

9. Parashant Dark Sky Park Light Management Plan (LMP)

Introduction:

Grand Canyon-Parashant National Monument encompasses over a million acres, including joint federal agencies, Arizona state lands, and private landowners. The Grand Canyon-Parashant National Monument Resource Management Plan (RMP) and the Monument founding Proclamation direct the BLM and NPS to maintain the Monument's rare wilderness characteristics, viewsheds, and natural resources. The night sky is one component of this wilderness experience enjoyed by Parashant's visitors and is endangered by encroaching light sources of nearby urban centers. This Light Management Plan takes the existing Monument RMP policies and expands these management efforts to maintain the current dark skies as well as to strategize for future conditions. This diminishing resource will be preserved by enacting this light management plan along with collaboration with neighboring public land units and communities to ensure the Parashant Dark Sky Park is an enduring sanctuary for generations to come. The following objectives will be implemented to enhance natural lighting in the proposed reserve, maintain visitor safety, and unite community and government dark sky efforts.

Objectives:

- Define Purpose and Need
- Define Lighting Zones
- Outdoor Lighting guidance for all government structures and facilities
- Outdoor Lighting guidance for private land owners within the Dark Sky Park
- Collaborate with adjacent land managers and communities to ensure the conservation of this Reserve including:
 - ❖ Grand Canyon National Park
 - ❖ BLM Las Vegas District
 - ❖ Hualapai Indian Reservation
 - ❖ BLM Arizona Strip District
- Educate the public on lighting options and the significance of night skies and this Reserve

Purpose and Need:

- The preservation of natural lightscapes will keep the nocturnal environment within the range of natural variability. Deviations outside this natural range may result in a modification to natural ecosystem function, especially to systems involving the behavior and survival of nocturnal animals. The natural night sky is therefore one of the physical resources under which natural ecosystems have evolved. A natural starry sky absent of anthropogenic light is a recognized natural resource.

- The history and culture of many civilizations are steeped in interpretations of night sky observations, whether for scientific, religious, or time-keeping purposes. As such, the natural night sky may be a very important cultural resource, especially in areas where evidence of aboriginal cultures is present.
- The recreational value of dark night skies is important to campers and backpackers, allowing the experience of having a campfire or sleeping under the stars.
- Economic value is also a consideration given the significant savings with reduced electrical cost and more efficient lighting uses.
- Night sky quality is an important wilderness value, contributing to the ability to experience a feeling of solitude in a landscape free from signs of human occupation and technology.

Lighting Zones Definition and Overview:

Lighting zones (LZ) reflect the base (or ambient) light levels that are desired. The use of lighting zones was originally 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 the Parashant Dark Sky Reserve, LZ-0 and LZ-1 (See Table 2). The following two lighting zones will be applied to the Parashant Dark Sky Reserve:

LZ-0: No ambient lighting

Areas where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from 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.

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.

Table 2. IES Guidance for chosen LZs for Parashant National Monument.

Zone	Recommended Uses or Areas	Zoning Considerations	Parashant DSP Implementation
LZ-0	<p>Lighting Zone 0 should be applied to areas in which permanent lighting is not expected and when used, is limited in the amount of lighting and the period of operation</p>	<p>Recommended default zone for wilderness areas, parks and preserves, and undeveloped rural areas.</p> <p>Includes protected wildlife areas and corridors.</p>	<p style="text-align: center;">Park Wide</p> <p>This zone will be the default lighting use in both Periphery and Core Reserve Areas to include BLM, NPS, and AZ State Trust Lands. Exceptions include: Administrative Sites and Private Property land units.</p> <p>Accounts for 97% of the entire DSR.</p>
LZ-1	<p>Lighting Zone 1 pertains to areas with low ambient lighting levels such as rural residential area with single or two family size structures or agricultural zone districts.</p> <p>Utilizing a 10pm light curfew to keep ambient lighting at a minimum along with retrofitting of exterior lighting to IDA dark sky guidelines.</p>	<p>Recommended default zone for rural and low density residential areas.</p>	<p style="text-align: center;">Identified Sites</p> <p>This zone applies to all Private Land sections and Administrative sites to use light curfews and retrofit 80% of their light fixtures.</p> <p>Accounts for 3% of the entire DSP.</p>

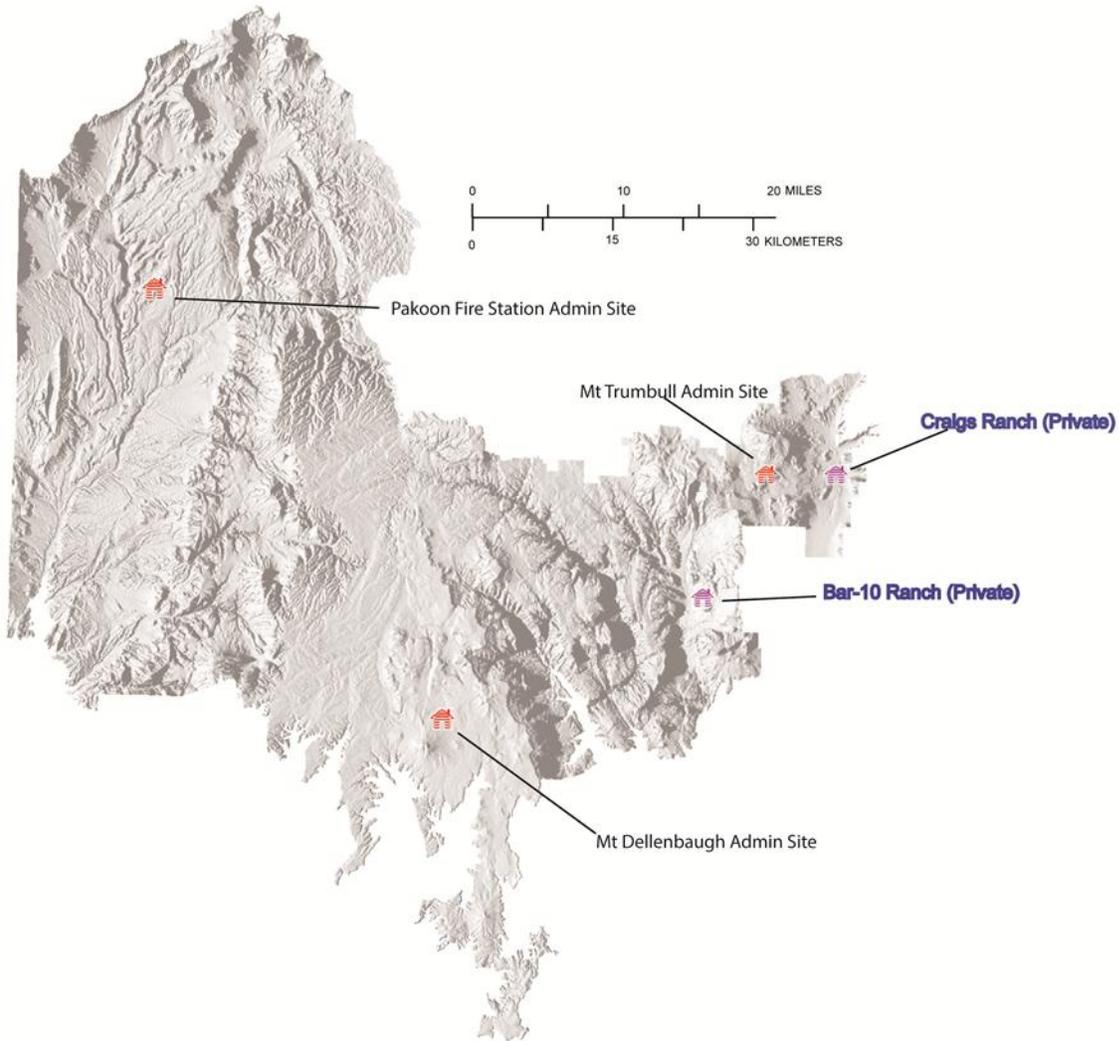


Figure 29. Locations of permanent light sources in the proposed Parashant Dark Sky Reserve. Note the private locations in purple and the federal locations in orange.

Given the undeveloped and solitary nature of Parashant (as well as the RMP Management Decision to maintain the quality of Class 1 viewsheds requiring no permanent outdoor lighting in the Monument) the Parashant Dark Sky Park will be primarily zoned as LZ-0.

The following sites will be the exception to the above lighting zone and will be managed as LZ-1 (Fig 29):

- Pakoon Fire Station -BLM Administrative Site (Site 1)
- Mt Dellenbaugh -NPS Administrative Site (Site 2)
- Mt Trumbull/Nixon - BLM Administrative Site (Site 3)
- Bar-10 Ranch –Private Property (Site 4)
- Craig Ranch –Private Property (Site 5)
- All other undeveloped Private Land Sections

These LZ-1 sites will also adhere to a 10 pm light curfew with all exterior lights extinguished and curtailed interior light use. The intent of this light curfew is to reduce or eliminate lighting after this specified time. Benefits include reduced environmental impact, longer hours of improved astronomy, energy savings, and improved sleeping conditions for residents and visitors.

Special Purpose <1000 Lumens Light Use

At the LZ-1 sites, unshielded lighting fixtures may be needed although they are highly visible even at lower wattages. These light fixtures will be designated as special purpose only. Special purpose light fixtures are to be only used momentarily, for a specific reason such as illumination of a front driveway while load/unloading vehicles or for periodic maintenance on a water tower. These light fixtures are not intended to be used for routine activity nor for extended durations.

Outdoor Lighting Guidance for all Government Structures within the DSP

Monument management recognizes the importance of this Reserve and will set an example for visitors by proudly using dark sky friendly light fixtures. This commitment is reflected in the RMP under chapter 2, Table 2.8 which specifies that all authorized structures comply with NPS/BLM dark night standards. This lightscape management plan further directs all federal government structures, facilities, or any permanent lighting sources will adhere to International Dark Sky Association (IDA) standards for “Fixture Seal of Approval”. These are lighting fixtures which will conform to the following criteria:

- The light source must be fully shielded and directed downwards.
- The fixture cannot emit any luminous output above 90 degrees in the vertical plane.
- Light fixtures will be specified to emit light at 4100K CCT and below.

All government sites will be retrofitted to be 100% IDA dark sky compliant by Fall 2014. These approved lighting fixtures will be inspected bi-annually by facility staff to ensure compliance.

Outdoor Lighting Guidance for private land owners within the Dark Sky Park

Within the proposed Parashant Dark Sky Park there are only 2 sites out of 5 private land owners that have permanent structures with light sources, Bar-10 Ranch and Craig Ranch (Only Bar-10 Ranch has exterior lighting as it serves as a quasi-bed-and-breakfast). Along with a 10 pm light curfew, these two sites will be further engaged as they will host astronomy groups, and will be on a five year plan to retrofit 80% of their existing exterior lighting to fixtures which will comply with IDA standards for “Fixture Seal of Approval”.