ABSTRACT

KEANE, ROSEMARY BRIGID. Social Media and the National Park Service: A Case Study of Visitor Preferences at Crater Lake National Park. (Under the direction of Dr. Jordan W. Smith)

New and emerging technologies such as social media and mobile applications have considerable potential for use by recreation resource management agencies, such as the National Park Service (NPS), to improve visitor services. These technologies can allow park managers to provide higher quality outdoor recreation opportunities to current visitors and also facilitate communication with previously unreached visitor groups. To maximize potential benefits, the use of social media by the NPS needs to be carefully planned and implemented so that it capitalizes on visitors’ current use of different platforms and reflects a clear understanding of the type of information visitors would like to receive through agency-managed social media channels. Using data collected via on-site surveys, this study examined the extent to which Crater Lake National Park visitors currently use social media platforms, visitors’ preferences for specific types of information that can be delivered through those platforms, visitors’ preferences for Wi-Fi access at the park and visitors’ perceptions of trust in information sources commonly used for trip planning. The results indicate that visitors have clear preferences for specific park related content delivered through distinct platforms and that the majority of visitors supported Wi-Fi access within the park. Visitors considered the NPS and family/friends to be the most trusted sources for trip-related information. The results of the study provide an important baseline of visitors’ trip-related social media behavior and preferences, which could aid Crater Lake National Park personnel in developing targeted social media focused communication and outreach plans.
Social Media and the National Park Service: A Case Study of Visitor Preferences at Crater Lake National Park

by
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DEDICATION

To my family and friends, thank you for your unconditional love and tireless support. You made me the person I am today, and I could not have achieved this without you.

To my parents, thank you for the opportunities you gave me. All of my success I owe to you.

To my siblings, thank you for being my constant source of happiness and inspiration.
BIOGRAPHY

Rosemary was born and raised in Champaign, Illinois. She learned her A.A. in Mass Communications and her A.A. in Sociology from Parkland College in Champaign, Illinois. She earned her B.S in Integrative Biology from the University of Illinois at Urbana-Champaign in 2010, and her M.A. of Environmental Journalism from Michigan State University in 2012. In 2014 she was selected as the 2014 Crater Lake Science and Learning Center Fellow.
ACKNOWLEDGEMENTS

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INTRODUCTION

Emerging web-based technologies such as social media and mobile applications have rapidly altered how individuals search for, find and learn about new information (Kaplan & Haenlein, 2010). Individuals are increasingly turning to their online social networks to obtain desired information. However, many public trust resource management agencies have been slow to adopt the use of these technologies, often citing concerns over not knowing how, or even if, members of the general public would use the content they post to these platforms (Bertot, Jaeger & Hansen, 2012). This is unfortunate, as social media-based content has the potential to dramatically change how members of the general public engage with individual agencies and the resources they manage. This is particularly true for the National Park Service (NPS), an agency whose resources and outstanding recreational opportunities attract visitors from across the globe. Visitors to NPS-managed recreational resources are already posting, tweeting, instagramming and sharing video recordings of their experiences through social media.

The agency might be able to capitalize on the ubiquitous use of technology to help visitors plan for and learn about the natural, cultural and recreational resources provided by park units. However, there has been little rigorous empirical academic research focused on social media and how it could potentially be used to improve visitor experiences. The purpose of this study is to determine if, and how, NPS visitors use social media for trip planning and obtaining information while at a park. Data and findings generated from this study are intended to contribute meaningful insights into specific social media-based
communication strategies the agency can use to improve visitors’ experiences and their knowledge of the park’s unique natural and cultural history.

Recreation resource management professionals have a large suite of communication tools designed to make park visits more memorable and to increase visitors’ ability to have meaningful experiences during their visit (Oppegaard & Shine, 2014). These communication tools commonly include pamphlets, interpretive tours and educational displays. Unfortunately however, each of these tools runs the risk of treating visitors the same regardless of their individual preferences or the preferences that tend to be shared by individuals with similar socio-demographic characteristics. For large public trust resource management agencies like the NPS, whose visitation is extremely diverse, the ability to develop targeted communication strategies capable transmitting specific information to specific populations in an efficient manner is particularly appealing (Parker, Green, & Johnson, 2014).

Targeted social media based communication strategies may result in multiple benefits for resource management agencies. Recent research has shown that when individuals are exposed to media they consider to be personally relevant, they are significantly more likely to exhibit greater concern and participate more readily in natural resource decision-making processes (Hart, Nisbet & Shanahan, 2011). Additionally, previous studies have shown science education programs are more likely to be successful if the material presented is personally and culturally relevant (Bell, Lewenstein, Shouse, & Feder, 2009; Lin, Hong, and Huang, 2012). Social media, specifically popular platforms such as Facebook, Twitter, YouTube and Instagram, provides the ability to create a meaningful connection between
individuals’ interests and park-related information by enabling visitors to share information about their trip before, during and after their actual visit to the park itself (Litvin, Goldsmith, & Pan, 2008; Fotis, Buhalis, and Rossides, 2012; Yoo, Lee, Gretzel, & Fesenmaier, 2009).

For public trust resource management agencies like the NPS, the use of social media is not completely foreign; social media and user-generated content is being quickly (albeit inconsistently) adopted across all organizational levels of the agency. Social media and user-generated content has also been made a top priority in the agency’s long-range planning efforts. In the report “Advancing the National Park Idea,” published by The National Parks Second Century Commission, an independent group created by the National Parks Conservation Association, social media and emerging user-generated content technologies were explicitly identified as critical avenues through which the NPS can communicate with the public (2009). One of the key recommendations of the report called for the NPS to “facilitate use of current and leading-edge technologies and media to enhance place-based learning, including social networking” (NCPA, 2009, p. 43.). Social media platforms are extremely flexible, allowing park managers to customize their information to a certain audience or individual in a very cost-effective way (Tham, 2013). Social media can also be used to facilitate the creation or management of online partnerships with community- or activity-related groups. This possibility can result in greater levels of visitor engagement and an increased ability of park personnel to effectively communicate with the public (Matloka & Buhalis, 2010; Ružić & Biloš, 2010).

Numerous non-empirical reports completed by the NPS have identified a growing desire among visitors for technology at the parks, but this has only been studied at the
national level, and generally in conjunction with research that includes visitor perceptions of other interpretive materials (Forist, 2003; Garrison & Li, 2014). Research has been conducted on how certain technological platforms can be used by younger children, but those educational platforms might not be seen as relevant for other audiences (Subramaniam, Valdivia, Pellicone, Neigh, & Lowman, 2014; Littlejohn, Le, Russell, Hollenhorst, & Gramann, 2009; Gramann, 2003). While these studies were not conducted specifically by or for the NPS, their findings are likely to still apply to how park managers can use technology to engage with different audiences. However, more focused research conducted specifically at NPS units is needed given the iconic nature of the agency and the fact that NPS units draw a much more geographically- and demographically-diverse set of visitors relative to other public-trust recreation resources (Moore & Driver, 2005).

The research outlined below provides an exploratory analysis designed to determine if, and how, visitors to an iconic national park (Crater Lake National Park in Oregon, USA) use social media to plan their visit and learn about the park’s unique geophysical, biological and cultural history. The investigation focuses on major social media platforms (Facebook, Twitter, Instagram, Flickr and YouTube) commonly used by visitors in their personal communication networks. Using data collected from on-site surveys, the study explores: which platforms are used most often; how likely visitors would be to seek out information about their park visit from each source; and what kinds of information visitors would prefer from each platform.

I also quantify the different types of information sources outside of social media (e.g., immediate friends, family, the NPS itself) that individuals use when planning their visits; this
information can be useful for the agency as they endeavor to develop more effective modes of communicating with visitors. The study also examines visitors’ attitudes toward, and preferences for, Wi-Fi access while at the Park. Coupled with data collected on visitors’ sociodemographic (e.g., age, gender, education level and ethnicity) and trip characteristics (e.g., length of stay, group size, group composition and first time or repeat visitor), the study aims to provide guidelines to inform an empirically grounded social media communication strategy for Crater Lake National Park personnel. Even though the study was conducted at only one park unit, it does focus on relatively common social media platforms, the findings are likely to hold implications for other parks and protected areas.

**LITERATURE REVIEW**

In examining the potential relationships between visitors’ use of social media and how the NPS can capitalize on its rapid growth, it is important to consider a number of topics including: 1) how the NPS has approached new and emerging technologies in interpretation and visitor outreach and how these approaches relate to current visitation trends; 2) whether park-specific empirical evidence can aid in the creation of better communication strategies; 3) how social media use relates to recreation experiences; and 4) how social media can be used to attract new visitors to the NPS.

*Social Media and the National Park Service*

Over the past several years, the NPS has paid an increasing amount of attention to the rapidly changing demographic profile of the population within the United States (Taylor, Grandjean & Gramann, 2011; Santucci, Floyd, Bocarro & Henderson, 2014). While the
nation’s population as a whole has become younger, more urban and racially diverse, the vast majority of domestic park visitors tend to be older, non-Hispanic white individuals (Murphy, 2005). A focus group organized by the NPS Park Planning and Special Studies Program has acknowledged the growing concern for these changing trends, especially the fact that “the fastest growing segment of the US population is made up of people who are under-represented in visits to parks - Latinos and other peoples of color” (Gramann, 2003).

Younger visitors are also less likely to value spending time outdoors, and as such are a critical audience for the NPS to target (Pergrams & Zaradic, 2008; NPS, 2015; Leask, Fyall & Barron, 2014). Outdoor recreation research suggests younger populations of visitors will be more comfortable with technology than their older counterparts (Gramann, 2003). Consequently, more effort needs to be made to integrate these kinds of media into park interpretation and outreach strategies.

A report recently published by the NPS identifies considerations that need to be made to better account for changing visitor populations. The report “Urban Matters: The Call to [Urban] Action” (2015) highlights the fact demographic changes are “not reflected in the National Park Service workforce, themes interpreted in its parks, or in its visitors” (p. 10). Additionally, the report calls for a greater integration in the NPS of the increasing diversity of the American public, charging managers to “in an age of increasing diversity…continually ask whether the way in which the National Park Service tells [its] stories has meaning for all our citizens” (p. 10, NPS, 2015).

Cultural constraints may also contribute to the divergence between the sociodemographic characteristics of park users and those of the general public. For example,
Solop, Hagen and Ostergen (2003) suggest individuals who lack a personal/cultural connection to a park are less likely to visit, and that younger individuals as well as minorities tend to have lower incomes relative to their older, white counterparts, also making them less likely to visit. Additionally, a lack of inclusion of varying cultural perspectives in the parks’ interpretive practices may limit underrepresented groups’ willingness to visit park units (NPS, 2015; Floyd, Bocarro & Thompson, 2008). The financial constraints faced by younger individuals may prohibit visitation to NPS units, which are more remote and charge higher access fees relative to other public recreation destinations such as those managed by the USDA Forest Service or the Bureau of Land Management (Stevens, More & Markowski-Lindsay, 2014; Benson, et al. 2013; Schultis & More, 2011).

Youth may also have a reduced desire to visit nature-based outdoor recreation destinations given increasing demands on leisure time from television and the Internet (Pergram & Zaradic, 2008; Leask, Fyall & Barron, 2014). The amount of time younger individuals spend online has increased dramatically over the past several years, largely as a result of the widespread adoption of web-enabled mobile devices (Thulin & Vilhelmson, 2007). While the consumption of digital information and media has been identified as a major factor limiting younger individuals’ participation in outdoor recreation and nature based activities, it may also offer a unique opportunity for natural resource agencies like the NPS to attract new, underrepresented visitors. Research has indicated younger populations of visitors are eager to improve their experience with the NPS through social media (Johnson, 2013; Garrison & Li, 2014). For these populations, social media could become a trusted
The NPS has recognized the potential of web-based digital information and media. In their “Call to Action Report”, the agency identifies the need to better “showcase the meaning of parks to new audiences through…social media,” and to “use leading-edge technologies and social media to effectively communicate and capture the interest of the public” (p. 10, NPS, 2015). This need was also reflected by NPS Director Jon Jarvis, who released a memorandum specifically related to social media in 2011 (DOI, 2011). The memorandum discussed the need to develop a social media strategy and outlines basic considerations park staff need to keep in mind when starting their own social media accounts on behalf of the park units they represent (DOI, 2011). While the memorandum offered a general level of guidance, it largely left discretion of what information to post and how to communicate via social media channels up to individual park staff tasked with creating communication strategies. While this approach gives agency personnel a lot of flexibility, it lacks any evidence-based recommendations.

Previous research indicates the NPS has begun to integrate certain social media platforms into their communication strategies, but the operation of these accounts is largely left to management officials at the parks themselves (Garrison & Li, 2014). To better guide these individual parks effectively, there is a need for empirically grounded research into how the public uses social media and what kinds of park specific information the public wants from the NPS.
Trust plays a critical role in the kinds of engagement the NPS hopes to gain from increased communication with its current and potential visitors. Hong (2013, 2014) concluded the general public is influenced by the kinds of communication they receive from government agencies online, and that they are more likely to have positive perceptions of the agency and trust the material more if it is presented through online communication channels. At present, no empirically based research has been conducted on the kinds of content the visitors to the NPS are willing to trust, nor how effective the current NPS social media communication strategies are proving to be. Mergel and Bretschneider (2013) have identified three stages in which social media is adopted by the government: 1) informal experimentation with social media; 2) norms are established and regulations are made; and 3) order becomes formalized through successful strategies and policies. It is important to note that these three processes have been used by other scholars to examine how the NPS is using social media. Garrison and Li (2014) argue that the NPS is now using its interim policies developed by Director Jon Jarvis and are searching for successful strategies and policies. This research should illuminate key insights in developing such strategies.

*Can Park Specific Empirical Evidence be used to Create Tailored Social Media Communication Strategies?*

Bertot and colleagues (2012) suggest that government agencies need a better understanding of what tools and approaches best promote an exchange between governments and users, what mix of technologies, data and information promote, support and foster user engagement, and how governments can create sustainable social media technology strategies and efforts. Research in the field of public relations and communications have identified
social media and emerging technologies as some of the most effective ways by which
government agencies can communicate with the public (Liu, Horsley & Yang, 2012; Mergel,
2012; Dadashzadeh, 2010).

Some logical goals of any park unit in creating a tailored social media communication
strategy should be to: 1) improve the experiences of current park visitors; and 2) attract new
visitors who otherwise might not have known about or considered the National Park as a
leisure time activity. In the case of Crater Lake National Park, managers would benefit from
understanding the differences in how and why visitors engage with the park’s social media
accounts. For example, currently the Crater Lake National Park’s Facebook page is “liked”
(i.e., followed or subscribed to) by 170,517 individuals. Managers could better tailor their
communication efforts to those individuals by knowing things such as how often they visit
the page, what content they interact with the most, or whether or not they follow Crater Lake
National Park on any other social media platforms. Managers would also benefit from
understanding what specific kinds of information (e.g., information about cultural resources,
weather, wildlife, etc.) visitors would like to receive from the agency before, during and after
their trip to facilitate the attainment of more desirable experiences while at the park.

Social Media and Recreation Experiences

The importance of visitor experiences at national parks and the personal significance
of their memories of those experiences has been examined by many leisure scholars
Visitors are motivated by many different needs and preferences when they visit a specific
destination and it is becoming increasingly important for managers to understand the
diversity of those needs and preferences throughout the entire visitor experience (Leask, 2010; Wells, Lovejoy & Welch, 2009; Devesa, Laguna & Palacios, 2010). Social media can create a link between visitors and a park, potentially making their trip more relevant and personally salient.

Although very little research has examined the role of social media in NPS management, studies into the role of social media for tourism and hospitality professionals have been conducted which can yield many insights useful for park managers (see Leung, Law, van Hoof & Buhalis, 2013 and Zeng & Gerritsen, 2014 for comprehensive reviews). Mobile technologies available through smart phones and other portable electronics have enabled visitors to more effectively find information they need to plan for park visits; these technologies have also made it easier for visitors to send information to others about their experiences and also store content about their experiences and memories (e.g., photos, videos, or other media) (Wang, Park & Fesenmaier, 2012).

Clawson and Knetsch (1966) identified five major phases of a visitor’s experience in an outdoor recreation setting: 1) anticipation; 2) travel to; 3) on site; 4) travel back; and 5) recollection. Park managers should consider how each of these phases can be enhanced through the use of social media. For example, in the specific case of Crater Lake National Park, posts by managers that are read by visitors will provide them with information such as the kinds of wildlife they would most likely find at the park, what special events are coming up in the days ahead, or other park-related news items. It is logical to expect visitors would plan their trip according to whether or not the posted information is related to their personal goals and motivations; this kind of planning also allows managers to get a much better
understanding of what visitors want before they actually arrive at the park. However, this is only true if the visitor engages with the park’s social media page.

Social media can also prove useful for the traveling phase of the trip. For example, specific platforms provide the option of connecting with businesses or attractions near the park. Given this, managers may want to carefully consider how they might partner with other amenity providers to encourage more regionally-integrated visitor experiences. For Crater Lake National Park, this could involve becoming connected (via Facebook, Instagram or some other commonly used platform) to state parks, campgrounds, national forests and other outdoor recreation sites in the area. Using social media in this way, natural and cultural resource managers can increase their exposure to visitors who might not have otherwise known about these attractions en route to their park destination. Once on site, social media could be used by visitors to share their experiences with others in their social network, consequently increasing park visibility online through “friends” and “followers,” as well as “friends of friends” and “followers of followers.” Managers looking to connect with visitors in this way could suggest individuals send them their photographs or multi-media items from that day’s hike, boat tour or camping trip. This could also benefit visitors by making them feel more connected to the park and their experience. Posts to social media by NPS personnel can also serve to alert visitors of serious weather or fire conditions in the park, which is something that occurs with relative frequency in certain seasons at Crater Lake. More research would be needed to identify the most effective ways to engage visitors with these kinds of context-driven messages.
As visitors leave the park, social media can be used in much the same way as it is used for visitors on their way to the park. In terms of recollection, social media is an ideal way for visitors to not only share their memories with family and friends, but also to “archive” their experiences and reminisce about them at a later point in time. As a result, these unique capabilities may increase the personal impact and salience of visitors’ experiences. Social media use by managers can involve commenting and sharing content with previous visitors as well, increasing a visitor’s engagement with the park and potentially encouraging them to make return visits.

**Attracting Visitors through Social Media**

As mentioned above, one of the major goals of any park unit in creating a tailored social media communication strategy is to attract new visitors who otherwise might not have known about or considered the park as a leisure time activity. The dissemination of park-specific information via trusted information sources is likely to result in an increased awareness about park resources and potentially increased visitation amongst underrepresented populations. Previous marketing research suggests information disseminated by individuals connected to others via online social networks is much more likely to affect consumer behavior relative to advertising content (Hudson & Thai, 2013; Munar & Jacobsen, 2014; Litvin, Goldsmith & Pan, 2008). For park managers, this means park-related information communicated through on-line social networks by individuals’ friends and followers is likely to garner more attention than if that same information were to be disseminated by the agency itself.
Having the Internet available to park visitors might also offer an opportunity for individual park units to attract new visitors. The infrastructure costs of having Wi-Fi throughout parks and protected areas can be daunting for managers, but the potential advantages should be examined. Visitors that can access free Wi-Fi at central locations in the park can more easily find park information, make reservations at nearby food and lodging establishments and access important personal or financial information while they are traveling in the event they would like to change their plans. Wi-Fi within National Parks also allows visitors to instantly share their park experiences. NPS groups have acknowledged the increased visitor demand for Wi-Fi on site (Gramann, 2003). Providing Wi-Fi on site could potentially create conflict for visitors who seek solitude and a distancing from technology by visiting the park.

For managers to better utilize social media for their specific parks, there needs to be a greater understanding of what kinds of platforms visitors are most likely to use, what specific types of information they are looking for via those platforms and whether or not they would be amenable to Wi-Fi access in the park. It would also be useful to know what kinds of information sources visitors trust so that managers can better provide relevant information via those trusted channels of communication. Managers should exercise caution in how they use social media; as with any engagement and communication tool there exists the possibility for conflict and negatively impacted public perceptions of the park if those conflicts are not handled correctly. It is also important for managers to consider their available resources (both financial and human) when including social media in their communication strategies.
METHODS

Research Framework

As stated above, the purpose of this study is to determine if, and how, NPS visitors use social media for trip planning and obtaining information while at a park. To achieve this goal, a multi-objective research framework was designed and used to guide the development of an on-site survey administered to visitors to Crater Lake National Park. The multi-objective research framework is presented in Table 1. The individual objectives described in the research framework were developed by first substantively reviewing the academic and non-academic literature related to social media and visitor experiences in publically managed recreation resources and then developing a set of research questions that had yet to be empirically examined. The research questions each have related implications for park and visitor management; these implications are listed in the third row of the framework. These research questions and their associated management implications were subsequently used to identify lists of general measures to be included in the on-site survey.
### Table 1: Research Framework

<table>
<thead>
<tr>
<th>Research Question</th>
<th>OBJECTIVE 1. Evaluate visitors’ social media behaviors and preferences.</th>
<th>OBJECTIVE 2. Assess preferences for the specific types of information to be disseminated via social media.</th>
<th>OBJECTIVE 3. Assess other sources used to obtain trip-related information.</th>
<th>OBJECTIVE 4. Assess visitor preferences for Wi-Fi access on site.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent do visitors use specific social media platforms in general, outside of planning their visit?</td>
<td>How would visitors share their trip related experiences with others through specific social media platforms? What are visitors’ preferences for information about the park from specific social media platforms?</td>
<td>To what extent do visitors use non-social media for trip-related information? How much trust do visitors place in information disseminated via social media or other forms of communication?</td>
<td>Do visitors prefer Wi-Fi access on site? To what extent would Wi-Fi access improve visitors’ experience at the park?</td>
<td></td>
</tr>
<tr>
<td>Managerial Implication</td>
<td>Park staff will be equipped to reach audiences through the most used social media channels. Park staff will be better able to understand what their audience is seeking, and how to best cater to that need.</td>
<td>Park staff will be able to target venues that might not have been utilized before to maximize communication impact.</td>
<td>Park staff will be better able to decide whether or not to invest in Wi-Fi infrastructure on site.</td>
<td></td>
</tr>
<tr>
<td>Survey Measures</td>
<td>• Prior use of social media • Social media platforms used</td>
<td>• Desired information</td>
<td>• Trusted information sources</td>
<td>• Support for Wi-Fi access on site • Wi-Fi and its relationship to visitor experience</td>
</tr>
</tbody>
</table>
**Study Site**

The study site was Crater Lake National Park, located in the Cascade Mountains of Oregon (USA) (Figure 1). Established in 1902, Crater Lake National Park is home to the deepest lake in the United States and second deepest lake in North America. The lake was formed through the eruption, implosion and subsequent filling of Mount Mazama. Due to the lack of inlets and tributaries, Crater Lake has been described as one of the purest in the world (Harmon, 2002). Between 2009 and 2014, Crater Lake National Park has consistently attracted more than 400,000 visitors each year, with visitation peaking from June through September. Visitors to the park can enjoy hiking, driving around the caldera on the Rim Drive (33 miles), swimming in the lake and taking boat tours to Wizard Island, among other activities. Visitors may hike to Mt. Scott, which boasts a full panoramic view of over 100 miles (on a clear day).

In addition to providing iconic and beautiful scenic views and facilitating a host of outdoor recreation activities, Crater Lake is also highly valued for its cultural significance to local Native American tribes (Deur, 2002). The ancient legends of the native Klamath Tribes describe the eruption of Mt. Mazama as a battle between Llao, the god of the underworld, and Skell, the god of the above world. The struggle ended with the eruption of Mt. Mazama (the destruction of Llao’s home), and the formation of Crater Lake.

As important caveat to remember when thinking about the use of web-based social media by the Crater Lake National Park staff is that the lake is located more than 40 forty miles from the nearest urban area (Klamath Falls). Consequently, Crater Lake National Park is much more isolated than other similarly sized national parks in the Northwestern United
States. The relatively remote location of the park may make NPS-provided Wi-Fi cost-prohibitive. The relatively remote positioning of Crater Lake National Park could be both an argument against social media (due to prohibitive costs and resources required for installation) but also a motivation for provision of these services, especially in times of emergency.

*Figure 1- Crater Lake National Park*
Survey Instrument and Analysis

Social Media Platforms

Social media platforms vary in the types of content they allow users to share. To design and implement efficient communication strategies, park managers need to disseminate different types of content (e.g., short messages (Twitter) or images (Instagram)) to target audiences who prefer to use and share that type of content. Consequently, collecting information about visitors’ preferences for specific platforms can assist managers in choosing where to disseminate specific types of information that might lend itself to one platform or another. This study focuses on the five most common social media platforms used in the United States; these platforms are Facebook, Twitter, Instagram, YouTube and Flickr. These platforms are listed and described in Table 2.

Table 2: Social Media Usage 2014 (Duggan et al., 2015)

<table>
<thead>
<tr>
<th>Platform Name</th>
<th>Description</th>
<th>Percentage of online US adults active on platform</th>
<th>In Use by the NPS</th>
<th>In Use by Crater Lake National Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>Social networking site</td>
<td>72%</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Twitter</td>
<td>Micro-blogging site</td>
<td>23%</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Instagram</td>
<td>Photo sharing site</td>
<td>26%</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>YouTube</td>
<td>Video sharing site</td>
<td>63%</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Flickr</td>
<td>Photo sharing site</td>
<td>26%</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
For the purposes of the study, visitor use of individual platforms refers to the individual logging on to the website and engaging with its content. This could be in the form of uploading content themselves, viewing content provided by others or interacting with others in discussion over the content through “likes,” “shares” or discussion. Questions included in the survey (Appendix) establish how often and for what reasons visitors generally use social media platforms. Individuals were asked about which social media platforms they would prefer (Facebook, Twitter, Instagram, Flickr and YouTube) for certain kinds of park content (history, directions, park conditions, natural features and local amenities and activities).

*General Demographic and Trip Information*

The survey instrument collected individuals’ basic socio-demographic characteristics as well as their trip characteristics (Table 3). By collecting information about an individual’s basic demographic and socioeconomic background, researchers and park staff can gain a better understanding of the different kinds of audiences that can be reached through specific social media platforms. Collecting trip characteristics and visitor demographic characteristics could yield valuable insights into previously unexplored trends, such as whether or not first-time visitors have different social media preferences relative to returning visitors, whether age is correlated with social media preferences or Wi-Fi preferences and whether or not those staying for shorter periods of time use social media differently than those staying longer.
Table 3 - Basic Demographic and Trip Variables

<table>
<thead>
<tr>
<th>Trip Characteristics</th>
<th>Group Size and Composition</th>
<th>Basic Demographics of Individual Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>• First or returning visit</td>
<td>• Number of individuals</td>
<td>• Gender</td>
</tr>
<tr>
<td>• Length of visit</td>
<td>• Number of adults (18+ years old)</td>
<td>• Age</td>
</tr>
<tr>
<td></td>
<td>• Number of minors (15-18 years old)</td>
<td>• Education level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Race/ethnicity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Home zip code</td>
</tr>
</tbody>
</table>

Objective 1: Evaluate visitors’ social media behaviors and preferences.

Data on the extent to which visitors use specific social media platforms in general, outside of planning their visit, was collected by asking individuals, “Which of the following social media sites have you used in the past month?” Respondents were prompted to give their response among six nominal categories that included, “Facebook,” “Twitter,” “Instagram,” “YouTube,” “Flickr” and “If another social media site, please specify:” followed by an open-ended response option.

Data on how visitors use each specific social media platform they indicated using was assessed by asking individuals several additional questions. The following questions are all specific to the social media platforms the visitor selected in the previous question.

Individuals were asked “How often do you use [specific social media platform]?” Respondents were prompted to give their response among five ordinal categories that included, “Several times a day,” “Once or twice daily,” “Several times a week,” “Once or twice weekly” and “Once or twice monthly.” Individuals were also asked about their reasons for using specific social media platforms. Respondents were prompted to give their response
among five nominal categories which included, “To keep in contact with family and friends,” “To stay informed of others in your extended social network,” “For entertainment purposes (e.g., games, video, etc.),” “To express your opinions” and “To find and share information.”

Objective 2: Assess preferences for the specific types of information to be disseminated via social media by Crater Lake National Park.

To accurately estimate how often visitors use the social media platforms already utilized by Crater Lake National Park, the following question were asked in connection to Facebook, Twitter and Flickr: “Have you visited the Crater Lake National Park [specific social media platform] page?” Individuals were prompted to respond with either “Yes” or “No.”

Data on what specific kinds of information visitors would prefer to receive from distinct social media platforms on which Crater Lake National Park has a presence was collected by asking individuals, “What types of information specifically from the Crater Lake National Park’s [specific social media platform] site would allow you to have a higher quality recreation experience?” Respondents were prompted to give their response among eight nominal categories which included “Information about current weather/trail conditions in the Park,” “Information about the Park’s natural and cultural history,” “Information about available recreational activities in the Park,” “Information about wildlife that can be seen within the Park,” “Information about getting to/from the Park,” “Information about local amenities and activities around the Park,” “Other (please specify):” and “None of the above.”

Data on whether or not visitors used a social media site to plan their trip was collected by asking individuals, “Did you use any of your social media accounts to plan this trip? If so,
which ones?” Respondents were prompted to select among seven nominal response categories which included: “Facebook,” “Twitter,” “Instagram,” “YouTube,” “Flickr,” “If some other social media site, please specify:” and “I did not use any of my social media accounts to plan this visit.” This question was only presented to respondents that indicated they were active on at least one social media platform.

Objective 3: Assess other sources used to obtain trip-related information.

Data were collected regarding the Crater Lake National Park website and whether visitors to the park had visited the website before their visit and if they had used it to plan their trip. Respondents were prompted to answer “Yes” or “No” to the following questions: “Did you visit the Crater Lake National Park website prior to this visit?” and “Did you use the Crater Lake National Park website to plan this visit?”

Individuals were also asked, “What other information sources did you use to plan this trip?” Respondents were given seven nominal response categories which included: “Close friends and/or family,” “Coworkers and/or friends you do not consider close,” “Online non-news source (e.g., Wikipedia),” “Material provided by an organization or group (e.g., school, church, non-profit, etc.),” “Magazines,” “National Park Service publications” and “Other (please specify):.”

Data about the extent to which individuals trusted information sources that were relevant to their trip was collected by asking how much trust individuals placed in each of the information sources used to plan their trip. Visitors were asked, “How much would you trust the trip-related information you received from that source?” and were presented with the
response matrix shown in Table 4. Respondents were instructed to select only one response for each information source selected.

Table 4: Survey regarding visitor trust in non-social media information sources.

<table>
<thead>
<tr>
<th>Information Source</th>
<th>I would not get my information from this source.</th>
<th>I would seek out information from this source, but I would be cautious about trusting it.</th>
<th>I would seek out information from this source, and I would always trust it.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close friends and/or family</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Coworkers and/or friends you would not consider close</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Online non-news source</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Material provided by an organization or group</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Magazines</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>National Park Service publications</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Objective 4: Assess visitor preferences for Wi-Fi access on site.

Data about the extent to which Wi-Fi would impact visitors’ recreation experiences at the park was collected using the following question: “Would having Wi-Fi access at Crater
Lake National Park allow you to have higher quality recreation experiences?” Respondents were prompted to respond by indicating “Yes,” “No” or “No opinion.”

Data about the extent to which visitors would support Wi-Fi access at the park was collected using the following question: “How strongly do you either support or oppose having Wi-Fi access at Crater Lake National Park?” Respondents were given five ordinal response options which included: “Strongly support,” “Somewhat support,” “Neither support nor oppose,” “Somewhat oppose” and “Strongly oppose.”

**Sampling Methodology**

Data were collected via an on-site paper survey administered by one graduate research assistant between July 15-24 and August 1-15, 2015. These dates were selected to gain access to the highest possible number of visitors, as June through September is the peak season for Crater Lake National Park. On-site surveys were selected because they can accurately capture visitors’ perceptions and behaviors during their visit. Post-visit data collection methods such as mail-back surveys have been known to produce biased assessments of on-site experiences (Armstrong & Overton, 1977). Although collecting data through on-site surveys is typically laborious and expensive, time and financial costs were offset by a Crater Lake National Park Science and Learning Fellowship, which provided housing and funding for survey administration.

Visitors to the park were surveyed at two central sites in the park: The Steel Village Visitor Center at the base of the caldera and the Rim Village Visitor Center at the rim (Figure 1). These sites were chosen to gain access to the highest amount of visitor traffic possible.
Surveys were conducted on paper, with an incentive of a raffled iPad for participation. Surveys were administered daily from 10 AM until 4 PM.

To ensure unbiased representativeness of the results, every other visitor was intercepted and asked to complete the survey. If pedestrian traffic in the visitor center was particularly heavy, every third visitor was asked to complete the survey. Respondents were asked to read and sign an informed consent form approved by the Institutional Review Board at NC State University. If a group of visitors was selected, the individual with the most recent birthday was asked to take the survey; this helped ensure group leaders were not oversampled (they tend to be predominantly older white males). At the conclusion of the survey the respondent was offered a chance to provide their email to the researcher to enter into a raffle for an iPad. The total number of visitors that were intercepted but declined to take the survey were tallied after each sampling effort to calculate a response rate.

Analysis

As the nature of this study is exploratory, the majority of conclusions drawn will come from general descriptive statistics of the responses. Analysis will also be performed using methods such as the chi-square test of independence to determine if there are relationships between visitor characteristics (e.g., age, gender, education and ethnicity), or trip characteristics (e.g., length of stay, first visit or repeat trip and number of individuals in the group) and social media behaviors (e.g., purpose of use, how often it is used, etc.). Insights provided by these kinds of statistical tests may allow managers to better understand where to post park-related content so that a specific audience can be most effectively
reached. With further research and different kinds of questions asked, other kinds of statistical analyses can provide more insight into visitor preferences.

RESULTS

Survey Response Rate

Data were collected at the Steel Visitor Center at the base of the caldera and the entrance of the Xanterra Gift Shop in the Rim Village complex. Survey administration was designed to occur on an alternating basis, but due to weather constraints, the Xanterra Gift Shop entrance was surveyed slightly less than the Steel Visitor Center (11 days and 12 days, respectively). The survey response rates are reported in Table 5.

<table>
<thead>
<tr>
<th>Tables 5: Survey Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accepted</td>
</tr>
<tr>
<td>Steel Center Visitor Center</td>
</tr>
<tr>
<td>Xanterra Gift Shop at Rim Village</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

General Demographic and Trip Information

Results indicate the majority of respondents visiting Crater Lake National Park during data collection were predominantly Caucasian, college-educated, and middle-aged individuals. The largest age group was comprised of individuals between 25 and 34 years old (23% of respondents), followed closely by individuals between 45 and 54 years old (21% of respondents). These findings are consistent with annual visitor surveys conducted by the
NPS. The vast majority of respondents had some form of college degree, with 30% of respondents holding bachelor’s degrees and 35% holding advanced degrees (Table 6).

Table 6: Demographic Characteristics of Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Number of Respondents</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender (n=556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>298</td>
<td>54%</td>
</tr>
<tr>
<td>Female</td>
<td>258</td>
<td>46%</td>
</tr>
<tr>
<td><strong>Age (n=554)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>72</td>
<td>13%</td>
</tr>
<tr>
<td>25-34</td>
<td>128</td>
<td>23%</td>
</tr>
<tr>
<td>35-44</td>
<td>108</td>
<td>19%</td>
</tr>
<tr>
<td>45-54</td>
<td>114</td>
<td>21%</td>
</tr>
<tr>
<td>55-64</td>
<td>87</td>
<td>16%</td>
</tr>
<tr>
<td>65+</td>
<td>45</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Education (n=554)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 9&lt;sup&gt;th&lt;/sup&gt; grade</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt;-12&lt;sup&gt;th&lt;/sup&gt; grade, no diploma</td>
<td>13</td>
<td>2%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>34</td>
<td>6%</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>91</td>
<td>16%</td>
</tr>
<tr>
<td>Associate’s degree</td>
<td>50</td>
<td>9%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>168</td>
<td>30%</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>196</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Ethnicity (n=546)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>468</td>
<td>86%</td>
</tr>
<tr>
<td>Black or African American</td>
<td>4</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>13</td>
<td>2%</td>
</tr>
<tr>
<td>Asian</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>American Indian</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Some other race/multiracial/other</td>
<td>34</td>
<td>6%</td>
</tr>
</tbody>
</table>
Respondents generally traveled to the park in smaller groups of less than 6 individuals (81% of respondents) (Table 7). The majority of respondents were first time visitors to Crater Lake National Park (65% of respondents). Over half of the respondents were only traveling through the park for one day (66% of respondents) (Table 7).

Table 7: Trip Characteristics of Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Trip Characteristics</th>
<th>Number of Respondents</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group Size (n=555)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>28</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>183</td>
<td>33%</td>
</tr>
<tr>
<td>3-6</td>
<td>241</td>
<td>43%</td>
</tr>
<tr>
<td>7-10</td>
<td>60</td>
<td>11%</td>
</tr>
<tr>
<td>11+</td>
<td>44</td>
<td>8%</td>
</tr>
<tr>
<td><strong>First Visit (n=555)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>361</td>
<td>65%</td>
</tr>
<tr>
<td>No</td>
<td>194</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Length of Stay (n=555)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 4 hours</td>
<td>165</td>
<td>30%</td>
</tr>
<tr>
<td>4-8 hours</td>
<td>200</td>
<td>36%</td>
</tr>
<tr>
<td>Overnight (1-2 days)</td>
<td>138</td>
<td>25%</td>
</tr>
<tr>
<td>Overnight (3+ days)</td>
<td>52</td>
<td>9%</td>
</tr>
</tbody>
</table>

Chi-square tests of independence were performed to explore possible associations between respondents’ trip characteristics to the park. The relationship between how long respondents were staying at the park and group size was significant, $\chi^2(12, N = 555) = 44.123$, $p < 0.001$. The larger the group of visitors, the shorter the time that the group spent at the park. A significant relationship was also found between how long visitors were staying at
the park and whether or not it was their first visit, $\chi^2 (3, N = 555) = 10.662$, $p = 0.014$. First
time visitors spent less time at the park than those who had visited before. These were the
only significant relationships found between respondents’ trip characteristics.

**Objective 1: Evaluate visitors’ social media behaviors and preferences.**

The majority of respondents visiting Crater Lake National Park (75%) indicated using
social media in the month prior to completing the survey (Table 8). Facebook was the most
frequently used social media platform, with 96% of respondents indicating they were active
on social media identifying Facebook as a regularly used platform. The least frequently used
social media platform was Flickr, with only 6% of respondents indicating they were active on
it (Table 8).

A chi-square test of independence was performed to determine any significant
relationships between survey respondents’ social media use and both their general
demographic characteristics and what information preferences they have for individual social
media platforms. The relationship between first time visitors and use of social media was
found to be significant, $\chi^2 (1, N = 555) = 5.009$, $p = 0.025$. First time visitors were more
likely to use some form of social media (in general, not specifically for planning their visit)
than those who had previously visited the park. The relationship between group size and the
use of social media was also found to be significant, $\chi^2 (4, N = 555) = 14.399$, $p = 0.006$. A
significant relationship was found between age and use of social media, $\chi^2 (5, N = 555) =
72.105$, $p < 0.001$. Younger respondents were much more likely to be active on some form of
social media platform.
Table 8: Social Media Usage by Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Social Media Activity</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active in last month</strong> (n=580)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>441</td>
<td>76%</td>
</tr>
<tr>
<td>No</td>
<td>139</td>
<td>24%</td>
</tr>
<tr>
<td><strong>In the last month, have you used:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook (n=441)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>424</td>
<td>96%</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>Twitter (n=441)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>124</td>
<td>28%</td>
</tr>
<tr>
<td>No</td>
<td>317</td>
<td>72%</td>
</tr>
<tr>
<td>Instagram (n=441)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>139</td>
<td>32%</td>
</tr>
<tr>
<td>No</td>
<td>302</td>
<td>68%</td>
</tr>
<tr>
<td>YouTube (n=441)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>244</td>
<td>55%</td>
</tr>
<tr>
<td>No</td>
<td>197</td>
<td>45%</td>
</tr>
<tr>
<td>Flickr (n=441)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>6%</td>
</tr>
<tr>
<td>No</td>
<td>414</td>
<td>94%</td>
</tr>
</tbody>
</table>

The majority of survey respondents (67%) indicated they were active on Facebook at least once a day. The predominant reasons behind the use of Facebook was reported as keeping in contact with family and friends (87%), keeping in contact with one’s extended social network (48%) and to find and share information (42%) (Table 9).
Relative to Facebook, survey respondents were much less active on Twitter; 67% of respondents reported using the platform on a weekly or monthly basis (Table 10). The main reason for using Twitter was “to find and share information” (49% of respondents) which is congruent with the purpose of Twitter, a microblogging site designed for users to post and read short 140-character messages.
Table 10: Twitter Usage by Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Twitter Usage/Preferences</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How often do you use Twitter?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a day</td>
<td>20</td>
<td>16%</td>
</tr>
<tr>
<td>Once or twice daily</td>
<td>19</td>
<td>15%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>18</td>
<td>15%</td>
</tr>
<tr>
<td>Once or twice a week</td>
<td>26</td>
<td>21%</td>
</tr>
<tr>
<td>Monthly</td>
<td>41</td>
<td>33%</td>
</tr>
<tr>
<td><strong>What are your main reasons?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To keep in contact with friends and family</td>
<td>26</td>
<td>21%</td>
</tr>
<tr>
<td>To stay informed of others in your extended social network</td>
<td>41</td>
<td>33%</td>
</tr>
<tr>
<td>Entertainment purposes</td>
<td>27</td>
<td>22%</td>
</tr>
<tr>
<td>To express your opinions</td>
<td>26</td>
<td>21%</td>
</tr>
<tr>
<td>To find and share information</td>
<td>61</td>
<td>49%</td>
</tr>
</tbody>
</table>

The number of respondents who reported using Instagram was not significantly higher than the number who reported using Twitter; however, the amount of time spent on the two platforms differed notably. More than half of the Instagram users (60% of respondents) indicated they use the site at least several times a week. A much smaller portion (46%) of Twitter users reported using that platform more than once a week. The majority of
respondents indicating they use Instagram were active on the platform at least once a day (80%); they reported that they used the site primarily to keep in contact with family and friends (71%) (Table 11).

Table 11: Instagram Usage by Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Instagram Usage/Preferences</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How often do you use Instagram?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a day</td>
<td>40</td>
<td>29%</td>
</tr>
<tr>
<td>Once or twice daily</td>
<td>40</td>
<td>29%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>16</td>
<td>12%</td>
</tr>
<tr>
<td>Once or twice a week</td>
<td>21</td>
<td>15%</td>
</tr>
<tr>
<td>Monthly</td>
<td>21</td>
<td>15%</td>
</tr>
<tr>
<td><strong>What are your main reasons?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To keep in contact with friends and family</td>
<td>99</td>
<td>71%</td>
</tr>
<tr>
<td>To stay informed of others in your extended social network</td>
<td>53</td>
<td>38%</td>
</tr>
<tr>
<td>Entertainment purposes</td>
<td>35</td>
<td>25%</td>
</tr>
<tr>
<td>To express your opinions</td>
<td>18</td>
<td>13%</td>
</tr>
<tr>
<td>To find and share information</td>
<td>37</td>
<td>27%</td>
</tr>
</tbody>
</table>

Just over half of the respondents (55%) indicated using YouTube in the last month (Table 12). Of these respondents, 67% used the website at least once a day. “Entertainment”
(79% of respondents) and being able “to find and share information” (44% of respondents) were indicated as the main reasons for the use of YouTube (Table 12).

Table 12: YouTube Usage by Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>YouTube Usage/Preferences</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How often do you use YouTube?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a day</td>
<td>30</td>
<td>12%</td>
</tr>
<tr>
<td>Once or twice daily</td>
<td>37</td>
<td>15%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>65</td>
<td>26%</td>
</tr>
<tr>
<td>Once or twice a week</td>
<td>59</td>
<td>24%</td>
</tr>
<tr>
<td>Monthly</td>
<td>53</td>
<td>22%</td>
</tr>
<tr>
<td><strong>What are your main reasons?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To keep in contact with friends and family</td>
<td>14</td>
<td>6%</td>
</tr>
<tr>
<td>To stay informed of others in your extended social network</td>
<td>21</td>
<td>9%</td>
</tr>
<tr>
<td>Entertainment purposes</td>
<td>195</td>
<td>79%</td>
</tr>
<tr>
<td>To express your opinions</td>
<td>10</td>
<td>4%</td>
</tr>
<tr>
<td>To find and share information</td>
<td>108</td>
<td>44%</td>
</tr>
</tbody>
</table>

Only 6% of survey respondents reported they were active on the photo-sharing site Flickr, with the greatest proportion of these individuals only indicating using the platform once a month (22% of the respondents) (Table 13). While the National Park Service has used
Flickr widely (Garrison & Li, 2014), these results are not encouraging nor do they support the continued use of Flickr as a popular National Park Service social media platform.

Table 13: Flickr Usage by Visitors to Crater Lake National Park

<table>
<thead>
<tr>
<th>Flickr Usage/Preferences</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How often do you use Flickr?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several times a day</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Once or twice daily</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Several times a week</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Once or twice a week</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Monthly</td>
<td>15</td>
<td>56%</td>
</tr>
<tr>
<td><strong>What are your main reasons?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To keep in contact with friends and family</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>To stay informed of others in your extended social network</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Entertainment purposes</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>To express your opinions</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>To find and share information</td>
<td>18</td>
<td>67%</td>
</tr>
</tbody>
</table>

Objective 2: Assess preferences for the specific types of information to be disseminated via social media by Crater Lake National Park.

Very few respondents indicated they had visited social media sites operated by Crater Lake National Park. Only 9% of respondents indicated they had visited the park’s Facebook page (Table 14).
Table 14: Visits to Crater Lake Social Media Pages

<table>
<thead>
<tr>
<th>Have you visited the Crater Lake National Park official:</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook page? (n = 424)</td>
<td>40</td>
<td>9%</td>
</tr>
<tr>
<td>Twitter page? (n = 124)</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Flickr page? (n = 27)</td>
<td>2</td>
<td>7%</td>
</tr>
</tbody>
</table>

Slightly more than half of respondents (54%) who reported using Facebook indicated they would prefer to receive park related information such as current weather and trail conditions from the Crater Lake Facebook page. Slightly less than half of respondents (46%) indicated a desire to receive information about recreation activities available in the park via Facebook (Table 15).

The majority of respondents who reported using Twitter indicated they would prefer to receive park related information such as current weather and trail conditions from the Crater Lake Twitter page (52%). Just over a third of respondents indicated a desire to receive information about recreational activities available in the park (36%) (Table 16).
### Table 15: Crater Lake Specific Information preferred on Facebook

<table>
<thead>
<tr>
<th>Crater Lake specific content on Facebook (n=424)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about current weather/trail conditions at the Park</td>
<td>231</td>
<td>54%</td>
</tr>
<tr>
<td>Information about the Park’s natural and cultural history</td>
<td>171</td>
<td>40%</td>
</tr>
<tr>
<td>Information about available recreational activities in the Park</td>
<td>196</td>
<td>46%</td>
</tr>
<tr>
<td>Information about wildlife that can be seen within the Park</td>
<td>148</td>
<td>35%</td>
</tr>
<tr>
<td>Information about getting to/from the Park</td>
<td>154</td>
<td>36%</td>
</tr>
<tr>
<td>Information about local amenities and activities around the Park</td>
<td>156</td>
<td>37%</td>
</tr>
<tr>
<td>Other</td>
<td>38</td>
<td>9%</td>
</tr>
<tr>
<td>None</td>
<td>48</td>
<td>11%</td>
</tr>
</tbody>
</table>
Table 16: Crater Lake Specific Information preferred on Twitter

<table>
<thead>
<tr>
<th>Crater Lake specific content on Twitter (n=124)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about current weather/trail conditions at the Park</td>
<td>65</td>
<td>52%</td>
</tr>
<tr>
<td>Information about the Park’s natural and cultural history</td>
<td>31</td>
<td>25%</td>
</tr>
<tr>
<td>Information about available recreational activities in the Park</td>
<td>45</td>
<td>36%</td>
</tr>
<tr>
<td>Information about wildlife that can be seen within the Park</td>
<td>33</td>
<td>27%</td>
</tr>
<tr>
<td>Information about getting to/from the Park</td>
<td>30</td>
<td>24%</td>
</tr>
<tr>
<td>Information about local amenities and activities around the Park</td>
<td>34</td>
<td>27%</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td>None</td>
<td>27</td>
<td>22%</td>
</tr>
</tbody>
</table>

Just over half of the respondents who used Instagram indicated they would prefer to receive park related information such as current weather and trail conditions from the Crater Lake Instagram page (52%). Nearly as many Instagram users (50%) indicated a desire to receive information about wildlife that can be seen in the park (50%) via the park’s Instagram page. Just under half (46%) of Instagram users indicated a desire to receive information about recreational activities available in the park via Instagram (Table 17).
A considerable number of respondents (55%) who reported using YouTube indicated a preference to receive information about wildlife that can be seen within the park via the Crater Lake YouTube page. Nearly the same proportion of YouTube users (54%) indicated a desire to obtain information about the park’s natural and cultural history via the platform (Table 18).

Table 17: Crater Lake Specific Information preferred on Instagram

<table>
<thead>
<tr>
<th>Crater Lake specific content on Instagram (n=139)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about current weather/trail conditions at the Park</td>
<td>72</td>
<td>52%</td>
</tr>
<tr>
<td>Information about the Park’s natural and cultural history</td>
<td>56</td>
<td>40%</td>
</tr>
<tr>
<td>Information about available recreational activities in the Park</td>
<td>62</td>
<td>45%</td>
</tr>
<tr>
<td>Information about wildlife that can be seen within the Park</td>
<td>69</td>
<td>50%</td>
</tr>
<tr>
<td>Information about getting to/from the Park</td>
<td>31</td>
<td>22%</td>
</tr>
<tr>
<td>Information about local amenities and activities around the Park</td>
<td>49</td>
<td>35%</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>12%</td>
</tr>
<tr>
<td>None</td>
<td>21</td>
<td>15%</td>
</tr>
</tbody>
</table>
Table 18: Crater Lake Specific Information preferred on YouTube

<table>
<thead>
<tr>
<th>Crater Lake specific content on YouTube (n=244)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about current weather/trail conditions at the Park</td>
<td>81</td>
<td>33%</td>
</tr>
<tr>
<td>Information about the Park’s natural and cultural history</td>
<td>131</td>
<td>54%</td>
</tr>
<tr>
<td>Information about available recreational activities in the Park</td>
<td>106</td>
<td>43%</td>
</tr>
<tr>
<td>Information about wildlife that can be seen within the Park</td>
<td>134</td>
<td>55%</td>
</tr>
<tr>
<td>Information about getting to/from the Park</td>
<td>62</td>
<td>25%</td>
</tr>
<tr>
<td>Information about local amenities and activities around the Park</td>
<td>81</td>
<td>33%</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>None</td>
<td>47</td>
<td>19%</td>
</tr>
</tbody>
</table>

The third of respondents who reported using Flickr indicated a preference to receive information about the park’s natural and cultural history from the Crater Lake National Park Flickr page. Just over a quarter of Flickr users (26%) indicated a desire to obtain information about wildlife that can be seen within the park via the platform (Table 19).
Table 19: Crater Lake Specific Information preferred on Flickr

<table>
<thead>
<tr>
<th>Crater Lake specific content on Flickr (n=27)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about current weather/trail conditions at the Park</td>
<td>6</td>
<td>22%</td>
</tr>
<tr>
<td>Information about the Park’s natural and cultural history</td>
<td>9</td>
<td>33%</td>
</tr>
<tr>
<td>Information about available recreational activities in the Park</td>
<td>6</td>
<td>22%</td>
</tr>
<tr>
<td>Information about wildlife that can be seen within the Park</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Information about getting to/from the Park</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Information about local amenities and activities around the Park</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>None</td>
<td>5</td>
<td>19%</td>
</tr>
</tbody>
</table>

Objective 3: Assess trusted sources used to obtain trip-related information.

A large majority of respondents (82%) indicated they always trust park related information from publications released by the National Park Service. A large number of respondents (74%) indicated they would always trust information from their close friends and/or family members (Table 20). Levels of trust in sources such as online non-news, colleagues and friends that are not considered close, magazines and material provided by a non-profit organization were all relatively equal (26-35%).
Chi-square tests of independence did not indicate any significant relationships regarding trusted information sources and visitor demographics, social media usage or information preferences.

Table 20: Trust in Various Sources of Park Related Information

<table>
<thead>
<tr>
<th>Source</th>
<th>I would not get my information from this source. N (%)</th>
<th>I would seek out information from this source, but I would be cautious about trusting it. N (%)</th>
<th>I would seek out information from this source, and I would always trust it. N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close friends and/or family (n = 535)</td>
<td>27 (5%)</td>
<td>113 (21%)</td>
<td>395 (74%)</td>
</tr>
<tr>
<td>Coworkers and/or friends you would not consider close (n = 466)</td>
<td>62 (13%)</td>
<td>252 (54%)</td>
<td>152 (33%)</td>
</tr>
<tr>
<td>Online non-news source (n = 480)</td>
<td>70 (15%)</td>
<td>287 (60%)</td>
<td>123 (26%)</td>
</tr>
<tr>
<td>Material provided by a non-profit organization/group (n = 455)</td>
<td>48 (11%)</td>
<td>249 (55%)</td>
<td>158 (35%)</td>
</tr>
<tr>
<td>Magazines (n = 458)</td>
<td>74 (16%)</td>
<td>229 (50%)</td>
<td>155 (34%)</td>
</tr>
<tr>
<td>National Park Service publications (n = 501)</td>
<td>33 (7%)</td>
<td>59 (12%)</td>
<td>409 (82%)</td>
</tr>
</tbody>
</table>
Objective 4: Assess visitor preferences for Wi-Fi access on site.

Regarding Wi-Fi technology, the majority of respondents (62%) indicated they would support the NPS in providing Wi-Fi access at the park (Table 21). There was a very small minority of respondents (7%) that strongly opposed having Wi-Fi access on site, and an equally small number (7%) that somewhat opposed Wi-Fi access on site.

Table 21: Visitor Preferences for Wi-Fi Access on Site

<table>
<thead>
<tr>
<th>Wi-Fi Access On Site (n = 563)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Support</td>
<td>232</td>
<td>41%</td>
</tr>
<tr>
<td>Somewhat support</td>
<td>119</td>
<td>21%</td>
</tr>
<tr>
<td>Neither support nor oppose</td>
<td>131</td>
<td>23%</td>
</tr>
<tr>
<td>Somewhat oppose</td>
<td>41</td>
<td>7%</td>
</tr>
<tr>
<td>Strongly oppose</td>
<td>40</td>
<td>7%</td>
</tr>
</tbody>
</table>

Nearly half (48%) of respondents indicated having Wi-Fi access on site would provide them with a higher quality recreation experience (Table 22). Just over one-quarter (27%) of respondents had no opinion regarding Wi-Fi access on site; a similar proportion of respondents (25%) indicated Wi-Fi access would not provide them with a higher quality recreation experience.
Table 22: Wi-Fi Access and Higher Quality Recreation Experience

<table>
<thead>
<tr>
<th>Wi-Fi would provide a higher quality recreation experience (n = 563)</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>270</td>
<td>48%</td>
</tr>
<tr>
<td>Disagree</td>
<td>141</td>
<td>25%</td>
</tr>
<tr>
<td>No opinion</td>
<td>152</td>
<td>27%</td>
</tr>
</tbody>
</table>

A chi-square test of independence was performed to examine possible relationships between respondents’ general demographic variables, their reported social media usage and their preferences regarding Wi-Fi access at the park. The relationship between visitor age and support for Wi-Fi access on site was found to be significant, $\chi^2 (20, N = 555) = 42.641, p = 0.002$. Additionally, visitor age was also significantly related to reporting that Wi-Fi access would lead to a higher quality recreation experience $\chi^2 (10, N = 555) = 25.789, p = 0.004$. Younger visitors were significantly more likely to be supportive of Wi-Fi access on site; they were also more likely to believe having Wi-Fi access would lead to higher quality recreation experiences.

Significant relationships were also found between social media usage and support for Wi-Fi access on site as well as social media usage and Wi-Fi access leading to a high quality recreation experience. Respondents who were active on social media (76%) were more likely to support having Wi-Fi access on site, $\chi^2 (4, N = 555) = 19.280, p < 0.001$. Visitors active on social media were also more likely to believe that Wi-Fi access would lead to a higher quality recreation experience for them $\chi^2 (2, N = 555) = 20.945, p < 0.001$. 

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DISCUSSION

Visitors’ online behavior in an increasingly technologically-integrated society could prove to be very useful for recreation resource managers, depending on how those managers choose to provide content to, interact with and promote park activities to visitors. This study offers some interesting insights into how, why and where visitors turn to for information they might want from park managers. Park managers should consider how the social media platforms and alternative information sources discussed here might be best used for their own outdoor recreation areas.

General Demographic and Trip Information

Results from this study indicated the demographic composition of visitors to Crater Lake National Park is consistent with the average visitor demographic statistics nationally (based on survey respondents) (Solop, Hagen & Ostergren, 2003; Taylor, Grandjean & Gramann, 2011). Given this study did not find significant relationships between ethnicity and general use of social media, preferences for content or use of the Crater Lake Website to plan their trip, there are no specific recommendations that can be offered relative to the race and/or ethnicity of visitors and their preferences for park-related social media content.

The majority of respondents had not previously visited Crater Lake National Park. These results are particularly important for managers to consider, as a targeted social media campaign could provide these first-time visitors with information to enhance their trip before they arrive on site. A large percentage of the visitors were also under the age of 35, which speaks to the fact that they are also more comfortable with, and more active on, social media platforms. Using more widely used platforms such as Facebook and Instagram to provide
information could be a cost effective method of communicating with younger first time visitors.

Providing visitors (regardless of age or demographic background) with information before their trip could also potentially enhance the trip for visitors that are not staying at the park for very long. Results from this study indicate that most of the survey respondents were only staying at Crater Lake National Park for one day. If managers could communicate with these visitors before they arrive and make them aware of any changing conditions at the park or potential activities particular aspects of the park the visitors might enjoy, the visitor could be better prepared for their trip and their experience could be enhanced. Having information readily available could provide visitors with a greater sense of control over their visit.

Providing information about the park’s recreation resources via social media could also enhance visitors’ awareness of available opportunities. Each visitor brings different motivations and preferences to their outdoor recreation experience (Manning, 1999), and access to information about different activities available to them would allow visitors to plan an experience that is personally relevant. The majority of visitors were traveling in groups of between 3 and 6 people, with the results suggesting the larger the group’s size, the more likely they are to stay at the park for a shorter period of time. Given visitors in larger groups are only at the park for a limited amount of time, managers should attempt to make trip-relevant information available to visitors as early as possible before their trip.

**Objective 1: Evaluate visitors’ social media behaviors and preferences**

Survey respondents had very clear preferences for the ways in which they use their social media accounts (Figure 2). Respondents indicated they used Facebook and Instagram
primarily to keep in contact with their social network. Flickr and Twitter, by comparison, were used primarily for finding and sharing information. Dissimilarly, YouTube was used primarily for entertainment purposes (almost exclusively). These findings provide managers with important information regarding how different social media platforms can be used to disseminate the information more likely to be read or viewed by future visitors. No previous empirical study has identified content-platform preferences among visitors to publicly managed outdoor recreation resources.

*Figure 2: Purpose of Social Media Usage by Respondents*

Facebook was the most used social media platform reported by respondents. Crater Lake National Park has already created a Facebook page, but managers from other NPS units might not have taken the important initial step of establishing a presence on the platform. Facebook provides users with the opportunity to post images, videos, text and links to outside content on other platforms (such as Twitter, Instagram, Flickr and YouTube). Consequently,
using Facebook as the primary social media account could be extremely useful for park managers. Content posted on other social media platforms should be linked to the park’s Facebook page in order to more effectively spread information to individuals that might only be active on Facebook.

Younger visitors were much more likely to be active on social media than their older counterparts. Further research could identify whether or not these younger populations are more active on certain social media platforms than others, but for the purposes of park managers, it is important to provide information to these younger audiences on social media to attract them to the park. First time visitors and visitors in larger groups were also more likely to be active on social media, making social media-based communication a particularly promising way to reach both new park visitors and visitors who tend to visit in large groups. The report “A Call to Action” (NPS, 2011) supports this kind of outreach through several of its recommended actions, including “Step by Step,” “Stop talking and listen,” “Arts afire,” “Go digital” and “Out with the old.” The main objectives of each of these actions are described in Table 23. “Go digital,” for example, speaks to the idea that the National Park Service is interested in creating a place for visitors to have conversations with management, and to express their opinions about park management and opportunities.
Table 23: A Call to Action Social Media Specific Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Objective Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step by Step</td>
<td>Create deep connections between a younger generation and parks through a series of diverse park experiences.</td>
</tr>
<tr>
<td>Stop talking and listen</td>
<td>Learn about the challenges and opportunities associated with connecting diverse communities to the great outdoors and our collective history.</td>
</tr>
<tr>
<td>Arts afire</td>
<td>Showcase the meaning of parks to new audiences through dance, music, visual arts, writing, and social media.</td>
</tr>
<tr>
<td>Go digital</td>
<td>Reach new audiences and maintain a conversation with all Americans by transforming the NPS digital experience to offer rich, interactive, up-to-date content from every park and program.</td>
</tr>
<tr>
<td>Out with the old</td>
<td>Engage national park visitors with interpretive media that offer interactive experiences, convey information based on current scholarship, and are accessible to the broadest range of the public.</td>
</tr>
</tbody>
</table>

The National Park Service also recognizes that younger audiences are more present on social media than their older counterparts, and that having a presence on these platforms would increase their exposure to these younger groups. These initiatives might not all explicitly mention social media usage by the National Park Service, but the potential exists to integrate the new interpretive material they call for with online components that visitors can access off-site.
Objective 2: Assess preferences for the specific types of information to be disseminated via social media by Crater Lake National Park.

Visitors expressed clear preferences for the kinds of park-related information they preferred from different social media platforms. Facebook was primarily preferred for obtaining information regarding weather and/or trail conditions, directions to the park, recreational activities and local amenities and activities. Other platforms were preferred secondarily for varying kinds of content, which is important to note for managers after they post content to Facebook initially.

For more immediate kinds of information such as weather and trail conditions, directions to the park and schedules of park-related activities or local amenities, Twitter and Instagram were preferred information sources after Facebook. Twitter was more preferred for information regarding weather/trail conditions and directions to the park (Figures 3 and 4) whereas Instagram was more preferred for information regarding park activities and local amenities and activities (Figures 5 and 6). This could be due to the more visual nature of Instagram’s platform. Managers should consider how visitors might want to see what an event or activity looks like before choosing to participate, and Instagram would be more amenable to that kind of multimedia content. It is also worth noting that nearly as many visitors expressed a desire to receive information about both park activities and local amenities and activities via YouTube relative to Instagram. It appears visitors have a clear preference for receiving this type of information via social media platforms that focus on sharing videos and photos.
YouTube (followed closely by Instagram) was also the preferred platform for obtaining information regarding the park’s natural and cultural history and wildlife seen at the park (Figures 7 and 8). The reasoning for this might be similar to visitor preferences for visual information regarding activities and amenities. It appears that visitors would like to preview what they are going to experience at the park via visual content.

This could be particularly advantageous for interpretive purposes, and could allow for a much greater dissemination of information regarding topics such as the indigenous people and their religious beliefs regarding Crater Lake, the kinds of wildlife and wildlife research programs that are being conducted on-site and other park-related stories. Many similar kinds of content can be found on YouTube from platforms connected to media like the Discovery Channel, The History Channel and other documentary providers. The NPS could benefit enormously by providing their own content and highlighting particular park stories or information they would like most to share.
Figure 3: Social Media Platform Preferences for Weather and/or Trail Condition Content

Figure 4: Social Media Platform Preferences for Directions to the Park Content
Figure 5: Social Media Platform Preferences for Recreational Activities Content

Figure 6: Social Media Platform Preferences for Local Amenities and Activities Content
Figure 7: Social Media Platform Preferences for Natural and/or Cultural History Content

Natural and/or Cultural History

- Facebook: 45%
- Twitter: 28%
- Instagram: 41%
- YouTube: 55%
- Flickr: 39%

Figure 8: Social Media Platform Preferences for Wildlife Content

Wildlife

- Facebook: 39%
- Twitter: 30%
- Instagram: 51%
- YouTube: 56%
- Flickr: 30%
While the preferences expressed by survey respondents are not generalizable to other parks, it is important for managers to consider that visitors to their parks might have similar content-platform preferences. It is equally important for managers to present their park-related material to visitors on the platforms those visitors are most likely to use.

The social media platforms included in this research were considered because of their widespread use by the general public, but managers should also consider other new and emerging social media platforms such as Vine, Snapchat and Soundcloud that might gain popularity in coming years. The various abilities of different platforms have different strengths that managers can and should leverage so the posting of park-related information is performed using the most useful and accessible platforms for distinct types of audio, video and text content.

Objective 3: Assess other sources used to obtain trip-related information.

Survey respondents indicated the most frequently used source of park-related information was family and friends; however, this result also included those respondents that would only sometimes trust that information. The most trusted source of park-related information was the National Park Service itself, which is a finding managers should use to their advantage (Figure 9). The fact that family and friends are considered an important source for information about natural resource issues has been shown in other research (Smith, Anderson & Moore, 2014). As previously discussed, the dissemination of park-specific information via trusted information sources would logically result in an increased awareness of park resources as well as potentially increased visitation amongst underrepresented
populations. Additionally, park-related information communicated through on-line social networks by individuals’ friends and followers may garner more attention than if that same information were to be disseminated by the agency itself (although data analyzed for this study suggest it would not be trusted as much).

Figure 9: Trusted Information Sources used by Visitors for Park-Related Information

This study indicates that although visitors are very active on social media, few of them had accessed the official National Park Service website for Crater Lake National Park, and even fewer had visited the park’s official Facebook page. For managers looking for greater exposure to potential visitor populations, using social media and starting conversations with the current or potential visitors online could result in greater information sharing via individuals’ social networks. As this study shows, information disseminated by the National Park Service is the most trusted, but also the least used in terms of social media website usage.
**Objective 4: Assess visitor preferences for Wi-Fi access on site.**

An important consideration managers might need to take into account is providing Wi-Fi access to visitors on-site. For this study, the survey instrument did not indicate whether or not the Wi-Fi coverage was widespread in the park or freely provided, but the answers provided still indicate a strong visitor preference for Internet access on-site, especially among younger visitors. Anecdotally, many visitors expressed a desire to access important financial documents, make alternative travel plans or access trip-related information for a later point in their visit.

*Figure 10: Visitor Support for Wi-Fi Access on Site*

![Wi-Fi Access On-Site Support](image)

Providing Wi-Fi for visitors would necessitate an investment in park infrastructure, a consideration that managers should not take lightly. However, if the park resources allow managers to provide Wi-Fi for visitors, this study provides insight into visitor support for
such an addition (Figure 10). The vast majority of visitors expressed support for having Wi-Fi access on site, with younger populations and larger visitor groups more likely to support the addition. Visitors who reported themselves as active on social media were also much more likely to support Wi-Fi access on-site than their non-social media active counterparts. This is important for managers to understand as they consider targeting their communications more towards visitors via social media.

BEST PRACTICES RECOMMENDATIONS

This study offers managers evidence for a number of recommendations for better connection with social media savvy visitor populations. The different attributes and resources available in each park will presuppose the inclusion of many of these recommendations, and managers should carefully examine how their own staff and funding allow for these changes. For managers, the major conclusions from this study are:

1) Visitors are active on social media, and a communication strategy that includes these platforms is a useful and cost effective method of reaching those visitors.

2) Visitors have clear content platform preferences when seeking information about their trip on social media.

3) The National Park Service is the most trusted source of trip related information for visitors, followed closely by family and friends.

Given these conclusions, the best practices recommendations offered to managers from this study are as follows:
1) **Develop a social media strategy.** Parks that have a routine and preferred platform for distributing their information will benefit from visitor use of the information. The established practice should be relatively simple for staff to consistently use. Developing partnerships online with similar agencies would also increase the park’s exposure to potential visitors. Parks with the ability to hire social media professionals or interns would also benefit from having a skilled expert knowledgeable about what types of content can and should be disseminated through different social media platforms. However, if funding for staff is not available, managers should communicate with the National Park Service Office of Communications on how to better integrate current initiatives into their park’s information dissemination.

2) **Be aware of content-platform preferences.** Managers should make every effort to post information where visitors are most likely to look for it. The timeliness of the information should be considered when evaluating potential platforms, as well as how many people could see the information. Facebook is an ideal platform to use for most information, but for more longer/narrative content (specifically related to activities facilitated by the park or available in nearby gateway communities), managers should consider using Instagram or YouTube.

3) **Develop multi-media content.** Managers should provide visitors with park information in a variety of different forms. Videos might be more effective for some visitors, while others still might prefer photographs or textual narratives.
Posting content in a number of different media and cross posting on multiple platforms would provide visitors multiple options regarding which information they choose to read and/or view.

4) *Engage in meaningful conversation with visitors.* Participating in National Park Service initiatives such as #FindYourPark and other centenary activities provides managers with an increased opportunity to communicate with visitors. As the NPS’s “Call to Action” report indicated, listening to the needs and concerns of under-served visitor populations would better equip managers with the knowledge needed to enhance their recreation experience.

Encouraging conversation on social media platforms and the sharing of visitor photos and content would also allow managers to see what aspects of their parks visitors already enjoy or would like to see improved.

5) *Consider providing free Wi-Fi access at central locations within the park.* Managers with the available resources and ability might find visitor experience enhanced if a limited amount of Wi-Fi was provided at the park. Visitors could better access their important personal and financial information, and could access interpretive material about the park in the medium(s) they prefer. However, this addition is something that each park manager must consider based on their individual park’s resources, staff, funding and infrastructure.
DIRECTIONS FOR FUTURE RESEARCH

This study has identified many recommendations and considerations for National Park Service managers, and provided important preliminary results regarding visitors’ preferences for online content. Future research might examine alternative platforms used by visitors to the National Parks, as well as content-platform preferences that might emerge from them. Additionally, an evaluation of current online content provided by the NPS would benefit park managers looking to improve their own park’s communication strategies.

As mentioned before, different parks have varying levels of funding, resources, staff and characteristics. Research into how visitors use social media could evaluate differences in usage from parks in more urban areas, parks with higher visitor rates, parks with Wi-Fi already on site or parks with more wilderness or undeveloped areas. The current social media strategies of the National Park Service should also be evaluated in-depth via rigorous social science research to determine if they are effective and if visitors enjoy and are seeking the kinds of interactions they currently have with park-related information online.

Promoting future research into these communication and interpretation topics would provide the NPS with a greater ability to engage with various populations of visitors, and greatly enhance the mission of the Service moving into its second century.
REFERENCES


Parker, S. E., Green, G.T. & C. Johnson. (2014). Differences in ethnic and minority recreation patterns: An examination of National Forest usage and activity participation across
four population subgroups in North Georgia. Presentation at the annual Southeastern Recreation Research Conference.


Appendix A – Informed Consent Form for Adults

North Carolina State University

INFORMED CONSENT FOR YOUR PARTICIPATION IN RESEARCH
WHILE VISITING CRATER LAKE NATIONAL PARK

Project title: The Evaluation of Internet Presence and Social Media Perceptions and Usage by Visitors to Crater Lake National Park

Lead investigator: Jordan W. Smith, Ph.D.

jwsmit12@ncsu.edu

Websites and social media have tremendous potential to inform and influence our decision, especially when planning trips and sharing trip experiences. By studying how visitors use the Internet and social media to plan park visits, park and natural resource managers can establish web-based presences that lead to more enjoyable outdoor recreational experiences. We would like you to participate in a short study that will allow us to learn how park visitors use the Internet and social media to plan their trip.

Your participation will involve completing a 5-minute questionnaire about your Internet and social media use related to this trip. The questions concern your average Internet use, reasons for using social media, and your preferences regarding Internet availability at the park in the future. Your participation in this study is completely voluntary. You have the right not to participate or stop participating at any time.

Risks and Benefits

Participation in this research involves little, if any, personal risks. All questions are non-sensitive in nature. You are not guaranteed any personal benefits from participation. By volunteering your email address at the end of the survey, you will be entered to win an iPad.

Confidentiality

The information in the study records will be completely confidential. Data will be stored securely in a password-protected database accessible only to project personnel. No reference will be made in oral or written reports that could link you to your responses or participation in
the study. You will NOT be asked to give your name on any study materials to prevent matching your identity to your responses.

Further Questions

If you have questions at any time about the study or the procedures, you may contact Dr. Jordan W. Smith, at jwsmit12@ncsu.edu, or (919) 515-3437. If you feel you have not been treated according to the descriptions in this form, or that your rights as a participant in the research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, at debra_paxton@ncsu.edu or (919) 515-4514.

Participant’s Consent

“Yes, I have read and understand the above information. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”

Participant’s signature ________________________________
Date ________________

Investigator’s signature ________________________________
Date ________________
North Carolina State University

INFORMED CONSENT FOR YOUR CHILD TO PARTICIPATE IN RESEARCH
WHILE VISITING CRATER LAKE NATIONAL PARK

Project title: The Evaluation of Internet Presence and Social Media Perceptions and Usage by Visitors to Crater Lake National Park

Lead investigator: Jordan W. Smith, Ph.D.
jwsmit12@ncsu.edu

Websites and social media have tremendous potential to inform and influence our decision, especially when planning trips and sharing trip experiences. By studying how visitors use the Internet and social media to plan park visits, park and natural resource managers can establish web-based presences that lead to more enjoyable outdoor recreational experiences. We would like you to participate in a short study that will allow us to learn how park visitors use the Internet and social media to plan their trip.

Your child’s participation will involve completing a 5-minute questionnaire about his or her Internet and social media use related to this trip. The questions concern his or her average Internet use, reasons for using social media, and his or her preferences regarding Internet availability at the park in the future. Your child’s participation in this study is completely voluntary. You have the right not to allow your child to participate.

Risks and Benefits

Participation in this research involves little, if any, personal risks. All questions are non-sensitive in nature. You are not guaranteed any personal benefits from participation. By volunteering your email address at the end of the survey, you will be entered to win an iPad.

Confidentiality

The information in the study records will be completely confidential. Data will be stored securely in a password-protected database accessible only to project personnel. No reference will be made in oral or written reports that could link your child to their responses or participation in the study. Your child will NOT be asked to give his or her name on any study materials to prevent matching his or her identity to responses.

Further Questions
If you have questions at any time about the study or the procedures, you may contact Dr. Jordan W. Smith, at jwsmith12@ncsu.edu, or (919) 515-3437. If you feel you or your child have not been treated according to the descriptions in this form, or that your child’s rights as a participant in the research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, at debra_paxton@ncsu.edu or (919) 515-4514.

**Parent/Guardian Consent**

“Yes, I have read and understand the above information. I agree to let my child participate in this study with the understanding that I may choose not to have them participate or to stop participating at any time without penalty or loss of benefits to which I, or my child, am otherwise entitled.”

Parent/Guardian’s signature __________________________ Date __________________

**Child’s Consent to Participate**

“I have read and understand the above information and agree to participate in this study.”

Child’s signature ________________________________ Date _________________

Investigator’s signature ___________________________ Date _________________
Appendix C – Survey for Visitors without Social Media

Thank you for participating in the survey! Before you begin, please make sure you have signed the informed consent form. If you have any questions, feel free to ask the research assistant for clarification.

If Crater Lake National Park were to have social media accounts, what types of information would allow you to have more enjoyable recreation experiences?

- Information about current weather/trail conditions in the Park
- Information about the Park’s natural and cultural history
- Information about available recreational activities in the Park
- Information about wildlife that can be seen within the Park
- Information about getting to/from the Park
- Information about local amenities and activities around the Park
- Other (please specify): ____________________
- None of the above

Did you visit the Crater Lake National Park website prior to this visit?

- Yes
- No

Did you use the Crater Lake National Park website to plan this visit?

- Yes
- No

What other information sources did you use to plan this trip?

- Close friends and/or family
- Coworkers and/or friends you do not consider close
- Online non-news sources (e.g., Wikipedia)
- Material provided by an organization or group (e.g., school, church, non-profit, etc.)
- Magazines
- National Park Service publications
- Other (please specify): ____________________
How much would you trust the trip-related information you received from that source?

<table>
<thead>
<tr>
<th>Source</th>
<th>I would not get my information from this source.</th>
<th>I would seek out information from this source, but would be cautious about trusting it</th>
<th>I would seek out information from this source, and I would always trust it.</th>
</tr>
</thead>
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<tr>
<td>Close friends and/or family</td>
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<tr>
<td>Coworkers and/or other friends you do not consider close</td>
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<td>Online non-news sources</td>
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<td>Material provided by an organization or group</td>
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<td>Magazines</td>
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<tr>
<td>National Park Service publications</td>
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</tr>
</tbody>
</table>

Would having Wi-Fi access at Crater Lake National Park allow you to have higher quality recreation experiences during your visit?

- [ ] Yes
- [ ] No
- [ ] No opinion

How strongly do you either support or oppose having Wi-Fi access at Crater Lake National Park?

- [ ] Strongly support
- [ ] Somewhat support
- [ ] Neither support nor oppose
- [ ] Somewhat oppose
- [ ] Strongly oppose
Is this your first visit to Crater Lake National Park?

- Yes
- No

How long will you be staying at Crater Lake National Park during this trip?

- less than 4 hours
- 4-8 hours
- Overnight (1-2 days)
- Overnight (3+ days)

How many individuals are with your group?

- Just myself
- 2
- 3-6
- 7-10
- 11+

How many adults are in your group (18+)?

How many individuals under the age of 18 are in your group?

What is your gender?

- Male
- Female

What is your age? ____________
What is the highest level of education that you have completed?
- Less than 9th grade
- 9th-12th grade, no diploma
- High school graduate
- Some college, no degree
- Associate’s degree
- Bachelor’s degree
- Graduate or professional degree

What is your race/ethnicity?
- White/Caucasian
- Black or African American
- Hispanic or Latino
- Asian
- American Indian
- Pacific Islander
- Some other race/multiracial
- Other (please specify): ___________________

What is your home zip code? ___________________

Thank you for your participation! If you would like to be included in a drawing to win an iPad, please provide your email address to the research assistant. Your email address will not be linked to your survey answers, and will only be used in the drawing.

Enjoy your trip to Crater Lake National Park!
Appendix D – Survey for Visitors with Social Media

Thank you for participating in the survey! Before you begin, please make sure you have signed the informed consent form. If you have any questions, feel free to ask the research assistant for clarification.

Which of the following social media sites have you used in the past month?

☐ Facebook
☐ Twitter
☐ Instagram
☐ Google+
☐ YouTube
☐ Flickr
☐ If another social media site, please specify: ____________________

Please only answer the following sections for the social media accounts that you have indicated above.

Facebook

How often do you use Facebook?

☐ Several times a day
☐ Once or twice daily
☐ Several times a week
☐ Once or twice weekly
☐ Once or twice monthly

What are your main reasons for using Facebook?

☐ To keep in contact with friends and family
☐ To stay informed of others in your extended social network
☐ Entertainment purposes (e.g., games, video, etc.)
☐ To express your opinions
☐ To find and share information
Have you visited the Crater Lake National Park Facebook page?

☐ Yes
☐ No

What types of information specifically from the Crater Lake National Park Facebook page would allow you to have more enjoyable recreation experiences?

☐ Information about current weather/trail conditions at the Park
☐ Information about the Park’s natural and cultural history
☐ Information about available recreational activities in the Park
☐ Information about wildlife that can be seen within the Park
☐ Information about getting to/from the Park
☐ Information about local amenities and activities around the Park
☐ Other (please specify): ____________________
☐ None of the above

Twitter

How often do you use Twitter?

☐ Several times a day
☐ Once or twice daily
☐ Several times a week
☐ Once or twice weekly
☐ Once or twice monthly

What are your main reasons for using Twitter?

☐ To keep in contact with family and friends
☐ To stay informed of others in your extended social network
☐ Entertainment purposes (e.g., games, videos, etc.)
☐ To express your opinions
☐ To find and share information

Have you visited the Crater Lake National Park Twitter page?

☐ Yes
☐ No
What types of information specifically from the Crater Lake National Park Twitter page would allow you to have more enjoyable recreation experiences?

- Information about current weather/trail conditions in the Park
- Information about the Park’s natural and cultural history
- Information about available recreational activities in the Park
- Information about wildlife that can be seen within the Park
- Information about getting to/from the Park
- Information about local amenities and activities around the Park
- Other (please specify): ____________________
- None of the above

**Instagram**

How often do you use Instagram?

- Several times a day
- Once or twice daily
- Several times a week
- Once or twice weekly
- Once or twice monthly

What are your main reasons for using Instagram?

- To keep in contact with family and friends
- To stay informed of others in your extended social network
- Entertainment purposes (e.g., games, video, etc.)
- To express your opinions
- To find and share information
If Crater Lake National Park were to have an Instagram account, what types of information would allow you to have more enjoyable recreation experiences?

- Information about current weather/trail conditions in the Park
- Information about the Park’s natural and cultural history
- Information about available recreational activities in the Park
- Information about wildlife that can be seen within the Park
- Information about getting to/from the Park
- Information about local amenities and activities around the Park
- Other (please specify): ____________________
- None of the above

**Google+**

How often do you use Google+?

- Several times a day
- Once or twice daily
- Several times a week
- Once or twice weekly
- Once or twice monthly

What are your main reasons for using Google+?

- To keep in contact with family and friends
- To stay informed of others in your extended social network
- Entertainment purposes (e.g., games, videos, etc.)
- To express your opinions
- To find and share information
If Crater Lake National Park were to have a Google+ account, what types of information would allow you to have more enjoyable recreation experiences?

- Information about current weather/trail conditions in the Park
- Information about the Park’s natural and cultural history
- Information about available recreational activities in the Park
- Information about wildlife that can be seen within the Park
- Information about getting to/from the Park
- Information about local amenities and activities around the Park
- Other (please specify): ____________________
- None of the above

**YouTube**

How often do you use YouTube?

- Several times a day
- Once or twice daily
- Several times a week
- Once or twice weekly
- Once or twice monthly

What are your main reasons for using YouTube?

- To keep in contact with family and friends
- To stay informed of others in your extended social network
- Entertainment (e.g., games, videos, etc.)
- To express your opinions
- To find and share information
If Crater Lake National Park were to have a YouTube account, what types of information would allow you to have more enjoyable recreation experiences?

- Information about current weather/trail conditions in the Park
- Information about the Park’s natural and cultural history
- Information about available recreational activities in the Park
- Information about wildlife that can be seen within the Park
- Information about getting to/from the Park
- Information about local amenities and activities around the Park
- Other (please specify): ____________________
- None of the above

**Flickr**

How often do you use Flickr?

- Several times a day
- Once or twice daily
- Several times a week
- Once or twice weekly
- Once or twice monthly

What are your main reasons for using Flickr?

- To keep in contact with family and friends
- To stay informed of others in your extended social network
- Entertainment (e.g., games, videos, etc.)
- To express your opinions
- To find and share information

Have you visited the Crater Lake National Park Flickr page?

- Yes
- No
What types of information from the Crater Lake National Park Flickr page would allow you to have more enjoyable recreation experiences?

☐ Information about current weather/trail conditions in the Park
☐ Information about the Park’s natural and cultural history
☐ Information about available recreational activities in the Park
☐ Information about wildlife that can be seen within the Park
☐ Information about getting to/from the Park
☐ Information about local amenities and activities around the Park
☐ Other (please specify): ____________________
☐ None of the above

(The section on specific social media sites is finished. Please answer all the remaining questions.)

Did you use any of your social media accounts to plan this trip? If so, which ones?

☐ Facebook
☐ Twitter
☐ Instagram
☐ Google+
☐ YouTube
☐ Flickr
☐ If some other social media site, please specify: ____________________
☐ I did not use any of my social media accounts to plan this visit.

Did you visit the Crater Lake National Park website prior to this visit?

☐ Yes
☐ No

Did you use the Crater Lake National Park website to plan this visit?

☐ Yes
☐ No
What other information sources did you use to plan this trip?

- Close friends and/or family
- Coworkers and/or friends you do not consider close
- Online non-news sources (e.g., Wikipedia)
- Material provided by an organization or group (e.g., school, church, non-profit, etc.)
- Magazines
- National Park Service publications
- Other (please specify): ____________________

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<td>☐</td>
<td>☐</td>
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Would having Wi-Fi access at Crater Lake National Park allow you to have higher quality recreation experiences during your visit?

- Yes
- No
- No opinion
How strongly do you either support or oppose having Wi-Fi access at Crater Lake National Park?

- Strongly support
- Somewhat support
- Neither support nor oppose
- Somewhat oppose
- Strongly oppose

Is this your first visit to Crater Lake National Park?

- Yes
- No

How long will you be staying at Crater Lake National Park during this trip?

- less than 4 hours
- 4-8 hours
- Overnight (1-2 days)
- Overnight (3+ days)

How many individuals are with your group?

- Just myself
- 2
- 3-6
- 7-10
- 11+

How many adults are in your group (18+)? __________

How many individuals under the age of 18 are in your group? __________

What is your gender?

- Male
- Female
What is your age? __________

What is the highest level of education that you have completed?
- Less than 9th grade
- 9th-12th grade, no diploma
- High school graduate
- Some college, no degree
- Associate’s degree
- Bachelor’s degree
- Graduate or professional degree

What is your race/ethnicity?
- White/Caucasian
- Black or African American
- Hispanic or Latino
- Asian
- American Indian
- Pacific Islander
- Some other race/multiracial
- Other (please specify): ____________________

What is your home zip code? ____________________

Thank you for your participation! If you would like to be included in a drawing to win an iPad, please provide your email address to the research assistant. Your email address will not be linked to your survey answers, and will only be used in the drawing.

Enjoy your trip to Crater Lake National Park!