



National Park Service
U.S. Department of the Interior
Social Science Program

OMB Control Number 1024-0224
Current Expiration Date:10-31-2015

Programmatic Approval for NPS-Sponsored Public Surveys

Submission Date 8-11-2014

1. **Project Title:** A Survey of Fluid Consumption of Backcountry Hikers at Grand Canyon National Park (GRCA)

2. **Abstract:** Grand Canyon National Park (GRCA) is seeking to understand the common hydration behaviors of backcountry hikers. The Preventive Search and Rescue Team (PSAR) is responsible for promoting the hiker education program through GRCA's *Hike Smart campaign*. The *Hike Smart campaign* emphasizes adequate preparation and behaviors such as hydration and electrolyte replacement. In order to improve upon this campaign, this study seeks to understand the relationships between hikers' preparation, hydration patterns, planned hiking itinerary, and environmental factors during a backcountry recreation experience.

(not to exceed 150 words)

3. **Principal Investigator Contact Information**

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4. **Park or Program Liaison Contact Information**

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Project Information

5. **Park(s) For Which Research is to be Conducted:** Grand Canyon National Park (GRCA)

6. Survey Dates:	FALL	10/2014	TO	11/2014
	SPRING	04/2015	TO	05/2015
	SUMMER	06/2015	TO	7/2015

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

Mail-Back Questionnaire Other (explain)	<input checked="" type="checkbox"/> On-Site Questionnaire	Face-to-Face Interview	Telephone Survey	Focus Groups
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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.*

This collection intends to build upon research and planning efforts currently focused on exercise-associated hyponatremia and heat illnesses within Grand Canyon National Park (GRCA). The goal of this collection is to better understand the current preparation and hydration behaviors park visitors' employ during backcountry recreation experiences.

The information collected will be used by rangers to better educate hikers on safe hiking practices. More data is needed to understand the sources of information visitor use to access Grand Canyon's most populated trails. Park leadership is also very interested in knowing more about the decision making processes of backcountry hikers (i.e. methods and quantity of hydration, levels of preparedness, and sources used for pre-hike information).

The information will be used to improve current preventive management strategies. These strategies include recommendations for how much water is needed by hikers and how much time a hike will require. Validating these recommendations relies upon improved knowledge of the hiking community. Centering preventive strategies on scientific data remain PSARs guiding objectives.

9. **Survey Methodology:** (Use as much space as needed; if necessary include additional explanation on a separate page.) **(a) Respondent Universe:** The respondent universe for this study will include all adult visitors (aged 18 and older) recreating in the GRCA backcountry during randomly selected dates during the following three sampling periods:

- October-November, 2014
- April - May, 2015
- June, 2015 - July 2015

A total of 3530 visitors (n=250 male and 250 female visitors per season) will be contacted and asked to participate in the survey upon completion of their hike.

(b) Sampling Plan/Procedures:

A stratified random sampling strategy will be used to collect the information for this study. The sample will be stratified by gender, trailhead (Bright Angel and South Kaibab) and hiking season (Fall, Spring, and Summer). Visitors will be systematically sampled as they exit the trail. A sampling interval of every n^{th} males and females appearing over the age of 18 to pass the administrator will be approached and invited to participate in the study. If they are willing, or a member of their hiking group is willing, the survey will be administered. Once the survey is completed and returned, the administrator will resume counting until the next n^{th} hiker passes.

(c) Instrument Administration:

Surveys will be administered by Preventive Search and Rescue (PSAR) rangers and volunteers. The questionnaire will be administered using a clipboard and pencil with questionnaire attached. The respondent will be handed the clipboard to complete and return the questionnaire onsite.

Intercept locations will be at two main trailheads from 10:00 am to 4:00 pm. Each location will have two surveyors to manage the data collection. The presence of two surveyors enables the surveyors to answer questions and manage other distractions while maintaining the sampling plan. At high-volume locations, a random start time will be selected at the beginning of the sample period (10:00 am). An equal number of male and female visitors will be sampled as they exit the trail. The date, time, location, and a survey ID number will be recorded on the instrument after completion and return of the survey. Once the survey is completed and returned, the administrator will resume counting until the next n^{th} hiker passes.

The following will be used as the invitation to participate in the study.

"Excuse me, sir/ma'am. We're conducting a study to understand the hydration strategies of hikers in the Grand Canyon. Participation is voluntary and all responses are anonymous. Would you be willing to take 5 minutes to help?"

If YES: *Have you completed a similar survey at a different location in the park?"*

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

If NO: *"Thank you. Who in your group is at least 18 years old and would be willing to fill out this survey?" [Provide the visitor with the clipboard, survey and pencil. Provide instructions for completing and returning the survey]. "Please feel free to ask me any questions you have about the survey."*

If NO: *"I understand. Would you be willing to answer two short questions?"*

If YES: *"Thank you, [Provide the visitor with clipboard, questions and pencil]. "Thank you for your time."*

If NO: *"Thank you, I hope you enjoyed your visit."*

Although the questionnaire will be self-administered, the surveyors will be available to provide assistance or clarification when necessary.

(d) Expected Response Rate/Confidence Levels:

A total of 1,765 visitors will be intercepted at the South Kaibab trailhead and 1765 visitors at the Bright Angel trailhead for a total of 3530 overall contacts. Based on previous on-site surveys conducted in GRCA (Backlund et al. 2006; Stewart & Cole, 1997), a final response rate of 85% is anticipated. The number of refusals will be documented in the survey log, and used to calculate a response rate. An 85% response rate will yield approximately 3000 completed questionnaires overall. We are choosing to accept a confidence level at 95%.

Number of Initial Contacts	Expected Response Rate	Expected Number of Responses	Margin of Error +/- %
3,530	85%	3,000	5%

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

A large color postcard of the Grand Canyon will be given to every person contacted to encourage participation. Surveyors will use an on-site contact log to document sampling location, time of day, gender, number of children present, personal group size, comments regarding reason for refusal and the responses to the following two questions from the survey:

1. *What types of fluids did you have with you during your hike?*
2. *How difficult was your hike?*

Analyses will be performed to determine if respondents differed significantly from non-respondents, and the implications, if any, for interpreting the results will be reported in any publication or presentation. If necessary, data weighting may be applied during the analysis phase.

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

Survey research methods and the questionnaire instrument were reviewed by NPS officials. The methods and instrument have also been reviewed by Dr. Peter Pettengill, Science and Resource Management, NPS; Dr. Thomas Myers, MD, Grand Canyon National Park Medical Advisor; and Dr. Hannah Heinrich, PSAR Science Advisor. Questionnaire items are either identical or variations to those used in previous studies in several other national park sites and appear

in the NPS Pool of Known Questions (OMB Control Number 1024-0224).

10 Burden Estimates: We plan to approach 3,530 individuals during the sampling period. With an anticipated response rate of 85%, we expect to receive 3000 total responses for this collection.

We expect that the initial contact time will be at least one minute per person (3,530 x 1 minute = 59 hours). We expect that 530 (15%) visitors will refuse to participate during the initial on-site contact, for those individuals collect the information for the non-response bias check described above. This is estimated to take an additional minute (530 x 1 minute = 9 hours) per respondent.

We expect that 3,000 people will agree to complete and return the questionnaire. With that, an additional 5 minutes will be required to complete the process (3,000 response x 5 minutes = 250 hours). The total burden for this collection is estimated to be 318 hours.

Estimated Number of Contacts		Estimation of Time (mins)		Estimation of Burden (hours)	
Total Number of Initial Contacts	3,530	Initial Contact	1	Initial Contact	59
Estimated number of on-site refusals	530	On-site Refusal/nonresponse	1	On-site Refusal/nonresponse	9
Total Number of Responses	3,000	Complete and return surveys	5	Complete and return surveys	250
				Total Burden	318

11. Reporting Plan: Analysis and results will include frequency distributions and descriptive statistics for all questionnaire variables as well as selected cross-tabulations and other comparisons. Depending on the variable, appropriate statistical analyses will be conducted, including correlations (Pearson’s rho), Chi-square, Analysis of Variance (ANOVA), factor analysis, and scale reliability analysis.

Electronic version (in PDF and MS Word file formats) of the completion report will be provided to the park representatives, NPS Denver Service Center; and the NPS Social Science Program for inclusion in the Social Science Studies Collection within 12 months after the collection is completed.

References

Backlund, E. A., Stewart, W., Schwartz, Z., & McDonald, C. (2006). Backcountry day hikers at Grand Canyon National Park. Champaign, Ill.: University of Illinois.

Stewart, W., and Cole, J. (1997). Bright Angel Trail Day-Hiker Study: A Preliminary Investigation. College Station, TX.: Texas A&M University.