



**National Park Service
U.S. Department of the Interior**

Social Science Program

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Programmatic Approval for NPS-Sponsored Public Surveys

Submission Date :

1. **Project Title:** Analyzing the Importance of Night Sky Quality at Acadia National Park

2. **Abstract:** *Concern for the preservation of dark skies and the problem of light pollution is rising in public consciousness. This shifting attitude is evidenced in national parks by increasing attendance at stargazing programs. However, it is important to establish indicators and standards for high quality nighttime experiences in parks. Additionally, little is known about the social, cultural, and symbolic attachments to night sky resources held by various audiences. To address these two related concerns, two research methods will be used. The focus of the survey portion of the research is to assess the importance of night skies and related resources to visitors and support the establishment of visitor-based indicators and standards of quality for night sky viewing experiences. The focus of the interview portion of the research will be to assess the meaning of night skies and related resources to visitors, and leaders of surrounding communities.*

(not to exceed 150 words)

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Project Information

5. **Park(s) For Which Research is to be Conducted:** Acadia National Park (ACAD)

6. **Survey Dates:** 7/1/13 TO 8/31/13

7. **Type of Information Collection Instrument (Check ALL that Apply)**

Mail-Back
Questionnaire

On-Site
Questionnaire

Face-to-Face
Interview

Telephone
Survey

Focus Groups

Other (explain)

8. **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, development.*

The National Park Service (NPS) is currently engaged in efforts to inventory night sky quality. A critical step in the management of natural lights capes is to measure and inventory the night sky condition. To address the measurement of this resource, the NPS Night Skies Team developed a system to measure and monitor changes to night sky brightness. Since 2001 the NPS has systematically inventoried night sky quality in approximately 100 parks. The data show that nearly every park measured exhibits some degree of light pollution. There is very little research available that points to the impact that light pollution has on human expectations and attitudes related to night skies. Combined with growing night sky data, social science research will help the NPS to manage this resource for the benefit of parks and the people who visit them.

The NPS Dark Skies Program has commissioned the Park Studies Laboratory at the University of Vermont (UVM) to conduct social science research that will address questions of visitor attitudes, expectations and acceptable thresholds - of what they consider natural, beautiful, and inspirational - using normative theory and related empirical methods. The purpose is to investigate the symbolic meanings of night sky experiences expressed by a sample of park visitors at Acadia National Park, agency personnel, and gateway community leaders associated with the park. The overall goal is to help the Night Skies Division understand the subjective qualities that make personal experiences of night skies at park settings rewarding in the context of other activities undertaken during a national park visit.

The interest in night skies extends well beyond the NPS. This research will also be helpful to multiple state, federal, and private business that report well-attended stargazing programs and private tours. Public interest in connecting

with night skies has resulted in the appearance of the term *Astro-Tourism* that focuses tourism and the night skies, which is a quickly becoming a significant economic force in regions still retaining relatively dark night skies. This collection will provide the information that is at the heart of various campaigns to develop and dedicate 'dark sky' parks and reserves where the night sky is preserved for future generations from light pollution.

This research will use a two phased approach. A questionnaire will be used to survey visitors at Acadia National Park; and qualitative interviews will be conducted with visitors, agency personnel and community leaders. The interviews will go further than the questionnaire to determine the cultural symbolism associated with night sky objects or features; the meanings of places / sites where night sky experiences are notable to visitors; the nature of stories told to express and solidify ties between people and place; the ways that people describe and make sense of night sky-related experiences; and the nature of myths, stories, and imagery related to night skies.

This research will help enhance the mission of the Night Skies Division by:

- 1) providing an understanding of the importance of night skies to the general public
- 2) allowing the NPS to set management targets related to visitor use for night sky quality conditions
- 3) adding to the general understanding of the value of conservation of natural places, and
- 4) by adding to the knowledge base of the ecosystem services are valued by modern society.

9. **Survey/Interview Methodology: (Use as much space as needed; if necessary include additional explanation on a separate page.)** (a) **Respondent Universe:**

Survey

The respondent universe for the on-site questionnaire will be all visitors (age 18 and over) to trailhead, campground, and viewpoint sampling sites at Acadia National Park, between July 1 and August 31, 2013.

Interviews

The respondent universe for the interviews will be all visitors to campgrounds, visitor centers, and selected viewpoints at Acadia National Park, age 18 and over, between July 1 and August 31, 2013. We will also interview a sample of NPS personnel and community leaders in gateway communities.

(b) **Sampling Plan/Procedures:**

Survey

The sampling period includes the park's peak use periods, during the summer and during the day (between 8 a.m. and 5 p.m. - the time of day when the majority of visitation occurs.). Sampling will be evenly divided between the trailhead, viewpoint, and campground locations. Seven days will be sampled at each trailhead, viewpoint, and campground location,

with both weekday periods and weekend periods represented proportional to use. This will ensure that a sufficient number of questionnaires will be completed to make inferences to the visitor populations at these locations with an acceptable degree of precision.

During each sampling period, a trained surveyor will be stationed at selected locations in the park. When the sampling period begins, the surveyor will approach groups exiting trailheads, visiting viewpoints, or staying in their campsite and ask them to participate in the survey. If members of the visitor groups agree to participate, the eligible person in the group whose birthday is closest to the sampling day will be asked to complete the questionnaire. After he/she completes the questionnaire, he/she will return it to the survey attendant. When the surveyor has completed his/her contact with the group, the surveyor will ask the next available group exiting the trailhead, visiting the viewpoint, or in the next campsite to participate in the survey. This process will continue throughout the sampling period. Visitors will be asked to complete the on-site questionnaire in the presence of the survey attendant, who will answer any questions that arise and collect the questionnaires upon completion. A screening question will be asked to assure that participants will not be surveyed more than once.

Sampling Plan/Procedures:

Interviews

Visitor Interviews:

An interviewer will intercept visitors before, during, or after their recreation experiences at places where people typically gather (attending day or evening programs, at campsites, at visitor centers, etc.). Interviewees will be selected based on visible criteria (alternating male/female; a range of ages; and those from different activity settings in the park) to maximize variation across interviewees. Intercepted visitors will be asked if they would be willing to participate in a short interview (approx. 30 minutes). If a person declines to participate, they will be thanked for their consideration, and an alternate will be asked. (It is our experience that very few people are likely to decline a chance to talk about their experiences; if they do, they often re-schedule for another time.) The desired sample size is 75 individual park visitors in total (3 to 5 interviews per day, over the span of a month). Interviews will be recorded with the permission of each interviewee. The interviewer will also take notes during the interview as a safeguard in the event of equipment failure.

Community Leader Interviews:

Interviews will be conducted with gateway community leaders (n=20). Working with current NPS personnel, we will identify several target individuals in relevant administrative positions, and then will use standard "snowball sampling" methods to obtain referrals to other individuals. Snowball sampling does not produce a random sample; rather, it is intended to allow researchers to analyze the shared meanings held across

wide groups of people in organizations. NPS personnel at Acadia National Park and leaders in adjacent communities will be contacted through their places of work, and asked to participate in a half-hour long, semi-structured interview at a designated time and place. The desired sample sizes are 20 NPS personnel and 20 community leaders.

(c) Instrument Administration:

Survey

Visitors at the study sites in the parks will be read the following script:

"Excuse me, sir/ma'am. We're conducting a study for the National Park Service to better understand visitor experiences concerning night sky viewing. Your participation is voluntary and all responses are anonymous. Would you be willing to take 15 minutes to help?"

If **YES**: "Thank you. Who in your personal group (who is at least 18 years of age) has the next birthday? Would you be willing to complete this questionnaire? Have you completed a questionnaire or interview at a different location in the park?"

If **YES**: "Thank you, but we can only accept one response per personal group. Thank you for your time."

If **NO**: "Thank you for participating."

Visitors will then be given a paper questionnaire to complete. The questionnaire will instruct respondents to view a series of 5 night sky simulation images mounted side-by-side on a 3' by 5' poster. The survey attendant will assist respondents as they answer this portion of the questionnaire. Respondents will then answer a series of questions in the questionnaires while seeing these images. After completing this portion of the questionnaire, respondents will continue to answer the remaining questions.

If **NO**: "I understand. I hope you enjoy your visit."

During the survey administration the respondents will be asked to rate a series of photographs to indicate their opinion of how the night sky should look for stargazing or viewing (see photo posters). The survey administrator will show the respondents a series of photographs. The photographs will be shown to the respondent one at a time. The order that photos will be presented to different respondents will alternate between incrementally increasing and decreasing the number stars and human caused light. A total of five photographs will be used for the "stargazing" questions.

Interview

Interviews will be conducted from a pre-determined script (see two attached interview protocols, one for visitors, and one for community leaders).

Visitors will be approached by an interviewer and asked to participate in the study. The interviewer will use the following script to guide this introduction:

“Hi, my name is _____. I’m from the University of Vermont Park Studies Laboratory. We’re helping the National Park Service gather information about night sky experiences at national parks. Could I ask you a few questions about your experiences related to the night skies? Participation is voluntary and your responses will be anonymous.

If No: Thank you for considering the request. Have a good day.

If Yes: This will take about a half hour, and I’d like to record our conversation so I can remember it later. Is this OK with you? Have you filled out a questionnaire elsewhere in the park?”

→ If No: “Great, let’s begin the interview.”

→ If Yes: “Thank you for your time. We only need one response per personal group.”

Interviews will be tape recorded only after consent is given, and the tapes will be later transcribed to aid in analysis of the interview content.

The interviews will be conducted in a conversational, semi-structured format. This will entail using an identical set of questions to guide each interview. The interviewer is, however, permitted to ask additional questions that would prompt the participant to add to the breadth or depth of the answer initially provided. Both guiding and follow-up questions will be based on exploration of the following three topics: experiences and enjoyment of night skies, meanings of night skies and night sky activities, and management/policy. Visitors will be assured that their responses will remain anonymous.

Immediately after an interview is completed, the interviewee will be provided a small card to be filled out at that time (see attached). The card will ask for demographic and socioeconomic information, and also request some information about the visitor’s current visit to the Park.

Interviews with community leaders will be arranged based on personal contact from the PI /research assistant, and will also be guided by a semi-structured interview format (similar to that used for visitors and noted above). Participation will be voluntary. Because the individuals in both of these groups will not be anonymous (they are public figures and agency representatives), they will be promised anonymity. Interviews will be taped and transcribed, and interviewees will be asked to review their own transcript for completeness and to reduce any transcription errors. For these samples, both guiding and follow-up questions will be based on exploration of the following topics: experiences related to night skies, the interests and abilities of agency/community to manage for such experiences, and current initiatives.

(d) Expected Response Rate/Confidence Levels: Survey

The overall survey sample size is expected to be approximately 429 visitors. Based on previous experience in conducting similar surveys, it is expected that

about 70% of visitors (about 300 individuals) will be willing to participate. In a similar night skies and visitor experience study at campgrounds in Acadia National Park in 2012 that used similar sampling methods, a response rate of 70% was attained. Another night skies study at Acadia, Grand Canyon, and Yosemite National Parks, and Golden Gate National Recreation Area attained a 70% response rate. Study findings are estimated to be accurate within 6 percentage points, based on a sample size of approximately 300 from each park using a 95% confidence level. This will be sufficient for NPS planning purposes. The number of people in each visitor party and date and time of refusals will be recorded and reported on a refusal log.

Number of Initial Contacts	Expected Response Rate	Expected Number of Responses	Margin of Error +/- %
429	70%	300	6%

Expected Response Rate/Confidence Levels: Interview

The intended sample size will be 75 visitors, and 20 community leaders. To obtain this number of visitors, we will need to contact about 88 recreationists - but to obtain 20 community leaders, we expect that all those we contact will agree to participate (the topic is relevant to their work, and public officials typically do not decline opportunities to share their views). The number of refusals for visitors will be recorded and reported. As with most qualitative methodologies, the sample will not be generalizable to the entire population of visitors.

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

Non-response bias will be examined by comparing selected characteristics of the sample population with characteristics observed and recorded in every group contacted (e.g., group size, gender and group type). Additionally, all visitors approached will be asked to answer three key questions from the survey:

1. *Is viewing the night sky (or “stargazing”) important to you?*
2. *Have you stargazed or observed the night sky in this park (including ranger-led programs) before this visit?*
3. *What is your home zip code or country of residence?*

These results and observational data will be recorded and compared to results from the respondents completing and returning the questionnaire to see if non-response bias is present. The results of the check for non-response bias will be reported and implications for data interpretation will be discussed in any reports prepared for the NPS managers.

Strategies for dealing with potential non-response bias: Interview

Because the sample of respondents is not random (as is typical in standard qualitative research), we will be unable to make statistical inferences regarding the population. Distinctly different from quantitative, survey research procedures, qualitative research typically seeks to select individuals who have social, demographic, and participation type differences, seeking a broad range of perspectives so that maximum variability is obtained. As noted above, the

purpose of qualitative work described here is to allow researchers to make interpretations about the ways language is used to express a wide array of meanings.

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

The questions included in these surveys have been designed and reviewed by the PI, research staff and graduate students at the University of Vermont, and NPS park and regional staff. The questions are similar to those used at several other national park areas in previous night sky studies and visitor experience studies. Research methods and findings from related studies in many units of the National Park System have been compiled into four text books that are used by students, researchers, and managers to plan, and manage parks and outdoor recreation (Manning 2007; Manning 2009; Manning 2011).

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

The interview questions identified for this study have been designed and reviewed by the research team, which includes an expert in qualitative research, and by research staff and graduate students. Interview questions are similar to those used by the qualitative researcher in other completed studies using narrative, text, and discourse analyses. The proposal and interview protocol have been peer-reviewed by colleagues. Researchers involved in the project are qualified and experienced in qualitative research methods, and have published academic papers on this topic.

10 **Burden Estimates** **Survey**

We plan to approach at least 429 individuals during the sampling period. With an anticipated response rate of 70%, we expect to receive 300 total responses for this collection.

We expect that the initial contact time will be one minute per person (429 x 1 minute = 7 hours). We expect that a total of 129 (30%) visitors contacted will refuse to participate in the study, for those individuals we will record their reason for refusal and ask them to answer the three questions that will be used for the non-response check. This is estimated to take no more than 2 minutes (129 x 2 minutes = 4 hours) to complete each session.

For those who agree to participate, we expect that a total of 300 visitors will complete and return the survey. With that, an additional 15 minutes will be required to complete the follow through (300 response x 15 minutes = 75 hours). The total burden for this collection is estimated to be 86 hours.

Interviews

We plan to contact 20 community leaders. We expect no more than 5 minutes will be required to schedule an interview community leader member (20 community leaders x 5 mins = 3 hours). Thirty minutes will be required to complete each interview (20 x 30 mins = 20 hours). This makes

the estimated total burden for community leaders to be 23 hours.

We plan to approach at least 88 individuals during the sampling period. With an anticipated response rate of 85% we expect to receive 75 total completed responses for this collection.

We expect that the initial contact time will be one minute per person (88 x 1 minute = 2 hours). We expect that 13 (15%) visitors will refuse to participate during the initial on-site contact, for those individuals we will record their reason for refusal and ask them the information on the sociodemographic card. This is estimated to take no more than 1 minute (13 x 1 minutes = 0.2 hours) to complete each session.

For those who agree to participate (n=75) we expect that everyone will agree to complete the interview (75 respondents x 30 minutes = 38 hours). The visitor-respondent burden for this collection is estimated to be 39.2 hours.

Survey

Estimated Number of Contacts	
Initial Contacts	
On-site Visitors	429
Estimated number of on-site refusals	129
Total Number of Responses	300

Estimation of Time (minutes)	
Initial Contacts	
On-site Visitors	1
On-site Refusal/nonresponse	2
Time to complete and return surveys	15

Estimation Burden (hours)	
Initial Contacts	
On-site Visitors	7
Estimated Burden Hours	4
Estimated Burden Hours	75

Subtotal 86

Interview

Estimated Number of Contacts	
Initial Contacts	
Visitors	88
Community Leaders	30
Estimated number refusals	
Visitors	13
Community Leaders	10
Number of Responses	
Visitors	75
Community Leaders	20
Total	

Estimation of Time (minutes)	
Initial Contact -	
Visitors	1
Community Leaders	5
Estimated number refusals	
Visitors	1
Community Leaders	
To complete and return	
Visitors	30
Community Leaders	30

Estimation of Burden (hours)	
Initial Contact	
Visitors	2
Community Leaders	2
Estimated number refusals	
Visitors	1
Estimated Burden Hours	
Visitors	38
Community Leaders	10

Subtotal 54

Total Combined Burden 141

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11. **Reporting Plan:** The results of this information collection activity will be presented in an internal agency report made available to the Night Skies division, shared with participating community leaders, and will also be available upon request.. A copy of the technical study report will be archived with the Social Science Division of the National Park Service for inclusion in the Social Science Studies Collection as required by the Programmatic Approval Process. The key estimates that will be derived from the data collected will be descriptive in nature, primarily measures of central tendency (mean and median), dispersion (standard deviation), and frequency distributions. Some tests for differences in means and proportions may be done. The project results will also be published in a peer-reviewed scientific publication discussing the methods, results, and conclusions.
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References

Manning, R. (2011). *Studies in Outdoor Recreation* (Third Edition). Corvallis: Oregon State University Press.

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