

MANAGING THE WILDERNESS EXPERIENCE AT OLYMPIC NATIONAL PARK:
A STUDY OF DAY AND OVERNIGHT VISITORS

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ABSTRACT

As the United States becomes increasingly urbanized, the importance of federally designated wilderness areas as places of reflection and refuge from city life becomes even more apparent. These wilderness areas provide visitors with opportunities for solitude, recreation, and connecting with nature. Wilderness has long been important to American society, influencing the likes of John Muir, Theodore Roosevelt, and Henry David Thoreau. With the passage of the Wilderness Act of 1964, the assurance that these areas would remain protected in perpetuity for the enjoyment of the American people was enshrined into law. While these wilderness areas remain protected by Federal law, increasing visitation rates and changing social norms may begin to threaten the so-called “wilderness experience,” making it difficult for visitors to enjoy and experience the conditions set forth in the Wilderness Act. Wilderness managers must therefore seek to understand the attitudes, preferences, and motivations of wilderness visitors using these areas to ensure that management conditions provide for a high-quality wilderness experience.

This study uses quantitative survey methods to explore differences in management preferences, wilderness conditions, and crowding perceptions between overnight and day visitors to wilderness areas. Visitors were surveyed at 30 trailheads throughout the Olympic National Park Wilderness during the summer of 2012. While wilderness visitors held many similar opinions on management preferences and wilderness conditions, there were differences in the *degree* to which they agreed or disagreed. Overnight visitors tended to be more sensitive to crowding than day visitors, both on hiking trails and at attraction sites, and were more supportive of management policies that limited access in favor of increasing opportunities for solitude experiences. This study supports the use of a management by objectives framework that incorporates indicators and standards of quality to ensure that certain conditions are met. Findings from this study can aid in the development of standards for crowding and the establishment of other management policies in Olympic National Park Wilderness to ensure that all visitors are provided with the opportunity for a high-quality wilderness experience.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
INTRODUCTION	1
Olympic National Park	1
The Wilderness Act of 1964	3
Olympic National Park Wilderness Stewardship Plan.....	4
LITERATURE REVIEW	5
Day and Overnight Visitors	5
The Wilderness Experience	6
Solitude and Primitiveness.....	7
Recreation Carrying Capacity.....	10
Management Frameworks.....	11
The Study	13
STUDY METHODS	13
RESULTS	16
Respondent Characteristics	16
Wilderness Conditions and the Wilderness Experience	17
Perceived Crowding and Wilderness Solitude.....	19
Crowding and Wilderness Trail Encounters	19
Crowding and Coastal Wilderness Attraction Sites: Photos.....	22
Visitor Support for Wilderness Management Policies.....	25

DISCUSSION.....	26
Differences in Visitor Demographics	27
Sensitivity to Crowding	27
Preference for Primitive Conditions	29
Support for Management Policies.....	29
Future Research	30
Limitations	31
CONCLUSION.....	33
REFERENCES	37
APPENDIX: SURVEY.....	71

LIST OF TABLES

Table 1. Completed questionnaires and response rates	46
Table 2. Reliability analysis of wilderness experiences components	47
Table 3. Reliability analysis of wilderness management policies	49
Table 4. Background characteristics of visitors	51
Table 5. Region of residency	52
Table 6. Visitors with Washington residency	53
Table 7. Wilderness trip and visitation history	54
Table 8. Experiencing wilderness as a motivation for visitors' wilderness trip	55
Table 9. Differences in importance of wilderness experience factors	56
Table 10. Experiencing solitude as a motivation for visitors' wilderness trip.....	57
Table 11. Acceptability of visitor encounters on wilderness trails	58
Table 12. Visitor encounter preferences on wilderness trails	59
Table 13. Acceptability of crowding at coastal wilderness attraction sites	60
Table 14. Crowding preferences at coastal wilderness attraction sites.....	61
Table 15. Photo that most accurately depicts the crowding levels experienced.....	62
Table 16. Perceptions of crowding in Olympic National Park wilderness	63
Table 17. Appropriate balance between managing for access and solitude in Olympic National Park wilderness	64
Table 18. Differences in support for wilderness management policy factors.....	65
Table 19. Self-reported familiarity with the legal definition of wilderness.....	66

LIST OF FIGURES

Figure 1. Hypothetical social norm curve.....	67
Figure 2. Coastal wilderness attraction site study photos.....	68
Figure 3. Social norm curve: Acceptability of encounters on wilderness trails	69
Figure 4. Social norm curve: Acceptability of crowding at coastal wilderness attraction sites	70

INTRODUCTION

The purpose of this study is to guide Olympic National Park wilderness managers in providing conditions that maximize the quality of the wilderness experience. More specifically, the study examines similarities and differences between day and overnight visitors. This study uses survey methods to address the following research questions:

1. Does support for more restrictive management policies vary among day and overnight visitors?
2. Is there a difference in sensitivity to crowding between day and overnight visitors?
3. Do overnight visitors prefer more primitive conditions than day visitors?
4. Are there significant demographic differences between day and overnight visitors?

Answering these questions will provide a better understanding of how wilderness conditions affect the quality of the wilderness experience and the degree to which this differs between day and overnight visitors.

Olympic National Park

In response to the concern over the region's disappearing forests, President Grover Cleveland designated much of the Olympic Peninsula of Washington as the Olympic Forest Reserve in 1897. A decade later, in 1909, President Theodore Roosevelt

designated part of the reserve as Mount Olympus National Monument in the hopes of protecting the area's elk, whose population had been reduced to less than two thousand as a result of unregulated hunting (National Park Service, 2003). After visiting the Olympic Peninsula in 1938 and seeing the destructive influences of widespread logging, President Franklin Delano Roosevelt signed the act that created Olympic National Park (Burns & Duncan, 2009). Since its establishment as a national park, Olympic has been designated an International Biosphere Reserve and a World Heritage Site, indicating its national and international significance. In 1988, Congress designated 95% of the park (876,669 acres) as a wilderness area under the provisions of the Wilderness Act of 1964. The wilderness area is one of the most biologically diverse wilderness areas in the United States, with three major ecosystems: a 73-mile long strip of wilderness coastline, an outer ring of temperate rainforests, and the glaciated Olympic Mountains at the park's core (National Park Service, 2013c). Olympic National Park's unique geography has led some to describe it as being "three parks in one" (National Park Service, 2013a).

Because of its natural beauty and proximity to large, urban areas like Vancouver, Portland, and Seattle, the Olympic Wilderness is one of the most popular wilderness areas in North America, with a visitation rate of almost three million visitors in 2012 (National Park Service, 2013b). Roughly 70% of the 43,000 acres of the coastal strip is designated as wilderness. This relatively small portion of Olympic Wilderness receives around 40% of the total overnight wilderness use (National Park Service, 2010). Because of the nature of wilderness day use, specifically the fact that the park does not require day visitors to register and apply for a wilderness permit, it is difficult to keep accurate

visitation numbers. Day use in Olympic Wilderness is significant, however, and likely greatly exceeds overnight use. These consistently high use levels have led to various wilderness management issues, especially in the popular coastal region (National Park Service, 2010).

The Wilderness Act of 1964

Signed into law by President Lyndon B. Johnson, the Wilderness Act of 1964 is arguably one of the most important pieces of legislation regarding the protection of the American landscape. Its passage created the legal definition of wilderness in the United States and established the National Wilderness Preservation System (NWPS), which originally protected over nine million acres as federally designated wilderness. There are currently over 750 wilderness areas in the National Wilderness Preservation System, covering almost 110,000,000 acres, or five percent of the United States (University of Montana, 2013). These NWPS wilderness areas are managed by four federal agencies: the U.S. Forest Service, the National Park Service, the Fish and Wildlife Service, and the Bureau of Land Management. While each agency has different management directives, they are bound by the requirements set forth in the Wilderness Act when managing wilderness areas.

The Wilderness Act defines wilderness as “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” According to the Wilderness Act, wilderness areas in the United States are

required to adhere to four basic criteria: 1) the area must appear to be primarily affected by nature rather than man; 2) the area must provide outstanding opportunities for solitude or a primitive and unconfined type of recreation; 3) the area must be at least 5000 acres, or be of sufficient size to make its preservation practical; and 4) the area must contain features of scenic, educational, or historical value (The Wilderness Act, 1964). While each of these criteria adds to the overall character of wilderness, wilderness managers often have the most control over ensuring the existence of opportunities for solitude or a primitive and unconfined type of recreation.

Olympic National Park Wilderness Stewardship Plan

Superintendents of national park units that contain wilderness resources are required to develop and maintain wilderness stewardship plans to manage these areas (National Park Service, 2006). These plans serve to guide the preservation, management, and use of the wilderness areas within the park boundaries with the ultimate goal of restoring, protecting, and enhancing their wilderness character (National Park Service, 2013d). National Park Service policy requires that wilderness plans must determine desired future conditions and establish indicators and standards (or thresholds) that determine the point at which management actions will be taken to reduce human impact on wilderness resources and the quality of the wilderness experience (National Park Service, 2012). In keeping with this policy, managers at Olympic National Park determined that it was necessary to update the park's outdated 1980 Backcountry

Management Plan with a more up-to-date Wilderness Stewardship Plan (National Park Service, 2013d). This thesis is the result of data collected from wilderness visitors as part of a survey designed to inform the Wilderness Stewardship Plan.

LITERATURE REVIEW

Day and Overnight Visitors

Wilderness visitors can be divided into two major groups: day visitors and overnight visitors. Despite studies showing that day use in many national park units represents an increasing majority of visitation numbers (Watson & Cole, 1999; Chavez, 2000; Taylor, 2000; Abbe & Manning, 2007), wilderness day visitors are often neglected in wilderness management plans (Marion, Roggenbuck, & Manning, 1993; Roggenbuck, Marion, & Manning, 1994). This has the possibility to become problematic to wilderness managers, many of whom report that day use creates unique resource and social impacts in wilderness areas (Abbe & Manning, 2007). Furthermore, some studies have suggested that day visitors may be less knowledgeable about wilderness than their overnight counterparts (Fazio, 1979). Research suggests that day and overnight visitors may hold differing opinions on many issues, including perceived crowding (Cole, 2001; Cole & Hall, 2008), valuation of solitude (Cole & Hall, 2008), management preferences (Vogt & Williams, 1999; Cole, 2001; Cole & Hall, 2008), perceptions of wilderness (Abbe & Manning, 2007), motivations for wilderness use (Papenfuse, Roggenbuck, & Hall, 2000; Cole & Hall, 2008), and expectations and tolerance of wilderness conditions (Cole, 2001;

Cole & Hall, 2008). Each of these issues can influence the overall wilderness experience and has the potential to cause recreational conflict if the preferred conditions and expectations are directly at odds with those of other groups (Roggenbuck, Hall, & Moldovanyi, 2006).

The Wilderness Experience

Wilderness managers responsible for ensuring a high quality wilderness experience among visitors must understand the motivations and expectations of those visiting wilderness areas. Wilderness experience can be viewed as a gauge of enjoyment that can be used to measure the success of a given wilderness visit, as well as a metric that indicates the success of management policies in a wilderness area in adhering to the Wilderness Act. These experiences incorporate social, resource, and management conditions (Hendee, Stankey, & Lucas, 1990), and often differ between individual visitor groups (Lucas, 1980; Shelby & Shindler, 1992) and between managers and visitor groups (Hendee & Harris, 1970; Shindler & Shelby, 1993). While the wilderness experience is greatly affected by on-site conditions and events, the overall recreation experience is more complicated. Research by Clawson and Knetsch (1966) suggested that recreation experiences consist of much more than what occurs at the recreation site; they also include anticipation, travel to and from the site, and recollection. This can both positively and negatively impact the overall wilderness experience, especially if a visitor's anticipated experience and actual experience are at odds (Cole & Williams, 2012).

Many studies have suggested that wilderness experience can be affected by a number of factors, including trail and campsite crowding (Graefe, Vaske, & Kuss, 1984; Manning, 1985; Dawson, Newman, & Fuller, 2000; Dawson & Watson, 2000; Johnson & Dawson, 2001), recreation conflict (Watson, Niccolucci, & Williams, 1993), the state of the natural environment (Hammitt & Madden, 1989), and management policies (Hall & Cole, 2000).

While an individual's wilderness experience is the result of many contributing factors and can differ greatly from person to person, the benefits that stem from experiences in the wilderness are more uniform. Many studies have demonstrated the psychological benefits associated with exposure to natural areas and wilderness areas. These benefits include restoration and recuperation (Kaplan & Kaplan, 1989; Hartig, Mang, & Evans, 1991; Abram, 1996), stress reduction (Ulrich et al., 1991), emotional well-being (Fredrickson & Anderson, 1999; Hinds & Sparks, 2009), personal growth and achievement (Kaplan & Talbot, 1983; Levine, 1994), the forging of group bonds (Fredrickson & Anderson, 1999; Wright and Tolan, 2009), and connecting with nature (Talbot & Kaplan, 1986; Watson & Roggenbuck, 1998).

Solitude and Primitiveness

The experience of solitude and primitiveness has long been considered an important aspect of wilderness areas. The Wilderness Act requires that wilderness areas be managed to provide outstanding opportunities for solitude. In keeping with this management directive, the National Park Service explicitly forbids activities that would

“interfere with...the atmosphere of peace and tranquility in wilderness” (National Park Service, 2006, p. 12). Rather than defining solitude in the traditional sense of the word, being alone where others cannot observe you (Westin, 1967), solitude in wilderness has become more aligned with the concept of privacy, or the ability to freely pick and choose one’s interaction with other groups (Hammitt, 1982; Burger, 1995). This ability to be alone with members of one’s own group is thought to be more important than complete solitude for most wilderness visitors (Lee, 1977; Stankey, 1989). One study (Lawson & Manning, 2001) found that nearly a majority of visitors to Delicate Arch were “solitude oriented,” meaning that they were willing to tolerate reductions in their chances of accessing the iconic arch in exchange for greater opportunities for solitude during their visit.

The ability to experience solitude and primitive recreation in natural areas can be beneficial to visitors in multiple ways. Participants in one study (Long, Seburn, Averill, & More, 2003) described nature as a place where they rarely felt lonely despite being alone, and reported that experiencing solitude in natural areas encouraged spirituality and inner peace. Solitude can provide an opportunity to engage in self-reflection, free from the influence of social pressures (Larson, 1990), and can help individuals find and connect to sources of meaning and value in their lives (Koch, 1994; Barbour, 2004). Additionally, solitude allows individuals the freedom to engage in desired activities (unconfined recreation), while also offering freedom from constraints that often accompany the presence of others (Long & Averill, 2003). There may also be important after-effects of solitude, with some studies showing increased feelings of alertness,

cheerfulness, and strength—essentially fostering a renewing effect on the psyche of an individual (Larson, Csikszentmihalyi, & Graef, 1982). Nevertheless, while solitude is a valuable component of the wilderness experience, there is evidence that it may not be the most important factor in having an “authentic” wilderness experience (Cole & Hall, 2008).

While solitude is an important aspect of the wilderness experience and something that wilderness managers are mandated to provide, there is evidence that the primitiveness or naturalness of an area is of more importance to wilderness visitors (Shafer & Hammitt, 1995). Like solitude, wilderness managers are explicitly required to manage wilderness areas to provide opportunities for primitive and unconfined recreation. The Wilderness Recreation Opportunity Spectrum (WROS) defines a primitive area as being an “essentially unmodified, natural environment” where “concentrations of visitors are low” and “evidence of human use is minimal.” Primitive wilderness areas also have “high opportunities for isolation, solitude, exploration, risk, and challenge” (Arthur Carhart, n.d., p. 3). Drawing on the writings of the so called “wilderness fathers,” Roggenbuck (2004, p. 22) defines a primitive wilderness experience as one that represents “living/eating/sleeping/traveling/playing in a simple, unguided, multiday, nonmotorized, nonmechanized, nonelectronic, and nonfacilitated way.” Essentially, Roggenbuck posits, a primitive wilderness experience is one that provides “immediate and deep contact with raw nature without the clutter and aid of modern conveniences” (p. 22).

Recreation Carrying Capacity

Visitors to wilderness areas who seek opportunities for solitude may quickly find their wilderness experience negatively impacted by unacceptable levels of crowding on trails, at campsites, and at popular attraction sites like waterfalls and scenic vistas.

Managers often refer to this issue as the “visitor carrying capacity” of wilderness when dealing with visitor use levels and crowding. Visitor carrying capacity is defined as “the type and level of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of a park” (National Park Service, 1997, p. 8). Natural resource managers have long applied the concept of carrying capacity to wildlife, fisheries, and habitat management, where carrying capacity refers to the number of animals that a specific area can support (Manning & Anderson, 2012).

While this idea was first applied to visitor management in recreation settings as a way to determine the total number of recreationists a given area could support before its natural resources became degraded (Meinecke, 1928; Bates, 1935), it was expanded to include the social aspects of the overall recreation experience when Wagar (1964, p. iii) argued that “the resource-oriented point of view must be augmented by consideration of human values” when determining the ideal recreation carrying capacity. This would eventually lead to the emergence of the three dimensions of recreation carrying capacity, a threefold framework, which added a managerial aspect to the resource and social components already in place.

Management Frameworks

Issues of managing wilderness experience and solitude have led to the development of several management frameworks, including the Recreation Opportunity Spectrum (ROS) (Clark & Stankey, 1979), and the Wilderness Recreation Opportunity Spectrum (WROS) (Arthur Carhart, n.d.), and Visitor Experience and Resource Protection (VERP) (National Park Service, 1997; Manning 2011). The Recreation Opportunity Spectrum (ROS) is an important experiential framework that serves to inform planners, managers, and researchers. The principle purpose behind the ROS framework is to ensure a diversity of recreation opportunities in parks and outdoor recreation (Clark & Stankey, 1979). Similarly, the WROS provides managers with a framework through which to ensure a diversity of opportunities for solitude and isolation from other visitors. Using standards for environmental, social, and managerial components (the threefold framework), the WROS guides managers in categorizing and managing natural areas as one of four classes: Pristine, Primitive, Semi-Primitive, and Transition (Arthur Carhart, n.d.). The VERP framework deals primarily with issues of carrying capacity, with the goal of determining the impact of various visitor uses on visitor experience and park resources by exploring things like visitor behavior, use levels, types of use, timing of use, and location of use (National Park Service, 1997).

The VERP framework applies an indicators and standards based management strategy to determine the appropriate levels and types of use for a given setting. This framework first requires the establishment of management objectives. Management

objectives are statements that describe desired conditions for a given recreation setting. These objectives outline resource conditions, recreation experiences, and the type and intensity of onsite management (Manning & Anderson, 2012). Once management objectives are established, indicators and standards of quality are determined to achieve these objectives. Indicators of quality are manageable variables that reflect the meaning of the management objective and serve as empirical measures for managers to determine the quality of the recreation experience. Standards of quality are the minimum acceptable conditions of indicator variables (Manning, 2011). Once these variables have been established, indicators of quality are monitored to evaluate the effectiveness of management actions and ensure that the standards of quality are consistently met.

One way that standards of quality can be determined is by using norm curves to graph the acceptability of a range of conditions for indicator variables (Figure 1). In this norm curve, mean acceptability ratings for encountering increasing numbers of visitor groups on wilderness trails are plotted. The resulting curve can serve as an important tool for managers to determine standards of quality for a number of wilderness management issues and consists of several significant features. The points on the curve above zero, where ratings fall from acceptable to unacceptable, make up the range of acceptable conditions. While visitor group encounters remain in the acceptable range, conditions are more or less representative of a high quality wilderness experience. The highest point on the curve, or the crowding range representing the most acceptable number of encounters, is called the “optimum condition.” The “minimum acceptable condition” is the point at which the norm curve changes from positive to negative and the ratings change from

acceptable to unacceptable (Manning, 2011). Once the norm curve has been plotted, managers may choose a point on the curve to use as a standard of quality.

The Study

While most wilderness managers are generally aware of the effects their management decisions have on the experience of visitors, better understanding the differences between day and overnight visitors allows managers to make more informed decisions. This study used quantitative survey methods to examine differences between day and overnight visitors on a range of wilderness issues, including management preferences, attitudes, and crowding perceptions on wilderness trails and at attraction sites.

STUDY METHODS

A questionnaire was developed and administered to wilderness visitors at Olympic National Park. The questionnaire was developed to collect information to help inform the Olympic National Park Wilderness Stewardship Plan and consisted of four sections: wilderness trip characteristics, which included questions regarding motivations, group characteristics, and experiential wilderness characteristics; wilderness solitude, which included questions about the acceptability of a range of encounter levels on trails and at attraction sites; wilderness management, where visitors were asked to rate their

support of a range of wilderness management policies; and wilderness visitor characteristics, where visitors were asked demographic questions and questions about their previous experience visiting wilderness areas. The data collected from this survey allowed for an analysis of the differences between day and overnight visitors on a range of wilderness issues.

At least two surveyors were employed throughout the field season, allowing for sampling at multiple trailheads each day. Sampling occurred on 60 days from July to September, 2012 at 30 wilderness trailheads that NPS staff classified as moderate to high use areas. Each trailhead was sampled at least twice, once during the week and once on a weekend. Visitors were intercepted at trailheads as they completed their hike and asked to participate in the survey. All members of groups over 18 years of age who agreed to participate were given a questionnaire. Visitors completed the self-administered questionnaire on-site and returned the completed questionnaire to the survey attendant. The overall response rate for the study was 50.4%, yielding a total of 1019 completed questionnaires (Table 1).

Respondents were given 34 questions about a range of wilderness conditions and instructed to indicate the extent to which each would add or detract from the quality of their wilderness experience using a response scale of -3 (would detract a lot) to +3 (would add a lot). A principal component analysis was used to reduce the amount of data being analyzed by grouping the 34 questions into six broad factors (Table 2). These factors represent a more comprehensive description of wilderness conditions examined in

the questionnaire and allow for a more reliable analysis by reducing the total number of variables. The resulting factors include “Seeing Park Personnel and Human-Made Structures,” “Presence of Signs and Development,” “Seeing and Hearing Technological Gadgets,” “Fees, Regulations, and Permits,” “Evidence of Pack Stock Use,” and “Crossing Streams Using Maintained Infrastructure.” A Cronbach alpha reliability analysis was employed to ensure consistency within the factors, using 0.65 as the lowest acceptable alpha (Vaske, 2008). Eight of the questions did not fit into any factors. However, it was decided that results from these items would add to the study and the items were analyzed independently.

Wilderness visitors were given 33 statements about a range of wilderness management policies and instructed to indicate the extent to which they supported or opposed each using a response scale of -2 (strongly oppose) to +2 (strongly support). A principal component analysis was used to group these 33 questions into eight broad factors (Table 3). These factors represent a more comprehensive description of the range of wilderness management policies examined in the questionnaire and allow for a more reliable analysis by reducing the total number of data sets. The resulting factors include “Limiting Group Size,” “Conducting Research in Wilderness Areas,” “Restricting Stock Use in Wilderness Areas,” “Employing Wilderness Camping Regulations, Fees, and Permits,” “Employing Campsite Restrictions,” “Measures to Ensure Resource and Wildlife Protections,” “Requiring Specialty Bags for Human Waste,” and “Not Having Bridges and Footlogs on Maintained Trails.” A Cronbach alpha reliability analysis was employed to ensure consistency within the factors, using 0.65 as the lowest acceptable

alpha. Five of the policies did not fit into any of the generated factors and were analyzed independently.

Respondents were also asked to rate the acceptability of various crowding levels, both on wilderness trails and at wilderness attraction sites. Visual simulations in the form of study photos (Figure 2) were used on coastal trails to represent a range of use levels at a coastal wilderness attraction site. Photos were also used on mountain and rainforest trails, but the number of people at one time (PAOT) represented in each photo varied from trail to trail, which made comparisons between surveys impossible. Visitors were asked to reference the study photos when answering questions about crowding at attraction sites. The photos represented five different use levels ranging from zero PAOT to twelve PAOT. Mean responses were then analyzed using t-tests to determine whether significant differences existed between day and overnight visitors. The mean responses were also plotted and norm curves were created.

RESULTS

Respondent Characteristics

The sex of respondents was predominantly male (54%) (Table 4). Overnight visitors were predominantly male (63.2%), while day visitors were almost evenly split (50.4% females versus 49.6% males). Respondents had an average age of approximately 42 years, with overnight visitors being significantly younger than day visitors (35 years

and 44 years, respectively). Nearly all respondents identified as neither Hispanic nor Latino (94.3%) and white (92.1%). Although both day and overnight visitors were predominantly white (85% and 95.4%, respectively) and neither Hispanic nor Latino (91.16% and 95.8%, respectively), overnight visitors were significantly more diverse than day visitors. Respondents were also highly educated (almost three-fourths of respondents had completed a four-year college degree or higher). While the majority of visitors were from the western United States (Table 5) and were residents of Washington State (60.1%), overnight visitors were significantly more likely to be a resident of Washington than day visitors (70.9% and 54.6%, respectively) (Table 6).

The vast majority of respondents (93.5%) had previously visited wilderness areas before their trip to Olympic (Table 7), with 40% of them going on wilderness trips two to five times per year. Respondents had visited over 15 other wilderness areas on average, and had visited the wilderness of Olympic National Park over 15 times.

Wilderness Conditions and the Wilderness Experience

Experiencing wilderness was important to many visitors. More than 80% of visitors listed experiencing wilderness as a motivation for their trip. Overnight visitors (85.5%) were significantly more likely to list experiencing wilderness as a motivation than day visitors (78%) (Table 8). More than one fourth of visitors (25.2%) viewed experiencing wilderness as the most important purpose of their trip. Overnight visitors (32%) were significantly more likely to hold this view than day visitors (22%).

Wilderness visitors were asked about their opinions on a number of wilderness conditions. Mean responses, representing the extent to which each condition would add or detract from the wilderness experience, were calculated and t-tests were used to compare the average responses between day and overnight visitors (Table 9). It is clear from the data that wilderness visitors prefer that recreation resources be somewhat developed, even in wilderness areas. For example, respondents rated crossing streams using maintained infrastructure as adding the most to their wilderness experience (mean rating of 1.04). This was significantly more positive for day visitors than overnight visitors (mean ratings of 1.08 and 0.95, respectively). Visitors also rated traveling cross country/off-trail (0.52) as adding to their wilderness experience. It added significantly more to the wilderness experience of overnight visitors (0.82) than day visitors (0.38). The presence of privies and toilets (0.58), seeing park personnel and human-made structures (0.53), fording (wading) streams (0.39), seeing areas closed for restoration (0.37), and the presence of signs and camp infrastructure (0.28) also added to the wilderness experience of respondents, although there were no significant differences between day and overnight visitors.

Although visitors may prefer somewhat developed recreation resources, the data suggests that they generally want wilderness resources to remain in a wild state. Respondents rated seeing/hearing technological gadgets (-1.78) as detracting most from their wilderness experience, followed by evidence of pack stock use (-0.8). Overnight visitors were significantly more affected by evidence of pack stock use (-0.99) than day visitors (-0.71). Wilderness visitors also rated seeing wildlife with radio collars, ear tags,

or other markings (-0.6), crossing streams on steel bridges (-0.59), and seeing visitor-created paths around campsites (-0.54) as having a negative impact on their wilderness experience. Overnight visitors (-0.84) were significantly more negatively affected by crossing streams on steel bridges than day visitors (-0.47). The presence of downed logs across trails (-0.24) and fees, regulations, and permits (-0.07) had a slightly negative impact on their overall wilderness experience.

Perceived Crowding and Wilderness Solitude

Experiencing solitude was important to many visitors (Table 10). More than 40% of visitors listed experiencing solitude as a motivation for their trip. Overnight visitors (50%) were significantly more likely to list experiencing solitude as a motivation than day visitors (36%). While experiencing solitude was viewed as the most important purpose of the trip to just over three percent of wilderness visitors, overnight visitors (4.6%) were significantly more likely to hold this view than day visitors (2.2%).

Crowding and Wilderness Trail Encounters

Visitors to wilderness trails were asked to rate the acceptability of a series of ten statements representing a range of use levels on wilderness trails. Using a response scale of -4 (highly unacceptable) to +4 (highly acceptable), visitors rated the acceptability of encountering other hikers. Mean responses were calculated for each question (Table 11)

and were plotted to form the social norm curves shown in (Figure 3). One norm curve is based on data for all respondents while the other two are for day and overnight visitors.

It is clear from the data and associated norm curves that, after a certain point, wilderness visitors generally tend to view increasing numbers of visitors as increasingly unacceptable. For all respondents, encountering two other hikers per day was rated as most acceptable (mean rating equaled 2.44). Encountering four other hikers per day was the second most acceptable option (2.39). Both of these encounter levels were rated higher than not encountering any other hikers (2.18), which suggests that wilderness visitors may feel uneasy being completely alone in wilderness areas. Encountering 80 other hikers per day was rated as least acceptable (-2.71), with overnight visitors (-3.02) rating it as significantly less acceptable than day visitors (-2.56). The norm curve for all respondents crossed the neutral line of the evaluation scale at approximately 25 encounters. This may be a good standard of quality as it is the point at which respondent evaluations cross out of the acceptable range and into the unacceptable range (i.e., it is the minimum acceptable condition). It is also clear that day use visitors are more tolerant of higher use levels; day visitors rated encountering 10, 20, 30, 40, 60, and 80 other hikers per day as significantly more acceptable than overnight visitors. Moreover, the point at which the norm curves for day and overnight visitors cross the neutral point of the evaluation scale is approximately 25 and 20 hikers encountered, respectively.

Visitors were asked several other questions about encounter levels on trails. First, they were asked which encounter level best represented the number of hikers they would

prefer to encounter per day. Respondents reported that they would prefer to encounter an average of just over 10 hikers per day (Table 12) and there was no significant difference between day and overnight visitors. Second, visitors were asked to record the maximum number of hikers they could encounter per day before they would no longer use the wilderness trails. Of those who reported a maximum encounter threshold, an average of just over 92 other hikers per day was reported. There was no statistically significant difference between day and overnight visitors. Respondents were given the opportunity to report that none of the levels represented a high enough level of use that would cause them to no longer use the trails. Although 36% of visitors chose this response option, day visitors (39%) were significantly more likely to hold this opinion than overnight visitors (29%).

Finally, visitors were asked to record the maximum number of hikers encountered per day that should be allowed on wilderness trails. Of those who chose an encounter level, an average of approximately 90 visitors was reported. There was a significant difference between day visitors (approximately 120 hikers) and overnight visitors (approximately 62 hikers). Respondents were able to report that none of the levels represented a high enough level of encounters to warrant the NPS restricting use. A majority of all respondents (65%) chose this option, but there was a significant difference between day and overnight visitors; 74% of day visitors and 46% of overnight visitors.

Crowding at Coastal Wilderness Attraction Sites: Photos

Visitors to coastal wilderness trails were asked to rate the acceptability of a series of five photos showing a range of use levels at a coastal attraction site (Figure 2). The response scale ranged from -4 (“highly unacceptable”) to +4 (“highly acceptable”). Mean responses were calculated for each photo (Table 13) and were plotted to form the social norm curves shown in Figure 4. One norm curve is based on data for all respondents while the other two are for day and overnight visitors.

It is clear from the data and associated norm curves that wilderness visitors tend to view increasing numbers of visitors as increasingly unacceptable. For example, for all respondents, the photo showing no visitors was rated as most acceptable (mean rating equaled 3.22) and the photo showing the highest number of visitors (12 visitors) was rated as the least acceptable (-0.8). The norm curve for all respondents crossed the neutral line of the evaluation scale at approximately 9 visitors. This may be a good standard of quality as it is the point at which respondent evaluations cross out of the acceptable range and into the unacceptable range (i.e., it is the minimum acceptable condition). It is also clear that day use visitors are more tolerant of higher use levels; day use visitors rated seeing six, nine, and twelve visitors as significantly more acceptable than overnight visitors. Moreover, the point at which the norm curves for day and overnight visitors cross the neutral point of the evaluation scale is approximately 10 and 8 people at one time, respectively.

Visitors were asked several other questions about the photographs. First, they were asked the number of visitors they would prefer to see at one time at a wilderness coastal attraction site. Respondents reported that they would prefer to encounter an average of just over three other visitors at one time (Table 14). However, there was a statistically significant difference between day and overnight visitors; day use visitors preferred to see approximately three visitors while overnight visitors preferred to see approximately four other visitors at one time.

Next, visitors were asked to choose the photo that best represented the maximum number of people seen at one time before they would no longer visit the site. Of those who chose a photo, an average of 10 visitors was reported and there was no statistically significant difference between day and overnight visitors. Respondents were given the opportunity to report that none of the photos represented a use level high enough to cause them to no longer visit the area. A majority of all respondents (63%) reported that none of the photos showed a high enough number of visitors that would cause them to no longer visit this area. However, a significantly lower percentage of overnight visitors (45%) than day users (72%) chose this response option.

Finally, visitors were asked which photo best represented the maximum number of visitors the NPS should allow at attraction sites. Of those who chose a photo, an average of approximately eight visitors was reported but there was no significant difference between day and overnight visitors. Respondents were allowed to report that none of the photos showed a high enough number of visitors to warrant the NPS

restricting the level of use. Roughly one third of the sample (34.12%) chose this option, but there was a significant difference between day and overnight visitors, with 28% of overnight visitors holding this opinion and 38% of day visitors. Respondents were also given the option to report that park management should not restrict visitation to the site. Roughly one third of the sample (34.45%) chose this option, but there was a significant difference between day and overnight visitors, with over 27% of overnight visitors holding this opinion and over 31% of day visitors.

Finally, visitors were asked which photograph most accurately depicted the number of people typically seen while visiting wilderness attraction sites on their trip (Table 15). Just over 42 percent of overnight visitors to coastal attraction sites reported the second photo (three PAOT) as most accurately depicting the crowding levels experienced, while around 41 percent of day visitors reported the third photo (six PAOT).

Visitors were also asked to report how crowded they felt on the day they completed the survey (Table 16). The nine-point response scale ranged from 1 (“not at all crowded”) to 9 (“extremely crowded”). The average score for the sample as a whole was 2.41 (between “not crowded” and “slightly crowded”) and there was no significant difference between day and overnight visitors.

Finally, visitors were asked about the appropriate balance between managing wilderness to maximize access versus providing opportunities for solitude (Table 17). The four-point response scale ranged from “do not restrict use to manage for solitude anywhere in the wilderness, even if use is heavy” to “manage for solitude everywhere in

the wilderness, even though this may mean that use will be restricted and people will be turned away.” The average score for all respondents was 2.03 (“manage for solitude along a few wilderness trails”). However, there was a significant difference between day and overnight visitors with the former reporting an average score of 1.9 and the latter reporting an average score of 2.2.

Visitor Support for Wilderness Management Policies

Wilderness visitors were asked about their opinions on a number of wilderness management policies. Mean responses, representing the extent to which visitors supported or opposed the management actions, were calculated and t-tests were used to compare the average responses between day and overnight visitors (Table 18).

Wilderness visitors were generally supportive of the management policies included in the questionnaire. They were most supportive of providing the opportunity to obtain wilderness permits online (1.19) and placing toilets in high use areas (1.12). They were also supportive of limiting the number of permits available to commercial operators (0.99), conducting research in wilderness areas (0.96), implementing measures to ensure resource and wildlife protection (0.93). There were no significant differences between day and overnight visitors for these policies. Respondents were also supportive of employing wilderness camping regulations, fees, and permits (0.9), and employing campsite restrictions (0.66). Overnight visitors (1.02) were significantly more supportive of employing wilderness camping regulations, fees, and permits than day visitors (0.84).

Overnight visitors (0.78) were also significantly more supportive of employing campsite restrictions than day visitors (0.60). Wilderness visitors slightly supported restricting stock use in wilderness areas (0.38) and requiring specialty bags for human waste (0.33). Day visitors (0.42) were significantly more supportive of requiring specialty bags for human waste than overnight visitors (0.16). Visitors barely supported leaving cross-country routes and unofficial trails off published maps (0.08).

Wilderness visitors opposed prohibiting campfires throughout the entire wilderness (-0.46) and the absence of bridges and footlogs on maintained trails (-0.39). Day visitors (-0.46) were significantly more opposed to the absence of bridges and footlogs on over water crossings on maintained trails than overnight visitors (-0.25).

Visitors were also asked to rate their familiarity with the legal definition of wilderness. Overnight visitors were significantly more familiar with the legal definition of wilderness than day visitors, with 21% of overnight visitors responding “I think I know a lot about the legal definition of wilderness” compared to 15.4% of day visitors (Table 19).

DISCUSSION

Understanding the motivations and attitudes of wilderness visitors is vital to the success of wilderness management. This study sought to understand the motivations and attitudes of wilderness visitors to Olympic National Park and to determine if there were

differences between day and overnight visitors. Resulting information allows for a better understanding of the people most affected by management policies and supports more informed management decisions.

Differences in Visitor Demographics

Overnight visitors were almost two-thirds male and almost ten years younger than their day use counterparts. Although the vast majority of wilderness visitors were white, overnight visitors tended to be more racially and ethnically diverse than day visitors. These demographic differences between visitors groups are especially important to wilderness managers. Multiple studies have suggested that ethnicity and race both impact the way that people recreate and interact with their environment (Carr and Williams, 1993; Floyd and Shinew, 1999; Cordell, Green, and Betz, 2002; Covelli, Graefe, and Dong, 2007). These findings, coupled with the increasing popularity of wilderness recreation and the rapidly changing racial makeup of the United States (U.S. Census Bureau, 2012) will undoubtedly change the way wilderness managers view their management directive.

Sensitivity to Crowding

Overnight visitors were more sensitive to density than day visitors. Overnight visitors reported feeling significantly more crowded at lower encounter levels than day

visitors, and reported higher levels of crowding as being significantly more unacceptable than day visitors. This trend holds true for both wilderness trails and coastal wilderness attraction sites. Additionally, day visitors were significantly more inclined to support allowing higher numbers of hikers on wilderness trails and at coastal wilderness attraction sites. Day visitors were also significantly more likely to continue hiking wilderness trails and visiting coastal attraction sites regardless of the number of hikers encountered and hold the belief that wilderness managers should not restrict visitation numbers.

These findings may be linked to motivations for visiting the Olympic National Park Wilderness. Overnight visitors were more likely than day visitors to select “experiencing the wilderness” or “experiencing solitude” as motivations for visitation, and more likely to select these motivations as the most important purpose of their trip. Because lower encounter levels can be used as indicators of solitude, wilderness visitors who seek to experience solitude would likely find higher levels of encounters more unacceptable than those who are less interested in opportunities for solitude. Similarly, people who visit wilderness areas to experience wilderness would be more likely to seek out areas with fewer hikers, and would subsequently be more likely to find higher levels of visitor encounters unacceptable. In keeping with this trend, overnight visitors were more likely than day visitors to support wilderness management plans that emphasized solitude over access.

Preference for Primitive Conditions

Day and overnight wilderness visitors generally held similar opinions about primitive conditions in wilderness. Responses suggested that wilderness visitors were not necessarily interested in having a purely primitive wilderness experience; seeing signs, certain types of infrastructure, and human-made structures generally added to the visitor experience. This could be attributed to the rise in popularity (Cordell, Betz, & Green, 2008) and increasing ease of access to visiting wilderness areas by less specialized recreationists who may not view so-called “pristine” wilderness areas as the ideal recreation setting or entirely necessary for a “genuine” wilderness experience.

Support for Management Policies

Day and overnight wilderness visitors generally held similar opinions towards wilderness management policies, and were both generally supportive of the implementation of these policies. While significant differences sometimes existed between the *degree* to which each group supported or opposed management policies, neither group was significantly more supportive overall of restrictive management policies than the other. Day and overnight visitors disagreed on one management policy, limiting group size; however, this disagreement was not significant. Overnight visitors were significantly more supportive than day visitors of using wilderness camping regulations, fees, and permits; and campsite restrictions. Since overnight visitors are more

affected by adverse camping conditions than day visitors, they may view management intervention more favorably in order to ensure high-quality conditions.

Day visitors were significantly more opposed than overnight visitors to the absence of bridges and footlogs over some water crossings on maintained trails. This supports the findings of previous studies (Cole, 2001; Abbe & Manning, 2007; Cole & Hall, 2008) that demonstrated the differences in expectations of wilderness conditions between the two groups. This finding is important to management because it illustrates the variation in preferences between day and overnight visitors.

Future Research

While this study suggests that some important differences between visitor groups exist, it stops short of exploring the possible reasons for these differences. Future research should address this topic, with additional attention being given to the characteristics of respondents in order to provide managers with greater information about the preferences and expectations of wilderness visitors. Additionally, using the data to explore differences between male and female wilderness visitors and local and non-local wilderness visitors could elicit beneficial information regarding wilderness management in Olympic National Park. Replicating this study at other national park wilderness areas, as well as wilderness areas under the jurisdiction of the other federal land managing agencies, may result in beneficial information regarding differences in wilderness visitors and their opinions towards wilderness management policies across

agencies. Additionally, a longitudinal study that assesses whether visitor perceptions and attitudes toward crowding and primitive conditions shift over an extended period of time would be beneficial to see the degree to which societal changes affect wilderness attitudes.

Limitations

There are several potential limitations of this study. The sheer size of Olympic National Park and the different ecosystems within its boundaries made this a difficult study. Visitors were surveyed at coastal, alpine, and forested sites. Because of the distinctive differences between these three ecosystems, it may be difficult to confidently draw conclusions across all visitors. Overnight visitors to coastal wilderness areas, for instance, may feel differently about crowding than those visiting forested areas because of the variance in geography and perception of space.

Another potential confounding factor is the lack of distinction between coastal attraction sites and other attraction sites throughout the park. Because the photographs used to depict attraction sites at the three ecosystems in which visitors were surveyed represented different use densities, it was impossible to compare crowding across all ecosystems. Additionally, low sample sizes for mountain and rainforest attraction sites made analysis of these sites impossible.

Attempting to survey the vast number of visitors at dozens of sites throughout the park to ensure a representative sample created a challenge with limited time and resources. This sample consisted of visitors to a given trail on a given day. While each trail was surveyed a minimum of two days, the sample may not be fully representative of all visitors to Olympic National Park that summer. Six trailheads were classified as “low use” by park managers, receiving around one visitor per day or less. Because of limited resources, it was not practical to survey at these sites and, therefore, they were not included in this study. Additionally, some trails were closed during the duration of the survey period. Both of these omissions could potentially affect the results of this study by excluding visitors who seek out solitude and only visit extremely low use trails or only recreate on certain trails.

The response rate of 50.4% is another possible limitation. Although the response rate for this questionnaire was lower than other studies (Begly, Manni, Eury, & Le, 2013; Kulesza, Le, & Hollenhorst, 2012; Kulesza, Gramann, Le, & Hollenhorst, 2012; Papadogiannaki, Le, & Hollenhorst, 2011; Blotkamp, Meldrum, Morse, & Hollenhorst, 2010), the demographic data are similar across these studies. The response rate, however, is somewhat misleading due to the nature of the study: depending on the survey site, response rates ranged from 100% to less than 35%.

CONCLUSION

To effectively manage for high quality wilderness experiences, managers should consider the motivations of wilderness visitors. The data from this study will help inform the wilderness stewardship plan at Olympic National Park in multiple ways. This study found that important differences between day and overnight visitors do indeed exist. These differences show that day and overnight wilderness visitors hold different motivations, attitudes, and preferences towards wilderness conditions, wilderness experience, and management policies. The data identify policies, conditions, and regulations that are important or beneficial to visitors, thereby providing wilderness managers with the information necessary to ensure the opportunity for a high-quality wilderness experience. Additionally, the data identify standards of quality for crowding on wilderness trails and at wilderness attraction sites, thereby providing wilderness managers with the information necessary to fulfill their responsibility mandated by the Wilderness Act of 1964 to manage for solitude. Incorporating these findings into the wilderness stewardship plan may help to enhance visitors' wilderness experience and will ensure that a representative spectrum of wilderness opportunities is available for wilderness visitors.

This study demonstrates the need for wilderness managers to offer a spectrum of wilderness recreation opportunities for wilderness visitors. Because there is a demonstrated diversity of values for wilderness recreation, the National Park Service should offer a diversity of wilderness recreation opportunities. One way to ensure that a

spectrum of opportunities is available for visitors is to institute a wilderness zoning plan using the ROS framework. While a form of de facto zoning naturally tends to occur in wilderness areas—more remote or inaccessible areas tend to have lower visitation rates, and those who do visit tend to be overnight visitors rather than day visitors—further formalization is needed as evolving technologies allow wilderness recreationists to extend their reach and increase their traveling distance. Zoning wilderness areas based on types of use, size of parties, and overall visitor density would ensure that those who seek a solitary recreation experience would find one, while also allowing opportunities for visitors who seek a more group oriented experience. Crowding is a universal concern but manifests itself in different ways. Therefore, crowding must be measured in different ways based on the context. Crowding at an attraction site, for example, is different from crowding on a hiking trail. When quantifying crowding at an attraction site, people at one time (PAOT) is a better measure than total number of encounters because of the nature of the setting. Likewise, total number of encounters more accurately depicts crowding on hiking trails because of the fluid nature of hiking trails and the difficulty of establishing PAOT on a given stretch of trail. Using PAOT as a measure in this setting would be inappropriate, as it would likely result in a misleading and unrepresentative number.

This research supports a management by objectives framework that incorporates indicators and standards of quality to ensure that certain conditions are met. Findings from this study can aid in the development of standards for crowding and the establishment of other management policies in Olympic National Park Wilderness to ensure that all visitors are provided with the opportunity for a high-quality wilderness

experience. By considering the differences between various visitor groups and providing these groups with a spectrum of wilderness recreation opportunities, wilderness managers would meet their management directive set forth in the Wilderness Act of 1964, and provide for a diversity of recreation opportunities.

Most importantly, the data show that visitors to the wilderness areas of Olympic National Park care about their recreational experience and want managers to ensure that these experiences are positive. Both day and overnight visitors consistently supported management policies that served to promote and protect their wilderness experience and the wilderness resources within the park. However, it is necessary to note the complexities inherent in the valuation of these wilderness resources. It is clear that the way visitors view wilderness in the 21st century is changing. While the Wilderness Act established guidelines by which wilderness lands must be managed, it is possible that a disconnect exists between the original ideals of that legislation, those tasked with managing wilderness, and the visitors recreating in these areas. This study suggests that wilderness visitors may be less interested in the criteria set forth in the original legislation and more interested in a more managed, developed setting in which to recreate. Opinions have evolved and are likely to continue to do so. Visitors to Olympic National Park wilderness areas may be less affected by evidence of humankind during their visit than Howard Zahniser and his contemporaries were in the 20th century. This evolution towards wilderness in the 21st century should be recognized and appreciated by wilderness managers; while it may not change their management directive in a legal sense, it may

force them to reevaluate the way they protect and preserve these areas for future generations.

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Table 1. Completed questionnaires and response rates

<i>Visitor Type</i>	<i>Completed Questionnaires</i>	<i>Response Rate</i>
Overnight	325	52.10%
Day	694	49%
All	1019	50.40%

Table 2. Reliability analysis of wilderness experience components

	<i>N</i>	<i>Mean (M)</i>	<i>Std. dev. (SD)</i>	<i>Item Total Correlation</i>	<i>Alpha If Item Deleted</i>	<i>Cronbach Alpha</i>
Factor 1.1: Seeing Park Personnel and Human-Made Structures						0.78
Encountering a wilderness ranger	958	0.69	1.25	0.43	0.77	
Seeing shelters (three-sided structures)	958	-0.04	1.21	0.412	0.77	
Seeing historic buildings (e.g., cabins)	958	0.98	1.27	0.518	0.75	
Seeing research equipment (e.g., weather stations)	958	0.11	1.07	0.522	0.75	
Seeing park staff spraying exotic, invasive plants	958	-0.22	1.41	0.38	0.78	
Seeing park staff engaged in research and monitoring activities	958	0.79	1.20	0.672	0.72	
Seeing park staff working in wilderness	958	0.96	1.19	0.641	0.73	
Factor 1.2: Signs and Development						0.77
Seeing directional signs inside the wilderness at trail junctions	955	1.08	1.41	0.554	0.72	
Seeing signs identifying landscape features or destinations in the wilderness (e.g., lakes, cabins, mountain passes)	955	0.58	1.51	0.57	0.72	
Seeing wilderness boundary marker signs	955	0.38	1.30	0.554	0.72	
Seeing well defined campsites in the wilderness	955	0.11	1.51	0.634	0.70	
Seeing a lot of bare ground around campsites	955	-0.96	1.48	0.355	0.77	
Presence of bear wires in campsites for hanging food	955	0.39	1.53	0.411	0.76	
Factor 1.3: Seeing/Hearing Technological Gadgets						0.76
Seeing/hearing aircraft	969	-1.54	1.12	0.568	0.70	
Seeing/hearing people using electronic devices (e.g., cell phones, GPS, etc.)	969	-1.78	1.18	0.572	0.70	
Seeing/hearing chainsaws or other motorized equipment	969	-2.08	1.11	0.599	0.69	
Seeing/hearing motor boats	969	-1.46	1.22	0.561	0.70	
Seeing trees damaged by campers	969	-2.07	1.09	0.345	0.78	

Factor 1.4: Fees, Regulations, and Permits						0.75
Not being allowed to have a campfire in specific areas	979	-0.02	1.49	0.485	0.72	
Overnight permit requirement	979	0.23	1.48	0.663	0.62	
Being required to camp at designated sites	979	0.01	1.61	0.594	0.65	
Paying a fee to access park trailheads	979	-0.46	1.58	0.429	0.75	
Factor 1.5: Use of Pack Stock						0.83
Seeing pack stock animals	985	-0.67	1.22	0.704	-	
Seeing evidence of pack stock animal use	985	-0.95	1.22	0.704	-	
Factor 1.6: Crossing Streams Using Maintained Infrastructure						0.65
Crossing streams on a footlog (downed log with handrail)	978	1.13	1.21	0.476	-	
Crossing streams on wood bridge	978	0.95	1.27	0.476	-	

Means are based on a scale of -3 "would detract a lot" to 3 "would add a lot."

Table 3. Reliability analysis of wilderness management policies

	<i>N</i>	<i>Mean (M)</i>	<i>Std. dev. (SD)</i>	<i>Item Total Correlation</i>	<i>Alpha If Item Deleted</i>	<i>Cronbach Alpha</i>
Factor 2.1: Limiting Group Size						0.79
Limit number of day use visitors in specific high use areas	920	0.13	1.22	0.61	0.74	
Limit number of overnight visitor throughout entire wilderness	920	-0.01	1.16	0.60	0.74	
Limit party size for day users	920	-0.13	1.21	0.63	0.72	
Make cross-country party size smaller than trail travel party size	920	0.14	0.99	0.57	0.76	
Factor 2.2: Conducting Research in Wilderness Areas						0.82
Research should be allowed in wilderness	942	1.41	0.68	0.52	0.81	
It's acceptable to tag animals (e.g., place collars on elk) for research purposes	942	1.06	0.91	0.67	0.77	
It's acceptable to use colored tape to mark locations for research purposes	942	0.93	0.96	0.71	0.75	
It's acceptable to place installations (e.g., weather recorders) for research purposes	942	1.04	0.86	0.76	0.74	
It's acceptable to use helicopters for research purposes	942	0.34	1.19	0.49	0.84	
Factor 2.3: Wilderness Camping Regulations, Fees, and Permits						0.72
Assign parties to specific campsites	936	-0.06	1.20	0.45	0.69	
Provide reservations for areas with limits on overnight camping	936	0.75	1.07	0.53	0.66	
Require visitors to obtain wilderness permits at Wilderness Information Centers	936	0.7	1.11	0.54	0.66	
Require all overnight users to watch pre-trip leave-no-trace video	936	-0.15	1.27	0.41	0.71	
Collect overnight wilderness fees to help fund wilderness projects	936	0.71	1.10	0.51	0.67	

Factor 2.4: Restricting Stock Use in Wilderness Areas						0.88
Restrict stock camping to designated stock camps	943	1	0.97	0.78	0.81	
Close some trails to stock	943	0.99	0.98	0.83	0.77	
Close subalpine areas to stock camping	943	0.7	1.04	0.69	0.90	
Factor 2.5: Campsite Restrictions						0.78
Close overused campsites	916	0.31	1.23	0.53	0.75	
Prohibit campfires at areas with little down wood	916	0.67	1.16	0.62	0.70	
Restrict group camping (greater than 6 people) to designated group camps	916	0.73	1.21	0.56	0.73	
Limit number of overnight visitors in specific high use areas	916	0.94	1.03	0.61	0.71	
Factor 2.6: Resource and Wildlife Protection						0.67
Revegetate impacted areas	945	1.25	0.81	0.40	0.68	
Require canisters for food storage in wildlife problem areas	945	1.17	0.94	0.63	0.38	
Require canisters for food storage throughout entire wilderness	945	0.38	1.14	0.47	0.63	
Factor 2.7: Specialty Bags for Human Waste						0.78
Provide specialty bags for carrying out personal human waste	949	0.46	1.07	0.64	-	
Require use of specialty bags for carrying out personal human waste	949	0.19	1.22	0.64	-	
Factor 2.8: Placing Bridges and Footlogs on Maintained Trails						0.75
Place no bridges or footlogs over some water crossings on high use, maintained trails	965	-0.57	1.06	0.59	-	
Place no bridges or footlogs over some water crossings on low use, maintained trails	965	-0.21	1.09	0.59	-	

Means are based on a scale of -2 "strongly oppose" to 2 "strongly support."

Table 4. Background characteristics of visitors

	<i>All Visitors</i>	<i>Overnight Visitors</i>	<i>Day Visitors</i>
Sex			
Male (Percent)	54	63.2	49.6
Female (Percent)	46	36.8	50.4
N	957	310	647
Std. Dev.	0.49	0.48	0.5
p-value	-	<0.001	
Age			
Mean	41.67	35.47	44.68
N	970	316	654
Std. Dev.	14.05	12.78	15.16
p-value	-	<0.001	
Ethnicity			
Hispanic or Latino (Percent)	5.7	8.84	4.2
Not Hispanic or Latino (Percent)	94.3	91.16	95.8
N	562	181	381
p-value	-	0.032	
Race			
American Indian or Alaska Native (Percent)	0.9	2	0.3
Asian (Percent)	4.5	6.33	3.6
Black or African American (Percent)	0.4	0.33	0.5
Native Hawaiian (Percent)	2.1	6.33	0.2
White (Percent)	92.1	85	95.4
N	933	300	633
p-value	-	<0.001	
Education			
Less than high school (Percent)	0.6	1.6	0.2
Some high school (Percent)	1.1	1.3	1
High school graduate (Percent)	4.6	5.5	4.2
Vocational/trade school certificate (Percent)	2	1.3	2.4
Some college (Percent)	9	5.5	10.7
Two-year college degree (Percent)	9.1	10.7	8.3
Four-year college degree (Percent)	39.2	42.7	37.4
Master's Degree (Percent)	24.4	22.5	25.3
Ph.D., M.D., J.D., or equivalent (Percent)	10	8.8	10.6
N	932	307	625
p-value	-	0.17	

Table 5. Region of residency

<i>Region</i>	<i>Frequency of responses (in percent)</i>		
	<i>All Visitors</i>	<i>Overnight Visitors</i>	<i>Day Visitors</i>
Northeast	4.8	2.3	6.2
South	8.5	3	11.4
Midwest	9.3	6.7	10.7
West	77.2	88.3	71.5
N	903	306	597

Table 6. Visitors with Washington residency

	<i>Frequency of responses (in percent)</i>		
	<i>All</i>	<i>Overnight</i>	<i>Day</i>
WA	60.1	70.9	54.6
N	543.0	184	359
p-value	-	<0.001	

Table 7. Wilderness trip and visitation history

	All Visitors	Overnight Visitors	Day Visitors
Have you ever been to a wilderness area before this trip?			
No (Percent)	6.5	8.6	5.5
Yes (Percent)	93.5	91.4	94.5
N	964	315	649
p-value	-	0.097	
How often have you gone on wilderness trips?			
Less than once a year (Percent)	10.7	5.9	13.1
Once a year (Percent)	20.8	18.8	21.8
2-5 times a year (Percent)	40	43.6	38.4
6-10 times a year (Percent)	13.9	14.6	13.5
More than 10 times a year (Percent)	14.5	17.1	13.2
N	884	287	597
p-value	-	0.006	
How many other wilderness areas have you visited?			
Mean	15.7	15.6	15.8
N	808	261	547
Std. Dev.	47.3	48.5	46.7
p-value	-	0.96	
How many times have you been to the wilderness of Olympic National Park?			
Mean	15.57	15.04	15.85
N	824	285	539
Std. Dev.	61.09	39.39	69.96
p-value	-	0.85	

Table 8. Experiencing wilderness as a motivation for visitors' wilderness trip

	All Visitors	Overnight Visitors	Day Visitors
Experiencing wilderness as a motivation for this wilderness trip	80.6	85.5	78.2
N	1019	325	694
p-value	-	0.004	
Experiencing wilderness as the <i>most important</i> purpose of this wilderness trip	25.2	32.3	21.9
N	1019	325	694
p-value	-	<0.001	

Table 9. Differences in importance of wilderness experience factors

	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	
Factor 1.1: Seeing Park Personnel and Human-Made Structures	997	0.53	0.85	318	0.46	0.92	679	0.56	0.81	0.093
Factor 1.2: Signs and Camp Infrastructure	1003	0.28	1.01	320	0.25	1.04	683	0.29	1.00	0.581
Factor 1.3: Seeing/Hearing Technological Gadgets	998	-1.78	0.83	318	-1.78	0.84	680	-1.78	0.82	0.961
Factor 1.4: Fees, Regulations, and Permits	998	-0.07	1.17	320	-0.16	1.20	678	-0.23	1.15	0.09
Factor 1.5: Use of Pack Stock	996	-0.80	1.12	318	-0.99	1.21	678	-0.71	1.07	<0.001
Factor 1.6: Crossing Streams with Maintained Infrastructure	992	1.04	1.08	318	0.95	1.02	674	1.08	1.11	0.064
Seeing User-Created Paths Around Campsites	989	-0.54	1.17	318	-0.54	1.15	671	-0.54	1.17	0.986
Presence of Privies/Toilets	995	0.58	1.51	319	0.52	1.56	676	0.60	1.49	0.4
Crossing Streams on Steel Bridge	984	-0.59	1.62	317	-0.84	1.64	667	-0.47	1.60	0.001
Fording (Wading) Streams	972	0.39	1.41	315	0.43	1.38	657	0.37	1.42	0.531
Traveling Cross-County/Off-Trail	964	0.52	1.48	312	0.82	1.53	652	0.38	1.44	<0.001
Seeing Areas Closed For Restoration	992	0.37	1.39	319	0.40	1.44	673	0.35	1.37	0.592
Seeing Wildlife with Radio Collars, Ear Tags, or Other Markings	987	-0.60	1.19	317	-0.59	1.17	670	-0.60	1.21	0.947
Presence of Downed Logs Across Trails	984	-0.24	1.32	318	-0.29	1.34	666	-0.21	1.31	0.37

Means are based on a scale of -3 "would detract a lot" to 3 "would add a lot."

Table 10. Experiencing solitude as a motivation for visitors' wilderness trip

	All Visitors	Overnight Visitors	Day Visitors
Experiencing solitude as a motivation for this wilderness trip	40.7	50.2	36.6
N	1019	325	694
p-value	-	<0.001	
Experiencing solitude as the <i>most important</i> purpose of this wilderness trip	3.4	4.6	2.2
N	1019	325	694
p-value	-	0.031	

Table 11. Acceptability of visitor encounters on wilderness trails

	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	
0	943	2.18	2.19	314	2.28	2.16	629	2.13	2.20	0.311
2	937	2.44	1.89	312	2.44	1.91	625	2.44	1.88	0.996
4	940	2.39	1.77	312	2.33	1.76	628	2.41	1.78	0.519
6	940	2.15	1.81	310	2.01	1.84	630	2.22	1.80	0.086
10	954	1.53	1.92	316	1.33	1.95	638	1.63	1.90	0.022
20	953	.32	2.10	316	-0.2	2.03	637	0.49	2.12	<0.001
30	953	-.70	2.17	315	-1.23	2.02	638	-0.45	2.20	<0.001
40	945	-1.55	2.15	313	-1.97	2.00	632	-1.35	2.19	<0.001
60	948	-2.23	2.03	313	-2.61	1.87	635	-2.04	2.19	<0.001
80	941	-2.71	1.89	312	-3.02	1.74	629	-2.56	1.94	<0.001

Means are based on a scale of -4 "highly unacceptable" to 4 "highly acceptable"

Table 12. Visitor encounter preferences on wilderness trails

	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>	
Preferred number of hikers encountered per day	879	10.26	8.36	285	9.9	14.19	594	10.43	15.62	0.356
Maximum number of hikers encountered per day before no longer using trails*	645	92.65	557.85	233	103.72	657.35	412	86.39	493.56	0.705
“I would continue to hike these trails regardless of the number of hikers encountered.”	363	36.01	0.479	96	29.17	0.457	267	39.32	0.487	0.005
Maximum number of hikers encountered per day that should be allowed on wilderness trails**	326	90.48	160.91	168	62.33	60.02	158	120.41	219.13	0.002
“The number of hikers on this trail should not be restricted.”	602	64.84	0.492	143	45.98	0.497	459	74.39	0.474	<0.001

*Respondents were given the option: “I would continue to hike these trails regardless of number of hikers encountered.”

**Respondents were given the option: “The number of hikers on these trails should not be restricted.”

Table 13. Acceptability of crowding at coastal wilderness attraction sites*

<i>People at one time</i>	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	
0	349	3.22	1.56	124	3.25	1.55	225	3.21	1.56	0.814
3	347	2.69	1.48	123	2.58	1.54	224	2.76	1.45	0.275
6	342	1.66	1.72	120	1.24	1.87	222	1.88	1.58	0.001
9	334	0.17	2.13	116	-0.49	2.21	218	0.52	2.00	<0.001
12	334	-0.80	2.34	116	-1.48	2.26	218	-0.44	2.31	<0.001

*Unable to test differences in responses for forest or mountain trails

Responses are based on a scale of -4 "highly unacceptable" to 4 "highly acceptable"

Table 14. Crowding preferences at coastal wilderness attraction sites*

	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	
Preferred number of people seen at wilderness attraction site	323	3.77	3.56	117	3.18	3.51	206	4.11	3.54	0.02
Maximum number of people seen before no longer visiting site	128	10.1	2.81	67	9.76	3.10	61	10.48	2.43	0.15
“None of the photographs are so unacceptable that I would no longer visit the site”	211	62.24	0.482	54	44.63	0.499	157	72.02	0.449	<0.001
Maximum number of people that should be allowed to visit site at one time	106	8.21	2.53	61	7.92	2.39	45	8.60	2.68	0.18
“None of the photographs show a high enough number of people to restrict visitation to this site”	115	34.12	0.486	26	21.67	0.412	89	41.01	0.499	<0.001
“The number of people visiting should not be restricted”	116	34.45	0.476	33	27.5	0.447	83	31.75	0.487	<0.001

*Unable to test differences in responses for forest or mountain attraction sites

Table 15. Photo that most accurately depicts the crowding levels experienced

<i>Visitor Type</i>	<i>Frequency of responses (in percent)</i>					<i>N</i>
	<i>Photo 1</i>	<i>Photo 2</i>	<i>Photo 3</i>	<i>Photo 4</i>	<i>Photo 5</i>	
Overnight	5.26	42.11	25.56	13.53	13.53	133
Day	3.31	33.7	41.44	17.68	3.87	181

Table 16. Perceptions of crowding in Olympic National Park wilderness

	Frequency of responses (in percent)		
	All Users	Overnight Users	Day Users
1: Not at all crowded	1.7	5.1	0
2: Not crowded	28.9	23.2	31.6
3: Slightly crowded	36.8	35.7	37.3
4: A little crowded	13.1	14.3	12.5
5: Somewhat crowded	8.2	7	8.8
6: Moderately crowded	3.9	5.7	3.1
7: Very crowded	5.8	7	5.2
8: Highly crowded	1	1	1.1
9: Extremely crowded	0.6	1	0.5
N	963	314	649
Mean	2.41	2.51	2.37
Std. Dev.	1.55	1.68	1.48
p-value	-		0.216

Table 17. Appropriate balance between managing for access and solitude in Olympic wilderness

	<i>Frequency of responses (in percent)</i>		
	<i>All Visitors</i>	<i>Overnight Visitors</i>	<i>Day Visitors</i>
Do not restrict use to manage for solitude	22.2	11.9	27
Manage for solitude along a few wilderness trails	55	53.8	55.6
Manage for solitude on most wilderness trails	20.9	31	16.1
Manage for solitude everywhere in wilderness	1.9	3.3	1.3
N	943	303	640
Mean	2.03	2.2	1.9
Std. Dev.	0.71	0.7	0.69
p-value	-	<0.001	

Table 18. Differences in support for wilderness management policy factors

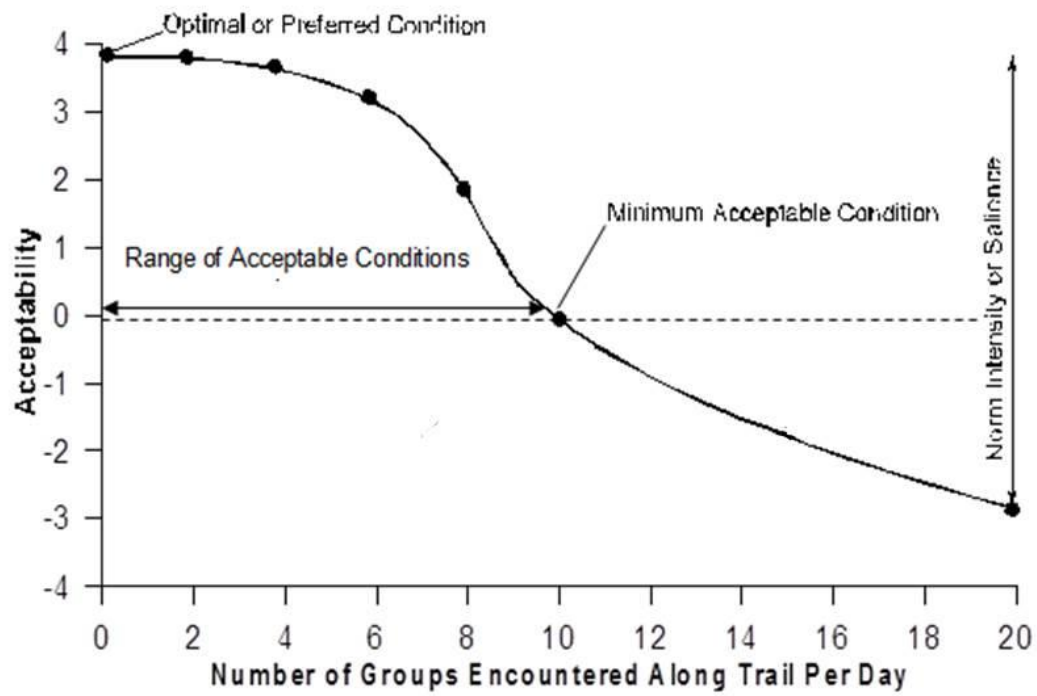
	<i>All Visitors</i>			<i>Overnight Visitors</i>			<i>Day Visitors</i>			<i>p-value</i>
	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	
Factor 2.1: Limiting Group Size	962	0.03	0.90	314	0.11	0.89	648	-0.01	0.90	0.07
Factor 2.2: Conducting Research in Wilderness Areas	952	0.96	0.71	313	1.02	0.70	639	0.93	0.72	0.071
Factor 2.3: Restricting Stock Use in Wilderness Areas	962	0.38	0.80	315	0.37	0.77	647	0.39	0.81	0.727
Factor 2.4: Wilderness Camping Regulations, Fees, and Permits	951	0.90	0.89	313	1.02	0.91	638	0.84	0.88	0.003
Factor 2.5: Campsite Restrictions	981	0.90	0.78	319	0.99	0.82	662	0.86	0.76	0.014
Factor 2.6: Resource and Wildlife Protection	957	0.93	0.76	314	0.89	0.77	643	0.94	0.76	0.33
Factor 2.7: Specialty Bags for Human Waste	956	0.33	1.04	314	0.16	1.09	642	0.42	1.00	<0.001
Factor 2.8: Not Having Bridges and Footlogs on Maintained Trails	967	-0.39	0.96	315	-0.25	0.93	652	-0.46	0.96	0.001
Leave Cross-Country Routes and Unofficial Trails Off Published Maps	949	0.08	1.19	313	0.12	1.29	636	0.06	1.14	0.472
Provide Opportunity to Obtain Wilderness Permits Online	957	1.19	0.97	313	1.27	1.00	644	1.15	0.95	0.062
Limit Number of Reserved Permits Available to Commercial Operators	949	0.99	1.07	310	1.03	1.09	639	0.97	1.06	0.492
Place Toilets in High Use Areas	953	1.12	0.89	313	1.14	0.89	640	1.12	0.89	0.742
Prohibit Campfires Throughout Entire Wilderness	945	-0.46	1.23	313	-0.56	1.29	632	-0.41	1.20	0.93

Means are based on a scale of -2 "strongly oppose" to 2 "strongly support."

Table 19. Self-reported familiarity with the legal definition of wilderness

Frequency of responses (in percent)

<i>Visitor Type</i>	<i>I have no idea</i>	<i>I have heard of wilderness areas</i>	<i>I know a little bit</i>	<i>I think I know a lot</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>p-value</i>
All	12.4	30.3	40	17.2	934	2.62	0.91	-
Overnight	11.1	28.2	39.7	21	305	2.7	0.05	0.05
Day	13	31.3	40.2	15.4	629	2.58	0.04	



Adapted from Manning, 2011

Figure 1. Hypothetical social norm curve

Study Photos

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Figure 2: Coastal wilderness attraction site study photos

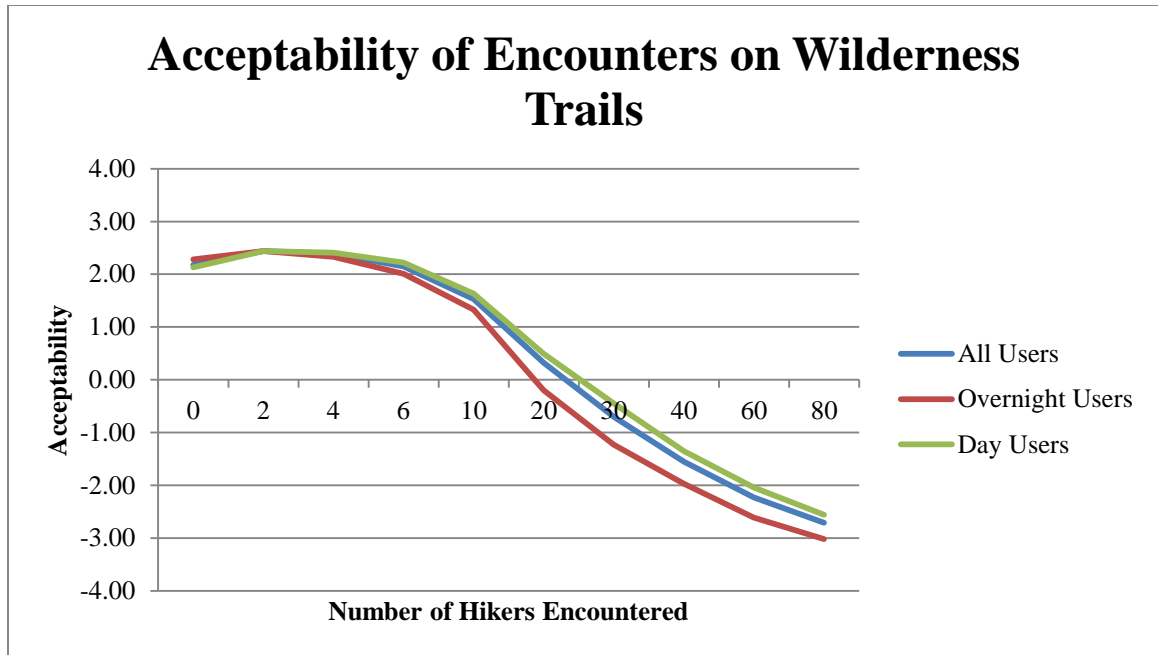


Figure 3. Social norm curve: Acceptability of encounters on wilderness trails

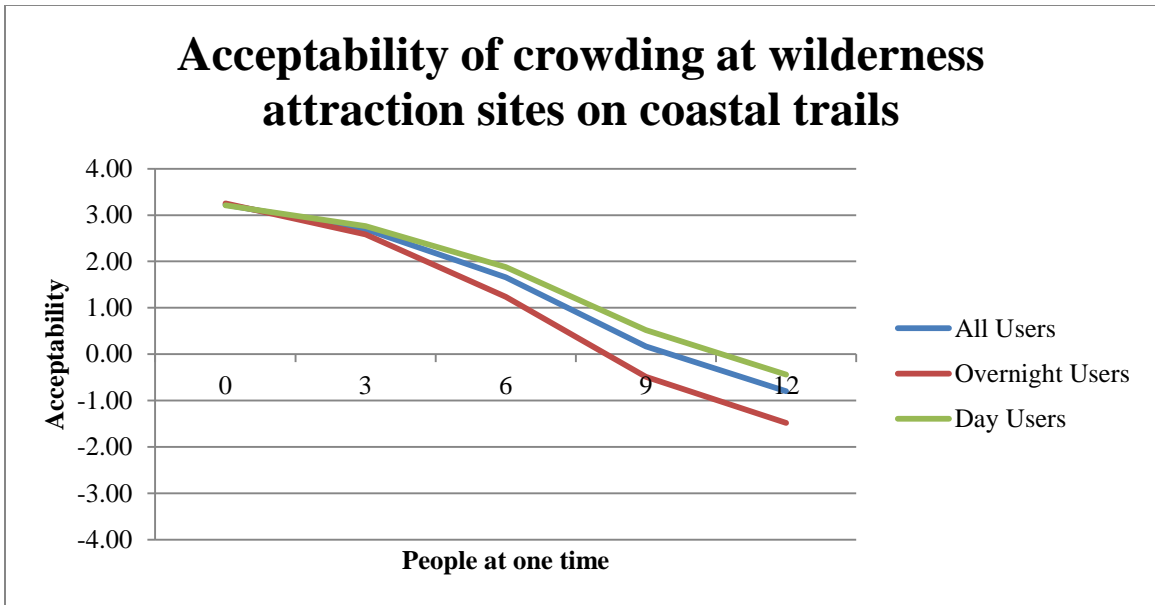


Figure 4. Social norm curve: Acceptability of crowding at wilderness attraction sites

OLYMPIC NATIONAL PARK WILDERNESS VISITOR SURVEY

Day Visitors



ID: _____ DATE: _____

GROUP ID: _____ PHOTOS: _____

Paperwork Reduction Act Statement: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. We will use this information to understand the quality of visitor experiences in the park, visitor characteristics and use patterns. This information will be incorporated into the park's efforts to prepare a Wilderness Stewardship Plan. Your responses are voluntary and completely anonymous. A Federal agency may not conduct or sponsor and you are not required to respond to, a collection of information unless it displays a currently valid OMB Control Number and expiration date.

BURDEN ESTIMATE STATEMENT: We estimate that it will take an average of 15 minutes to complete this questionnaire. Please direct any comments that you have concern this collection to Jennifer Chenoweth, Wilderness Planning Specialist, Olympic National Park Port Angeles, WA 98362; Jennifer.chenoweth@nps.gov (email).

OMB CONTROL NUMBER 1024-0224
Expiration Date: 8/31/2014

Olympic National Park is preparing a Wilderness Stewardship Plan for the park. You are being asked to participate in this survey because you are using the **wilderness** portion of the park. Most of Olympic National Park (about 95%) has been designated **wilderness** which means that the area should be managed to retain its natural character and provide visitors a high quality **wilderness** experience, including opportunities for solitude. Your participation in this survey will help the National Park Service prepare a plan that meets the needs of visitors like you. Thank you for your help.

I. WILDERNESS TRIP CHARACTERISTICS

This section of the questionnaire asks about your trip in the wilderness of Olympic National Park on the day you were contacted about this survey.

1. How many hours did you spend in the wilderness? _____
2. How many people (including yourself) are in your group? _____
3. What was your primary destination on this trip? _____
- 4a. What were the purposes for going on this wilderness trip? (*Mark all that apply.*)
 - Photography
 - Camp out
 - Observe wildflowers
 - Observe wildlife
 - Physical challenge
 - Fishing
 - Horseback riding
 - Get out of the city
 - Get away from normal routine
 - Be with family/friends
 - Experience wilderness
 - Enjoy the scenery
 - Climbing
 - Experience solitude
 - See Pacific Ocean
 - Group outing
 - Other (Please specify: _____)
- b. Please circle the most important purpose of this wilderness trip.

- 5a. Did you travel into the wilderness with pack stock animals?
- Yes
 - No (*Skip to question 6.*)
- b. What type of stock animals did you use? (*Mark all that apply.*)
- Horse
 - Mule
 - Burro
 - Llama
 - Other (Please specify: _____)

II. THE WILDERNESS EXPERIENCE

This section of the questionnaire asks for your thoughts and opinions about a wilderness experience at Olympic National Park.

6. Indicate the extent to which each of the following would add or detract from the quality of your wilderness experience in Olympic National Park. (*Circle one number for each item.*)

Item:	Effect on WILDERNESS experience						
	Would Detract			No	Would Add		
	A Lot	A Little		Effect	A Little	A Lot	
Signs and camp areas							
Seeing directional signs inside the wilderness at trail junctions	-3	-2	-1	0	+1	+2	+3
Seeing signs identifying landscape features or destinations in the wilderness (e.g., lakes, cabins, mountain passes)	-3	-2	-1	0	+1	+2	+3
Seeing wilderness boundary marker signs	-3	-2	-1	0	+1	+2	+3
Seeing well defined campsites in the wilderness	-3	-2	-1	0	+1	+2	+3
Seeing a lot of bare ground around campsites	-3	-2	-1	0	+1	+2	+3
Presence of bear wires in campsites for hanging food	-3	-2	-1	0	+1	+2	+3
Trails and Water Crossings							
Fording (wading) streams	-3	-2	-1	0	+1	+2	+3
Crossing streams on a footlog (downed log with handrail)	-3	-2	-1	0	+1	+2	+3
Crossing streams on wood bridge	-3	-2	-1	0	+1	+2	+3
Crossing streams on steel bridge	-3	-2	-1	0	+1	+2	+3
Traveling cross-country/off-trail	-3	-2	-1	0	+1	+2	+3
Presence of downed logs across trails	-3	-2	-1	0	+1	+2	+3
Visitor Use Management							
Not being allowed to have a campfire in specific areas	-3	-2	-1	0	+1	+2	+3
Overnight permit requirement	-3	-2	-1	0	+1	+2	+3
Being required to camp at designated sites	-3	-2	-1	0	+1	+2	+3
Paying a fee to access park trailheads	-3	-2	-1	0	+1	+2	+3
Presence of privies/toilets	-3	-2	-1	0	+1	+2	+3
Seeing areas closed for restoration	-3	-2	-1	0	+1	+2	+3

Item:	Effect on WILDERNESS experience							
	Would Detract			No	Would Add			
	A Lot	A Little		Effect	A Little	A Lot		
Sights and Sounds								
Seeing/hearing aircraft	-3	-2	-1	0	+1	+2	+3	
Seeing/hearing people using electronic devices (e.g., cell phones, GPS, etc.)	-3	-2	-1	0	+1	+2	+3	
Seeing/hearing chainsaws or other motorized equipment	-3	-2	-1	0	+1	+2	+3	
Seeing wildlife with radio collars, ear tags, or other markings	-3	-2	-1	0	+1	+2	+3	
Encountering a wilderness ranger	-3	-2	-1	0	+1	+2	+3	
Seeing/hearing motor boats on the coast	-3	-2	-1	0	+1	+2	+3	
Seeing user-created paths around campsites	-3	-2	-1	0	+1	+2	+3	
Seeing trees damaged by campers	-3	-2	-1	0	+1	+2	+3	
Seeing pack stock animals or evidence of pack stock animal use	-3	-2	-1	0	+1	+2	+3	
Seeing shelters (three-sided structures)	-3	-2	-1	0	+1	+2	+3	
Seeing historic buildings (e.g., cabins)	-3	-2	-1	0	+1	+2	+3	
Seeing research equipment (e.g., weather stations)	-3	-2	-1	0	+1	+2	+3	
Seeing park staff spraying exotic, invasive plants	-3	-2	-1	0	+1	+2	+3	
Seeing park staff engaged in research and monitoring activities	-3	-2	-1	0	+1	+2	+3	
Seeing park staff working in wilderness	-3	-2	-1	0	+1	+2	+3	

III. WILDERNESS SOLITUDE

This section of the questionnaire asks about the meaning and importance of solitude in the wilderness of Olympic National Park.

- 7a. We would like to know how many hikers per day you think it is acceptable to see on the wilderness trails you hiked today without feeling too crowded. Please rate the acceptability of encountering each of the following numbers of hikers per day on the wilderness trails you used today. A rating of “-4” means the number of hikers encountered per day is highly unacceptable, and a rating of “+4” means the number of hikers encountered per day is highly acceptable. (Circle one rating for each of the numbers of other hikers encountered per day.)

Number of hikers encountered per day on wilderness trails	Highly	Very	Moderately	Slightly	Neutral	Slightly	Moderately	Very	Highly
		Unacceptable					Acceptable		
No other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
2 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
4 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
6 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
10 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
20 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
30 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
40 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
60 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
80 other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4
100 or more other hikers	-4	-3	-2	-1	0	+1	+2	+3	+4

- b. What is the number of hikers per day that you would prefer to encounter along the wilderness trails you hiked today?

Preferred number of hikers encountered per day: _____

- c. What is the maximum number of hikers you think you could encounter per day before you would no longer hike the wilderness trails that you used today? If you would continue to hike these trails regardless of the number of hikers, you may indicate that.

Maximum number of hikers encountered per day before you would no longer use these wilderness trails: _____

OR

- I would continue to hike these wilderness trails regardless of the number of hikers I encountered.

- d. What is the maximum number of hikers encountered per day that you think the National Park Service should allow on the wilderness trails you used today? In other words, at what point do you think visitors should be restricted from hiking these trails? If you think the number of hikers on these wilderness trails should not be restricted, you may indicate that.

Maximum number of hikers encountered per day that should be allowed on these wilderness trails: _____

OR

- The number of hikers on these wilderness trails should not be restricted.

- e. What is the approximate number of hikers you encountered today on these wilderness trails?

Approximate number of hikers encountered: _____

- f. Approximately how much time did you spend hiking on these wilderness trails today?

Length of hike: _____ (hours and/or minutes).

- 8a. Visitors often stop and visit selected “attraction sites” (e.g., waterfalls) in the wilderness. We would like to know how many people you think could visit a wilderness attraction site without you feeling too crowded. To help judge this, we have a series of photographs that show different numbers of people at an attraction site in the wilderness of Olympic National Park. Please rate each photograph by indicating how acceptable you find it based on the number of people shown. A rating of “-4” means the number of people is highly unacceptable, and a rating of “+4” means the number of people is highly acceptable. *(Circle one number for each photograph.)*

	Highly Unacceptable	Very Unacceptable	Moderately Unacceptable	Slightly Unacceptable	Neutral	Slightly Acceptable	Moderately Acceptable	Very Acceptable	Highly Acceptable
	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 1.....	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 2.....	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 3.....	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 4.....	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 5.....	-4	-3	-2	-1	0	+1	+2	+3	+4
Photo 6.....	-4	-3	-2	-1	0	+1	+2	+3	+4

- b. Which photograph shows the number of people you would prefer to see while visiting a wilderness attraction site?

Photo number: _____

- c. Which photograph shows the number of people that would be so unacceptable that you would no longer visit this wilderness attraction site? If none of the photographs represent this condition, you may indicate that.

Photo number: _____

OR

- None of the photographs are so unacceptable that I would no longer visit this wilderness attraction site.

- d. Which photograph shows the highest number of people you think the National Park Service should allow to visit this wilderness attraction site? In other words, at what point should people be restricted from visiting this site? If you think use should not be restricted at any point represented in the photographs, or not restricted at all, you may indicate that.

Photo number: _____

OR

- None of the photographs show a high enough number of people to restrict people from visiting this wilderness attraction site.

OR

- The number of people visiting this wilderness attraction site should not be restricted.

- e. Which photograph looks most like the number of people you typically saw while visiting wilderness attraction sites on this trip?

Photo number: _____

9. How crowded did you feel on this visit to the wilderness of Olympic National Park? (*Circle one number.*)

Not at all crowded 1	Not crowded 2	Slightly crowded 3	A little crowded 4	Somewhat crowded 5	Moderately crowded 6	Very crowded 7	Highly crowded 8	Extremely crowded 9
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10. National Park Service managers must find an appropriate balance between allowing people to visit the wilderness and providing opportunities for solitude. In your opinion, which of the four following options strikes the best balance for the wilderness of Olympic National Park? (*Mark one.*)

- Do not restrict use to manage for solitude* anywhere in the wilderness, even if use is heavy.
- Manage for *solitude along a few wilderness trails*. The number of people allowed to use these few trails will be limited, but the majority of trails will have no use limits.
- Manage for *solitude on most wilderness trails*, by limiting the number of people using these trails. A few trails will have unrestricted use. Use levels will be increased and high on these trails.
- Manage for *solitude everywhere* in wilderness, even though this may mean that use will be restricted and people will be turned away.

IV. WILDERNESS MANAGEMENT

This section of the questionnaire asks for your opinions about wilderness management.

11. How familiar are you with the legal definition of wilderness? (*Mark one.*)
- I have no idea -- I didn't even know there was a legal definition of wilderness.
 - I have heard of wilderness areas, but I don't know anything about the legal definition of wilderness.
 - I know a little bit about what the legal definition of wilderness is.
 - I think I know a lot about the legal definition of wilderness.
12. Please indicate the extent to which you oppose or support the following wilderness management actions. (*Circle one number for each item.*)

	Strongly Oppose	Oppose	No Opinion	Support	Strongly Support
Trails and Campsites					
Close overused campsites	-2	-1	0	1	2
Prohibit campfires at areas with little down wood	-2	-1	0	1	2
Prohibit campfires throughout entire wilderness	-2	-1	0	1	2
Restrict group camping (greater than 6 people) to designated group camps	-2	-1	0	1	2
Place no bridges or footlogs over some water crossings on high use, maintained trails	-2	-1	0	1	2
Place no bridges or footlogs over some water crossings on low use, maintained trails	-2	-1	0	1	2
Visitor Use Management					
Assign parties to specific campsites	-2	-1	0	1	2
Provide reservations for areas with limits on overnight camping	-2	-1	0	1	2
Require visitors to obtain wilderness permits at Wilderness Information Centers	-2	-1	0	1	2
Provide opportunity to obtain wilderness permits online	-2	-1	0	1	2
Limit number of overnight visitors in specific high use areas	-2	-1	0	1	2
Limit number of day use visitors in specific high use areas	-2	-1	0	1	2
Limit number of overnight visitor throughout entire wilderness	-2	-1	0	1	2
Limit party size for day users	-2	-1	0	1	2
Make cross-country party size smaller than trail travel party size	-2	-1	0	1	2
Require all overnight users to watch pre-trip leave-no-trace video	-2	-1	0	1	2
Collect overnight wilderness fees to help fund wilderness projects	-2	-1	0	1	2
Limit number of reserved permits available to commercial operators	-2	-1	0	1	2

	Strongly Oppose	Oppose	No Opinion	Support	Strongly Support
Stock Use					
Restrict stock camping to designated stock camps	-2	-1	0	1	2
Close some trails to stock	-2	-1	0	1	2
Close subalpine areas to stock camping	-2	-1	0	1	2
Facilities and Services					
Place toilets in high use areas	-2	-1	0	1	2
Provide specialty bags for carrying out personal human waste	-2	-1	0	1	2
Require use of specialty bags for carrying out personal human waste	-2	-1	0	1	2
Resource Management					
Revegetate impacted areas	-2	-1	0	1	2
Require canisters for food storage in wildlife problem areas	-2	-1	0	1	2
Require canisters for food storage throughout entire wilderness	-2	-1	0	1	2
Leave cross-country routes and unofficial trails off published maps	-2	-1	0	1	2

13. Research is frequently conducted in the wilderness of Olympic National Park. Please indicate the extent to which you agree or disagree with the following statements about research in the wilderness portion of the park. (Circle one number for each item.)

Research Activity	Strongly disagree	Disagree	No Opinion	Agree	Strongly agree
Research should be allowed in wilderness	-2	-1	0	1	2
It's acceptable to tag animals (e.g., place collars on elk) for research purposes	-2	-1	0	1	2
It's acceptable to use colored tape to mark locations for research purposes	-2	-1	0	1	2
It's acceptable to place installations (e.g., weather recorders) for research purposes	-2	-1	0	1	2
It's acceptable to use helicopters for research purposes	-2	-1	0	1	2

V. WILDERNESS VISITOR CHARACTERISTICS

This section of the questionnaire asks about you and your use of wilderness.

- 14. Have you ever been to a wilderness area before this trip? *(Mark one.)*
 - No *(Skip to question 18.)*
 - Yes

- 15. Since your first wilderness trip, about how often have you gone on wilderness trips (including this and other wildernesses)? *(Mark one.)*
 - Less than once a year
 - Once a year
 - 2-5 times a year
 - 6-10 times a year
 - More than 10 times a year

- 16. About how many other wilderness areas, besides this wilderness, have you visited?

Number of other wilderness areas: _____

- 17. About how many times have you been to the wilderness of Olympic National Park?

Number of times: _____

- 18. What is your age? _____

- 19. What is your zip code? _____

- 20. Are you ___ male or ___ female? *(Mark one.)*

- 21. Did you or any member of your group obtain a wilderness permit for your current visit to the wilderness of Olympic National Park? *(Mark one.)*
 - Yes
 - No
 - I don't know

- 22. In what ethnicity and race would you place yourself? *(Circle one number for ethnicity)*
Ethnicity:
 - 1 HISPANIC OR LATINO
 - 2 NOT HISPANIC OR LATINORace: *(Circle one or more)*
 - 1 AMERICAN INDIAN OR ALASKA NATIVE
 - 2 ASIAN
 - 3 BLACK OR AFRICAN AMERICAN
 - 4 NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER
 - 5 WHITE

23. What is the highest level of formal education you have completed? *(Please mark only one.)*

- Less than high school
- Some high school
- High school graduate
- Vocational/trade school certificate
- Some college
- Two-year college degree
- Four-year college degree
- Masters Degree
- Ph.D., M.D., J.D., or equivalent

THANK YOU FOR YOUR PARTICIPATION