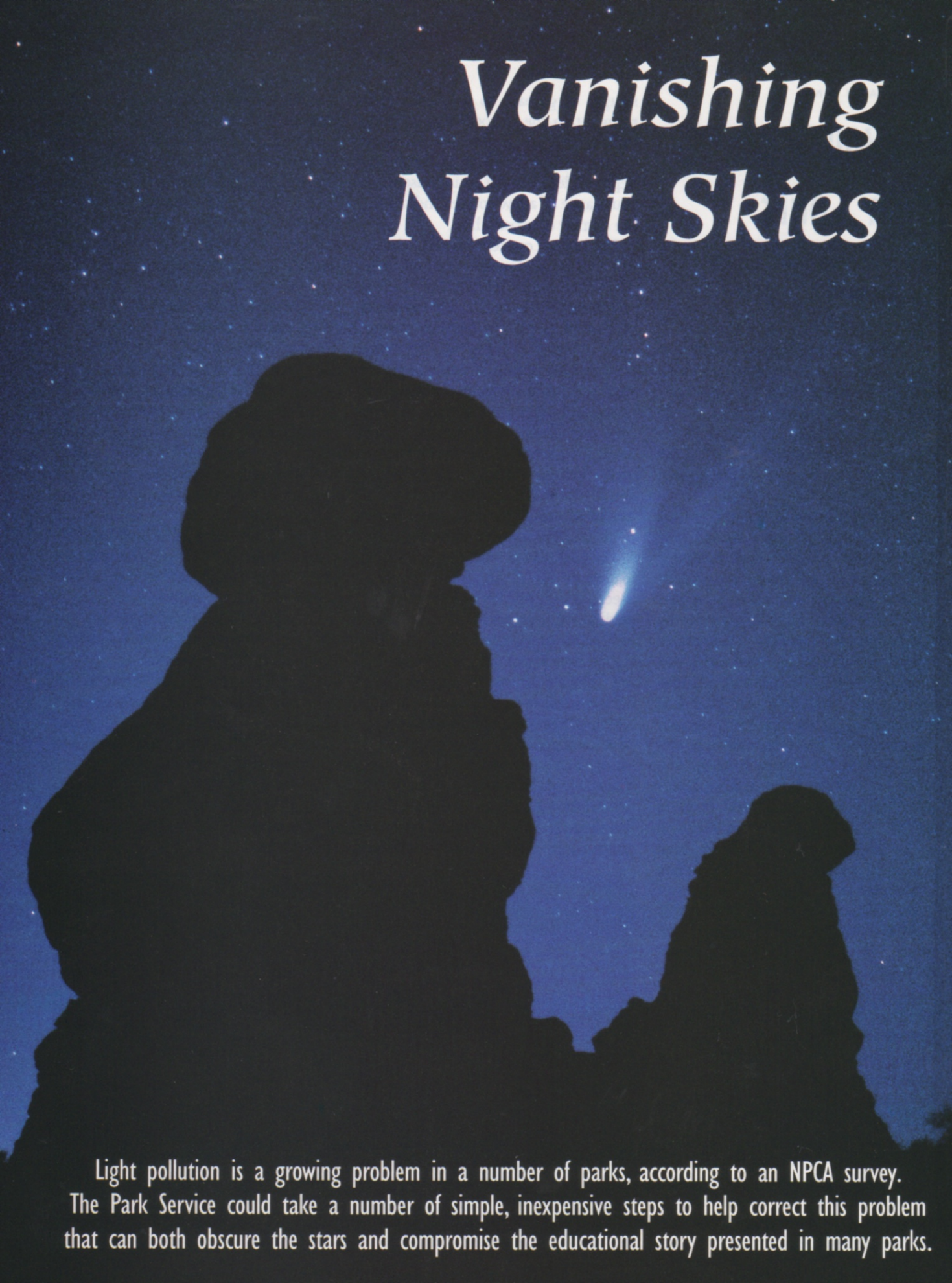


Vanishing Night Skies



Light pollution is a growing problem in a number of parks, according to an NPCA survey. The Park Service could take a number of simple, inexpensive steps to help correct this problem that can both obscure the stars and compromise the educational story presented in many parks.

IN THE SUMMER of 1991, Joe Sovick, then acting superintendent of Chaco Culture National Historical Park, fell in love with New Mexico's night sky. He would attend the evening campfire talk that began at dusk and ended beneath a blanket of glinting stars. Then he would ride his bicycle five miles in the velvet darkness to his quarters.

"It was an incredible experience, the quiet, the stars," says Sovick, now chief of recreation and partnerships for the National Park Service's Intermountain Support Office. Incredible, that is, until he turned a corner and confronted the visitor center, blazing like the Love Boat with mercury vapor lights, a diffuse source that sends much of its light skyward. "I would get angry every night," he recalls.

That nightly assault on Sovick's enjoyment of Chaco's sky prompted him to encourage Southwestern parks to establish a "night sky initiative." Chaco defined the night sky as a park resource as precious as its ancient buildings and archaeological sites. The park retrofitted the mercury vapor lights with incandescents—shielded so they prevented light from escaping sideways and skyward—and placed them on motion sensors to illuminate only when needed. Though the park spent \$1,000 on the project, its electric bill dropped by 30 percent.

Now, says Sovick, "When you're at Chaco at night and looking at the sky, you are viewing essentially the same nighttime landscape the Chacoans viewed 800 years ago."

Park ranger G. B. Cornucopia agrees, pointing out that "the sky is part of the history and cultural history." Indeed at Chaco, the night sky is a key part of interpretive programs about American Indians who used the stars and planets to develop celestial calendars. Many re-

searchers believe that a pictograph at Chaco of a bright star, a crescent moon, and a hand print dates from 1054, when a supernova occurred that was so bright people could see it by day for three weeks.

But while the technology exists to replace light-polluting fixtures and bulbs with something less intrusive and wasteful, some parks—many in the East and those already inundated with haze and urban lighting—do not see the night sky as a high enough priority to spend the time and money to preserve it. And among those that do, fighting invasive light is often an uphill battle, requiring change both within the park and in neighboring communities, since



Researchers believe that this pictograph of a star, moon, and hand dates back to 1054, when a supernova occurred that was so bright it was visible by day.

light pollution sources can affect national parks more than 100 miles away.

Light pollution is most often caused by excessive or misdirected outdoor lighting and hinders the ability to view celestial features. Under ideal conditions, a viewer might observe a night sky with more than 15,000 visible stars, plus the Milky Way (which itself contains billions of stars). Only about 10 percent of the U.S. population experiences these conditions regularly.

If you haven't thought about it before, designating a dark night sky as a natural resource—as worthy of protection as, say, an old-growth forest or a spectacular waterfall—may seem peculiar. That's part of the problem: too many people either take it for granted or overlook it.

"It's just one of those things we don't

think about because we've lost it substantially in our urban environment," says Terri Martin, who from 1982 to 1996 was National Parks and Conservation Association's Rocky Mountain regional director. "But when people go to a place and step out of their tent or car and see the night sky, I think it's sort of life-changing.

"People look up at the sky and get a completely different feel of how they fit into the scheme of things," she says. "That's one of the things parks are about—to give us that perspective."

In many parks, particularly in the Pacific, Southwest, and Intermountain regions, a night sky free of light pollution is gaining increasing recognition as a park resource—one that is significantly threatened. At Rocky Mountain National Park, for example, planners recently listed light pollution as one of six major problems, says land use specialist Larry Gamble. Although the problem has been identified, the park has made little progress because of a lack of funds.

At White Sands National Monument, where astronomy programs, star parties, meteor shower viewings, and star-gazing are among the park's major activities, the night sky is part of the park's interpretive planning documents, says Superintendent Dennis Vasquez. "We view the night sky as one of the park resources that we're entrusted to care for," he says. But that responsibility is growing more difficult. About 20 years ago, Vasquez conducted night sky programs as a White Sands ranger. These nights, he's concerned about what he sees.

"To me it's obvious there are more lights and more pollution in the area," he says. "This is anecdotal of course—we haven't measured that. But as someone who did Friday night star programs for many summers, I was pretty attuned to what the night sky looked like. And I'm pretty convinced there is incrementally more light pollution around here."

Vasquez's experience underscores the importance of establishing a baseline and continually monitoring park resources, says Dave Simon, NPCA's

The Hale-Bopp comet as seen from The Garden of Eden in Arches National Park, Utah.

NIGHT SKY Continued

Southwest regional director, who, along with Duke University student Scott Babcock, compiled a nationwide survey of the effects of light pollution on the park system. (See page 25.)

In one attempt to measure the problem, Don Davis, a senior scientist at the Planetary Science Institute in Tucson and president of the board of the International Dark Sky Association, is trying to simplify a method that was tried—with mixed success—at Organ Pipe Cactus National Monument in Arizona. Using an astronomical photometer (essentially a highly sensitive video camera), the park monitored light pollution by measuring background light.

"The amount of effort the parks would need to expend to see how bad or good their skies are is not that great, particularly if we could have this straight-up protocol to make it easier," Davis says.

In White Sands' case, nearly all light pollution is external. The park itself has no lights, other than those on timers at residential areas and the administration building. The nearby town of Alamogordo—population about 30,000—has a local ordinance to reduce light pollution, Vasquez says. But the majority of light at White Sands comes from Holloman Air Force Base and El Paso, Texas, 80 miles away.

Such is the case at many national parks. Though Gulf Islands National Seashore in Florida and Mississippi uses low-pressure sodium lights that throw less glare, has others on motion sensors, and simply shuts off many lights deemed unnecessary, sea turtles continue to be threatened by external light sources. As hatchlings make their nocturnal way into the world, the first thing they seek is light. Historically, that light would come from starlight and moonlight bouncing off the waves, guiding the vulnerable turtles into their ocean home. But lately, the light is coming from land—street lights, high-rise condominiums, parking lots.

"Sometimes the tracks will go up to a street light and wander around and around, and then they'll go off to another street light," says Riley Hoggard, a

Gulf Islands resource management specialist. In their haywire wanderings, the hatchlings become prey to birds, crabs, cars, and eventually the sunlight, which dries them out and kills them.

Hoggard says the local power company shields its lights to eliminate glare, and the park is working with the private sector to print stickers for every hotel room encouraging occupants to turn off their lights or draw their blinds late in the evening. The response, Hoggard says, has been mixed. Developers continue to oppose light restrictions as threatening their ability to build on the beach.

In most cases, though, communities



Lights draw baby turtles away from the ocean, making them easy prey.

pass lighting ordinances, leading the way on this issue rather than the parks. And most often, communities have passed lighting ordinances to provide observatories with a clear view to the night skies.

"If we want communities outside parks to take action, the Park Service must lead by example," says NPCA President Thomas C. Kiernan. "Protecting dark night skies in our national parks is as vital as protecting clean air, water, wildlife, and the sounds of nature. Star gazing is a connection to humanity's earliest curiosity about our place in the universe. Clear night vistas in our national parks are an important resource that is literally fading from sight."

Ordinances vary, but some common requirements are placing shields and

"full cut-offs" on light fixtures to prevent light from going sideways and skyward; creating different lighting zones within a community; requiring timers on lights or imposing light curfews; limiting the total lumens (or light) from bulbs and fixtures; prohibiting lights and fixtures that promote glare, such as mercury vapor lights or "wall-packs," which bounce light off the walls on which they are mounted; and requiring developers to limit light pollution.

In the Southwest, several national parks benefit from the efforts of Pima County and Flagstaff, Arizona, which have passed lighting ordinances largely at the behest of astronomers and observatories. "The local politics and the astronomy lobby in Tucson have done more than the parks" to limit light pollution, says Meg Weesner, chief of the science and resource management division at Saguaro National Park, but the park has benefited.

In the East and Southeast, the problem is a little hazier, like the air itself. Doug Morris, superintendent at Shenandoah National Park, uses his recent management experience in the western parks to define Shenandoah's light pollution as a low priority by comparison.

"In Alaska, there is a great expectation of freedom from all consequences of human occupation, so even a little bit of light that impinges on that experience is an issue. The same is true in the desert Southwest," he says. "The expectation of Shenandoah and the Piedmont is not really clear skies."

NPCA's survey suggests that residents in the East have become desensitized to the loss of night sky—but in the desert Southwest a clear night sky is one of the primary attributes, says Steve Oakes at Carlsbad Caverns National Park in New Mexico. Not only are several of our country's premier astronomical observatories located in New Mexico, Texas, and Arizona, Oakes points out, but "light pollution has a negative impact on bats and other nighttime animal species. Normal behavioral patterns are altered depending on unnatural lighting conditions."

Edmund Nieto, a Park Service archi-

RICK FOLEY

Survey Results

In an effort to measure how light pollution is affecting parks, Dave Simon, NPCA's Southwest regional director, recently completed a survey that found "a quiet crisis."

"Although the public believes that the National Park System and all of its resources are protected, the truth is more complicated," Simon wrote in his report. "Unless light pollution problems are remedied, dark night skies within parks will continue to disappear."

In addition to obscuring the stars, excessive light pollution can seriously compromise the educational story presented in many national parks. Observing the night sky has been a crucial human activity since the Pleistocene era, inspiring wonder and curiosity, shaping religious beliefs, propelling scientific inquiry, motivating and guiding global exploration to the present day. "From the builders of celestial calendars at Chaco Culture National Historical Park in New Mexico to the builders of rockets at Canaveral National Seashore in Florida, the mission of our national parks could not be complete without dark night skies to help tell these stories," states the executive summary of *Vanishing Night Skies*, a public policy paper that was released by NPCA this spring. It was compiled by Simon with the help of Scott R. Babcock, a Stanback Conservation Program intern from Duke University.

NPCA surveyed superintendents at 376 park units and received responses from 189. The analysis focused particular attention on 130 parks that allow overnight visitation, 77 percent of which responded to the survey. Among the survey's findings:

- ▶ Light pollution is a widespread problem for national parks, regardless of size or geographic location.
- ▶ Ninety-four percent of all parks that were surveyed offer overnight visitation and consider dark night skies an important resource. Sixty-two percent of these



A map of the United States shows a night view of light sources.

within the national parks. Park facilities should be retrofitted using best available technology. NPS should establish a comprehensive light pollution monitoring program.

2. Parks should expand their night sky interpretation programs. Educating park visitors about the night sky is not only part of the interpretive story of many parks but is also crucial for increasing public awareness about light pollution.

3. Communities adjacent to parks, as well as communities at greater distances that have an effect on parks, should adopt progressive outdoor lighting ordinances to reduce light pollution.

4. Congress should expand the Environmental Protection Agency's existing "Green Lights" program, which provides incentives to install energy-efficient lighting, to assist communities near parks to reduce light pollution.

5. To prevent further deterioration of night sky quality from air pollution, Congress should support and strengthen the Clean Air Act and regulations to control regional haze; EPA and the National Park Service should aggressively enforce them.

6. Light pollution in the Midwest, Pacific, and Intermountain regions should be addressed before the problem becomes more widespread and serious.

For a copy of the *Vanishing Night Skies* report, call 800-628-7275, ext. 222, or visit our web site, at www.npca.org. For additional information on night skies and the effects of light pollution, contact the International Dark Sky Association in Tucson, Arizona. Visit its web site at www.darksky.org.

—WMC

overnight parks offer some type of night sky interpretive program.

▶ The Park Service considers light pollution a serious problem at many national parks and at many locations within parks. Two-thirds of the overnight parks reported problems, and more than 35 percent of these parks judged the problem to be "moderately serious" or "very serious."

▶ Of all parks with overnight visitation, only 10 percent report the presence of helpful ordinances in nearby communities that limit light pollution.

Though NPS has made excellent progress reducing light pollution in some places, there is still a great deal of room for improvement. NPCA recommended several key steps to safeguard national parks from the negative effects of light pollution, including:

1. NPS must lead by example to aggressively reduce sources of light pollution

banning high-wattage lamps. And he suspects that when parks take a critical look at their lighting, they'll find they can do with much less.

"We CAN do something about it, that's the great thing," says Cornucopia. "This isn't one of those things where once the forest is cut down, it's gone.

This is something we CAN do something about. It's just a matter of education and doing it."

WENDY MITMAN CLARK lives in Maryland and last wrote for National Parks about rebuilding Yosemite National Park after the flood.

tect and illumination specialist at the Denver Service Center, speaks for many when he says parks are obligated to take the lead in reducing light pollution. Nieto would like to see guidelines for all parks to retrofit their lights and fixtures, adding timers, motion sensors, shields, and low-wattage bulbs while