HELP POLLINATORS, PLANTS, AND ANIMALS: TURN OUT THE LIGHTS!

Outdoor lighting at night is part of modern life, and few of us can imagine living without it. Yet outdoor lighting has a "dark side." Natural cycles of light and darkness are essential to the proper functioning of ecological systems. Life on Earth evolved in conditions subject to only natural sources of light and is adapted to these natural cycles. Many plants and animals depend on these cycles for optimal health and even survival. Evidence is mounting that **artificial light at night (ALAN)** affects the behavior, health, and abundance of various living creatures, thereby disrupting natural ecological processes.

White-lined sphinx moth feeding at night. Photo credit: Dr. Bill May.

Natural Cycles of Light and Darkness Are Critical to Ecological Systems

Most invertebrates (insects, spiders, etc.) and many vertebrates (mammals, birds, amphibians, etc.) are crepuscular (primarily active at twilight), nocturnal (primarily active at night), or both. These animals are adapted to function under low or extremely low light levels, moths and bats being obvious examples. Many other animal species rely on natural cycles of daylight and darkness to trigger and regulate behaviors such as hunting, hiding from predators, mating, nesting, navigating, and communicating. Plants too depend on natural cycles of daylight and darkness to regulate processes such as flowering, leaf drop, and growth form.

Artificial Light at Night Harms Insects

ALAN is harmful to many nocturnal and crepuscular insects. In fact, ALAN is thought to be contributing—among other causes—to the global decline of insects that has been observed in recent decades. Because insects are so critical to ecological health as pollinators, seed dispersers, nutrient recyclers, predators, and as a food source for birds and many other animals, the decline in insects is already having serious impacts on many species, including humans. For example, many important food crops, especially fruits and vegetables, depend on insect pollination.

Research has shown that ALAN affects development, reproduction, and survival of certain insect species. Many types of insects use visual information to navigate, find food, find mates, and avoid predators. ALAN negatively affects some species' ability to orient and navigate when flying. Depending on the species, ALAN interferes with pollination, reduces feeding time, decreases pheromone production, affects immune systems, or disrupts life cycle changes. For example, ALAN masks bioluminescence from fireflies, interfering with communication essential for successful reproduction. Even very low levels of ALAN affect predator avoidance behavior in certain aquatic insects. Moths and other nocturnal insects exhibit "flight to light" behavior; they are irresistibly attracted to lighting, and untold billions die as a result. Unfortunately, ALAN also helps predators to hunt insects that are drawn to lights more effectively, further decreasing insect populations.

The Good News: You Can Help

Reducing the negative impacts of ALAN on insects, other animals and plants can be as simple as turning off the lights, and that is something everyone can do. In fact, there are many easy ways for all of us to reduce the harmful effects of artificial light while still enjoying its benefits. Many are listed in this fact sheet. Best of all, most of these practices will also save money, save energy, and beautify and enhance enjoyment of our night skies, all while improving our own health and well-being!

For more information, please contact Robert Sullivan at rgsullivan@hotmail.com.

REDUCING THE IMPACTS OF OUTDOOR ARTIFICIAL LIGHT: WHAT YOU CAN DO

Light only WHEN you need it: Switch off lights and use lighting controls.
- Switch off lights unless there is an important reason to have them on, i.e., a task that requires light.
- Use lighting controls effectively, including motion sensors and timers.
- Make a special effort to switch off or dim lights during times of critical biological activity, e.g., bird migration.
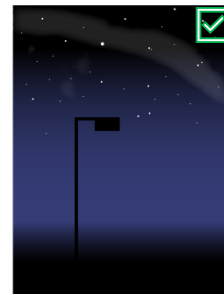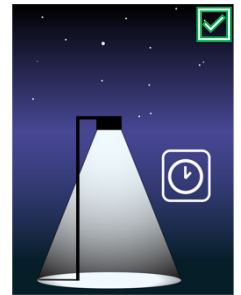
TURN LIGHTS OFF   *USE CONTROLS*

Light only WHERE you need it: Shield and direct lights properly.
- Aim floodlights down. Illuminate only intended surfaces or task areas.
- Don't aim lights upward or horizontally, or into sensitive wildlife habitat.
- Use fully shielded light fixtures that emit light only below the horizon.
- Use structures or vegetation to screen light sources.
- Use drapes and shutters at night to avoid attracting wildlife to indoor lighting.
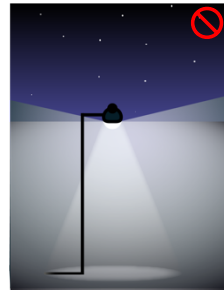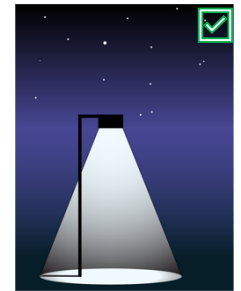
UNSHIELDED LIGHT   *FULLY SHIELDED LIGHT*

Use the MINIMUM level of illumination necessary: Avoid over-illumination.
- Over-illumination can make wayfinding and tasks less safe for humans by interfering with dark adaptation and by causing too much contrast between lighted and darker areas.
- Lighting should not exceed the minimum number of fixtures, intensity and coverage required for safety and basic security, for navigation, and other outdoor tasks.
- Use dimmers to lower lighting levels during times of night when less light is needed.
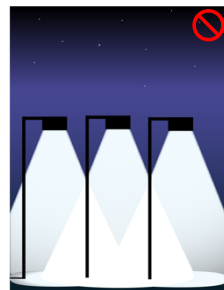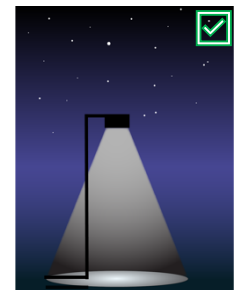
OVER-ILLUMINATION   *MINIMUM LIGHTING*

Use light of the APPROPRIATE COLOR: Use "wildlife friendly" amber, orange or red lighting.
- Amber, orange, and red lighting reduces human health and most wildlife impacts and improves night skies.
- Avoid using lights (especially LED lights) that emit short-wavelength (blue or ultraviolet) light, which attracts insects and insect predators, increases most wildlife and human health impacts, and degrades night skies.
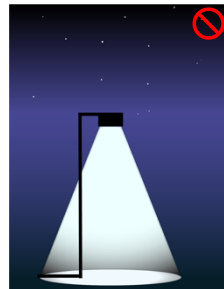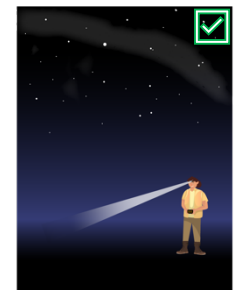
BLUISH-WHITE LIGHT   *AMBER LIGHT*

Light only IF you need it: Use alternatives to permanent lighting.
- Not all areas need to be illuminated. Using too many lights can make wayfinding and tasks *less* safe for humans. Dark adaptation and low contrast conditions help both humans and animals see better at night.
- Use reflective or luminescent markers, or light-colored pavement and surfaces to increase visibility instead of adding lighting.
- Use personal, mobile lights, such as headlamps and flashlights (preferably with red light) to avoid installing permanent lighting.
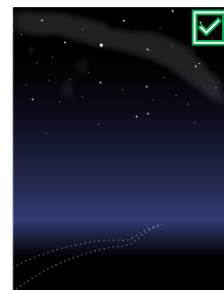
REFLECTIVE MARKERS   *MOBILE LIGHTING*

REMEMBER – LOSE THE LIGHT TO SAVE THE NIGHT!