

The diurnal cycle of night and day is a fundamental aspect of the natural environment that is programmed into nearly every living thing. The circadian rhythm governs individual behavior and community ecology at every level of biology. If the sun never sets, it alters foraging, mating, flowering, navigation, migration, communication, competition, and predation from soil microbes up. (1)

If the impact were entirely confined to the city it might not be such an issue, but lighting does not stop at the city limits, light pollution from a single modest city, such as Little Rock, can impact the night environment over hundreds of square miles.

The impacts can be subtle but are pervasive. For example, zooplankton migrate in the water column of a lake with the day/night cycle. Light pollution can prevent the zooplankton from rising at night where they would normally feed on the phytoplankton. The result can contribute to algae blooms, impact fish populations and water quality. (2)

The mating ritual of fire flies can be disrupted by light pollution, driving down their population.(3)

It has been estimated that millions of migratory birds are killed each year when colliding with tall illuminated structures, such as office buildings, while sea turtle hatchlings fail to go to sea, mistaking city lights for the moon which normally guides them. (4)

One can go on, but humans are not immune from this disruption. Of principle concern is the production of the pineal hormone melatonin that is naturally linked to the diurnal cycle of night and day. Normal room lighting levels (<200 lux) can materially delay, shorten and suppress melatonin production. (5)

Depending upon wavelength, the circadian rhythm has been shown to respond to light levels as low as 1.5 lux, a level well below what poorly designed outdoor lighting can cast into a bedroom. (6)

Melatonin is central to the human sleep cycle. Sleep disorders and deprivation impact functionality and are thought to contribute to diabetes, obesity, and depression, all three burgeoning diseases of modern urban society. In addition, Lower levels of melatonin may encourage the growth of some types of cancers, including prostate and breast cancer, also becoming more prevalent in modern society. (7)

While a causative link between light pollution and specific diseases remains to be firmly established, the biological processes are sufficiently well understood for the American Medical Association to call for action to address the potential human health risks associated with light pollution and poor lighting practices. (8)

As well, the Federal Highway Administration is reviewing its street lighting recommendations due to these emerging environmental and health related concerns. (9)

Hence, turning night into day is not as trivial a thing as we once thought; it is expensive, implicates public health and has various environmental consequences, all leading forward-thinking cities around the world to readdress lighting practices. (10)

References: