There are many nocturnal creatures that are most active during the night that forage for food with less fear of predators. A single yard light can contaminate over one square kilometre. To avoid the danger of the artificial lighting, wildlife may change their behaviour by foraging less or abandoning their familiar habitat. As they migrate into other areas, they put pressure on the indigenous wildlife as they compete for limited resources.

Under the bright full moon animals reduce their food intake but for the rest of the month during the relative darkness, the affected animals compensate by eating more. However, with artificial lighting, there is no dark time.

Songbirds rely on a good insect population but a single light will attract insects from over 100 meters away. This interrupts their normal behaviour of eating, mating and migrating. As they decrease in number, the insect-eating birds migrate to other regions in search of a better food supply. The apparent loss of songbirds has been attributed to these changes in their environment.

Vegetation is also affected by artificial light. Some plants get their cues about the season from the length of the night. A short night means it is late spring and time to pollinate. Nights that are getting longer indicate it is time to store up nutrients and drop leaves in preparation for winter. Artificial lighting keeps the nights short and “summer-like” delaying pollination until it is too late for the insects and delaying the preparation for winter until it maybe too late.



½ kw of Private Marker Lighting

Examples of light pollution are not limited to hamlets and towns. They are found across the rural landscape. The main source is uncontained private lighting from “dusk-to-dawn” yard fixtures, driveways and outdoor building lights. Many of these are left on even after the occupants have gone to bed. Not only do they make it difficult to see along a country road but they contaminate the area for wildlife.

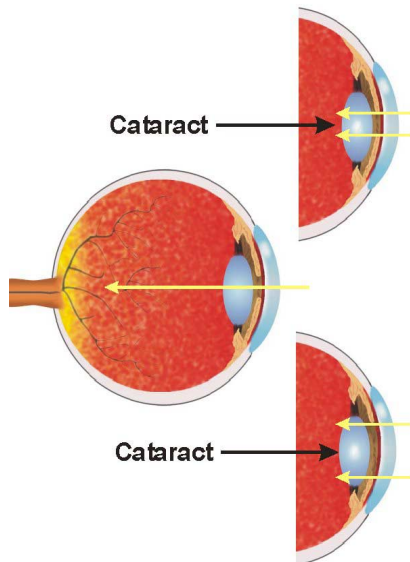


Glare from Shoreline Lighting

Shoreline illumination affects both human and aquatic life. It creates glare along the navigable channel. The bright lights prevent the eyes of boaters from adapting to the darkness. They fail to see channel markers and hazards. Without this obtrusive shoreline lighting, it is much easier to see the tree line and flotsam in the water.

Constant illumination along built-up shorelines overwhelms the cues for the changing seasons needed by aquatic wildlife. This light makes the length of the autumn night seem short and summer-like. It can also drive zooplankton to deeper waters while encouraging the growth of algae on the surface. This separation of the consumers from the food supply may stress the vitality of the ecosystem.

Our Eyes



Structure of Eye – Light Rays
with Cataracts

We use light to help us see after dark but it can have the opposite effect, especially if we are senior citizens!

After age 40, our eyes begin to deteriorate and incipient cataracts form in the centre of our lens. With glare from unshielded lights, our iris (pupil) closes down to protect the eye. Any light entering the eye must pass through the incipient cataract in the centre. Scattered light obscures the darker areas.

Without glare our iris widens and much more light passes through the clear part of our lens giving us a clearer view. So, we see better with less light!

During the day, our iris is also small but there is plenty of light from daytime scenes and our brain does a good job of correcting for our hazy vision.

Simple Solutions

As good stewards of the land and water, we must minimize our impact on the environment. The solutions to light pollution are much easier than reducing air and water pollution.

After dark, close your curtains to keep our indoor light in side. When we go to bed we should turn lights off, or at least ensure that the lights are well shielded to minimize environmental contamination. Use motion detectors instead of dusk-to-dawn fixtures. Use the lowest wattage that suits your purpose. Making light shields can be a simple activity suitable for children. Shield shoreline lights and keep them away from the water's edge, then turn them off when you go to bed. These and other examples are shown on the web at Starlight Theatre. Soon you will be able to share the night sky with your neighbours.

References:

General background information on light pollution (LP) published by the Royal Astronomical Society of Canada - www.rasc.ca/lpa/index.shtml

Essays and published articles about LP with supporting imagery and a few projects for children and adults to reduce LP. Lighting policy documents and information on Dark Sky Preserves and Urban Star Parks - www.starlight-theatre.ca/LT-POLLUTION.HTM

A large quantity of written material on LP and the reduction of glare, light trespass and sky glow. Although its main focus is astronomy, it also covers some environmental topics - www.darksky.org

Summaries and contact information on ecology of the night (scotobiology with references to researchers in the field. - www.muskokaheritage.org/ecology-night/

Compilation of research into scotobiology highlighting the environmental impact of light - Ecological Consequences of Artificial Lighting T. Longcore, C. Rich
Island Press, 2006 ISBN 1-55963-129-5