

Biological clock and circadian rhythm



Peter Wienerroither

Animals and plants live by a rhythm which is attuned to our planet's 24-hour cycle. This is an inherited trait, which is passed on through the genes of a species. Humans may

notice a change in their circadian rhythm when they travel by airplane between several time zones, characterized by sleepiness, lethargy, or a general sense that something is "off."

Wildlife and fish experience this same disorientation of time when there is too much artificial light at night. Behavior governing mating, migration, sleep, and finding food are determined by the length of nighttime. Light pollution negatively disrupts these age-old patterns. See inside for details about the ill-effects of light pollution on our environment and wildlife.



Jeremy Stanley

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Dave Wymer

The International Dark-Sky Association (IDA), is an educational organization that seeks to preserve the natural night skies worldwide. Light pollution is an increasing problem threatening astronomical facilities, ecologically sensitive habitats, all wildlife, our energy use as well as our human heritage. Light pollution is excessive and inappropriate artificial light. The four components of light pollution are often combined and overlapping:

- **Urban sky glow**—the brightening of the night sky over inhabited areas.
- **Light trespass**—light falling where it is not intended, wanted, or needed.
- **Glare**—excessive brightness which causes visual discomfort. High levels of glare can decrease visibility.
- **Clutter**—bright, confusing, and excessive groupings of light sources, commonly found in over-lit urban areas. The proliferation of clutter contributes to urban sky glow, trespass, and glare.

Keeping lights on in unoccupied buildings, outdoor lights pointing up to the sky or unshielded lights create sky glow. Visit the IDA Web site at www.darksky.org to learn more about the causes of light pollution and what you can do to keep the skies dark.

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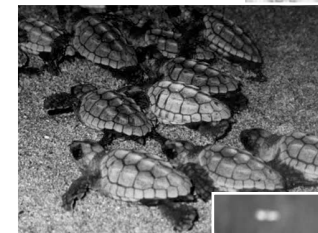
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International Dark-Sky Association

To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting.

Light Pollution and Wildlife



US Fish and Wildlife

Mammals

The bright lights from cities and towns cause nocturnal mammals across the globe to experience a loss of their night ecosystem. Examples of these affected mammals are bats, raccoons, coyotes, deer and moose. These species can experience:



- A decline in reproduction, leading to a shrinking population
- Difficulty foraging for food due to too much light
- Exposure to predators that would otherwise be unable to see them
- Increased mortality caused by impairment of their night vision

Birds



Many species of birds migrate or hunt at night. This dependence on darkness makes them extremely vulnerable to bright lights in areas that are naturally dark.

Birds can be drawn to light sources and become fixated on the beam. This confusion causes a variety of negative effects, such as:

- 100 million birds a year throughout North America die in collisions with lighted buildings and towers
- Not wanting to fly back into the dark, they continue to fly in the light's beam until they are exhausted, fall or become prey
- The artificial lights can also cause migrating birds to wander off course and never reach their natural destination
- Marine birds have been known to collide with lighthouses, wind turbines and drilling platforms at sea

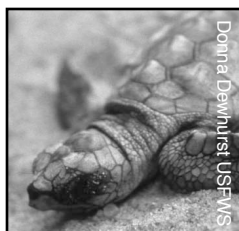
Amphibians

The haze from sky glow extends far beyond the borders of an urban city, impacting the environment for miles, including wetlands, the natural habitat of amphibians. It causes amphibians, and other creatures of the marshes, to become confused and disoriented, causing:



- A decrease in reproduction, resulting in lower populations
- Reduced foraging for food and lower body weight
- Confusion of natural instincts that protect against predators and the elements

Reptiles



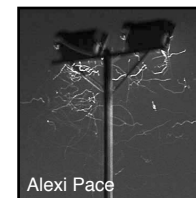
Reptiles are greatly affected by light pollution. For example, female sea turtles like to nest on remote and very dark beaches. Coastal lights interfere with their ability to find a safe nesting area for their eggs. Sea turtle hatchlings crawl instinctively toward the relative safety of

the ocean because of its reflection of the moon and stars. For centuries, this reflection was the brightest point of light on a beach. Artificial lights can confuse the hatchlings and cause them to crawl away from the ocean and onto roads or into communities. If they do not find their way back to the ocean, they could become fatally exhausted or dehydrated. Nocturnal reptiles can also become disoriented by the artificial light invading their homes and experience a change in natural behaviors. These behaviors might include:

- Appetite problems resulting in decreased weight
- Decrease in mating, resulting in diminished populations
- Increased vulnerability to natural predators and unusual ones like cars and humans

Insects

Moths and other insects are attracted to artificial lights and may stay near that light all night. This activity around the light:



- Expend too much energy and interferes with mating and migration, causing population reduction
- Makes them easy prey for bats and other nocturnal predators, further reducing their numbers
- Impacts all species who rely on insects for food or pollination

There are solutions

IDA believes that there are solutions to these issues:



- Shield your outdoor lighting
- Only use the light when you need it
- Use timers and dimmers
- Shut off the lights when you can
- Use only enough light to get the job done
- Use long wavelength light with a red or yellow tint to minimize impact

A shielded light uses less wattage and saves you money. Work with your neighbors and local government to keep the skies natural. This is a win-win situation for everyone. You save money while simultaneously reducing the impact of artificial light at night.



Before and during the East Coast blackout, 2003