



PROGRAMMATIC REVIEW AND CLEARANCE PROCESS FOR NPS-SPONSORED PUBLIC SURVEYS



The scope of the Programmatic Review and Clearance Process for NPS-Sponsored Public Surveys is limited and will only include individual surveys of park visitors, potential park visitors, and residents of communities near parks. Use of the programmatic review will be limited to non-controversial surveys of park visitors, potential park visitors, and/or residents of communities near parks that are not likely to include topics of significant interest in the review process. Additionally, this process is limited to non-controversial information collections that do not attract attention to significant, sensitive, or political issues. Examples of significant, sensitive, or political issues include: seeking opinions regarding political figures; obtaining citizen feedback related to high-visibility or high-impact issues like the reintroduction of wolves in Yellowstone National Park, the delisting of specific Endangered Species, or drilling in the Arctic National Wildlife Refuge.

SUBMISSION DATE: 12/1/2024

PROJECT TITLE: Visitor perceptions regarding the night skies and lighting in Great Smoky Mountains National Park's campgrounds

ABSTRACT: (not to exceed 150 words)

Anthropogenic light sources are increasingly threatening the visibility of night skies in U.S. national parks, many of which are home to some of the last remaining pristine night skies. To help mitigate this issue, the National Park Service has implemented upgraded lighting systems designed to protect dark skies. The purpose of this study is to investigate the effects of park lighting on visitor experiences at two campgrounds in Great Smoky Mountains National Park: Elkmont and Smokemont. Specifically, this study will focus on comfort station interior lighting, which is one of the most common and widespread lighting types across National Park Service units. By examining visitor responses to experimental lighting conditions in comfort stations, this research aims to provide park managers with data to make informed decisions about lighting infrastructure that balances visitor needs and dark sky preservation.

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PROJECT INFORMATION:

Where will the collection take place: Great Smoky Mountain National Park (GRSM)

Sampling Period Start Date: 05/12/2025

Sampling Period End Date: 08/15/2025

Type of Information Collection Instrument: (Check ALL that Apply)

Mail-Back Questionnaire

On-Site Questionnaire

Telephone Survey

Face-to-Face Interview

Focus Groups

Other (List)

Will an electronic device be used to collect information? No Yes

SURVEY JUSTIFICATION:

Social science research in support of park planning and management is mandated in the NPS Management Policies 2006 (Section 8.11.1, "Social Science Studies"). The NPS pursues a policy that facilitates social science studies in support of the NPS mission to protect resources and enhance the enjoyment of present and future generations (National Park Service Act of 1916, 38 Stat 535, 16 USC 1, et seq.). NPS policy mandates that social science research will be used to provide an understanding of park visitors, the non-visiting public, gateway communities and regions, and human interactions with park resources. Such studies are needed to provide a scientific basis for park planning and development.

Anthropogenic sources of light have increased with urban and exurban population development. These impacts, expressed as "light pollution," have detrimental effects on wildlife, human health, and stellar visibility. Natural dark skies are increasingly recognized as an important biological, cultural, and experiential resource in national parks. Light pollution threatens night sky visibility in national parks, which protect some of the only remaining pristine night skies in the United States. The Natural Sounds and Night Skies Division (NSNSD) requested this study because research is needed to inform a better understanding of how visitors respond to different lighting conditions in park settings. This information is needed to inform strategies for managing current and future lighting infrastructure.

Increasingly, park artificial lighting modifications are being considered to protect natural darkness and reduce impacts to wildlife while still achieving the desired outcomes for visitors (e.g., safety, navigation, recreation, etc.). Upgrades to the lighting systems used by the National Park Service can help meet the NSNSD's mission to protect dark skies as a social and ecological resource (National Park Service, 2016). However, there is a gap in the scientific knowledge on how artificial lighting conditions in natural protected areas impact visitors' experiences, which this study would address.

This study will inform NPS and the NSNSD regarding lighting infrastructure, based on visitor preferences for various lighting conditions in bathrooms/comfort stations in GRSM campgrounds. This study will take place in Elkmont and Smokemont campgrounds during the summer of 2025. The current bathrooms/comfort stations lights are bright white (predominant color currently used in most park settings), and illuminate through windows to the exterior, which creates significant ecological impacts inside and outside of the bathrooms/comfort stations. This study will examine visitor perceptions of current white light, lower intensity white light, and no light/dark conditions. Specifically, this study will examine how the lights/dark may influence visitor experiences and provide insights regarding how onsite visitor experiences with park infrastructure may influence visitor behaviors off-site (i.e., known as spillover behaviors) (Nilsson et al., 2017). Ultimately the results from this study will inform lighting infrastructure at GRSM bathrooms/comfort stations. Beyond the park, this important research will produce results that can begin to inform lighting infrastructure and design standards for NSNSD, and thus other park units.

SURVEY METHODOLOGY

(A) Respondent Universe:

Based on the NPS Visitor Use Statistics and Recreation.gov, Smokemont has 148 campsites and Elkmont has 220 campsites. These campgrounds are on average 85% full during the proposed sampling dates, and on average campers stay for four nights (Rice et al., 2019; <https://www.sciencedirect.com/science/article/pii/S0160738319300131>). The respondent universe for the on-site intercepts will be adult visitors (18 years old and older) that are camping at Elkmont and Smokemont between May 12 – August 15, 2025.

(B) Sampling Plan / Procedures:

Visitors will be randomly intercepted at their campsites through a stratified surveyor rove approach (by campground loop). Surveyors will intercept every Nth group by campsite number. Based on the limited number of campsites, the random numbers will range between 2-5. During each sampling period, once the random number is generated, the surveyors will go to and skip campsites based on that number, for a given sampling period. For example, if the number 3 is generated, surveyors will attempt to survey every third campsite in a given campground loop. Based on the number of campsites, anticipated occupancy rates, and sampling period of 5-9pm each sampling evening, we anticipate surveying 14 participants per sampling period, with a 70% response rate. Tree coverage in the campsites allow for sampling to begin before true darkness due to the light levels in the comfort stations.

This study will include visitor evaluations of four different lighting conditions including: 1) Existing lighting, 2) Low lighting intensities, 3) High lighting intensities, and 4) No light/dark within the campground restrooms/comfort stations. Lighting conditions will be stratified by campground and campground loop (Table 1).

- Existing lighting will be evaluated by visitors across both Elkmont and Smokemont campgrounds during nine evenings at each campground between May 12-24, 2025.
- Low-level lighting will be evaluated by visitors across the west side campsites in the Elkmont campground during nine evenings between July 25-Aug. 4, 2025.
- High-level lighting will be evaluated by visitors across the east side campsites in the Elkmont campground during nine evenings between July 25-Aug. 4, 2025.
- No light/dark will be evaluated by visitors across Smokemont campground during nine evenings between Aug. 4-Aug. 15, 2025.

The gap between sampling dates (June and most of July 2025) will allow for lighting changes/installations at the facilities.

Table 1. Example Schedule During a Sampling Period.

Survey Locations	Conditions	Dates	Sampling Evenings	Number of Visitor Contacts	Surveys Completed
All of Elkmont Campground	Existing lighting	May 12-24, 2025	9	180	126
All of Smokemont Campground	Existing lighting	May 12-24, 2025	9	180	126
West Elkmont Campground	Low-level lighting	July 25-Aug. 4, 2025	9	180	126
East Elkmont	High-level lighting	July 25-Aug. 4, 2025	9	180	126
All of Smokemont Campground	No light/dark	Aug. 4-15, 2025	9	180	126
Totals			45	900	630

(C) Instrument Administration:

Trained surveyors will rove the campground by stratified loop and random number intervals, asking campers if one adult (18 years of age or older) in a camping group would be willing to participate in the anonymous, voluntary survey. Additionally, visitors will be asked if they have visited a comfort station in the campsite yet. Visitors who refuse to participate will be asked several non-response questions (see below).

“Hello, we are conducting a study about the lights you are experiencing here at campground, and specifically the comfort stations/bathrooms, and how they may influence your visitor experience here at Great Smoky Mountain National Park. Your participation is voluntary and your responses will be anonymous. In total, this study will take you about 12 minutes to complete. Would you be willing to participate?”

- *If NO: “Do you mind if I ask you just a couple of questions?*
 - o *Over the past 12 months, how many visits have you made to Great Smoky Mountain National Park?*
 - o *Over the past 12 months, how many times have you camped here in Great Smoky Mountain National Park?*
 - o *How many people are in your personal group today, including you?*

Thank you for your time and consideration. I hope you enjoy your visit.”
- *If YES: “Thank you for your willingness to assist with this study. Have you visited a comfort station in [Elkmont/Smokemont] Campground during your current visit? Who in your group (who is at least 18 years old) has the next birthday?”*

Using a tablet computer, the surveyor will also capture additional observational information to aid with calculating potential non-response bias:

- time of contact,
- number of adults and children in group, and
- potential language barrier

(D) Expected Response Rate / Confidence Level:

Based on the NPS Visitor Use Statistics and Recreation.gov data regarding the campsites and occupancy rates, we expect to contact at least 900 visitors during the sampling period. It is estimated that 70% (n=630) will be willing to participate in the surveys, based on previous campsite studies (e.g., Taff et al., 2022; <https://www.mdpi.com/2073-445X/11/10/1872>). Of those who do not agree to participate in the on-site survey (n=270), we expect 90% to answer the non-response bias questions (n=243) with roughly 24 visitors completely refusing to participate in any part of the collection.

Table 2: Expected Response Rates

Total Number of Visitor Contacts	Completed Onsite Surveys (70% of contacts)	Refusals (30% of contacts)	Completed Non-Response Surveys Soft Refusals (90% of refusals)	Hard Refusals (10% of refusals)
900	630	270	243	27

For quantitative outdoor recreation related surveys, it is recommended that the sample size be approximately 300 respondents (Vaske, 2008). The current sample estimates for this study (at least 300 completed surveys) are with the recommended number and viewed as acceptable. The results of this collection will not be used to generalize any population beyond the individuals participating in this study during this sampling period or speculate about any areas beyond GRSM. Sampling and recruiting efforts will conclude at the end of the sampling period.

(E) Strategies for dealing with potential non-response bias:

All soft refusals will be asked to provide responses to the following questions, which will serve as the non-response bias check:

- *If NO: "Do you mind if I ask you just a couple of questions?"*
 - o *Over the past 12 months, how many visits have you made to Great Smoky Mountain National Park?*
 - o *Over the past 12 months, how many times have you camped here in Great Smoky Mountain National Park?*
 - o *How many people are in your personal group today, including you?*
- Thank you for your time and consideration. I hope you enjoy your visit."*

Using a tablet computer, the surveyor will also capture additional observational information to aid with calculating potential non-response bias:

- time of contact,
- number of adults and children in group, and
- potential language barrier

The data from these questions and the observational data collected during the intercept (outlined above) will be used to determine any non-response bias. Any implications of non-response bias will be outlined in the final report and discussed with NPS managers and staff.

(F) Description of any pre-testing and peer review of the methods and/or instrument:

The survey questions are primarily pulled from the NPS Pool of Known. The intercept survey instrument was pre-tested in the format in which it will be delivered (i.e., tablet or online) to determine question understanding and length. The pre-tests were conducted by Social Scientists working on the project at Penn State. These Social Scientists identified students, researchers, and staff (5 in total) who were placed in a mock situation in which they found themselves at GRSM. All pre-testers have worked, preformed research, or are very familiar with GRSM. Based upon the pretest we were able to assess and correct skip patterns within the survey and gauge readability of the posed questions. We have estimated from these pre-tests that it will take up to one minute to introduce the survey and an additional 11 minutes to complete the intercept survey. For the visitors refusing to complete the survey it will take 1 minute to ask nonresponse questions.

BURDEN ESTIMATES:

We anticipating contacting 900 individuals, resulting in a total of 873 completed responses (630 on-site surveys and 243 non-response surveys) for a total burden of 130 hours.

On-site Survey: Of the 900 individuals we intercept, we expect 70% (n=630) to agree to participate in the survey. The survey will take 11 minutes to complete, plus an additional one minute for the initial contact, resulting in a total burden of 126 hours.

Non-response Survey: Of the 270 individuals who refuse to complete the on-site survey, we expect 90% (n=243) to complete the non-response survey, which we anticipate will take one minute to complete, including the initial contact, resulting in a burden of four hours.

Table 3. Burden Estimates

	Estimated Total Number	Completion Time (minutes)	Burden Hours
On-site Survey	630	12	126
Non-response survey	243	1	4
Total	873		1300

REPORTING PLAN:

The study results for GRSM will be presented in internal agency reports for NPS managers. Summary statistics will be provided. Additional comparative statistics may be used to examine potential differences by demographics or attitude typologies. The report will be reviewed by GRSM staff, and subsequently revised by the PI and team until the final report is processed and made public through the NPS. The report will be archived with the NPS Social Science Program for inclusion in the NPS Social Science Studies Collection as required by the NPS Programmatic Approval process. Hard copies will be available upon request.

REFERENCES:

Nilsson, A., Bergquist, M., & Schultz, W. P. (2017). Spillover effects in environmental behaviors, across time and context: a review and research agenda. *Environmental Education Research*, 23(4), 573-589.

Rice, W. L., Park, S. Y., Pan, B., & Newman, P. (2019). Forecasting campground demand in US national parks. *Annals of Tourism Research*, 75, 424-438.

Taff, B. D., Miller, Z., Lawhon, B., Freeman, S., & Newman, P. (2022). Effective Communication and Campground Recycling: Lessons Learned from Yosemite, Grand Teton, and Denali National Parks. *Land*, 11(10), 1872. <https://doi.org/10.3390/land11101872>

Vaske, J. J. (2008). Survey research and analysis: Applications in parks, recreation and human dimensions. (No Title).

NOTICES
Privacy Act Statement

General: This information is provided pursuant to Public Law 93-579 (Privacy Act of 1974), December 21, 1984, for individuals completing this form.

Authority: National Park Service Research mandate (54 USC 100702)

Purpose and Uses: This information will be used by The NPS Information Collections Coordinator to ensure appropriate documentation of information collections conducted in areas managed by or that are sponsored by the National Park Service.

Effects of Nondisclosure: Providing information is mandatory to submit Information Collection Requests to Programmatic Review Process.

Paperwork Reduction Act Statement

We are collecting this information subject to the Paperwork Reduction Act (44 U.S.C. 3501) and is authorized by the National Park Service Research mandate (54 USC 100702). This information will be used by The NPS Information Collections Coordinator to ensure appropriate documentation of information collections conducted in areas managed by or that are sponsored by the National Park Service. All parts of the form must be completed in order for your request to be considered. We may not conduct or sponsor and you are not required to respond to, this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number. OMB has reviewed and approved The National Park Service Programmatic Review Process and assigned OMB Control Number 1024-0224.

Estimated Burden Statement

Public Reporting burden for this form is estimated to average 12 minutes per collection, including the time it takes for reviewing instructions, gathering information and completing and reviewing the form. This time does not include the editorial time required to finalize the submission. Comments regarding this burden estimate or any aspect of this form should be sent to the Information Collection Clearance Coordinator, National Park Service, 1201 Oakridge Dr., Fort Collins, CO 80525.