



Why should we value responsible lighting and dark skies in New Mexico?

A valuable natural resource : Over the past 150 years as widespread use of artificial light has increased, a dark night sky, once the domain of many, has now become the domain of a few. New Mexico has a valuable natural and cultural resource in its dark skies that helps define our uniqueness and sense of place. We should not let this slip away!!

Economic impact : Dark skies provide positive economic impact in New Mexico in multiple ways. Astro tourism is increasing in the state. There are night sky tour businesses and New Mexico True has a New Mexico Dark Skies theme that focuses on several formally designated Dark Sky Places. There are several 'dark sky' residential communities across the state that attract new homeowners from out of state. There are multiple telescope-hosting small businesses that provide locations for people from around the world to remotely operate their telescopes under dark skies, and the owners occasionally visit. NM research universities have active observatories that attract students and federal funding; several federal facilities in New Mexico also have observatories. There are a number of amateur astronomy clubs across the state and there is at least one large star party that attracts visitors from out of state.

Worker Safety : It has been recognized that responsible lighting improves worker safety. Reducing glare (direct view of light sources) allows for better visibility. More light is not necessarily safer; putting light *where it is needed* is safer.

Security : Similarly, implementing responsible lighting in urban settings can increase security. Glare makes it harder to see intruders or other hazards. Putting security lighting on timers and motion sensors allows easier identification of intruders.

National security : National labs in New Mexico, e.g. Starfire Optical Range, are involved in satellite tracking and monitoring, efforts that are affected by light pollution. At White Sands Missile Range, dark skies are needed for realistic testing and training conditions, concealment of activities, and for "dark sky missions" such as tracking celestial objects or testing of night-vision equipment.

Human health : Excess light impairs sleep, which may have long-term health impacts. Improved roadway lighting to reduce glare can decrease the frequency of accidents involving both pedestrians and vehicles.

Ecological benefits : Multiple species are adversely affected by excess artificial light at night. In particular, 60% of pollinators, on whom agriculture depends, are negatively affected. A large fraction of migratory birds travel at night and can be misled by artificial light; the Rio Grande corridor is a major bird migration route.

Energy and money savings : Putting light only where it is needed saves energy and saves money.

Respecting property rights : Some property owners are severely affected by light trespass from adjacent private or public properties. Property owners should have the right to light their property as they see fit, but also be observant of neighboring property owner rights. Properly directed and controlled light so it does not extend beyond the property of origin prevents light trespass.

Human appreciation : For generations, humans have appreciated the night sky. The night sky is the most ancient of all natural beauties. Viewing the stars and Milky Way in an unspoiled dark sky stokes imagination, creativity, wonder, serenity and an awesome sense of connection to something far beyond our daily experience. The ability to do so is declining rapidly: for example, it's estimated that only 20% of the US population can see the Milky Way from where they live. New Mexico has a great resource in its dark skies, a shared heritage deserving of preservation and conservation so we can pass it on to future generations.

A cultural resource : The original Night Sky Protection Act grew out of the New Mexico Heritage Preservation Alliance's declaration of the night sky as a threatened cultural resource, one we all share. The night sky provides a connection across all cultures, Indigenous, Spanish and other European ancestry. Oral traditions and storytelling in cultures worldwide are being lost to light pollution.

Scientific study : The three research universities in the state all have active astronomy programs. Our ability to learn about the Universe, which may have implications that we cannot fully foresee, depends on dark skies to see fainter objects. Loss of natural darkness across the US has led to many advanced observatory projects being located outside the continental US. Dark skies help to keep New Mexico competitive.

Amateur astronomy : There are many amateur astronomers who take great satisfaction in looking at the night sky. Some produce artistic work, others are involved in scientific studies, and others spend significant time sharing their enthusiasm with the public.

How can we implement responsible lighting and protect dark skies in New Mexico?

DarkSky International and the Illuminating Engineering Society have developed five simple principles for responsible outdoor lighting:

1. **Useful : Use light only if it is needed.** All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.
2. **Targeted : Direct light so it falls only where it is needed.** Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.
3. **Low level : Light should be no brighter than necessary.** Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.
4. **Controlled : Use light only when it is needed.** Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.
5. **Warm colored : Use warmer-color lights where possible.** Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.

If we implement these relatively simple principles, we enhance safety and security, save money and energy, support human health and protect wildlife, preserve cultural and aesthetic values, enable scientific studies, and help to attract people to New Mexico – a winning combination!



WHY CHANGE THE NEW MEXICO NIGHT SKY PROTECTION ACT? Dark skies are a valuable New Mexico resource that provide a positive economic impact through tourism, astronomical residential communities, astronomy-related small businesses, and educational and scientific research institutions. Despite the existing 1999 Night Sky Protection Act, light pollution is increasing across the state. Lighting technology has changed dramatically since 1999, and it is now recognized that responsible lighting can be safer, save energy and money, be healthier, have less adverse effect on wildlife, and enable greater human appreciation and scientific study of the night sky.

PROPOSED IMPROVEMENTS (justification in italics)

74-12-1. Short title

Amend the title to be the Responsible Outdoor Lighting and Night Sky Protection Act.

In addition to protecting the night sky, best practices in lighting improve safety, decrease energy usage, save money, and have less adverse health and ecological effects. The title should reflect that there is value in responsible lighting beyond that of protecting the night sky.

74-12-2. Purpose

- A. Expand the purpose to recognize additional benefits beyond astronomy.

Benefits of responsible lighting are much broader than astronomy: they encompass cultural heritage, safety, human health, wildlife, energy and cost savings, and positive economic impact.

- B. Add five principles of responsible lighting: 1) Light should have a clear purpose; 2) Light should be directed onto areas only where it is needed; 3) Light should be no brighter than necessary; 4) Light should only be used when it is useful; 5) Use warmer color lights where possible.

DarkSky International and the Illuminating Engineering Society have jointly released these basic principles of responsible lighting that ensure safety and minimize impact on neighbors and the night sky.

74-12-3. Definitions

- A. Amend the definition of fully shielded light fixture to limit the amount of light delivered from any light source above 80 degrees from nadir to 5% of the total light output of the fixture.

DarkSky International now recommends that light be restricted to below 10 degrees from horizontal to prevent light trespass and to significantly reduce light extending to unwanted areas.

- B. Add definition for light trespass: artificial light sources emitting light into adjacent properties or public right-of-way.

The term light trespass is now recognized to be an important principle that has an impact on safety, environmental issues, and light pollution.

74-12-4. Shielding of outdoor light fixtures

- A. Modify to: Any light source that is mounted above 4 feet shall be fully shielded to prevent light trespass or glare, with the exception of temporary holiday or festoon lighting. Shielded lights must be installed and maintained in accordance with manufacturer's specifications and instructions for use.

This revision takes into account changes in lighting technology since the original NSPA, and is more specific with regard to exceptions. It explicitly notes that fixtures must be installed per specification in order to achieve the requirement.

- B. Light fixtures lower than 4 feet and less than 1000 lumens shall not be directed towards the sky or public right of way and shall not result in light trespass or glare.

With the almost universal change to LED lights, watts is no longer an appropriate unit for specifying brightness, since LEDs are far more efficient at providing visible light than the older technology. The amount of light should be specified in units of luminous flux (lumens) rather than in inappropriate units of energy (watts), which can vary with lighting technology.

74-12-5. Nonconforming light fixtures

- A. Remove existing exemption if light is extinguished after 11:00 pm

The impact of poor lighting applies to all times of night, not just after 11:00pm. In fact, it may be more important to use responsible lighting when people are awake more likely to be affected.

74-12-6. Use of Mercury Vapor lighting fixtures

Change title to 'Light Source' and modify as follows: Outdoor Luminaires shall be Solid-State (e.g., LED) and capable of turning on, off, and dimming down to 25% of full output.

Solid state lighting, which includes the currently predominant LED, is energy efficient and has the capability to be dimmed.

74-12-7. Exemptions

- A. Modify exemption for advertisement signs to apply to "roadway navigation and safety signs" instead of "advertisement signs."

Advertisement signs can be lit from above and achieve the same functionality.

- B. With respect to subparagraph (4), regarding worker safety at farms, ranches, dairies, feedlots or industrial, mining or oil and gas facilities: maintain current exemptions for legally installed lighting in existing facilities but stipulate that all new construction starting after January 1, 2027 adhere to provisions of the Responsible Outdoor Lighting and Night Sky Protection Act except where federal law requires otherwise.

Lighting industry suggests that responsible lighting can be installed at comparable cost so long as it is planned before construction. Responsible lighting is as safe or safer than older lighting. This revision gives industry time to make adjustments prior to mandating this change for new installations.

- C. Add expiration date for exemptions for legally installed lighting in existing facilities to be ten years from passage of revised NSPA or when existing lighting needs to be replaced, whichever comes sooner.

Existing lighting has a finite lifetime and should be replaced by responsible lighting when replacement is needed. Energy efficiency and short ROI may justify replacing existing light at an earlier time!