

Proposal Introduction

Beliefs about Bear Resistant Food Canister Use Among Backcountry Visitors in Glacier National Park

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Table of Contents

Introduction	1
Abstract	3
Background	3
Statement of Issue	3
Literature Summary	5
Scope of Study	5
Intended Use of Results	5
Research Questions and Objectives to be Tested	6
Methods	8
Description of Study Area	8
Procedures	8
Sampling	10
Collections	13
Analysis	13
Schedule	14
Budget	15
Products	15
Publications and Reports	15
Literature Cited	16
Qualifications	17
Supporting Documentation and Special Concerns	
Safety	18
Access to Study Sites	18
Ethical Issues	19
NPS Assistance	19
Wilderness Questionnaire Approval	19

Abstract

Bear resistant food canisters (BRFC) have been manufactured and used since 1982. The mandatory and recommended use of them has been adopted in various ways by National Parks and National Forests throughout the country. Agencies in the Rocky Mountains and the Sierra Nevada have developed techniques to test and approve these devices, but no research has been conducted to discover why backcountry users choose to take or not take BRFCs on wilderness trips.

This research will use an internet questionnaire using the (Ajzen & Fishbein, 1975) elicitation method to identify (elicit) the salient beliefs of overnight backcountry users concerning the use or non-use of BRFCs. Furthermore, after data are collected, the salient beliefs will be categorized into three value orientations for those who engage in environmentally sound behavior. These three categories are egoistic, altruistic, and biospheric.

This study will also explore relationships between the use or non-use of BRFCs and the user's trip characteristics by asking additional questions concerning the participant's trip.

Key Words: Bear resistant food canister (BRFC), Fishbein elicitation method, salient beliefs

Background

Statement of Issue

Bear resistant food canisters or BRFCs have proven to be an effective means of food storage for backpackers since the first manufactured version of these tools

(Backpackers Cache) was made available in 1982 by the Garcia Company. When used properly, National Park Service approved BRFCs can be 100% effective at preventing bears and other wildlife from obtaining human food. Since then, many National Parks and National Forests throughout the United States have adopted the use of them in varying degrees.

In Glacier National Park, little is known about the beliefs people have about the use of BRFCs or why people choose to use them or not to use them. Most of the research that has been conducted on BRFCs was through the product approval process by the Interagency Grizzly Bear Committee (Sowka & Jonkel, 2004). These devices work to keep bears and other wildlife from acquiring human food, but there is no data as to why wilderness users choose to take or not take BRFCs along with them on their trips. This research is important in that it will allow the park and other interested parties to know why people use or do not use BRFCs when there are other acceptable food storage alternatives available such as food hangs. Furthermore, it will assist the Park in developing messages or programs to increase the public's usage of BRFCs. In 1998, Glacier National Park had over 13,000 visitors enter the backcountry for overnight trips (Van Ormer, 2002). With the backcountry use levels as high as this; there is a great risk of bears and wildlife acquiring human food.

Glacier National Park (GNP) makes an interesting setting for this study because of some of its unique characteristics. Since the use of BRFCs is not required in most areas of the park, most people who use them take them at will. This will allow for a sample of backcountry users who use BRFCs and those who do not use a BRFC. A second unique characteristic that makes GNP a good location for this study is the

presence of both black bears and grizzly bears; this will make the study more robust in that there is an increased level of danger of losing food to bears in the backcountry.

Literature Summary

There is little literature currently available about BRFCs. Most of it comes in the form of management documents for National Parks or other agencies in the form of rules and regulations for the use of them such as the Glacier National Park Wilderness and Backcountry Management Plan or the Bear Management Guidelines (USDI, 2001, 2003). Literature explaining the process that BRFCs have to go through for approval by National Parks and other agencies that support the use of BRFCs is also available. An example of this is the Bear-Resistant Product Testing Program report (Sowka & Jonkel, 2004).

Harris and Martin (2003) conducted a visitor survey along the Lost Coast Trail in California that included questions about the use of BRFCs and reported it in a poster presentation. This research found a positive relationship between the distance that a person traveled and the use of BRFCs. People who traveled 100 miles or greater were more likely to carry a BRFC than people who lived closer to the Lost Coast Trail.

Scope of Study

The geographic scope of this project is Glacier National Park. Data that is found from this study may be useful to other National Parks and National Forests, and researchers who are interested in knowing about the use of BRFCs.

Intended Use of Results

When the data are collected and analyzed, a written report will be produced and a presentation will be arranged at the convenience of Glacier National Park. The results will also be used for a master's thesis. A publishable article for a peer-reviewed journal

will be developed and submitted as well. Also, a list of belief statements will be composed for further research on the beliefs of backcountry users and the use of BRFCs.

Research Questions and Objectives to be Tested

Research Question: What beliefs do overnight backcountry users in Glacier National Park hold about the use or non-use of bear resistant food canisters?

Objective 1: To identify the beliefs that overnight backcountry users in Glacier National Park hold about the use or non-use of bear resistant food canisters.

Objective 2: To categorize the identified beliefs according to three value orientations to create a profile of Glacier National Park users.

Purpose:

One purpose of this study is to identify and differentiate the beliefs that overnight wilderness users traveling on foot in Glacier National Park hold relative to the use or non-use of BRFCs and further to categorize the beliefs as being egoistic, altruistic, and biospheric to create a profile of GNP wilderness users. Three types of value orientations have been proposed by (Schultz, 2000) to explain why people engage in environmentally sound behaviors. These three value orientations include egoistic, altruistic and biospheric. People with egoistic value orientations identify themselves as “relatively independent from other people and from the natural environment” (Schultz, 2000 p. 394). An example of a person with egoistic value orientations would take a BRFC only for purposes for survival. This could also be a person who does not carry a BRFC because of the inconvenience of taking one on his or her trip. People who see themselves as interconnected with others and are concerned with avoiding harm to other people would be said to have an altruistic value orientation (Schultz, 2000). An example of a person with an altruistic value orientation would be if someone admitted that they take a BRFC on his or her trip for the safety of others in the group. Someone who has a biospheric

value orientation would seek to avoid harm to the environment around them. This includes harm to plants and animals (Schultz, 2000). A person that is biospherically oriented might take a BRFC on a trip to protect the health of the bears and other wildlife by preventing them from becoming habituated to human food. It is important to know which of the three value orientations is influencing visitors' choices of using or not using BRFCs. The Park Service typically employs a biospheric appeal by telling visitors that bears must be prevented from obtaining human food. This is because the bears will quickly learn to seek out human food once they get their first taste. This will lead to problematic and dangerous encounters which eventually result in the bears removal and destruction. However, a biospheric appeal may not be congruent with the salient beliefs that lead people to take/not take BRFCs. The Theory of Reasoned Action (Fishbein & Manfredo, 1992) has demonstrated that persuasive communication is more effective if appeals are made congruent with people's salient beliefs and values. This will be the first research to ever investigate the motivations behind why people use/don't use BRFCs and has great potential utility to the Park Service.

Objective 3: To identify relationships between the use and non-use of bear resistant food canisters and characteristics of the user as well as his or her party and trip.

Purpose:

Since very little research has been performed on bear resistant food canisters there is no information about relationships that may arise between the use of them and the characteristics of the users or non-users of them. In one study, a positive relationship was found between distance traveled to the destination and increased use of BRFCs (Harris &

Martin, 2003). This study found that people who traveled more than 100 miles were more likely to use BRFCs. The reason why this relationship existed was not investigated. Results of this analysis will further assist the Park Service in designing messages and programs for specific target audiences (Fazio & Gilbert, 1981) to increase the use of BRFCs. Information on user and trip characteristics will be collected from a sample of backcountry permits and an internet survey. Correlational analysis will be conducted on use/non-use of BRFCs and characteristics such as distance that is traveled to the park, wilderness trip length in days, miles hiked, experience in backcountry travel, backcountry user's age, number of people in traveling group, use of pepper spray and bear bells.

Methods

Description of Study Area

The study area includes all of the Glacier National Park backcountry where people obtain permits for overnight use. All the research that is to be performed in the park will take place in the backcountry permit stations. These include Apgar Backcountry Permit Center, St. Mary Visitor Center, Many Glacier Ranger Station, Two Medicine Ranger Station, and the Polebridge Ranger Station.

Procedures

A internet based elicitation questionnaire will be used that follows a semi-structured elicitation procedure that is based on the Theory of Reasoned Action and Theory of Planned Behavior (Ajzen & Fishbein, 1980). The purpose of using this approach is to identify (elicit) people's salient beliefs concerning the use, or non-use of

BRFCs. Open-ended questions concerning the behavioral beliefs, normative beliefs, and control beliefs relative to the use or non-use of BRFC will be asked in this questionnaire. The participants will be asked to create a list of beliefs that they associate with each question asked. This process will identify salient beliefs from the range of users. This range will include people who have not used BRFCs to people who have used the devices extensively. This questionnaire will also include additional questions that will be vital to discover relationships between users and the beliefs that were elicited from them. These questions will be multiple choice questions about themselves and characteristics about the party's trip.

Currently the questionnaire is in the process of being developed on the internet and space will be provided for management to add any questions that they may have for management purposes. This survey questionnaire will follow the guidelines of the Tailored Design Method (TDM) as described for mail and internet surveys by (Dillman, 2000). A draft of the developed questions can be found attached to this document. A link to the internet questionnaire will be sent by e-mail to trip leaders selected by a simple random sample from contact cards people will voluntarily fill out when they secure their backcountry trip permits. The contact cards will inform people that a study of backcountry travelers is being conducted by the University of Idaho and they can participate in an internet survey by entering their name and a valid e-mail address. Emphasis will be made to the fact that the participant's e-mail address will not be used for absolutely any other reason except for the survey. Recent research of backcountry users in Glacier National Park (Van Ormer, 2002) indicate that people are willing and

interested in participating in survey research as evidenced by their high 75% response rate.

Sampling

This research will use a two-stage cluster sample. The primary sampling units for this will be weekend and weekdays that are selected at random at five ranger stations where permits can be obtained. These five locations were chosen because of the number of permits that they issue. The information in the table below shows each of the permit issuing locations in Glacier National Park and the percent of permits that each issued in 2002. This information was found in the 2002 State of the Backcountry Report for Glacier National Park (USDI, 2002). The locations with * next to them have not been chosen for sampling because of the low number of permits they issue. The table also shows the number that will be sampled from each location.

Location	2002	(n) to be sampled
Apgar Visitor Center	61.0%	427
Qtrs #3 Advanced Reservations	- *	
St. Mary Visitor Center	20.5%	144
Many Glacier Ranger Station	8.6%	67
Two Medicine Ranger Station	4.9%	41
Park Headquarters (winter)	1.6% *	
Polebridge Ranger Station	2.9%	21
Goat Haunt Ranger Station	0 (1) *	
Waterton Visitor Station	.5% (24) *	
Total Number (n) to be Sampled		700

Weekends and weekdays will be sampled equally because we do not know if the number of permits that are issued varies by weekend and weekdays. The study will be conducted from June 15 through August 31. During this period of time there are 78 days that have the possibility to be sampled. Nine three-day blocks will be sampled. The starting day for these blocks will be determined using a random number table so that both weekdays and weekends are sampled equally.

The secondary sampling units will be individuals from backcountry parties who are receiving permits. On these days, visitor contact cards will be filled out voluntarily by overnight backcountry users. Only one person per party will be asked to fill out a card to prevent receiving multiple responses from people in a group who are sharing the use of a single BRFC. From the visitor contact cards, a systematic random sample will be selected to receive an internet questionnaire. Because some of the permit issuing stations issue many more permits than others, they will be sampled proportional to use.

In order to project the results of this research to the entire population of overnight backcountry users in Glacier National Park, 363 questionnaires will need to be collected. This number was calculated by using the sample size estimator formula found in (Dillman, 2000, p. 206).

$$N_s = (N_p) (p) (1-p) / (N_p-1) (B/C)^2 + (p) (1-p)$$

Where: N_s = completed sample size needed for desired level of precision.

N_p = Size of population

p = proportion of population expected to choose one of the two response categories

B = acceptable amount of sampling error

C = Z statistic associated with confidence level

In order to get 363 completed questionnaires submitted, approximately 700 questionnaires will need to be sent out since everyone will not respond.

E-Mailings	Expected Response	(n)	Non-Response	(n)
1st E-Mailing	30%	210	70%	490
Follow Up E-Mail	30%	147	70%	343
3rd E-Mailing	20%	69		
Target	80%	426		

The table above shows the anticipated response rates based on sending out 700 questionnaires. Notice that the target number of received questionnaires in the table is higher than 363. This over sampling will allow for potential errors in the expected response rates.

These 700 questionnaires will be sent out in increments every 2 weeks throughout the summer so that people who receive them still have a clear memory of their backcountry trip. The process for each set of e-mailings will be as follows:

1. A cover letter by e-mail and a link to the survey questionnaire will be sent out in the initial mailing.
2. 7-10 days after the participants receive the initial e-mail with a link to the internet questionnaire a reminder e-mail will be sent out that both thanks the participants who have completed the questionnaire and submitted it, and asks the participants who have not yet completed the survey to do so.
3. 21 days after the initial mailing, a final e-mail will be sent out that includes another link to the questionnaire and another cover letter to those who still have not returned their submitted a survey.

Additionally, this research will utilize the wilderness permit database to analyze backpacker's trends on taking BRFCs and attempt to find relationships between different variables such as trailheads entered, distance traveled, wilderness user's place of residence, and length of trip. This will be accomplished by using the data from the permit database throughout the summer and analyzing the data on the researcher's own time. People's names will not be taken from the database, therefore, ensuring complete confidentiality of all permit holders' data.

Collections

Only names and addresses of backcountry users will be collected. No samples of plant or animal materials will be collected.

Analysis

For objective number one, the researcher will conduct content analysis on the salient beliefs that are elicited in the questionnaire. Each of the salient beliefs that are identified will be coded and placed into categories based on similarity of meaning following standard content analysis techniques (Rosengren, 1981). To increase validity, the researcher will use a panel of expert coders to categorize the responses. This panel will be composed of graduate students in the Department of Resource Recreation and Tourism at the University of Idaho. Elicited beliefs will be narrowed down as suggested by (Ajzen & Fishbein, 1975, 1980). The results from this are referred to as the modal salient beliefs or the population beliefs for users and non-users of BRFCs.

Data from both the permits and internet questionnaire will be entered into a database set up in the SPSS software program. To analyze and interpret the collected data, descriptive statistics will be calculated on the data such as median, mode and range.

The researcher will also run appropriate correlational analysis and discriminate function analysis to differentiate between the use or non-use of BRFCs and characteristics of the backcountry user's trip and their belief structures (Nie, N. H., Hull, C.H., Jenkins, J. G., Steinbrenner, K. & Bent, D. H., 1975).

Schedule

April 2004	-Finalize proposal -Develop main questionnaire and test -Submit Information for NPS research permit
May 2004	-Finalize project logistics with Glacier National Park -Present proposal to College of Natural Resources -Purchase supplies for the research -Develop internet surveys & email cover letters & reminders -Travel to Glacier National Park and start work
June 2004	-Start collecting names of backcountry users on June 15 -Start sending e-mails with links to the questionnaire
July 2004	-Continue with data collection -Data entry
August 2004	-Continue with data collection -Data entry
September-December 2004	-Data analysis -Prepare a document and presentation for Glacier National Park -Schedule a date for a presentation to Glacier National Park
January 2004-March 2005	-Thesis writing
April-May 2005	-Thesis defense & final report writing

Budget

This project is being conducted by an unfunded graduate student. No federal or state monies will be involved in conducting the research.

Printing -Visitor Contact Card (2000 = \$81.00)	\$81
Supplies -Printer Cartridge \$30.00 - Phone \$100	\$130
Software -SPSS Software (student version) \$190.00	\$190
Travel (personal vehicle) (GNP) -648 miles (round trip) X 3 trips X .365 per mile Travel within Park -Approximately 800 miles X .365 per mile	\$710 \$292
Grand Total	\$1403

Products

Publications and Reports

Three products are expected from this project. First, a written report will be produced and a presentation will be arranged for Glacier National Park. Secondly, the results will also be presented in a master's thesis. Lastly, a publishable article for a peer reviewed journal will be developed and submitted.

Collections

No collections will be made in this research project.

Data and Other Materials

A copy of the SPSS data will be provided on CDROM to Glacier National Park.

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Qualifications

Primary Researcher

Dr. Ed Krumpe is a Professor of Resource Recreation and Tourism in the University of Idaho's College of Natural Resources. In addition to his academic responsibilities, Dr. Krumpe is the Principal Scientist of Wilderness Management of the University of Idaho's Wilderness Research Center, for which he served as director for six years. He has twenty-five years experience in conducting research and teaching about recreation and tourism management, wilderness and wild and scenic river planning, and public involvement and conflict resolution in National Parks, National Forests, BLM Public Lands and other natural resource areas. He has conducted workshops and training in wilderness management, limits of acceptable change (LAC) planning, and public involvement for federal and state agencies as well as at international conferences. He holds BS, MS and PhD degrees in resource recreation management and has conducted studies in Glacier National Park, Yellowstone National Park, and Admiralty Island National Monument. In addition, he has worked with the National Park Service Inventory and Monitoring Program's Vital Signs Monitoring Program for the Greater Yellowstone Ecosystem Network, the Northern Colorado Plateau Network, and the Upper Columbia Basin Network and developed several internet-based surveys for each of these networks.

Additional Researcher

Steven Best, the additional researcher on this project is qualified for this research in that he has a Bachelor's degree in Recreation and Leisure Services with an emphasis in Outdoor Recreation from the University of North Dakota. He has been extremely interested in this topic since volunteering in Yosemite National Park during the summer

of 2003. Here he issued backcountry permits and rented BRFCs to backcountry users. He also conducted three-day patrols where he was able to use and test the newest designs of BRFCs. While preparing to conduct research in Glacier National Park for the upcoming summer, he has become familiar with most of the Parks backcountry rules and regulations. Steven has been enrolled and working towards completing a Master's degree in Resource Recreation and Tourism at the University of Idaho in Moscow, Idaho. He has completed courses such as Fundamentals of Research, Research Literature for Resource Recreation and Tourism, Sample Survey Methods as well as other courses in public lands management.

Supporting Documentation and Special Concerns

Safety

Data will be collected via internet survey. Therefore, there are really no hazardous activities involved with this research.

Access to Study Sites

Weekly visits will be made to various backcountry permit stations. This will include driving on park and state roads to access the backcountry permit stations. This project will not need to access any restricted areas.

Use of Mechanized and Other Equipment

Not Applicable

Chemical Use Not Applicable

Ground Disturbance Not Applicable

Ethical Issues

This research will be reviewed and approved by the University of Idaho Human Assurance Committee. This ensures that there are no harmful effects to the participants of this study.

Animal Welfare

Not Applicable

NPS Assistance

Minimal assistance from the Glacier National Park backcountry permit staff will be required to collect contact cards with backcountry user's names and valid e-mail addresses. This will be done using a note-card that will ask a backcountry user to check a box if they are interested in participating in a wilderness internet survey. It will then ask for their e-mail address and assure them of strict confidentiality. The backcountry permit database will also be used to explore permit data. No names or addresses will be collected from the database ensuring confidentiality.

Wilderness “minimum requirement” Protocols

Not Applicable

Wilderness Questionnaire Approval

OMB approval of the questionnaire will be secured by the University principal investigator through the Aldo Leopold Wilderness Research Institute social science program which has an approved set of questions for conducting survey research in wilderness and wilderness study areas.