

Skyrm Sheds Some Light On Growing Pollution Problem

By Sarah Wetzal For the Plain Talk, Nov 15, 2024

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Susanne Skrym, USD Professor Emeritus of music, discussed the Dark Sky International Program at the Oct. 30 Vermillion Rotary Club meeting on behalf of the Living River Group chapter of the Sierra Club.

The program works with communities, manufacturers, retailers and designers to basically keep the night sky as dark as possible by minimizing light pollution.

Skyrm shared the definition of light pollution as “Excessive misdirected or obstructive artificial light at night that washes out starlight in the night sky, disrupts ecosystems, has adverse health effects and wastes energy and money.”

The three types of light pollution include sky glow, glare and light trespass.

“Sky glow is the dome of brightness on the horizon that obscures our view of the night sky,” Skyrm said. “Sky glow is caused by misdirected light scattering through our atmosphere.”

She said this creates a huge waste of energy and money not to mention the excess electricity that causes further greenhouse emissions.

Glare occurs when unnecessarily bright light enters our eyes at a shallow angle causing pain and visibility problems. Oncoming headlights are an example.

Light trespass occurs when light falls outside the property boundary onto another property or home.

According to Skyrm, about 35% of lighting worldwide is wasted light shooting straight up into the sky.

“When we do the math, we spend about three to seven billion dollars a year on wasted light while adding 21 million tons of carbon dioxide to the atmosphere each year,” she said.

Other than the waste of energy and money there are lots of other negative consequences, many of them ecological.

Skyrm said she and her sources calculate that the cumulative scale of ecological destruction due to artificial light at night is comparable in severity and scale to the effects of climate change on ecosystems.

Many species, from sea turtle hatchlings and migratory birds to insects, orient themselves with light.



Susanne Skrym, a member of the Living River Group chapter of the Sierra Club, speaks to members of the Vermillion Rotary Club about the problems caused by light pollution and the importance of the nighttime environment to the world's ecology and wildlife. Courtesy of Vermillion Rotary Club

Bodies of water reflect the brightness of the moon and the stars used as beacons guiding these species to safety.

With light pollution from cities, it can cause confusion and disorientation in these animals.

“Birds, like moths, are drawn to artificial light with migratory birds being especially susceptible to sky glow which can draw them from their migration routes causing them to not mate or to even die from exhaustion,” she said. “Birds also navigate using celestial navigation and when they are confronted by large, brightly lit skylines they become disoriented. Not only are they attracted to the bright lights of the city, but the sky glow obscures their view of the night sky which they use to find their direction.”

The fact that the vast majority of North American migratory birds (80%) migrate at night makes the problem greater.

“I also talked to Dave Swanson who teaches here at USD,” Skyrm said. “He’s an ornithology professor. He said that while Vermillion is certainly not an urban center like Chicago where there’s been quite a bit of collisions of birds with buildings ... still we could turn down the lights and it would have beneficial effects because we are on a migratory flyway here.”

She said amphibians and bats, including several local South Dakota species, will avoid foraging in light polluted areas.

Even trees are not exempt from negative effects of light pollution.

“When trees are exposed to artificial light at night they bud earlier, they lose their leaves later and they have shorter life spans,” Skyrms said. “This can also affect other species that depend on trees for food and habitat. It can cause a mismatch in the timing of migration because plants that start budding or leafing out earlier can affect the species that depend on them for food.”

She cited a study in Germany about how insects are impacted in their hunting and mating and the lights make them more vulnerable to predators.

“For example, mayflies, which only live and breed for a day, could be confused by light reflecting off the asphalt and lay their eggs on the asphalt instead of water,” Skyrms said. “A mistake like that can cause a whole population to be wiped out in a single night.”

Just like the animal kingdom, humans evolved with a day/night cycle related to light that gets disrupted as well with too much exposure to artificial light, specifically blue/white light that mimics the light of the sun.

According to Skyrms’s sources, nearly 80% of Americans can’t see the Milky Way where they live and 99% live under light-polluted skies.

“We can see the Milky Way in Vermillion, but today only one in 10 people in the world live under skies that can reach that level of darkness,” she said.

“We have a lot of pollution problems out there right now, but light pollution is the only one that we can solve right now at the speed of light,” Skyrms said. “Each individual action makes a difference and we can work together to create changes on a larger scale that will benefit everyone.”

She highlighted five principles for better lighting design:

1. Use light only if it is needed
2. Direct light so it falls only where it is needed
3. Light should be no brighter than necessary
4. Use light only when it is needed
5. Warmer color temperatures where possible

Skyrms pointed out that aiming light only where it is needed increases visibility and saves energy.

She said the higher the color temperature, the bluer the light is and the closer it is to sunlight. Cooler or bluer light has a much stronger negative effect on living

beings while warmer light is healthier for us. The light temperature recommended by the American Medical Association is 2,700 Kelvin and below.

Skyrms said when people are indoors at night, they can use dimmers and color temperature apps that adapt their electronic screens to the time of day with cool light appearing during daylight hours and warmer light at night.

“LED lights are more efficient and powerful than previous bulb technology,” she said. “This efficiency and power have led to over-lighting because it’s easy to install bulbs that are much more powerful than needed.”

Skyrms recommended using software or filters when available to select the appropriate light intensity for designated use with LED lights.

Though Vermillion is not like a big city, she said light pollution is bad enough for it and other small towns, creating its own sky glow that can be seen when driving towards it.

“Lighting ordinances are a way that cities could ensure that their lighting meets [dark-sky-appropriate] criteria,” Skyrms said. “As far as I know, Vermillion doesn’t have a lighting ordinance. We need these kinds of things to make sure our lighting is safe, but it’s also keeping unnecessary light from going into the sky or nearby protected areas. The dark sky website has some model lighting ordinances that people can look at to create their own.”

She later attended the Nov. 4 Vermillion City Council meeting to advocate for the cause.

Skyrms said those interested in dark sky friendly lighting can find the Dark Sky International fixture seal of approval program on the darksky.org website. People can also look for the seal of approval when purchasing lighting at local hardware stores. They may also join darksky.org and use the website for advice on how to properly light.

The movement is growing with a Dark Sky chapter in South Dakota that has its own Facebook page.

“The beauty of the night sky is worth preserving,” Skyrms said. “The beauty of the night sky is worth experiencing. The night sky provides perspective and inspiration and leads us to reflect on our humanity and place in the universe. The history or scientific discovery and even human curiosity itself is indebted to the natural night sky. Artists, composers, scientists and discoverers have all been inspired by the night sky.”