

GRAND CANYON NATIONAL PARK BACKCOUNTRY
TRAIL USERS' PERCEPTIONS OF SAFETY, SOCIAL,
PHYSICAL, AND POLICY IMPACTS FROM AN
INCREASING NUMBER OF DAY USERS

By

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INTRODUCTION

Overview

The November 2009 edition of a popular running magazine, *Trail Runner*, featured an article which listed running across the Grand Canyon as the number one must-do item in a list of must-have experiences for every trail runner – a rite of passage (Graubins, 2009). The popularity of trail running in Grand Canyon National Park (GCNP) has been increasing steadily in recent years as many runners enjoy the physical and mental challenges of crossing the majestic canyon from one rim to the other on the corridor trails or just heading out for solitude in the backcountry wilderness.

As late as five years ago, few runners ventured into the Grand Canyon backcountry. Those that did normally arranged to complete a rim-to-rim run in one day and often wrote about their ventures in running magazines and online accounts. As awareness of this challenge increases, more trail runners are undertaking the attempt. The challenge has increased from just running rim-to-rim (R2R) to completing a rim-to-rim-to-rim (R2R2R), a trip that requires running from one rim to the other and making a return trip back to the starting point in one day. This normally requires running much of the course while the sun is down. Running the Grand Canyon, whether down to the plateau and back, or a full rim-to-rim-to-rim, is now on many bucket lists. Medinger (n.d.) wrote on the popular trail running website *Ultrarunning* that the Grand Canyon is a perfect location for ultra runners.

Trail runners share backcountry trails with day hikers, overnight backpackers, and mule riders. GCNP Management plans have been written primarily for the overnight backpackers and mule riders and have not yet taken into consideration the involvement from trail running activities.

The Trend in Trail Running

Until the late 1990s, American Trail Running Association had not been founded, *Trail Runners* magazine did not exist, nor was there unlimited access to online trip reports from runners and hikers. The popularity of trail running in general, along with the availability of online trip reports that describe and promote a runner's favorite running locations and activities, has lured more and more runners to add the Grand Canyon to their must-do list. The easy access to online trip reports has escalated the popularity of running in GCNP more so than would have happened prior to wide use of the internet.

Hanenburg (2010) wrote:

Why trail running? One of the reasons for many (myself included) is to have the opportunity to mingle with this amazing planet we all share. One such place that simply bursts epic trail running experience is the Grand Canyon. I am not sure if everyone and their pet turtle is doing this but I sure seem to be hearing a lot about it this spring...and I have been mesmerized by their experiences (p. 1).

Hanenburg's report mentions that his friend had run the Grand Canyon in 2009 as a solitary runner and returned in 2010 with a dozen friends. This common pattern can be witnessed in many other online trail runner accounts and indicates a measure of growth in

day use that could far exceed the expected growth that is being used to plan for park management. Many reports are available online that describe runners, either running alone or in groups of 15 or more, making their debut in the canyon. The lure to make it across draws thousands every year and the trend is increasing.

Skurka (2009) stated that, although a quite extreme adventure, running Rim-to-Rim-to-Rim is not uncommon and is a must-do within trail running circles. Encouraging others to challenge themselves, he recommends it as a fantastic undertaking for those who either have limited time, want to test themselves, or cannot obtain the necessary permits required to do the rim-to-rim-to-rim in the traditional 4-5 days that it normally takes to backpack.

Similarly, two popular marathons (26.2 mile runs) are on the must-do list for many road runners and have had enormous growth requiring strict management. Boston Marathon has grown from under 7,000 participants in 1988 to over 25,000 today (Boston Marathon History, n.d.). New York Marathon began in 1970 with under 200 entries to 47,000 in 2011 (The ING New York City Marathon, 2012). Both races have been forced to put caps in place to limit the number of entries to a sustainable level. Similar to the GCNP backcountry overnight permit system, hopefuls must gain entrance via a lottery system.

Park History and Management

"Let this great wonder of nature remain as it now is. You cannot improve on it. But what you can do is keep it for your children, your children's children, and all who come after you, as the one great sight which every American should see" (Reese, 2010,

para. 4) stated President Theodore Roosevelt on his visit to the Grand Canyon in 1903. On November 28, 1906 President Roosevelt established the Grand Canyon Game Preserve, three years after his first visit to the rim. Two years later it was re-designated as a national monument. In February 1919, President Woodrow Wilson signed Senate Bill 390 upgrading the Grand Canyon from a national monument to one of the fifty four national parks we have today. The National Park Service was created during this period (1916).

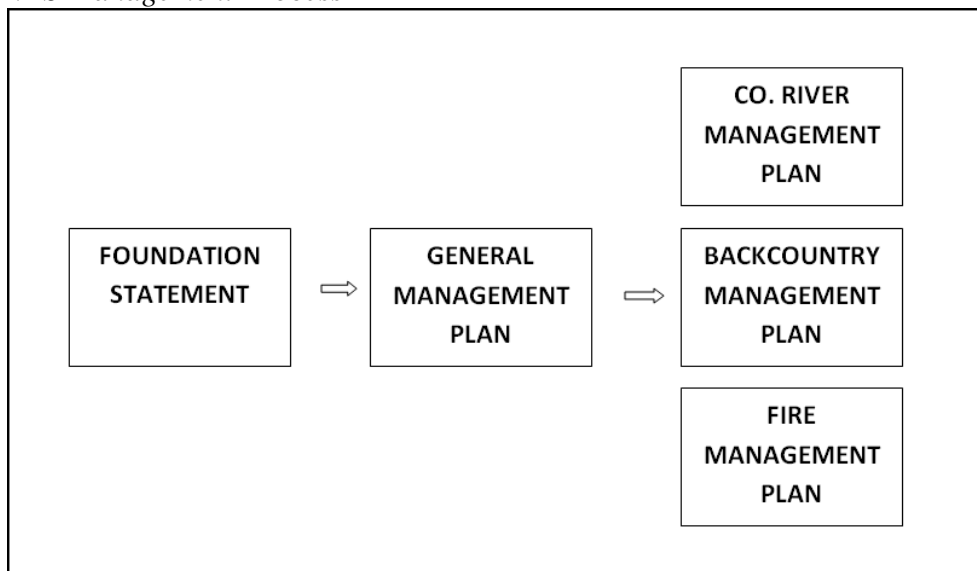
The National Park Service (NPS), established in 1916 by the Organic Act, “shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (National Park Service, n.d., para. 3). A General Management Plan was created in 1995 with a primary purpose of protecting park resources while providing for meaningful visitor experience (National Park Service, 1995).

As defined in the Organic Act, the fundamental purpose of GCNP must be considered when uses and activities within the park raise questions related to (1) conservation of the scenery and natural and historic objects and wildlife, (2) provision of enjoyment of these same resources, and (3) management to leave the resources unimpaired for future generations.

A park's purpose, significance, and special mandates are derived from and bounded by law and policy. Figure 1 shows the standard management process for developing park policy, beginning with the foundation statement. According to the foundation statement (National Park Service, 2010), the purpose of the Grand Canyon National Park is to:

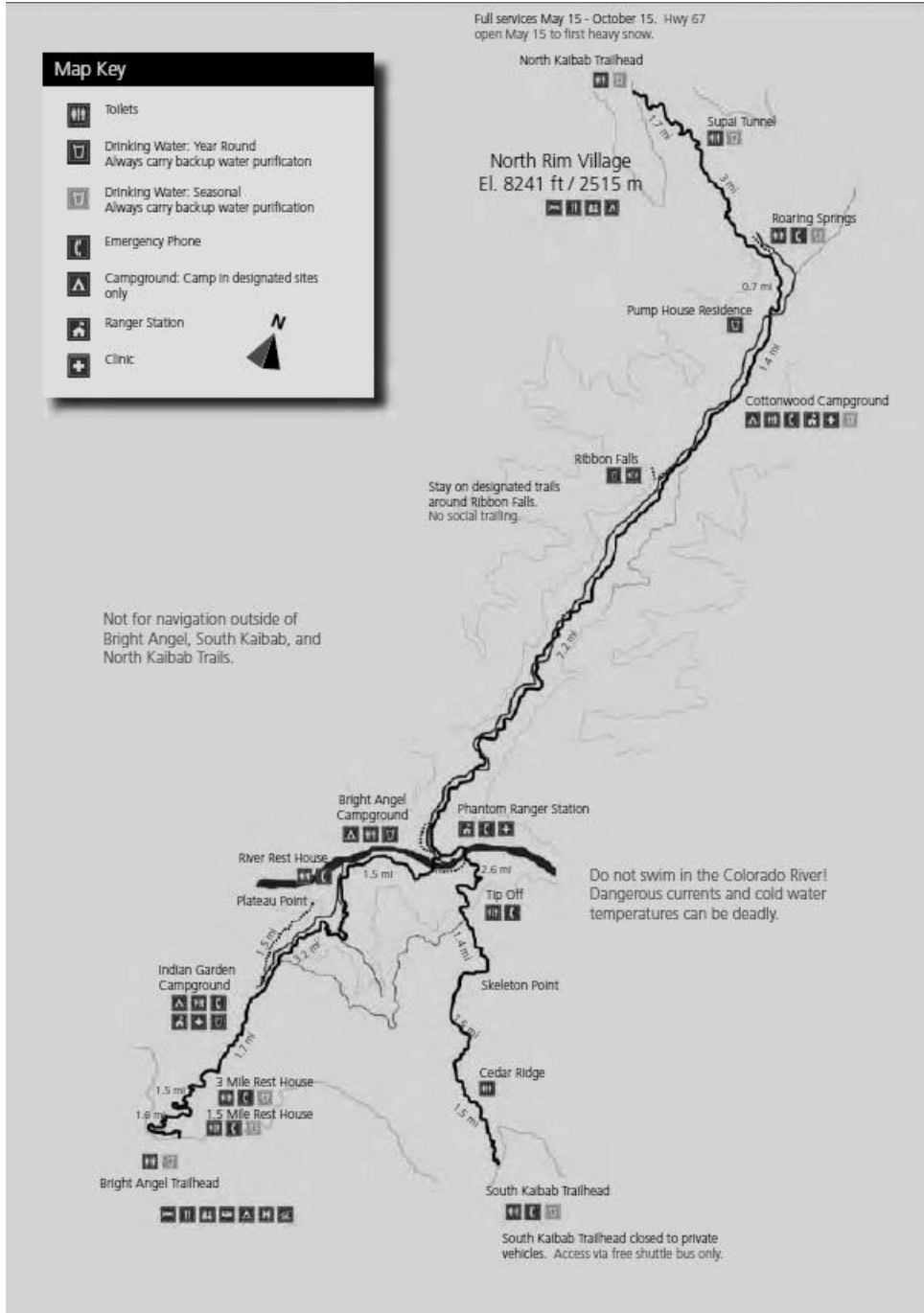
- preserve and protect Grand Canyon's unique geologic, paleontologic, and other natural and cultural features for the benefit and enjoyment of the visiting public
- provide the public opportunity to experience Grand Canyon's outstanding natural and cultural features, including natural quiet and exceptional scenic vistas
- protect and interpret Grand Canyon's extraordinary scientific and natural values

Figure 1
NPS Management Process



NPS's 1988 Backcountry Management Plan (BMP), created after recommendation from 1984-1986 ecological and sociological research, covers policy relating to visitor use and resource protection for over 1.1 million acres of the Grand Canyon National Park. Objectives were written for each of the four backcountry management zones (Corridor, Threshold, Primitive, and Wild). This paper is concerned with the Corridor and Threshold zones, particularly Bright Angel, South Kaibab, and North Kaibab corridor trails which receive most of the backcountry visitors. As shown in figure 2, Bright Angel and South Kaibab trails begin on the South rim, converge at the Colorado River, and change to the North Kaibab trail as the corridor continues to the North rim of the canyon.

Figure 2
Corridor and Threshold Trails



Six objectives are clearly defined in the 1988 BMP. One of them, objective 5, includes moderating the number of visitors permitted for overnight use and the number of daytime contacts with others, as well as campsite number and condition. This objective measures a very specific factor relating to the physical and social quality of the backcountry environment. As described in Section J of the existing BMP, these values will be kept current by periodic reassessments using public comments and an analysis of past and on-going backcountry research and monitoring programs (National Park Service, 1988).

Objective 4 defines the variety of recreational activities. In the Corridor and Threshold areas, activities listed are day hiking, backpacking, livestock grazing, and river running (Backcountry Management Plan, 1988). Trail running was not mentioned in the 1988 plan.

The General Management Plan (GMP) created in 1995 addressed the recreational pursuits of its time – river running, fishing, hiking, photography, nature study, and sightseeing. The 1995 plan which was intended to be a guide for management of the park for the following 10-15 years did not mention trail running as an activity.

According to the plan, the purpose of park management is to preserve and protect its natural and cultural resources and ecological processes, as well as its scenic, aesthetic, and scientific values and to provide opportunities for visitors to experience and understand the environmental interrelationships, resources, and values of the Grand Canyon without impairing the resources (National Park Service, 1995). This language is consistent with the 1916 mandate for the National Park Service.

The canyon's pristine natural setting allows a person to hike for days in solitude and experience natural quiet, which has led to several objectives in the plan to help preserve this asset:

- Protect the natural quiet and solitude of the park.
- Develop visitor use management strategies to enhance visitor experience while minimizing crowding, conflicts, and resource impacts.
- Where livestock and visitors share the same trails and areas, minimize conflicts and resource impacts, and enhance safety.
- Provide a quality backcountry experience consistent with historic uses of the cross-canyon corridor.
- Maintain the Bright Angel, North Kaibab, South Kaibab, and River Trails to accommodate high levels of backcountry visitor use.

Under Summary of Parkwide Actions of the 1995 GMP, it is mentioned that the number of visitors may be limited in certain areas during peak visitation periods based on the desired visitor experience and resource protection, but later included that day visitation on the South Rim and corridor trails is not expected to be limited during the life of the plan. However, it acknowledged that the North Rim may need limits sometime after 2005. Rim to rim hikers and runners require access to both the South and North rims.

Corridor trail planning issues mentioned in the 1995 GMP are (1) the trails are often overcrowded and (2) the historic character, cultural landscape, and archeological resources near the trails are being impacted by high visitor use. However, they indicated that no action will be taken to limit hiking on any trail. This is in contrast to the 1995 GMP's review of the 1988 Backcountry Management Plan (BMP) where it is mentioned

that an updated BMP may include the possibility of day use permits or other restrictions in certain areas.

Yosemite National Park is currently assessing a similar situation and is seeking input from the public on its plan to limit the number of hikers each day attempting to scale its iconic Half Dome. The current level is 1,200 per day, with plans to drastically limit access to only 300 (Yosemite plan opts for fewer hikers on iconic Half Dome, 2012).

A recent change in management resulting from an executive order signed by President Bush in 2002 outlines steps for promoting fitness in the nation, which was praised by the director of the NPS who pledged her support. This effort may encourage consideration to include a health and fitness paradigm in national park plans (Wexler, 2005). An example offered by Wexler includes designing a system of trails for the purpose of improving the nation's cardiac fitness.

Although there has been little criticism of the proposal, Wexler believes caution should be urged because extensive changes in management and visitor use may contradict the very purpose and meaning of the park system itself (Wexler, 2005). Referring to the work of Joseph Sax who teaches that even small changes can have profound effects on visitor experience and park function and that national parks should stand in contrast to cities, Wexler warns that using our national parks as gyms may not be wise. Wexler suggests that an argument can be made that competition and fitness is more fitting in an urban environment rather than the calm reflection of the natural environment.

Statement of Problem

NPS has a duty to properly manage visitor activities and must understand visitor expectations when developing park plans. This study will provide insight into visitor experience and the perception people have about the social, safety, and physical impact of trail running in Grand Canyon National Park.

Much research has been published assessing the quality of visitor experience in Grand Canyon and other national parks. However, because the frontcountry receives by far the largest number of visitors to the Grand Canyon, little research is published concerning visitor use, activities, or visitor experience for areas below the canyon rim. Additionally, the limited amount of studies that focus on the park's backcountry do not specifically address the social, safety, and physical impact from the unexpected and rapidly increasing number of trail runners.

As part of a lawsuit settlement, the National Park Service has been given a directive to revise its backcountry management plan to bring it in line with the 1995 General Plan and to provide a strategy to sustain the park for the next twenty years (National Parks Conservation Association, 2010). NPS is currently seeking input from the public for the new plan to assist in identifying acceptable effects to backcountry resources by current visitor pressure, monitor changes, and take action to improve the negative impacts (National Parks Conservation Association, 2010). Having an understanding of the park visitor's perception of impact due to changes in visitor activities, such as trail running, is essential for creating a strong management plan.

Purpose of the Research

The backcountry trails of the Grand Canyon have recently seen a substantial increase in use due to the popularity of rim-to-rim running and other trail running. This increase has social, physical, or safety impact that may require changes in policy or management adaptations for the park. No other studies specifically addressing trail running in national parks were found. The purpose of this study was to gain insight into the perceived safety, social, and physical impact and necessity for changes in management due to this increased use.

Definition of Terms

This study will define *backcountry* as any area of the park that is below the rim, not just the 94% that is currently being managed as wilderness. It will define *wilderness* as any area that is managed as wilderness, even though it may not yet be designated as such. *Frontcountry* is defined as any developed area in the National Park that is on the rim such as visitor centers, rim campgrounds, trailheads, etc. Day use can encompass any use of the backcountry trails, either during day or night, which does not currently require an overnight permit. Currently only overnight backpacking requires a permit.

Trail runners are persons who participate in runs on unpaved surfaces such as parks, dirt roads, and wilderness. Ultra runners are those that run distances in excess of marathon length (26.2 miles) or run in extreme terrain such as the Grand Canyon National Park backcountry.

REVIEW OF LITERATURE

The literature used for this research includes studies on park management, social experience from visitor activities, and implications from adding or changing visitor use regulations. Prior research relating to increased day use of GCNP backcountry from trail running could not be found.

Managing NPS Resources

Managing National Park System Resources: A Handbook on Legal Duties, Opportunities, and Tools (Mantell, 1990) indicates the requirement for the National Park Service to not only focus on preserving park resources themselves but also focus on visitor's enjoyment of those resources. This may require going beyond what science and resource management currently indicate.

The fundamental purpose of a national park must be considered when defining management plans. An example is a lawsuit brought against Cape Cod National Seashore that permitted use of off-road vehicles (ORV) within the park. The park service had performed adequate scientific studies to determine the impacts of ORV use on the sand dunes. However, the court found that the park service failed to address "the more fundamental, but less scientific, question of whether private and commercial motor vehicle use of the seashore constituted an appropriate recreation use generally" (Mantell,

1990, p. 248). The court basically said that use of ORVs might be inappropriate for non-scientific reasons. The case was returned to the park service to make a determination.

Daniel Dustin, professor, Department of Parks, Recreation, and Tourism, University of Utah, completed a 100-mile trail race that commenced at Sequoia National Park's General Sherman tree. By the time he arrived at the half-way point of his successful finish, he discerned that the purpose of national parks did not include indulging trail runners and later shared his reflections. Wilderness is not meant to run through anymore than a museum is and that anyone who does so is a defiler of the wilderness. Trail runners are committing sacrilege for the sake of self-aggrandizement and must stop now, if not for themselves, then for those that care about wilderness (Dustin, 1993).

Professor Joseph Sax of The University of California at Berkeley feels that many management issues are not so much protection of resources, but *visitor experience* of those resources (Mantell, 1990). In identifying the preservationist's argument on different kinds of visitor experiences, Sax observes:

The presence of motorboats on the Grand Canyon is not really an ecological issue, though it was regularly put in those terms. Nor is ecological disruption the sole – or even the principal – reason there has been so much objection to snowmobiles or [off-road vehicles.] While one element of preservationist advocacy is scientific and truly based on principles of land management, another . . . is dominated by value judgments. . . . The preservationist constituency . . . is disturbed not only. . . by physical deterioration of the parks, but by a sense that the style of modern

tourism is depriving the parks of their central symbolism, their message about the relationship between man and nature, and man and industrial society (Mantell, 1990, p. 248).

Several issues arise when determining how to best manage visitor experience. Three that deserve special recognition are preferring one visitor experience over another, deciding how the visitor experience should be delivered, and when should visitor experience arguments be used (Mantell, 1990).

Parks should be places for contemplative recreation and should offer relief from the daily existence and artificial recreation readily found outside the parks (Mantell, 1990). Many who enjoy the parks do not share this vision. They see national parks not as places for contemplation and reverence, but as places to play, in complete contrast to the typical preservationist view (Mantell, 1990). As a public agency, whose clients have their own representatives and senators, NPS is pulled by the desire to serve visitors who have very diverse expectations. Ultimately however, preserving park resources may necessitate providing only visitor experiences that are less and less available outside the parks (Mantell, 1990).

National Parks Conservation Association (NPCA) published the *State of the Park* which identifies major challenges facing GCNP. Areas of concern are park size, visitation patterns, and shortfalls in funding for frontcountry and backcountry management (National Parks Conservation Association, 2010). The NPCA report explained the following generalized management objectives for the backcountry trails:

- Approximately \$24 million of the park's deferred maintenance is related to the park's 630-mile trail system.
- Grand Canyon's visitation has increased significantly during the past 25 years, and increased visitation has brought with it increased impacts on the park's historic resources, particularly trails.
- Corridors connecting the North and South Rims, including trails such as the Bright Angel, South Kaibab, North Kaibab Trails, comprise 42 miles of the park's network of trails. These trails are particularly important as historic features because they not only are evidence of the history and significance of Grand Canyon with a history of their own, but also because they help sustain Grand Canyon's mission to protect natural and cultural resources while providing a way for visitors to experience them (National Parks Conservation Association, 2010, p. 67).

The 2010 NPCA report recognizes the park's challenge of resource protection and preservation, which is the primary focus at every national park, while accommodating visitors with diverse expectations. Balancing visitor needs with resource needs is the ultimate challenge of the large park.

O'Brien (1999) wrote that natural landscape is, or should be, the core interest of park management and limits to wilderness access are thereby increasing. He mentioned a trip to Yosemite in 1947 that it was sheer joy compared to the sheer agony of a similar trip made 20 years later. Park management had left visitor use unregulated, resulting in a mass of people, cars, and tents. Prior to this period, NPS encouraged increased tourism.

After witnessing the destruction from unregulated use, the attitude of NPS shifted more toward sustainability and preservation of natural resources (O'Brien, 1999).

As stated by O'Brien (1999), the goal of NPS is to allow the public to use national parks as much as possible for recreation that is directly related to the parks unless that use interferes with others' enjoyment or damages the park's ecology. This is a daunting task because new forms of outdoor recreation often appear to complicate the matter. O'Brien feels that one of NPS's most serious tasks will be staying ahead of new forms of recreation and ensuring the parks are managed for the enjoyment of all the people, not just a selected few (O'Brien, 1999).

O'Brien (1999) focuses on the *use* of national parks which he feels is a crucial factor in sustainability. One important step for improving the quality of management is being prepared for changing forms of outdoor recreation. No one could have anticipated the tremendous increase in rock climbing, mountain biking, rafting, etc. (O'Brien, 1999). By anticipating changes in trail use and understanding visitor perceptions, NPS can possibly avoid difficult management modifications and mitigate conflict.

Considering social science critical for adequate park management, NPS created the Social Science Division in the 1990s to help provide an understanding of the relationship between people and parks. There exists a viable mandate for scientific research, including social science, from the NPS Organic Act, official management policies, legislation, and formal planning documents (National Park Service, 1996). A few of the critical questions for NPS Social Science Division (SSD) include who visits national parks and what do they look for, who doesn't visit and why, how do these

visitors affect national park resources, and how does park management affect the visitor experience (National Park Service, 1996).

An interesting observation by O'Brien (1999) is that many forms of recreation are mentioned, but trail running is not among those discussed. Existing literature suggests that trail running has only recently gained popularity in national parks. Grand Canyon National Park is unique in that an expanded trail system cannot be easily created to allow for new activities or increased visitor use.

The Social Experience

The park planning and policy lab of University of Illinois furnished its study by Backlund, Stewart, Schwartz, and McDonald (2004) of day hikers to NPS in 2006. Two of the objectives were to assess day hiker's satisfaction and to suggest management actions that best meet the social needs of hikers. The study found that the satisfaction of day hikers was mostly influenced by the behavior of others with 'considerate behavior of other groups' the most important factor, trumping the *number* of other hikers encountered. Managerial conditions were less important than social conditions.

The study by Backlund et al. (2006) recommended developing and implementing a program to monitor visitor's perceptions and evaluations of social, managerial, and environmental conditions to assess management objectives related to site conditions and quality of the hiker's experience. Interestingly, although respondents were questioned about their motivation for hiking, trail running was not isolated as a desired experience. Long-distance day hikers comprised 11% of the hikers interviewed. This group included those doing rim-to-rim or river-and-back-out trips which, although not specifically

mentioned, may have included trail runners. Overnight backpackers were not mentioned in the research.

One common trait among a large percentage of hikers was the desire for solitude, even those on the main corridor trails that are heavily used. The researchers found that 94.2% were interested in nature appreciation, 87.1% desired solitude, and testing skills was a motivation for 46.5% of the hikers.

The Backlund et al. (2006) study also included management alternatives and collected data on support of changes. More than 72% opposed a limitation on day use by means of a daily permit system with only 13.2% supporting this system. The only other suggested alternative that had such a large opposition was requiring hikers to take total responsibility for their own health and safety (78.7% opposed, 9.9% supported).

Stewart and Cole (2001) showed that although 60% of backcountry backpackers interviewed had a negative experience quality based on the increase in number of groups encountered on their visit, more detail of the research revealed that the number of encounters would need to increase dramatically (i.e. from four to 100 per day) to reflect a 50% reduction in experience quality for all participants. Only a few people (2% of the sample) would be strongly affected by increased encounters. Overall, most participants reported a quality experience even though they felt more crowded than they preferred. The findings suggest that the current permit system does improve quality of experience as a result of limitations (Stewart and Cole, 2001). This study was conducted prior to trail running becoming popular and most backcountry encounters would likely have been with other backpackers.

Hutson, Montgomery, and Caneday (2010) completed a study using Q methodology to understand perceptions of outdoor recreation professionals toward place meanings in natural environments. One factor revealed in the research is described as *Relational: Social-ritual meaning attributed to places*. This group of participants revealed a strong agreement with the importance of solitude and attachment to particularities of settings as defining characteristics (Hutson, et al., 2010). Although the Hutson research focused on outdoor recreation professionals, similar findings would be expected focusing on outdoor recreation users.

The Hutson et al. (2010) study found an attainable method for resolving outdoor recreation conflicts by understanding a person's link to a specific environment. It revealed the meaning and importance people have to settings, the relationship between motivation to visit a location and place attachment, and place attachment and attitude toward fees. This research may provide insight into the acceptance of fee-based permits based on the user's attachment to the area as well as acceptance of day use regulation.

METHODOLOGY

Q Methodology

Q methodology (Q) is communication about a personal point of view (McKeown and Thomas, 1988), which provides the basis for a science of subjectivity (Brown, 1980). Q was chosen for this research in that park management may benefit from understanding subjective perspectives through mutual relations between participants. Q is used to understand both similarities and differences in viewpoints among individuals based on a particular subject. The information sought from this research was not discovering quantitative data, but rather understanding distinct subjectivity areas that can be identified through a Q sort analysis. In contrast to R analysis that obtains a small set of data from a large sample of the population, Q studies a large amount of data from a small sample of the population. In R research, respondents are subjects and questions are variables, but this is reversed in Q. In Q the subjects are the statements and the variables are the Q sorts of the participants (Webler, Danielson, and Tuler, 2009).

According to van Exel and de Graaf (2005), Q is useful in understanding the part of the personality that influences behavior but often remains unexplored. Q can reveal a characteristic independently of that characteristic's distribution relative to others and can be done with only a small population sample.

Q methodology begins with a concourse created from a collection of as many statements as possible that can be communicated about a topic (Webler, Danielson, and Tuler, 2009). After all statements are collected, a sub-set is created that encompasses a broad range of opinions about the topic. The concourse can be divided into categories with a few questions from each category included in the sub-set. This sub-set, referred to as the Q set, is placed on individual cards to create a Q deck.

Q sets represent communication contexts and do not include all communication possibilities (McKeown and Thomas, 1988). The statements included in the set can be obtained from either structured or unstructured sampling and obtained either by naturalistic or ready-made methods (McKeown and Thomas, 1988). Naturalistic samples are obtained via interviews, written narratives, and media; ready-made are obtained via sources other than communication with participants or stakeholders. In unstructured sampling, statements are selected based on relevancy to the topic and may not provide adequate coverage. Statements are obtained more systematically in structured sampling and incorporate hypothetical considerations (McKeown and Thomas, 1988).

The population (P set) is purposively selected. Each individual is invited to participate based on his or her knowledge and interest in the topic, therefore providing a relevant viewpoint and the likelihood of well-defined results (factor definition). It is important to include stakeholders from all spheres surrounding the topic so that the points of view are all-encompassing.

The members of the P set are asked to sort the statements in the Q deck based on how much they agree or disagree on each one (i.e., whether each statement is most like or

most unlike them) and then enter the number of each statement on a record sheet. Follow up interviews may be necessary for better understanding of the thinking process of participants who are selected for their high definition of a factor.

The data from all record sheets are entered into the selected software for data analysis. Van Exel (2005) explains the following steps in data analysis: (1) calculate the correlation matrix of all Q sorts; (2) identify the number of natural groupings by virtue of being similar or dissimilar to one another. Note that people with similar views will likely be in the same natural group or factor; (3) factor rotation is needed to view the results from different angles. Factor rotation can be objective or judgmental; (4) calculation of scores such as the z-score (normalized weighted average); (5) interpret the results.

Selection of Participants and Statements

The initial statements were obtained from personal interviews with Grand Canyon trail runners, day hikers, park rangers, and backpackers, and with online Grand Canyon hiking and trail running discussion groups, over a period from May 2010 through January 2012. Statements were obtained from park rangers during visitations in May 2010 and May 2011 and from park service employees at a National Park Service open house in May 2011. The open house was being held to discuss revision of the Grand Canyon National Park's 1988 Backcountry Management Plan.

Beginning in October 2011, backpackers, day hikers, and trail runners were asked their thoughts concerning the increased number of trail runners in the backcountry via face-to-face interviews, email, and online discussion groups. These stakeholders were

persons that had each made multiple visits to the GCNP backcountry. Some were known to the researcher or contacted by the researcher through the Grand_CanyonHikers Yahoo Group. Others were invited to contribute by the president of the Northern Arizona Trail Runners Association.

By collecting input from stakeholders from most arenas involved in backcountry activities, the resulting statements encompass a wide range of thinking processes toward the safety, physical, and social impact, and possible changes required in policy from increased day use. Mule rider concessionaires and visitors were not included in the interviews as mule riding is a commercial activity within the park and subject to its own policy.

The initial statement list was analyzed and reduced (by omitting similar statements) to thirty four final statements that covered as many areas of opinion as possible based on communications with stakeholders. The statements were structured by safety, social, physical, and policy areas. The final statements selected, along with corresponding categories, can be viewed in Appendix A. After the statements were identified and a targeted population was defined, an application (Appendix B) was made to the Oklahoma State University Institutional Review Board (IRB). The research was approved by IRB on January 24, 2012.

Participants were targeted for selection based on the presumption of them being strong stakeholders in the Grand Canyon backcountry. The presumption was based on either personal knowledge by the researcher, or the participant's affiliation with an organization whose members are active in the GCNP backcountry. Persons known by the

researcher to have frequently used the Grand Canyon backcountry trails for either backpacking or running were invited to participate. These persons were given a copy of the invitation script requesting participants (Appendix C) to share with others who they know are also frequent users of the Grand Canyon backcountry. The invitation in Appendix C was also provided to Tulsa Area Trail and Ultra Runners, the Northern Arizona Trail Runners Association, and the Grand_CanyonHikers Yahoo Group via each group's discussion website. All invited participants were given a copy of the Information Sheet in Appendix D.

The final Q set (population sample) consisted of 26 users of the Grand Canyon National Park backcountry and included one Grand Canyon National Park ranger. Each participant was considered to have a salient stake in current and future use of backcountry trails.

Some participants were interviewed in person, others via mail. All were again provided a copy of the information sheet (Appendix D), a deck of 34 laminated cards (one card for each of the statements), and a record sheet with a demographic survey on the back (Appendix E). Those participating via mail were also given an introductory letter listing the contents of the package and contact information, written instructions (Appendix F), an 11 x 17 inch form board (larger version of record sheet found in Appendix E), and a self-addressed, stamped envelope for returning the record sheet and demographic survey.

Instructions

Each participant was asked to sort according to the condition of instruction “What do you consider when thinking about the Grand Canyon backcountry”. Each was instructed to create three stacks and place each card into one of the stacks based on three criteria; one stack for ‘most unlike me’, one for ‘most like me’, and one for neutral. After creating the 3 stacks, the participant was asked to arrange the cards on the form board by selecting one statement they felt that was most like them and placing it in the far right column and then selecting the one least like them and placing it on the far left. They were instructed to continue this processes (placing one card on the right, one card on the left) until all cards were on the board. They were then allowed to review their sort and make any changes needed to best represent their view.

FINDINGS

Q Population Demographics

A table of the demographics can be found in Appendix G. Nine females and 17 males participated. An average age of 53, with a range of 32 through 77 was calculated based on the ages of the 25 participants who provided their age. Most participants engaged regularly in backpacking and day hiking. Less than half participated in trail running and water sports such as kayaking and rafting. Other miscellaneous forms of outdoor recreation, such as photography, were also listed. Table 1 shows the demographics for Grand Canyon activities.

Table 1
Outdoor activities of participants

| Activity | Number of Participants |
|------------------------|-------------------------------|
| Backpacking | 22 |
| Day Hiking | 24 |
| Trail Running | 12 |
| Kayaking, Rafting, etc | 9 |
| Other | 12 |

The highest level of education ranged from high school diploma to Doctor of Philosophy with most having a Bachelor degree or above. Table 2 shows the breakdown by education level.

Table 2
Highest Level of Education Achieved

| Highest Level Completed | Number of Participants |
|--------------------------------|-------------------------------|
| High School | 2 |
| Associate | 3 |
| Bachelor | 10 |
| Master | 8 |
| Doctorate | 3 |

PQMethod Analysis

Eight factors were extracted by PQMethod2.20 software in the original data analysis. The factors are ordered according to the proportion of the variance of the original data and are normally orthogonal (Abdi, n.d.). One of the most commonly used orthogonal rotation methods, Varimax, was chosen to reduce the original factor analysis from eight to a sub-set of three. This is a standard process described by Abdi (n.d.) as “In general, only a (small) subset of factors is kept for further consideration and the remaining factors are considered as either irrelevant or nonexistent (i.e., they are assumed to reflect measurement error or noise)” (p. 1).

Webler, Danielson, and Tuler (2009) further explains the criteria for reducing the number of factors and selecting the appropriate number to use based on using simplicity, clarity, distinctness, and stability. For simplicity, fewer factors are better as long as differences in views are preserved. Clarity is maintained when each participant loads highly on one and only one factor and is obtained by removing confounded and non-defining sorts from the final factors (those who load highly on multiple factors are

considered ‘confounded’ and those who do not load highly on any factor are considered to be ‘non-defining’). Distinctness is shown when correlations between factors are low. Even when participants have many views in common, the ones in which they disagree are particularly important. Stability is expressed when clusters (factors) of people that share similar views are preserved.

The resulting three arrays, shown in Table 3, reveal one strong and two moderate factors. The factors are based on loadings, which represents the degree in which an individual’s sort correlates with a factor. Of the 26 sorts, four were considered to be confounded and one was non-defining. Sorts were considered to be confounded when a sort loaded on two factors by at least 0.42 degrees for more than one factor. One sort was considered to be non-defining as it did not load significantly (at least 0.42) on any of the three factors. Of the 21 remaining sorts, eleven loaded on factor 1, five on factor 2, and five on factor 3.

Table 3
Factor Matrix with Loadings

| Participant ID | Factor 1 | Factor 2 | Factor 3 |
|-----------------------|-----------------|-----------------|-----------------|
| 1 | 0.6215 | 0.3914 | 0.2291 |
| 3 | 0.8213 | -0.2476 | 0.2778 |
| 5 | 0.572 | -0.203 | 0.3707 |
| 6 | 0.6408 | 0.2305 | -0.085 |
| 7 | 0.6969 | 0.2223 | 0.1145 |
| 8 | 0.7603 | 0.1892 | 0.0973 |
| 15 | 0.4872 | 0.1082 | 0.247 |
| 18 | 0.7241 | 0.1464 | 0.2621 |
| 20 | 0.7971 | 0.1914 | 0.0037 |
| 24 | -0.5726 | 0.3188 | 0.2921 |
| 25 | 0.8471 | -0.0625 | 0.1285 |
| | | | |
| 2 | 0.1091 | 0.6933 | 0.1459 |
| 11 | 0.2534 | 0.4925 | 0.1205 |
| 14 | 0.1102 | 0.7699 | -0.2397 |
| 19 | -0.0775 | 0.743 | 0.0773 |
| 26 | 0.0632 | 0.5953 | 0.3504 |
| | | | |
| 10 | 0.1155 | 0.1338 | 0.7008 |
| 16 | 0.1611 | 0.3147 | 0.7333 |
| 17 | 0.248 | 0.2146 | 0.6824 |
| 22 | 0.0828 | -0.0161 | 0.8437 |
| 23 | 0.1076 | -0.0132 | 0.8398 |
| | | | |
| 4 | 0.5737 | 0.4271 | 0.3125 |
| 9 | 0.0265 | 0.5954 | 0.605 |
| 12 | 0.4546 | 0.1847 | 0.4955 |
| 13 | 0.5013 | -0.2644 | 0.432 |
| 21 | 0.4065 | 0.3519 | 0.25 |

Appendix H visually illustrates mockups for each of the three factors representing the sort of ‘pseudo participants’ who had a 1.0 degree loading. The patterns of opinion shown in Appendix H reveal the views for the group of participants that loaded for that factor and may or may not be the opinion of any particular participant within the group.

Participants who have a high loading on a factor are considered to define the factor's perspective (Webler, Danielson, and Tuler, 2009). Distinguishing statements (those that reveal different positions between the factors) are identified with bold text. Consensus statements (those that share positions between the factors) are identified with an '=' at the end of the statement.

Of the four consensus statements listed below, only one helped define the factors. The first statement shown below was highly ranked by all and reflects that all three factors have, at minimum, moderate concern for one's impact on other visitors. The other three consensus statements fall toward the neutral area and thus do not define any of the factors. They only reflect a shared indifference.

Two consensus statements in the 'most like me' range are:

- We should be concerned about our own impact on other visitors
- The culture and historical value of the park must be preserved at all costs

Two consensus statements in the 'most unlike me' range are:

- Any additional regulation in trail use will only discourage visitors
- The most important part of park management is providing enjoyment and education for visitors

Three tables that reveal the differences between sets of factors (factor 1 and factor 2, factor 1 and factor 3, and factor 2 and factor 3) can be viewed in Appendix I. The differences, as well as similarities, can also be easily seen on the mockups in Appendix H.

Interpretation of Factors

The mockups made from the three factors were interpreted by the researcher and others to reveal what the Q sort was telling about the viewpoints. The following descriptions were interpreted and the factors have been identified as *Guardian Conservationist*, *Competitive Conservationist*, and *Compromising Conservationist*.

Factor 1 - *Guardian Conservationist*

Of the 11 participants that sorted as *Guardian Conservationists* (Guardians), ten were backpackers and four were trail runners (three were both trail runners and backpackers). The two highest loaders listed backpacking, but not trail running, as an activity. Ages ranged from 39 through 77, with an average of 61 years. This viewpoint had the highest average age of the three factors and a mean education level of Bachelor degree. The statements with the highest z-scores are shown in Table 4.

Guardians are very concerned about long term impact of unregulated visitor use, including their own, and are willing to do what is necessary to protect the fragile backcountry environment. They fully understand the physical injury created by increased visitor use as well as the social damage. They place stewardship of the canyon above their own personal enjoyment.

Solitude is very important to their personal enjoyment (highest z-score of the study) and it has been affected by the increased trail use. However, they are open to using non-corridor trails to achieve solitude if necessary. They also believe that the Grand Canyon is better enjoyed through hiking and backpacking rather than running. This perspective is interested in actively playing a role in protecting the fragile social and

physical environment of the GC backcountry and does not believe that day use regulation will negatively affect their personal enjoyment, nor the enjoyment of others.

One of the high and pure loaders for Guardians commented “Just because you can, doesn’t mean you should”. This participant indicated via the sort that the backcountry is an ideal place to backpack but not to run and canyon trails were not intended to be used as a race track.

One participant who loaded in factor 1 could possibly provide a sub-factor. This participant has worked in GCNP and offers a unique viewpoint. He/she has a strong interest in conservation, is concerned about personal impact to other visitors, ranked solitude as a high priority, and indicated the canyon backcountry is more suited to backpackers than trail runners. As a result, this respondent fits well with the *Guardian Conservationist’s* viewpoint. However, other statements that were ranked high by this person fell into the other two factors. This participant agreed with *Competitive Conservationists* that one of the attractions for day use is it is free and easy to plan, and hikers and runners must have adequate planning so as not to rely on ranger’s assistance. This participant also agrees with *Compromising Conservationists* that NPS should keep pace with changing needs and find ways to accommodate increasing use.

Table 4
Guardian Conservationist - Highest Z-Scores

| ID | Statement | Z-SCORE |
|-----------|--|----------------|
| 1 | One of the primary appeals of the backcountry is its solitude | 2.077 |
| 22 | The most important part of park management is preserving habitat and ecosystems, not indulging visitors | 1.298 |
| 9 | Stewardship of the canyon is paramount to personal enjoyment | 1.219 |
| 2 | We should be concerned about our own impact on other visitors | 1.067 |
| 21 | There are many other places to run trails, but the canyon offers a unique backpacking experience | 0.998 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | 0.973 |
| 5 | I would readily accept more stringent access to reduce impact | 0.891 |
| 19 | Overnight users seeking solitude should use non-corridor trails | 0.882 |
| 14 | The culture and historical value of the park must be preserved at all costs | 0.831 |
| 6 | Any additional regulation in trail use will only discourage visitors | -0.751 |
| 4 | Trail running does not increase physical danger to other users | -0.94 |
| 17 | The presence of trail runners in the backcountry improves safety for others | -1.175 |
| 11 | Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | -1.182 |
| 16 | Personal enjoyment of the backcountry has not been impacted by increased trail activity | -1.428 |
| 3 | The rocky GC trails can sustain an increased visitor load without physical harm | -1.477 |
| 7 | National parks were created for unlimited use by any citizen or visitor & should remain that way | -1.521 |
| 15 | The park is owned by the public and the public should have unlimited access | -1.554 |
| 34 | The trails should be shared equally by all with no regulation | -1.9 |

Factor 2 - Competitive Conservationist

Five participants sorted as *Competitive Conservationists* (Competitors). This viewpoint includes four backpackers and two trail runners (one of whom lists both trail running and backpacking activities). The two highest loaders listed backpacking, but not trail running, as an activity. Ages (when provided) ranged from 32 through 65 with an average of 49 years. One participant chose not to share an age. The mean education level is Bachelor degree. This is the only factor that consists of all male participants. The other two, and also the confounded sorts, have a balance of male and female members. The statements with the highest z-scores are shown in Table 5.

Competitors wish for noninterference and self-challenges. They enjoy the freedom of access to the backcountry without needing to plan ahead and are not open to any regulation for day use.

Solitude is very important to personal enjoyment for Competitors and the Grand Canyon has a special place meaning. However, regulating day use would negatively impact their personal enjoyment. They do not envision an increase in trail running activity, thus new regulation is not needed to preserve their solitude and would only cause dissension.

Competitors do not feel responsible for their impact to the canyon, but neither do they expect the canyon (i.e. rangers) to take care of them. They feel that day hikers and runners may not be as well-prepared to take care of themselves as are backpackers.

The two high and pure loaders for this viewpoint provided very similar comments – the less regulation the better, there is no need for new rules, and everyone should get lessons in trail etiquette. “I do feel a stewardship for The Canyon, but maybe that is secondary to what I wish to achieve” is a view shared post-survey by the person with the highest loading.

Table 5
Competitive Conservationist – Highest Z-Scores

| ID | Statement | Z-SCORE |
|-----------|--|----------------|
| 1 | One of the primary appeals of the backcountry is its solitude | 1.821 |
| 12 | Since day use of the trails has never been regulated, placing a limit now would create much dissension | 1.429 |
| 18 | No other public land can offer challenges similar to those of the Grand Canyon | 1.387 |
| 30 | Neither hikers nor runners should expect ranger assistance due to inadequate planning | 1.335 |
| 27 | Trail running or day hiking is an enjoyment because it is free and easy to plan | 1.181 |
| 31 | Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 1.144 |
| 2 | We should be concerned about our own impact on other visitors | 1.123 |
| 19 | Overnight users seeking solitude should use non-corridor trails | 1.006 |
| 11 | Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | 0.886 |
| 34 | The trails should be shared equally by all with no regulation | -0.59 |
| 20 | There are many other places to backpack, but the canyon offers a unique running challenge | -0.795 |
| 29 | Requiring permits for day use would improve safety in the canyon | -0.964 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | -1.267 |
| 8 | Increased use of the trails by runners could change the nature of the backcountry forever | -1.497 |
| 24 | The popularity of running across the Grand Canyon will increase significantly over the next decade | -1.518 |
| 32 | Running lures many that may not be prepared for the environment | -1.582 |
| 5 | I would readily accept more stringent access to reduce impact | -1.631 |
| 26 | The challenge of obtaining a backcountry use permit just adds to the adventure | -1.796 |

Factor 3 – *Compromising Conservationist*

Five participants sorted as *Compromising Conservationists* (Compromisers). All are trail runners and three are also backpackers. The highest loader lists trail running, but not backpacking, as an activity. Ages range from 36 through 66 with an average of 49 years. The mean education level is Master's degree. The statements with the highest z-scores are shown in Table 6.

This is the only viewpoint which does not place emphasis on solitude as a primary appeal of the Grand Canyon backcountry. Compromisers are concerned about the stewardship of the Grand Canyon and their own impact on the enjoyment of other

visitors. They do not believe that the backcountry should be open to unlimited use by the public, but see no harm from their chosen use - trail running.

Compromisers hold that NPS has the responsibility to keep pace with the changing use of the backcountry and should find ways of accommodating an increase in day use. They acknowledge that failing to address increased use will have significant long-term harm, regulating use will not discourage visitors, and the public should not have unlimited access. However, they are personally reluctant to accept such regulation.

Table 6
Compromising Conservationist- Highest Z- Scores

| ID | Statement | Z-SCORE |
|-----------|--|----------------|
| 9 | Stewardship of the canyon is paramount to personal enjoyment | 1.966 |
| 2 | We should be concerned about our own impact on other visitors | 1.738 |
| 10 | NPS policies must keep pace with changing needs and expectations | 1.329 |
| 25 | Park management should find a way to accommodate increased day use | 1.246 |
| 4 | Trail running does not increase physical danger to other users | 1.123 |
| 24 | The popularity of running across the Grand Canyon will increase significantly over the next decade | 1.009 |
| 20 | There are many other places to backpack, but the canyon offers a unique running challenge | 0.973 |
| 22 | The most important part of park management is preserving habitat and ecosystems, not indulging visitors | 0.953 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | 0.782 |
| 28 | The canyon trails were not intended to be used as a race track | -0.619 |
| 8 | Increased use of the trails by runners could change the nature of the backcountry forever | -0.818 |
| 23 | The most important part of park management is providing enjoyment and education for visitors | -0.917 |
| 6 | Any additional regulation in trail use will only discourage visitors | -0.925 |
| 29 | Requiring permits for day use would improve safety in the canyon | -1.046 |
| 5 | I would readily accept more stringent access to reduce impact | -1.263 |
| 26 | The challenge of obtaining a backcountry use permit just adds to the adventure | -1.569 |
| 15 | The park is owned by the public and the public should have unlimited access | -1.901 |
| 7 | National parks were created for unlimited use by any citizen or visitor & should remain that way | -1.901 |

General Comparisons and Summary

Guardians are unique in thinking that the use of GCNP backcountry is better suited for backpacking than for trail running. Competitors have a neutral view and Compromisers lean slightly toward preferring trail running over backpacking. Outdoor activity demographics appear to be a significant factor in the thinking process of best use. While most Guardians are backpackers with less than one third also trail runners, all Compromisers are trail runners. Three of the Compromisers who are trail runners are also ultra runners and the Grand Canyon backcountry certainly provides opportunity to accommodate this activity.

While both Guardians and Compromisers have great concern for stewardship and conservation of the canyon environment, Competitors are only concerned about their impact on other visitors and indicate no interest in stewardship, preservation, and conservation. This is an interesting view because Competitors had the highest ranking for a statement referring to place-meaning. The lack of interest in conservation indicates the place-meaning for them may be the Grand Canyon's ability to fulfill a personal athletic challenge rather than the grandeur of the majestic park.

The only statement that showed a strong opinion by all three viewpoints was a common concern for one's impact on other visitors. All three viewpoints were neutral on the statement "hiking is the best and safest way of experiencing the canyon". This may be due to the ambiguity of the statement since it can have multiple answers. It can be the *best* way, but not the *safest* or vice versa.

Guardians and Competitors have few views in common, but both share solitude as a primary appeal of the backcountry. Both also suggest that overnight users seeking solitude should use non-corridor trails. Neither suggests that trails should be shared equally by all with no regulation. Compromisers remain neutral in these areas.

Guardians and Compromisers consider stewardship to be more important than personal enjoyment. They feel that visitor activity in National Parks should not be left unregulated with unlimited use and NPS should focus on preserving habitat and ecosystems rather than indulging visitors. They do not envision that additional regulation will discourage visitors. Competitors remain neutral on all of these perspectives.

Placing conservation very high, Guardians would readily accept more stringent access to reduce impact. Both Competitors and Compromisers feel strongly against this. Competitors rank implementing new restrictions as negative while Guardians indicate the opposite. Compromisers are neutral. Both Guardians and Compromisers believe that failing to address increased use of trails from unregulated day use will have significant long-term harm. Competitors feel strongly against this.

Only Guardians feel strongly that personal enjoyment of the backcountry has been impacted by increased trail activity, that the rocky trails cannot sustain an increased visitor load without physical harm, and culture and historical value of the park must be preserved at all costs. Guardians do not agree with Compromisers that trail running does *not* increase physical danger to other users.

Guardians remain neutral while Competitors and Compromisers have low rankings in thinking that permits would increase safety, increased use of the trails by

runners could change the nature of the backcountry forever, and the challenge of obtaining a permit is an adventure itself.

Both Guardians and Compromisers have a high ranking for significant long-term harm from failing to address the increasing number of trail runners. This is held very low on Competitor's ranking, possibly because this viewpoint does not believe that the number of trail runners *is* increasing. The three had completely different opinions on whether or not adding regulation for day use would cause dissention, with Guardians having no concern, Compromisers staying neutral, and Competitors having a strong opinion that there would be dissention.

Ten of the 21 participants that loaded on the three viewpoints are trail runners. Thirty percent of these ten loaded as Guardians, 20 percent as Competitors, and 50 percent as Compromisers (*all* participants for this point of view were trail runners). Seventeen of the 21 participants are backpackers. Of the four that were not backpackers, one loaded as Guardians, one as Competitors, and two as Compromisers. Keeping in mind that there were only five participants in factor 3, these statistics may indicate a strong relationship between preferred activity and direction of thinking. A high loader for Guardians suggested that the primary purpose of backpackers is the environment, while the primary purpose of trail runners is the activity, leaving environmental impact secondary.

Guardians were the most vocal both before and after the study. Some of their comments include (not directly quoted) 'I've seen results from overuse and misuse, which impacted my choices', 'have been disappointed when unable to get a permit, but

felt this regulation is necessary’, ‘trail running below the rim is unsafe’, ‘unprepared day hikers are more of a safety issue than backpackers and trail runners’. The last comment, which was originally obtained from a Guardian for use as a Q statement, was ranked highly by Competitors but not by Guardians.

Several Guardians commented on negative encounters with trail runners because of the runner’s lack of trail etiquette. Lack of trail etiquette was defined as failure to yield to uphill hikers, leaving food traces and trash on trail, and leaving toilet paper and human waste near the trail.

Another Guardian was concerned about the waste left along the trail because facilities provided by the park service were not used. Failure to use the facilities was attributed to long lines created during prime hiking season which is also prime running season.

A comment was made about the funding of backcountry facilities. Overnight users (backpackers) pay a fee to help offset the cost of access to water, restrooms, and ranger assistance. Trail runners have the same access but do not pay.

DISCUSSION, RECOMMENDATIONS, AND CONCLUSION

Discussion

This study contributes insight into the thinking process of the backcountry user's perceptions, especially the need or level of acceptance of regulation. The three viewpoints presented by the Q analysis showed a wide range of backcountry users' perspectives toward the increasing day use. They can best be described as 'there is no problem so just leave me alone and let me enjoy the Grand Canyon as it is today', 'we may have a problem and it is up to NPS to come up with a solution that does little to inconvenience me', and 'we do have a problem and I am willing to do whatever is necessary to protect the social and physical status of the Grand Canyon'.

Webler, Danielson, and Tuler (2009) mention that there is no ideal mathematical method of determining if a Q solution is good. Because of desired excess meaning, Q statements can be interpreted in different ways by different participants. However, if there is too much excess meaning, comparing the resulting perspectives will be difficult (Webler, Danielson, and Tuler, 2009). Four sorts were confounded and one was a non-defining, representing 19% of the original Q population. More precise meanings (less excess meaning) on statements may have reduced this percentage.

The Grand Canyon has a carrying capacity that identifies the number of visitors the park can manage without doing physical harm to the ecology. There is also a

psychological carrying capacity that is much more difficult to understand and measure. O'Brien (1999) mentions that overcrowding is a relative term and the level at which people consider there are too many around them to enjoy the national parks is not easy to identify. He also recognizes how protective people are of their favorite sport and how difficult it is for the park to not allow activities that are perfectly acceptable outside the park. Equally as difficult is adding regulations that prohibit activities that were once allowed or even encouraged such as GCNP backcountry day use.

Politics play a big role in park management. A rise in visitor use may be accepted by NPS because it brings public support and potential funding increases. Anything that might turn visitors away or decrease tourism in surrounding communities would take a brave superintendent (O'Brien, 1999). This may be the largest obstacle for regulating any special use of the backcountry.

Mule trips into the Grand Canyon are a part of history, carrying passengers to Phantom Ranch since tourism began, but each trip takes a huge toll on the physical resources. Rachel Stanton, an environmental-protection specialist with the Park Service, has been working on a plan to assess the damage caused from mule trains for several years and realizes just how sensitive the topic is (Faherty, 2009). Stanton considers mules the primary cause of physical damage to trails while foot traffic is beneficial as it packs down dirt. (Note: This view is not held by some environmental scientists as can be seen in studies such as David Cole's 1991 study of the fragile cryptogamic soil crust

easily damaged by footsteps). Placing new regulation on the much-loved mule rides, such as limiting them to above the rim, is being considered. According to Faherty (2009), just the announcement of an environmental assessment concerning the mule operations showed how tight a line the park service must walk. Regulation, though absolutely necessary for sustainability, often brings with it initial criticism and public outcry.

To better manage the Grand Canyon National Park backcountry, it is important to understand how the changing use of the backcountry fits in with the definition of fundamental purpose of the Organic Act of 1916. The Organic Act mandates that fundamental purpose must be considered when activities raise questions related to visitor enjoyment or experience. Each of the three perspectives defined in this study have a distinct view of one's acceptable visitor experience of the backcountry system, any of which may not support the fundamental purpose.

One of the six objectives defined in the backcountry management plan includes moderating the number of daytime contacts with others. Solitude is of utmost importance to the personal enjoyment of both *Guardian Conservationists* and *Competitive Conservationists* with Guardians indicating their enjoyment has already been impacted. To successfully manage the number of contacts as defined in the backcountry management plan, regulation may be required to moderate the number for both day and overnight use. This study reveals that two of the three viewpoints are not receptive to implementation of new regulation, at least none that places limitations on their chosen activity.

Recommendations

Additional research is needed to identify if, and how much, growth there has been. *Competitive Conservationists* indicate there has not been an increase in trail use by runners, suggesting a need for future investigation.

One person who provided pre-study interviews to help develop Q statements (but did not participate in the sort), made a comment on the possible impact to the natural environment from trail running. His concern was for the nocturnal wildlife since many trail runners, often in groups, prefer to run in darkness. The participant addressed the impact a group of nocturnal runners might have on wildlife reproduction, feeding activities, and migration. Impact to wildlife was not included in this research and should be further investigated by a scientific study.

Based on a comment made post-survey by a high and pure *Competitive Conservationist* sorter, this group may place more value in conservation and stewardship of the environment than was indicated by the sort. Although stewardship and conservation ranked low for this factor compared to other areas such as regulation, these participants may nonetheless hold a conservationist position. Additional research is needed to understand the tenets shared by *Competitive Conservationists*.

As mentioned earlier, the NPS Social Science Division was created to help provide an understanding of the relationship between people and parks. The Social Science Division of the National Park Service provides NPS managers and the public with knowledge derived from its state-of-the-art social and science research (National Park Service, 2011b). The viewpoints of participants in this study may provide a basis

for further research by the SSD to benefit the NPS in its management of Grand Canyon National Park and other property of which NPS is responsible.

Conclusion

The National Park Service is the most complex, carefully articulated, and most specific park system in the world (Wink, 1997). According to Wink, inconsistency of many NPS policies is often blamed on the contradictory mandate brought about by the Organic Act of 1916. Many agree the contradiction is stated in the preamble to the act – “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (Wink, 1997, p. 1). Wink’s paper concluded, after determining the intent of Congress in 1916, no contradiction exists. The primary intent was to protect park resources. Denis Galvin (2007) agrees, stating “There is no fundamental contradiction in the Organic Act if one can define impairment. The complexity arises because one person’s ‘impairment’ is another’s ‘acceptable impact’” (p. 24). The complexity of the definition can clearly be recognized in the three viewpoints defined in this study as each one reveals a unique view on what constitutes acceptable impact and what is considered to be impairment. It is apparent that there is no simple solution to address the needs of all visitor expectations.

With or without a conflicting mandate, the National Park Service deserves much appreciation for its history in managing this complex, constantly changing system. By way of solicitous management decisions that are based on an understanding of heterogeneous visitor perceptions, NPS can conceivably address the wishes and

requirements of backpackers, trailer runners, and day hikers while maintaining the fundamental purpose of the park.

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APPENDICES

APPENDIX A

Q-Sort Categories and Statements

SAFETY

- 4 Trail running does not increase physical danger to other users
- 17 The presence of trail runners in the backcountry improves safety for others
- 29 Requiring permits for day use would improve safety in the canyon
- 31 Day hikers and runners are normally not as prepared to handle emergencies as are backpackers
- 32 Running lures many that may not be prepared for the environment
- 33 Hiking is the best and safest way of experiencing the canyon

SOCIAL and PHYSICAL

- 1 One of the primary appeals of the backcountry is its solitude
- 2 We should be concerned about our own impact on other visitors
- 3 The rocky GC trails can sustain an increased visitor load without physical harm
- 5 I would readily accept more stringent access to reduce impact
- 8 Increased use of the trails by runners could change the nature of the backcountry forever
- 9 Stewardship of the canyon is paramount to personal enjoyment
- Failing to address the increased use of trails from unregulated day use will have significant long-term harm
- 13
- 14 The culture and historical value of the park must be preserved at all costs
- 16 Personal enjoyment of the backcountry has not been impacted by increased trail activity
- 18 No other public land can offer challenges similar to those of the Grand Canyon
- 19 Overnight users seeking solitude should use non-corridor trails
- 20 There are many other places to backpack, but the canyon offers a unique running challenge
- 21 There are many other places to run trails, but the canyon offers a unique backpacking experience
- 24 The popularity of running across the Grand Canyon will increase significantly over the next decade
- 26 The challenge of obtaining a backcountry use permit just adds to the adventure
- 27 Trail running or day hiking is an enjoyment because it is free and easy to plan
- 28 The canyon trails were not intended to be used as a race track

POLICY

- 6 Any additional regulation in trail use will only discourage visitors
- 7 National parks were created for unlimited use by any citizen or visitor & should remain that way
- 10 NPS policies must keep pace with changing needs and expectations
- 11 Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness
- 12 Since day use of the trails has never been regulated, placing a limit now would create much dissension
- 15 The park is owned by the public and the public should have unlimited access
- The most important part of park management is preserving habitat and ecosystems, not indulging visitors
- 22
- 23 The most important part of park management is providing enjoyment and education for visitors
- 25 Park management should find a way to accommodate increased day use
- 30 Neither hikers nor runners should expect ranger assistance due to inadequate planning
- 34 The trails should be shared equally by all with no regulation

APPENDIX B

Oklahoma State University IRB Approval

Oklahoma State University Institutional Review Board

Date: Tuesday, January 24, 2012
IRB Application No GU121
Proposal Title: Perceived Safety, Social, and Physical Impact and Necessity for Management Changes Due to Increased Trail Use by Runners in Grand Canyon National Park
Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 1/23/2013

Principal Investigator(s):
Lynna Gilstrap Lowell Caneday
14195 E. 550 Rd. 180 Colvin Center
Inola, OK 74036 Stillwater, OK 74075

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

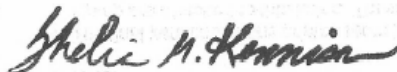
The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Shelia Kennison, Chair
Institutional Review Board

APPENDIX C

Invitation Script

Participants Needed for Research Study

The backcountry trails of the Grand Canyon have recently seen a substantial increase in use due to the popularity of rim-to-rim runners and other trail runners. This increase may or may not have a social, physical, or safety impact requiring changes in policy or management of the park. The purpose of this study is to gain insight into the thinking process of backcountry trail users to determine their perceived safety, social, and physical impact and necessity for changes in management due to this increased use.

If you are interested in participating, please contact:

Lynna Gilstrap

Master of Science candidate

Oklahoma State University

lynna.gilstrap@okstate.edu

918.695.7033

APPENDIX D

Information Sheet

INFORMATION SHEET

- Project Title:** Perceived Safety, Social, and Physical Impact and Necessity for Management Changes Due to Increased Trail Use by Runners in Grand Canyon National Park
- Researcher:** Lynna Gilstrap, Master of Science candidate, Oklahoma State University.
- Purpose:** The backcountry trails of the Grand Canyon have recently seen a substantial increase in use due to the popularity of rim-to-rim runners and other trail runners. This increase may or may not have social, physical, policy, or safety impact that will require changes in management of the park. The purpose of this research study is to determine the perceived resultant and necessity for changes in management due to this increased use, based on responses from Grand Canyon National Park hikers and runners.
- Procedures:** You will be asked to review a set of 34 statements and sort them according to how they reflect your opinions. You will then be asked to record your results on the Record Sheet and to complete a short survey that has demographic questions about you. The session should last 30-75 minutes. If you choose to provide a first name (or code name) and phone number, you may be called to discuss your perspective on the research study results and elaborate on one or more of your statement positions. The call will last 10-20 minutes.
- Risks of Participation:** There are no known risks associated with this project which are greater than those ordinarily encountered in daily life.
- Benefits:** The results from this research study may improve the management of the Grand Canyon National Park backcountry, benefitting all trail users.

Confidentiality:

Signed consent forms will not be used (so that no names are collected) in order to preserve anonymity. Your responses to both the sort and the survey are confidential. No names or other identifying information will be attached to your packet and only aggregate data will be reported. The data will be securely stored in the researcher's home office. The paper copies will be destroyed one year after the completion of the research study. Only the researcher will have access to the information that is stored electronically, which has no identifying information, and it will be destroyed two years from completion of the research study. If you provide your name and phone number for a follow-up interview, this information will be stored in the researcher's home office and will be destroyed within 30 days after the interview.

However, The Oklahoma State University Institutional Review Board has the authority to inspect records and data files to assure compliance with approved procedures.

Participants Rights:

Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time, without penalty.

By participating, you are giving your consent to participate.

APPENDIX E

Demographic Survey and Record Sheet

Demographic Survey

1. What is your gender (check one)? Female Male

2. How old are you? years

3. What is the highest degree that you have completed (check one)?

- High School Diploma Associate's Degree
 Bachelor's Degree Master's Degree
 Doctorate Degree Other, please specify: _____

4. How often do you visit the Grand Canyon? _____

5. What was the primary purpose of your last trip (backpack, rim-to-rim, employment, etc)?

6. Please check the outdoor activities you enjoy.

Trail Running

Ultra Running

Day Hiking

_____ Backpacking

_____ Kayaking/Rafting

_____ Other (specify) _____

7. What else would you like to say about the ideas on the statements you sorted?

A follow-up phone interview may be conducted to clarify results. If you would be willing to participate in a phone interview please write your first name (or a code name that you will know) and a telephone number at which you can be reached.

(CODE) NAME _____ PHONE _____

APPENDIX F

Instructions

Researcher's Script: Directions for Sorting Q Statements

Thank you for agreeing to participate in this study. Please make sure you have the materials in front of you. You should have a Form Board and an envelope containing 34 cards, each with a statement and number. Later you will need a pencil to record your choices.

Step 1: Keeping the following question in mind, read each statement and decide what it means to you:

“What do you consider when thinking about the Grand Canyon backcountry?”

You will be sorting the statements according to whether they are most *like* you or most *unlike* you. Others have found it easiest to begin by sorting all statements into three piles – **most like** you, **most unlike** you, and **no strong feelings**. Place the stack for the most like you on the far right and the most unlike you on the far left.

Step 2: Now that you have three piles of cards, start with the pile to your right (most like) and select two (2) cards from this pile that are *most like* your response to the question and place them in the two (2) spaces at the far right of the Form Board in column 9. The order of the cards within the column (the vertical positioning of the cards) does not matter.

Step 3: From the pile to your left (most unlike) select two (2) cards that are *most unlike* your response to the question and place them in the two (2) spaces at the far left of the Form Board in column 1.

Step 4: Go back to pile on your right and select three (3) cards from those remaining in the most like pile and place them into the three (3) open spaces in column 8.

Step 5: Go back to the pile on your left and select three (3) cards from those remaining in the most unlike pile and place them into the three (3) open spaces in column 2.

Step 6: Working back and forth, continue placing cards onto the Form Board until all of the cards have been placed into all of the spaces.

Step 7: Once you have placed all the cards on the Form Board, feel free to rearrange the cards until the arrangement best represents your opinions.

Step 8: Record the number from each of the statements on the Record Sheet.

Finally, please complete the survey printed on the back of the Record Sheet and add any comments.

Thank you for your participation!

APPENDIX G

Summary of Demographics

| Sort ID | Sex | Age | Highest Education | Annual Visits | Activities |
|-----------------|-----|-----|-------------------|---------------|---------------------|
| FACTOR 1 | | | | | |
| 1 | F | 56 | M | 300 | D,O |
| 3 | F | 58 | B | 4 | D,B,K |
| 5 | M | 73 | B | 1-2 | D,B,O |
| 6 | M | 68 | M | 1 | D,B,O |
| 7 | M | 77 | B | > 1 | D,B,O |
| 8 | F | 77 | H | > 1 | D,B,K,O |
| 15 | F | 39 | M | 5 | T,U,D,B |
| 18 | M | 42 | M | 5 | T,D,B,K,O |
| 20 | M | 60 | A | 1 | D,B,O |
| 24 | M | 64 | H | < 1 | T,U,B,O |
| 25 | M | 58 | A | 1-2 | D,B |
| FACTOR 2 | | | | | |
| 2 | M | 65 | B | >1 | B,K |
| 11 | M | 45 | A | 8 | T,U,D,O |
| 14 | M | ng | M(2) | 12 | D,B,K |
| 19 | M | 32 | B | 4+ | D,B,O |
| 26 | M | 52 | D | 4-7 | T,U,D,B,K,O |
| FACTOR 3 | | | | | |
| 10 | M | 42 | M | 3-5 | T,U,D,B,K |
| 16 | M | 43 | B | 4-6 | T,D,O |
| 17 | F | 36 | D | 3-5 | T,D,B,O |
| 22 | F | 66 | M | 3 | T,U,D,K |
| 23 | M | 60 | B | 3 | T,U,D,B,K |
| OTHER | | | | | |
| 4 | M | 66 | D | 1 | D,B,O |
| 9 | M | 50 | B | 4-6 | D,B,O |
| 12 | F | 45 | B | 8 | T,U,D,O |
| 13 | F | 32 | B | 6 | T,U,D,B |
| 21 | F | 26 | M | 1 | D,B |
| | | | H-High School | | T-Trail Running |
| | | | A-Associate | | D-Day Hiking |
| | | | B-Bachelor | | B-Backpacking |
| | | | M-Master | | U-Ultra Running |
| | | | D-Doctorate | | K-Kayaking, Rafting |
| | | | | | O-Other |

APPENDIX H

Record Sheet Mockups by Factor

Factor 1: Guardian Conservationist:

| | | | | | | | | | |
|---|---|---|---|--|--|---|--|--|-------|
| | | | | | 12. Since day use of the trails has never been regulated, placing a limit now would create much dissension | | | | |
| | | | | 23. The most important part of park management is providing enjoyment and education for visitors = | 24. The popularity of running across the Grand Canyon will increase significantly over the next decade | 8. Increased use of the trails by runners could change the nature of the backcountry forever | | | |
| | | | 11. Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | 20. There are many other places to backpack, but the canyon offers a unique running challenge | 31. Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 32. Running lures many that may not be prepared for the environment | 14. The culture and historical value of the park must be preserved at all costs = | | |
| | 7. National parks were created for unlimited use by any citizen or visitor & should remain that way | 17. The presence of trail runners in the backcountry improves safety for others | 26. The challenge of obtaining a backcountry use permit just adds to the adventure | 30. Neither hikers nor runners should expect ranger assistance due to inadequate planning | 18. No other public land can offer challenges similar to those of the Grand Canyon | 19. Overnight users seeking solitude should use non-corridor trails | 21. There are many other places to run trails, but the canyon offers a unique backpacking experience | | |
| 34. The trails should be shared equally by all with no regulation | 3. The rocky GC trails can sustain an increased visitor load without physical harm | 4. Trail running does not increase physical danger to other users | 25. Park management should find a way to accommodate increased day use | 29. Requiring permits for day use would improve safety in the canyon | 10. NPS policies must keep pace with changing needs and expectations | 5. I would readily accept more stringent access to reduce impact | 2. We should be concerned about our own impact on other visitors = | 22. The most important part of park management is preserving habitat and ecosystems, not | |
| 15. The park is owned by the public and the public should have unlimited access | 16. Personal enjoyment of the backcountry has not been impacted by increased trail activity | 6. Any additional regulation in trail use will only discourage visitors = | 27. Trail running or day hiking is an enjoyment because it is free and easy to plan | 33. Hiking is the best and safest way of experiencing the canyon | 28. The canyon trails were not intended to be used as a race track | 13. Failing to address the increased use of trails from unregulated day use will have significant long-term | 9. Stewardship of the canyon is paramount to personal enjoyment | 1. One of the primary appeals of the backcountry is its solitude | |
| Disagree | | | | | | | | | Agree |
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | | 4 |

Factor 2. Competitive Conservationist

| | | | | | | | | | |
|--|--|---|---|--|--|--|---|--|-------|
| | | | | | 25. Park management should find a way to accommodate increased day use | | | | |
| | | | | 23. The most important part of park management is providing enjoyment and education for visitors = | 9. Stewardship of the canyon is paramount to personal enjoyment | 22. The most important part of park management is preserving habitat and ecosystems, not | | | |
| | | | 13. Failing to address the increased use of trails from unregulated day use will have significant long-term | 17. The presence of trail runners in the backcountry improves safety for others | 3. The rocky GC trails can sustain an increased visitor load without physical harm | 14. The culture and historical value of the park must be preserved at all costs = | 11. Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | | |
| | 32. Running lures many that may not be prepared for the environment | 29. Requiring permits for day use would improve safety in the canyon | 6. Any additional regulation in trail use will only discourage visitors = | 16. Personal enjoyment of the backcountry has not been impacted by increased trail activity | 21. There are many other places to run trails, but the canyon offers a unique backpacking experience | 19. Overnight users seeking solitude should use non-corridor trails | 27. Trail running or day hiking is an enjoyment because it is free and easy to plan | | |
| 26. The challenge of obtaining a backcountry use permit just adds to the adventure | 24. The popularity of running across the Grand Canyon will increase significantly over the next decade | 20. There are many other places to backpack, but the canyon offers a unique running challenge | 7. National parks were created for unlimited use by any citizen or visitor & should remain that way | 4. Trail running does not increase physical danger to other users | 33. Hiking is the best and safest way of experiencing the canyon | 2. We should be concerned about our own impact on other visitors = | 30. Neither hikers nor runners should expect ranger assistance due to inadequate planning | 12. Since day use of the trails has never been regulated, placing a limit now would create much dissension | |
| 5. I would readily accept more stringent access to reduce impact | 8. Increased use of the trails by runners could change the nature of the backcountry forever | 34. The trails should be shared equally by all with no regulation | 10. NPS policies must keep pace with changing needs and expectations | 28. The canyon trails were not intended to be used as a race track | 15. The park is owned by the public and the public should have unlimited access | 31. Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 18. No other public land can offer challenges similar to those of the Grand Canyon | 1. One of the primary appeals of the backcountry is its solitude | |
| Disagree | | | | | | | | | Agree |
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | | 4 |

Factor 3. Compromising Conservationist

| | | | | | | | | | |
|--|---|---|--|--|---|--|---|---|--|
| | | | | 32 . Running lures many that may not be prepared for the environment | | | | | |
| | | | 18 . No other public land can offer challenges similar to those of the Grand Canyon | 11 . Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | 12 . Since day use of the trails has never been regulated, placing a limit now would create much dissension | | | | |
| | | 6 . Any additional regulation in trail use will only discourage visitors = | 30 . Neither hikers nor runners should expect ranger assistance due to inadequate planning | 21 . There are many other places to run trails, but the canyon offers a unique backpacking experience | 14 . The culture and historical value of the park must be preserved at all costs = | 13 . Failing to address the increased use of trails from unregulated day use will have significant long-term | | | |
| | 26 . The challenge of obtaining a backcountry use permit just adds to the adventure | 23 . The most important part of park management is providing enjoyment and education for visitors = | 34 . The trails should be shared equally by all with no regulation | 31 . Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 3 . The rocky GC trails can sustain an increased visitor load without physical harm | 22 . The most important part of park management is preserving habitat and ecosystems, not | 4 . Trail running does not increase physical danger to other users | | |
| 15 . The park is owned by the public and the public should have unlimited access | 5 . I would readily accept more stringent access to reduce impact | 8 . Increased use of the trails by runners could change the nature of the backcountry forever | 33 . Hiking is the best and safest way of experiencing the canyon | 17 . The presence of trail runners in the backcountry improves safety for others | 16 . Personal enjoyment of the backcountry has not been impacted by increased trail activity | 20 . There are many other places to backpack, but the canyon offers a unique running challenge | 25 . Park management should find a way to accommodate increased day use | 2 . We should be concerned about our own impact on other visitors = | |
| 7 . National parks were created for unlimited use by any citizen or visitor & should remain that way | 29 . Requiring permits for day use would improve safety in the canyon | 28 . The canyon trails were not intended to be used as a race track | 27 . Trail running or day hiking is an enjoyment because it is free and easy to plan | 19 . Overnight users seeking solitude should use non-corridor trails | 1 . One of the primary appeals of the backcountry is its solitude | 24 . The popularity of running across the Grand Canyon will increase significantly over the next decade | 10 . NPS policies must keep pace with changing needs and expectations | 9 . Stewardship of the canyon is paramount to personal enjoyment | |
| Disagree | | | | | | | | Agree | |
| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | |

APPENDIX I

Differences Between Factors

Factors 1 and 2

| ID | Statement | Factor 1 | Factor 2 | Difference |
|-----------|--|-----------------|-----------------|-------------------|
| 5 | I would readily accept more stringent access to reduce impact | 0.891 | -1.631 | 2.522 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | 0.973 | -1.267 | 2.239 |
| 32 | Running lures many that may not be prepared for the environment | 0.55 | -1.582 | 2.132 |
| 8 | Increased use of the trails by runners could change the nature of the backcountry forever | 0.477 | -1.497 | 1.974 |
| 24 | The popularity of running across the Grand Canyon will increase significantly over the next decade | 0.071 | -1.518 | 1.588 |
| 26 | The challenge of obtaining a backcountry use permit just adds to the adventure | -0.458 | -1.796 | 1.339 |
| 29 | Requiring permits for day use would improve safety in the canyon | 0.356 | -0.964 | 1.321 |
| 9 | Stewardship of the canyon is paramount to personal enjoyment | 1.219 | -0.006 | 1.225 |
| 22 | The most important part of park management is preserving habitat and ecosystems, not indulging visitors | 1.298 | 0.248 | 1.05 |
| 10 | NPS policies must keep pace with changing needs and expectations | 0.617 | -0.161 | 0.778 |
| 21 | There are many other places to run trails, but the canyon offers a unique backpacking experience | 0.998 | 0.449 | 0.549 |
| 14 | The culture and historical value of the park must be preserved at all costs | 0.831 | 0.314 | 0.516 |
| 28 | The canyon trails were not intended to be used as a race track | 0.675 | 0.159 | 0.516 |
| 1 | One of the primary appeals of the backcountry is its solitude | 2.077 | 1.821 | 0.256 |
| 20 | There are many other places to backpack, but the canyon offers a unique running challenge | -0.633 | -0.795 | 0.161 |
| 33 | Hiking is the best and safest way of experiencing the canyon | 0.457 | 0.467 | -0.009 |
| 2 | We should be concerned about our own impact on other visitors | 1.067 | 1.123 | -0.056 |
| 19 | Overnight users seeking solitude should use non-corridor trails | 0.882 | 1.006 | -0.124 |
| 23 | The most important part of park management is providing enjoyment and education for visitors | -0.687 | -0.52 | -0.167 |
| 25 | Park management should find a way to accommodate increased day use | -0.335 | -0.058 | -0.277 |
| 6 | Any additional regulation in trail use will only discourage visitors | -0.751 | -0.436 | -0.315 |

| | | | | |
|----|--|--------|--------|--------|
| 17 | The presence of trail runners in the backcountry improves safety for others | -1.175 | -0.507 | -0.668 |
| 18 | No other public land can offer challenges similar to those of the Grand Canyon | 0.594 | 1.387 | -0.792 |
| 31 | Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 0.103 | 1.144 | -1.041 |
| 4 | Trail running does not increase physical danger to other users | -0.94 | 0.106 | -1.045 |
| 30 | Neither hikers nor runners should expect ranger assistance due to inadequate planning | 0.242 | 1.335 | -1.093 |
| 7 | National parks were created for unlimited use by any citizen or visitor & should remain that way | -1.521 | -0.342 | -1.179 |
| 34 | The trails should be shared equally by all with no regulation | -1.9 | -0.59 | -1.31 |
| 27 | Trail running or day hiking is an enjoyment because it is free and easy to plan | -0.196 | 1.181 | -1.377 |
| 16 | Personal enjoyment of the backcountry has not been impacted by increased trail activity | -1.428 | 0.072 | -1.5 |
| 3 | The rocky GC trails can sustain an increased visitor load without physical harm | -1.477 | 0.054 | -1.531 |
| 12 | Since day use of the trails has never been regulated, placing a limit now would create much dissension | -0.14 | 1.429 | -1.569 |
| 15 | The park is owned by the public and the public should have unlimited access | -1.554 | 0.489 | -2.044 |
| 11 | Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | -1.182 | 0.886 | -2.068 |

Factors 1 and 3

| ID | Statement | Factor 1 | Factor 3 | Difference |
|-----------|--|-----------------|-----------------|-------------------|
| 5 | I would readily accept more stringent access to reduce impact | 0.891 | -1.263 | 2.153 |
| 29 | Requiring permits for day use would improve safety in the canyon | 0.356 | -1.046 | 1.403 |
| 1 | One of the primary appeals of the backcountry is its solitude | 2.077 | 0.722 | 1.354 |
| 8 | Increased use of the trails by runners could change the nature of the backcountry forever | 0.477 | -0.818 | 1.295 |
| 28 | The canyon trails were not intended to be used as a race track | 0.675 | -0.619 | 1.294 |
| 18 | No other public land can offer challenges similar to those of the Grand Canyon | 0.594 | -0.546 | 1.14 |
| 26 | The challenge of obtaining a backcountry use permit just adds to the adventure | -0.458 | -1.569 | 1.111 |
| 21 | There are many other places to run trails, but the canyon offers a unique backpacking experience | 0.998 | -0.082 | 1.08 |
| 33 | Hiking is the best and safest way of experiencing the canyon | 0.457 | -0.458 | 0.915 |
| 32 | Running lures many that may not be prepared for the environment | 0.55 | -0.31 | 0.859 |
| 19 | Overnight users seeking solitude should use non-corridor trails | 0.882 | 0.065 | 0.818 |
| 30 | Neither hikers nor runners should expect ranger assistance due to inadequate planning | 0.242 | -0.492 | 0.735 |
| 14 | The culture and historical value of the park must be preserved at all costs | 0.831 | 0.389 | 0.442 |
| 7 | National parks were created for unlimited use by any citizen or visitor & should remain that way | -1.521 | -1.901 | 0.38 |
| 15 | The park is owned by the public and the public should have unlimited access | -1.554 | -1.901 | 0.347 |
| 22 | The most important part of park management is preserving habitat and ecosystems, not indulging visitors | 1.298 | 0.953 | 0.345 |
| 23 | The most important part of park management is providing enjoyment and education for visitors | -0.687 | -0.917 | 0.23 |
| 27 | Trail running or day hiking is an enjoyment because it is free and easy to plan | -0.196 | -0.408 | 0.212 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | 0.973 | 0.782 | 0.191 |
| 6 | Any additional regulation in trail use will only discourage visitors | -0.751 | -0.925 | 0.174 |
| 31 | Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 0.103 | -0.067 | 0.17 |
| 12 | Since day use of the trails has never been regulated, placing a limit now would create much dissension | -0.14 | 0.315 | -0.455 |
| 2 | We should be concerned about our own impact on other visitors | 1.067 | 1.738 | -0.672 |
| 10 | NPS policies must keep pace with changing needs and expectations | 0.617 | 1.329 | -0.712 |

| | | | | |
|----|--|--------|--------|--------|
| 9 | Stewardship of the canyon is paramount to personal enjoyment | 1.219 | 1.966 | -0.747 |
| 24 | The popularity of running across the Grand Canyon will increase significantly over the next decade | 0.071 | 1.009 | -0.938 |
| 11 | Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | -1.182 | -0.149 | -1.034 |
| 17 | The presence of trail runners in the backcountry improves safety for others | -1.175 | -0.003 | -1.172 |
| 34 | The trails should be shared equally by all with no regulation | -1.9 | -0.467 | -1.434 |
| 25 | Park management should find a way to accommodate increased day use | -0.335 | 1.246 | -1.581 |
| 20 | There are many other places to backpack, but the canyon offers a unique running challenge | -0.633 | 0.973 | -1.607 |
| 4 | Trail running does not increase physical danger to other users | -0.94 | 1.123 | -2.062 |
| 16 | Personal enjoyment of the backcountry has not been impacted by increased trail activity | -1.428 | 0.686 | -2.114 |
| 3 | The rocky GC trails can sustain an increased visitor load without physical harm | -1.477 | 0.644 | -2.122 |

Factors 2 and 3

| ID | Statement | Factor 2 | Factor 3 | Difference |
|-----------|--|-----------------|-----------------|-------------------|
| 15 | The park is owned by the public and the public should have unlimited access | 0.489 | -1.901 | 2.39 |
| 18 | No other public land can offer challenges similar to those of the Grand Canyon | 1.387 | -0.546 | 1.932 |
| 30 | Neither hikers nor runners should expect ranger assistance due to inadequate planning | 1.335 | -0.492 | 1.828 |
| 27 | Trail running or day hiking is an enjoyment because it is free and easy to plan | 1.181 | -0.408 | 1.589 |
| 7 | National parks were created for unlimited use by any citizen or visitor & should remain that way | -0.342 | -1.901 | 1.559 |
| 31 | Day hikers and runners are normally not as prepared to handle emergencies as are backpackers | 1.144 | -0.067 | 1.212 |
| 12 | Since day use of the trails has never been regulated, placing a limit now would create much dissension | 1.429 | 0.315 | 1.115 |
| 1 | One of the primary appeals of the backcountry is its solitude | 1.821 | 0.722 | 1.098 |
| 11 | Implementing new restrictions for hikers/runners will negatively affect the park's attractiveness | 0.886 | -0.149 | 1.035 |
| 19 | Overnight users seeking solitude should use non-corridor trails | 1.006 | 0.065 | 0.941 |
| 33 | Hiking is the best and safest way of experiencing the canyon | 0.467 | -0.458 | 0.924 |
| 28 | The canyon trails were not intended to be used as a race track | 0.159 | -0.619 | 0.778 |
| 21 | There are many other places to run trails, but the canyon offers a unique backpacking experience | 0.449 | -0.082 | 0.531 |
| 6 | Any additional regulation in trail use will only discourage visitors | -0.436 | -0.925 | 0.489 |
| 23 | The most important part of park management is providing enjoyment and education for visitors | -0.52 | -0.917 | 0.397 |
| 29 | Requiring permits for day use would improve safety in the canyon | -0.964 | -1.046 | 0.082 |
| 14 | The culture and historical value of the park must be preserved at all costs | 0.314 | 0.389 | -0.074 |
| 34 | The trails should be shared equally by all with no regulation | -0.59 | -0.467 | -0.124 |
| 26 | The challenge of obtaining a backcountry use permit just adds to the adventure | -1.796 | -1.569 | -0.228 |
| 5 | I would readily accept more stringent access to reduce impact | -1.631 | -1.263 | -0.368 |
| 17 | The presence of trail runners in the backcountry improves safety for others | -0.507 | -0.003 | -0.504 |
| 3 | The rocky GC trails can sustain an increased visitor load without physical harm | 0.054 | 0.644 | -0.591 |
| 16 | Personal enjoyment of the backcountry has not been impacted by increased trail activity | 0.072 | 0.686 | -0.614 |
| 2 | We should be concerned about our own impact on other visitors | 1.123 | 1.738 | -0.615 |

| | | | | |
|----|--|--------|--------|--------|
| 8 | Increased use of the trails by runners could change the nature of the backcountry forever | -1.497 | -0.818 | -0.679 |
| 22 | The most important part of park management is preserving habitat and ecosystems, not indulging visitors | 0.248 | 0.953 | -0.705 |
| 4 | Trail running does not increase physical danger to other users | 0.106 | 1.123 | -1.017 |
| 32 | Running lures many that may not be prepared for the environment | -1.582 | -0.31 | -1.273 |
| 25 | Park management should find a way to accommodate increased day use | -0.058 | 1.246 | -1.304 |
| 10 | NPS policies must keep pace with changing needs and expectations | -0.161 | 1.329 | -1.49 |
| 20 | There are many other places to backpack, but the canyon offers a unique running challenge | -0.795 | 0.973 | -1.768 |
| 9 | Stewardship of the canyon is paramount to personal enjoyment | -0.006 | 1.966 | -1.972 |
| 13 | Failing to address the increased use of trails from unregulated day use will have significant long-term harm | -1.267 | 0.782 | -2.048 |
| 24 | The popularity of running across the Grand Canyon will increase significantly over the next decade | -1.518 | 1.009 | -2.527 |

VITA

Lynna K Gilstrap

Candidate for the Degree of

Master of Science

Thesis: GRAND CANYON NATIONAL PARK BACKCOUNTRY TRAIL
USERS' PERCEPTIONS OF SAFETY, SOCIAL, PHYSICAL, AND
POLICY IMPACTS FROM AN INCREASING NUMBER OF DAY
USERS

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Date of Degree: July, 2012

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: GRAND CANYON NATIONAL PARK BACKCOUNTRY TRAIL
USERS' PERCEPTIONS OF SAFETY, SOCIAL, PHYSICAL, AND
POLICY IMPACTS FROM AN INCREASING NUMBER OF DAY
USERS

Pages in Study: 72

Candidate for the Degree of Master of Science

Major Field: Environmental Science, Policy and Conflict Management

Scope and Method of Study: The backcountry trails of the Grand Canyon have recently seen a substantial increase in use due to the popularity of rim-to-rim running and other trail running. This increase may or may not have a social, physical, or safety impact requiring changes in policy or management of the park. The purpose of this study is to gain insight from current backcountry trail users into the perceived safety, social, physical, and policy impacts from increased day use. Q methodology was chosen in order to understand subjective perspectives through mutual relationships between participants.

Findings and Conclusions: Three viewpoints were revealed. The first viewpoint is described as Guardian Conservationists. The members within this perspective generally care deeply about stewardship and conservation of the Grand Canyon National Park and are willing to do what is necessary to protect it, even if additional regulation impacts their own use. They are also concerned about their own impact on the enjoyment of others. The second viewpoint is described as Competitive Conservationists. The individuals defining this perspective are primarily interested in the physical challenges and want to be left alone to enjoy the Grand Canyon backcountry as is. They do not envision any growth in use and do not see need for additional regulation. The third viewpoint is described as Compromising Conservationists. The individuals within this perspective are concerned about stewardship of the Grand Canyon National Park and their own impact on the enjoyment of others. They acknowledge that park management needs to address the increased use of the trails, but are reluctant to accept new regulation that will impact the enjoyment of their chosen activities (primarily trail running). This data will be useful for the National Park Service and other interested parties as the Backcountry Management Plan is updated to meet current and future visitor demands while meeting the fundamental purpose of the Grand Canyon National Park.

ADVISER'S APPROVAL: Dr. Lowell Caneday
