



Grand Canyon's Corridor Trails

A Study of Visitor Use and Experience



ON THE COVER

North Kaibab Trail outside Cottonwood Campground
Photograph by: Michael Quinn, National Park Service

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Executive Summary

This report describes findings from a pilot study conducted from spring 2013 to summer 2015 that was designed to assess visitor use and experience on Grand Canyon's Corridor Trails. The purpose of the study was threefold. First, it estimated what use levels along Corridor trails *actually are*. Second, it considered visitor perceptions of what use levels along Corridor trails *should be*. Third, it focused on a further understanding of issues along Corridor trails and management interventions that may be used to address them. Methods for data collection included an OMB approved visitor questionnaire, automated visitor counters, and trail encounter rate monitoring.

Estimates of visitor use levels based on automated counts suggest that while the extent of use on inner canyon trail can be considerable, the frequency to which high use events occur is relatively limited. Furthermore, trends in use levels over the study period suggest that use levels associated with these events are fairly stable and predictable. Staff observations of use levels corroborate these trends and suggest that weekends in spring and fall tend to receive more use than weekdays.

When observed levels of use are compared to visitor perceptions of acceptable use levels, it is clear unacceptable conditions are being experienced by visitors traveling inner canyon trails. For example, results from the visitor questionnaire suggest that visitors deem encountering more than approximately 45 other visitors while traveling between Tipoff and Black Bridge unacceptable; 28% of visitors reported experiencing these conditions; 31% of observations made by park staff in spring 2014 documented these conditions.

While visitors are periodically experiencing unacceptable levels of use on inner canyon trails, an inherent tension exists between perceptions of unacceptable use levels and support for direct management actions that may address them. For example, permits with use limits could ensure that use levels do not become unacceptable. However, over half of respondents to the questionnaire opposed permits with limits whether they had associated fees or not. Addressing this tradeoff, between access and quality, warrants further discussion and may be integrated into the public involvement process for the Draft Environmental Impact Statement for the park's Backcountry Management Plan.

Support for indirect management action does exist. For example, 76% of respondents to the questionnaire supported more education regarding trail etiquette/appropriate behavior while only 4% opposed it. This strong level of support led park staff to begin developing ["Trail Courtesy Practices That Leave No Trace"](#) in 2014. These practices were developed in partnership with the Leave No Trace Center for Outdoor Ethics, and have been incorporated in outreach efforts that include both traditional and electronic media. Grand Canyon's Facebook page and Twitter feed have allowed park staff to emphasize the educational message electronically during the busiest times of the year and information regarding visitor use patterns and trends may also be communicated to help visitors avoid crowded trails and unacceptable conditions in the future. However, an ongoing program of monitoring and research should continue to document potential changes in use patterns or unintended consequences from this action (e.g. unacceptable conditions being experienced more often on weekdays). Ongoing monitoring may reveal a need for more direct management actions in the future.

Contents

	Page
Executive Summary	ii
Figures.....	v
Tables.....	vi
Acknowledgments.....	viii
Background.....	9
Study Purpose	9
Methods.....	10
Study Area	10
Visitor Questionnaire.....	11
Automated Visitor Counters.....	11
Trail Encounter Rate Monitoring	11
Results.....	12
Visitor Questionnaire.....	12
General Characteristics of Inner Canyon Visitors.....	12
Group Characteristics of Inner Canyon Visitors	14
Recreation Activities of Inner Canyon Visitors	15
Visitor Perceptions of Crowding and Use Levels in the Inner Canyon.....	16
Importance of Backcountry/Wilderness Characteristics to Inner Canyon Visitors.....	20
Visitor Assessments of Problems on Inner Canyon trails	21
Visitor Attitudes toward Potential Management Actions.....	22
Automated Visitor Counts.....	24
Trail Encounter Rates	28
Discussion	29
Visitor Perceptions of Use Levels	29
Staff Observations of Use Levels	29

General Estimations of Use Levels and Trends.....	30
Visitor Support for Potential Management Actions	30
Recommendations and Potential Management Implications	31
Lessons Learned.....	32
Conclusion	33
References.....	34
Appendices.....	35
Appendix A: Open-ended responses to question 10b.....	35
Appendix B: Sample Visitor Questionnaire	38

Figures

	Page
Figure 1. Map of study area	10
Figure 2. Respondents mean acceptability evaluations for crowding scenarios on the Bright Angel Trail.....	17
Figure 3. Respondents mean acceptability evaluations for crowding scenarios on the South Kaibab Trail.....	18
Figure 4. Respondents mean acceptability evaluations for crowding scenarios on the North Kaibab Trail.....	19
Figure 5. Manzanita Rest Area visitor counts (spring 2013-2015).....	25
Figure 6. Indian Garden visitor counts (spring 2013-2015).....	26
Figure 7. Tipoff visitor counts (spring 2013-2015)	26
Figure 8. Manzanita Rest Area visitor counts (fall 2013-2014)	27
Figure 9. Indian Garden visitor counts (fall 2013-2014)	27
Figure 10. Tipoff visitor counts (fall 2013-2014)	28

Tables

	Page
Table 1. Education level	12
Table 2. Gender.....	12
Table 3. Age.....	12
Table 4. Ethnicity – Hispanic/Latino	13
Table 5. Race	13
Table 6. US resident.....	13
Table 7. Number of prior visits.....	13
Table 8. Year first visited the inner canyon	13
Table 9. Group size	14
Table 10. Group type	14
Table 11. Packaged tour.....	14
Table 12. Past, current, and future activities.....	15
Table 13. Most important activity.....	15
Table 14. Primary reason for visit.....	15
Table 15. Perceived level of crowding.....	16
Table 16. Crowding compared to expectations.....	16
Table 17. Mean acceptability evaluations for Bright Angel Trail	17
Table 18. Mean acceptability evaluations for South Kaibab Trail.....	18
Table 19. Mean acceptability evaluations for North Kaibab Trail.....	19
Table 20. Respondents preferred level of use	20
Table 21. Respondents estimates of actual use levels.....	20
Table 22. Importance of backcountry/wilderness characteristics to inner canyon visitors.....	21
Table 23. Degree to which inner canyon visitors experienced solitude.....	21
Table 24. Visitor assessment of potential problems in the inner canyon.....	22
Table 25. Visitors reporting interference from other visitors and their activities	22

Table 26. Visitor attitudes towards access	23
Table 27. Level of use at which National Park Service should begin restricting access	23
Table 28. Level of support for potential management actions.....	24
Table 29. Results from spring season visitor encounter rate monitoring.....	28
Table 30. Results from fall season visitor encounter rate monitoring	29

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Background

National Park Service staff observations, combined with comments from the park's 2011 Backcountry Management Plan public scoping process, demonstrate that growing use of backcountry trails is a concern among trails users and managers alike. Specifically, increasing use of Corridor trails has led to user conflict, increased litter, abandoned gear, improper disposal of human waste, crowding at restrooms and attraction sites, an overburdened wastewater treatment plant, vehicle congestion and crowding at trailheads, and general concerns over trail courtesy among visitors. Furthermore, park rangers have reported increases in un-prepared and injured rim-to-rim participants resulting in additional search and rescue responses. Increases in use levels and commensurate impacts are exacerbated by social and popular media outlets. Hiking and running rim-to-rim has been reported on by a number of popular magazines and numerous Facebook sites exist promoting the traverse as a day trip.

Grand Canyon's 1988 Backcountry Management Plan provides guiding policy for Corridor and other trails in the park's more remote reaches (National Park Service 1988). For example, overnight use limits for backpacking were established by the plan. Furthermore, it clearly noted that the number of daytime contacts a backcountry user has with other people is an important indicator of quality for visitor experience. While limits for overnight parties were implemented by the 1988 plan, day use levels were not explicitly addressed.

Given that decades of research demonstrate solitude is an important motivation among visitors to Grand Canyon's backcountry (Towler 1977; Underhill et al. 1986; Stewart 1997; Backlund et al. 2006), and that the park's 1988 Backcountry Management Plan discerns daytime contacts with others as integral to visitor experience, park planners chose to reassess use levels, and visitor perceptions of them, along Corridor trails.

Study Purpose

The purpose of this study was threefold. First, it estimated what use levels along Corridor trails *actually are*. Second, it considered visitor perceptions of what use levels along Corridor trails *should be*. Third, it focused on a further understanding of issues along Corridor trails and management interventions that may be used to address them. The study was launched as a pilot in 2013 to provide a sound baseline of information regarding visitor use and experience related to Grand Canyon's Corridor Trails. Lessons learned from the pilot will help further refine monitoring and research in the future that may support adaptive management decision-making.

Methods

Study Area

This study focused on inner canyon trail segments of the Bright Angel, South and North Kaibab trails (Figure 1). Specifically, it considered the Bright Angel trail from Indian Garden to Silver Bridge (approx. 4.5m); the South Kaibab trail from Tipoff to Black Bridge (approx. 2m); and North Kaibab trail from Manzanita resthouse to Clear Creek Junction (approx. 10m). Each of these trail segments begins approximately five miles into the canyon and ends outside of the Phantom Ranch area. Inner canyon trail segments were chosen based on a reasonable expectation for relative solitude given distance from trailheads, and the Phantom Ranch area was excluded based on its design as a place for people to gather, relax, and spend time.

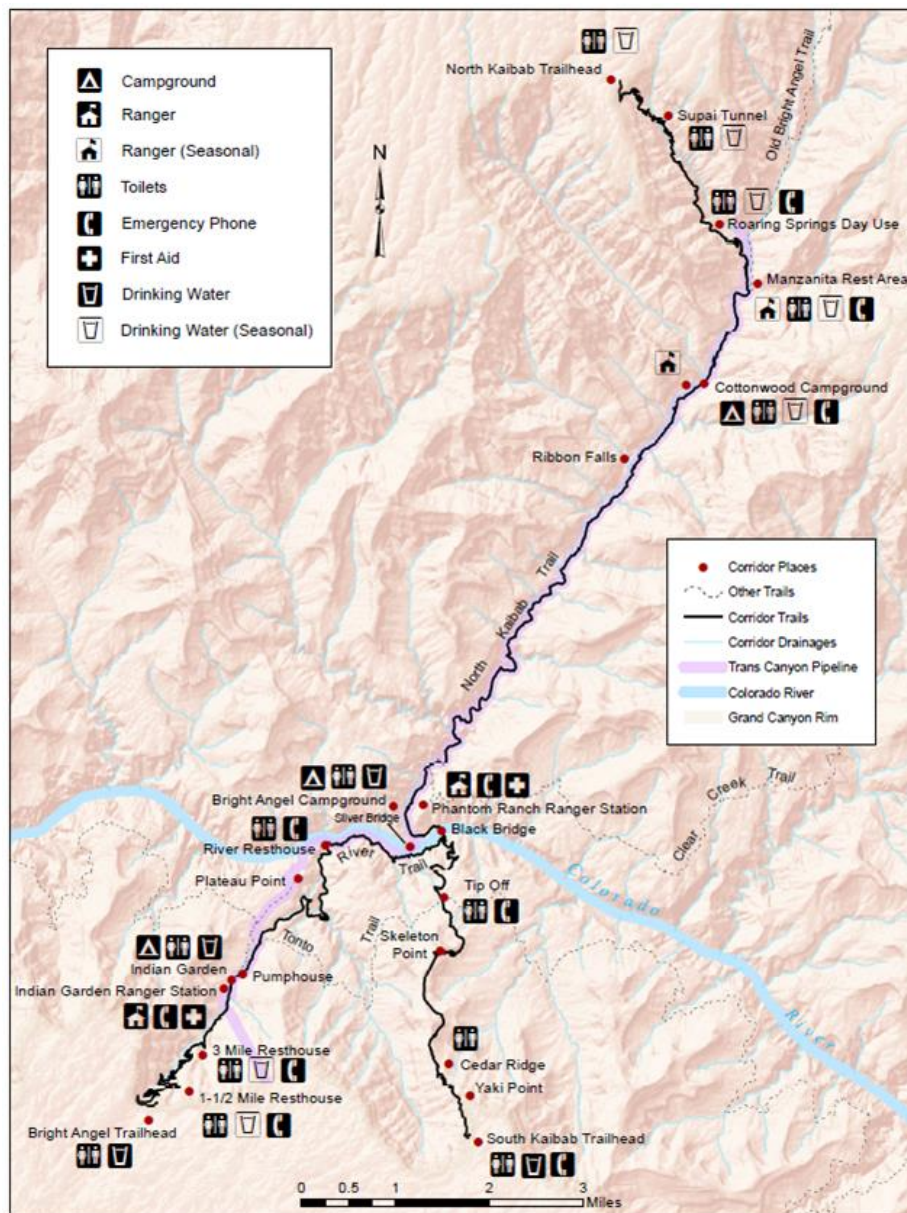


Figure 1. Map of study area

Visitor Questionnaire

A visitor questionnaire was designed to assess visitor perceptions of what use levels along trails segments should be and further understand a number of issues along Corridor trails and management interventions that may be used to address them. Approval to administer the survey was received in advance from the Office of Management and Budget. The survey was administered to a representative sample of visitors at Manzanita Resthouse along the North Kaibab trail, Indian Garden along the Bright Angel trail, and Phantom Ranch along the South Kaibab trail. Surveys were administered on weekdays and weekends between April 27 and May 27, 2013. Sampling locations were strategically chosen in order to facilitate sampling visitors shortly after they had traveled a segment of inner canyon trails. At the start of each sampling day, surveyors stationed at each sampling location approached the first visitor group to arrive and asked a member of their group if he/she would be willing to participate in the survey. Visitors who agreed to participate in the study were given the survey instrument and provided verbal instructions about how to complete the questionnaire. Visitors who were unwilling or unable to participate in the survey were thanked for their consideration. After completing each contact with a visitor group, the surveyor completed an entry on a survey response log and then asked the next visitor group to participate. This process continued throughout each sampling day. Of 573 people asked to participate in the study, 477 agreed. The overall response rate for the survey was 83%.

Automated Visitor Counters

Automated visitor counters were deployed to approximate trail use volumes. Counters were established approximately five miles into the canyon along each trail to coincide with the study area. Each counter consisted of an infrared scope linked to small memory unit that stored count data. The unit registered a count each time the scope detected an infrared signature of a warm moving object. Count data was collected from the months of May to July 2013-2015 and August to December from 2013-2014.

Trail Encounter Rate Monitoring

The second approach for estimating use levels along Corridor trails utilized park staff and volunteers to collect data regarding use levels along inner canyon trail segments. Staff and volunteers were instructed to count the number of people they encountered while traveling along inner canyon trail segments. Hand counters and monitoring forms were provided. Monitoring forms included a number of attributes to be recorded, including the date, start and end time of hike, and which trail segment and direction hiked. Given limited resources for the study, an opportunistic sampling plan was employed. Monitoring forms were made available from April to June and September to November 2013-2014. Staff and volunteers participated as their duties and free time allowed.

Results

Visitor Questionnaire

Questionnaires were administered on weekends and weekdays from April 27 to May 27, 2013. The survey response rate was 83% resulting in a total of 477 completed questionnaires. Results from the survey include general characteristics of visitors, visitor assessments of a number of potential problems along Corridor trails, evaluations of encounters with other visitors, attitudes towards access, and perceptions of a range of possible management interventions. General descriptive results from the survey are described in both narrative and tabular format below.

General Characteristics of Inner Canyon Visitors

A substantial majority of visitors to inner canyon trails have a college degree or higher education (Table 1); are male (Table 2); are between 25 and 64 years old (Table 3); and identify themselves as white (Tables 4 & 5). Approximately 11% of visitors to inner canyon trails are traveling from countries outside of the United States (Table 6). On average visitors to inner canyon trails had visited them six times before, although 43% were on their first trip (Table 7). Over half of all visitors reported their first visit to the inner canyon being in the last five years, and the earliest visit reported was in 1958 (Table 8).

Table 1. Education level

Education Level	(n=462)	
	Count	Percent
Less than high school	1	1%
High School Diploma/GED	34	7%
Technical school or Associate's Degree	50	11%
Bachelor's Degree	183	40%
Master's Degree	136	29%
Ph.D., M.D., J.D., or equivalent	58	13%

Table 2. Gender

Gender	(n=460)	
	Count	Percent
Male	321	70%
Female	139	30%

Table 3. Age

Age Group	(n=463)	
	Count	Percent
18-24	40	9%
25-44	203	44%
45-64	194	42%
65+	26	6%

General Characteristics of Inner Canyon Visitors (cont.)

Table 4. Ethnicity – Hispanic/Latino

Response	(n=445)	
	Count	Percent
Yes	14	3%
No	431	97%

Table 5. Race

Response	(n=452)	
	Count	Percent
American Indian	7	2%
Asian	43	10%
Black	2	Less than 1%
Native Hawaiian	1	Less than 1%
White	399	88%

Table 6. US resident

Response	(n=468)	
	Count	Percent
Yes	418	89%
No	50	11%

Table 7. Number of prior visits

(n=462)	
Don't know	21
Min	1
Max	500
Mean	6.61
First trip	200(43%)

Table 8. Year first visited the inner canyon

(n=415)	
Don't know	13
Min	1958
Max	2013
Mean	2004
First visit in last 5 years	234(56%)

Group Characteristics of Inner Canyon Visitors

A substantial majority of visitors to inner canyon trails travel in groups of six or less and the vast majority travel in groups of 30 or less (Table 9). However, survey respondents did report traveling in groups of up to 70 people. A number of visitors also reported being part of various types of organized groups (Table 10). For example, 4% of visitors were part of a commercial group, less than 1% were part of a school/education group, and 14% reported being part of some other organized group (such as running club, scout group, etc.). Approximately 5% of visitors reported their trip being part of a packaged tour (Table 11).

Table 9. Group size

(n=477)	
Min	1
Max	70
Mean	6
Report 6 or less	397(83%)
Report 11 or less	431(90%)
Report 30 or less	465(97%)

Table 10. Group type

Group Type	n	Count	Percent
Commercial	474	20	4%
School/educational	473	1	Less than 1%
Other(running club, scout group, etc.)	472	66	14%

Table 11. Packaged tour

(n=454)		
Response	Count	Percent
Yes	22	5%
No	432	95%

Recreation Activities of Inner Canyon Visitors

The survey included a number of questions regarding recreation activities available in the inner canyon. Results demonstrate what activities visitors participated in during past trips, their current trip, and what activities they would participate in on a future visit (Table 12). Visitors also reported the most important activity on their current trip and which activity was the primary reason for visiting the inner canyon (Tables 13 and 14).

Table 12. Past, current, and future activities

Activity	(n=476)					
	Past Visit		Current Visit		Future Visit	
	Count	Percent	Count	Percent	Count	Percent
Day Hiking	239	50%	349	73%	251	53%
Overnight Backpacking	106	22%	148	31%	202	42%
Overnight Lodging at Phantom Ranch	63	13%	83	17%	150	32%
Trail Running	44	9%	58	12%	87	18%
Mule Ride	11	2%	9	2%	55	12%
River Rafting	50	11%	13	3%	201	42%

Table 13. Most important activity

Activity	(n=442)	
	Count	Percent
Day Hiking	231	52%
Overnight Backpacking	108	24%
Overnight Lodging at Phantom Ranch	39	9%
Trail Running	36	8%
Mule Ride	2	1%
River Rafting	6	1%
None	20	5%

Table 14. Primary reason for visit

Activity	(n=464)	
	Count	Percent
Day Hiking	271	58%
Overnight Backpacking	115	25%
Overnight Lodging at Phantom Ranch	28	6%
Trail Running	39	8%
Mule Ride	4	1%
River Rafting	7	1%

Visitor Perceptions of Crowding and Use Levels in the Inner Canyon

Survey respondents were asked a number of questions related to crowding. For example, survey respondents were asked to indicate how crowded they felt by the number of people present along inner canyon trails. Approximately 79% reported feeling some degree of crowding on the Bright Angel trail; 63% reported feeling crowded on the South Kaibab trail; 61% reported feeling crowded on the North Kaibab trail; and 53% reported feeling crowded on the River trail. Survey respondents were also asked to indicate how crowded they felt by the number of people present at specific locations. Approximately 70% of respondents reported feeling some degree of crowding at Phantom Ranch; 57% reported feeling crowded at Cottonwood campground; and 46% reported feeling crowded at Ribbon Falls (Table 15). It is worth noting that substantially higher levels of crowding were reported along the Bright Angel trail and at Phantom Ranch compared to other trails and locations. However, only 15% of respondents reported feeling more crowded than they expected and half of respondents experienced the level of crowding they expected (Table 16).

Table 15. Perceived level of crowding

Inner Canyon Trail/Location	N	Perceived Level of Crowding				
		Not at All Crowded	Slightly Crowded	Moderately Crowded	Very Crowded	Extremely Crowded
South Kaibab Trail	370	36%	34%	22%	6%	1%
Bright Angel Trail	274	20%	30%	32%	14%	3%
North Kaibab Trail	182	40%	32%	21%	6%	2%
Phantom Ranch	273	30%	22%	36%	9%	3%
Ribbon Falls	101	54%	26%	14%	5%	1%
Cottonwood Campground	145	43%	37%	16%	3%	1%
River Trail	109	48%	36%	16%	0%	1%

Table 16. Crowding compared to expectations

How crowded visitors felt compared to what they expected	(n=469)	
	Count	Percent
Did not know what to expect	62	13%
Less crowded than expected	99	21%
About the same as expected	237	50%
More crowded than expected	71	15%

Visitor Perceptions of Crowding and Use Levels in the Inner Canyon (cont.)

Curves derived from plotting visitors' mean crowding-related acceptability evaluations for each of the scenarios describing various levels of visitor encounters are depicted in Figures 1, 2, and 3 (mean acceptability evaluations for crowding are also depicted in Tables 17, 18, and 19). The x-axis of each graph corresponds with the number of visitors that were described in the questionnaire scenarios. The y-axis corresponds with visitors' mean crowding-related acceptability evaluations associated with the scenarios described in the questionnaire. The general downward slope of the curves suggest a mostly negative linear relationship between the number of visitors encountered while hiking in the inner canyon and visitors' crowding-related acceptability evaluations. This result suggests that, generally, as the number of people traveling on inner canyon trail segments increases, people perceive the trails to be increasingly crowded.

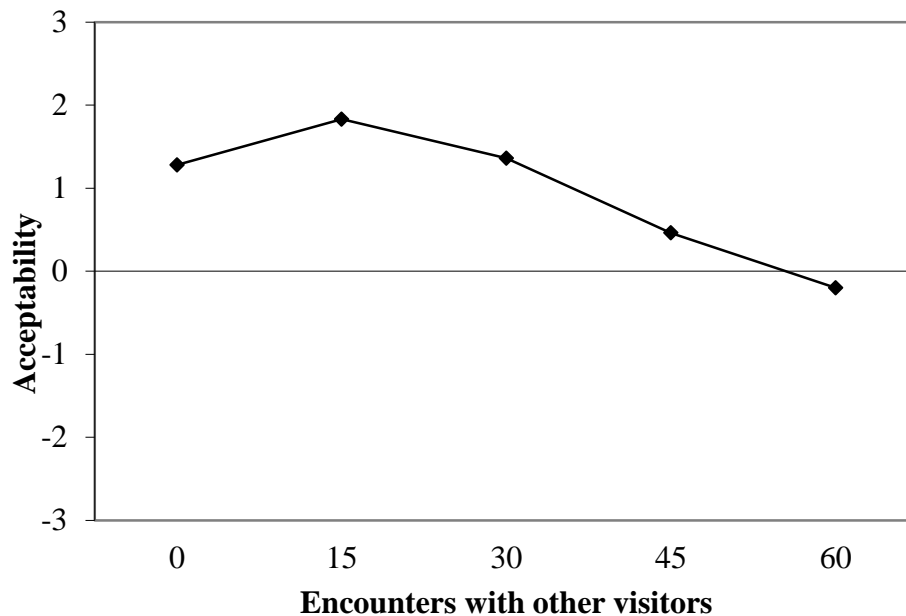


Figure 2. Respondents mean acceptability evaluations for crowding scenarios on the Bright Angel Trail

Table 17. Mean acceptability evaluations for Bright Angel Trail

Scenario (# of visitors encountered)	n	Mean Acceptability
1 (0 other visitors encountered)	160	1.28
2 (15 other visitors encountered)	162	1.83
3 (30 other visitors encountered)	162	1.36
4 (45 other visitors encountered)	162	.46
5 (60 other visitors encountered)	161	-.2

Visitor Perceptions of Crowding and Use Levels in the Inner Canyon (cont.)

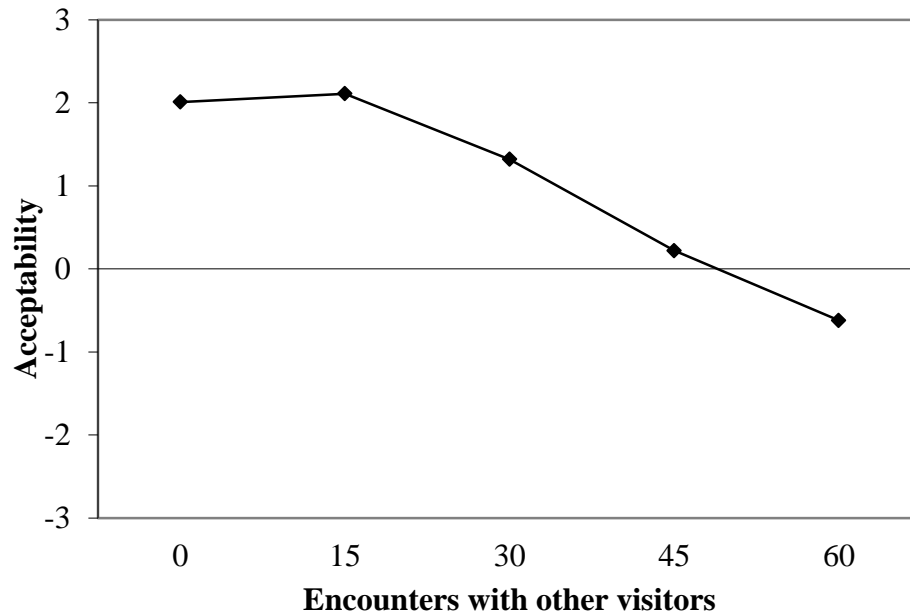


Figure 3. Respondents mean acceptability evaluations for crowding scenarios on the South Kaibab Trail

Table 18. Mean acceptability evaluations for South Kaibab Trail

Scenario (# of visitors encountered)	n	Mean Acceptability
1 (0 other visitors encountered)	140	2.01
2 (15 other visitors encountered)	142	2.11
3 (30 other visitors encountered)	139	1.32
4 (45 other visitors encountered)	139	.22
5 (60 other visitors encountered)	140	-.62

Visitor Perceptions of Crowding and Use Levels in the Inner Canyon (cont.)

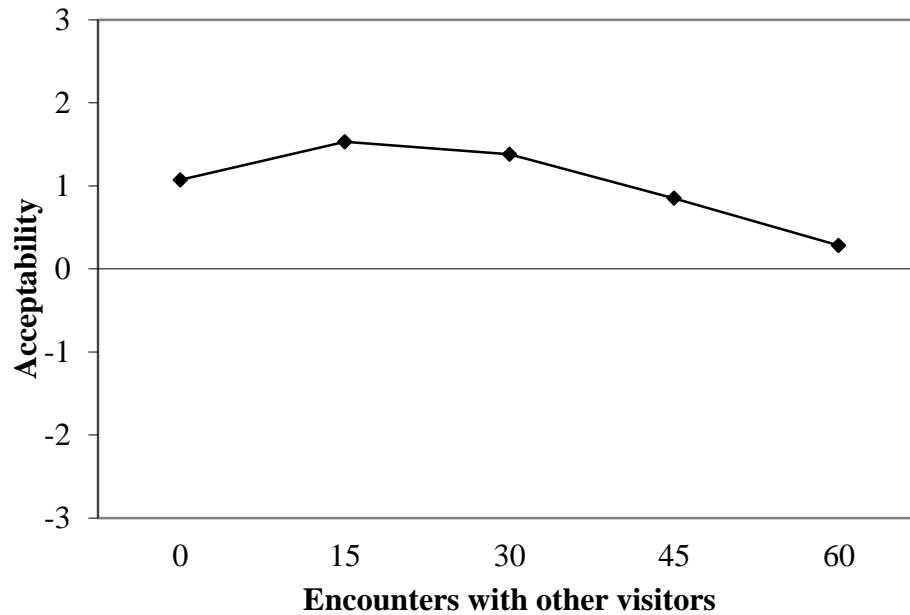


Figure 4. Respondents mean acceptability evaluations for crowding scenarios on the North Kaibab Trail

Table 19. Mean acceptability evaluations for North Kaibab Trail

Scenario (# of visitors encountered)	n	Mean Acceptability
1 (0 other visitors encountered)	140	2.01
2 (15 other visitors encountered)	142	2.11
3 (30 other visitors encountered)	139	1.32
4 (45 other visitors encountered)	139	.22
5 (60 other visitors encountered)	140	-.62

Visitor Perceptions of Crowding and Use Levels in the Inner Canyon (cont.)

Respondents were also asked which scenario described the level of use they would *prefer* to experience. Approximately 83% of respondents reported preferring to encounter 30 or less other visitors while hiking from Silver Bridge to Indian Garden; 87% reported preferring to encounter 30 or less other visitors while hiking from Tipoff to Black Bridge; and 66% reported preferring to encounter 30 or less other visitors while hiking from Phantom Ranch to Manzanita Resthouse (Table 20). The numbers of visitors (estimated by respondents) that were actually seen while traveling along these same trail segments are reported in Table 21. Approximately 47% of respondents reported seeing 30 or less other visitors from Silver Bridge to Indian Garden; 53% reported seeing 30 or less other visitors from Tipoff to Black Bridge; and 42% reported seeing 30 or less other visitors from Phantom Ranch to Manzanita Rest Area.

Table 20. Respondents preferred level of use

Inner Canyon Trail	n	Preferred Scenario (# of visitors encountered)				
		(0 encounters)	(15 encounters)	(30 encounters)	(45 encounters)	(60 encounters)
South Kaibab Trail	135	15%	50%	21%	7%	6%
Bright Angel Trail	158	8%	44%	32%	10%	7%
North Kaibab Trail	103	14%	22%	30%	20%	14%

Table 21. Respondents estimates of actual use levels

Inner Canyon Trail	n	Estimates of numbers of visitors actually seen while traveling inner canyon trails					
		0-15	16-30	31-45	46-60	60+	Can't Remember
South Kaibab Trail	135	26%	27%	7%	12%	16%	12%
Bright Angel Trail	158	16%	31%	8%	10%	20%	16%
North Kaibab Trail	103	21%	21%	8%	13%	18%	20%

Importance of Backcountry/Wilderness Characteristics to Inner Canyon Visitors

Survey respondents were provided with a list of characteristics commonly associated with backcountry and wilderness areas, and asked to indicate how important each item was to them as a reason to use inner canyon trails. Approximately 90% of respondents reported that a 'pristine natural

environment’ was either a very or extremely important reason for their visit to the inner canyon (Table 22). Almost 40% of respondents reported that ‘unconfined recreation/free from rules and regulations’ was not at all or only a slightly important reason for their visit to the inner canyon. Nearly 90% of respondents placed some level of importance on ‘solitude’ as a reason for their visit to the inner canyon and 94% of respondents also reported experiencing it to some degree (Table 23).

Table 22. Importance of backcountry/wilderness characteristics to inner canyon visitors

Backcountry/wilderness characteristic	n	Level of Importance					
		Not at all important	Slightly important	Moderately important	Very important	Extremely important	Don't know
Solitude	463	11%	15%	36%	23%	15%	1%
Primitive recreation/few facilities	461	13%	20%	31%	25%	10%	2%
Pristine natural environment	455	1%	2%	7%	31%	59%	1%
Physically challenging	468	3%	4%	33%	33%	27%	1%
Unconfined recreation/free from rules and regulations	462	21%	18%	28%	18%	12%	3%

Table 23. Degree to which inner canyon visitors experienced solitude

Degree of Solitude Experienced	(n=468)	
	Count	Percent
Not at all	26	6%
Slightly	77	16%
Somewhat	174	37%
Moderately	135	29%
Very much	56	12%

Visitor Assessments of Problems on Inner Canyon trails

Survey respondents were provided with a list of issues and asked to assess how much of a problem they were in the inner canyon. While over half of visitors did not think any of the issues were a problem, it is worth noting that ‘too many other visitors’ and ‘unacceptable impacts to park resources (litter/human waste)’ were rated as either small or big problems by 38% and 36%, respectively (Table 24). Approximately 30% of respondents reported that ‘rude and inconsiderate other visitors’ were a problem. However, when asked if other visitors and their activities interfered with their visit

to the inner canyon, over 90% of respondents stated no (Table 25). When those who did report interference were given the opportunity to explain how other visitors and their activities impacted their visit, twelve out of the thirty-six comments involved trail runners (Appendix A).

Table 24. Visitor assessment of potential problems in the inner canyon

Issues	n	Extent of Problem			
		Not a problem	Small problem	Big problem	Don't know
Too many other visitors	448	55%	35%	3%	6%
Rude and inconsiderate other visitors	448	65%	18%	12%	5%
Too many day hikers	451	72%	20%	3%	5%
Too many trail runners	449	70%	17%	7%	6%
Too many backpackers	448	82%	10%	1%	6%
Poorly maintained facilities/bathrooms	448	71%	17%	7%	5%
Unacceptable impacts to park resources (litter/human waste)	448	57%	23%	13%	7%

Table 25. Visitors reporting interference from other visitors and their activities

Response	(n=469)	
	Count	Percent
Yes	42	9%
No	427	91%

Visitor Attitudes toward Potential Management Actions

Survey respondents were asked a number of questions related to potential management actions. For example, survey respondents were asked to indicate the extent to which they agreed with a number of statements regarding access. While statements related to crowding and solitude lacked general agreement, the statement regarding visitor-caused impacts had the highest level of agreement (73% agreed or strongly agreed), and 17% of respondents agreed or strongly agreed with the statement ‘access should never be reduced, even if use is high’ (Table 26). Survey respondents were also asked if, and at what level, the number of visitors should be restricted in the inner canyon. Almost

30% of visitors thought that the number of visitors in the inner canyon should not be restricted (Table 27). Approximately 20% did not think any of the scenarios describing various use levels was high enough to restrict visitor use. However, of the other half of respondents, approximately 92% supported use restrictions once visitors begin encountering 30 or more other visitors while traveling along inner canyon trail segments.

Table 26. Visitor attitudes towards access

Statement	n	Level of Agreement					
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
If people feel crowded, access should be reduced	448	9%	28%	27%	24%	10%	2%
If visitor-caused resource impacts are high, access should be reduced	441	25%	48%	15%	6%	4%	1%
Access should never be reduced, even if use is high	438	6%	11%	20%	39%	22%	1%
If solitude is lost, access should be reduced	437	7%	25%	31%	25%	11%	1%

Table 27. Level of use at which National Park Service should begin restricting access

Scenarios describing highest level of use that the National Park Service should allow	(n=362)	
	Count	Percent
Scenario 1 (0 other visitors encountered)	6	2%
Scenario 2 (15 other visitors encountered)	10	3%
Scenario 3 (30 other visitors encountered)	61	17%
Scenario 4 (45 other visitors encountered)	54	15%
Scenario 5 (60 other visitors encountered)	55	15%
No scenario describes a level of use high enough to restrict the number of visitors	71	20%
The number of visitors in the inner canyon should not be restricted	105	29%

Visitor Attitudes toward Potential Management Actions (cont.)

Survey respondents were also provided with a list of potential management actions and asked to indicate the extent to which they either supported or opposed each action. ‘More education regarding trail etiquette/appropriate behavior’ received the highest level of support (76% with 4% opposition), while ‘permits required for day use (limits and an \$8 fee)’ received the highest level of opposition (62% with 17% support) (Table 28). In general, the rest of the potential management actions received a more mixed level of support/opposition.

Table 28. Level of support for potential management actions

Potential management action	n	Level of Support					
		Strongly support	Support	Neither support nor oppose	Oppose	Strongly oppose	Don't know/no opinion
More education regarding trail etiquette/appropriate behavior	451	34%	42%	19%	3%	1%	1%
Permits required for day use (no limits and no fees)	448	6%	28%	22%	26%	16%	2%
Permits required for day use (no limits and includes an \$8 fee)	447	6%	17%	20%	31%	24%	2%
Permits required for day use (limits and no fees)	444	4%	19%	19%	31%	24%	3%
Permits required for day use (limits and an \$8 fee)	442	5%	12%	19%	31%	31%	2%
Permits required for day use (limits except for 2 weekends/year)	441	2%	12%	24%	30%	29%	4%
Limit group sizes for day use to 11 people or less	447	10%	26%	23%	21%	16%	4%

Automated Visitor Counts

Results from the automated counters placed on each trail show that use was variable over the course of the study period. Peak use occurred repeatedly on the first Saturday after the North Rim opened, and use was highest during weekends in the months of May and October. Overall use began to taper off during the warmer months of June and July after Memorial Day weekend and during the colder months after the North Rim closed for the season. Figures 5-10 demonstrate total daily use, as estimated from automated counter data. These counts include all types of trail users, including day hikers, trail runners, backpackers, Phantom Ranch guests, mule trips, river exchanges, and administrative users. While the counter data does not discern between user types or specify the exact

number of people using inner canyon trails each day, it does provide general estimates of total use along Corridor trails and valuable information regarding overall use patterns and trends.

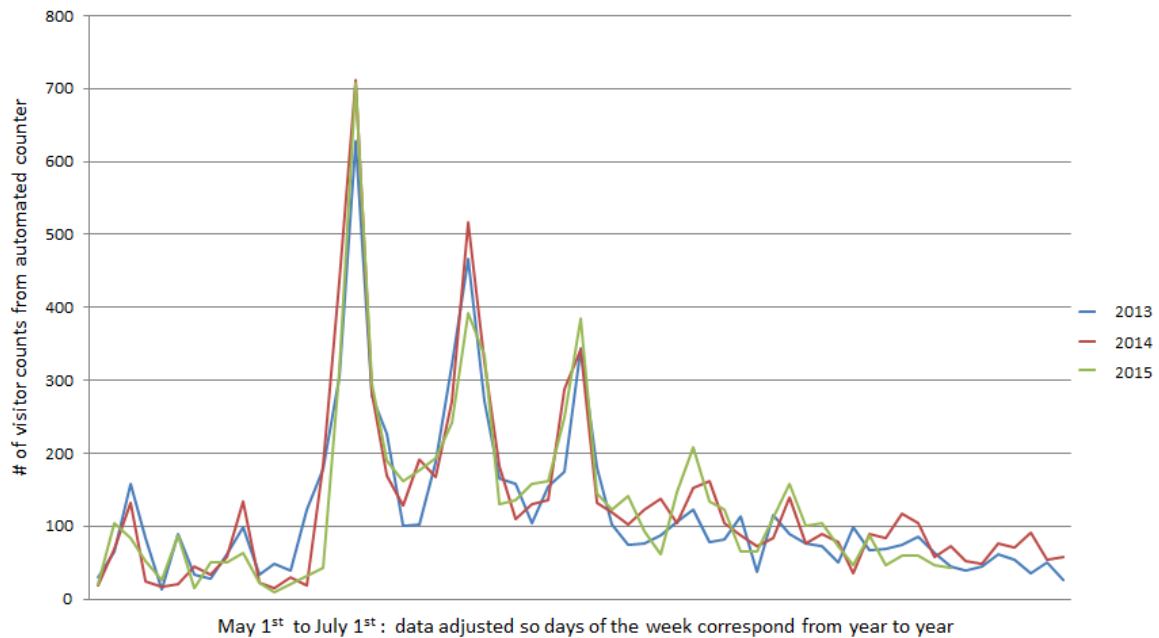


Figure 5. Manzanita Rest Area visitor counts (spring 2013-2015)

Automated Visitor Counts (cont.)

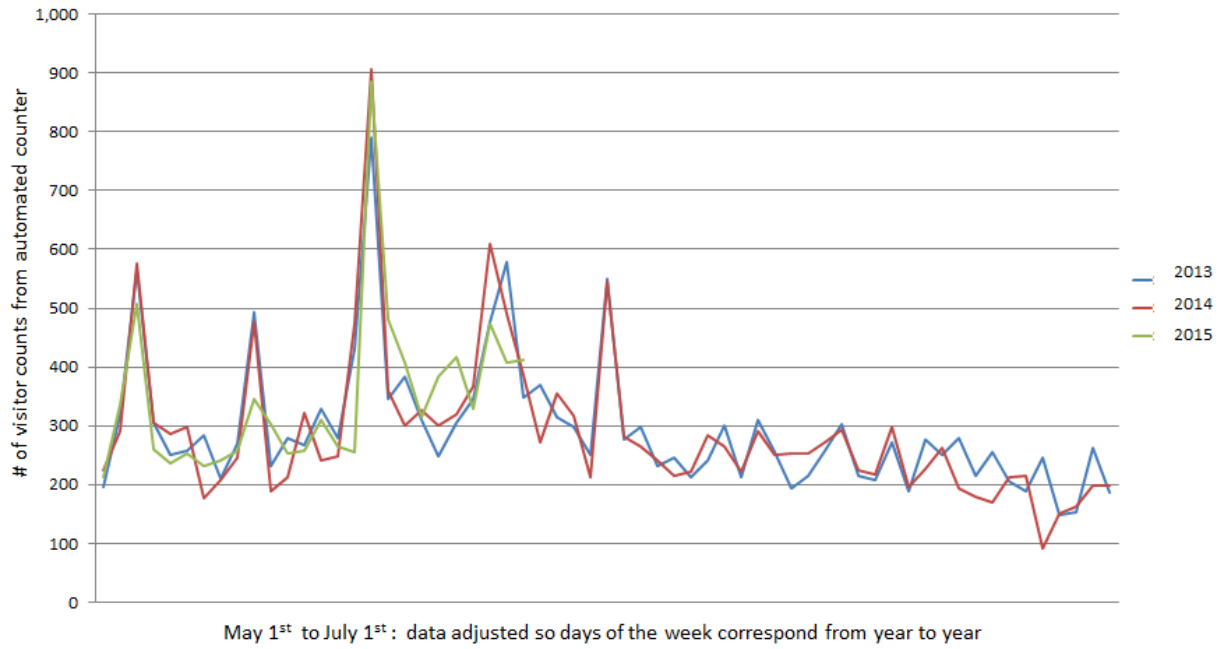


Figure 6. Indian Garden visitor counts (spring 2013-2015)

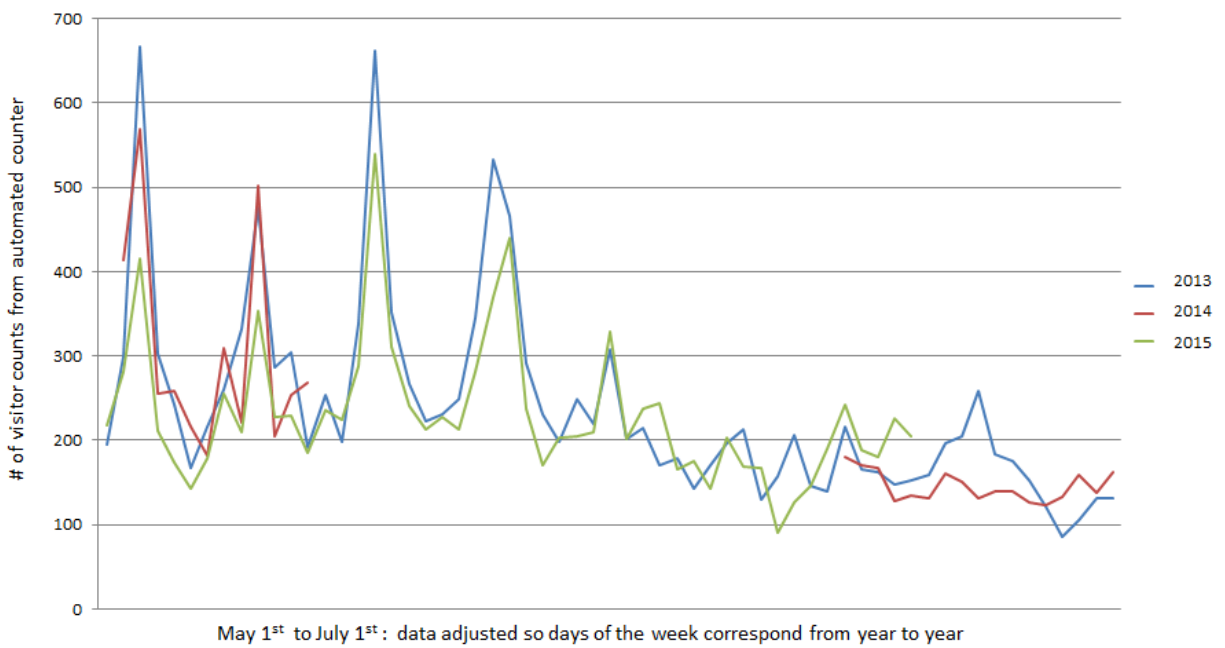


Figure 7. Tipoff visitor counts (spring 2013-2015)

Automated Visitor Counts (cont.)

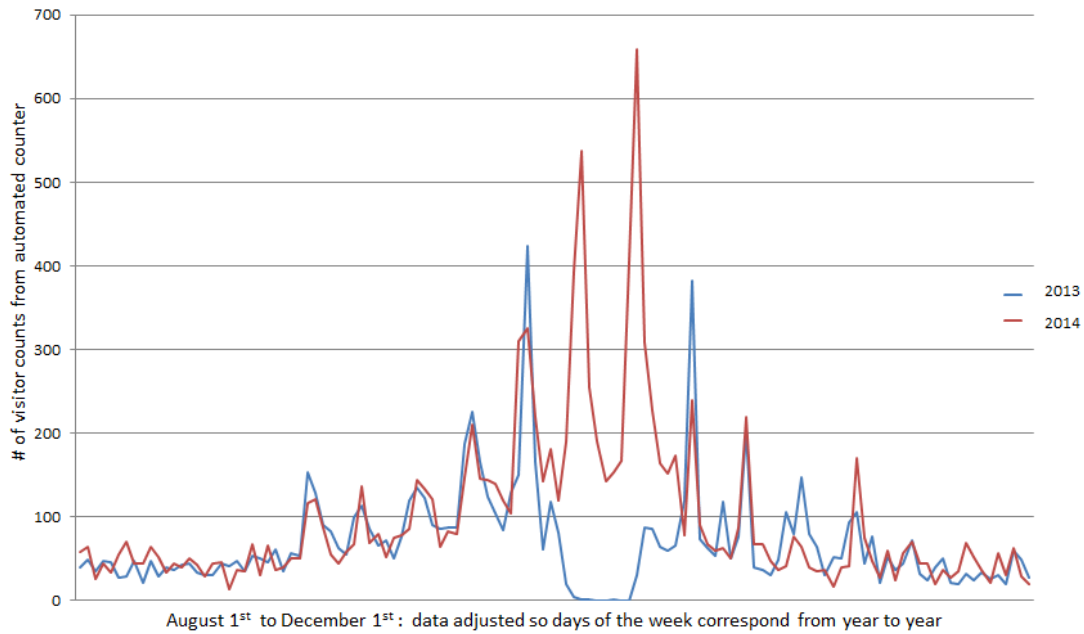


Figure 8. Manzanita Rest Area visitor counts (fall 2013-2014)²

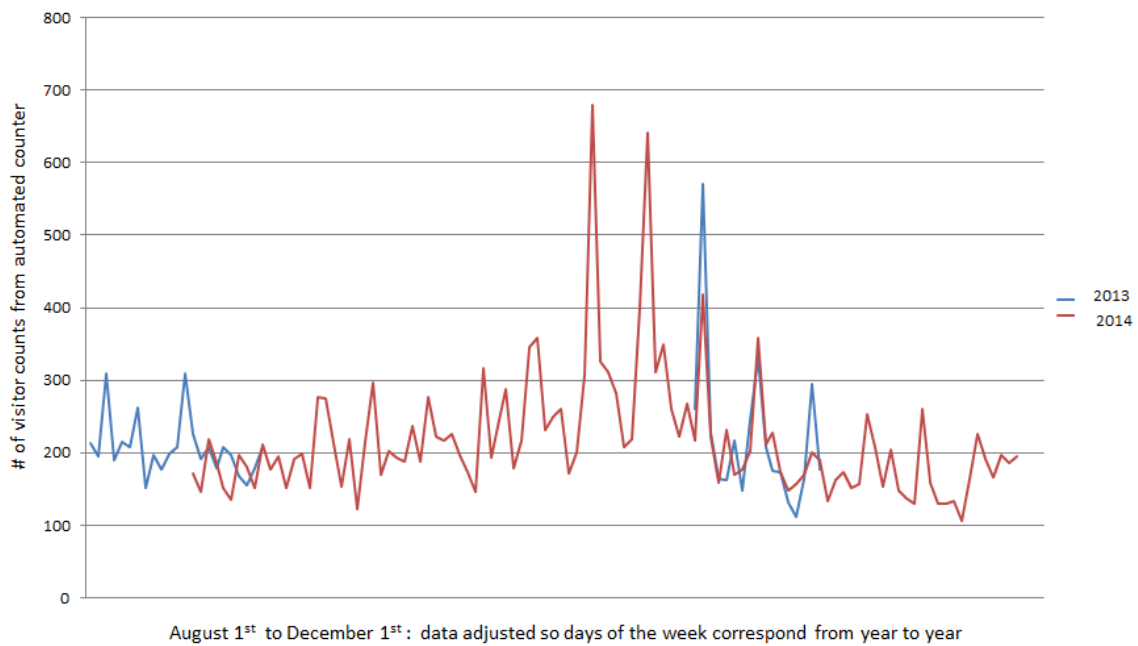


Figure 9. Indian Garden visitor counts (fall 2013-2014)

Automated Visitor Counts (cont.)

² Slump in use during 2013 corresponds with government shutdown during the dates of October 1 – 16th.

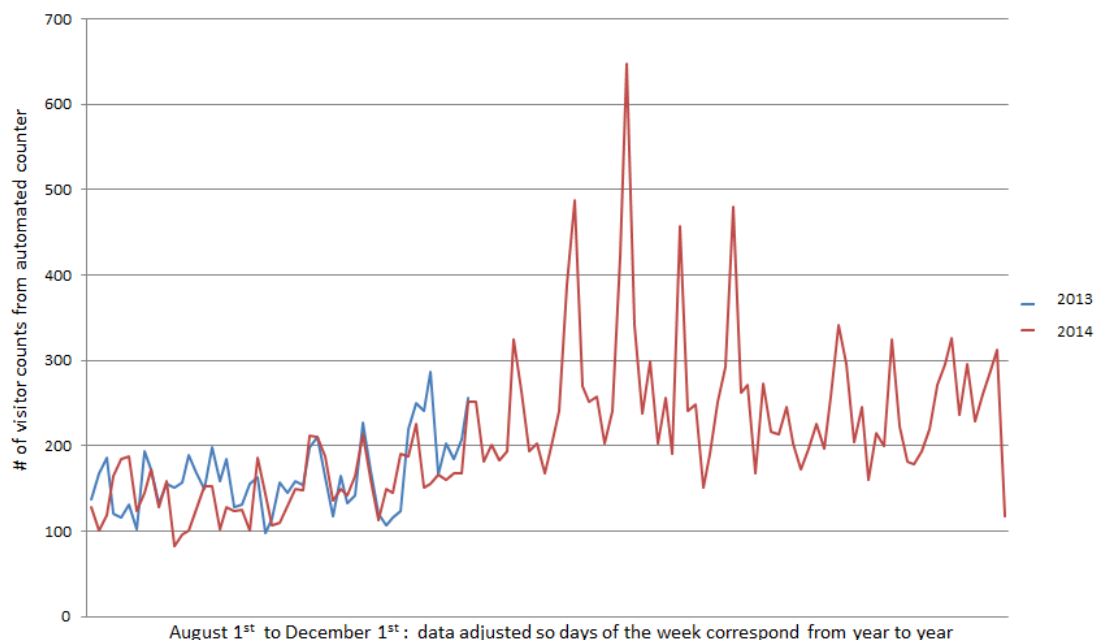


Figure 10. Tipoff visitor counts (fall 2013-2014)

Trail Encounter Rates

Visitor encounter data was collected on each inner canyon trail segment from April to June 2013 and 2014, and September to November 2014. Fall data was not collected during 2013 due to the government shutdown. A total of 196 monitoring forms were collected during the study period. Results indicate that encounters with other visitors tended to be higher on weekend days (Friday-Sunday) than weekdays (Monday-Thursday), see Tables 29 and 30.

Table 29. Results from spring season visitor encounter rate monitoring

Descriptive statistics	South Kaibab Trail		Bright Angel Trail		North Kaibab Trail	
	2013 (n=44)	2014 (n=16)	2013 (n=34)	2014 (n=17)	2013 (n=22)	2014 (n=22)
Minimum	0	0	0	3	9	2
Maximum	143	138	241	263	428	438
Average (Monday – Thursday)	12	10	33	30	33	27
Average (Friday – Sunday)	39	51	72	64	114	110
Observations over 30	11 (25%)	5 (31%)	20 (59%)	8 (47%)	15 (68%)	14 (64%)
Observations over 45	7 (16%)	5 (31%)	15 (44%)	4 (24%)	13 (59%)	11 (50%)
Observations under 15	24 (55%)	8 (50%)	9 (26%)	6 (35%)	2 (9%)	4 (18%)

Table 30. Results from fall season visitor encounter rate monitoring³

Descriptive statistics	South Kaibab Trail 2014 (n=14)	Bright Angel Trail 2014 (n=20)	North Kaibab Trail 2014 (n=7)
Minimum	3	0	7
Maximum	49	226	317
Average (Monday – Thursday)	22	43	7
Average (Friday – Sunday)	18	82	158
Observations over 30	5	13	6
Observations over 45	1	12	5
Observations under 15	5	6	1

Discussion

Visitor Perceptions of Use Levels

Questionnaire results demonstrate that there is a relationship between use levels and visitor experience. Generally visitors prefer to experience lower use levels while traveling in the inner canyon, and as use levels increase conditions become less acceptable to visitors. Furthermore, use levels may become unacceptable to visitors. This threshold may be important to park managers, as it demonstrates an adverse effect to visitor experience that is no longer acceptable to park visitors.

For example, Figure 3 indicates that visitors deem encountering more than approximately 45 other visitors while traveling between Tipoff and Black Bridge unacceptable. Furthermore, 86% of visitors would prefer to encounter 30 or less other visitors while traveling on the same segment of trail (Table 20). When compared to visitor estimates of how many visitors were actually seen from Tipoff to Black Bridge, it is clear unacceptable conditions are experienced by some visitors. In fact, based on visitor estimates of use levels, unacceptable conditions are experienced approximately 28% of the time (Table 21). These findings are corroborated by staff observations of use levels.

Staff Observations of Use Levels

Results from encounter rate monitoring by park staff demonstrate that unacceptable conditions are experienced by visitors (Tables 29 & 30). For example, during the spring of 2014, approximately 31% of observations made by park staff along the South Kaibab Trail from Tipoff to Black Bridge were of 45 visitors or more. However, it is important to note that these observations were made opportunistically and the sample size is relatively low depending on the trail and season (spring: n ranges from 16 to 44; fall: n ranges from 7-20). Other noteworthy results from staff observations are general use patterns on inner canyon trails.

³ Percentages not calculated for this table due to relatively low sample sizes

While unacceptable conditions were observed on both weekends and weekdays, it is clear that use tends to be higher Friday through Sunday (Tables 29 & 30). For example, on average, use levels were five times higher Friday through Sunday than during the rest of the week based on observations made along the South Kaibab trail in spring 2014. Furthermore, on average, the number of visitors encountered along inner canyon trails is double to five times as high on weekend days (Friday – Sunday) as it is during the week (Monday – Thursday).

The frequency and extent to which unacceptable conditions are experienced also warrants discussion. For example, up to 143 other visitors were encountered by park staff while traveling between Tipoff and Black Bridge on the South Kaibab Trail. This is over three times the minimum acceptable condition as evaluated by park visitors and demonstrates that the extent to which acceptable conditions may be exceeded can be considerable. However, observations along the same trail segment during the springs of 2013 and 2014 indicate that unacceptable conditions were observed only 16 – 31% of the time, and that preferred conditions (observations of < 30 other visitors) were observed 69 – 75% of the time. The use patterns described above, along with findings regarding the extent and frequency to which unacceptable conditions are being experienced by visitors, are corroborated by general estimations of use levels and trends.

General Estimations of Use Levels and Trends

Results from automated visitor counters demonstrate that while the extent of use on inner canyon trails can be considerable, the frequency to which high use events occur is relatively limited. For example, the highest use levels recorded by the automated visitor counter near Manzanita Rest Area in the spring were over three consecutive weekends after the North Rim opened (Figure 5). While it is clear each of these weekends represents a substantial deviation from use levels during the rest of the study period, it is also clear that these events are concentrated over a relatively limited period of time.

Trends in use levels over the course of the study period also warrant discussion. For example, high use event weekends appear to be relatively stable and predictable. The first Saturday after the North Rim opens has consistently been the highest use day in the inner canyon across all three trails. The following two Saturdays are consistently the second and third busiest of the season. Furthermore, use levels appear to be relatively stable. For example, over the course of three years, automated visitor counts from Manzanita Rest Area ranged from 629-712 per day on the Saturday after the North Rim opened.

Visitor Support for Potential Management Actions

While it is clear visitors are periodically experiencing unacceptable levels of use on inner canyon trails, an inherent tension exists between perceptions of unacceptable use levels and support for direct management actions that may address them. For example, permits with use limits could ensure that use levels do not become unacceptable. However, over half of respondents opposed permits with limits whether they had associated fees or not (Table 28). Addressing this tradeoff, between access and quality, warrants further investigation.

Support for indirect management action does exist. For example, 76% of respondents support more education regarding trail etiquette/appropriate behavior while only 4% oppose it (Table 28). It should be noted that this strong level of support led park staff to begin developing [“Trail Courtesy Practices That Leave No Trace”](#) in 2014. These practices were developed in partnership with the Leave No Trace Center for Outdoor Ethics, and have been incorporated in outreach efforts that include both traditional and electronic media. For example, trail courtesy practices have been posted at trailheads and on park shuttle buses. A park website was developed to disseminate the information, and social media including Grand Canyon’s Facebook page and Twitter feed have allowed park staff to emphasize the educational message electronically during the busiest times of the year.

Recommendations and Potential Management Implications

Grand Canyon’s Corridor Trails provide a diverse range of recreation opportunities and preserving these opportunities requires an equally diverse suite of management actions. Rather than looking to a single action to resolve visitor use related issues, park managers should consider a full range of management actions and how they may work in tandem to enhance resource protection and visitor experience. The following paragraphs outline an adaptive process that incorporates ongoing monitoring, multiple management actions, and sound professional judgment in the context of contemporary policy.

As noted earlier, strong visitor support for more education regarding trail etiquette/appropriate behavior led park staff to develop [“Trail Courtesy Practices That Leave No Trace”](#) in 2014. This indirect management action is a sound first step in modifying visitor behavior to protect park resources and reduce user conflict. However, it does not address the unacceptably high use levels that are periodically being experienced in the inner canyon.

Communicating predictable high use periods to park visitors may allow them to plan ahead for their desired experience and potentially reduce use levels on peak weekends. However, this action may have unintended consequences. For example, many solitude seeking visitors may already be aware of use patterns and plan their trips for weekdays accordingly. If weekend use is distributed throughout the week, opportunities for solitude may decline and inner canyon experiences may become homogeneous. Furthermore, this action contains questions of equity. Is it fair to displace visitors seeking solitude to weekdays when weekends are the ideal time for recreation for most of the visiting public?

Implementation of a day use permit system for inner canyon trails may help protect park resources, preserve and enhance diverse opportunities, and promote relevancy without degrading backcountry values. For example, issuing permits would provide an opportunity to educate visitors regarding trail etiquette and appropriate behavior as well as increasing their knowledge of how to travel safely in the inner canyon (<http://www.nps.gov/grca/planyourvisit/hike-smart.htm>). Having the opportunity to disseminate these messages directly through a permit system may reduce resource impacts, lessen user conflict, and decrease pressure on park staff conducting search and rescues.

A permit system with variable use limits would also enhance the diversity of recreation opportunities in the Corridor. Currently, weekends after the North Rim opens in the spring and weekends leading up to

the North Rim's closure in the fall, are the busiest days of the year on inner canyon trails. Developing use limits for some of these weekends may provide a more equitable system for, and enhance the experience of, visitors seeking solitude. Conversely, accommodating high use weekends and designating specific days for group events may maximize access to recreation opportunities in the inner canyon and help introduce more visitors to the values of Grand Canyon's backcountry. Furthermore, knowing when event weekends are going to occur may allow park managers to appropriately plan and staff for them.

The management strategy described above requires professional judgment and is in keeping with contemporary policy. For example, the with coming of the second century of the National Park System drawing near, the National Park Service established a "Call to Action" to guide park planning and management in future years. Some of the primary objectives of this call are to "expand the use of parks as places for healthy outdoor recreation that contributes to people's physical, mental, and social well-being," and "welcome and engage diverse communities through...experiences that are accessible to all" (U.S. Department of the Interior 2011, p.9). In 2013, the Outdoor Foundation reported that "running, including jogging and trail running, was the most popular outdoor activity with more than 53 million participants and a participation rate of 19 percent" (Outdoor Foundation 2013, p. 7). Running is also described as a "gateway" to other types of outdoor recreation (ibid., p. 26) and is the favorite form of recreation for all racial and ethnic groups researched in the study, including African Americans, Asian/Pacific Islanders, Caucasians, and Hispanics (ibid., p. 48). Clearly, introducing visitors to Grand Canyon's backcountry on a few high use weekends through extended day use, including trail running, is in keeping with the "Call to Action." Concentrating high use periods to a few weekends a year may also introduce multitudes to intermittent moments of solitude below the rim and inspire visitors to return seeking more. Maintaining acceptable use levels through a permit system with limits the rest of the year may ensure those opportunities are available. Thus, this system may help preserve backcountry values while making them relevant to the next generation of park visitors.

While it is clear that some management judgment would be needed in implementing this strategy, an ongoing program of monitoring and research promises to inform sound decision-making. For example, results from the visitor questionnaire administered in 2013 provide a rational basis for determining when use levels become unacceptable to visitors. Implementing a permit system, monitoring encounter rates, evaluating how often unacceptable conditions are being experienced, and adjusting use limits so as to not exceed these levels the majority of the time could all be accomplished as part of an adaptive process. However, it should be noted that this study was conducted as a pilot and lessons learned from it may contribute to a more refined process for ongoing monitoring and research.

Lessons Learned

While this study provides a sound baseline for information regarding visitor use and experience related to Grand Canyon's Corridor Trails, it was launched as a pilot in 2013. Lessons learned from the pilot will help further refine monitoring and research in the future that may support adaptive management decision-making.

The visitor questionnaire and its administration may be refined for future research efforts. For example, the scenarios describing various levels of use along inner canyon trail segments should be updated to be context specific and representative of realistic conditions. In 2013, the questionnaires for each trail segment used the same range (zero-60). However, encounter rate monitoring revealed a much higher range and a high degree of variability across trail segments (Table 29 – S. Kaibab: 0-143; Bright Angel: 0-263; N. Kaibab: 9-438). Future questionnaires using scenario analysis should be updated with these more realistic ranges.

While opportunistic sampling for encounter rate monitoring was effective during the study period, it could be refined for future studies. For example, visitors could be given hand counters at the beginning of each trail segment by a study administrator and asked to record how many other people they encounter while traveling to the end of the trail segment. Another study administrator would be deployed at the opposite trail segment to collect the hand counter and record data. Rather than depend on park staff to simulate visitor experiences along each trail segment, these would be true reflections of actual visitor experience.

Maintenance, downloading, and calibration of automated visitor counters may be refined for future research efforts. As demonstrated by Figures 5-10, gaps in visitor count data do exist. More routine maintenance and downloading of these counters by trained and experienced staff may help resolve this issue in the future. Furthermore, while calibrations of each automated counter were made during the study period, conducting them more regularly could provide more confidence in their accuracy.

Conclusion

This study provides a sound baseline for information regarding visitor use and experience related to Grand Canyon's Corridor Trails. It should be used to help explain and further discuss issues related to visitor use and experience, in particular the tradeoff between use levels and experiential quality. One practical venue for this discussion is the public involvement component of the Draft Environmental Impact Statement for the park's Backcountry Management Plan. As a full range of potential actions are considered through the NEPA process, this study and an ongoing commitment to monitoring and research may provide a strong basis for managing issues related to visitor use in Grand Canyon's backcountry.

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Appendices

Appendix A: Open-ended responses to question 10b

10. During this visit, did other visitors and their activities interfere with your visitor to the inner canyon?

b) If yes, how? Please explain. _____

Comment 1: 20, group of runners

Comment 2: a few runners over the years.

Comment 3: Another hiker pushed by

Comment 4: BA group site ppl overstayed, loud CG. In cottonwood rim to rim runners came through at 4am for water.

Comment 5: Downhill hikers/backpackers not moving off the trail (right of way) for uphill travel.

Comment 6: Garbage

Comment 7: Hiking rules not being followed

Comment 8: horse riders, not much though

Comment 9: I don't like mule poop

Comment 10: In does seem invasive when visitors are 4racing up and down the canyon-they are in such a rush they do not observe trail etiquette.

Comment 11: ladies toilets overloaded, crowded trail

Comment 12: lots of traffic on the trails

Comment 13: loud rafters stopping at PR

Comment 14: mule rides, we have to stop and wait and feel less important.
Comment 15: mule train and I got stuck behind.
Comment 16: no big deal but some runners go really fast around narrow bends
Comment 17: other hikers
Comment 18: picked up trash several times. Tired of seeing cig. Butts on trails etc. Felt compelled to attend to ppl in over their heads.
Comment 19: rangers checking permits
Comment 20: rude runners
Comment 21: runners and noise
Comment 22: runners tend to take hikers for granted
Comment 23: runners passing you without warning
Comment 24: snoring man in next campsite
Comment 25: so many runners, you feel like being on a race track.
Comment 26: Some kids playing a radio which shouldn't be allowed.
Comment 27: Talked and said hi
Comment 28: talking on the trail
Comment 29: The mule manure stank up the trails, detracting a bit from the experience

Comment 30: too many mules

Comment 31: trail canyon runners!!!

Comment 32: trail etiquette

Comment 33: Trail runners seem to be interested in rushing more than taking in the views and solitude. I saw an 8yr old boy get bunbed out of the way because he didn't know what "left meant

Comment 34: trail running around mules

Comment 35: trails runners dominate the trail.

Comment 36: Writing on rocks

Appendix B: Sample Visitor Questionnaire

**2013 GRAND CANYON NATIONAL PARK
VISITOR SURVEY**
North Kaibab Trail



DATE: _____ TIME: _____ ID: _____

PAPERWORK REDUCTION ACT STATEMENT: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will help park managers understand the quality of visitor experiences in the park and may be incorporated into park planning by managers at Grand Canyon National Park. Your response to this request is voluntary and anonymous. No action may be taken against you for refusing to supply the information requested. 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 burden for this collection is estimated to be 10 minutes per response. Direct comments regarding the burden estimate or any other aspect of this collection to Peter Pettengill, Outdoor Recreation Planner; Division of Science & Resource Management, Peter.Pettengill@nps.gov (email), Grand Canyon National Park, PO Box 129, Grand Canyon, AZ 86023-0129.

OMB Control Number: 1024-0224

Current Expiration Date: 8-31-2014

Grand Canyon National Park Visitor Survey 2013

Dear Grand Canyon National Park Visitor:

We are conducting this survey to learn more about visitors to Grand Canyon National Park so that we can improve our service to you. You have been chosen to participate in this survey, and your opinions are important to us. The survey takes about 10 minutes to complete and the information you provide will be anonymous. Please read each question carefully and respond to the best of your ability.

In this questionnaire, your personal group is defined as anyone that you are traveling with such as spouse, partner, family, or friends. This does not include the organized group that you might be traveling with such as school, church, boy or girl scouts, or tour group. Also, the inner canyon refers to the trail segments below Roaring Springs on the North Kaibab Trail, below Indian Garden on the Bright Angel Trail, and below Tipoff on the South Kaibab Trail. Please ask the survey attendant if you are unsure about where these areas are located.

1. Including yourself, how many people are in your personal group during this visit to the inner canyon?

____ Number of people

2. On this visit, were you with the following type of organized groups?

Commercial guided tour group	<input type="radio"/> Yes	<input type="radio"/> No
School/educational group	<input type="radio"/> Yes	<input type="radio"/> No
Other organized group (such as running club, scout group, etc.)	<input type="radio"/> Yes	<input type="radio"/> No

3. Was your trip to Grand Canyon part of a packaged tour (package tours commonly include transportation, meals, lodging, and activities sold as a pre-set itinerary from a single company)?

☐ Yes ☐ No

4. If YES, what was the name of the company (not travel agency) that provided the package tour?

5. About how many times have you visited the inner canyon, including this visit?

_____ Number of visits **OR** ☐ Don't know/Not sure

6. To the best of your recollection, in what year did you first visit the inner canyon?

Year: _____ **OR** ☐ Don't know/Not sure

7. This question lists activities available to visitors in the inner canyon

a) On past visits, in which activities did you participate? Please mark (●) **all** that apply in **column A**. If you did not participate in an activity in the past, please leave this column blank.

b) On this visit, in which activities did you participate? Please mark (●) **all** that apply in **column B**.

c) If you were to visit in the future, in which activities would you participate? Please mark (●) **all** that apply in **column C**.

	A Activities <u>on</u> <u>past visits</u>	B Activities <u>on</u> <u>this visit</u>	C Activities <u>on</u> <u>future visit</u>
Day hiking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overnight backpacking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overnight lodging at Phantom Ranch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trail-running	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mule ride	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
River rafting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

d) On this visit, which one activity in **column B** that you participated in was the **most** important to your visit to this park? Please **list only one or mark none**.

_____ ☐ None

8. Which one of the above activities in which you participated was your **primary reason** for visiting the inner canyon? Please list only one.

9. At which of the following trailheads did you start and do you plan to end this trip?

Starting location (Mark <u>one</u> .)	Listings of Specific Trailheads	Ending location (Mark <u>one</u> .)
<input type="radio"/>	South Kaibab trailhead	<input type="radio"/>
<input type="radio"/>	Bright Angel trailhead	<input type="radio"/>
<input type="radio"/>	North Kaibab trailhead	<input type="radio"/>
<input type="radio"/>	Other: please specify	<input type="radio"/>

10. During this visit, did other visitors and their activities interfere with your visit to the inner canyon?

☐ Yes

☐ No

b) If Yes, how? Please explain. _____

11. The following is a list of characteristics commonly associated with backcountry and wilderness areas. Please indicate how important each of the items listed below was to you as a reason to use the trails in the inner canyon today. (Circle one number for each item.)

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Don't Know/ Not Sure
Solitude	1	2	3	4	5	DK/NS
Primitive recreation/few facilities	1	2	3	4	5	DK/NS
Pristine natural environment	1	2	3	4	5	DK/NS
Physically challenging/ demanding	1	2	3	4	5	DK/NS
Unconfined recreation/free from rules and regulations	1	2	3	4	5	DK/NS

12. For the places you visited in the inner canyon, please rate how crowded you felt by the number of people present at the following locations. Please mark (●) **only one** answer for each place.

Visit on this trip? (●)	Not at all crowded	Slightly crowded	Moderately crowded	Very crowded	Extremely crowded
<input type="radio"/> South Kaibab trail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Bright Angel trail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> North Kaibab trail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Phantom Ranch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Ribbon Falls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Cottonwood campground	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> River trail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Other (Specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. On this visit to the inner canyon, compared to what you expected, how crowded did you feel? Please mark (●) only one.

- ☐ I didn't know what to expect
- ☐ Less crowded than expected
- ☐ About the same as expected
- ☐ More crowded than expected

14. Please indicate the degree to which you experienced solitude while in the inner canyon today? Please mark **only one** answer.

Not at all	Slightly	Somewhat	Moderately	Very Much
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. About how many other visitors did you see per day while you were traveling on the inner canyon trails during your backcountry trip? (Enter a question mark "?" if you don't remember)

of visitors per day: _____ **OR** ☐ Did not see any other visitors

Please estimate the number of other visitors you saw at each of the following locations.

Location	Number of other visitors	I can't remember
South Kaibab trail (from Tipoff to Phantom Ranch)	_____	<input type="radio"/>
Bright Angel trail (from Indian Garden to Phantom Ranch)	_____	<input type="radio"/>
North Kaibab (from Roaring Springs to Phantom Ranch)	_____	<input type="radio"/>

16. We would like to know how many other visitors you think you could encounter along trails in the inner canyon without feeling too crowded. To help judge this, a series of scenarios is described below. These scenarios describe different numbers of visitor encounters.

Scenario 1	While traveling between Phantom Ranch and Roaring Springs Ranger Station on the North Kaibab trail I encounter <u>0</u> other visitors.
Scenario 2	While traveling between Phantom Ranch and Roaring Springs Ranger Station on the North Kaibab trail I encounter <u>15</u> other visitors.
Scenario 3	While traveling between Phantom Ranch and Roaring Springs Ranger Station on the North Kaibab trail I encounter <u>30</u> other visitors.
Scenario 4	While traveling between Phantom Ranch and Roaring Springs Ranger Station on the North Kaibab trail I encounter <u>45</u> other visitors.
Scenario 5	While traveling between Phantom Ranch and Roaring Springs Ranger Station on the North Kaibab trail I encounter <u>60</u> other visitors.

Please rate each scenario described above by indicating how acceptable you find each one based on the number of visitor encounters described. A rating of “-3” means the number of visitors is “very unacceptable”, and a rating of “+3” means the number of visitors is “very acceptable”. (Circle one number for each scenario.)

	Very unacceptable	Unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Acceptable	Very Acceptable
Scenario 1	-3	-2	-1	0	+1	+2	+3
Scenario 2	-3	-2	-1	0	+1	+2	+3
Scenario 3	-3	-2	-1	0	+1	+2	+3
Scenario 4	-3	-2	-1	0	+1	+2	+3
Scenario 5	-3	-2	-1	0	+1	+2	+3

- a. Which scenario describes the level of use that you would prefer to experience in the inner canyon?

Scenario number: _____

- b. Which scenario describes the highest level of use that the National Park Service should allow in the inner canyon? In other words, at what point should visitors be restricted from touring the inner canyon? If use should not be restricted at any point represented in the scenarios, or not restricted at all, you may indicate that by checking one of the boxes below.

Scenario number: _____

☐ None of the scenarios describe a level of use high enough to restrict the number of visitors in the inner canyon

☐ The number of visitors in the inner canyon should not be restricted

17. Please indicate the extent to which you agree or disagree with each of the following statements concerning management of recreational travel in the inner canyon. (Circle **one** number for each item.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know / Not Sure
If people feel crowded, access should be reduced	1	2	3	4	5	DK/NS
If visitor-caused resource impacts are high, access should be reduced	1	2	3	4	5	DK/NS
Access should never be reduced, even if use is high	1	2	3	4	5	DK/NS
If solitude is lost, access should be reduced	1	2	3	4	5	DK/NS

18. How much of a problem do you think the following issues are in the inner canyon? Please circle one number for each item.

	Not a Problem	Small Problem	Big Problem	Don't Know/ No Opinion
Too many other visitors	1	2	3	DK
Rude and inconsiderate visitors	1	2	3	DK
Too many day hikers	1	2	3	DK
Too many trail runners	1	2	3	DK
Too many overnight backpackers	1	2	3	DK
Poorly maintained facilities/bathrooms	1	2	3	DK
Unacceptable impacts to park resources (litter/human waste)	1	2	3	DK

19. Please indicate the extent to which you would support or oppose each of the following potential management actions in the inner canyon. (Please mark (•) one number for each item.)

	Strongly Support	Support	Neither Support nor Oppose	Oppose	Strongly Oppose	Don't Know/ Not Sure
More education regarding trail etiquette/appropriate behavior	O	O	O	O	O	DK
Permits required for day use (no limits and no fees)	O	O	O	O	O	DK
Permits required for day use (no limits and includes an \$8 fee)	O	O	O	O	O	DK
Permits required for day use (limits and no fees)	O	O	O	O	O	DK
Permits required for day use (limits and an \$8 fee)	O	O	O	O	O	DK
Permits required for day use (limits except for 2 weekends/year)	O	O	O	O	O	DK
Limit group sizes for day use to 11 people or less	O	O	O	O	O	DK

20. Are you ...?

- ☐ Male
- ☐ Female

21. What is your age? _____

22. Do you live in the United States?

- ☐ Yes

What is your Zip Code? _____

- ☐ No

What country do you live in? _____

23. Please indicate the highest level of education that you have attained. (Select one)

- ☐ Less than high school
- ☐ High School Diploma/GED
- ☐ Technical school or Associates Degree
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Ph.D., M.D., J.D., or equivalent

24. For you only, are you Hispanic or Latino? (Select one)

- ☐ Yes, Hispanic or Latino
- ☐ No, not Hispanic or Latino

25. For you only, which of these categories best describes your race? (Select one or more)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

Thank you for helping us with this important study. If there is anything else you would like to tell us? Please do so in the space below.