International Dark-Sky Association

"…to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting."

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August 24, 2010

RE: EPA–HQ–OAR–2007–0492 Second Draft Document Related to the Review of the National Ambient Air Quality Standards for Particulate Matter – additional comments

I would like to draw the committee's attention to the attached document from the National Park Service. The NPS mentions:

> *A 2007 visitor survey by Southern Utah University in Utah national parks found*
> *• 90% believe that some places need to be preserved especially for their nighttime visibility, and 80% believed that communities near national parks should assist in maintaining dark skies.*
> *• 86% of visitors thought that the quality of park night skies was "somewhat important" or "very important" to their visit.*
> *• 99.4% preferred to stargaze in a national park over other locations. Thousands of visitors stargaze on their own in parks each year.*

I believe this document is important because it relates to:

Page 195, Lines 14-16
14 ...In addition, we are not aware
15 of preference or valuation studies providing information on public preferences for nighttime
16 visual air quality (VAQ).

Sincerely,

Robert Wagner
President, Board of Directors

Attachment: http://www.nature.nps.gov/publications/pdf/StargazingInParks_Web.pdf

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Air Resources Division
Night Sky Program

Stargazing in National Parks

The Last Harbors of Darkness

Above us on every clear night is a spectacular scene of the larger cosmos within which we dwell. It humbles us with its vastness; one can feel small and insignificant, as well as be reminded how precious and fragile our world is. Unfortunately, most Americans can't see this from their backyards and home towns due to light pollution.

Wasted light from cities and towns has pushed the view of a natural starry sky far from where most people live. National parks have become some of the last sanctuaries of darkness amidst a rising surge of light pollution. The National Park Service, with its mission to protect scenery, wildlife, and heritage, is both endowed with this endangered resource and charged with its preservation.

The night sky is a key connection between a park visitor and the natural or primeval world. It links us to our philosophical vision of nature, a distant past, and our understanding of the universe. It is no less important to our modern spiritual compass than to humans long past, regardless of our cultural heritage. The starry sky is a guide through time and creation, and there we have always found meaning in our struggles, our dreams, events in society, and our own lives. No other singular resource has inspired mankind like a starry sky.

No sight is more provocative of awe than is the night sky scattered thick with stars.

—Llewelyn Powys

The National Park Service has applied science to this transcendental resource and has measured the degree to which it has been impaired. Data shows that a pristine night sky is markedly rare. Preserving it for future generations will hinge upon its enjoyment by park visitors and their understanding of how it can be protected.

Park visitors are encouraged to get out into the night and admire the view of the Universe from their home planet. Rangers set up telescopes that grasp faint light from distant galaxies and nebulae, teach young and old how to find the north star, and tell ancient stories of the night. For many, the experience is a first and becomes a lifelong memory.

In parks we preserve an ever-narrowing portal to this resource, and all that natural darkness in turn protects. If the stars and dark of night are cut from humanity, what will be the result? Will we ever find as much inspiration, wonder, humility, scientific curiosity, peace, or poetry?

Few national parks are able to offer a scene like this to visitors—that of a pristine night sky. The Milky Way arcs brightly over Devil's Racetrack at Death Valley National Park. Photo by Dan and Cindy Duriscoe.

10 Quick Facts

1. **Darkness Is Rare:** Out of 80 parks measured by the NPS, only a handful still possess a natural night sky.

2. **The Reach of Cities:** Under the clear air of high altitude western parks, city lights can be seen over 300 km (185 mi) away.

3. **Dark Sky Parks:** In 2007, Natural Bridges National Monument became the first International Dark Sky Park.

4. **Stargazing Festivals:** In several parks, informal "star parties" have grown into Stargazing Festivals. Bryce Canyon National Park's Astronomy Festival attracts over 6000 visitors. Grand Canyon's is even larger. Acadia, Great Basin, and Olympic national parks have followed in their footsteps.

5. **Popularity:** In an estimated 20 parks, stargazing events are the most popular ranger-led program.

6. **Cosmic Shadows:** Under natural moonless conditions, it is easy to see your shadow from the glow of Venus or Jupiter. In some cases, your Milky Way shadow can be glimpsed.

7. **Fragile Vision:** It takes at least 20 minutes for your eyes to dark-adapt after exposure to a white light; good park facility lighting is critical to visitor enjoyment.

8. **Moonlight:** Night hikes using only the light from the moon charm visitors, being careful of course. Moonlight provides 0.02 footcandles, roughly 1/100th as bright as your typical lit parking lot.

9. **NPS Asteroid:** In 2007, an asteroid (minor planet 49272) was named in honor of Bryce Canyon National Park, recognizing the park's heritage of showing the public the night sky, with ongoing stargazing programs since 1969.

10. **What's That Cloud?:** What is often asked by visitors who see the Milky Way for the first time in a national park.

Growing Visitor Interest

What the American people value in national parks has evolved over the decades. Ever new experiences are being sought. Curiosity and the seeking out of natural wonders are joined by a desire to see and understand natural ecosystems. Parks have become fertile ground for pursuits such as rock climbing and photography and are also valued for the solace they provide to city-weary visitors. Though national parks are set aside for their uniqueness, park visitors also seek to connect with what is universal to the human experience.

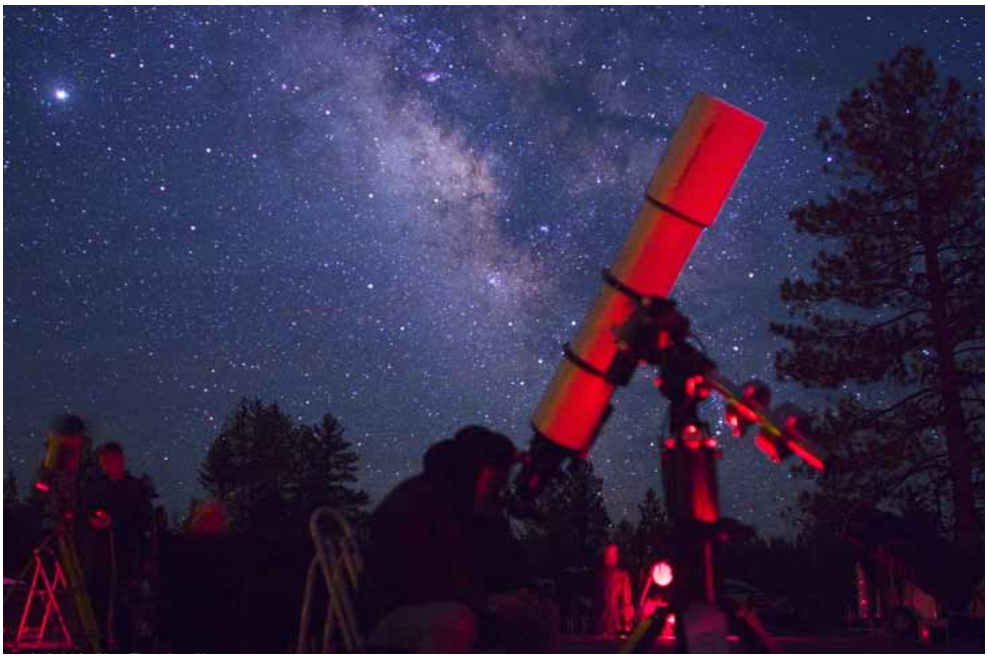
The NPS mission to conserve the scenery incorporates the view of the night sky, yet the gradual increase in light pollution has only recently garnered attention. Increasingly, park visitors are seeking out the scenery of a dark and starry night sky; parks are reporting that attendance at stargazing programs is up sharply. Park managers are responding to this demand by emphasizing the "other half of park scenery."

The NPS Night Sky Program tracks 60 parks with regular stargazing programs, though there are undoubtedly more programs. In many of these, night-themed ranger programs are ***the*** most popular event the park offers.

A 2007 visitor survey by Southern Utah University in Utah national parks found

- 90% believe that some places need to be preserved especially for their night-time visibility, and 80% believed that communities near national parks should assist in maintaining dark skies.
- 86% of visitors thought that the quality of park night skies was "somewhat important" or "very important" to their visit.
- 99.4% preferred to stargaze in a national park over other locations. Thousands of visitors stargaze on their own in parks each year.

Additional visitor surveys are planned by Clemson University for 2011.



Visitors are astounded at the view of the Milky Way at the Bryce Canyon Astronomy Festival, "The Last Grand Sanctuary of Dark Skies." Over 40 telescopes provided by volunteers allow eager visitors to peer deep into the Universe and ponder the larger questions of life. Photo by Wally Pacholka / AstroPics.com.

Astro VIPs—Harnessing the passion of amateur astronomers

Beginning in 2008, the NPS Night Sky Program began recruiting amateur astronomers nationwide to seed stargazing programs in parks. Using the successful volunteer astronomer initiative at Chaco Culture NHP as inspiration, Astronomy Volunteers In Parks (Astro VIPs) were paired with 8 to 12 selected parks each year.

These Astro VIPs are skilled in sharing the sky and are trained in interpretive techniques and outreach. They supplement park staff and are helpful in managing the large crowds that accompany stargazing programs.

These volunteers also play a role in the protection of starry skies. Though park night skies typically astound, light pollution threatens nearly every site. Educating visitors about what causes light pollution, the effect it has upon national parks, and what can be done about it are key messages that are conveyed by the Astro VIPs to visitors. They are laying the foundation for the restoration of the night sky.

Amateur Astronomers have been helping park visitors connect with the cosmos for decades, such as here at Glacier Point in Yosemite. Morris Jones photo.

Junior Night Explorers

It is commonly said that astronomy ranks second only to dinosaurs at getting youth interested in science. Any park ranger who sets up a telescope or gives a constellation tour can confirm this, as beaming youngsters, awake well past their bedtime, beseech their parents to admire the stars overhead or Saturn through a telescope.

In 2009, Intermountain Region interpreters developed a Junior Ranger Night Explorer booklet, the first resource-based Junior Ranger program. Kids learn about nocturnal animals that depend on darkness to live, star formation and planets, constellations and myths, and what they can do to prevent light pollution.

Wilderness of the Night

Far from urban electric lights, dark night skies are an integral part of the wilderness experience. Such *natural lightscapes* are the nighttime extension of natural landscapes. The wilderness of Earth is extended to the wilderness of the Universe. We see that our planet is immersed in a vast wilderness all the time, and the roots of our creation lie in this wilderness.

Today's effort to protect natural darkness echos the conservation of wilderness movement that culminated in 1964 with the passage of the Wilderness Act. The maintenance of a starry sky is essential to maintaining the primeval character of wild lands and offering Americans distinctive landscapes untrammeled by man.

The presence of light pollution in a designated wilderness impairs the wilderness character at night, even though the land may look "wild" during the day. Imagine encountering views marked with communication towers, visible air and water pollution, or aircraft in the sky all day long on a wilderness journey. Similarly, light pollution is a constant reminder of human technology all night long.

Wilderness needs naturally dark night skies as much as starlight needs wilderness. With much of the U.S. affected by light pollution from cities near and far, some of the best places to enjoy a pristine view of the heavens are found in lands protected as wilderness.

A wilderness sky gives one the impression of our fragile planet nestled among the other suns in the Milky Way Galaxy. Dinosaur National Monument. NPS Photo.

Night Skies in the Media

Popular media interest in national park night skies has continued to increase since the formation of the NPS Night Sky Program in 1999. The following list chronicles public yearning for a starry sky, including such high profile sources as ***National Geographic***, the ***New Yorker***, the ***LA Times***, PBS television's ***Nature***, and ***National Public Radio***.

Jul / Aug 1999	***National Parks***— NPCA Magazine, "Vanishing Night Skies," by Wendy Mitman Clarke.
Mar / Apr 2000	***Audubon***, "The Darker Side of Light," by Joe Bower.
May 2, 2002	***Talk of the Nation***— NPR radio broadcast, live interview "Effects of Light Pollution on the Night Sky and Solutions for Reducing Unnecessary Light," by Neal Conan.
May 9, 2003	***The New York Times***, "Rediscovering the Brilliance of the Stars," by Gary Andrew Poole.
Oct 7, 2003	***The Los Angeles Times***, "The Edge of Night," by Deborah Schoch.
Dec 2003	***Sierra Nature Notes***, "Starry, Starry Night A Thing of the Past?" by Judy Rocchio, Tamara Williams, and Dan Duriscoe.
Spring 2004	***Conservation Magazine***, "Degraded Darkness," by Ben Harder.
Aug 6, 2004	***USA Today***, consultant for "Nights with a Heavenly View," by Laura Bly.
Oct 2004	***Backpacker***, consultant for "Darkest Campsite."
Oct 24, 2004	***The Santa Fe New Mexican***, "Star Search," by Anne Constable.
May 23, 2005	***The Salt Lake Tribune***, "Stargazers crusade to preserve dark sky," by Jim Davis.
Jun 2005	***Physics Today***, "Limiting Light Pollution is Ongoing Challenge," by Toni Feder.
Jul 31, 2005	***The Star-Telegram***, "Starry, Starry Nights," by Valerie Russo.
Aug 1, 2005	***The Desert Sun***, "Clear Night Skies, Stellar Photos," by Benjamin Spillman.
Dec 30, 2005	***The Desert Sun***, "Cities: Turn Down Lights, let the Stars Shine," by Stefanie Frith.
Jan 2005	***Nature***—a PBS television documentary, "Life in Death Valley," by Gianna Savoie.
Feb 22, 2006	***The Land Institute***, consultant for "When Night Is No Longer Dark," by Janet Kauffman.
Mar 18, 2006	***Science News***, "Light All Night," by Ben Harder.
Apr 19, 2006	***The Desert Sun***, "Wasted Light Erases Stars at Joshua Tree," by Ben Spillman. Follow-up article on April 27, 2006.
May 2, 2006	***Sky and Telescope Magazine***, "National Park Service tracks Light Pollution," by Valerie Coffey.
Summer 2006	***Parks Magazine***—National Park Foundation, consultant for "Wild File—Catch a Falling Star," by Amanda Kwan.
Jun / Jul 2006	***National Geographic Adventure***, "Night Rangers," by James Vlahos.
Jun 20, 2006	***AP News***, "Park Pressures," by Frank Bass and Rita Beamish.
Jun 2006	***Backcountry Radio***, "The WildBeat—The Wilderness at Night," an audio journal, by Brian Brinkerhoff.
Jul 27, 2006	***California Connected***—radio story, "In Search of Darkness," produced by Coll Metcalfe.
Summer 2006	***National Parks Magazine***—NPCA, "Star Struck," by Scott Kirkwood.
Sep 11, 2006	***AP News***, "Northern Pa. Park a Stargazing Haven," by Dan Nephin.
Sep 2006	***Texas Wildflowers Magazine***, "Finding Dark Night Skies," by Melissa Gaskill.
Oct 2006	***Parks & Recreation Magazine***, "The Sky's the Limit," by Robert Gent.
Fall 2006	***Friends of Acadia Journal***, "Of Curiosity and Starlight," by Peter Lord.
Jan / Feb 2007	***Zoogoer Magazine***, "Night, Interrupted," by Mary-Russell Roberson.
Apr 5, 2007	***AP News***, "Natural Bridges Named World's First International Dark-Sky Park," NPS Press Release.
May 7, 2007	***Deseret News***, "Public Observatory May Shine at Bryce," by Joe Bauman.
Jun 2007	***Backpacker***, "Crusaders of Darkness," by Allison Fromme.
Jun 8, 2007	***New York Times: Escapes***, consultant for "Built for Stargazing," by Maria Finn.
Aug 20, 2007	***The New Yorker***, "The Dark Side," by David Owen.
Nov 2, 2007	***USA Today***, "Fans of starry skies take a dim view of disappearing dark," by John Ritter.
Nov 2, 2007	***USA Today***, "Cities dim lights to see stars, lower bills," by John Ritter.
Dec 10, 2007	***High Country News***, "Quest for Darkness," by Michelle Nijhuis.
Dec 2007	***Astronomy Picture of the Year 2007***—NASA website, one of 12 photo awards "A Dark Sky over Death Velley," edited by R. Nemiroff and J. Bonnell.
Jan 24, 2008	***Plenty Magazine***, "Lights Out for Stargazers," by Susan Cosier.
Mar 2, 2008	***The Arizona Republic***, "Are Arizona's Dark Skies in Jeopardy," by Kathleen Ingley.
Mar 24, 2008	***US News and World Report***, "Turning Out the Lights: The dangers of a bright night are becoming more apparent," by Ben Harder.
Spring 2008	***Wasatch Journal***, "Into the Dark: Utah's Milky Way Wilderness," by Christopher Cokinos.
Jun 18, 2008	***Forbes***, "World's Best Places to See the Stars," by Rebecca Ruiz.
Jul 25, 2008	***The Wall Street Journal***, "It's All About the Lighting," by Robert Lee Hotz.
Sep 2008	***The Reflector***—publication of the Astronomy League, consultant for "Bryce Canyon National Park 2008 Astronomy Festival," by Rodger Fry.
Nov 2008	***National Geographic***, consultant for "Our Vanishing Night," by Verlyn Klinkenborg, photography by Jim Richardson.
Dec 28, 2008	***AP News / The Los Angeles Times***, "Death Valley Works to Preserve Night Sky," by Alicia Chang.
Jan 11, 2009	***Environmental Health Perspectives***, "Switch On the Night: Policies for Smarter Lighting," by Luz Claudio.
Jan 15, 2009	***Fort Collins Now*** newspaper, "Army of Darkness," by Rebecca Boyle.
Feb 2, 2009	***Environmental Health Perspectives***, "Missing the Dark: Health Effects of Light Pollution," by Ron Chepesiuk.
Apr 2009	***Inside Outside Magazine***, "A New Dark Age," by Stan Wellborn.
Aug 29, 2009	***Astronomy Picture of the Day***—NASA website, photo selection of "A Dark Sky Over Sequoia National Park," edited by R. Nemiroff and J. Bonnell.
2009/2010	***Oh Ranger!***—Utah's National Parks & Monuments, contributed "Utah at Night," by Chad Moore.
Winter 2009	***Mercury***—Journal of the Astronomy Society of the Pacific, image contribution to "Dark Night," by Rowena Davis.
Dec 4, 2009	***Our National Parks***, "Everglades offers ideal location to view night sky," by Farah Dosani.
Dec 24, 2009	***Miller-McCune***—online magazine, "Starry, Starry Skies," by Melinda Burns.
Feb 2010	***National Parks Traveler***, "The Dark Side of National Park Visits," by Jim Burnett.
Feb 2010	***Sunset Magazine***, "Starstruck—Why I live here, Fort Collins, CO" by Anna Nordberg.
Spring 2010	***National Parks Magazine***, "Diamonds in the Sky—Fading Fast," by Anne Minard
Mar 6, 2010	***Arizona Daily Star***, "Nighttime Scenery Worth Preserving, Group Says," by Tom Beal
Mar 6, 2010	***Arizona Daily Star***, "Dark Skies Often Caught in Glare of Security Lights," by Tom Beal
Apr 6, 2010	***Blue Ridge Outdoors***, "Dark Skies," by Graham Averill
Apr 15, 2010	***Second Act Magazine***, consultant for "Photographer Left Day Job to Shoot Night Sky," by Susan Christian Goulding.
Apr 2010	***North Forty News***, "Let There Be Night," by Gary Raham.
May 2010	***Sky & Telescope Magazine***, "Saving the Night Sky," by Kelly Beatty.
May / June 2010	***AARP Magazine***, consultant for "National Parks Less Traveled," by Laura Daily.
June 11, 2010	***AP News / Press Enterprise***, "Efforts to Preserve Dark Skies are Gaining Momentum," by Janet Zimmerman.

Background—Astro VIP Nils Allen scans the twilight sky at Cedar Breaks National Monument.

Natural Resource Program Center

Science, Stewardship, Solutions

National Park Service
U.S. Department of the Interior

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http://www.nature.nps.gov/air/lightscapes

The mission of the Night Sky Program is to protect and restore natural lightscapes— the visual quality of a park's nighttime scenery that is dependent on natural light sources and darkness. We achieve this through developing methods for measuring night sky quality, sharing results, encouraging the enjoyment of nighttime scenery, understanding nocturnal ecology, and building a profession of lightscape stewardship.