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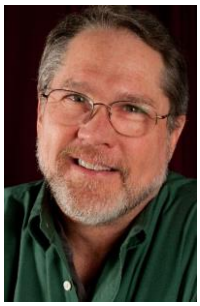
LIGHT MATTERS

Moonlight vs. streetlights: exploring the differences

"On a clear night under a full moon I can see plenty well enough to walk the streets. When I look up, the moon appears pleasant, not glaring. Why can't streetlights be more like moonlight?"

–Kristin McFadyen

BY HOWARD JOHNSON



Howard Johnson

The Western man within me loves this question. Walking, even skiing, by the light of the Moon is a marvelous experience. Even animals, especially the coyotes around my home, seem energized by the hearty glow of a full Moon. It makes them howl ceaselessly throughout the night.

Perhaps we do not wish to copy in our streetlights the howl-encouraging aspect of Moon lighting, as many people behave strangely enough at night already, but let us nevertheless explore the question of what makes moonlight so special and how it differs from the output of an artificial light fixture like a streetlight.

Lighting professionals characterize all light fixtures (including streetlights) by four properties: Where the fixture throws its light, When it comes on, How much light it throws, and What color light it makes. Ignoring the pedestrian issue of cost, let's see what these four properties tell us about streelights.

Where: On a cloudless night the full moon throws its light equally across the entire landscape. The uniformity of moonlight makes it just as easy to see a mountain lion in the distance as your own shoes. In a wide-open prairie, moonlight provides near-perfect overhead illumination.

A streetlight can never be as high as the Moon, so it will always throw a non-uniform pattern of light. For example, an arrangement of tall, widely-spaced streetlights creates a "hot spot" under each bulb, with relative darkness between. Look at the bulb and it glares down at you. An arrangement of smaller streetlights, mounted on shorter poles and closely spaced, distributes the light more uniformly, creating fewer deep shadows behind trees and bushes. With good baffling, the smaller lamps create very little glare, like moonglow.

When: The exact time when moonlight begins and ends on any specific evening has to do with the Moon's orbit around the Earth. This inconvenient aspect of moonlight limits its use as a streetlight substitute, but at the same time raises an interesting question. Why must streetlights run all night? Why not make them feel more natural by turning them down, or off altogether, after a certain hour?

How much: The amount of light a streetlight throws depends on its internal lamp (light source) and the shielding provided around that lamp. Measured at street level, the streetlights in Winthrop produce about 180 times as much light as a full Moon. Why so much? Moonlight by itself is perfectly adequate for walking about, but the first time a halogen-bright, pupil-puckering headlamp on a passing BMW knocks your dark-adapted vision into the gutter you'll be thankful for a nearby streetlight to help you see your next footfall.

Streetlights must be bright enough to compete with car headlamps, but there is no purpose served by over-lighting a street or parking area. This author's moonish preference is to install the lowest intensity lighting guaranteed to make the roadway safe, and keep glare out of everyone's eyes. Check out the new streetlights in Twisp.

What color: Streetlights come in many different colors. Lights that tend towards the blue end of the spectrum, like metal-halide vapor lamps and many "bright white" LED lamps, appear extremely bright to animals with high sensitivity to blue and near-ultraviolet light. Bees, dogs, birds, and many game animals fall into this category. If we do not wish to drive these creatures away, orange or yellow lights make a lot of sense.

Light from the Moon comes from pure sunlight, reflected by the slightly reddish surface of the moon and passed through our atmosphere, creating a tint slightly more yellow than the familiar yellow color we associate with the Sun. Moonlight appears blue only in the movies. Streetlights should emit a similar yellowish color, technically specified as a correlated color temperature less then 3000 degrees Kelvin.

If you learn to intelligently consider the four properties of light fixtures in every lighting situation, you will have learned the craft of a lighting engineer. Perhaps than you can begin to earn additional income using your new skill working on the side, moonlighting.

What do you think about light? If you have opinions or questions concerning lights, lighting, the sky, or anything else, please email: editor@methownews.com

Howard Johnson, noted author and technologist, lives south of Winthrop. He helped found the Methow Dark Sky Coalition, which seeks to preserve and protect the nighttime environment of the Methow Valley.