Some documents concerning

# Ecological Impacts of Light Pollution

"Celestial Compass Obscured by Urban Light Pollution for Some Nocturnal Animals," *ScienceDaily*, October 27, 2011.
http://www.sciencedaily.com/releases/2011/10/111027112513.htm
"Urban light pollution has been shown to reduce the visibility of not only the stars, but also of an important navigational signal for some nocturnal animals. During clear moonlit nights, a compass-like pattern of polarized light that is invisible to the human eye stretches across the sky....The report...cautions that screening of the celestial compass may reduce the evolutionary fitness of certain nocturnal animals...possibly leading to disruption of food webs and affecting entire ecosystems....'What our study shows is that the depolarizing effect of skyglow is a form of pollution with global reach.'....Much or most of the skyglow propagating large distances from the city is caused by lights that aren't pointed at the ground."

"Bats and Light Pollution," published online, 2010.
http://www.centroregionalechirotteri.org/download/eurobats/Bats%20and%20light%20pollution.pdf
"Throughout evolution living organisms have adapted to the natural variations in available light. In the last 150-200 years, however, artificial light has profoundly changed nighttime light conditions....Bats are particularly exposed to light pollution due to their nocturnal habits. They have a high conservation interest (many species are threatened) and an important ecological role (being the principal predators of nighttime insects)."

"Impacts of Light Pollution on Organisms and Ecosystems," Chapter 4 of *Artificial Light in the Environment*, Royal Commission on Environmental Pollution, November 27, 2009.
www.official-documents.gov.uk/document/other/9780108508547/9780108508547.pdf
"Globally, cumulative natural...and anthropogenic...changes are having profound, long-term effects on the Earth's ecosystems....The proliferation of artificial light throughout the biosphere could act in synergistic and unknown ways with these other large-scale environmental changes."

"Lights Out? Experts Fear Fireflies Are Dwindling," *USA Today*, August 30, 2008.
http://www.usatoday.com/news/world/2008-08-30-1331112362_x.htm
"Lynn Faust spent a decade researching fireflies on her 40-acre farm in Knoxville, Tenn., but gave up on one species because she stopped seeing them. 'I know of populations that have disappeared on my farm because of development and light pollution,' said Faust. 'It's these McMansions with their floodlights. One house has 32 lights. Why do you need so many lights?'"

"Bright Nights Dim Survival Chances," AAAS *Science Now*, February 22, 2007.
http://news.sciencemag.org/sciencenow/2007/02/22-02.html?ref=hp
"All animals--from one-celled critters to humans--produce melatonin, a hormone that regulates cell metabolism, protects against the formation of cancerous tumors in larger animals, and allows many mammals and humans to enjoy restful sleep. But the hormone accumulates most efficiently in recurring or total darkness, such as in regular day-night cycles. When those cycles are disrupted, so is melatonin production. On the behavioral side, even seeing artificial illumination--such as street lights or indoor lamps shining through windows--at night can throw off foraging and migration in many species."

"Ecological Light Pollution," *Frontiers in Ecology and the Environment,* May 2004.
http://urbanwildlands.org/Resources/LongcoreRich2004.pdf
Excellent review of the issues by organizers of the 2002 conference (see below).

"Degraded Darkness," *In Practice: A Publication of the Society for Conservation Biology*, Spring 2004.
(No longer freely available online.)
"Many of the effects of artificial light may resonate up and down food chains, dragging whole ecosystems into imbalance. And by modifying the playing field on which nocturnal organisms develop, interact, and reproduce, artificial light may sculpt not only their individual lives but also the biological evolution of their species."

"Turn Down the Lights," *Discover*, July 2003.
Subtitled "The party's over: When we turn up the lights, nature goes a little haywire."
(No longer available online.)
"On a clear, dark night far from light-polluted skies, roughly 2,500 celestial points of light can be discerned by the naked eye. For people living in the suburbs of New York, that number dwindles to 250; residents of Manhattan are lucky to see 15. Moreover, as the stars fade from view, a growing body of research suggests that excessive exposure to artificial night light can alter basic biological rhythms in animals, change predator-prey relationships, and even trigger deadly hormonal imbalances in humans."

"Light Pollution Taking Toll on Wildlife, Eco-Groups Say," *National Geographic Today*, April 17, 2003.
http://news.nationalgeographic.com/news/2003/04/0417_030417_tvlightpollution.html
"Designating a dark sky as a natural resource which is as worthy of protection as an old growth forest or a scenic river may seem odd, but biologists worry about the ultimate impact caused by this little-understood ecological disturbance."

"Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches," Florida Marine Research Institute, Third Edition, 2003. With Executive Summary.
http://research.myfwc.com/engine/download_redirection_process.asp?file=tr2_0814.pdf&objid=39080&dltype=publication
"Sea turtle populations have suffered worldwide declines, and their recovery largely depends upon our managing the effects of expanding human populations....Of the many ecological disturbances caused by human beings, light pollution may be among the most manageable."

"Turn Off the Lights!," *California Wild: The Magazine of the California Academy of Sciences,* Fall 2002.
http://researcharchive.calacademy.org/calwild/2002fall/stories/horizons.html
"Bulb by bulb, the invention made famous by Thomas Edison has come to usurp the moon and Milky Way as evening beacons. There is mounting evidence that the disappearance of darkness has far-ranging effects on birds and bats, frogs and fireflies, fish and zooplankton. And while research into the ecological effects of night lighting remains in its infancy, the accumulated evidence so far shows how deeply the constant aura surrounding human habitations affects night creatures."

"Ecological Consequences of Artificial Night Lighting" (ECANL)
Conference co-sponsored by UCLA and the Urban Wildlands Group, February 23-24, 2002.
www.urbanwildlands.org/conference.html

- Companion bibliography (annotated), 20 pages
- Abstracts issued in advance of conference
- Follow-up book with the same title, published in 2005, available for purchase at Amazon.

"Adirondack Council Statement on Light Pollution," January 29, 2002.
A rare moth, *Lithophane lepida lepida*, is so susceptible to artificial light that it vanished from the Albany Pine Bush and was subsequently threatened by development in its only remaining New York State habitat, the Clintonville Pine Barrens.

"City Lights, a Siren's Song for Birds, Are Dimmed," *New York Times*, May 16, 2001.
www.nytimes.com/2001/05/16/us/city-lights-a-siren-s-song-for-birds-are-dimmed.html
Illuminated buildings confuse migrating birds accustomed to navigating by the stars. Some smash into windows, and others drop from exhaustion after hovering moth-like around the lights. With estimated deaths at more than 100 million a year, major skyscrapers in Chicago and New York have begun dimming their lights.

"Science Observer: Night Lights," *American Scientist*, January-February 2001.
http://www.americanscientist.org/issues/pub/night-lights
Light pollution striking the surface of lakes is found to reduce movement of a species of plankton. "As a result, increased amounts of surface algae left unconsumed by the zooplankton could potentially lead to algal blooms and poor water quality."

"Signals Maintenance Shapes Salmon Solution, *Northwest Region Bulletin,* Washington State Department of Transportation, March 23, 2001.
Declining numbers of sockeye salmon in Washington's Cedar River were found to be a result of lighting above the Cedar River Trail. Deprived of darkness, the salmon "fry" were easy for predators to spot. Salmon populations rebounded after the Department of Transportation fashioned black rubber shields for the trail lights.

"The Dark Side of Light," *Audubon*, March-April 2000.
http://magazine.audubon.org/darksideoflight.html
"Light pollution is a growing threat to our birds and wildlife. Worse, it may even increase cancer rates in humans."

"Security Lighting and Its Impact on the Landscape," *Journal of Arboriculture*, October 1975.
http://joa.isa-arbor.com/request.asp?JournalID=1&ArticleID=1348&Type=2
High-pressure sodium was "the new light source" when this was written, with intensity two to four times higher than older street lighting systems, and the Department of Agriculture was receiving many questions from florists and nurserymen. Among the answers:

> "Light throughout the 24-hour day inhibits flowering and promotes vegetative growth of short-day plants, encourages continued vegetative growth and early flowering of long-day plants, and increases stem lengths of day-neutral plants."
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> "Into the fall season young plane trees (sycamores) in the nursery grew more rapidly and much later than plants of similar age that had been screened from the night lighting. Winter dieback was severe on the lighted trees during the following spring."
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> "Continuous lighting depresses the formation and maintenance of chlorophyll in leaves and promotes lengthening of the internodes of the branches and expansion of the leaf area. All of these changes increase the likelihood that the leaves will be more sensitive to air pollution during the growing season."

*The foregoing is just a small sampling of the research on this subject. For a listing of some 400 studies (most with abstracts), see http://www.trianglealumni.org/mcrol/LAN-Environmental-References.pdf*