Factors Influencing Conservation Knowledge: A Survey of Residents in the United States

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Abstract

Basic principles have been established for visitors of national and state parks, but some visitors may be more aware of conservation practices than others. To understand visitor awareness, this study investigated three factors that influence the general public's understanding of the Leave No Trace (LNT) conservation ethic: natural areas visitation, state of residence, and media consumption. Each of the factors showed statistically significant impacts on awareness of LNT, supporting our hypotheses that this knowledge will increase with a higher frequency of park visits and media consumption, and that region of residence will also impact LNT knowledge.

Keywords: Leave No Trace, National Parks, State Parks, Media, Environment, Conservation, Natural Areas

1 INTRODUCTION

In the United States, millions of people visit natural spaces for the activities and scenery they provide. Visitor presence physically alters such spaces and can severely affect the longevity of the ecosystems and natural resources located there. In 2019, National Parks received over 327.5 million visitors[1]. Furthermore, in 2018, over 807 million people visited state parks across the country[2]. To sustain these visitation rates and ensure the health of these parks, there must be a minimal impact left by each individual visitor. Conservation principles have been in place at national and state parks, but visitor understanding of these principles may vary. To understand visitor awareness, this study investigates three factors that influence the general public's understanding of the Leave No Trace conservation ethic: natural areas visitation, state of residence, and media consumption.

The Leave No Trace (LNT) initiative emphasizes minimizing human impact on wildlife and ecosystems through a variety of practices to ensure both visitor enjoyment and ecosystem preservation. They engage the public through use of conservation principles such as "travel and camp on durable surfaces," "dispose of waste properly," "minimize campfire impacts," and "leave what you find"[3]. LNT was built upon work by the U.S. Forest Service, National Park Service, and the Bureau of Land Management and released in 1999. Its principles seek to minimize the impact of visitors on natural spaces and call for people to be informed and critical of their use of national parks[4]. As visitors are not monitored in these large open areas, conservation practices rely on voluntary participation from those recreating within the space.

There are numerous studies which analyze the effectiveness of these principles and public attitudes toward them. Most of the studies conducted on LNT perceptions are on backcountry visitors instead of the more common and large group of day-users[5]. Research on awareness of LNT among backcountry visitors has shown variability in knowledge of these practices[6]. From previous research of overnight backcountry users, 44% of variation in LNT behaviors can be predicted, but the predictors vary greatly depending on the park, age, years of backcountry camping experience, and the size of group travelled in[7]. For the more common day visitor, little is known of their awareness of conservation practices like LNT.

Beyond park signage, we also expect that awareness of LNT should be influenced by public media. Utilizing media avenues for public conservation awareness may present a strategy to convince visitors to comply with conservation suggestions[6;7]. Investigations into the patterns of viewing television with conservation topics found that nature documentary consumption is predicted by environmental concern and influences positive environmental behaviors[8]. However, studies like Holbert et al. focus on TV consumption and do not

encompass other forms of media, such as daily news, social media, and advertisements.

Conservation is gaining traction in many communities. It can be argued that this topic was made popular in the mainstream media by Steve Irwin, who promoted wildlife education and preservation throughout his career. A study done in 2010 showed that his career had a major effect on increasing the public's knowledge of wildlife and conservation practices[9]. Such wildlife education programs and nature documentaries can be accessed nationally via television, but little is known on the variability of conservation awareness by state. Differences in conservation awareness may depend on the prominence of environmental education in each state. Ruskey et al. analyzed components of state-level environmental education to determine the extent of success in each state[10]. The next step is to determine the success of these environmental education programs by gauging conservation knowledge in the general public. There is a gap in research as to the effect of state residency on conservation awareness. Environmental education efforts may play a role, and it is unclear if an additional variables affecting conservation knowledge is accessibility to parks based on number per state.

Despite the depth of research in these separate areas, there is no research specifically on the different factors which influence LNT awareness amongst the general public. This survey seeks to investigate variables which affect resident knowledge of LNT in the United States. Specifically, this survey analyzes three factors and their relationship with self-assessed knowledge of LNT practices: use and frequency of visit to state and national parks, consumption of environmental news in regular media, and current state of residence. We predict awareness will increase as the frequency of park visits per year and consumption of environmental media increases. Finally, we predict residents in different regions of the U.S. will have different levels of awareness and that the number of parks in each region will positively affect awareness scores.

2 METHODS

To collect data on knowledge of the LNT initiative, we created a five-question survey using Qualtrics. The questions were designed to compare state of residence, use and time spent in state and national parks, and appearance of conservation topics in regularly consumed media to a self-assessment of awareness of conservation practices. Self-awareness of LNT was determined by the survey respondents on an integer scale of 1–10 with 10 being the most aware and subject to interpretation by the individual. All questions were designed as multiple choice with no option for free response except for Question 4, seen in Appendix A.

Participants for the survey were recruited over social media. The survey was shared by all three researchers on Facebook, by one on Snapchat, and by one on Instagram. The recruitment post can be found in Appendix B. Abridged versions were used for Snapchat and Instagram. All versions of the recruitment post stated the age requirement of 18 years or older, the length of the survey at five minutes, the role of the survey as a school assignment for a conservation biology course, and the voluntary and anonymous nature of participation.

The survey was available for two weeks and then closed to further public response. States were converted to United States regions using the U.S. Census Bureau guidelines to ensure an adequate sample size to test the impact of geography[11]. We analyzed frequency of park visits and frequency of conservation media topics as predictors for self-reported awareness scores as the dependent variable. To do this, responses to the survey were coded from ordinal categories into numeric values. A multiple linear regression was performed to analyze how frequency of park visits and consumption of conservation media affected self-reported LNT awareness. To test the differences between region of residence for self-reported LNT knowledge, an ANOVA was performed. Finally, a linear regression was done to investigate the relationship between frequency of park visits and the number of state and national parks in the region of residence.

3 RESULTS

Our survey received a total of 292 responses. Using a multiple linear regression, we found that both frequency of media and frequency of park visits each significantly explained self-reported awareness of LNT (Table 1; *awareness* = 5.80 + (0.57*frequency of media) + (0.37*frequency of visits)). Additionally, 12.9% of variability in awareness of LNT was explained by the two variables frequency of visiting parks and the amount of conservation media consumed.

Term	Value
R^2 adjusted	0.129
p of media	0.0001
p of visits	0.0018
Whole model prob > F	0.001

Table 1 Multiple Linear Regression Results of Consumption of Environmental Media and Frequency of Park Visits to LNT Awareness. A statistical term and their values for the multiple linear regression of frequency of visits and frequency of media consumption compared to the self-reported awareness scores.

Awareness of LNT also significantly differed by region; with the Midwest scoring lowest and the West scoring highest (Figure 1); F = 6.58, DF = 3, 277 $p <$

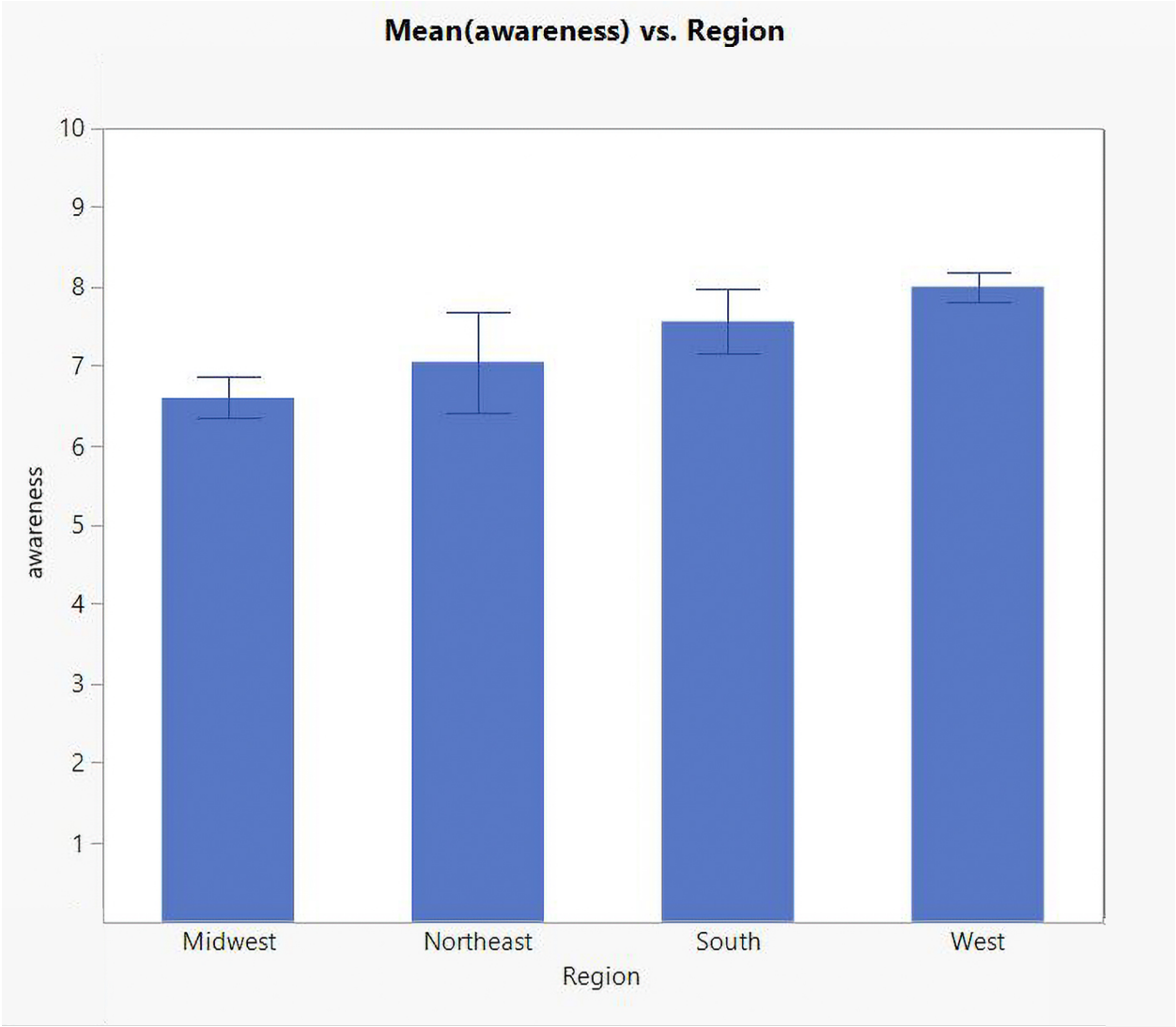

Figure 1. *Mean Awareness Score and Current Region of Residence.* Respondents provided their state of residence, and these states were arranged into regions in accordance with the US Census Bureau Regions of the US. The respondents reported their awareness of LNT conservation practices on a scale of 1–10 and values are subject to respondent bias.

0.001)

Additionally, the number of state and national parks within the respondent's region did not significantly explain the frequency of park visits ($p = 0.253$).

4 DISCUSSION

Each factor tested showed statistically significant impacts on awareness of LNT, supporting our hypotheses that this knowledge will increase with higher frequency of park visits and media consumption, and that region of residence will also impact LNT knowledge. Our results differ from the previous finding by Holbert et al. in 2003 in which they found that regular media consumption had no trend linked to positive environmental behaviors and only people who sought out environmental media had knowledge of conservation practices[8]. The hypothesis that conservation media consumption impacts LNT knowledge had the strongest relationship, suggesting that those whose social media feeds or news sources prioritize conservation will have greater awareness of how to actively participate in behaviors which support conservation. Aside from media consumption and frequency of visiting parks, the current region of residence also influenced overall awareness. We theorized that the number of state and national parks in each region would influence the awareness of respondents from that region. Our data, however, did not support this hypothesis. Further investigation is needed to determine what causes differences in conservation awareness by region, but it may be due in part to variance in public education[10]. There are likely additional variables that explain differences in awareness by region. Given that the strongest relationship was between

awareness and conservation media consumption, there could be differences in social media feeds based on region or other cultural impacts that would explain why the awareness of LNT in the West is much higher than in the Midwest.

In this study all the values were self-reported allowing for irregularity in awareness levels. Since a majority of the respondents, although anonymous, consisted of people from our social media and who we know personally, there may have been some social desirability bias. Additionally, because all scores were self-reported, different people with the same actual knowledge of LNT Principles may have self-reported different scores. Because this survey was shared within the researchers' social media circles, it also limited our chance to reach out to multiple people from each state. Finally, it could be likely that people who do not know or do not care about conservation would not take the survey, skewing the average awareness. Overall, we had a large number of responses, but in future research it would be helpful to reach out to a more diverse group and provide more detailed definitions of national and state parks.

Another limitation in our findings is the format of the response options for Questions 2 and 4 (Appendix A). The possible responses for both questions were based on frequency of use, however, there was discontinuity in the response scales. For example, in Question 2 regarding frequency of park visitation, options went from 1–2 times a year to 5–6 times a year with no option for survey respondents that visit 3–4 times a year. This was an error in the survey creation, and respondents were at will to arbitrarily choose the option they found most fitting. We cannot assume all respondents who had 3 park visits rounded down, nor that respondents with 4 park visits rounded up, though this may have been true for some of the survey takers. There is also a gap between 6 visits a year to 12 visits a year. A similar issue is found in Question 4 where the frequency scale of media consumption has gaps and user response will reflect those errors.

Despite these limitations, we found a strong relationship between frequency of park visitation and media consumption on conservation knowledge in the general public. These findings suggest that if the public can be encouraged to visit these natural spaces and consume media on conservation, then more people will know about these important practices which could have a dramatic effect on natural spaces in recovery. Since region of residence has influence on conservation awareness, federal organizations like the National Parks Service can analyze individual state or regional efforts where awareness is high and replicate those techniques in states and regions with lower awareness values. It is also important to recognize that this form of conservation campaigning should also be advertised to different demographics who would not normally consume or search out this information in ways which are easy to understand.

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6 EDITOR'S NOTES

This article was peer-reviewed.

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APPENDICES

A Appendix A

List of Survey Questions:

1. What state do you live in now?
2. Many people spend time outside in their daily lives by going on walks or spending time in city parks. How frequently do you typically visit national and/or state parks?
3. When you go to these spaces what do you do? Check all that apply. (hiking, climbing, camping, skiing, etc.)
4. How often do you hear about conservation in the media you consume (daily news, social media, TV and streaming services, advertisements)?
5. On a scale of 1-10, how aware would you say you are of "Leave No Trace" and other conservation efforts?

B Appendix B

Recruitment Post:

Hello! If you are 18 years of age or older, please consider taking our survey surrounding conservation practices. The survey is 5 questions and will take under 5 minutes. Your participation is entirely voluntary, all data is anonymous and will not be saved for future use. Our analyzed findings will be submitted for publication with the University of Denver Undergraduate Research Journal. The survey is linked below.