

8. Great Basin Dark Sky Park Light Management Plan (LMP)

Purpose and Goals

Great Basin National Park's unique location enables it to have some of the darkest night skies in the continental United States. Due to its distance from major urban centers, and unique geographical placement, it also maintains some of the clearest and steadiest atmosphere conditions. These conditions create superb transparency and stability in its skies. This combination produces the world-class night skies that make Great Basin an international destination for park visitors seeking a pure, primeval night sky experience. As part of the park's mission, Great Basin recognizes this as an important resource for preservation and protection.

Not only is the park's true dark sky an invaluable natural resource which park visitor come to experience, but the skies also provide one of the best locations to conduct astronomical and astrophysical research. In the 1970's Arizona State University considered Wheeler Peak of Great Basin National Park to be the last best-undeveloped site for an astronomical observatory in the United States (oral communication with Dr. David Bennum, University of Nevada, Reno). Great Basin is in the planning process of developing the first research-class astronomical observatory in the national park system. The Great Basin Observatory (www.greatbasinobservatory.org) plans to be a fully automated and autonomous observatory utilizing a 0.7-meter Planewave telescope and research class charge coupling devices (CCD) for imaging. This addition to the park will not only increase its visibility as a world-class night sky destination but will mark Great Basin National Park a world-class location to conduct research.

The Light Management Plan provides a foundation and blueprint for preserving the natural dark skies over Great Basin National Park. The guide outlined in this management plan will help guide park management in future lighting decisions and the modification of existing light in the park with the goal of having the lowest output while creating a safe environment for visitors and employees.

The park has had verbal conversations with White Pine County, NV Department of Public Works about the County's policies on public and private outdoor lighting and none are available at this time. Great Basin will meet the local codes (Storey County Codes Sections 8.02.010 through 8.02.090) and ordinances of other rural counties in Nevada such as Storey County in western Nevada where dark night skies are prevalent and important to local residents.

In the 2006 NPS Management Policies document, lightscape management is defined as: "the effective use of good design to appropriately light areas and minimize or eliminate clutter, the spill-over of light into areas where light is not wanted, and light pollution, all of which wastes energy and impacts park visitors, neighbors and resources."

The goal of the Light Management Plan is to continue to ensure that night skies above the park remain uninfluenced by any anthropogenic lighting. This will preserve the idea that the many visitors seeking a dark sky refuge can enjoy almost any location within the park.

Lighting Guidelines

Lighting Zones

Lighting zones (LZ) reflect the base (or ambient) light levels that are desired. The use of lighting zones was initially developed by the International Commission on Illumination (CIE) and appeared first in the United States in IES Recommended Practice for Exterior Environmental Lighting, RP-33-99. Following the IES guidance, two LZs were chosen for Great Basin National Park, LZ-0, and LZ-1. The following two lighting zones are applied to the Great Basin National Park:

LZ-0: No ambient lighting

Areas where the natural environment will be severely and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and detracting from the human enjoyment and appreciation of the natural environment. Human activity is subordinate in importance to nature. The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting. When not needed, lighting should be extinguished. Approximately 99.8% (77,089 acres²) of the area of Great Basin National Park falls within lighting zone zero (LZ0) (Figure 30).

LZ-1: Low ambient lighting

Areas where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety and convenience, but it is not necessarily uniform or continuous. After curfew, most lighting should be extinguished or reduced as activity levels decline. Approximately 0.2% (91 acres) of the park is located within light zone one (LZ1). This includes the Lehman Caves Visitor Center (1 acre), maintenance and residential area (10 acres), and the Baker Administrative Site (including the Great Basin Visitor Center, Resource Center, and Baker Residential Area) (80 acres) (Figure 30).

Park Management Commitments

Great Basin National Park commits to replacing or removing 50% of these non-compliant fixtures by the end of calendar year 2016 to full cutoff fixtures. The park also commits to replacing or removing 100% of non-compliant fixtures by the end of calendar year 2017. This night sky friendly lighting project will be highlighted in a public display in the park's main visitor center for the public to see the changes the park is making and serve as an example that visitors can do at home and work. The following requirements will be used in making future lighting decisions:

- Light fixtures will only be used for specific purposes and specific tasks.
- Lights will only be operated when necessary.
- Lights should work on switches or motion sensors only, excluding the full cutoff lights on the exteriors of the Lehman Caves Visitor Center and the Great Basin Visitor Center. Both visitor center light systems are on time-operated systems that will be programmed to illuminate for only a few hours after sunset.
- Light fixtures will be full cutoff and pointed downward.
- Light out will not exceed 600 lumens unless necessary for safety or emergencies.
- The light color temperature will be <2500 kelvin amber or warm white.
- Energy efficiency should be considered when making lighting decisions; compact fluorescent (CFL) or light emitting diode (LED) should be used.

Conclusion

Great Basin National Park recognizes its location in non-light polluted skies is one of the last remaining dark-sky sanctuaries in the United States. The true dark skies over the park have become a desired destination for thousands of visitors per year, and the park is committed to maintaining this special dark space. At this moment, Great Basin National Park has no plans to add any additional lighting within the park.

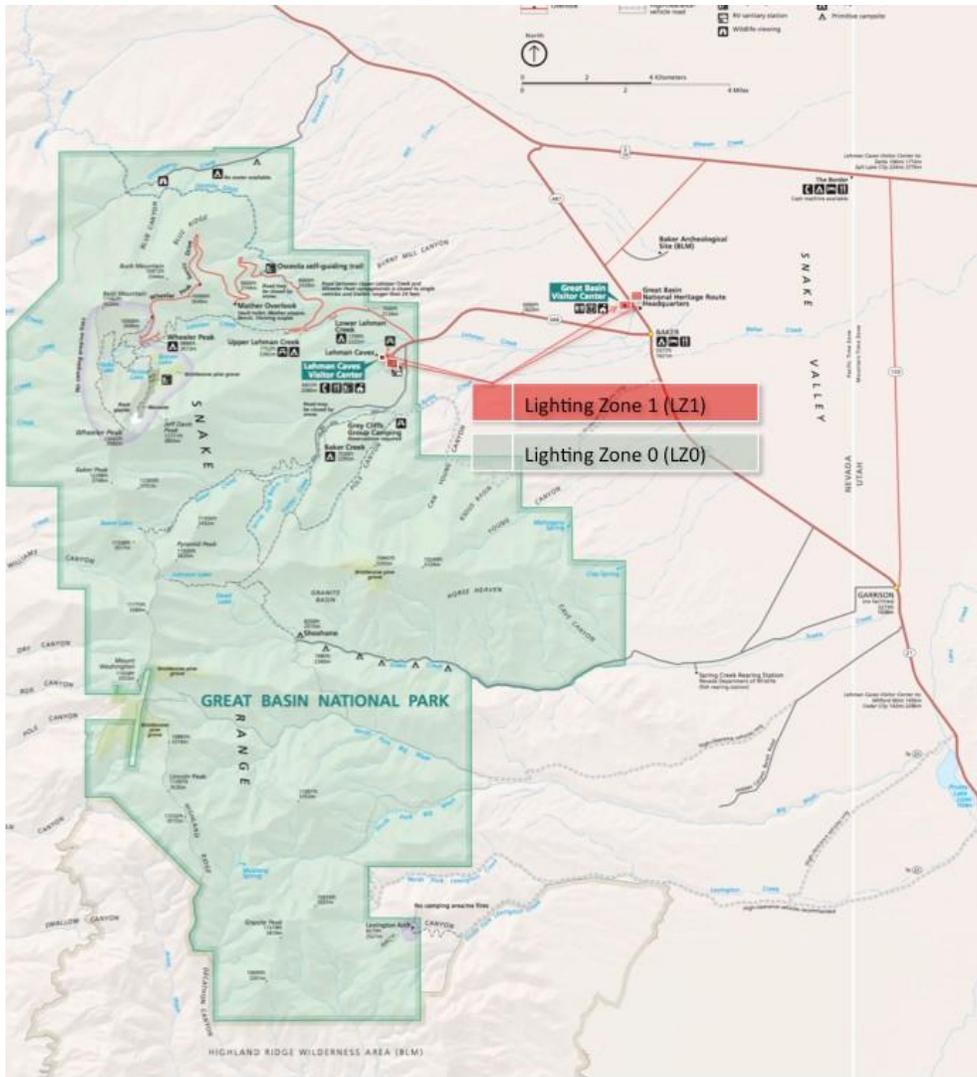


Figure 29. Great Basin Lighting Zones