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Restorative Biophilic Design



Fall, 2018

In Defense of Darkness

Flowering plants, which are illuminated at night, are visited around two thirds less frequently by pollinators, than those without any light sources in the vicinity.

This negatively effects the fruit set, and therefore the reproduction of plants.

As follow-up to our [BioPhilly 4](#) conference, I was recently invited by the [Rittenhouse Astronomical Society](#) to speak at the Franklin Institute. When later we stepped onto the roof to regard the night sky, surrounding tall buildings, still largely illuminated at 10 PM, were competing with a luminous moon. The city sky was aglow, making stargazing difficult but through an enormous telescope, where for the first time, I was able to see Mars and Saturn. What an unforgettable experience!

For me it was another opportunity to reflect how we have begun to glean the importance of day-light for human health, but fail to give equal weight to the health benefits of night-darkness.



In addition to circadian disruption, 4000K LED highway light causes glare conditions for drivers, and disrupts nesting and pollinator habitat more than highway noise.

Circadian Health vs. Energy Savings?

“The introduction of artificial light probably represents the most drastic change human beings have made to their environment.” ~ Christopher Kyba, Research Scientist GFZ

Exposure to high levels of artificial light at night results in melatonin suppression. Alzheimer’s, depression, attention-deficit/hyperactivity disorder (ADHD), heart disease, obesity, cancer, diabetes and other metabolic issues are among the many conditions that appear to be linked to circadian disruption. Light pollution is real.

Most of us lack sufficient sunlight during the day, and are exposed to too much white-blue light at night in the form of devices, computer screens, televisions and, increasingly, high Kelvin blue-white LED lighting. It is estimated that a blue-white LED lamp is at least 5 times more powerful in influencing circadian physiology than a high pressure sodium light based on melatonin suppression. Yet cities all over the world are switching to white, mostly 4000 K, LED street lights to save energy. While we reduce our carbon footprint, our cities are getting brighter at night. The detrimental effects on our health, on **bird migration and insect populations** are well documented.

We should not have to choose between carbon footprint reduction and circadian health.



Communities Prefer Warmer Light

In addition to the [International Dark Skies Association Lighting & Light Fixture Recommendations](#), the solution seems to lie in a combination of cooler (3,000 K for thoroughfares) and warmer (2,500-2,700 K for residential areas) LED's, along with city-wide wireless control systems that dim most lights and extinguish some completely after midnight. Studies indicate, brighter light does not necessarily mean greater safety. Glare issues with the 3-4,000 K LEDs can make it difficult to see who might be lurking in the shadows.

“Communities like the warmer light,” says Patrick Roche, energy coordinator for the Boston-based Metropolitan Area Planning Council, in an IEEE report about LED streetlights. “And 3,000 K is good news for the [IDA](#), which, along with the ‘Loss of the Night Network’ in Europe and the [American Medical Association](#) recommends that color temperature as the maximum.”

“Another design trick: mixing LEDs of different colors in the same fixture ...combining amber LEDs with 3,000-K LEDs.... The white LEDs switch off after workers go home, and the amber lights switch on to provide security with minimal impact on astronomers and wildlife.”

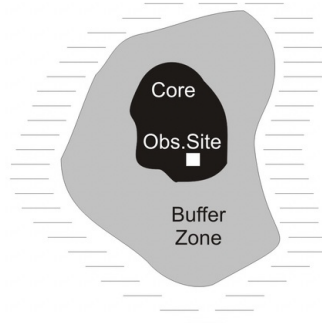


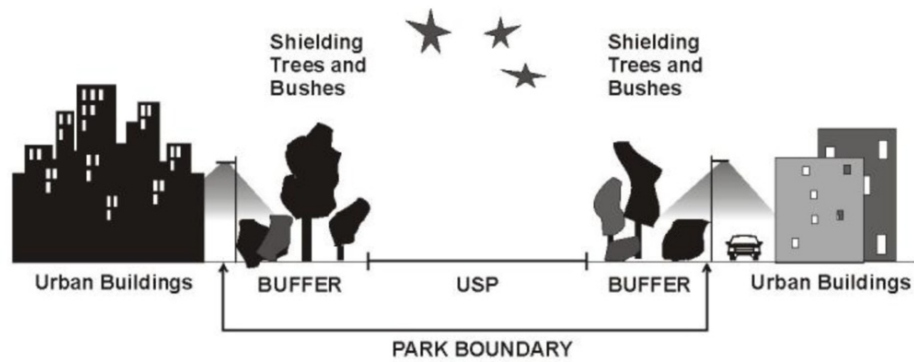
Biophilia of the Night: Health Benefits of Star-Bathing

Anyone who has experienced the mesmerizing, awe-inspiring beauty of a starry night sky will never forget it. All life on earth has evolved in response to the rhythmical interplay of night and day. Our physiology, and that of all life, **depends on it**. The experience of the night sky is essential for our humanity and, indeed, for our health. Recent UC Berkeley research shows, that of all emotions, **awe** is the one that most strengthens human immune response. Like forest-bathing, star-bathing is good for us.



Non-designated
Area





Urban Star Parks (USPs)

In 2008, the [Royal Astronomical Society of Canada](#) adopted the RASC Dark-Sky Program™ that includes Dark-Sky Preserves™ (DSPs), Urban Star Parks™ (USPs) and Nocturnal Preserves™ (NPs). These three designations reflect the benefit for outreach programs of readily accessible sites within or near urban areas and more remote dark sites for observing the pristine sky.

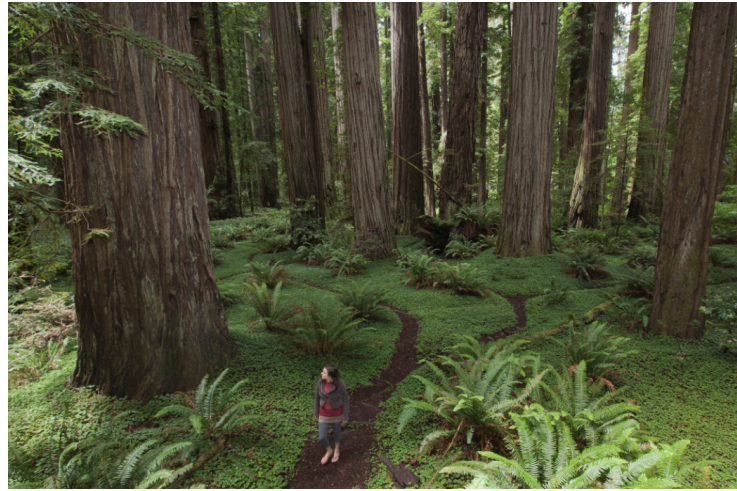
Urban Star Parks are important educational tools for children and adults alike, reconnecting urban populations with bird migrating seasons and important celestial events such as the solstices, the fall and spring equinox, full moon events and star-bathing, fire-fly, and owl prowling festivals.

Above: a diagrammatic map of potential USPs in Philadelphia, establishing dark sky zones primarily along waterways to protect nesting sites, support wildlife corridors for nocturnal life, as well as restoring the beauty and health benefits of the dark night sky to urban dwellers of all species.



A composite photo of the position and phases of the moon over 28 days, each photo taken at the same exact location each day. (photo by Georgina Hofer Photography in 2017)

Nature in the News



E.O. Wilson's Half-Earth Project

Take a Walk in the Woods. Doctor's Orders.

A Month of Microadventures in New York City

Worth Noting



A conversation with Emma Loewe,
mbg Sustainability Editor, [MBGPlanet.com](https://www.mbgplanet.com):

How To Create A Happy Home, According To Neuroscience

Learn more about **Places that foster Cognitive Ease and Re-Connection with the Natural World.** For Biophilic Architecture and Consulting promoting the Experience of Physiological Health and Well-Being in the built environment, please [email me](mailto:emma@mbgplanet.com) or call me at: 610-299-7530 for more information.

Learn more about my **BUILDING BLOCKS FOR PHYSIOLOGICAL WELL-BEING IN THE BUILT ENVIRONMENT**

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