

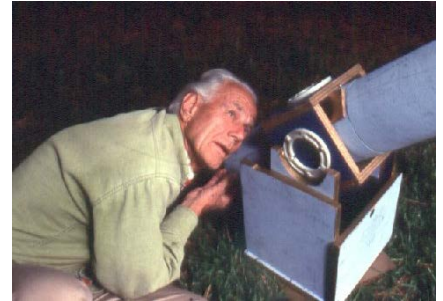
Night Skies and Photic Environment Resource Summary Rock Creek Park

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Natural Sounds & Night Skies Division



The quality of the nighttime environment is relevant to nearly every unit in the NPS System. The 2006 NPS Management Policies (section 4.10) speak of the importance of a natural photic environment to ecosystem function and the importance of the natural lightscape for aesthetics. A lightscape can be important as a natural feature, a cultural feature, or both. Natural lightscapes are also important to wilderness character and have been identified under the Clean Air Act Amendments as an air quality related value. Therefore, the importance of lightscapes and photic environments is related to an array of park resources and values and has broad implications for park management.



When developing the foundation document, park staff should consider night skies as a resource with inherent value that may be recognized when appropriate in the Fundamental Resource and Value, Other Important Resource and Value, or another section of the document. In addition, parks should consider the photic environment and lightscapes as important factors that can have a profound effect on the quality of many other park resources and values such as wildlife, wilderness character, visitor experience, cultural landscapes and historic preservation. This approach provides parks with a degree of flexibility regarding when and how night skies can be addressed in the foundation document. The topics in Attachment 1 discuss the importance of night skies in relation to park resources and values. Please see Attachment 2 for an example of how Bryce Canyon National Park incorporated night skies into various sections of the foundation document.

Quality of the Resource at Rock Creek Park

The significance of dark night skies to Rock Creek Park and how the park serves as a refuge for the surrounding urban area is well described in a 2009 Natural Resource Condition Assessment. The excerpt is as follows:

Night light: *Another change that probably helped was the elimination of the lights along beach drive in the 1970s. There used to be streetlights along the whole length of Beach Drive. They turned them off in the 1970s during the energy crisis and they never turned them on again, fortunately. People complained but over time the infrastructure of the lights deteriorated so that it would've been too expensive to reconnect them. So, finally to complement the wise decision to shut them off in the first place, it was decided to get rid of them and to remove the poles from the park so they were not an enticement to even think about putting them back on. Night lights could've had an influence on the animals in the park. They're finding more and more with studies that the light, artificial light at night effects the behavior and the successful longevity of a lot of things. Rock Creek at night is pretty dark—you've got the skylight and the neighborhood lights, but if you go out into the woods, it's really dark. They do telescope programs at night at Military Field and there is enough skylight to see stars and planets. Driving along some of the roads in the park, it's pitch black, and you find that there are still people. We go out and do deer spotlighting and there are people out. Early in the morning and even in the middle of the night there are people jogging through on the roadway. Or riding their bike—I've seen people riding their bike at 4:30 in the morning...on a Sunday. People are using the park at all hours. Washington is a big city. People in big cities find time, they want to be alone.*

Beyond this, one way the Natural Sounds & Night Sky Division (NSNSD) scientists measure the quality of the photic environment is by measuring total sky brightness averaged across the entire sky and comparing that value to natural nighttime light levels. This measure, called the Anthropogenic Light Ratio (ALR), can be directly measured or modeled when observational data is unavailable. Lower ALR levels reflect higher quality night sky conditions.

Figure 1 provides modeled ALR levels for the contiguous U.S. This figure illustrates the quality of the night skies found throughout the country and across the national park system. Figure 2 provides modeled night sky quality for the local area surrounding the park. These attachments provide an important landscape scale context for considering night sky

quality at the park. Figure 3 is a 360-degree panorama captured at the park that depicts sky brightness in false colors, and is intended provide information on nearby light domes and other sources of anthropogenic light.

Ground based observations collected in 2012 within the park produced an ALR of 52.72. The averaged modeled ALR value (Figure 2) is 51.33. These measures show high ALR when Rock Creek Park is compared to all parks in the NPS system. At these light levels, only brightest constellations are typically visible while the Milky Way and other extended celestial features are not visible. Little sense of naturalness remains in the night sky, with the horizon aglow and the landscape clearly shadowed or illuminated.

Although the park night sky quality is degraded due to the proximity to the large metropolitan area of Washington D.C., the conditions are likely better than surrounding areas. Rock Creek Park provides important open space and habitat for nocturnal wildlife and provides the best opportunity for millions of people to enjoy night sky resources. With the active planetarium, a multitude of night sky programs, and conduction of night sky quality monitoring, the park has demonstrated that it is dedicated to protecting night sky resources. With the only planetarium in the National Park Service and its urban characteristics, Rock Creek Park is uniquely poised to enable visitors to compare the city night sky with that of the country.

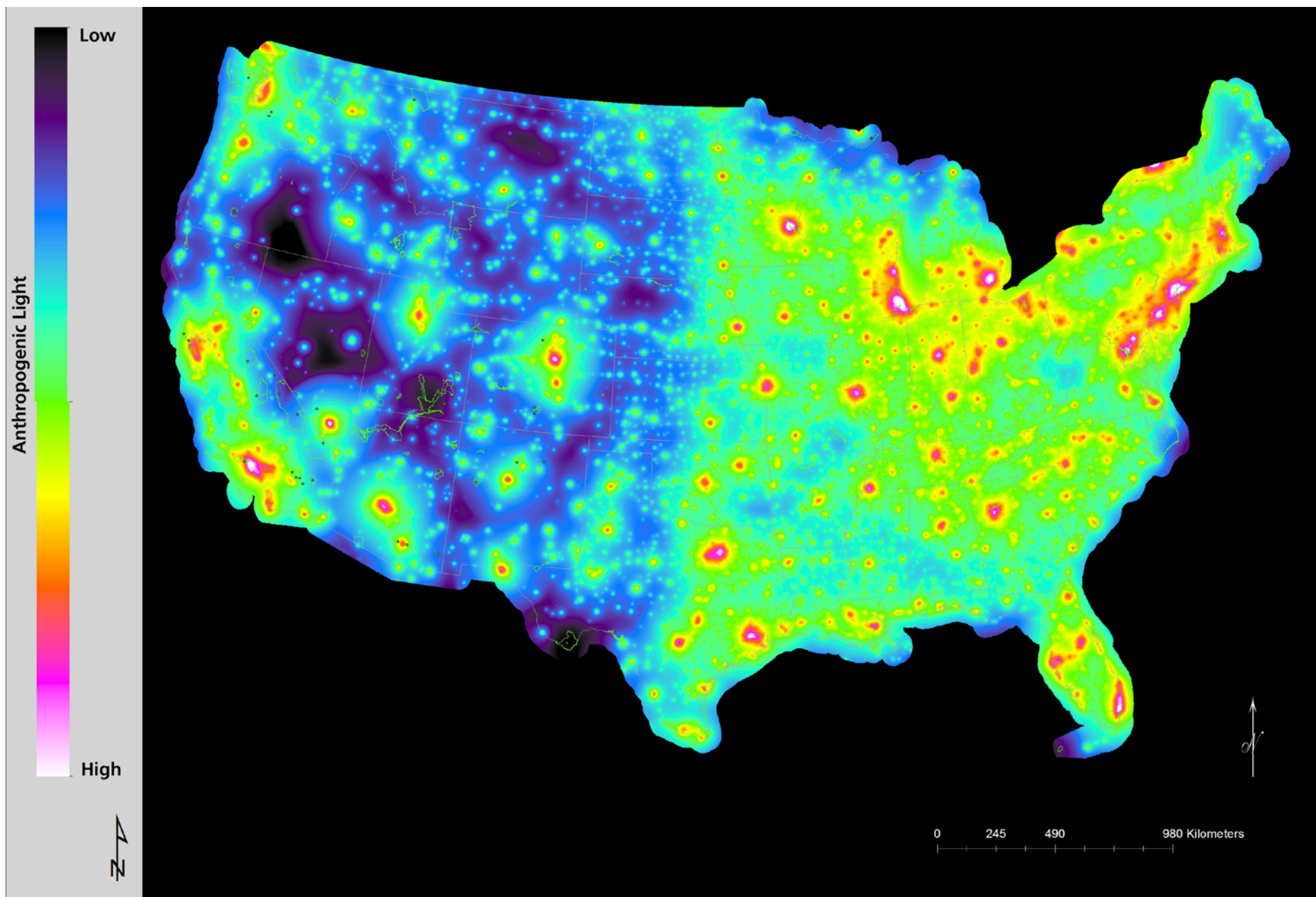


Figure 1 – Anthropogenic Light Ratios (ALRs) for the Contiguous US.



Average Anthropogenic Sky Luminance

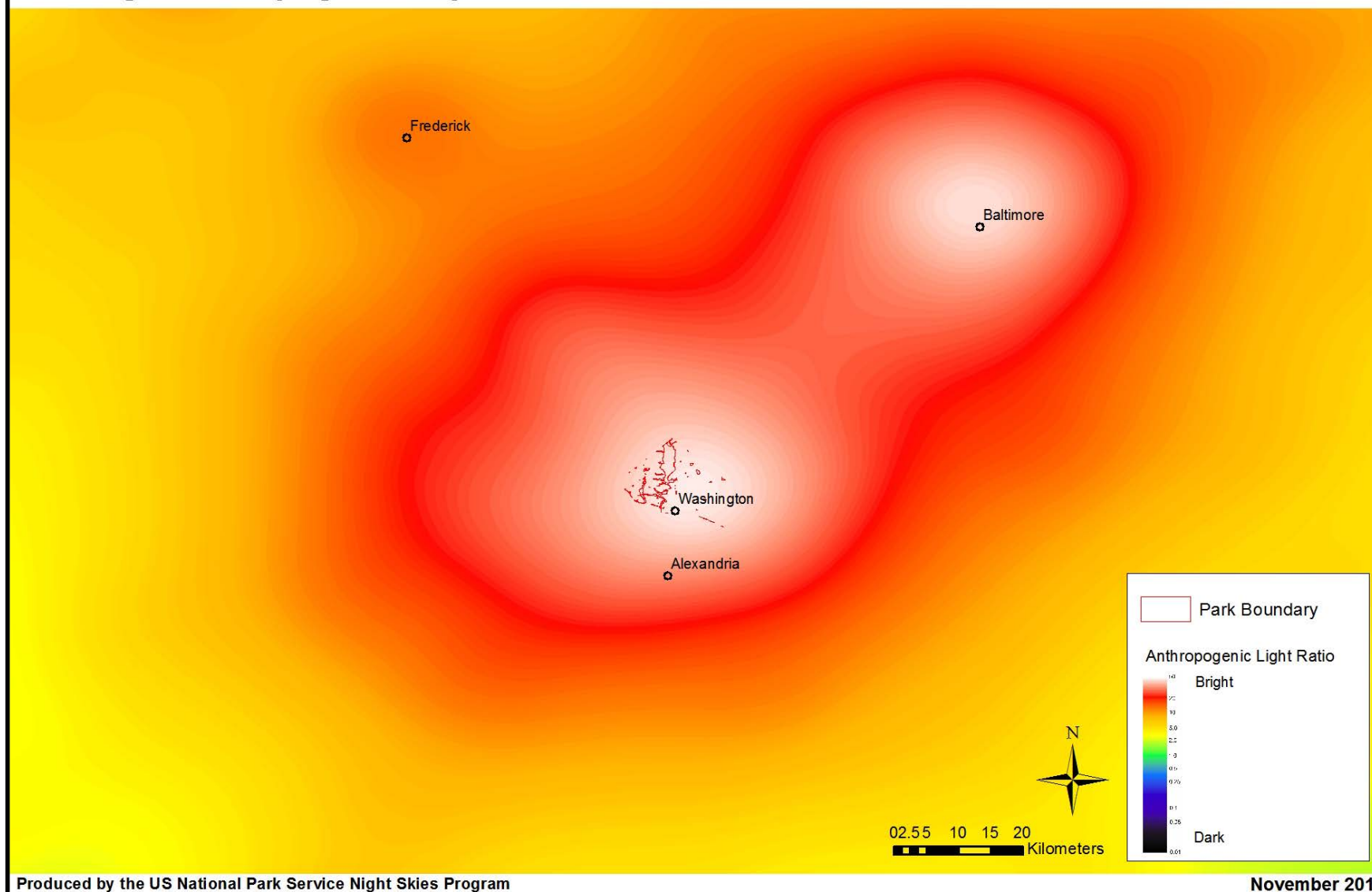


Figure 2 – Regional ALR near Rock Creek Park

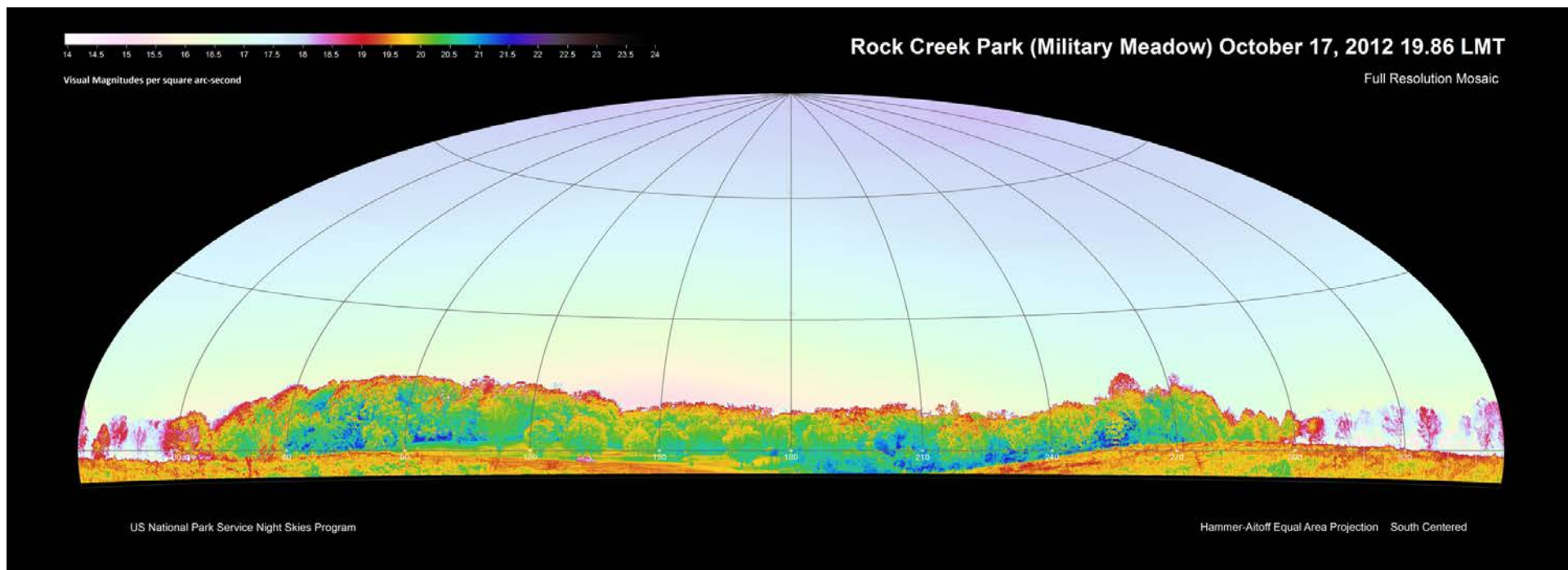


Figure 3 – Panoramic Image of Anthropogenic Light