



Expedited Approval for NPS- Sponsored Public Surveys

1. Project Title | Submission Date:

2. Abstract:

(not to exceed 150 words)

3. Principal Investigator Contact Information

First Name: Last Name:

Title:

Affiliation:

Street Address:

City: State: Zip code:

Phone: Fax:

Email:

4. Park or Program Liaison Contact Information

First Name: Last Name:

Title:

Park:

Park Office/Division:

Street Address:

City: State: Zip code:

Phone: Fax:

Email:

Project Information

5. **Park(s) For Which Research is to be Conducted:** Denali National Park and Preserve
6. **Survey Dates:** 05/28/2010 (mm/dd/yyyy) to 09/05/2010 (mm/dd/yyyy)
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, operations, management, education, and interpretive activities.

The Denali National Park and Preserve Backcountry Management Plan (BCMP) developed management prescriptions for approximately 6,028,941 acres, or just over 99%, of the park. Two key concepts to the backcountry management of Denali are the backcountry "units" in the park, which are boundaries placed over geographic features, and indicators and standards. Indicators can be thought of as physical or social conditions managers and visitor care about, with standards being the acceptable level of each indicator (Vaske, et al., 2002). The Denali BCMP lists five indicators of resource conditions and five indicators of social conditions.

The indicators of *resource conditions*, as listed on page 35 in the plan, are:

1. Trail and campsite disturbance.
2. Evidence of modern human use, including equipment
3. Landscape modifications.
4. Litter and human waste.
5. Natural sound disturbance (indicated by audible motorized noise).

The indicators of *social conditions* are:

6. Encounters with people.
7. Encounters with large groups.
8. Camping density.
9. Accessibility.
10. Administrative presence.

To illustrate, Table 2-3 on page 40 of the BCMP discusses evidence of modern human use. The table provides the following descriptor for evidence of modern human use, including equipment (bullet #2, above):

"Modern equipment includes communication facilities, research equipment, chain saws, motorized or mechanized vehicles on the ground, and other similar devices. This definition does not include portable devices that a person could reasonably carry without assistance (e.g., cell phones, GPS units, fuel burning stoves), subsistence equipment such as traps or firearms, or aircraft in flight."

The plan describes 3 possible levels for this standard: high, visitors have at most 5 encounters with modern equipment each day of their trip; Medium, visitors have at most 3 encounters with modern equipment each day of their trip; low, visitors have at most 1 encounter with modern equipment per trip.

The indicators and their standards define the backcountry experience (Denali National Park and Preserve, 2006). The indicators are the same for every backcountry unit of the park; however standards for each indicator can vary by unit. It is necessary to monitor the indicators to see if the standards are being exceeded.

The BCMP specifies that monitoring will be conducted at least once every 5 years by visitor survey. The plan also states that the first visitor survey after plan approval would contain questions to evaluate the usefulness of the evidence of modern human use indicator and investigate other alternatives for indicating the impact of modern civilization on the wilderness experience. The proposed visitor surveys are limited to questions mandated by the BCMP.

This study also includes face-to-face semi-structured interviews. For the interviews, the park is primarily concerned about the impact on the backcountry experience of modern human use, including equipment. As required by the park's BCMP, the interview is designed primarily to explore the utility of modern equipment as an indicator of modern human use.

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

(a) Respondent universe:

The respondent universe consists of backcountry visitors 18 years of age and older to Denali National Park and Preserve during the summer of 2010. This includes both overnight backpackers and day users of backcountry trails.

(b) Sampling plan/procedures:

Two survey forms will be used: one for the overnight backpackers and one for day users. This is because the two groups access the backcountry in different ways. In addition, overnight backpackers are in the backcountry longer than are day users. For these two reasons, different sampling procedures will be employed for these two groups.

Overnight backpackers

The overnight users are required to obtain a permit at the park's Backcountry Information Center (BIC) before camping in the backcountry. This provides an efficient opportunity to sample backcountry users. We will randomly select 4-hour time blocks in which the sample will be drawn.. This method was used successfully by Swanson et al. (2002) in an earlier survey of backcountry use in Denali (prior to the Backcountry Management Plan)

There are 184 4-hour time blocks between June 1 and August 31. Seventy-five blocks will be randomly sampled (41% of the total). Approximately 2,300 overnight permits are issued per year, and 40% of this equals 920. However, because we will sample during the peak-use season, we expect to contact approximately 1,250 groups.

NPS employees at the BIC will sample overnight backcountry users and distribute the surveys. The PI will meet with the staff before the study begins to train them in the survey protocol. An instruction sheet will be developed that can be referred to if any questions arise. In addition, the PI will meet again with the BIC staff after the first week of sampling to review the procedures and discuss any unanticipated issues. A graduate research assistant will be present in the park for the duration of the study and also will be able to answer

questions. Finally, the PI will visit the park periodically to help with the day-visitor survey and semi-structured interviews. During these visits, he will check with the BIC staff to monitor progress. A quality assurance plan for backpacker sampling is included with this information collection request.

Day hikers

Day users access the backcountry by several methods. They can drive a private vehicle 12 miles into the park to a parking area at Savage River and hike from there. Day users can also enter the backcountry from park buses at any point along the road. Because they do not have to register, little data exists on the distribution of day hikers. Therefore, at OMB's suggestion, a pretest funded and conducted by the University of Alaska Fairbanks was conducted in summer 2008 to estimate the distribution of day hikers and develop a sampling plan. Day hikers were sampled at the Wilderness Access Center (WAC), where the bus trips start and end, and at popular day hiking destinations along the park road. With one exception, results indicated that sampling at the WAC provides a good representation of the distribution of day hikers. The exception is the popular Savage River area, which would be under-represented by a WAC-only sample due to those driving a private vehicle into the park (see "pretest" section of this supporting statement for more details).

For this reason, day hikers will be sampled at 2 locations: the WAC bus terminal and the Savage River parking area. The pretest also showed that sampling visitors as they get off the bus on their return trip (rather than as they wait to load the bus before their trip) results in a higher response rate. Therefore, bus riders will be sampled when they return to the WAC. The bus schedule varies by time of the season, but at the peak there are 31 buses returning the WAC per day during the afternoon and evening hours. This time span will be broken up into an afternoon 5-hour time block and an evening 5-hour time block. Sixty-six time blocks from May 28 to Sept 5, 2010 will be selected to be sampled at the WAC. A University of Alaska research assistant will be at the WAC to intercept returning visitors. Passengers exiting the bus will be asked if they hiked during their trip. At the Savage River parking area, three 2-hour time blocks will be randomly selected, and the same intercept procedures will be followed.

Interviews

Semi-structured interviews will be conducted with 20 day users and 20 overnight backpackers during the survey period. These qualitative interviews will provide insights into the usefulness of the current indicators of the backcountry experience (primarily "modern human use") and explore whether or not visitors think additional indicators are needed. This assessment is mandated by the park's BCMP.

(c) Instrument administration:

Overnight backpackers

During the sampled time blocks, all groups obtaining a permit at the park's Backcountry Information Center will be asked to complete a survey and return it after their trip. The group member with the most recent birthday will be asked to complete the survey. Respondents will be instructed to return the survey either to a University of Alaska survey administrator or place the completed survey in a drop box. Survey booklets will be of different lengths to accommodate different length trips. The drop boxes have been constructed by the NPS and are of sturdy construction with a locked top. One box will be fixed to the top of a bear-resistant food container drop box at the BIC (backpackers are required to have a bear-resistant food container); the other will be locked to the WAC near the bus drop off. This area is highly visible and staffed by NPS personnel each day. The chances of theft or vandalism are

extremely low.

Day hikers

University survey administrators will be present at the WAC at return times indicated by the bus schedule. A table and sign announcing the survey will be displayed at the sampling location. The sign will announce that a survey of visitors who hiked in the backcountry is being conducted. The sign also will include a map showing the backcountry units. Visitors exiting the bus will be asked if they hiked in the backcountry as shown on the map. For those who respond yes, the survey administrator will confirm that they hiked at least 150 feet off the park road (the definition of where the backcountry begins). Those who meet this requirement and agree to participate will be given the questionnaire and instructed to complete it and return it to the survey administrator or deposit it in one of the drop boxes. For day hikers in a group, we will ask the member with the most recent birthday to complete the survey.

Semi-structured Interviews

Selected day users and overnight backpackers will be asked to participate in a short interview regarding their experience. They will be asked if the interview can be recorded. If permission to record is denied, the interviewer will take hand-written notes. The interview sample is purposive and will provide insights into the utility of the park's backcountry-experience indicators. It is not intended to statistically represent the population of backcountry visitors.

For the interview sample of day users, we will randomly select 20 time blocks when day surveys are being conducted. We will select a random number between 1 and 10 and ask the person who completed the survey that corresponds to that number to participate in the interview. We will continue to sample until someone agrees to participate. One interview will be completed per time block.

For the interview sample of overnight users, we will randomly select 20 time blocks when camper buses are returning. We will select a number between 1 and 15 and start our sampling with that number. We will continue sampling until someone agrees to participate. Unlike the day user sample, all people on a camper bus are potential respondents. This is the reason for having a wider range of numbers to use as a starting point. One interview will be completed per time block.

(d) Expected response rate/confidence levels:

Previous studies conducted in Denali provide guidance for expected response rates. Swanson et al. (2002) achieved a 92% response rate in a survey of overnight backpackers. The Visitor Services Project survey conducted at Denali National Park in 2006 attained an 81% response rate (Meldrum, et al., 2007). The pretest conducted by the University of Alaska Fairbanks in 2008 (of both backpackers and day users) achieved a 69% response rate.

Overnight backpackers

Expected responses and CI

The expected response rate for the backpacker survey is 80%. This is consistent with the Swanson et al. results. The 1,250 overnight visitor groups contacted will produce 1,000 completed surveys. This will result in a confidence interval of +/- 2.7% at 95% confidence for backpackers as a whole. However, the NPS needs to compare conditions in each backcountry unit to the standard. Approximately 43 units will be of interest, and the number of returned surveys will vary by unit. The expected number of completions and power to detect differences by unit is discussed in the next section.

Expected CI and power by unit

The purpose of this study is to compare levels of indicators, as measured by a survey instrument, to the standards that have been set for the units in the park's BCMP. Several of the standards are numeric (e.g., 2 encounters with other groups per day), and others are simply the lack of any presence of the indicator (e.g., no landscape modifications).

Three possibilities exist with respect to the relationship between the level of the indicator as reported in the survey and the standard: the level could be below the standard, equal it, or exceed it. Consultation with park staff indicates that unit means of 0.5 or less above the standard (i.e., 1.5 encounters per day vs. 1), or percentages of 5% or less above the standard (i.e., 10% vs. 5% of respondents sighting litter or human waste), would not be considered significant. Such small differences could be due to unusual circumstances that season. However, greater differences would indicate the need for management action, including increased monitoring in units where the standard has been exceeded. Therefore, adequate power to detect a 0.5 and 5% difference above the standard is required.

With respect to power, the following generalizations hold:

- Given a sample size, the less variation the greater the power.
- Given a level of variance, the larger the sample size the greater the power.
- Holding variance and sample size constant, the larger the effect size the greater the power.

This relationship is displayed in Table 1.

Table 1. Power under different scenarios of variance, sample size, and effect size

	Standard deviation	Difference of .5	Difference of 1
n			
10	1.25	.21	.61
20	1.25	.40	.92
30	1.25	.56	.99
40	1.25	.69	.99
50	1.25	.79	.99
30	1	.75	.99
30	1.5	.42	.94
30	2	.26	.75

Data in this table calculated with G*Power 3 (Faul, Erdfelder, Lang, & Buchner (2007).

Calculated for a 2-tailed t-test

Based on the Swanson et al. data, it is unlikely that all backcountry units will have a standard deviation as high as 1.25. At a standard deviation of 1.0, there would be only 2 fewer units with power of 0.8 with a sample of 1,000 vs. 1,265. For a total sample of 1,000, 29 backcountry units likely will have a final n of 13 or more, large enough to detect a difference of 10 with a power of 0.7, given a standard deviation of 1.25. Thirty-one units will have an n of 10, which can detect a difference of 1.0 with power of 0.6. However, a total sample of only 800 would result in very few individual units having adequate power, assuming a standard deviation of 1.0. For this reason, a final sample of 1,000 completed surveys by overnight backpackers is considered optimum.

Day hikers

Expected response rate and confidence interval

For day hikers, the response rate is expected to be no lower than the pretest data (69%). Three of the refusals by day hikers in the pretest were because they needed to catch a bus to their hotel outside the park. For these visitors, postage-paid return envelopes will be available. Thus, we expect to achieve a

75% response rate for day hikers. Given that pretest results suggest there will be approximately 20 eligible respondents per day, sampling 60 time blocks will result in approximately 1,000 completed surveys.

We also expect a 75% response rate at the Savage River parking area. The three times blocks sampled at this location will result in approximately 45 contacts and 34 completed surveys.

Confidence intervals and power by unit

For day hikers, the relationship between sample size, variance, effect size, and power is the same as for overnight users. With a standard deviation of 1.25, a sample size of approximately 50 is required to achieve power of 0.8 to detect a 0.5 difference, and 30 is required to achieve power of 0.56 to detect a 0.5 difference.

For analyzing encounters with others, pretest data indicate that the units with approximately 10 day hikers in the sample will not exceed 0.5 of the standard. For other units with anticipated ns between 10 and 50, it appears high standard deviations are associated with means far above the standard and low standard deviations are associated with means near the standard. An overall sample of approximately 1,000 completions will allow those units with low visitation to have an n of at least 10. This should ensure adequate power to test whether sample estimates for indicators differ from standards.

Interviews

The response rate for the interviews is also anticipated to be 75%, resulting in 15 interviews with day hikers and 15 with overnight hikers. Because the interviews are qualitative and are not attempting to represent the population of backcountry visitors, confidence intervals are not calculated.

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

For overnight backcountry users, we will number surveys and record the following information from their permits: backcountry unit, trip length, group size, gender of respondent, and residence. These will be compared between respondents and nonrespondents.

For day hikers who did not accept a survey, we will attempt to maintain contact long enough to ask how many people they saw in the backcountry and if they heard motorized noise. These answers will be compared with those of respondents to estimate the risk of non-response bias.

For day hikers, observable characteristics of all those contacted will be recorded (e.g., group size and group type). In addition, we can compare response rates between time blocks. Thus, we can identify specific times with lower response rates and compare those times to corresponding time blocks (i.e., same bus route or time of week) with higher response rates.

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

A pretest of a similar survey instrument was supported and conducted by the University of Alaska Fairbanks from June 27 to July 5, 2008. The pretest evaluated 3 different methods of survey administration:

- Before visitors boarded the bus at the WAC, asking if they planned on hiking
- As returning visitors got off the bus, asking if they had hiked
- At the Savage River parking area and Eielson Visitor Center as hikers completed their hike.

The locations along the park road had the highest response rate, followed by the WAC post-hike method (Table 3).

Table 3. Response Rate by Sample Location

	n	Agreed to complete survey	Completed surveys
Pre-trip at WAC	111	101 (91%)	30 (27%)
Post-trip at WAC	68	55 (81%)	47 (69%)
Post-trip at rest areas ^a	83	62 (75%)	61 (73%)

a. Includes Savage River and Eielson.

From the pretest it can be concluded that sampling at the WAC and Savage River parking area after the trip will result in a higher response rate, minimizing the risk of non-response bias. The pretest also revealed confusion caused by wording in a small number of questions. Appropriate revisions have been made.

The study proposal was peer-reviewed by 2 university professors with experience in recreation survey-based research. Denali National Park and Preserve staff also reviewed the methods and instrument.

10. **Total Number of Initial Contacts | Expected Respondents:** D: 1378 O: 1250 I: 40 D: 1,034 O: 1,000 I: 30 **II. Estimated Time to Complete Initial Contact | Instrument (mins.):** 1/2 D: 5 O: 10 I: 20 **Total Burden Hours:** 285 n

13. **Reporting Plan:** The University of Alaska Fairbanks will present results to the NPS, provide a written report; and develop a web-based, searchable database to query the levels of indicators of different backcountry units. The presentation and report will present the distribution of responses for each indicator by backcountry unit, and the appropriate summary statistic (mean or percentage). The appropriate test statistic (t-test, chi-square test) will then be used to compare the data to the standard. A copy of the final report will be archived in the Social Science Studies Collection.

Literature Cited

Denali National Park and Preserve. (2006). Denali National Park and Preserve final backcountry management plan. General management plan amendment and environmental impact statement. National Park Service, U.S. Department of the Interior, Denali Park, Alaska.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.

Glass, G. V. & Hopkins, K. D. (1996). *Statistical methods in education and psychology*. Needham Heights, MA: Simon & Schuster, Inc.

Meldrum, B. H., Evans, J. & Hollenhorst, S. J. (2007). Denali National Park and Preserve Visitor Study Summer 2006. Park Studies Unit, Visitor Services Project Report 180. Social Science Program, National Park Service, U.S. Department of the Interior.

Swanson, J. E., Vande Kamp, M. E., and Johnson, D. R. (2002). A survey of overnight backcountry visitors to Denali National Park and Preserve. Technical Report NPS/CCSOUW/NRTR-2002-04 NPS D-318. Cascadia Field Station, USGS/BRD/FRESC, College of Forest Resources, University of Washington.

Vaske, J. J., Whittaker, D., Shelby, B. & Manfredo, M. J. (2002). Indicators and standards: Developing definitions of quality. In Manfredo, M. J. (ed.), *Wildlife Viewing a Management Handbook*, Corvallis, OR: OSU press. Pgs. 143-171.

Quality Assurance for Denali National Park Visitor Survey

Peter Fix, Principal Investigator, University of Alaska Fairbanks

Philip Hooge, Assistant Superintendent, Denali National Park and Preserve

The staff of Denali National Park and Preserve is committed to the success of a visitor survey which will provide valid scientific results for future park planning. Quality assurance in the field will be provided by the onsite park coordinator, who will oversee the survey and train a staff of permanent and seasonal park employees. This staff will carry out the distribution of the overnight surveys. Additional oversight will be provided by Denali's management staff.

Responsibilities of Park Coordinator

- Oversees the survey onsite to ensure a valid, non-biased sampling based on the pre-defined sampling periods.
- Trains all employees who will be distributing surveys on the survey process before the survey begins, and train all new employees who will be distributing surveys as the survey continues through the season.
- Ensures ample visitor center staffing on the pre-determined survey days so that those employees responsible for distributing surveys will not be diverted away from this priority to fulfill other duties.
- Makes all other staff members aware of the survey so that they may answer survey-related questions upon encountering participants in the park.
- Positions survey drop boxes so that they are highly visible and easily accessible.
- Discuss collection protocols with visitor center staff and bus drivers.

Responsibilities of Surveyors (*Permanent and seasonal employees*)

- Will be trained according to the pre-determined survey distribution instructions and guidelines prior to distributing surveys.
- Will be dedicated to that duty for the survey day.
- Will adhere to survey distribution instructions to ensure valid, accurate results.
- Will maintain survey logs recording the disposition of every contact (including refusals) and the observable characteristics of refusers and non-refusers for use in a non-response bias analysis.

Responsibilities of Principal Investigator

- Prepares a detailed sampling protocol document to use in training park staff and to guide and remind interviewers of the protocol.
- Conducts at least two training sessions in collaboration with the Park Survey Coordinator—one prior to beginning the survey and a second training session as new employees are hired (e.g., for the summer season).
- Ensures a graduate student will be onsite for the duration of the study to sample day users, collect surveys, and be in contact with park staff.
- Is in continuous contact with graduate student and park staff conducting the survey.
- Makes park visits as needed to ensure continued commitment.
- Provide reports as specified in the agreement.