

**Assessment
of
Rocky Mountain National Park
Backcountry Campers' Adoption
of
Leave No Trace Technologies**

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Executive Summary

Improper disposal of human waste (feces) in our National Parks is an increasing problem. In Rocky Mountain National Park alone, some 28,000 backpackers obtain permits for overnight or extended camping trips each year. The RMNP staff asked us to survey backcountry campers to assess the following objectives: (1) Describe the demographics of respondents and their backcountry camping characteristics, (2) Assess their camping activities and practices in Rocky Mountain National Park, (3) Assess their awareness of Leave No Trace practices and their use of them, (4) Assess their views and perceptions of Restop2 bags and (5) Compare selected characteristics of respondents who had used Restop2 bags with respondents who had not used Restop2 bags.

We used Dillman's Tailored Design to conduct a mail survey to a purposive sample of July and August backcountry campers in Rocky Mountain National Park. Volunteer recruiters approach backcountry campers as they left the Backcountry Permit office and asked if they would complete a mail survey about one month after their trip. Those backcountry campers who agreed (N=227) were surveyed during August, September, October, and November 2011.

In all, 122 backcountry campers returned the survey for an overall response rate of 56%. We ran descriptive statistics for all respondents and inferential statistics to compare users (adopters) and non-users (non-adopters) of Restop2 bags.

Demographics

For all respondents, 56% had backpacked during July and 44% during August. They ranged from 16 to 77 years old with a mean age of $M = 39.27 \pm 12.87$ years old. Overall, 77% of the respondents were males and 23% were females.

Camping Practices

In the last 12 months, respondents reported having camped from 1 to 20 times and averaged 2.99 ± 2.99 times. They reported they had high levels of camping expertise using topographical maps, treating water, surviving a variety of weather conditions, protecting food from wildlife, and using GPS technology. About half of the respondents had planned their backcountry trip one or more months in advance of arriving at Rocky Mountain National Park. While camping, photography and bird watching were the most frequent additional activities of respondents. Respondents reported using a wide variety of information sources about their camping opportunities with their usage, in decreasing order, were friends, other Websites, Rocky Mountain National Park Website, outdoor/sporting good stores, and camping/recreational magazines.

Overall, respondents' answers to the Leave No Trace scale suggest they were highly familiar with the Leave No Trace Guidelines.

Restop2 Bags

While 96% of the 122 respondents reported having received the Restop2 bags, only 44 (37% of the respondents (now known as adopters) reported using the Restop2 bags. Of the 44 Restop2

adopters, 84% reported using the bags between 1 and 3 times. About 91% (n=40) disposed of the bags using dumpsters at the trailheads or the trash and garbage at various locations.

The most frequently reported advantages of Restop2 bags were ease of use, convenience, leaving less waste behind, and not needing to dig a cat hole. The more frequently reported disadvantages were bags were hard to use, carrying the bags out, bags being smelly, and their weight.

Participants reported the environment advantages of Restop2 bags included less impact and the decrease in human waste left behind while the environmental disadvantages included wastes ending up in landfills and the plastics used in the bags. The most frequently reported advantages to the immediate camping area in the use of Restop2 bags were lower human waste, and a cleaner camping area. The disadvantages listed included people were too lazy to use a Restop2 bag; the bag includes plastic and chemicals; the bag ends up in a landfill; it is inconvenient to use; and bags need to be packed out.

All respondents (n=122)—both users and non-users--were asked to rate Restop2 bags on understanding the bag's directions, opening the bag, closing the bag, using the gel, packing it out, and disposing of the bag. For each item, they could rate the Restop2 bags on a 1 to 7 scale where 1 = "very difficult" to 7 = "very easy" or they could opt out of answering the item, by circling "N/A" if they thought it "does not apply to you" or it was "not applicable."

While most of the users (n=43 to 41) rated Restop2 bags, fewer non-users (n=19 to 37) rated the items about Restop2 bags. The raw numbers of users and non-users, small sample sizes for non-respondents rating the items, and unequal variance (range) in responses between users and non-users dictates caution when interpreting the statistics.

That said, we found no significant differences in respondents rating of their understanding of the bag directions, opening the bag, closing the bag and using the gel. They generally rated the bags relatively highly (means between 6.19 ± 1.03 to 5.26 ± 1.20).

In response to packing the bags out and disposing of the bags, users rated the bags slightly higher than non-users. More specifically, in response to packing the bags out, users rated the bags higher (n=43; mean= 5.23 ± 1.29) than non-users (n=23, mean= 4.35 ± 2.10) with a significance level of $p=.075$). In response to their assessment of disposing of the bags, users rated the bags higher (n=41, mean= 6.24 ± 0.99) than non-users (n=23, mean= 5.39 ± 2.11) with a significance level of $p=.078$). Because the variances were not equal, the means are not statistically significant at the $p=.05$ level, but had the variance been equal, the ratings would have been statistically significant with a probability of $p=.038$ for packing Restop2 bags out and a probability of $p=.031$ for disposing of the bag.

Seventy-three respondents (i.e., non-adopters) listed three main reasons for not using the Restop2 bags; their leading reasons included the availability of pit toilets, not needing them, or not wanting to carry them out.

Overall, the likelihood that respondents would purchase a Restop2 bag for a future trip was moderate (n = 120, M= 3.23 ± 2.05 on a 1 to 7 scale where 1= Not likely to 7 = Likely). Using a similar scale, their likelihood of supporting mandatory use was M= 4.20 ± 2.26 . One factor in determining whether Restop2 bags would be used is the easy of use versus digging a hole for

human waste. Fifty-seven percent of the 117 respondents reported digging a hole would be easier, 21% reported it would be as easy, and 22% reported digging a hole was harder.

The most important reason identified for using a Restop2 bag (or similar device) is having a National Park require Restop2 bag use ($M=5.96 \pm 1.67$ on a 1 to 7 scale where 1= Not important to 7 = Very important).

Responses on camping characteristics in relation to Restop2 use were compared. It was found that:

- Respondents using the Restop2 bags camped significantly fewer nights than did respondents not using them.
- Respondents using Restop2 bags had significantly fewer campers in their groups.

When we compared adopters and non-adopters of Restop2 bags on the Leave No Trace scale only four of the 16 characteristics were significantly different:

- Adopters reported camping in their permit-designed area significantly fewer times than non-adopters.
- Adopters reported leaving plants and rocks in their natural area significantly fewer times than non-adopters.
- Adopters reported hanging food or scent items in bear barrels significantly fewer times than did non-adopters.
- Adopters reported packing everything out significantly fewer times than non-adopters.

When compared on their views or attitudes toward the Restop2 bags:

- Adopters reported being significantly more likely to purchase a Restop2 bag than non-adopters.
- Adopters were significantly more likely to support mandatory use of Restop2 bags than non-adopters.

When asked about factors influencing respondents' decision to use Restop2 or similar devices on a future backpacking trip:

- Adopters rated "camping group decision" significantly higher than non-adopters of the Restop2 bags.
- Adopters rated "environmental impact" significantly higher than non-adopter of the Restop2 bags.

Clearly, more research is needed to explore why the adopters scored significantly higher on these Leave No Trace characteristics.

Table of Contents

Introduction 6

Methodology 7

Results 10

Results—characteristics of backcountry campers 10

Results—Gender 10

Results—Prior camping experience 11

Results—Camping in Rocky Mountain National Park 14

Results—Restop2 usage 18

Results—Comparison of adopters (users of Restop2 bags) and non-adopters 23

Discussion 25

Conclusion 27

References 28

Appendix A Recruiting 29

Appendix B Letters & questionnaire 37

Appendix C Residence of respondents 50

Appendix B Final comments 51

Tables

Table 1. Groups with which respondents camped 11

Table 2. Years of experience backcountry camping 11

Table 3. Levels of self-assessed backcountry camping 12

Table 4. Information sources of respondents 13

Table 5. Related activities do you participate in while camping 13

Table 6. Advance planning of backcountry camping trips 14

Table 7. Length of planned stay in backcountry camping trips 14

Table 8. Number of campers in group 15

Table 9. Familiarity with Leave no trace practices 16

Table 10. Means and standard deviations of familiarity with leave no trace practices 17

Table 11. Assessment of factors influencing use of Restop2 bags 20

Table 12. Likelihood of buying bags and supporting mandatory use 21

Table 13. Importance of factors influencing use of Restop2 bags 22

Table 14. Importance of items influencing decisions to use Restop2 bags 22

Introduction

Improper disposal of human waste (feces) in our National Parks is creating an increasing problem. Human waste can contaminate streams and lakes, alter wildlife behavior, and create health problems for humans and wildlife alike. Therefore, many national parks are moving toward a policy requiring climbers, hikers, and campers to pack out their human waste. This practice aligns with the Leave No Trace multi-agency project that encourages cleanliness in all areas of national parks.

Packing out human waste is a common practice among climbers, river rafters, kayakers, cavers and canyoneers. For example, in Yosemite National Park, climbers are required to carry down all trash and human waste and dispose of it appropriately. It is illegal to throw *anything* off a cliff in Yosemite. For visitors of Mt. Whitney, the only acceptable waste disposal method is to pack-it-out. Packing out waste is encouraged or required at Mt. Shasta, Mt. Rainier, Mt. Hood, Grand Tetons National Park, Zion National Park, and Denali.

Several manufacturers market kits that make it easier to carry out human waste. The kits consist of disposable bag systems made of a puncture-resistant material with a locking zip closure. Each waste bag is pre-loaded with a non-toxic gelling agent that quickly turns waste into a stable gel for easy transportation, catalyzes decay, and removes odors (no perfumes). The kits are degradable and are approved for disposal in landfills. They cost from \$3.95 per bag to \$1.91 if backpackers buy packages of 12 units.

Research Setting—Rocky Mountain National Park

Each year about 28,000 backpackers obtain permits for overnight or extended camping trips into Rocky Mountain National Park. Backpackers must obtain their backcountry permits at either the Beaver Meadows Visitors' Center (East Side) or the Kawuneeche Visitors' Center (West Side). At these locations, Rocky Mountain National Park staff distribute 3,000 human solid waste disposal units to backpackers annually. American Innotech, Inc. donates the Restop 2 Disposal Travel Toilet packets to Rocky Mountain National Park.

Background--Diffusion of Innovations

Because of human waste's negative impact on the environment, RMNP requested research on why backcountry campers would or would not adopt a disposable bag system such as Restop2.

Research on diffusion of innovation, an area in social science and communication research, can provide useful insights. Diffusion of innovations looks at technology transfer. A technology can be an idea, process, or a physical object, such as the Restop2 bag.

Over the past 75+ years, researchers have studied the adoption of technologies in diverse settings worldwide. Among these technologies have been a wide range of health and sanitation technologies. Rogers (1962, 1971, 1983, 1995, 2003), the foremost leader in diffusion of

innovation and technology transfer research, provides a framework to investigate the multitude of factors influencing the adoption of technologies.

According to Rogers (2003), when potential adopters are aware of a technology, five overriding factors have been shown to influence the rate of adoption of innovations: (1) perceived attributes of innovations, (2) type of innovation decisions, (3) awareness of innovations through communication channels, (4) the nature of the social system, and (5) the extent of change agents' promotion efforts.

Once an individual is aware of an innovation or technical, Rogers (2003) has identified six perceived attributions of an innovation relevant to its adoption; they include *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability*. Rogers (2003) defines perceived *relative advantage* as "...the degree to which an innovation is perceived as better than the idea it supersedes" (p. 15, Rogers, 2003). *Compatibility* is defined as "...the degree to which an innovation is perceived as being consistent with existing values, past experiences, and the needs of the potential adopters" (p. 15) and *complexity* as "... the degree to which an innovation is perceived as difficult to use or understand" (p.16). Rogers defines *trialability* as "... the degree to which an innovation may be experimented with on a limited basis" (p.16) and *observability* as "... the degree to which the results of an innovation are visible to others" (p.16).

Research Questions/Objectives

Our objectives for this research were:

1. Describe the demographics of respondents and their backcountry camping characteristics
2. Assess their camping activities and practices in Rocky Mountain National Park
3. Assess their awareness of Leave No Trace practices and their use of them
4. Assess their views and perceptions of Restop2 bags
5. Compare respondents who had used Restop2 bags to those who did not on selected characteristics:
 - a. Demographics and backcountry camping characteristics
 - b. Camping activities and practices in Rocky Mountain National Park
 - c. Awareness of Leave No Trace practices and their use of them
 - d. Views and perceptions of Restop2 bags

Based on the objectives, the methodology for this research, a descriptive analysis for all respondents, a comparison of respondents who had used the Restop2 units versus those that did not, and the findings are discussed in the following pages.

Methodology

We used Dillman's Tailored Design methodology for a mail survey (Dillman, 2003). Dillman is from Washington State University and began developing the methodology in the mid 1970s. He based the methodology on extensive reviews of the empirical literature of what produces the highest quality data. Three key characteristics of this approach are to (1) emphasize to the survey

receiver the benefits of completing the survey; (2) use a series of contacts over time to increase number of surveys returned; and (3) minimize the time and effort required to complete the survey.

When followed carefully, the Tailored Design methodology will overcome major errors in surveying: (1) sampling errors, (2) coverage errors, (3) measurement errors, and (4) non-response errors.

Following the Dillman methodology, we used four contacts pieces:

1. The Initial Contact Letter. Backpackers recruited during the sampling period received an explanation letter and contact form after obtaining their permits.
2. The First Packet. The packet included another personalized letter; a stamped, addressed, return envelope; and the questionnaire. The letter explained the project, asked backpackers for their help, explained how to complete and return the survey, why completing the survey will benefit them and other backpackers. The survey contained a control number for tracking respondents.
3. The Letter Follow-up. This letter was a brief reminder to return the survey and included a thank you if they have returned the survey.
4. The Second Packet. This packet consisted of another personalized letter explaining the project; another questionnaire; and a stamped, return envelope.

Appendix B provides samples of the questionnaires and letters.

We used the sequence of mailings starting about month after the backpackers agreed to help with the survey. Mailings # 3 and # 4 followed about two weeks apart.

We followed this methodology twice. For participants recruited in July 2011, we started the survey protocol in August 2011. For participants recruited in August 2011, we began their survey protocol in September 2011.

The Tailored Design Methodology requires attention to many details in writing the copy for the letters, designs of the survey, packaging the mailings, and follow-up. We merged letters with backpackers' names on the letter. The surveys had a control number matched to individual's name. We removed respondent's names from the Excel file before the fourth mailing.

Restop2 Sampling Strategy

Our original plans called for recruiting 500 participants over a summer, but we had to modify the sampling strategy because of delays in obtaining OMB's approval of the project. We had submitted the application to the NPS Social Science Unit in December 2008, but OMB delays in precluded the NPS Social Science Unit could not submit the application until April 5, 2010. The application was approved on May 18, 2010.

Working in consultation with Rocky Mountain National Park staff, we planned sampling for July and August. This allowed the Rocky Mountain National staff to arrange for volunteers to recruit backcountry campers.

For this survey, backcountry campers were recruited at the Beaver Meadows Backcountry Office. We developed a detailed recruiting plan and quality assurance plan (See Appendix A). We generated and followed a purposeful sampling plan that included three Fridays, four Saturdays, three Sundays, and eight week days (three Tuesdays, three Wednesdays and two Thursdays) in July and August.

We trained the volunteer recruits on June 22, 2011, and provided all of the recruiting supplies, signs and storage cases.

The volunteer recruiters were stationed just outside of the Backcountry permit office and began approaching backcountry campers as they left the building. They recruited July 2, 3, 4, 7, & 9. Based on the response rate, i.e., backcountry campers agreeing to fill out the contact information and the available volunteer recruiters, we followed the initial recruiting plan through the remaining days in July and August.

The RMNP staff stored the completed contact forms in their offices, and the lead researcher picked up the completed July forms in early August and the completed August forms in early September.

Volunteers recruited 227 backcountry campers: 115 in July and 112 in August.

At CSU, a master list of participants for each month was created and the the initial survey packet was sent to participants within a month of their visit to Rocky Mountain National Park. Specifically, the first mailing was sent to the July backcountry campers in August and the first mailing to the August backcountry campers in September. As backcountry campers responded to a mailing, their names was removed from the master list so that only the non-respondents received subsequent mailings.

Six of the July and five of August volunteer backcountry campers' letters were returned with incorrect addresses. Therefore, we used 216 for the number of backcountry campers surveyed (227 addresses minus 11 returned letters = 216 participants.)

In all, 122 backcountry campers completed the survey by 1 January 2011, the cutoff date. Sixty-eight surveys came from the July backcountry campers and 54 surveys came from the August backcountry campers.

The overall response rate was 56% for completing the survey before the 1 January 2011 cutoff date. The response rate for July backcountry campers was 62% and the response rate was 50% for the August backcountry campers.

Data Analysis & Reporting

As mail surveys (questionnaires) were received, the responses were reviewed and then entered into a database. Statistical analyses were run using SPSS-19 PC version. Descriptive statistics and inferential statistics where comparisons were needed between groups were run.

Results

The following discussion first summarizes the characteristics of respondents, followed by discussions of camping experience, camping at Rocky Mountain National Park, Restop2 usage, and then compares adopters and non-adopters characteristics.

Survey Respondents Characteristics

Overall, 122 backcountry campers completed the survey. Of those respondents, 56% had backpacked during July and 44% during August. The respondents ranged from 16 to 77 years old with a mean age of $M=39.27 \pm 12.87$ years old. Some groups had mixed age groups and other did not. Age distribution of participants in the groups follows: 20% were under 18 years old, 24% were 18 to 26 years old, 34% were 27 to 35 years old, and 47% were 36 years old and older.

Of the respondents providing their residency, 27 states and countries were reported. Of them, 54% of the respondents were from Colorado. Other leading state residency included 4% each from Minnesota, Missouri, and Texas; 3.3% from New York; and 2.5% each for Arkansas, Arizona, Kansas, and Nebraska. One or two respondents came from other states (See Appendix C: Home States of Respondents). One respondent came from Canada and two from the United Kingdom.

Gender of Groups

Overall, 77% of the respondents were males and 23% were females. While mixed gender groups were common, most groups had more males than females (Pearson Chi Squared, $p > .001$). Thirty-five percent of the groups did not have any females, and 2% did not have any males in their groups. Of the groups with females, 54% of the groups had one female and only 12% of the groups had two or more females. *

When asked with what groups respondents camped, friends and family were the leading groups (see Table 1.). Note that respondents could mark multiple groups. For the "Other" category, three respondents noted they camped alone and nine others each listed groups such as youth groups, clients, schools, tours, and outfitters.

Table 1.
*Groups with which Respondents Camped (n=122)**

Category	Percentage
Youth group	7.40%
Church groups	3.30
Family	70.00
Friends	84.00
Others	10.00

* Respondents could answer more than one category

Prior Camping Experiences & Expertise

Of the respondents who had camped in the backcountry in the last 12 months, respondents reported having camped from 1 to 20 times and averaged $M=2.99 \pm 2.99$ times. Thirty-two percent had camped once in the backcountry, 25% had camped twice, 15% had camped three times, 10% had camped four times, and the remaining 16% had camped five or more times. Of note, 5% of the respondents had camped 10 to 20 times, and 1 respondent reported having camped 20 times. Of those reporting having camped in the last two months, 73% reported having camped 1 to 2 nights, 22 reported having camped 3 to 4 nights, and 6% reported having camped five or more nights.

The respondents were experienced backcountry campers. About two-thirds of them reported having more than 10 years experience backcountry camping (see Table 2.)

Table 2.
*Years of Experience Backcountry Camping (n=120)**

	Percentage
Less than three years	18%
3 to 6 years	8
7 to 9 years	7
10 or more years	67
Total	101

* Total number exceeds 100% because of rounding.

Respondents (n = 121) assessed themselves as having moderate to high levels of camping expertise (M=5.67 to 3.40) using a 1 to 7 scale where 1 = Novice and 7 = Expert (see Table 3).

Table 3.
*Levels of Self-Assessed Backcountry Camping Expertise**

Areas	Novice							Expert		Mean	SD	n
	1	2	3	4	5	6	7					
Using topographic maps	9%	0%	0%	0%	26%	21%	13%	4.59	±1.76	121		
Treating water	4	3	7	9	21	31	25	5.30	±1.61	121		
Surviving a variety of weather conditions	7	3	9	17	28	27	9	4.76	±1.56	121		
Protecting food from wildlife	5	3	2	11	30	34	16	5.21	±1.49	121		
Using GPS	27	13	12	13	18	7	9	3.40	±2.02	121		
Other	13	0	0	7	13	7	60	5.67	±2.13	107		

* Scale 1 to 7 where 1 = Novice to 7 = Expert

“Other” responses of back country camping expertise included backcountry cooking, backcountry emergency medicine, camping trip preparation, harvesting wildlife (hunting), hiking fast, looking at scenery, orienteering, safely planning hikes, technical climbing, ultra light, and ultra light packing.

In response to an open-ended question on how participants gained camping experience (Q12), 43 participants reported they gained their expertise through a wide range of training opportunities including youth groups, mountain clubs, workshops, military training, working for natural resource agencies, outdoor training programs, and related experiences.

When asked about their camping in cross country and hiking off trail, only 4% of the 54 participants reported they had had such experience.

Respondents reported frequently using a wide variety of information sources (M= 3.41 to 5.60) about camping on a 1 to 7 scale where 1 = Never to 7 = Very Often (see Table 4.)

Table 4.
*Information sources of respondents**

Areas	Never				Very Often				Mean	SD	n
	1	2	3	4	5	6	7				
Rocky Mountain National Park Website	10%	13%	13%	17%	23%	16%	9%	4.13	±1.80	120	
Other Websites	12	9	14	12	20	19	15	4.35	±1.95	92	
Outdoor stores (REI, Cabela’s, etc.)	11	13	15	16	19	22	4	4.03	±1.77	117	
Camping/recreational magazines	22	18	16	13	13	13	6	3.41	±1.92	116	
Friends	4	8	10	13	22	29	16	4.90	±1.64	115	
Other	7	-	-	7	27	27	33	5.60	±1.60	105	

* Scale 1 to 7 where 1 = Novice to 7 = Expert

In addition to the Rocky Mountain National Park Website, 33 participants listed a wide range of other Websites including Backpacker.com, Leave No Trace, Trailmaps.com, Google, Summitgroup.com, National Forest Service, Trails.com, Weather Forecast/NOAA.gov, NPS.gov, 14ers.com, ColoradoTrail.com, Viewsfromthetop.com, ClimbingWebsites.com, lnt.org, Natlparks.org, RMNP.com, and wintertrekking.com.

When asked about other information sources, 15 participants listed groups such as Boy Scouts, library, Google, relatives, and word of mouth.

In addition to camping, respondents reported taking part in a variety of related activities with photography and bird watching (see Table 5) being the leading activities.

Table 5.
*What related activities do you participate in while camping**

	Percentage	n
Fishing	25%	31
Photography	64	78
Bird watching	46	56
Other	43	53

* Respondents could answer more than one category

The other activities that participants listed included Rocky climbing (49%, n=26), hiking (26%, n=14), mountaineering (11%, n= 6), star gazing (6%, n=3), swimming (6%, n=3), skiing (4%, n=2), and one each for orienteering, reading/writing, exploring, and painting/sketching.

Camping in Rocky Mountain National Park

About half of the respondents had planned their backcountry trip one or more months in advance of arriving at Rocky Mountain National Park (see Table 6). Only one respondent reported planning the trip a year or more in advance.

Table 6.
*Advance Planning of Backcountry Camping Trips**

Advance Planning	Percentage	n
Day of trip	1%	1
2 to 7 days	17	20
8 to 30 days	32	38
1 to 6 months	42	51
More than 6 months but less than a year	8	10
A year before trip	1	1
	99.20	121

* Totals less than 100 due to rounding.

The respondents reported their groups spent from 1 to 7 nights camping with a mean of about two days (M=1.98± 1.21). The majority of camping trips were only one night (see Table 7).

Table 7.
Length of Planned Stay in Backcountry Camping Trips

Number of Nights	Percentage	N
One night	43.00%	52
Two nights	35.00	42
Three nights	4.90	16
Four nights	2.50	3
Five nights	4.90	6
Six or seven nights	0.80	2
Total	99.20	121

* Totals less than 100 due to rounding.

Respondents' group size ranged from one to seven participants with the mean group size being $M = 2.50 \pm 1.57$ campers (see Table 8).

Table 8. <i>Number of Campers in Group*</i>		
Number in Group	Percentage	n
1	10.00%	12
2	57.00	69
3	17.00	20
4	12.00	14
5	2.50	3
7	2.50	3
Total	100.00	121

* No groups of 6 campers.

Overall, respondents being reported highly familiarity with the “Leave No Trace” guidelines and frequently followed the guidelines (see Tables Q13a & Q14a). Less than 4% of the respondents reported that they were not familiar with any one guideline.

Table 9.

Percentage of familiarity with Leave No Trace Practices

Topic	Not Familiar with Guideline	Never							Always	n
		1	2	3	4	5	6	7		
I check the regulations and special guidelines for the camping area that I plan to visit.	2	1%	-	3%	5%	12%	25%	52%	121	
I check out the current weather conditions before leaving on my camping trip.	1	1	-	2	2	7	20	67	121	
I check out special area information before leaving on my camping trip.	4	2	3	3	5	16	23	48	121	
I leave an itinerary with someone at home when I backpack.	2	3	7	4	9	12	16	48	121	
I plan my meals and repackage food into reusable containers.	1	3	2	3	17	16	21	36	120	
I stay on designated trails.	1	-	1	5	21	20	21	30	119	
Except in tundra areas, my camping party hikes single file.	4	1	1	3	7	14	34	34	119	
When I rest, I sit on rocks, logs, or in clearings.	3	-	-	-	5	16	33	39	119	
My camping party speaks softly.	3	2	1	9	21	22	26	16	119	
I use the tent pad at the campsite if available or camp on other durable surfaces.	3	1	2	-	4	8	30	53	118	
I generally camp in the area indicated on my permit.	1	1	2	-	1	3	12	80	120	
I generally use a portable stove for cooking.	1	1	3	1	1	3	9	80	120	
I leave plants and rocks in their natural positions.	2	-	2	-	3	4	25	64	120	
I hang or place food and scented items (e.g., deodorant, shampoo, etc.) in a 'bear barrel' or special food container.	1	2	2	2	3	4	18	66	119	
I wash my dishes at least 200 feet from water sources.	3	1	2	3	8	14	25	44	120	
I pack out everything I bring into the backcountry.	2	3	-	-	2	2	11	81	120	

On the 1 to 7 scale where 1 = Never and 7 = Always, all items had an average self-reported compliance above M=5.00. Further, for 25% of the items, respondents who were familiar with

the guidelines reported high familiarity ($M=6.50$) and low standard deviations (less than ± 1.10). The items with highest compliance were packing everything out, camping in designated permit areas, using a camping stove, leaving plants and rocks in the natural position, checking current weather conditions, and using the tent pad.

Table 10.
Mean and standard deviations of familiarity with Leave No Trace Practices.

	Mean*	Standard Deviations	n
I check the regulations and special guide- lines for the camping area that I plan to visit.	6.16	± 1.16	119
I check out the current weather conditions before leaving on my camping trip.	6.48	± 0.98	120
I check out special area information before leaving on my camping trip.	5.59	± 1.40	116
I leave an itinerary with someone at home when I backpack.	5.63	± 1.76	119
I plan my meals and repackage food into reusable containers.	5.58	± 1.45	119
I stay on designated trails.	5.50	± 1.31	118
Except in tundra areas, my camping party hikes single file.	5.89	± 1.19	114
When I rest, I sit on rocks, logs, or in clearings.	6.05	± 1.11	116
My camping party speaks softly.	5.10	± 1.40	116
I use the tent pad at the campsite if available or camp on other durable surfaces.	6.30	± 1.10	115
I generally camp in the area indicated on my permit.	6.66	± 0.96	119
I generally use a portable stove for cooking.	6.58	± 1.78	119
I leave plants and rocks in their natural positions.	6.50	± 0.91	118
I hang or place food and scented items (e.g., deodorant, shampoo, etc.) in a 'bear barrel' or special food container.	6.37	± 1.26	118
I wash my dishes at least 200 feet from water sources.	5.96	± 1.30	117
I pack out everything I bring into the backcountry.	6.66	± 1.06	119

*Means & SD for respondents familiar with guidelines.

A Closer Look at Restop2 Bags Usage

Of the 122 respondents surveyed, 96% (n=117) reported having received on the Restop2 bags; of these, 97% (n=114) reported receiving the bags from the Backcountry Permit Office. The remaining three reported having receive them from other sources—i.e., Rocky Mountain National Park, other campers, and the Internet.

Three respondents reported having purchased the bags, one from the Back Country Permit Office, one from the National Park Office in Grant Teton National Park, and one through the mail.

Only 37% of the respondents (n=44) reported having used the Restop2 bags. Of the 44 respondents, 84% reported using the bag between one and three times and 16% reported having used the Restop2 bag 4 to 6 times during their trip to Rocky Mountain National Park.

Of the 44 respondents who reported using Restop2 bags, 91% (n=40) report on the methods they used to dispose the bags. Some 23% (n=9) reported packing the bags out without indicating where they disposed of the bags—they simply enter, “packed it out,” or similar phrases in respond to the open-ended question.

Of those who mentioned specific disposal methods, 28% (n=11) reported using dumpsters at trail heads, Ranger Stations and similar locations; 30 % (n=12) reported putting Restop2 Bags in the trash or garbage without indicating the specific location; and 21% (n=7) reported putting in the trash at home.

All respondents were asked a series of open-ended questions probing their viewpoints on the advantages and disadvantages of using the Restop2 bags to campers, the environment, and the impact on the immediate area where they camped. Respondents could listed one of more answers to these questions.

Of the 44 respondents who reported using the bags, 98% (n=43) listed reported advantages to backcountry campers. The leading viewpoints were:

1. Usable, easy to use, and convenient (19%, n=8)
2. Less human waste left behind (19%, n=8)
3. Don't need to dig a hole (19%, n =8)

Items receiving three responses (7%, n=3 each) were:

1. Environmentally responsible
2. No disease to spread, clean, and sanitary to use

Items receiving two responses (5%, n=1) were:

1. Free/inexpensive
2. Cleaner climbing and camping areas
3. Reduces impact

Items receiving one response (2%, n=1) were:

1. Easy to carry
2. No smell
3. Adherence gives peace
4. Easy to pack out
5. Size and packaging
6. Very handy with T/P included

Of the 44 respondents who reported using the bags, 82% (n=36) reported disadvantages. The leading disadvantages reported were:

1. Hard to use (bag manually held open) (22%, n=8)
2. Carry it out (smelly) (22%, n=8)
3. More weight to carry (14%, n= 5)
4. Worry about soundness of the bag (potential contamination of backpack (11%, n=4)
5. Being too bulky (8%, n=3)

The remaining disadvantages all received one nomination were:

1. Unclear about disposal
2. Bulkiness of multiple bags
3. Need waterproof sack
4. Not compact for multiday use
5. Too much packing
6. Landfill
7. Uncomfortable carrying feces
8. Instructions are inconvenient

Of the 44 respondents, who reported using the bags, 80% (n=35) reported advantages to the environment (Q19). The leading responses were:

1. Reported reduces or zero impact on the environment (29%, n=10)
2. Decrease human waste left behind (26 %, n=9)
3. Protect heavily used areas (11%, n=4)

Responses receiving 9 % of the (n=3) nominations included:

1. No risk/less impact to wildlife
2. Keeps backcountry/forest cleaner

Items receiving 6% of the (n=2) nominations included:

1. No digging holes
2. No contamination of water sources

Of the 44 respondents who reported the bags, 59 % (n=26) reported disadvantages to the environment (Q19). The leading disadvantages were:

1. Ends up in landfill/more trash (38%, n=10)
2. Involves plastics (23%, n=6)
3. Biodegradable (12%, n=3)

Other disadvantages included:

1. Involves chemicals (8%, n=2)
2. Has to be transported (8%, n=2)
3. People are lazy and won't use it (4%, n=1)
4. Inconvenient to use (4%, n=1)
5. Need to pack out (4%, n=1)

Respondents were asked an open-ended question (Q20) focusing on the impact of Restop2 have on the immediate area where the respondent camped. Only 24 respondents provided information on the impact of Restop2 on the immediate camping area: (1) 33% reported no or lower human waste; (2) 17% keep area clean; (3) 13% protect area or lower impact; (4) 8% no digging cat holes; (5) 8% no tainting water; (6) 4% more pleasant area; and (7) 4% less fill in latrine.

Respondents were then asked to assess the ease of use of Restop2 bags based on the bag's characteristics using a 1 to 7 scale where 1 = Very difficult to 7= Very easy. All means are above M=5.00 except for packing out the bags (see Table 11). Opening the bag was the highest rate characteristic followed by disposing of the bag, understanding the bag's instructions and then closing the bag. Packing the bag out received the lowest mean (M=4.92±1.66) with 22% of the respondents rating packing bags out a 3 or lower on the 1 to 7 scale.

Table 11.												
<i>Assessment of factors influencing use of Restop2 by percentage, means and standard deviations.</i>												
Attribute	Very Difficult							Very Easy		Mean	SD	N
	1	2	3	4	5	6	7					
Understanding the bag's directions	-	-	3%	10%	20%	25%	43%	5.95	±1.12	80		
Opening the bag	-	-	1	3	17	34	44	6.17	±0.92	70		
Closing the bag	-	-	4	10	19	29	37	5.84	±1.17	68		
Using the gel	-	2%	6	8	27	29	29	5.59	±1.27	49		
Packing out the bag(s)	5%	3%	14	12	30	14	23	4.92	±1.66	66		
Disposing of the bags after your trip	5%	-	2	8	16	17	53	5.94	±1.53	64		

Respondents were asked to list the reasons they did not use the Restop2 bag, 73 respondents listed reasons. Reasons reported included: (1) the availability of pit toilets or privy toilets (38%); (2) didn't need to use them (26%); (3) didn't want to carry the Restop2 bags out or they were bulky (11%); (4) Restop2 bags were highly unsanitary or gross (5%); (5) forgot about the Restop2 bags (4%); and (6) the number of days that they were camping (3%).

When asked about the likelihood of purchasing Restop2 bags and supporting their mandatory use in backcountry, respondents appear slightly more likely to support their mandatory use than purchasing them (see Table 12). Considered in an alternative way, 56% of the respondents rated the likelihood of purchasing the bag.

Table 12. <i>Likelihood of buying bags and supporting mandatory use on backcountry</i>										
Attribute	Not Likely			Very Likely				Mean	SD	N
	1	2	3	4	5	6	7			
Likelihood of purchasing bag	33%	13%	10%	16%	12%	9%	8%	3.23	± 2.05	120
Likelihood to support mandatory use in backcountry	23%	8%	7%	11%	15%	16%	21%	4.20	± 2.26	119

When asked to compare the ease of use of Restop2 and similar bags to digging a hole for human waste, 57% of the respondents (n=117) reported that digging the hole was easier, 21% reported it was just as easy, and 22% reported digging was harder than using a Restop2 or similar bag.

When respondents were asked on how frequently they had seen Restop2, about one-quarter (25%) reported not having seen the Restop2 bag at all. In looking at possible places when Restop2 bags could be seen, respondents (n=121) 63% had not seen Restop2 bags in camping or sporting good stores, 79% had not seen Restop2 bags in advertisements, and 83% had never seen people with them at camping sites. However, 68% reported having seen Restop2 or similar bags at National Park Service Offices, 1% in camping magazines, and 6% in other places.

While 14 respondents (6%) listed other sources, no clear pattern of other sources emerged. Each of the following categories received two nominations: workshop/outdoor activities, online, and at trailheads/trails. Single responses included Whitney Zone NPS, news article, recommendation from others, History Channel, BML office, truck stop, and stores.

When asked about the importance of different factors influencing their decision to use a Restop2 bag on a future backpacking trip using a 1 to 7 scale where 1 = Not at all important to 7 = Very important, a National Park Requirement received the highest rating (M=5.96 \pm 1.67) followed by other reasons (M=5.50 \pm 2.56) and environmental impact (M=5.44 \pm 1.62) (see Table 13).

Table 13.
How important each item would be influencing your decision to use Restop2 or a similar device on a future backpacking trip

Attribute	Not important							Very Important							Mean	SD	N
	1	2	3	4	5	6	7	1	2	3	4	5	6	7			
National Park Requirement	5%	4%	-	4%	11%	19%	57%								5.96	±1.67	120
Camping group decision	12	6	8%	17	18	27	13								4.57	±1.88	119
Environmental impact	6	2	2	13	19	27	31								5.44	±1.62	119
Health reasons	10	3	2	18	22	22	24								5.00	±1.82	118
Other	14	-	5	9	-	23	50								5.50	±2.56	22

Not all respondents (n=22) who marked “other,” listed a reason. Of those who did list a reason (n=12), the leading reasons included bag elements (price, convenience, and ease of use), and situation (location, vegetation, heavily used area, no pit, and party size).

Respondents then rated the important of factors influencing their decision to continue using Restop2 or similar bags. Generally, respondents rated all factors highly (i.e., Mean = 5.29 or higher) (see Table 14.)

Table 14.
Importance of items would be to influencing your decision to use Restop2 or similar devices

Attribute	Not important							Very Important							Mean	SD	N
	1	2	3	4	5	6	7	1	2	3	4	5	6	7			
Convenient to purchase	10%	-	3%	11%	17%	28%	30%								5.29	±1.82	117
Free to backcountry campers	9	9%	3	8	7	19	54								5.74	±1.90	117
Purchase price	10	-	2	12	10	27	39								5.48	±1.86	117
Ease of disposal	8	1	2	5	9	33	42								5.76	±1.70	118
Length of camping trip	9	-	2	6	9	27	47								5.74	±1.81	117
Weight of bag	7	4	4	6	7	33	39								5.56	±1.82	117
Other*	3	-	6	-	-	6	71								5.65	±2.42	17

* Only 17 respondents marked the “Other,” category.

Finally, respondents were asked to share anything else about their recent backcountry trip to RMNP and the disposing of human feces (see Appendix D). Some comments were only a phrase or two while others wrote a paragraph.

The following themes emerged from their comments:

1. Overwhelmingly, respondents believe that the protection of the environment is important.
2. Restop bags or similar devices are a good idea for areas where it is not feasible to dig a hole, high traveled areas, or where campsites are close. However, they are impractical for short hikes.
3. Some respondents believed that there is no reason to use Restop bags because human waste is biodegradable.
4. Respondents suggested alternatives to Restop bags, such as solar poop cooker (Looprivy), Groovers, and decomposable toilets would have less of an impact on the environment than Restop2 bags.
5. Generally respondents believed that Restop (or similar device) would be more likely used if it was free.
6. Respondents also believe that high resistance would be met if their use was mandatory, even though several respondents indicated that use should be required. One respondent stated they would stop going to RMNP if the use of Restop was mandated.
7. The largest hurdles in the respondents using Restop are product characteristics and lack of knowledge about the benefits of Restop. According to respondents, Restop2 is bulky, has too much packaging, unclear directions, sealing the bag is a problem, and something is needed to support the bag to make it feasible to use.
8. Additionally respondents don't understand the benefits to the environment in using Restop. No data details the positive impact that Restop may have on the environment.

Results—Comparison of Adopters versus Non-Adopter

Only 36% (n=44) of the 122 respondents reported having used the Restop2 bags. To explore possible differences between adopters (users of Restop2 bags) and non-adopters (non-users of Restop2 bags), we ran four Chi Square tests on nominal data (yes or no questions and other categorical data) and 55 *t*-tests for internal data (numerical) to ascertain whether significant differences between adopters and non-adopters of Restop2 bags). We used $p > .05$ as the cutoff point.

None of the Chi-square significant tests were significant and only 13 of the 55 pair comparisons of *t*-tests were significant.

Results---Comparisons Respondent Characteristics

Respondents using the Restop2 bags camped significantly fewer nights in Rocky Mountain National Park than respondents who did not use the Restop2 bags ($M=1.64\pm 0.78$ vs. $M=2.18\pm 1.41$, $t=-2.36$, $df=116$, $p=.02$)

Respondents using the Restop2 bags had significantly fewer people in their groups when compared to respondents who did not use the Restop2 bags ($M=1.64\pm 0.78$ vs. $M=2.18\pm 1.41$, $t=-2.21$, $df=116$, $p=.03$)

Results---Comparison of Leave No Trace Practices

The Leave No Trace scale asked respondents to rate how familiar they were with the 16 guidelines on a 1 to 7 scale where 1 = Never to 7 = Always. (See the methods section for details.)

Of the 16 items, 25% produced significant differences between Restop2 adopters and non-adopters.

The adopters reported camping in the area designated on their permit significantly fewer times than non-adopter of the Restop2 bags ($M=6.41\pm 1.28$ vs. $M=6.86\pm 0.39$, $t=-2.80$, $df=114$, $p=.01$).

The adopters reported leaving plants and rocks in their natural positions significantly fewer times than non-adopter of the Restop2 bags ($M=6.30\pm 1.06$ vs. $M=6.68\pm 0.60$, $t=-2.45$, $df=113$, $p=.02$)

The adopters reported hanging or place food or scented items in “bear barrel” or special food container significantly fewer times than non-adopter of the Restop2 bags ($M=6.20\pm 1.36$ vs. $M=6.65\pm 0.85$, $t=-2.16$, $df=113$, $p=.03$)

The adopters reported packing out everything brought into the backcountry significantly fewer times than non-adopter of the Restop2 bags ($M=6.4\pm 1.40$ vs. $M=6.89\pm 0.36$, $t=-2.76$, $df=114$, $p=.01$)

Results---Comparison of Views of Restop2 Bags

To explore respondents’ views on the Restop2 bags, we asked respondents to rate various Restop2 bag attributes on a 1 to 7 scale, where 1 = Very difficult to 7 = Very easy.

The adopters reported packing Restop2 bags out as significantly easier than non-adopter of the Restop2 bags ($M=5.23\pm 1.29$ vs. $M=4.35\pm 2.10$, $t=2.12$, $df=64$, $p=.04$).

The adopters reported disposing of the Restop2 bags after a trip as significantly being easier than non-adopter of the Restop2 bags ($M=6.24\pm 0.99$ vs. $M=5.39\pm 2.11$, $t=2.20$, $df=62$, $p=.03$).

On a 1 to 7 scale where 1= Not likely to 7=Very likely, adopters reported being significantly more like to purchase a Restop2 or similar bag than non-adopters of the Restop2 bags ($M=4.32\pm 1.97$ vs. $M=5.39\pm 2.11$, $t=5.25$, $df=115$, $p=.000$). Additionally adopters were significantly more likely to approve the mandatory use of Restop2 or similar bags than non-adopters ($M=5.23\pm 1.98$ vs. $M=3.53\pm 2.21$, $t=-4.18$, $p=.00$).

On a 1 to 7 scale where 1= Not important to 7 = Very important, respondents explored factors influencing their' decision to use Restop2 or similar devices on a future backpacking trip. Adopters rated "camping group decision' significantly higher than non-adopter of the Restop2 bags ($M=5.02\pm 1.85$ vs. $M=4.30\pm 1.88$, $t=2.01$, $p=.05$). Adopters also rated "environmental impact' significantly higher than non-adopter of the Restop2 bags ($M=5.86\pm 1.32$ vs. $M=5.18\pm 1.77$, $t=2.20$, $p=.03$)

Discussion

The survey reflected the demographics and viewpoints of backcountry campers who obtained their permits from the Beaver Meadows, East side of RMNP in July and August 2011. Backcountry permits can also be obtained from the Kawuneeche Visitor Center on the West side of Rocky Mountain National Park or by mail or by phone. Additionally, respondents were recruited only in July and August. Backcountry campers during May through June and then September and October may be different from those sampled. Thus, this report focuses on respondents surveyed rather than drawing conclusions about all RNMP backcountry campers.

People surveyed were experienced backcountry campers and camped about three times a year with slightly more than half being Colorado residents. Their average age was about 40 years old and about three-quarters were males. About three-fifths had 10 years or more of camping experience and rated their camping expertise highly. As group, respondents rated themselves highly on following the Leave No Trace guidelines when camping.

All respondents ($n=122$) were asked to rate Restop2 bags. Of the 122, from 52% to 69% rated the bag highly on the following characteristics: the instructions (66%), opening (57%), closing (56%), and disposing of the bag (52%). Restop2 users and nonusers rated the attributes similarly.

Slightly less than three-quarters listed reasons they did not use the Restop2 bags; chief among the reasons being the availability of pit toilets and no need to use them.

Most respondents were not likely to purchase Restop2 bags, but they were somewhat likely to support mandatory use ($M=4.20\pm 2.26$ on a 1 to 7 scale), and say a Park requirement to use the bags as very important ($M=5.96\pm 1.67$ on a 1 to 7 scale). Respondents reported the following characteristics influencing their decision to use Restop2 or similar units highly: convenient to purchase, free to backcountry campers, price, ease of disposal, weight of bag, and length of camping trip.

The finding of few significant differences between the non-adopter and adopters of the Restop2 bags could be attributed to difference in number of adopters (n=44) and non-adopters (n= 88). Unequal sample sizes may create problems when interpreting the results. Likewise, when calculating inferential statistics, i.e., the differences between two groups such as adopters and non-adopters, larger and more equal sizes are needed for statistical differences to be found. A larger sample might have shown more significant difference when comparing adopters and non-adopters on other characteristics than those reported here.

About one third of the respondents (n=44) reported using the Restop2 unit. We compared respondents who used the Restop2 bags as adopters and those who didn't use the Restop2 bags as non-adopters on multiple characteristics. That said, we did so cautiously because of unequal sample sizes and the low number of adopters. Few statistical differences emerged between respondents using the bags and those who did not use the bags.

- Adopters (i.e., respondents using the Restop2 bags) camped significantly fewer nights and had significantly fewer campers in their groups than respondents who do not use the bags.
- Adopter rated themselves significantly lower than non-adopters on three Leave No Trace practices: (1) camping in areas designated on their permits fewer times, (2) leaving rocks and plants in their natural positions fewer times, and (3) hanging or placing food or scented items in bear barrels.
- When asked about factors influencing their future use of Restop2 bags, adopters rated camping group decision and environmental impact significantly higher than non-adopters.

These findings may reflect the need to segment adopters into different groups. Doing so would require a larger sample size for running statistical tests.

When considering the characteristics of Restop2 bag usage, adopters, when compared to non-adopters, reported packing out the Restop2 bags easier and disposing of Restop2 bags significantly easier. Further, adopters were significantly more likely to purchase Restop2 bags and the support their mandatory use than non-adopters.

Some of the findings on the Leave No Trace scale seem counter-intuitive—especially the adopters' reporting of camping in areas designated on the permit significantly fewer times, leaving plants and rocks in their natural positions fewer times, using bear barrels or handing food fewer times, and packing everything out significantly fewer times.

Overall, the Adopters report relatively high compliance, i.e., with responses in the M=6.20 to 6.41 area for the items on the 1 to 7 scale where 1= Never to 7 = Always.

While the data are statistically significant, the mean differences are relatively small, from .38 to .49 between adopters and non-adopters. If the mean differences between adopter and non-adopter scores are divided the 7 (base of 1-7 scale), the overall differences are about 7% of possible

responses to the 1 to 7 scale. Such differences may or may not be meaningful for management decisions.

Adopters scoring lower on using bear barrels or hanging food out the reach of wildlife may be related to their prior experiences. Future studies could explore their encounters with wildlife and especially bears and their years of camping experience. If they have not had any negative experiences, they may be less inclined to use bear barrels or hang food out of reach. Further, the fear of bears or other wildlife may differ.

While adopters scored significantly lower on packing everything out than non-adopters, future studies, with larger sample of adopters, could explore this topic in more depth. Such focus could explore other possible differences in their camping practices and experiences influencing those packing everything out.

When exploring the differences between adopter and non-adopters on their evaluation of Restop2 bags, adopters were clearly more supportive. Adopters scored higher than non-adopters ($M=5.23$ to 6.24) on the 1 to 7 scale. The mean differences on responses between adopters and non-adopters the mean difference ranged from .68 to 1.07. If the mean differences between adopter and non-adopter scores are divided the 7 (base of 1-7 scale), the overall differences ranged from 10% to 15% higher on responses to the 1 to 7 scale. Such differences may or may not be meaningful for management decisions.

Viewed from the diffusion of innovation framework, future studies could explore if the non-adopters awareness of Restop2 and similar bags outside of RMNP, and whether they have ever purchased or used Restop2 bags on trips outside of RMNP.

Overall, respondents did not report having seen much promotion or information on Restop2 or similar bags in stores, advertisements, or other places. Increasing backcountry campers' awareness of Restop2 bags and their benefits might encourage non-adopters consider trying them.

Conclusions

Overall, the survey produced a 56% ($n=122$) response rate of the 216 backcountry campers who volunteered to complete the survey and provided accurate addresses. They were recruited from backcountry campers obtaining camping permits at the Beaver Meadows Visitor Center during July and August 2010.

The scales and questions provide insights into backcountry campers, their demographics, camping practices, complying with Leave No Trace guidelines, and perceptions of the Restop2 bags.

Most respondents were not likely to purchase Restop2 bags, but they were somewhat likely to support mandatory use, and said RMNP requiring the use of Restop2 or similar bags would be very important in their future use.

Slightly more than one third (n=44) of the 122 respondents reported using, i.e., adopting the use of the Restop2 bags. When compared to non-adopters (non-users of Restop2 bags), we found a few significant differences.

Future evaluations should recruit and survey backcountry campers across the entire camping season and recruit volunteers from both the east and west backcountry permit offices at RMNP.

Efforts should be explored to segment the population of backcountry campers who use Restop2 or similar bags. Different factors may be important roles in determining the use of Restop2 and similar bags.

For future studies, a power analysis and response rate should be used to estimate the needed sample size for a more rigorous statistical analysis. The data from this study can be used for such estimations.

When backcountry campers receive the Restop2 bags, different messages could be tested to encourage them to try the Restop2 bags.

Providing more information to backcountry campers on the importance and how to use Restop2 or similar bags may play an important role in increasing awareness of the bags and encouraging backcountry campers to use them.

To improve the survey, the responses to the open-ended questions assessment their opinions on the advantages and disadvantages of Restop2 bags to campers, the environment and immediate areas (Questions 18- 20) could be converted to scale questions.

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Appendix A



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TO: Judy Visty, RMNP
FROM: Don Zimmerman
RE: Questions & Planned sampling & Logistics
Leave No Trace Survey--2010
DATE: June 3, 2010

Below, I've outlined the basic strategy on training and sampling, a proposed sampling schedule, and posed key questions on logistics (they're in *italic*).

My wife and I are in Estes Park for a wedding last Saturday, so I dropped by the Backcountry Permit Office so I would know the basic layout.

Could we have the RMNP volunteer recruit participants in the front area of the Backcountry Permit Office?

Training

Schedule: 10-11 a.m., Tuesday, June 22
Format: Power Point covering key points
Details: I'll bring the sampling scripts, 1000 copies of the cover letter, and 1000 copies of the sign-up sheets, boxes, save bins, return envelopes, etc.

Sampling

I've develop a purposeful sample that includes three Fridays, four Saturdays, three Sundays, and eight week days (3 Tuesdays, 3 Wednesdays and 2 Thursdays). See Figure 1, Page 2; shadowed dates indicate recruiting dates.

The objective will be to obtain $n = 500$ names of backcountry campers who are willing to complete a mail survey.

To begin, I'm suggesting that recruiting should be 2, 3, & 4, 7, & 9 July; see shadowed dates on calendar (Figure 1). After that, we'd have an idea of the potential success rate and **I can then make adjustments as needed.**

Will asking volunteers to recruit the first weekend work—i.e., asking them to recruit on the 4th of July weekend?

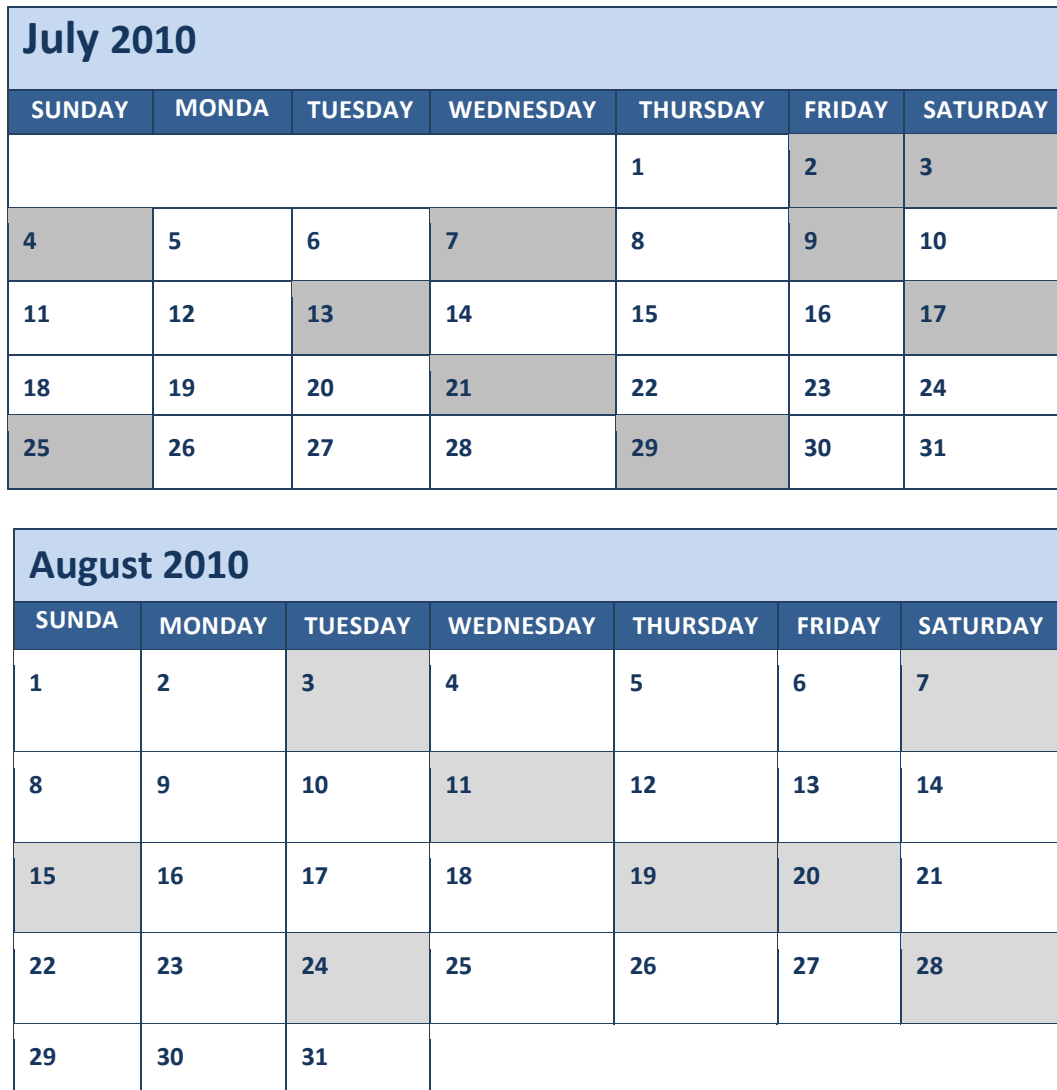


Figure 1. Proposed sampling days, dates shadowed.

Logistics

A. Training

1. *Can you provide a small room for training—i.e., where I could show the Power Point, and walk through the logistics. I'll bring a laptop and projector along.*

B. Handling Completed Sampling Participant Sheets

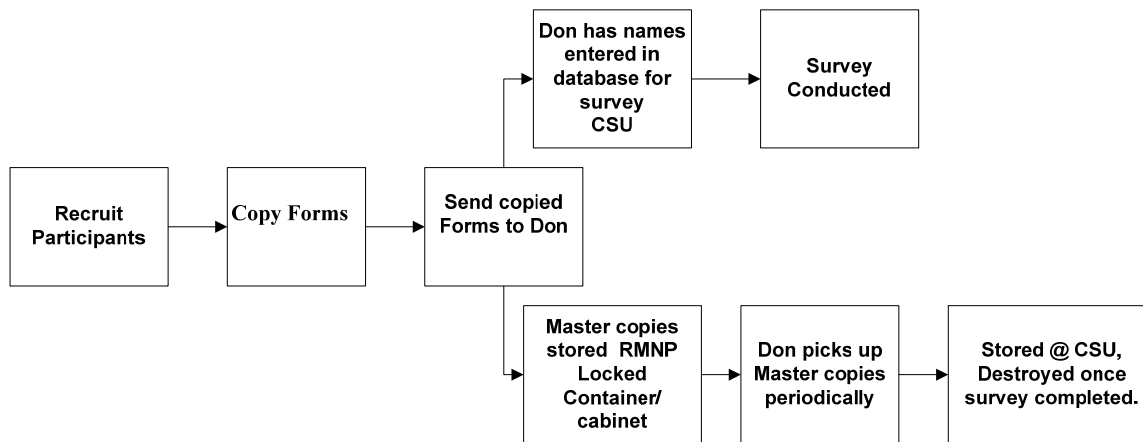


Figure 2. Recruiting process and returning contact forms to Don Zimmerman

We need to set up a process of (1) making copies of the sign-up forms of participants; (2) keeping a master set of the forms; (3) mailing the copies to me; (4) picking up the master copies.

Questions:

1. *Can your office copy the completed participant forms (n =500)?*
2. *Can you provide a place in the Backcountry Office where the volunteers can keep the supplies and possibly the completed forms?*
3. *Is there a place that we can store (under lock) forms completed by recruited participants?*

Supporting Documents

The recruiting script, letter, sign up form, and quality assurance document follow.

Recruiting Script

Hi,

I'm _____ and I'm helping with a research project being conducted by Colorado State University for Rocky Mountain National Park.

We're looking for visitors who received a Restop2 unit.

Did you receive such a unit?

If NO → Thank you very much.

If YES→ Would you be willing to help complete a mail questionnaire about your backcountry experiences that will take about 20 minutes to complete?

We'll be sending the questionnaire out in about a month.

Once we have the list of backcountry visitors, we will be sampling 500 names from the list.

Would you be willing to participate in this study?

If YES → Who in your group has had the most recent birthday? Could we add your name to our list of possible people to be sampled?

Could you give me your name? _____

Here's a letter detailing the project.

Please fill out the information form and return it to me.

If NO → Thank you very much.

Recruiting Letter

OMB # 1024 – 0224 (NPS 09-010)

Expiration date: June 30, 2011



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& Technology
Journalism & Technical Communication
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Dear Backcountry Camper:

Thanks for your willingness to volunteer for our research project.

Rocky Mountain National Park has asked Colorado State University to conduct a research project that explores backcountry campers' use of Leave No Trace practices and supplies.

We will add your name to our pool of names of backcountry campers enjoying Rocky Mountain National Park during the 2010 summer season. Later this summer, we will be drawing a random sample of 500 names from the pool to help us with the project.

In about a month, we will be sending a mail questionnaire to the campers sampled, and we will be asking them to complete and return it using a postage-paid envelope.

Thank you for your time and consideration. Only with the assistance from people like you will our research be helpful in making backcountry camping experiences enjoyable.

Have a good backcountry camping trip.

Sincerely,

Don Zimmerman
Professor & Director
E-mail: don.zimmerman@colostate.edu

Expiration date: June 30, 2011

Contact Information Record



Center for Research on Communication & Technology
Journalism & Technical Communication
C-223 Clark Bldg
Colorado State University
Fort Collins, CO 80523-1785
Telephone 970-491-5674
e-mail: Don.Zimmerman@colostate.edu

Dear Backcountry Camper:

Thank you for your willingness to help with this important research project. Only with the assistance from people like you will our research be helpful in making backcountry camping experiences enjoyable. Please provide the information requested below. It will only be used for our research project.

- 1. Name:
2. Street Address:
3. City:
4. State:
5. Zip Code:
6. E-mail:
7. Number in your camping group:
8. Number of days planned for camping in the backcountry:
9. How often in a year do you go backcountry camping for two or more days in a row?
times a year This is my first time!

PRIVACY ACT and PAPERWORK REDUCTION ACT statement:
16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Burden estimate statement: Public reporting for this form is estimated to average 20 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to: Judy Visty, Research Administrator/Ecologist, Continental Divide Research Learning Center, Rocky Mountain National Park, 1000 Highway 36 Estes Park, CO 80517, e-mail: Judy_Visty@nps.gov.

Quality Assurance for *Leave No Trace* Survey, Rocky Mountain National Park

Don Zimmerman, Principal Investigator, Colorado State University.

Judy Visty, PARK CO-COORDINATOR ON PROJECT

Cheri Yost, PARK CO-COORDINATOR ON PROJECT

The staff of Rocky Mountain National Park is committed to the success of backcountry campers by recruiting volunteers for recruiting participants for the *Leave No Trace* survey of backcountry campers in Rocky Mountain National Park.

Responsibilities of Park Coordinator

- Recruits volunteers, hereafter called “volunteer recruiters.” (They will recruit participants for the mail survey.)
- Ensures ample volunteer recruiters for recruiting participants.
- Provides a room for training volunteer recruiters.
- Informs RMNP staff members when volunteer recruiters will be soliciting survey participants so they can answer survey-related questions.
- Provides sufficient Restop2 bags for distribution during sampling period.
- Provides pickup and return locations for forms (Names and address lists for potential participants of the *Leave No Trace* survey).

Responsibilities of Volunteer Recruiters

- Complete training to recruit participants according to project sampling strategy.
- Available to recruit participants on prescribed days.
- Follow the recruitment procedures.
- Maintain a count of the number of park visitors approached, and a log of the observable characteristics of refusals and non-refusals for use in a non-response bias analysis.
- Return completed survey logs to the Park Coordinator at the end of each day of recruiting.

Responsibilities of Principal Investigator

- Prepares detailed sampling protocol to use in training volunteer recruiters and to guide and remind volunteers of the protocol.
- Conducts two training sessions in coordination with Park Project Coordinator./
One session will be prior to the beginning recruitment of volunteers and the second if additional or alternative volunteers are needed.
- Is in regular contact with Park Coordinator.
- Makes periodic visits to the Park to ensure volunteers are complying with protocol.
- Provides reports to Rocky Mountain National Park staff as required in the agreement.

Appendix B. Packet letters and Questionnaire

Cover Letter for First Packet



Center for Research on Communication
& Technology
Journalism & Technical Communication
C-223 Clark Bldg
Colorado State University
Fort Collins, CO 80523-1785
Telephone 970-491-5674
e-mail: don.zimmerman@colostate.edu

<ADDRESS BLOCK>

Dear

About a month ago, you completed a backcountry camping trip to Rocky Mountain National Park. We hope you enjoyed your trip. When you obtained your backcountry camping permit, you indicated that you would be willing to help us with a research project.

We sincerely appreciate your willingness to help us with our research. You are one of a select sample of backcountry campers being asked to complete the enclosed questionnaire. Our research project focuses on developing a better understanding of backcountry campers' use of Leave No Trace supplies and camping practices. Our findings will help the Rocky Mountain National Park staff provide better services and enhance backcountry camping experiences.

Please complete the enclosed questionnaire and mail it to us in the enclosed, stamped, return envelope.

Your responses to this survey are voluntary and final data is anonymous. Our findings will be released as summaries. When you return the questionnaire, your name will be deleted from our mailing list and never connected to your answers in any way. If, for some reason, you prefer not to respond, please let us know by returning the blank questionnaire in the enclosed envelope.

If you have any questions, feel free to e-mail, call, or write me (see letterhead).

Thanks for your help.

Sincerely,

Don Zimmerman
Professor & Director

Assessing Backcountry Campers' Adoption of Leave No Trace Technologies



PRIVACY ACT and PAPERWORK REDUCTION ACT statement:

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Center for Research on Communication and Technology
C-244 Clark
Colorado State University
Fort Collins, CO 80523

Control Number _____

Your Recent Backcountry Experience at Rocky Mountain National Park

Thank you for choosing to participate in this visitor survey. The following questions are about your recent backcountry experience at Rocky Mountain National Park when you volunteered to help with this study earlier this year.

1. Where do you live?
 - a. City _____ State _____ Zip _____
 - b. Country (if not US) _____

2. How many nights did you spend in the backcountry of Rocky Mountain National Park?
 Number of nights ____ OR __ Don't Know

3. How many people were in your backcountry group, including yourself? _____ people

4. When did you or your group make the decision to take your backcountry trip in Rocky Mountain National Park? (Check one.)

_____ On the day of the trip	_____ 1 to 6 months before the trip
_____ 2-7 days before the trip	_____ More than 6 months, but less than a year before the visit
_____ 8 to 30 days before the trip	_____ A year or more before the trip

5. Did you plan the trip for an organization (Boy Scouts, Girl Scouts, Colorado Mountain Club, etc.)?
 - _____ Yes → Go to Question 5a.
 - _____ No → Skip to Question 6.

5a. If YES, what was the group? _____

6. For the recent backpacking trip on which we contacted you, how many people in your group were:
 ____ # Female ____ # Male

7. How many times have you been backcountry camping in the last 12 months? _____

8. What is the most common length of your backcountry camping experiences
 ____ 1 to 2 nights ____ 3 to 4 nights ____ 5 or more nights

9. Have you ever camped in cross-country zones or hiked off-trail?
 - _____ Yes → Go to Question 9a.
 - _____ No → Skip to Question 10.

9a. If YES, how often did you camp in a cross-country zone or hike off trails in the last 12 months? How many times? _____

10. For your trip when you agreed to participate in this study, what age group were your camping companions? (Check all that apply.)

_____ Under 18 years _____ 18 to 26 years _____ 27 to 35 years _____ 36 and older

11. Please briefly describe any training experience you have received for backcountry camping, including workshops, guided camping experiences, Boy Scouts, Sierra Club, etc.

12. For each area below, please circle one number that represents your level of camping expertise. Let 1= Novice to 7= Expert

Areas	Novice						Expert	
	1	2	3	4	5	6	7	
a. Using topographic maps	1	2	3	4	5	6	7	
b. Treating water	1	2	3	4	5	6	7	
c. Surviving a variety of weather conditions	1	2	3	4	5	6	7	
d. Protecting food from wildlife	1	2	3	4	5	6	7	
e. Using GPS	1	2	3	4	5	6	7	
f. Other (please list): _____	1	2	3	4	5	6	7	

13. National Park Service “Leave No Trace” initiative

The following questions ask you to rate yourself in terms of knowledge and implementation of the National Park Service’s “Leave No Trace” initiative. Some people are familiar with these guidelines; others are not. If you aren’t familiar with the guideline, circle the ? mark. If you are familiar with the guideline, please circle one number representing how often you follow it, using the scale **where 1 = Never and 7 = Always**.

Guidelines	Not Familiar with Guideline	Never							Always	
		1	2	3	4	5	6	7	6	7
a. I check the regulations and special guidelines for the camping area that I plan to visit.	?	1	2	3	4	5	6	7		
b. I check out the current weather conditions before leaving on my camping trip.	?	1	2	3	4	5	6	7		
c. I check out special area information before leaving on my camping trip.	?	1	2	3	4	5	6	7		
d. I leave an itinerary with someone at home when I backpack.	?	1	2	3	4	5	6	7		

14. For the following questions, Let 7 = Never and 1= Always

Guidelines	Not Familiar with Guideline	Never Always						
		7	6	5	4	3	2	1
e. I plan my meals and repackage food into reusable containers.	?	7	6	5	4	3	2	1
a. I stay on designated trails.	?	7	6	5	4	3	2	1
b. Except in tundra areas, my camping party hikes single file.	?	7	6	5	4	3	2	1
c. When I rest, I sit on rocks, logs, or in clearings.	?	7	6	5	4	3	2	1
d. My camping party speaks softly.	?	7	6	5	4	3	2	1
e. I use the tent pad at the campsite if available or camp on other durable surfaces.	?	7	6	5	4	3	2	1
f. I camp in the area indicated on my permit.	?	7	6	5	4	3	2	1
g. I use a portable stove for cooking.	?	7	6	5	4	3	2	1
h. I leave plants and rocks in their natural positions.	?	7	6	5	4	3	2	1
i. I hang or place food and scented items (e.g., deodorant, shampoo, etc.) in a ‘bear barrel’ or special food container.	?	7	6	5	4	3	2	1
j. I wash my dishes at least 200 feet from water sources.	?	7	6	5	4	3	2	1
k. I pack out everything I bring into the backcountry.	?	7	6	5	4	3	2	1

Assessment of Restop2 Units Use in Rocky Mountain National Park

One guideline of “Leave No Trace” is to manage human feces by using campsite pit toilets or digging a small pit, sometimes called a cathole. For this research project, you received a Restop2 bag. Restop2 is a bag system where you use the bag, seal the bag, and pack out the waste.

Some campers in **Rocky Mountain National Park** have received a Restop2 bag for free or have purchased them or a similar bag.

15. Do you receive a Restop2 bag **for free** on your recent backpacking trip?

_____ Yes → Go to Question 15a.

_____ No → Skip to Question 16.

15a. Where did you receive a Restop2 bag for free? Check all that apply.

- Rocky Mountain National Park office
- From a fellow camper
- Trailhead
- Other (list): _____

16. Have you ever purchased a Restop2 or similar disposal bag for any backpacking trip to Rocky Mountain National Park?

- Yes → Go to Question 16a.
- No → Skip to Question 17.

16a. Where have you purchased a Restop2 or similar bag? Check all that apply.

- Rocky Mountain National Park office Sporting or camping store
- From a fellow camper Other (list): _____

17. If you either received or purchased a Restop2 bag or a similar device during your recent backcountry experience at Rocky Mountain National Park, did you use it?

- Yes, I used it. → Go to Question 17a.
- No, I didn't use it. → Skip to Question 18.

17a. How often did you use Restop2 bags or a similar product on your recent backpacking trip?

- 1 to 3 times 4 to 6 times 7 to 9 times 10 or more times

17b. How did you dispose of the Restop2 bag(s) or similar product?

Opinions about the Use of Restop2 Bags

18. In your opinion, what are the advantages and disadvantages to campers of using a Restop2 bag?

Advantages: _____

Disadvantages: _____

19. In your opinion, what are the disadvantages and advantages to the environment of using a Restop2 bag?

Advantages: _____

Disadvantages: _____

20. In your opinion, what impact, if any, did Restop2 use have on the immediate area where you camped?

21. For each attribute below, please circle one number representing the Reststop2 or similar product’s ease of use. Use the scale of 1 = Very Difficult to 7 = Very Easy. Circle N/A, i.e., not applicable, if it does not apply to you.

Attribute	Very Difficult			Very Easy				Not Applicable
	1	2	3	4	5	6	7	
a. Understanding the bag’s directions.	1	2	3	4	5	6	7	NA
b. Opening the bag.	1	2	3	4	5	6	7	NA
c. Closing the bag.	1	2	3	4	5	6	7	NA
d. Using the gel.	1	2	3	4	5	6	7	NA
e. Packing out the bag(s).	1	2	3	4	5	6	7	NA
f. Disposing of the bags after your trip.	1	2	3	4	5	6	7	NA

22. If you had Restop2 or similar bags on your recent backpacking trip and didn’t use them, list the reasons why you did not.

23. How likely are you to **purchase** a Restop2 or similar disposal bag for future backcountry use? (Please circle one number.)

Not likely 1 2 3 4 5 6 7 Very likely

24. How likely are you to support the **mandatory use** of the Restop2 or similar device in the backcountry of Rocky Mountain National Park? (Please circle one number.)

Not likely 1 2 3 4 5 6 7 Very likely

25. In your opinion, is digging a small hole for disposing human waste (check one only):

- Easier than using a Restop2 or similar bag
- As easy as using a Restop2 or similar bag
- Harder than using a Restop2 or similar bag

26. For each statement below, please circle one number representing how frequently you have seen or observed each situation. Use the scale where 1 = Never to 7 = Very often.

27.

<i>Areas</i>	<i>Never</i>						<i>Very often</i>
a. A Restop2 or a similar bag at a camping or sports store.	1	2	3	4	5	6	7
b. A Restop2 or a similar bag being advertised.	1	2	3	4	5	6	7
c. People walking with a Restop2 bag at a campsite.	1	2	3	4	5	6	7

28. Check all the places where you have seen information about Restop2 or a similar product.

- Haven't seen any information **OR** National Park Service office/Park rangers
 Camping magazines
 Other (please specify): _____

29. For each item, please circle one number representing how important the item would be in influencing your decision to use Restop2 or a similar device **on a future backpacking trip**. Use the scale where 1 = Not important to 7 = Very important

<i>Items</i>	<i>Not important</i>				<i>Very important</i>		
l. National Park requirement	1	2	3	4	5	6	7
m. Camping group decision	1	2	3	4	5	6	7
n. Environmental impact	1	2	3	4	5	6	7
o. Health reasons	1	2	3	4	5	6	7
p. Other (list): _____	1	2	3	4	5	6	7

30. For each item, please circle one number representing how important the following would be in influencing your decision to continue using Reststop2 or a similar device. Use the scale where 1 = Not important to 7 = Very important.

Areas	Not important				Very important		
	1	2	3	4	5	6	7
a. Convenient to purchase	1	2	3	4	5	6	7
b. Free to backcountry campers	1	2	3	4	5	6	7
c. Purchase price	1	2	3	4	5	6	7
d. Ease of disposal	1	2	3	4	5	6	7
e. Length of camping trip	1	2	3	4	5	6	7
f. Weight of the bag	1	2	3	4	5	6	7
g. Other (list): _____	1	2	3	4	5	6	7

Background Information

30. What is your age? _____

31. What is your gender? ___ Male ___ Female

32. How long have you been backcountry camping (overnight activity)?

___ Less than 3 years ___ 3 to 6 years ___ 7 to 9 years ___ 10 or more years

33. With what groups do you go backcountry camping? (Check all that apply.)

___ Youth groups ___ Family ___ Friends ___ Recreation club
 ___ Church groups ___ Other (please specify): _____

34. In what related activities do you participate while camping? (Check all that apply.)

___ Fishing ___ Bird/Wildlife watching
 ___ Photography ___ Other (list): _____

35. For each of the following information sources, please circle one number that represents how frequently you use it to learn about camping. Use the scale where 1 = Never to 7= Very often.

Information source	Never							Very often
	1	2	3	4	5	6	7	
a. Rocky Mountain National Park Website	1	2	3	4	5	6	7	
b. Other websites (list): _____	1	2	3	4	5	6	7	
c. Outdoor store (e.g., REI or Cabela's)	1	2	3	4	5	6	7	
d. Camping/Recreational magazines	1	2	3	4	5	6	7	
e. Friends	1	2	3	4	5	6	7	
f. Other (list): _____	1	2	3	4	5	6	7	

Is there anything else you would like to tell us about your recent backcountry trip to the RMNP and disposing of human feces? If so, please use the space below.

POSTCARD REMINDER

Month, Day, 2010

About two weeks ago, we mailed you a questionnaire about your use of Leave No Trace practices and supplies while backcountry camping.

If you have completed and returned the questionnaire, please accept our sincere thanks. If not, please do so today. We sincerely appreciate your help because it is only by asking backcountry campers like yourself to share their viewpoints that we will develop a better understanding of campers' use of Leave No Trace practices and supplies.

If you did not receive the questionnaire or it was misplaced, please e-mail me at Don.zimmerman@colostate.edu or call me at 970-491-5674, and we will mail you another questionnaire.

Thanks for your help.

Sincerely,

Don Zimmerman, Professor & Director
Center for Research on Communication & Technology
C-244
Colorado State University
Fort Collins, CO 80523-1785

Cover Letter Second Questionnaire



Center for Research on Communication
& Technology
Journalism & Technical Communication
C-223 Clark Bldg
Colorado State University
Fort Collins, CO 80523-1785
Telephone 970-491-5674
e-mail: don.zimmerman@colostate.edu

<ADDRESS BLOCK>

Dear

I am writing about the backcountry camping survey at Rocky Mountain National Park, in which you agreed to participate. The waiting period for incoming questionnaires is almost over, and as of today, we have not yet received yours. (If you have mailed it within the past few days, thank you!) Since you are one of a select number of backcountry campers at Rocky Mountain who were chosen to participate in the survey, I would appreciate you completing the questionnaire.

The staff of Rocky Mountain National Park is anxiously awaiting the survey results. They want to use your ideas and opinions in making decisions and learning more about backcountry campers Leave-No-Trace viewpoints.

So please complete the enclosed questionnaire and return it by [date]. It should take you about 20 minutes. Your contribution to the success of this study is greatly appreciated.

We also want you to know that protecting your identity is important to us and the University. The identification number on the back of the questionnaire enables us to check your name off of the mailing list when the questionnaire is returned. At the end of the research period, the list of names is destroyed so that individual names cannot be connected to the questionnaire results in any way.

We hope that you fill out and return the enclosed questionnaire soon, but if you prefer not to, please let us know by returning a note or a blank questionnaire in the enclosed, stamped, self-addressed envelope.

If you have any questions, feel free to e-mail me, call, or write me (see letterhead).

Thanks for your help.

Sincerely,

Don Zimmerman
Professor & Director

Appendix C

Residence States of Respondents

Arizona
Arkansas
California
Colorado
Florida
Georgia
Illinois
Indiana
Kansas
Michigan
Minnesota
Missouri
Nebraska
New Hampshire
New Mexico
New York
North Carolina
Ohio
Oklahoma
Pennsylvania
Texas
Vermont
Virginia
Washington
Wisconsin
Wyoming

Appendix D.

Final Comments

At the close of the questionnaire, the last page provided respondents the opportunity to respond to the following question.

“Is there anything else you would like to tell us about your recent backcountry trip to the RMNP and disposing of human feces? If so, please use the space below.”

- Overwhelmingly, people believe that the protection of the environment is important.
- Restop bags or similar devices are a good idea for areas where it is not feasible to dig a hole, high travel areas, or where campsites are close. However, they are impractical for short hikes.
- Others believe that there is no reason for Restop bags. Human waste is biodegradable.
- Plus RMNP visitors suggested alternatives to Restop bags: Solar poop cooker (Looprivy), Groovers, decomposable toilets, etc. Respondents also believe these alternatives have less of an impact on the environment than Restop.
- Generally people believed that Restop (or similar device) would be more likely used if it was free.
- People also believe that high resistance would be met if their use was mandatory, even though several people indicated that use should be required. One person stated they would stop going to RMNP if the use of Restop was mandated.
- The largest hurdles in the public using Restop are product characteristics and lack of knowledge about the benefits of Restop. According to respondents, Restop2 is bulky, has too much packaging, unclear directions, sealing the bag is a problem, and something is needed to support the bag to make it feasible to use.
- Additionally people don't understand the benefits to the environment in using Restop. No data details the positive impact that Restop may have on the environment.