Coalition of American Canyoneers

SUU Southern Utah University
Learning Lives Forever

Canyoneering in the United States • 2015
Final Project Report

December 20, 2015

Zion National Park, Utah • Photograph by Keith Howells, Howells Outdoors

Table of Contents

Table of Tables

Abstract

This report describes an exploratory study sponsored by the Coalition of American Canyoneers (CAC) to better understand how people are engaging in the sport of canyoneering in the United States. It includes a summary of results from an online survey administered in February 2015, as well as a discussion of study implications for land managers, instructors, leaders, guides, advocacy groups and the canyoneering community at large.

While this study was exploratory in nature, it fills a crucial gap in the recreation literature regarding canyoneers' experiences, practices, knowledge and opinions related to the sport. The information presented here serves as a starting point for further study into canyoneering, its relationship with the landscape, and the people who participate in the activity.

In conjunction and with support from Southern Utah University

Introduction

Purpose and Goals

This study is designed to explore the activity of canyoneering in the United States. Specific objectives for this research are as follows:

- Provide baseline data on people who participate in the sport.
- Provide baseline data on canyoneers' experiences, canyoneering practices, and knowledge.
- Investigate participants' opinions related to potential canyoneering issues.
- Identify areas of interest and/or concern to the canyoneering community.

Approach

As mentioned previously, research on canyoneering and the people who participate in the sport is lacking in the recreation literature. This exploratory study was conducted to collect some initial data that will provide an enhanced understanding of canyoneering that will be useful to land managers, instructors, and canyoneering advocacy groups.

An online survey was designed to collect information about canyoneers' experiences, practices, knowledge, opinions, and involvement with canyoneering and outdoor organizations. Various land management groups, including representatives from several national parks, had input into the survey design. SurveyMonkey® was used to administer the survey and collect response data. We were interested in collecting as many responses from active canyoneers as possible rather than limiting the survey to members of selected canyoneering organizations and groups. Because there are multiple canyoneering groups and organizations ranging from the local to national level, a convenience sampling method was used to collect responses. The Coalition of American Canyoneers (CAC) sent an initial email and follow-up reminder email to its registered members with information about the study and a link to the online survey. The CAC also posted a link to the survey on its Facebook page, and to the Facebook pages of other canyoneering groups. Repeated messages were posted on popular canyoneering forums—Bogley and The Canyon Collective. The survey was also publicized by several guides and canyoneering websites. Organizations and individuals were encouraged to share the link, which many did. This convenience/snowball sampling method achieved a final sample that was nearly evenly split between CAC members and nonmembers. The survey was open from February 19 to March 1, 2015 and a total of 900 responses were collected. The final sample included 846 usable[1] responses.

Methods, Results, and Discussion

A survey was designed to collect data regarding canyoneering experience, practices, knowledge, attitudes, opinions, affiliation with canyoneering-specific and other outdoor organizations, and demographic information. Any adult age 18 or over who had been canyoneering at least one time in 2014 was eligible to participate in the survey. For the purposes of this study, *canyoneering* was defined as the technical or semi-technical descent of canyons involving ropes and other equipment. The survey included questions asking respondents about their experience level, training, and skills; trip experiences in 2014; knowledge of area regulations and policies; potential issues at locations where they canyoneer; and permit and access concerns. Information regarding respondent demographics and affiliations with outdoor organizations was also collected. Data analysis was conducted using SPSS Statistics version 22 (IBM 2013).

[1] Three respondents indicated they were not of sufficient age (18 years or older) to participate in the study; fifty respondents answered the age screening question affirmatively but did not answer any other questions; one response was an Internet troll and was excluded from the sample. While the remaining 846 respondents may have left some questions blank, they provided sufficient information to be included in the analysis. The number responding is noted in the reporting of the results.

Canyoneering Participants

A total sample of 846 survey responses was obtained. Overall, the vast majority of respondents were male (Table 1) and the average age was about 43 years (Table 2). Respondents overall were also highly educated, with 75.7% holding a four-year or graduate degree (Table 3), more than twice the national average. The canyoneering community also has high household incomes (Table 4), with nearly 75% of those responding having a household income of $50,000 or higher, compared to the U.S. median HH income of $51,939[2]. Nearly 97% of respondents live in the United States or U.S territories, representing 30 U.S. states and Puerto Rico, with most providing ZIP codes from Utah (29.7%), California (22.5%), and Arizona (16.1%). Of the twenty-five international respondents, 40% were from Canada and 32% were from European countries. See Appendix II for a summary of state and country of residence for respondents.

Table 1. Gender of survey respondents (N = 747)

Gender[3]	Percent
Male	76.6
Female	23.3

Table 2. Respondent age: mean = 43.0, min = 18, max = 77 (N = 711)

Age	Percent
19 and under	0.4
20-24	4.2
25-29	10.4
30-34	15.3
35-39	13.6
40-44	11.5
45-49	12.2
50-54	11.4
55-59	10.0
60-64	7.2
65-69	2.3
70-74	1.3
75 and over	0.1

[2] "US Census Bureau, Income Distribution to $250,000 or More for Households: 2013."
[3] Ten respondents chose "Prefer not to answer" to this question. The Male/Female ratio in this chart factors these out.

Table 3. Education level (N = 743)

What is the highest level of formal education you have completed?

Education Level	Percent
Less than high school	0.3%
High school graduate/GED	2.7%
Vocational/trade school certificate	2.2%
Some college	10.9%
Associates/two-year college degree	8.2%
Bachelors/four-year college degree	42.9%
Master's degree	23.4%
Ph.D. or other advanced degree	9.4%

Table 4. Annual household income (N = 743)

What is your annual household income before taxes?

Income Level	Percent
Under $25,000	8.9
$25,000 to $49,999	12.9
$50,000 to $74,999	16.2
$75,000 to $99,999	15.6
$100,000 or above	32.8
Prefer not to say	13.2

Canyoneering Experience

Study participants were asked several questions about their experience with canyoneering. Most respondents began canyoneering in the mid-1990s or later, with few participating in the sport prior to that time (Table 5). This is a strong reflection of the newness of the sport. Half of the respondents have been canyoneering for five years or less (i.e. since 2010) and 25% for three years or less.

Table 5. First Canyoneering (N = 840)

In what year did you first go canyoneering?

Year first went canyoneering[1]	Percent
Prior to 1970	.2%
1970-1974	.2%
1975-1979	1.0%
1980-1984	0.8%
1985-1989	1.4%
1990-1994	4.2%
1995-1999	7.3%
2000-2004	11.3%
2005-2009	23.0%
2010-2014	49.9%
2015	0.7%

[1] 25th percentile = 2004; 50th percentile = 2010; 75th percentile = 2012

Respondents were asked, "Approximately how many technical or semi-technical canyons did you descend?" in 2013 and 2014. Respondents descended a mean average of about 14 canyons per year, with a median average of 8 canyons, in both 2013 and 2014 (Table 6).

Table 6. # of Canyoneering Descents (n = 846)

Approximately how many technical or semi-technical canyons did you descend in 2014? In 2013?

Year	Mean	Max	Percentile		
			25th	50th	75th
2013	14.1	210	3	8	20
2014	13.8	160	4	8	18

Respondents were asked whether they considered themselves to be at a beginner, intermediate, advanced, or expert canyoneering level (Table 7). Approximately 75% of respondents consider themselves intermediate or advanced canyoneers.

Table 7. Self-reported level of canyoneering expertise (N = 841)

Overall, what level canyoneer do you consider yourself?

Level	Percent
Beginner	11.7
Intermediate	40.2
Advanced	35.9
Expert	12.2

The survey also asked respondents whether they had experienced a number of specific situations while canyoneering in 2014 (Table 8). The most common situations experienced were descending a canyon that required a wetsuit or dry suit (75.5%), leading a group (61.8%), and participating in a multiple-day backpacking trip that included canyoneering (31.8%).

Nearly 6% of respondents indicated they experienced a situation with a significant injury while canyoneering in 2014. Also, nearly 6% reported experiencing a rescue. While these experiences were reported with the same frequency, the same respondents did not necessarily report them. Of those who experienced a situation with a significant injury, 25 (51%) also reported a rescue. Of the 38 respondents who reported an unplanned overnight, 9 (24%) reported a significant injury and 11 (29%) reported a rescue. We must note that these data cannot tell us whether those situations were connected (i.e. an unplanned overnight was associated with a significant injury or rescue during the same trip).

Table 8. Situations experienced while canyoneering in 2014 (N = 846)

Did you experience any of the following while canyoneering in 2014? (Please select all that apply.)

Situation	Percent
Canyon that required a wetsuit or dry suit	75.5
Leading a group	61.8
Multiple-day backpacking trip	31.8
Winter canyoneering (snow and/or ice)	24.2
Packing out human waste	20.0
Significant injury	5.8
Rescue	5.8
Unplanned overnight	4.5

Overall, the rate of both Significant Injuries and Rescues were both about .4% of estimated canyon descents (or four out of every 1000 canyons). Of note, while Experts and Advanced canyoneers reported more Significant Injuries and Rescues, the rate of incident per canyon descent increased substantially for those less skilled. This suggests a need for better preparation and training for beginning canyoneers.

Table 9. Rescues Per Descent by Canyoneering Skill Level

Reported Canyoneering Skill Level	Total Respondents	Total Canyons Descended 2014	# of Rescues 2014	Rescues Per Canyon Descents
Experts	12.1%	3631	13	.36%
Advanced	36.0%	5266	22	.42%
Intermediate	40.2%	2781	13	.47%
Beginner	11.7%	326	3	.92%
Total	100.0%	12,004	51	.43%

Table 10. Areas visited and number of canyons descended in 2014 (N = 757)

We would like to know about the areas you went canyoneering in 2014. If in 2014 you visited an area listed below, please indicate the number of canyons you descended in that area.

Location	Canyoneered in Area	% of Total Respondents	Descended 1-5 Canyons	Descended 6-9 Canyons	Descended 10+ Canyons
Zion National Park (UT)	496	65.5%	71.4%	15.7%	12.9%
North Wash (UT)	209	27.6%	70.3%	18.7%	11.0%
Grand Staircase-Escalante	184	24.3%	87.0%	9.2%	3.8%
Other Utah	184	24.3%	79.3%	11.4%	9.2%
San Rafael Swell (UT)	166	21.9%	89.8%	8.4%	1.8%
Southern California	159	21.0%	54.7%	15.1%	30.2%
Grand Canyon National Park	155	20.5%	83.9%	9.0%	7.1%
Northern Arizona – excl. GCNP	141	18.6%	79.4%	11.3%	9.2%
Capitol Reef National Park (UT)	138	18.2%	88.4%	8.7%	2.9%
Robbers Roost (UT)	125	16.5%	88.8%	8.0%	3.2%
Central Arizona	125	16.5%	76.0%	12.0%	12.0%
Arches National Park (UT)	120	15.9%	87.5%	9.2%	3.3%
Death Valley National Park	119	15.7%	83.2%	11.8%	5.0%
Moab Area (UT) – excl. Arches	112	14.8%	92.9%	4.5%	2.7%
Other U.S. States	104	13.7%	76.0%	12.5%	11.5%
Ouray (CO)	77	10.2%	88.3%	9.1%	2.6%
Other Arizona	71	9.4%	80.3%	5.6%	14.1%
International	71	9.4%	64.8%	12.7%	22.5%
Northern California	57	7.5%	75.4%	17.5%	7.0%
Other Colorado	27	3.6%	88.9%	7.4%	3.7%
Oregon	20	2.6%	80.0%	5.0%	15.0%
Washington	13	1.7%	84.6%	7.7%	7.7%
Idaho	8	1.1%	75.0%	12.5%	12.5%

Zion National Park in Utah was the most visited area, with 496 respondents (65.5% of total) having made at least one descent in 2014 and an average of over 4.5 canyons descended per Zion visitor. North Wash, Utah was the second most visited area (27.6%), and Grand Staircase-Escalante National Monument was the third most visited (24.3%).

A significant amount of respondents indicated they went canyoneering outside of the United States in 2014 (n = 71). A summary of international countries where respondents went canyoneering is presented in Table 10. A total of 28 countries/regions are represented, with Canada, Spain, and Switzerland receiving the most visits. There were 11 countries with one visitor—not listed on this table.

Table 11. International locations visited by respondents in 2014

Country	Number of Respondents Who Visited
Canada	12
Spain	11
Switzerland	11
France	8
New Zealand	8
Australia	5
Costa Rica	4
Italy	4
Portugal	3
Bali	2
Chile	2
"Europe" (country not specified)	2
Vietnam	2

Geographic Comparisons

Different geographical areas and national parks were linked with varying canyoneer segments and experiences.

- Grand Canyon National Park (GCNP) and Arches National Park (ANP) attracted the most experienced canyoneers, with an average of 9.7 years of experience. Southern California and Death Valley National Park had the lowest levels of experience (6.0 and 6.1 years, respectively).
- GCNP visitors have the highest reported knowledge of land use designations, backcountry regulations, installation of fixed gear and "Leave No Trace" equipment and techniques. This may be largely because of the correlation to experience levels, but it might be noted that expertise among GCNP visitors exceeds ANP visitors, which have a similar level of experience.
- 40% of high-frequency GCNP canyoneers (6+ canyons in 2014) reported an unplanned overnight, by far the highest for high-frequency canyoneers, which mostly ranged from 10-14%. Importantly, this does not necessarily mean that the unplanned overnights were in Grand Canyon National Park; only that those that frequented GCNP reported the experience in 2014.
- Zion National Park (ZNP) had the lowest reported knowledge levels concerning anchor-building techniques. This should not be surprising given (a) their relative low level of experience, and (b) the fact that so many canyons in Zion have fixed anchors in place.

Canyoneering Practices and Knowledge

When asked to indicate the typical group size on canyoneering trips, a group of four people was most common, with about five people being the average (Table 11). Groups tend to number eight people or fewer, with very few respondents indicating a typical group size of 9 people or more. The average group size did not vary much by geography, ranging from averages of 4.6 to 5.4 from respondents who canyoneered in various areas and parks.

Table 12. Most common group size on canyoneering trips (N = 770)

What is the most common group size in your canyoneering trips? (Please enter the typical number of people.)

Typical Group Size	Frequency	Percent
1	2	0.3
2	58	7.5
3	98	12.7
4	200	26.0
5	121	15.7
6	172	22.3
7	17	2.2
8	70	9.1
9	5	0.6
10	20	2.6
12	6	0.8
17	1	0.1

Overall, respondents generally obtain permits for locations that require them for canyoneering activities (Table 12). Nearly 79% responded that someone in the party secures a permit 100% of the time, and nearly 87% said their party secures a permit at least 75% of the time. About 9% of respondents said they received a permit less than 25% of the time. Permitting incidence did not vary substantially based on location (88% - 92% across visitors to the various national parks). However, it was lowest among Beginner canyoneers, 80% vs. 89% for all others). Of note, the incidence of permits could be underreported, as some respondents (especially Beginners) may not be aware that someone else in their group has secured the appropriate permit. Nevertheless, it points to an opportunity to increase awareness of the necessity to only visit restricted canyons when a permit is granted.

Table 13. Percentage of time the party secures a permit (where required) (N = 738)

If you are visiting a national park or place that requires permits, what percentage of the time does someone in your party secure the required permit? (Please enter a number between 0 and 100.)

Percentage of Time Permit is Secured	Frequency	Percent
0% of the time	25	3.4
1-24% of the time	40	5.4
25-49% of the time	6	0.8
50-74% of the time	27	3.7
75-99% of the time	59	8.0
100% of the time	581	78.7

Respondents were presented with a list of equipment and asked to indicate whether they typically bring that item while canyoneering, if someone in their party usually brings that item, if the item is not typically present on trips, or if they were unsure or did not know whether or not an item was present. Items listed included a variety of canyoneering, emergency, and personal equipment. The list of items and a summary of responses are presented in Table 13. Helmet (95.8% and headlamps (90.8%) were the two items most frequently carried, followed by emergency warm clothing (85.5%) and a whistle (77.7%). Someone in the group brought a first aid kit 96.1% of the time, canyon information/beta 94.3% and extra rope 88.7%. Leave No Trace anchor gear was reported in over half of groups (55.3%) and SPOT/PLB devices in over a third 35.8%.

Table 14. Items typically carried while descending a canyon

Which of the following do you typically bring while descending a canyon? (Select one option for each item.)

Item	I Bring this Item	Someone in Party Brings Item	Not Typically Present	Don't Know/Unsure
	%	%	%	%
Helmet	95.5	2.3	2.2	0.0
Headlamp	90.8	4.0	4.4	0.9
Extra rope	52.6	36.1	9.8	1.5
Bolt Kit	5.8	13.4	76.4	4.3
G-Pick	2.2	5.4	77.8	14.6
GPS	45.8	32	18.8	1.2
LNT anchor gear	28.1	27.2	35.6	4.3
First aid kit	73.7	22.4	3.5	0.4
Walkie Talkies/Radio	13.3	13.0	69.5	4.2
SPOT or PLB	19.4	16.4	56.2	8.0
Whistle	77.7	8.4	13.1	0.9
Emergency warm clothing	85.5	3.1	10.1	1.3
Emergency bivy gear	49.3	7.4	38.9	4.5
Topographic map	60.1	24.2	13.9	1.7
Canyon information (Beta)	71.3	23.0	4.4	1.3
WAG BAG/personal waste disposal	36.4	9.1	50.2	4.3
Contingency plan	53.5	23.0	12.7	4.5

The survey also included questions about respondents' knowledge and skills. Canyoneering requires specific geographic features, and areas suitable for canyoneering activity are spread out over large areas managed by a number of different federal, state, and local agencies and organizations. These areas are often subject to unique land use and backcountry regulations that vary from place to place. Study participants were asked to rate their level of knowledge for a number of these regulations as it related to the places they go canyoneering. A summary of responses is presented in Table 14.

Overall, it appears there is an opportunity to better educate canyoneers on local land use regulations, as only about half of canyoneers reported to be "Well Informed" on these issues. It should be noted that in many cases, someone in the party is well-informed. Nevertheless, this points to an opportunity for education and awareness.

Table 15. Knowledge of land use and backcountry regulations in areas visited for canyoneering

Canyoneering often occurs in places with unique land use and backcountry regulations. For each item, please rate your knowledge of this topic as it relates to the places you go canyoneering. (Select one option for each item.)

Regulation	Well Informed	Somewhat Familiar	No Knowledge
	%	%	%
Land use designations and related regulations (e.g. canyoneering in Wilderness or proposed wilderness areas)	50.5	44.0	5.5
Local backcountry regulations (e.g. group size limits, "camouflaging" of software left in place and fixed gear, use of motorized drills, etc.)	55.8	36.9	7.3
Permit/registration process	74.7	22.6	2.7
Installation of fixed gear	42.3	40.5	17.3
Establishing new routes	30.5	39.8	29.7
Area closures	53.0	38.9	8.1

Overall respondents appear to be at least somewhat informed of local regulations that may influence canyoneering activities. However, the percentage of respondents who responded "No Knowledge" of some items was rather high. For example, almost a third of respondents indicated they had no knowledge of policies and regulations regarding the establishment of new canyoneering routes in the areas they go canyoneering.

This raises the question of whether knowledge of local regulations might vary based on an individual's level of canyoneering experience. An analysis of variance (ANOVA) was conducted to test whether there are differences in knowledge between experience levels (Table 16). Significant differences were observed for all regulation types. Respondents who consider themselves *beginner* canyoneers had lower self-reported levels of knowledge for all regulation types, *intermediate* canyoneers had slightly higher levels of knowledge for all regulation types, and *advanced* and *expert* canyoneers reported similar (i.e. not statistically different) levels of knowledge for land use designations, local backcountry regulations, permit/registration processes, and area closures. *Advanced* and *expert* canyoneers reported significantly different levels of knowledge regarding fixed gear and establishing new routes, with experts reporting higher levels of knowledge in these areas.

Table 16. Knowledge of regulations by self-identified canyoneering experience level (Well-Informed = 2, Somewhat Familiar = 1, No Knowledge = 0).

Regulation Area	Beginner	Intermediate	Advanced	Expert
Land use designations and related regulations	1.1	1.3	1.6	1.7
Local backcountry regulations	1.0	1.4	1.6	1.7
Permit / registration process	1.3	1.7	1.8	1.9
Installation of fixed gear	0.8	1.1	1.4	1.7
Establishing new routes	0.5	0.8	1.2	1.6
Area closures	1.0	1.4	1.6	1.7

Respondents were asked to rate their skill levels in a number of areas. Overall, the highest rated skills were Reading Topographical Maps (46.6% Advanced) and Route-finding (42.8% Advanced). The lowest-rated skills were Pothole Escapes (49.3% Novice or No Experience) and Class C (moving water) Canyons (51.8% Novice or No Experience), driven largely by low scores from self-described Beginners. One important conservation-oriented training opportunity for new canyoneers may be how to minimize rope grooves, which had an average skill rating of Novice (.95) among Beginners.

Table 17. Self-rating of Canyoneering Skills

"Please rate your skills in the following areas. (Select one option for each skill.)"

Skills	Advanced (3)	Intermediate (2)	Novice (1)	No Experience (0)	Average
Route-Finding	42.8%	43.8%	11.2%	2.3%	2.27
Reading Topographical Maps	46.6%	39.0%	13.1%	1.3%	2.31
Pothole Escapes	13.9%	36.7%	33.1%	16.2%	1.48
Class C Canyons	12.0%	37.2%	33.8%	17.0%	1.44
Minimizing Rope Grooves	27.9%	45.8%	21.7%	4.6%	1.97
Building Low-Impact Anchors	34.1%	38.3%	21.2%	6.4%	2.00
Leave No Trace Techniques	38.9%	41.2%	14.1%	5.9%	2.13
Ascending a Rope	39.0%	37.5%	17.6%	5.9%	2.10
Emergency First Aid	27.1%	42.9%	26.4%	3.6%	1.93

Based on anecdotal research and experience, the CAC has been concerned about canyoneers who may not be properly checking anchors before rappels. Respondents were asked "How frequently do you thoroughly inspect anchors—including all webbing—even when the webbing is buried or difficult to reach?" 69.1% of all respondents reported Always thoroughly inspecting anchors, and 26.0% replied Mostly. However, 5.0% of respondents reported Hardly Ever or Never. This may not be quite as alarming as it first appears, as perhaps others in their party are checking the anchors. In any event, it points to another training opportunity.

Table 18. Anchor Checking

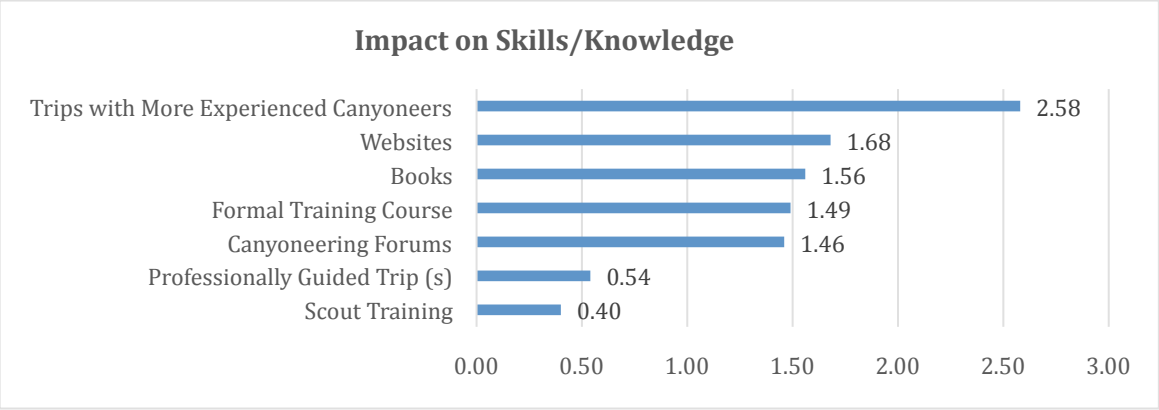
How frequently do you thoroughly inspect anchors - including all webbing - even when the webbing is buried or difficult to reach? (Select one.)

Frequency	Percent
Always	69.2%
Mostly	25.9%
Sometimes	4.3%
Hardly Ever	0.4%
Never	0.3%

The predominant method for improving canyoneering knowledge and skills is to take trips with more experienced canyoneers. When asked "Which of the following has had an impact on your canyoneering knowledge and skills?", Professionally Guided Trips and Scout Training were the lowest rated impact. Nearly half of respondents (48.7%) reported Professional Guided Trips having Slight Impact or No Impact on their canyoneering knowledge and skills, suggesting that either they are not taking professional trips, or if they are, that most of their skill development is coming from other sources. In contrast, nearly half (47.4%) said that Canyoneering Forums (e.g. Bogley, Canyon Collective) had a Large or Moderate Impact on their canyoneering knowledge and skills.

Graph 19. Impact on Canyoneering Knowledge and Skill Levels

Which of the following has had an impact on your canyoneering knowledge and skills? (Select one option for each item.) (Large Impact—3, Moderate Impact—2, Slight Impact—1, No Impact—0).

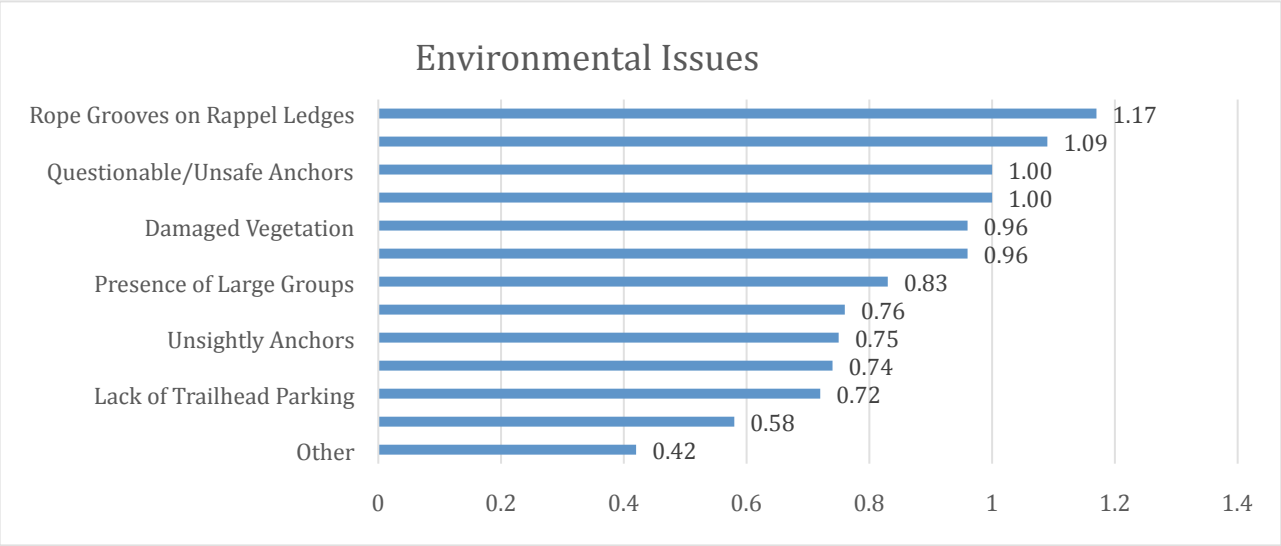


Attitudes and Opinions

The survey included several very specific questions about respondent opinions on important issues. As in any wilderness activity, conservations issues are always a concern. Respondents were asked to rate a number of potential environmental issues from a problem standpoint. Most issues graded out as, on average, a "Minor" problem. However, the highest rated environmental issue was regarding rope grooves (1.17 score) and multiple trails (1.09 score). Of note, the concern over rope grooves was driven largely by Expert and Intermediate canyoneers. It as the item with the biggest gap between Expert and Beginner opinions (1.25 vs. .81). On every issue, Experts were more sensitive to subtle issues than Beginners, such as rope grooves, unsightly anchors and the presence of large groups in canyons. This again points to an educational opportunity with Beginner and Intermediate canyoneers.

Graph 20. Environmental Issues in Canyons

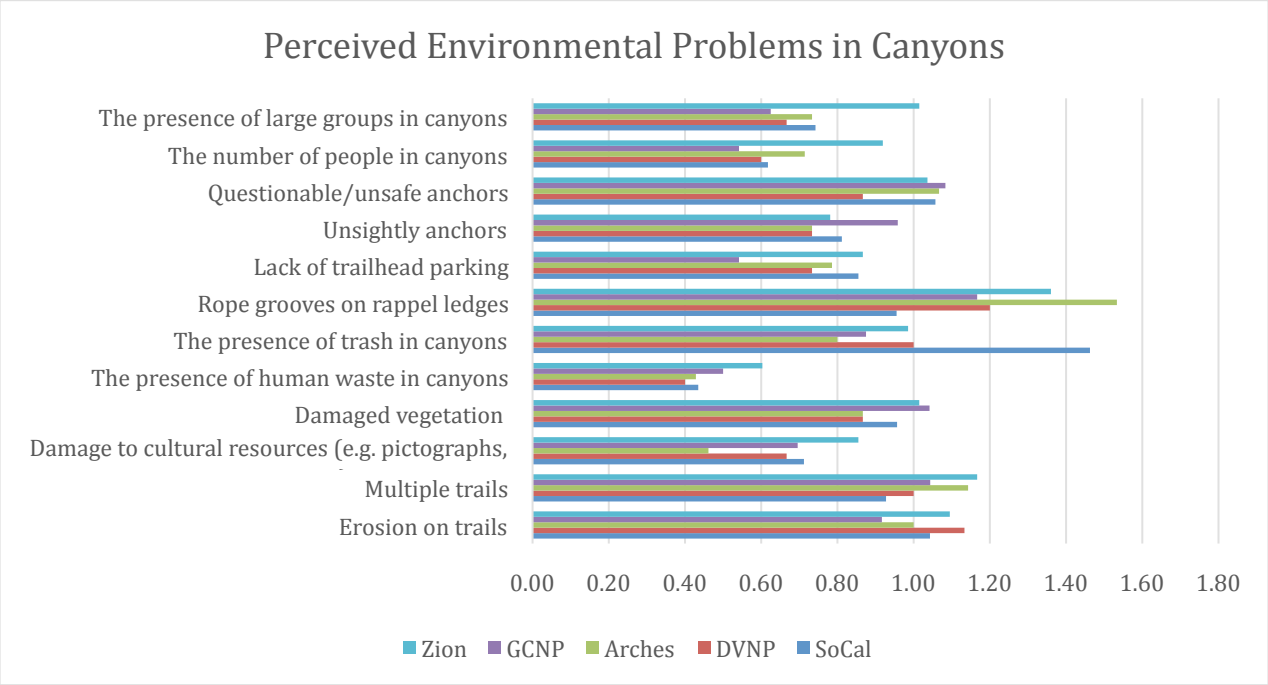
In general, how much of a problem do you think the following issues are at locations where you have gone canyoneering? (Select one option for each item.) Significant Problem-2, Minor Problem-1, Not a Problem-0.



Canyoneers who frequented different areas tended to view environmental issues slightly differently. Zion and Arches canyoneers (i.e. those that descended at least six canyons in that area in 2014) felt that rope grooves, erosion on trails and multiple trails were more of a problem than others. Grand Canyon, Arches and Zion canyoneers were most concerned about damage to cultural resources, and also saw the presence of human waste as more of a problem than in other locales. Southern California canyoneers by far rated trash in canyons as a bigger problem. GCNP canyoneers saw unsightly and unsafe anchors as a bigger problem than others, perhaps reflecting the higher experience level of canyoneers there. Zion was the only area where canyoneers appears to be concerned about trailhead parking.

Graph 21. Perceived environmental problems by frequented canyoneering areas.

Significant Problem-2, Minor Problem-1, Not a Problem-0.



On average, respondents felt like the canyoneering communicating was doing well in its efforts to minimize the environmental impact, although some did not score as highly. Of note, these scores did not differ substantially by geography or by skill level.

Table 22. Canyoneering Community Environmental Efforts

In your opinion, how well does the canyoneering community minimize its environmental impact?

Community Environmental Efforts	
Excellent	22.4%
Well	55.5%
Fair	18.0%
Poor	1.7%
No Opinion	2.3%

In general, respondents were opposed to permitting, with only 2.1% of respondents indicating they "Strongly Favor" permitting systems, and 51% said they "Oppose" or "Strongly Oppose" them. Of note, the scores did not differ substantially by geography or between skill levels.

Table 23. Attitudes relating to permit systems.

Permit systems for canyoneering are generally designed to protect environmental resources and provide a high quality experience for users. In areas that do not currently require a permit for canyoneering, would you generally oppose or favor establishing a permit system?

Permit System Attitude	
Strongly Favor	2.1%
Favor	16.9%
Neither	30.0%
Oppose	34.3%
Strongly Oppose	16.7%

Respondents were, on average, Moderately to Very Concerned about the elimination of access to canyons. This did not vary substantially by geography or skill level.

Table 24. Concern about canyon access elimination.

In general, how concerned are you about access in canyons being eliminated?

Concern over Canyon Access Elimination	
Extremely Concerned	17.5%
Very Concerned	29.7%
Moderately Concerned	29.5%
Slightly Concerned	18.7%
Not at All Concerned	4.5%

National Park Visitor Differences

Some interesting differences emerged from those who canyoneered in different national parks. Because it was a highly frequented area, we have also included the Southern California area (SoCal) for comparisons. Some distinguishing statistics:

- Grand Canyon National Park (GCNP) and Arches National Park (Arches) attract the longest-term canyoneers, both about 9.7 years of experience, 18% higher than the national average of 8.2 years.
- GCNP canyoneers are significantly more likely to experience packrafting (6.7x) than non-visitors to GCNP. Similarly, they are also more likely to experience a first descent (2.2x), packing out human waste (2.6x) and multiple-day canyoneering trips (3.5x).
- High-frequency (6+) GCNP canyoneers were five times more likely to experience an unplanned overnight than non-GCNP canyoneers.
- Those who canyoneered in Death Valley National Park (DVNP) were 2.4x more likely to experience a first descent than non-visitors.
- High-frequency Arches canyoneers were 39% more likely to use "leave no trace anchor gear (e.g. Sandtrap, Fiddlestick, Potshots, etc.") than those who didn't canyoneer in Arches.
- GCNP and SoCal canyoneers were the most likely to use SPOT or PLB devices. GCNP canyoneers were 41% more likely than non-GCNP canyoneers. For SoCal, the ratio is 35% more likely than non-visitors.
- Higher-frequency (6+ descents) GCNP canyoneers were the most likely to carry WAGBAGS or other human waste disposal systems.
- GCNP canyoneers were consistently the most informed on backcountry and land use regulations.
- GCNP canyoneers reported the highest skill self-assessments for route-finding, pothole escapes, leave no trace techniques, reading topo maps and emergency first aid.
- Arches canyoneers expressed the greatest concerns regarding multiple trails, trail erosion and rope grooves.
- SoCal canyoneers were the most positive regarding permits: 2.61 on a five-point scale, with 1 = Strongly Oppose, 2 = Oppose, 3 = Neutral, 4 = Favor and 5 = Strongly Favor) whereas higher-frequency Arches canyoneers were the most negative (1.87).
- Higher-frequency GCNP and Arches canyoneers were the most concerned about canyon access being eliminated.
- Arches canyoneers are, on average, the oldest (average age 52) while SoCal canyoneers have the youngest average age (41).

Coalition of American Canyoneers

Since the survey was co-sponsored by the Coalition of American Canyoneers (CAC), and the CAC managed the recruiting, there was some concern that the sample would skew dramatically to CAC members. In fact, only about half (52%) of respondents reported being CAC members—67% of Experts, 57% of Advanced Canyoneers, 46% of Intermediates and 38% of Beginners. A few responses distinguished CAC members from non-Members, although much of this can be explained by the increased experience level.

- Members went canyoneering more frequently than non-members (17.2 canyons in 2014 vs. 10.9).
- CAC members were more likely than non-members to visit certain areas, including SoCal (+136%), Ouray (+148% more), North Wash (+70%), GCNP (+81%) and Capitol Reef National Park (+69%)
- CAC members had substantially more experience at leading a group (74% vs. 58%), using wetsuits/drysuits (87% vs. 76%), winter canyoneering (30% vs. 11%) and multi-day trips (40% vs. 27%).
- CAC members are 17% less likely to take a bolt kit and 12% less likely to take a G-pick. However, they are 14% more likely to take a GPS and 17% more likely to take a SPOT.
- CAC members are 18% more likely to take "leave no trace" gear, 33% more likely to take bivy gear, and 15% more likely to take a WAG bag (or similar product).
- CAC members are 10-20% more aware of regulations and permitting processes, and have 17-24% higher self-rated skills in pothole escapes, Class C canyons, minimizing rope grooves and Leave No Trace techniques.

- CAC members are 20% more likely to have taken a formal training course and 21% more likely to be impacted by participation in canyoneering forums.
- CAC members are 10% more sensitive to trail erosion as a problem and 15% more sensitive to trash in canyons.
- 86% of CAC members have visited the website, 55% viewed CAC on Facebook and 69% have read the CAC email newsletters.

Discussion and Conclusions

Canyoneering is a growing sport with many established veterans, but a healthy mix of beginners (50% with less than five years of experience and 20% with less than two years). As expected, the beginners tend to be less informed with acknowledged lower skill levels than the veterans. Canyoneers are predominantly male (77%) and older than most outdoor sports enthusiasts, with an average age of 43 and only 15% under the age of 30. They also tend to be highly educated, with 95% having some college, and 33% with a graduate degree.

The community is generally well-informed regarding the sport, with broad experiences and a reasonably high self-reported skill level. Most canyoneers are informally educated in the sport, and get the bulk of their knowledge from canyoneering with more experienced enthusiasts. However, they are also quite involved in canyoneering forums (e.g. Bogley, Canyon Collective) other websites.

Canyoneers tend to frequent multiple areas, and are not loyal to any particular geography. A high-frequency canyoneer is highly likely to have visited multiple national parks or other canyoneering areas outside of his/her home turf.

The community, even beginning canyoneers, generally has a high degree of sensitivity and awareness of environmental issues, although clearly there are opportunities for improvement in this area. However more frequent and experienced canyoneers have a higher awareness and concern about subtle environmental issues. This holds true for local area regulatory issues as well. Beginners lag others particularly in awareness of the permitting process and regulations, although respondents report that when permits are required, they have them 88% of the time.

Generally, the research points to a need for the CAC and canyoneering groups to improve efforts to increase awareness and training on skills, environmental issues and local regulatory compliance, particularly with beginners.

Appendix I. Canyoneering in the United States 2015 Survey

Thank you for taking the **Canyoneering in the United States 2015** survey. This survey is sponsored by the Coalition of American Canyoneers (CAC), a non-profit organization that supports the canyoneering community, in partnership with Southern Utah University (SUU). The purpose of this survey is to better understand how people are engaging in the sport. We are interested in learning more about participants' experiences, practices, knowledge, and opinions related to canyoneering. This information will be useful for land managers, instructors, leaders, guides, and the rest of the community.

For the purpose of this survey, ***canyoneering*** will be defined as *the technical or semi-technical descent of canyons, involving ropes and other equipment*.

This survey is for anyone age 18 or over who has been canyoneering at least one time in the past two years.

A summary of the results will be published on the CAC website: http://www.americancanyoneers.org/survey

The survey should take 10-15 minutes to complete. Please read each question carefully and answer honestly. Your responses will remain confidential and will only be reviewed in the aggregate.

By continuing on with the survey, you give your consent to participate in this study.

SUU Research Study Information and Informed Consent:
You will be asked questions regarding your canyoneering experience, practices, attitudes and opinions, organizational affiliations, and basic demographic information. No identifying information will be collected, and your responses will remain completely confidential and only reviewed in the aggregate. You may skip any question you do not wish to answer. Participation is voluntary. You may discontinue the study at any time for any reason without penalty. You may ask questions at any time by emailing the principle investigator (contact information

below).

This study is considered minimal risk, meaning you should not encounter any risk or discomfort beyond those typical to day-to-day activities. While you may not receive direct individual benefits by participating in this study, your participation will yield information that will benefit canyoneering instructors, leaders, and guides; land managers; and the larger community of people who participate in the sport. The results of this study will inform the development of future education, safety, and information materials for canyoneers, as well as inform management of canyoneering areas. You will not be given any compensation for participating in this study.

If at any time you have any concerns, questions, or would like to receive any additional information about the study, please contact the principle investigator:
Kelly Goonan
Assistant Professor of Outdoor Recreation in Parks and Tourism
Southern Utah University
kellygoonan@suu.edu

By continuing on with the survey, you give your consent to participate in this study.

The Institutional Review Board (IRB) of Southern Utah University has reviewed this study for the protection of the rights of human subjects in research studies, in accordance with federal and state regulations.

***1. Are you 18 years of age or older?**

- Yes
- No

A. Canyoneering Experience

2. In what year did you first go canyoneering?

3. Overall, what level canyoneer do you consider yourself? (Select one.)

- ○ Beginner
- ○ Intermediate
- ○ Advanced
- ○ Expert

4. Approximately how many technical or semi-technical canyons did you descend in 2014?

5. Approximately how many technical or semi-technical canyons did you descend in 2013?

6. Did you experience any of the following while canyoneering in 2014? (Please select all that apply.)

- ☐ Leading a group
- ☐ Canyon that required a wetsuit or drysuit
- ☐ Packrafting
- ☐ Winter canyoneering (snow and/or ice)
- ☐ First descent (i.e. first known descent of a canyon)
- ☐ Packing out human waste
- ☐ Multiple-day backpacking trip
- ☐ Unplanned overnight
- ☐ Significant injury
- ☐ Rescue

A: Canyoneering Experience

7. We would like to know about the areas you went canyoneering in 2014. If in 2014 you visited an area listed below, please indicate the number of canyons you descended in that area. If you did not visit an area in 2014, please select the *Did Not Visit in 2014* option.

	Did not visit in 2014	1	2	3	4	5	6	7	8	9	10	More than 10 descents
a. Zion National Park (UT)	○	○	○	○	○	○	○	○	○	○	○	○
b. Arches National Park (UT)	○	○	○	○	○	○	○	○	○	○	○	○
c. Grand Canyon National Park (AZ)	○	○	○	○	○	○	○	○	○	○	○	○
d. Death Valley National Park (CA)	○	○	○	○	○	○	○	○	○	○	○	○
e. Grand Staircase-Escalante National Monument (UT)	○	○	○	○	○	○	○	○	○	○	○	○
f. Capitol Reef National Park (UT)	○	○	○	○	○	○	○	○	○	○	○	○
g. San Rafael Swell (UT)	○	○	○	○	○	○	○	○	○	○	○	○
h. North Wash (UT)	○	○	○	○	○	○	○	○	○	○	○	○
i. Robbers Roost (UT)	○	○	○	○	○	○	○	○	○	○	○	○
j. Moab Area (UT) - excluding Arches National Park	○	○	○	○	○	○	○	○	○	○	○	○
k. Other Utah	○	○	○	○	○	○	○	○	○	○	○	○
l. Ouray (CO)	○	○	○	○	○	○	○	○	○	○	○	○
m. Other Colorado	○	○	○	○	○	○	○	○	○	○	○	○
n. Northern Arizona – excluding Grand Canyon National Park	○	○	○	○	○	○	○	○	○	○	○	○
o. Central Arizona	○	○	○	○	○	○	○	○	○	○	○	○
p. Other Arizona	○	○	○	○	○	○	○	○	○	○	○	○
q. Southern California	○	○	○	○	○	○	○	○	○	○	○	○
r. Northern California	○	○	○	○	○	○	○	○	○	○	○	○
s. Oregon	○	○	○	○	○	○	○	○	○	○	○	○
t. Washington	○	○	○	○	○	○	○	○	○	○	○	○
u. Idaho	○	○	○	○	○	○	○	○	○	○	○	○
v. Other U.S. States	○	○	○	○	○	○	○	○	○	○	○	○
w. International (please specify below)	○	○	○	○	○	○	○	○	○	○	○	○

International (please specify)

B: Canyoneering Practices

8. What is the most common group size in your canyoneering trips? (Please enter the typical number of people.)

9. If you are visiting a national park or place that requires permits, what percentage of the time does someone in your party secure the required permit? (Please enter a number between 0 and 100.)

10. Which of the following do you typically bring while descending a canyon? (Select one option for each item.)

	Not typically present	I bring this item	Someone in my party brings this item	Don't Know/Unsure
a. Helmet				
b. Headlamp				
c. Extra rope beyond what the longest rappel is expected to require				
d. Bolt kit				
e. G-Pick				
f. GPS				
g. Leave No Trace anchor gear (e.g. Sandtrap, Fiddlestick, Potshots, etc.)				
h. First aid kit				
i. Walkie Talkies or radios				
j. SPOT or PLB device				
k. Whistles				
l. Emergency warm clothing				
m. Emergency bivy gear				
n. Topographic map				
o. Canyon information ("beta")				
p. WAG BAG or other personal human waste disposal system				
q. Contingency plan in case of problems				

11. Canyoneering often occurs in places with unique land use and backcountry regulations. For each item, please rate your knowledge of this topic <u>as it relates to the places you go canyoneering</u>. (Select one option for each item.)

	No Knowledge	Somewhat Familiar	Well Informed
Land use designations and related regulations (e.g. canyoneering in Wilderness or proposed wilderness areas)	○	○	○
Local backcountry regulations (e.g. group size limits, "camouflaging" of software left in place and fixed gear, use of motorized drills, etc.)	○	○	○
Permit/registration process	○	○	○
Installation of fixed gear	○	○	○
Establishing new routes	○	○	○
Area closures	○	○	○

12. Please rate your skills in the following areas. (Select one option for each skill.)

	No Experience	Novice	Intermediate	Advanced
Route-finding	○	○	○	○
Pothole escapes	○	○	○	○
Class C (moving water) canyons	○	○	○	○
Minimizing rope grooves	○	○	○	○
Building dependable low-impact anchors	○	○	○	○
Using Leave No Trace techniques to minimize impact on natural and cultural resources	○	○	○	○
Reading topographical maps	○	○	○	○
Ascending a rope	○	○	○	○
Emergency first aid	○	○	○	○

13. Which of the following has had an impact on your canyoneering knowledge and skills? (Select one option for each item.)

	No Influence	Slight Influence	Moderate Influence	Large Influence
Formal training course	○	○	○	○
Professionally guided trip(s)	○	○	○	○
Trip(s) with more experienced canyoneer(s)	○	○	○	○
Scout training	○	○	○	○
Canyoneering forums (e.g. Bogley, Canyon Collective, etc.)	○	○	○	○
Websites	○	○	○	○
Books	○	○	○	○

C. Attitudes and Opinions

14. In general, how much of a problem do you think the following issues are at locations where you have gone canyoneering? (Select one option for each item.)

	Not a Problem	Minor Problem	Significant Problem	Don't Know
Erosion on trails	○	○	○	○
Multiple trails	○	○	○	○
Damage to cultural resources (e.g. pictographs, petroglyphs, structures, etc.)	○	○	○	○
Damaged vegetation (e.g. trampled vegetation, damage to trees/shrubs, etc.)	○	○	○	○
The presence of human waste in canyons	○	○	○	○
The presence of trash in canyons	○	○	○	○
Rope grooves on rappel ledges	○	○	○	○
Lack of trailhead parking	○	○	○	○
Unsightly anchors	○	○	○	○
Questionable/unsafe anchors	○	○	○	○
The number of people in canyons	○	○	○	○
The presence of large groups in canyons	○	○	○	○
Other (please specify)	○	○	○	○

Other

15. How frequently do you thoroughly inspect anchors - including all webbing - even when the webbing is buried or difficult to reach? (Select one.)

- ○ Always
- ○ Most of the time
- ○ Sometimes
- ○ Hardly ever
- ○ Never

16. In your opinion, how well does the canyoneering community minimize its environmental impact on canyons?

Poor	Fair	Well	Excellent	Don't Know/No Opinion
○	○	○	○	○

17. Permit systems for canyoneering are generally designed to protect environmental resources and provide a high quality experience for users. In areas that do not currently require a permit for canyoneering, would you generally oppose or favor establishing a permit system?

Strongly Oppose	Oppose	Neither Oppose nor Favor	Favor	Strongly Favor
○	○	○	○	○

18. In general, how concerned are you about access in canyons being eliminated?

Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
○	○	○	○	○

19. Are there any <u>specific</u> areas where you are concerned access may be eliminated?

- ○ Yes
- ○ No

C: Attitudes and Opinions

20. If you answered Yes, please identify the area.

D. CAC and Affiliations

21. Are you a member of the Coalition of American Canyoneers?

- ○ Yes
- ○ No

D: CAC and Affiliations

22. Do you read the CAC email newsletter?

- ○ No
- ○ Yes

D: CAC and Affiliations

23. Do you follow the CAC on Facebook?

- ○ Yes
- ○ No

24. Have you been on the CAC website in the past year?

- ○ Yes
- ○ No

D: CAC and Affiliations

25. Are you a member of any other outdoor organizations (e.g. Sierra Club, Access Fund, National Parks Conservation Association, etc.)?

- No
- Yes

D: CAC and Affiliations

26. If Yes, please specify which organization(s).

Organization
Organization
Organization
Organization
Organization

D: CAC and Affiliations

27. Do you follow any outdoor organizations through newsletters, social media, websites, or other means?

- No
- Yes

D: CAC and Affiliations

28. If Yes, please specify which organization(s).

Organization
Organization
Organization
Organization
Organization

E: Demographics

29. Do you live in the United States?

- Yes
- No

E: Demographics

30. What is your ZIP code?

E: Demographics

31. In what country do you live?

E: Demographics

32. In what year were you born?

33. What is your gender?

- Male
- Female
- Prefer not to answer

34. What is the highest level of formal education you have completed?

- Less than high school
- High school graduate/GED
- Vocational/trade school certificate
- Some college
- Associates/Two-year college degree
- Bachelors/Four-year college degree
- Masters degree
- Ph.D. or other advanced degree

35. What is your annual household income before taxes?

- Under $25,000
- $25,000 - $49,999
- $50,000 - $74,999
- $75,000 - $99,999
- $100,00 or above
- Prefer not to say

36. Please use this space to provide any additional comments you may have.

Appendix II. Summary of respondents' state (domestic) and country (international) of residence

Note: For the question, "Do you live in the United States?" 27 respondents replied NO, 722 replied YES, and 97 did not reply. The frequencies below reflect the results of the replies to "Country of residence" and "ZIP code." Eight ZIP codes were incomplete (i.e. less than five digits) and thus could not be linked to a state.

Residence	Frequency	Percent
Not specified	*112*	*13.24*
International Country		
Australia	1	0.12
Belgium	1	0.12
Canada	10	1.18
France	1	0.12
Germany	1	0.12
Italy	2	0.24
Japan	1	0.12
Netherlands	1	0.12
New Zealand	1	0.12
Saudi Arabia	1	0.12
Spain	1	0.12
Switzerland	1	0.12
Total international residents	***22***	***2.60***
US State or Territory		
Alaska	1	0.12
Alabama	1	0.12
Arizona	114	13.48
California	160	18.91
Colorado	86	10.17
Florida	3	0.35
Georgia	4	0.47
Hawaii	2	0.24
Idaho	8	0.95
Indiana	2	0.24
Kansas	1	0.12

Kentucky	1	0.12
Louisiana	1	0.12
Minnesota	2	0.24
Missouri	1	0.12
Montana	5	0.59
North Carolina	3	0.35
New Mexico	13	1.54
Nevada	53	6.26
New York	5	0.59
Ohio	2	0.24
Oregon	4	0.47
Pennsylvania	5	0.59
Puerto Rico	2	0.24
Tennessee	4	0.47
Texas	2	0.24
Utah	211	24.94
Virginia	5	0.59
Washington	9	1.06
Wisconsin	1	0.12
Wyoming	1	0.12
Total US residents	***712***	***84.16***
Total	**846**	**100**