

Toward an Appreciation of the Dark Night Sky

This is not a typical GEORGE WRIGHT FORUM—for never before has the FORUM dedicated an entire issue to topics relating to the preservation of the dark night sky.

Public interest in preserving the dark night sky has been growing by leaps and bounds during the past decade. Increasing public awareness of and appreciation for dark night skies has been reflected in frequent newspaper editorials, greater community activism, and a profusion of new local and state outdoor-lighting ordinances.

Astronomy is not the only perspective from which to view the preservation of the dark night sky. As shown by the wide variety of papers presented in this issue of the FORUM, the concept of preserving the night sky has broad-based support from numerous and diverse interest groups and individuals who share an appreciation of this very special resource.

Most of us have gained an appreciation of the night sky from personal experiences while viewing a dark sky filled with thousands of bright stars. My own experience began one clear, moonless summer night when I was 12, fishing on a remote lake in northern Wisconsin. The lake was surrounded by forest, and the horizon was formed by the black silhouettes of the tall Eastern white pines along the shoreline. Overhead, I viewed a magnificent night sky so full of stars that the cumulative starlight illumi-

nated the night. The origin of the name “Milky Way” became suddenly obvious to me, as I viewed the wide cloudy white band running across the sky. There were so many stars in view it hardly seemed possible there could be room to fit any more. I found it so inspiring! And from that night on, the dark night sky would always be a source of great beauty and reflective thought for me.

A dark night sky can be so thought-provoking that it is no wonder that such a sky is associated with so many facets of history, philosophy, religion, societal development, poetry, song, mathematics, and science. It follows that, to fully achieve an understanding of the past, clear views of the night sky must be accessible to us. For example, without experiencing a view of the Big Dipper, it would be difficult to appreciate the underlying message in “Follow the Drinking Gourd,” a song composed

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by slaves to help guide them north along the Underground Railroad.

I became involved in promoting the preservation of the dark night sky due to a series of repeated incidents at Chaco Culture National Historical Park. It was here that my heretofore passive appreciation turned to activism. During the summer of 1991, I was privileged to be detailed to Chaco as acting superintendent. Chaco has an eight-mile paved loop road that provides access to trailheads leading to the park's World Heritage archeological sites. After attending evening campfire talks, I would bicycle this loop road in the dark before returning to my residence. After my eyes became accustomed to the dark, I relied on starlight to enable me to follow the faint indication of the pavement of the road before me. On this loop road near the trailheads leading to Pueblo Bonito and Casa Rinconada, I would stop to peer at the Chaco's incredibly dark night sky. I suddenly realized that, because the sky was so pristine and devoid of diffuse artificial light or sky glow, I was experiencing the very same view of the sky that was seen by the Chacoans 1,000 years ago. And by experiencing such a profound connection to the past, I was experiencing Chaco's night sky as a prehistoric landscape.

Regrettably, the last leg of my evening bicycle rides was the approach to the park visitor center. The visitor center was closed at

night, but its exterior was illuminated by unshielded mercury vapor lights that sent more light into the atmosphere than onto the parking lot. The lighting was supposedly needed for security; however, the security it provided turned out to be marginal at best, and the adverse impact it had on the resource was incontrovertible. I wondered, What kind of example could the National Park Service (NPS) be setting for visitors? For staff? For others? How could NPS persuade developers of future coal mines or gas wells in the San Juan Basin to install appropriate lighting when NPS did not do so for its own visitor centers?

I took this concern to John Cook, who was then the director of the NPS Southwest Region. Quickly understanding the Chaco situation within a larger vision, he first funded a project to retrofit Chaco's outdoor lights. A resourceful Chaco facility manager, Bobby Clark, designed and installed a system of motion sensors. These efforts were followed by development of a formal Night Sky Initiative for the Southwest Region, which you will find discussed in more detail in one of the papers in this issue of the FORUM.

National parks present special opportunities and offer great potential for the incubation of progressive ideas in resource conservation that can eventually be adopted by communities. Preservation of the dark night sky is an excellent example of a

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park resource- and facility-management activity that is well suited for universal adoption. *Sky glow does not have to be accepted as an unavoidable impact of growth and development.* Appropriate lighting measures are available, and these measures are more energy efficient and less costly to operate than inappropriate ones. With regard to private property rights, appropriate lighting affords greater protection from unwanted light for private landowners. Corresponding to the growing concern for dark skies within parks is a growing interest and activism in communities outside of parks. Statewide organizations, astronomy groups, and cultural resource preservationists dedicated to preserving the dark night sky are now active throughout the USA—and around the world.

Many people, representing numerous disciplines, research the stars, including those in astronomy, cosmology, archaeo-astronomy, and ethnography. Many programs and functions within NPS park staffs can be involved in preserving the dark sky, including resource management, visitor education, partnerships, sustainability design, energy conservation, and facility management. The wide variety of papers in this issue of THE GEORGE WRIGHT FORUM reflect the many disciplines involved within and outside of NPS units to preserve the dark night sky resource. Authors of these papers are distin-

guished as leaders in efforts to preserve the dark sky.

- Arguably, the most effective organization advocating the preservation of the dark night sky is the International Dark Sky Association, based in Tucson, Arizona. A book could be written on the leadership and accomplishments of this organization. We are fortunate to have a paper entitled “The Value of Dark Skies and of High-Quality Night Lighting — Building Public Awareness,” co-authored by Elizabeth M. Alvarez del Castillo and David Crawford of the association.
- In “The Ultimate Cultural Resource,” Jerry Rogers and I present the case for recognizing the dark night sky as a cultural resource, declaring it endangered, and using the “endangered” designation to support preservation.
- Adding to the cultural and astronomical values of a dark night sky, Dan Duriscoe, forest ecologist at Sequoia and Kings Canyon national parks, provides a convincing rationale for recognizing the dark night sky as a wilderness value in his paper “Preserving Pristine Night Skies in National Parks and the Wilderness Ethic.”
- The Southwest features a great deal of undeveloped landscape, and offers a dry climate, high altitude, relatively unpolluted air, and a high incidence of clear nights. There are places in the Southwest in which the dark sky is virtually

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pristine. Thus, high-quality sky viewing experiences are available—*but the resource is disappearing*. In “Let There Be Dark,” Jerry Rogers and I address the work done in the Southwest using leadership, strategic thinking, and partnerships to promote interest in preserving the dark sky.

- You need to know where you are before you know how to get to where you are going. But how do we determine how much progress is being made in eliminating the degradation of dark skies we are experiencing in parks? While awareness of the dark sky issue has been building, before 2000 there were few tools available for the scientist and manager. The NPS Night Sky Team was formed that year to establish measurement standards and protocols. Led by Chad Moore and Dan Duriscoe, both of whom are authors in this issue, the team developed the needed tools for inventory and monitoring of this endangered resource. Ranging from simple to sophisticated, these methods have been employed in a successful pilot study. The team has also provided technical assistance ranging from interpretation and community outreach to facility lighting review. Moore, a physical scientist at Pinnacles National Monument, provides a paper entitled “Visual Estimations of Night Sky Brightness” on the quantitative measurement of

the night sky. Duriscoe and astronomer Steve Albers of the National Oceanic and Atmospheric Administration collaborate on “Modeling Light Pollution from Population Data and Implications for National Park Service Lands.”

- The evolution of star-watching as a popular activity at Cherry Valley State Park in north-central Pennsylvania provides insight into the growing public interest in preserving the dark night sky resource. Applying social science, demographics, and ecotourism and related economics, Thom Bemus, director of the National Public Observatory’s Stars in the Parks Program, provides an explanation for growing public support for preservation efforts in “Stargazing as a Driving Force in Eco-Tourism at Cherry Springs State Park.”
- Our park visitors are one of our most important resources. Management assistant Brad Shattuck and park interpreter G. B. Cornucopia of Chaco Culture National Historical Park share anecdotes from visitors’ experiences of Chaco’s dark night sky in the paper “Chaco’s Night Lights.” Parks such as Cherry Valley and Chaco also provide high-quality visitor experiences that will contribute to inspiring others to support preservation of the dark sky.
- Inappropriate outdoor lighting can also have indirect, unexpected adverse effects that do not have any-

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thing to do with our views of the night sky. These effects can be ecological, and could lead to the degradation of cultural resources. In Washington, D.C., the bright white marble walls of the Lincoln Memorial are illuminated at night. Two species of midges, *Chironomus plumosus* and *Chironomus tenuatus*, are attracted to the building by the structure's lighting system. The lights dazzle and confuse the midges, causing the egg-laden females to literally dash themselves to death against the memorial's walls. Tiny spiders feed on the remains and deposit excrement. Along with the excrement, harmful deposition from the atmosphere (which is trapped by the spider webs) further stains the marble. This sequence of events degrading the building was initiated by inappropriate outdoor lighting. The adverse impacts of inappropriate artificial lighting can also extend to endangered species. The paper "Light Pollution and Marine Turtle Hatchlings: The Straw that Breaks the Camel's Back?", prepared by Mark Nicholas, resource management specialist at Gulf Islands National Seashore, provides a case study about

the effects of outdoor lighting on marine turtles in the park.

- Most parks are vulnerable to light pollution from sources outside of park boundaries. Because of its size and location, Yellowstone National Park is one of the least affected—yet it has outdoor lighting issues attributed to its own facilities. The lighting issues in Yellowstone are symptomatic of the challenges faced by many other parks as they seek to install appropriate lighting. Lynn Chan and Eleanor Clark, landscape architects at the park, provide an introduction to the problem at a park level in "Yellowstone at Night."

Many thanks to the authors of the excellent papers published in this issue. For those of you who are interested in preserving the dark night sky for future generations, I hope these papers provide a stimulus to get actively involved in efforts to protect the environment from inappropriate lighting. And I hope that they help people recognize that light pollution can be minimized, and that national parks can be an environmental leader in contributing to changes that can benefit the quality of life beyond park boundaries.

Reference

Messersmith, Donald H. 1993. Lincoln Memorial Lighting and midge study. Unpublished report prepared for the National Park Service. CX-2000-1-0014. N.p.

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