Alabama Pilot Survey for a New National Outdoor Recreation Survey Focusing on Minority Access and Views

by

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Abstract

Since 2014, the agencies tasked with managing our outdoor recreation sites have experienced a knowledge gap caused by the discontinuation of the National Survey on Recreation and the Environment (NSRE), which was previously the main data collection tool assessing national outdoor recreation trends for state and federal agencies. Outdoor recreation is an important part of how people interact with nature, with greater interaction with nature being shown to improve both physical and mental wellbeing, however more data is needed to determine the gaps in access to outdoor recreation nationwide. We developed pilot survey in Alabama to potentially replace the NSRE utilizing an online panel survey to test the gaps in Black and White outdoor recreation participation, outdoor recreation motivations and constraints, and valuation of ecosystem services. We found that there are significant differences in how Black and White Alabama citizens perceive the outdoors and outdoor recreation, however found that more participated in outdoor recreation than other studies have found. By expanding the definition of outdoor recreation, we were able to find more participants, and this data could provide managers opportunities to provide minority populations with novel outdoor recreation opportunities.

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Chapter 1 Activity Participation, Motivations and Constraints

The National Survey on Recreation and the Environment (NSRE) was the predominate tool collecting national and state level outdoor recreation data from 1994 to 2014. The NSRE originated in the early 1960s as the Outdoor Recreation Resources Review Commission ran the first national recreation participation survey, the findings of which pushed Congress to pass the Outdoor Recreation Act of 1963. This act created the Bureau of Outdoor Recreation and required it conduct nationwide inventory of federal recreation and evaluate the rapidly growing needs and resources of outdoor recreation called the National Recreation Survey. When the Bureau of Outdoor Recreation was eliminated in 1979, these duties moved to the National Park Service and then the Forest Service when the Rangeland Renewable Resources Planning Act was passed (Cordell, 2004). The Rangeland Renewable Resources Planning Act of 1974 requires the Department of Agriculture to analyze the current and anticipated demand, use, and supply of forest resources; create an inventory of said resources; describe the relationship between Forest Service programs and responsibilities with public and private activities; and discuss factors that may influence the use, ownership, and management of forest resources (Forest and Rangeland Renewable Resources Planning Act of 1974, 2000).

In 1994 the Forest Service ran the first National Survey on Recreation and the Environment in order to assess and plan for the wise use of their outdoor recreation resources. This nationwide telephone survey replaced the previous national recreation surveys, but with the additional goal of connecting recreation to the environment (*National Survey on Recreation and the Environment (NSRE)*, 2002). The NSRE was created in order to collect all facets of data regarding outdoor recreation to meet the needs of the Rangeland Renewable Resources Planning Act, however it primarily collected data on the participation in a wide variety of recreational activities, without consideration of other, harder to quantify factors that may influence personal connection to the resource. The NSRE was a telephone survey designed to be collected every 5 years to measure long term trends of outdoor recreation participation. The survey gathered data on 80+ different outdoor recreation activities. The survey was administered as a phone interview of a representative sample of the national population with a sampling intensity that allowed for national, state, and regional analysis (Cordell, 2004). The questions asked by interviewers determined annual participation rates of activities, number of days spent participating in each

activity, what kind of setting were used by participants, and how participation compared between states. In addition to questions regarding activities, the NSRE also included modules on management preferences for natural resources, beliefs on the environment and management strategies, and attitudes regarding the environment, as well as individual questions such as questions about ecosystem services and the protection of wildlife (USDA Forest Service, 2014, 2021). The ability to compare long term activity participation alongside these extra modules across demographics, states, and regions made the NSRE a powerful tool for measuring outdoor recreation trends and attitudes toward the environment (Cordell et al., 1999).

Potential Improvements to NSRE

While the NSRE measured general participation in activities and frequency, it did not connect activities to locations. This gave a picture of what activities recreators might do and their level of participation, but not where they were going to participate in specific activities. As a telephone survey, the NSRE was able to gather samples representative of the national population (Forest and Rangeland Renewable Resources Planning Act of 1974, 2000). However the NSRE began facing the drawbacks of telephone survey that have plagued researchers in recent years where people are less likely to accept calls from surveyors (Pew Research Center, Washington D. C., 2019). Low sampling intensity also meant the survey could not analyze recreation trends at any scale more localized than the state level (W. C. Morse, Cerveny, et al., 2022). These drawbacks prevented the NSRE from being as useful for specific recreation sites (parks, forests, etc). However, the measurement of trends pertaining to outdoor recreation still proved useful in guiding decision making for many levels of the outdoor recreation field at the state and national levels, from public to private. The NSRE excelled at providing comparisons between large scale regions and demographics in the participation in outdoor recreation activities, cementing it as an integral part of decision making for state and federal agencies, commonly used in Statewide Comprehensive Outdoor Recreation Plans, the outdoor recreation plans required for states to receive outdoor recreation funding, as well as private industry. This survey became the predominant source of national outdoor recreation data, however due to a shift towards funding data collection based on agency specific needs and the retirement of the director, the NSRE was

discontinued (W. C. Morse, Cerveny, et al., 2022). With its discontinuation in 2014, the absence of the NSRE has left a considerable knowledge gap in the outdoor recreation field.

Evolution of outdoor recreation management

These nationwide recreation surveys were originally developed to assist in the management of outdoor recreation by providing information on participation and activity preference in order to supply resources needed to facilitate these activities (Driver, 2009). As recreation theory developed, recreation managers turned their attention towards managing for specific recreation experiences based on motivations and preferences (R. L. Moore & Driver, 2005). This was known as the experience-based management theory, which states that identifying the motivations of outdoor recreation participants is key to determining why recreationists participate in their chosen activities (Manfredo et al., 1996). Motivation theory in recreation stems from Maslow's theory of the Hierarchy of Needs, which states that humans have motivations to meet these needs that would eventually result in the top of the hierarchal pyramid, self-fulfillment (J. Johnson et al., 2018). These outdoor recreation motivations depend on the desired experiential outcomes of recreation participants, a concept that became labeled "benefits", which were thought to be developed through activity participation (Cordell, 2004). Benefit-based management soon began to replace experience-based methods as the benefits of outdoor recreation to society and to the environment became the focus of outdoor recreation management (R. L. Moore & Driver, 2005). Outcomes focused management is a term used to be more inclusive of the potential negative outcomes of outdoor recreation (Driver, 2009). These outcomes have been categorized into individuals' psychological and psychophysiological outcomes; outcomes for households, communities and society such as economic impacts and social cohesion; management outcomes such as funding levels and public image; and environmental outcomes such as resource conservation and ecosystem service provisioning (Driver, 2009). Today, outcome-based management is the basis on which modern recreation management strategies draw upon, and recreation research must follow suit in order to be applicable to decision making. In order to effectively measure the outcomes of increased participation in outdoor recreation, whether increased place attachment, increased environmental

degradation, or increased community outcomes, rates of participation must be examined (W. C. Morse, Cerveny, et al., 2022).

Current Recreation Demand Surveys

Nationally the Outdoor Industry Association, a group of recreation companies representing aspects of the private outdoor recreation industry (Outdoor Industry Association, 2018) replaced the NSRE for long term outdoor recreation trend data collection, however due to the proprietary methodological approaches, the data cannot be compared to other nation or statewide recreation, health, and equity data, and county level participation data is not available (W. C. Morse, Cerveny, et al., 2022). Statewide Comprehensive Outdoor Recreation Plans previously relied heavily on the NSRE for statewide participation trend data, but with the discontinuation of the NSRE individual states had to develop their own surveys to replace data collected by the NSRE at a state level (W. C. Morse, Cerveny, et al., 2022). Statewide Comprehensive Outdoor Recreation Plans were a requirement of the Land and Water Conservation Fund State Assistance Program, a program established by the Land and Water Conservation Fund Act of 1965, a bipartisan act meant to protect Americas natural resources including access to recreation (National Park Service Department of the Interior, 2008). The Land and Water Conservation Fund provides matching funds to states for acquiring land for outdoor recreation as well as for managing outdoor recreation programs and facilities (National Park Service Department of the Interior, 2008). In order to meet the conditions for these funds, states design Statewide Comprehensive Outdoor Recreation Plans that must fulfill requirements such as designating a state agency to communicate the plan, creating a program of plan implementation, provide opportunities for the public to participate in plan design, and providing an evaluation of supply and demand for outdoor recreation resources in the state (National Park Service Department of the Interior, 2008). Many states create and distribute statewide recreation surveys to evaluate outdoor recreation and although these surveys provided the necessary data for recreation within states, they did not connect data between different states. Due to the differing methodological strategies of data collection, surveying, and reporting between states, comparisons cannot be made between different state data (Hall et al., 2009) hindering collaboration between recreation managers in different states. Another requirement of Statewide

Comprehensive Outdoor Recreation Plans is to inventory recreation supply (National Park Service Department of the Interior, 2008), however much like recreation data collection, methodological differences mean that individual state supply data cannot be compared to other states or to federal data.

At the national level the Protected Area Database developed by the U.S. Geological Survey to provide an analysis of available habitat for threatened and endangered wildlife, identifying those 'gaps' in available protected land that need to be filled (Gargely & McKerrow, 2013). The stewardship layer from the initial Gap analysis is a map of all levels of protected areas; national, state, local and private. Statewide Comprehensive Outdoor Recreation Plan supply analysis are updated every 5 years, and with the integration of data from the National Recreation Database, the Protected Area Database can be the basis for recreation supply data nationally (GreenInfo Network, 2016). This information has the potential to be integrated at the local level to become a national source of recreation participation and demand data demonstrating links between local supply and demand.

Building an updated NSRE

While the knowledge gap created by the discontinuation of the NSRE has undoubtably limited our understanding of recreation trends post 2014, it does give us the opportunity to expand on the original framework. A revised NSRE will need to address current issues and be able to monitor trends related to equity in access to outdoor recreation. A revamped NSRE will also need to refine the type of data collected and increase the number of spatial scales the data can be assessed, allowing decision makers to track distinct trends at all levels of management. Data collection procedures will also need to be improved to become more reliable and efficient, utilizing cutting-edge data collection methods and expanding the pool of resources used to do so. If outdoor recreation land is meant to be managed for the enjoyment of the people, then gaps in knowledge on what the people want and why prevent managers meeting this goal.

Equity in access to outdoor recreation

Disadvantaged populations, such as low income or minority populations, often find that outdoor recreation and nature-based activities are often more difficult to access due to physical, social, and economic restraints (L. V. Moore et al., 2008). The origin of protected lands in the United States comes from ideology that is rooted in discriminatory ideals of natural purity that reflect the perceptions of a White society (Mowatt, 2020). By continuing to perpetuate these ideals through the assertion that nature must be enjoyed a certain way, land managers suppress the nature values held by people of color (Theriault & Mowatt, 2020) continuing the long held view of natural recreation areas as "White spaces" (Scott & Lee, 2018). Lack of access to socioeconomic resources is one of the main limitations of national park visitation for people of color (Floyd & Stodolska, 2014), as many constraints to visitation can be attributed to lower socioeconomic statuses. Bowser (2007) found that even at the same education level, Blacks earn less money than Whites, and these kinds of systematic differences in economic status may prevent people from effectively negotiating constraints. However according to Floyd & Stodolska (2014), some people of color may not view many outdoor recreation activities as "culturally relevant", and therefore limit outdoor recreation based on cultural factors. Still, many people of color who travel and participate in outdoor recreation find themselves faced with discrimination while at these natural areas, greatly decreasing their enjoyment and desire to participate (Lee & Scott, 2017). Scott (2014) posits that the embedded and often seemingly ordinary practices within management agencies perpetuate the discriminatory patterns within outdoor recreation by promoting White history, White views of nature, and White cultural norms of how one must enjoy nature.

Recently the COVID-19 pandemic has revealed the importance of expanding access to outdoor recreation for disadvantaged groups for not only equity's sake, but for community resiliency as well. Restrictions put in place for COVID to decrease the spread of the virus had harmful effects on mental health (Holman et al., 2020; Jenkins et al., 2021; Rossi et al., 2020). As marginalized groups face equity concerns of susceptibility to physical and mental health issues during the pandemic (Browning et al., 2021; Czeisler et al., 2020; Fortuna et al., 2020; Hooper et al., 2020), mitigating these impacts is imperative. Outdoor recreation has been shown to improve the physical and mental health of participants, not only decreasing stress levels and increasing physical activity, but reducing the risk of chronic health conditions as well (Bratman et al., 2019; Hartig et al., 2014; Kuo, 2015; Shanahan et al., 2016). Beall et al. (2022) found that

those who participated in outdoor activities and nature activities before the pandemic and continued to participate during the pandemic had less declines in well-being. There was an overall decrease in outdoor recreation participation which may have been due to a variety of factors including safety concerns and closure of parks. This study also found that men and White respondents experienced fewer negative impacts to well-being compared to women and Hispanic respondents (Beall et al., 2022). Increasing participation in outdoor recreation may be as key to creating resilient communities as other well-known factors of resiliency. This is especially important when examining the disproportionate impact of crises on marginalized populations, therefore more effort should be placed on increasing outdoor recreation participation in these populations.

Research has shown difference in outdoor recreation behavior based on race and ethnicity (Hrymkowski et al., 2014), and as diversity is increasing it has become more important to develop a model that includes socio-demographics and outdoor recreation participation. Motivation is key to understanding why these differences occur, but motivation scales do not provide information on where people go to participate in outdoor recreation. To manage sites effectively, it is necessary to know where people go and why, especially if trying to meet the needs of diverse groups. Studies have shown that that cultural values and norms have a highly important role in the kind of outdoor recreation people participate in (Stodolska, 2015), however marginalized groups experience more structural constraints that prevent them from participating in outdoor recreation than White people (Wilhelm-Stanis et al., 2009)). A new national recreation survey should measure and account for these factors in order to be completely comprehensive, and by measuring the needs of "around the home" recreation at a county level, outdoor recreation managers can better meet the needs of these disadvantaged groups.

Outdoor Recreation Motivations and Constraints

Constraints are what limit the ability of people, whether on their own or as a group, to participate in the recreation activities that they would prefer and is often utilized in the context of lack of access to recreation by socio-cultural groups (Godbey et al., 2010). Jackson et al. (1993) theorized that constraints are divided into intrapersonal, interpersonal, and structural factors, which exist in a hierarchal structure causing individuals to negotiate through the structure in a

sequential manner (intrapersonal to interpersonal to structural) if the individual is to participate in a leisure activity. Godbey et al. (2010) expanded on these ideas and used the three categories, intrapersonal, interpersonal, and structural constraints, as the basis of their constraint framework. Intrapersonal constraints were defined as the constraints driven by a person's internal momentum, constraints such as lack of knowledge, lack of skills, and desire to do other activities. Interpersonal constraints are where the framework shifts into the external, wherein an individual's interactions with others are what limits their participation in recreation, for example discrimination from others or lack companions to recreate with. Structural constraints revolve around how society limits the opportunities to pursue recreation, such as issues of lacking time for recreation due to job responsibilities, lack of available recreational spaces within one's area, or imposed cultural norms (Godbey et al., 2010). As the Land and Water Conservation fund stipulates that Statewide Comprehensive Outdoor Recreation Plans must identify outdoor recreation issues faced by the state's population (National Park Service Department of the Interior, 2008) an assessment of the constraints faced by potential outdoor recreation participants is needed. Constraints are experienced by all populations, however the constraints experienced vary depending on the specific population (Green et al., 2012). Many constraints are experienced most acutely by people of color and minority communities and much research has focused on identifying these constraints and how minority populations respond to them (Stodolska et al., 2020). These groups experience a variety of constraints differently, however the main constraints experienced by underserved groups tends to be cost, time, lack of knowledge, and safety (Dorwart et al., 2019; Green et al., 2012; Stodolska et al., 2020). For example, Stodolska (2018) found that the strongest constraints to the participation of people of color in parks and recreation activities were cost, lack of knowledge, lack of transportation, time, safety, facilities, and language barriers. According to Larson et al. (2014) local access to parks and recreation was of greater importance to Latinos than Whites, which can be due to constraints in transportation (Perry et al., 2015) or accessibility in general (Le, 2012).

Outdoor recreation is a process, one that is influenced by motivation and setting to achieve a desired outcome that may effect not only the participant in the activity, but the managers, ecosystem, and other stakeholders as well. The phases within this process: anticipation and planning, travel-to, on-site experience, travel-from, and recollection (R. L. Moore & Driver, 2005). The framework developed by Morse, Stern, et al. (2022) shows this

progression from motivation and preferences driving participation in an activity while the three types of settings, biophysical, managerial, and social, determine the context of the activity and with ultimately the individual creating the outcome.
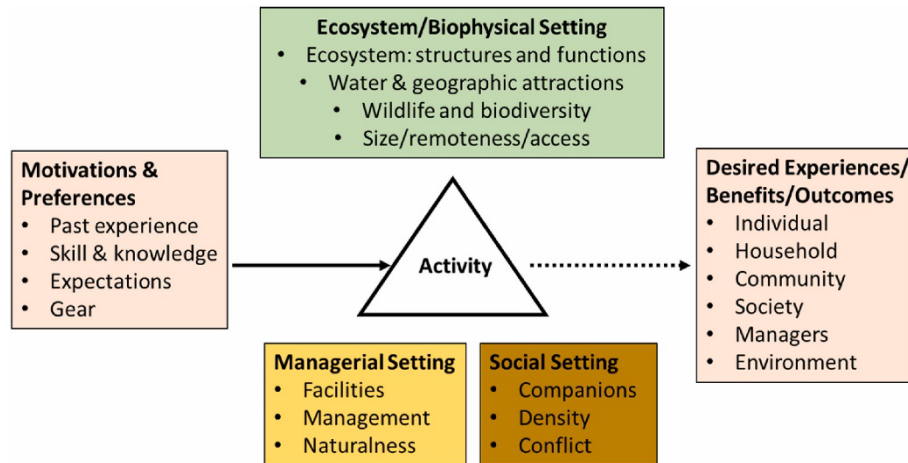

Fig. 1. Recreation Experience Model from W. C. Morse, Stern, et al., (2022)

Participants in outdoor recreation are motivated to participate in their desired activity within a preferred setting (W. Morse, 2020), and while the activity is created by the participant through their own actions, the role of the manager is to provide the recreation opportunity setting that will satisfy the motivation and preferences of the visitor (R. L. Moore & Driver, 2005). Incomplete understanding of the motivation, needs, and constraints of the potential visitor limits the manager's ability to effectively develop recreation opportunities and therefor efforts to provide a more complete understanding of their visitors, current and potential, is paramount.

In Jackson et al. (1993) the authors posit that the negotiation of constraints in outdoor recreation is directly influenced by the strength of motivation to participate in the activity. Conceptual models of leisure constraint negotiation have been developed to examine the role of motivation in negotiation self-efficacy (Hubbard & Mannell, 2001; Loucks-Atkinson & Mannell, 2007). White (2008) suggests a structural model for constraint negotiation wherein motivation has a central role in leisure participation. Motivation not only exhibited a positive effect on negation levels, but also had a stronger correlation in leisure participation than negotiation while decreasing perceived constraints (White, 2008). The effect of motivation was shown to have a greater impact on underserved groups of older adults and women, as the level of self-directed negotiation of constraints was greater in those who had high motivation to participate in physically active leisure (Son et al., 2008). Motivation is highly important to the participation in

outdoor recreation, however while constraints may not prohibit potential participants from leisure activities, they still act as limiters to participation (Silva & Correia, 2008). Managers of outdoor recreation have the most control over the structural constraints of leisure and can provide many opportunities for decreasing the limiting effects of these constraints (Pennington-Gray & Kerstetter, 2002). Constraints, being directly influenced by the culture within an individual resides (Godbey et al., 2010) will be inherently different through the lenses of different cultural groups, and examining constraints and preferences as a monolith prevents recreation managers from meeting the unique needs of different groups (Stodolska et al., 2020). For example, in the Xiao et al. (2021) paper examining the constraints faced by visitors and non-visitors to national parks found that Black and Hispanic respondents preferred recreation activities that were socially and culturally motivated. In this way, these respondents were constrained from visiting National Parks due to activities that better fit these cultural preferences taking precedent. Examining why different groups prefer one type of activity over another may help answer these questions of cultural differences and allow for managers to be more effective in helping minority groups negotiate constraints.

Our paper

This survey was developed in order to measure the outdoor recreation motivations, constraints, and needs of Alabama citizens, as well as the rates of outdoor recreation activity participation between the Black and White Alabama population. The motivation, constraints, and needs scales can be utilized alongside the activity participation measures to determine how land managers can better meet the needs of Alabama's population. By focusing on the differences between Black and White outdoor recreation participation, managers can determine where resources should be allocated in order to meet the needs of underserved minority populations. As determined by the previous literature on the subject, by including analysis on motivations, constraints, and needs, this study can provide the necessary information on how to improve minority participation. In this study we ask how outdoor activity participation differs between Black and White citizens of Alabama, and how motivations and constraints for outdoor recreation differ as well. We also ask how the outdoor recreation motivations and constraints of Alabama citizens differs for recreation based near their homes and recreation away from their

homes. Lastly, we ask how access to near home outdoor recreation differs between Black and White Alabama citizens.

Study Site

Our study site is the state of Alabama, a state in the southeast wherein 69% of the 5,059,887 population is White, 26% Black, and 5% Latino (*U.S. Census Bureau QuickFacts*, 2020). Approximately 22.7% of the population lives in rural areas (USDA Economic Research Service, 2022) who tend to have worse health outcomes (Douthit et al., 2015), lower incomes, and higher rates of poverty than counterparts in urban areas (Guzman et al., 2021). Alabama residents are also limited in their ability to access public outdoor recreation areas, especially for those who may have less access to modes of transportation to reach far away areas and less time to spend traveling for recreation. The current figures for the US Geological Survey Protected Area Database Gap Analysis Project show that only 4.77% of Alabama's 33,548,850 acres is permanently protected from large scale land cover change and 3.02% of Alabama's total acreage is open to public use (U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2022). Through an analysis of how different demographic groups are participating in outdoor recreation, we can determine how these issues of limited access may be effecting disadvantaged groups in Alabama.

Protected area distribution between counties also variers significantly, however outdoor recreation supply data between states and land management agencies has not been standardized since the last distribution of the NSRE (W. C. Morse, Cerveny, et al., 2022). One source of data that can be utilized to compare distribution between counties in Alabama is the US Geological Service Protected Area Database. This data has already been utilized to help land managers coordinate conservation efforts of endangered species, utilizing this standardized data to make necessary management decisions. While the purpose of the Protected Area Database database is to assess ecological needs, in the United States protected areas are open to human use and recreation, making this continuously updated source of data (GreenInfo Network, 2016) a good basis for measuring protected area distribution.

Methods

With the recent decline in mail survey response rates (Stedman et al., 2019), there has been a greater interest in distributing surveys over online panels in order to save time and money, as well as be more efficient with data management (Needham & Vaske, 2019b). Our survey was designed and distributed over the internet and was self-administered with the option to take on the computer, on the phone, or on any other device with internet connection. This approach can have issues with non-response and self-selection errors, and may miss populations that have limited internet access, such as rural minorities and those in poverty (*Coverage Error in Internet Surveys" Pew Research Center*, 2015). In order to minimize the errors inherent in a random, self-administered internet survey, we elected to use panel surveys. Panel surveys are paid surveys often used in marketing research where people who register to be available for survey taking are selected to be representative of the general population (Callegaro et al., 2015). As online panels can set quotas to match the demographic distributions of the general population, findings from online panels are still consistent with those from traditional sample probability designs (Vaske et al., 2022; Wardropper et al., 2020). The survey design and distribution company Qualtrics administered this online panel survey in order to expedite and simplify the distribution process, this distribution method will also guarantee a response rate representative of Alabama's population even if the survey length may dissuade randomly selected, unpaid survey participants from completing the survey (Kost & Rosa, 2018). As Qualtrics has pre-recruited respondents who are effectively "on-call" to complete surveys sent to them by the company, this allowed for the collection of responses to be faster than if distributed to randomly selected survey-takers (Callegaro et al., 2015). We requested that Qualtrics distribute the survey to a general population panel, in which a panel that is selected to the demographically similar to the population that is trying to be matched through the distribution (Callegaro et al., 2015). There are challenges with this panel approach however, as some online panel surveying methods have been shown to have low data quality, however by selecting for a high amount of population variables, the data should be fairly accurate (*Assessing the Accuracy of Online Nonprobability Surveys*, 2016). Still, there are concerns about whether recruitment for panels can always procure a truly representative sample from the general population (Stedman et al., 2019), especially when attempting to target geographic areas with lower populations.

Qualtrics recruits panel survey participants through several different sources, including referrals from other members, email lists, gaming websites, customer loyalty websites, social media, and other such web pages. To ensure validity, Qualtrics utilizes a third-party company that verifies names, address, and birth dates of potential panel members, and Qualtrics also scrubs panels for bot respondents, incorrect IP addresses, and other indicators of false panelists. As the survey is being distributed, Qualtrics continues to scrub respondents from the survey checking for unusable responses from panelists taking the survey too fast, entering random answers for short answer questions, or entering patterns of responses.

Questionnaire Components and Design

The survey questionnaires were based on the (Dillman et al., 2014) tailored design method when writing questions and designing survey flow. The basis of the activity participation questionnaire was the National Survey on Recreation and the Environment (USDA Forest Service, 2014) with other surveys from the state level providing an updated list of the most common outdoor recreation activities, as well as the format for the questions on participation rates and on additional household members participating in activities. These portions of the activity questionnaire were taken from the Oregon Statewide Comprehensive Recreation plan survey (O. Parks & Department, 2019), from which we took the question format and list of outdoor recreation activities, decreasing the breadth of the questions and condensing the specificity of the activities to increase the survey brevity. To find categories to condense activities into and to expand the breadth of activities to choose from, we also consulted the California Statewide Comprehensive Outdoor Recreation Plan survey (C. S. Parks, 2014) and the Outdoor Industry Association 2018 Annual Report (Outdoor Industry Association, 2018). To address the goal of assessing environmental justice and concerns on equitable access to outdoor recreation, questionnaires to assess outdoor recreation motivations and constraints of the participants were included, as well as a questionnaire on participants' local access to trails, parks, and green spaces. The motivations questionnaire was adapted from the Driver Recreation Experience Preference Scales (Manfredo et al., 1996), with 16 statements extracted from the list and transposed onto a five-point Likert scale. The constraints questionnaire was a five-point Likert scale adapted from the Carter (2019) Alabama obesity survey.

In order to decrease the overall mental load on participants from spending time taking the survey (Kost & Rosa, 2018) and to increase survey efficiency, we utilized the ability of online surveys to program skip patterns into the survey taking process. When a participant selects a response to a question in the survey, this response will cause the program to either skip further along in the survey or allow the participant to answer the following question if it is relevant to their response. Skip patterns were used in the activity questionnaire, so participants did not have to read through questions on activities they did not participate in the past year and by reducing the number of questions participants read through, we were able to reduce the amount of time spent on the survey.

Demographics Comparison	Panel demographics %	Alabama Census %
Race		
White Population Percentage	69.1%	68.9%
Black Population Percentage	25.1%	26.9%
Gender		
Male Population Percentage	24.9%	48.6%
Female Population Percentage	75%	51.4%

Table 1: Demographic comparison between panel respondents and actual Alabama population

The racial demographics were fairly close to Alabama's own demographics, however 75% of respondents were female as opposed to the 51% female population. In order to analyze the data to reflect a representative population, the values had to be weighted to reflect higher female participation than the Alabama population.

Analysis

For our analysis we weighted the female data by 0.68 and the male data by 2.103 to simulate the data of a representative Alabama population. Then we used survey weighted generalized linear models to compare Black and White population participation rates for each activity in the survey. We also used survey weighted generalized linear models to determine the

difference between the mean scores of outdoor recreation motivation and constraints and estimated the marginal means. To compare the means of the near and away from home motivations and constraints we ran a simple t-test. To determine if there was any difference in access to nearby recreation amenities we performed a survey weighted generalized linear model.

Results

Percent of Population Participating in Near Home Activities	Black %	White %	p-value	Total %
Walking/jogging local streets or sidewalks	74.14%	74.00%	0.975	74.07%
Walking/jogging local trails and paths (paved or unpaved)	64.88%	60.41%	0.375	62.65%
Relaxing or hanging-out in parks or green-spaces	63.13%	55.26%	0.12	59.20%
Gathering with family/friends in parks or green-spaces	59.00%	58.96%	0.994	58.98%
Attending concerts, fairs, festivals outdoors	55.88%	57.29%	0.785	56.59%
Swimming - outdoor pool	51.95%	57.99%	0.242	54.97%
Gardening	48.72%	52.87%	0.424	50.80%
Taking kids to a local playground	53.11%	47.19%	0.253	50.15%
Visiting historic sites	48.91%	48.93%	0.996	48.92%
Bird watching around your home or neighborhood	49.34%	41.56%	0.131	45.45%
Other wildlife viewing around your home or neighborhood	44.25%	45.69%	0.782	44.97%
Picnicking	46.04%	43.17%	0.579	44.61%
Dog walking or going to a dog park or off-leash area	42.00%	45.68%	0.478	43.84%
Biking local streets	41.34%	23.09%	0.00016 ***	32.22%
Biking local trails/paths (paved or unpaved)	39.09%	20.80%	0.0001***	29.95%
Total Near Home Activity Participation	91.87%	96.45%	0.0364*	94.16%

*<0.05, **<0.01, ***<0.001

Table 2: Black and White percent of population participating in near home activities

We found that the most commonly participated in near home activity was walking/ jogging local streets or sidewalks, and the second most common was walking/ jogging local trails or paths, with relaxing or hanging-out in parks or green-spaces coming in third. Black respondents reported participating more in biking (on streets- p-value= 0.00016, and trails- p-

value=0.0001) near home than White respondents, but overall Black participation in near home activities was lower than White participation (p-value=0.03645).

Percent of Population Participating in Away from Home Activities	Black %	White %	p-value	Total %
Hike	54.96%	62.84%	0.28	58.90%
Visiting the beach	49.04%	54.73%	0.0944	51.895
Freshwater Fishing	40.28%	43.01%	0.602	41.65%
Relaxing by the lake	32.21%	42.27%	0.0492*	37.24%
Swimming in lakes and rivers	27.38%	39.68%	0.141	33.53%
Nature Observing	24.97%	37.53%	0.0117*	31.25%
Ocean swimming	19.75%	42.09%	6.389e-06***	30.92%
Tent Camping	29.44%	24.74%	0.312	27.09%
Bird Watching	24.07%	23.05%	0.818	23.56%
Visiting gardens or nature centers	20.04%	23.15%	0.484	21.60%
Ocean photography	11.08%	26.21%	0.000338***	18.65%
Wildlife Watching	11.11%	25.89%	0.00078***	18.50%
Visiting coastal area (non-beach)	11.47%	23.70%	0.0039**	17.59%
RV Camping	15.61%	16.35%	0.853	15.98%
Off Roading	10.12%	18.31%	0.028*	14.22%
Backpacking	13.93%	11.28%	0.47	13.93%
Cabin Camping	16.34%	11.28%	0.157	13.81%
Outdoor photography	7.15%	18.23%	0.0011**	12.69%
Target Shooting	9.40%	15.81%	0.0728	12.61%
Trail Running	16.87%	8.05%	0.00833**	12.46%
Biking on paved paths	14.59%	9.84%	0.162	12.22%
Collecting outdoor materials	11.65%	12.77%	0.745	12.21%
Big Game Hunting	13.36%	8.46%	0.136	10.91%
Motorboating	6.65%	14.46%	0.0199*	10.56%
Painting outdoors	13.86%	7.15%	0.0194*	10.51%
Flatwater boating	7.01%	13.43%	0.049*	10.22%
Small Game Hunting	11.71%	8.25%	0.295	9.98%
Horse	8.50%	8.54%	0.99	8.52%
Wildlife watching on Coast	3.34%	12.58%	0.0049**	7.96%
Whitewater boating	9.83%	5.98%	0.164	7.91%
Fishing off a pier (ocean)	5.95%	9.43%	0.267	7.69%
Mountain biking	9.83%	4.43%	0.0434*	7.13%
Caving	3.84%	10.02%	0.0177*	6.93%
Bird watching on coast	3.70%	9.24%	0.0508	6.47%

Personal watercraft operating	5.59%	6.69%	0.693	6.14%
Fishing off a boats (ocean)	6.32%	5.18%	0.654	5.75%
Rock climbing	4.60%	5.74%	0.639	5.17%
Waterskiing	4.83%	4.94%	0.964	4.89%
Boating in the ocean	2.61%	4.10%	0.497	3.36%
Mountaineering	2.98%	3.67%	0.741	3.33%
Waterfowl Hunting	2.22%	4.13%	0.328	3.18%
Total Away from Home Activity Participation	94.08%	93.71%	0.882	93.9%

*<0.05, **<0.01, ***<0.001

Table 3: Black and White percent of population participating in away from home activities

Our results show that the most commonly participated in away from home activity was day hiking/ walking, the second most common was visiting the beach, and the third most common was freshwater fishing. While there was no significant difference in overall away from home activity participation rates, Black respondents participated less in spending time at lakes (p-value=0.0492), nature observation (p-value=0.0117), swimming in oceans (p-value= 6.389e-06), ocean (p-value= 0.000338) and outdoor photography (p-value= 0.0011), wildlife watching away from (p-value= 0.00078) and on the coast (p-value= 0.0049), target shooting (p-value= 0.0728), motor (p-value= 0.0199) and flatwater boating (p-value=0.049), and caving (p-value=0.0177) than White respondents. However, Black respondents participated more in trail running (p-value=0.00833), outdoor painting (p-value=0.0194), and mountain biking (p-value=0.0434) than White respondents.

Mean of Near Home Motivations (On a scale of 1-5)	Black	White	p-value
To promote my physical fitness/exercise	3.51	3.37	0.509
To do something with my family or friends	3.74	3.77	0.83
To connect with nature	3.2	3.2	0.955
To get away from the usual demands of life	3.6	3.71	0.408
To enjoy the sights and sounds of nature	3.44	3.59	0.285
To explore the area and learn about nature	3.17	3.17	0.996
To improve my mental health	4.03	3.94	0.519
To escape noise and crowds	3.56	3.73	0.238
To experience adventure/ excitement	3.51	3.34	0.214
To be with others who enjoy the same things I do	3.53	3.41	0.434
To develop my skills and abilities	3.60	2.95	4.18e-05 ***

To develop my personal/spiritual values	3.60	3.18	0.00513**
To learn about the history/culture of an area	3.25	2.85	0.00478**
To relax	4.14	4.05	0.506
For solitude	3.80	3.52	0.0571
It was safer to be outside because of COVID	3.18	2.66	0.00214**

*<0.05, **<0.01, ***<0.001

Table 4: Black and White near home motivation means

As motivations were measured on a scale of 1-5, values above 3 represent being affected by a motivation and values below 3 represent not being effected by a motivation. Black respondents were more motivated to participate in outdoor recreation by the desire to develop skills and abilities (p-value=4.18e-05), the desire to develop personal and spiritual values (p-value=0.00513), the desire to learn about the history of an area (p-value=0.00478), and because they found safety from COVID outside (p-value=0.00214). The development of personal and spiritual values however only varied by how much Black and White respondents found it motivated them, as opposed to White respondents feeling it did not motivate them.

Means of Near Home and Away from Home Motivation (on a scale of 1-5)	Near Home	Away from Home	p-value
To promote my physical fitness/exercise	3.38	3.25	0.0759
To do something with my family or friends	3.81	3.96	0.0281*
To connect with nature	3.18	3.26	0.312
To get away from the usual demands of life	3.67	3.82	0.0261*
To enjoy the sights and sounds of nature	3.51	3.53	0.776
To explore the area and learn about nature	3.08	3.14	0.45
To improve my mental health	3.98	3.94	0.56
To escape noise and crowds	3.68	3.67	0.869
To experience adventure/ excitement	3.36	3.42	0.36
To be with others who enjoy the same things I do	3.43	3.64	0.00469**
To develop my skills and abilities	3.02	2.92	0.219
To develop my personal/spiritual values	3.25	3.25	0.983
To learn about the history/culture of an area	2.89	2.93	0.629
To relax	4.07	4.10	0.643
For solitude	3.59	3.52	0.328
It was safer to be outside because of COVID	2.83	2.83	0.922

*<0.05, **<0.01, ***<0.001

The highest motivation for recreating near home was to relax, and the lowest because it was safer to be outside due to COVID. The highest motivation for recreating away from home was to relax, and the lowest because it was safer to be outside due to COVID. Generally motivations stayed the same across near home and away from home scales, however away from home motivations of doing something with family or friends (p-value=0.0281), getting away from the usual demand of life (p-value=0.0261), and being with others who enjoy the same things (p-value=0.00469) were significantly greater than the near home motivations. However, these were only different by degree of positive effect, not by lack of effect, so the difference may not be socially significant.

Mean of Near Home Constraints (On a scale of 1-5)	Black	White	p-value
No one to go with	2.39	2.52	0.346
Travel distance; not enough nearby places to go	2.89	2.71	0.261
Too busy with family	2.75	2.78	0.8
Not enough time due to work	3.16	2.88	0.0654
Health concerns	3.09	2.38	9.17e-06***
High fees	2.56	2.34	0.137
Lack of security or feeling of unsafety	2.92	2.37	0.000334***
Lack of accessibility for disabled or impaired individuals	2.62	2.01	6.6e-05***
Discrimination of any kind	2.78	1.95	1.85e-07***
Not enough facilities (picnic tables, playground equipment, trails, etc.)	2.67	2.26	0.00836***
Overcrowding	3.12	2.56	0.000353***
Choosing to do other things with my free time	3.27	3.07	0.123
Poorly maintained facilities	3.09	2.40	6.14e-06***
Not interested; don't like to participate in outdoor recreation	2.70	2.02	1.17e-05***
Not wanting to catch COVID	3.61	2.27	<2e-16***
Feeling unwelcome or uncomfortable	3.06	2.19	9.13e-08***

*<0.05, **<0.01, ***<0.001

Table 6: Black and White near home constraint means

As constraints were measured on a scale of 1-5, values above 3 represent being effected by a constraint and values below 3 represent not being effected by a constraint. Black respondents in general felt more constrained than White respondents to participate in outdoor recreation. The constraints that were significantly different for Black respondents were health concerns (p-value=9.17e-06), lack of security (p-value=0.000334), lack of accessibility for disable individuals (p-value=6.6e-05), discrimination of any kind (p-value=1.85e-07), not enough facilities (p-value=0.00836), overcrowding (p-value=0.000353), poor maintained facilities (p-value=6.14e-06), no interest in outdoor recreation (p-value=1.17e-05), not wanting to catch COVID (p-value=<2e-16), and feeling unwelcome or uncomfortable (p-value=9.13e-08).

Means of Near Home and Away from Home Constraints (on a scale of 1-5)	Near Home	Away from Home	p-value
No one to go with	2.56	2.62	0.469
Travel distance; not enough nearby places to go	2.83	2.91	0.285
Too busy with family	2.82	2.86	0.609
Not enough time due to work	2.9	2.9	0.936
Health concerns	2.62	2.54	0.346
High fees	2.42	2.71	0.000412 ***
Lack of security or feeling of unsafety	2.64	2.52	0.122
Lack of accessibility for disabled or impaired individuals	2.61	2.46	0.0608
Discrimination of any kind	2.16	2.2	0.62
Not enough facilities (picnic tables, playground equipment, trails, etc.)	2.39	2.46	0.367
Overcrowding	2.77	2.77	0.919
Choosing to do other things with my free time	3.11	2.92	0.00822**
Poorly maintained facilities	2.59	2.56	0.75
Not interested; don't like to participate in outdoor recreation	2.17	2.14	0.615
Not wanting to catch COVID	2.7	2.75	0.538
Feeling unwelcome or uncomfortable	2.45	2.36	0.321

*<0.05, **<0.01, ***<0.001

Table 7: Near home and away from home constraints means

The biggest constraint near to home was choosing other things to do with free time, and the least constraining factor was discrimination of any kind. The biggest constraint away from

home was choosing other things to do with free time, and the least constraining factor was lack of interest. In general constraints were neither ranked as effecting respondents strongly or as being different between near home and away from home constraints, however two constraining factors were different between the two scales. Respondents found high fees to be more constraining away from home (p-value=0.000412) and choosing to do other things with their free time more constraining near home (p-value=0.00822).

Percent of Population Without Access to Around the Home Outdoor Recreation	Black	White	p-value	Total
Public Park	7.41%	6.27%	0.787	7.66%
School Recreation Areas	14.78%	20.9%	0.133	19.3%
Sidewalks	11.41%	14.65%	0.333	15.62%
Natural Trails	22.15%	18.58%	0.376	21.05%
Bike Lanes	27.71%	42.46%	0.00335**	39.55%
Green Space	16.63%	12.92%	0.297	14.67%

*<0.05, **<0.01, ***<0.001

Table 8: Black and White percent of population without access to around the home recreation opportunities

Lack of access to around the home outdoor recreation facilities was generally low between both populations as all population percentages were below 30%, however White respondents did report less access to bike lanes than Black respondents (p-value=0.00335).

Discussion

According to the Outdoor Industry Association (OIA) 55% of White Americans and 38% of Black Americans participate in outdoor recreation (Outdoor Industry Association, 2021), this differs largely from our research that found that 94.08% of Black respondents participated in away from home outdoor recreation at least once, and 93.71% of White respondents participated in away from home outdoor recreation. The 2021 Alabama Statewide Comprehensive Outdoor Recreation Plan also found a 60.7% overall outdoor recreation participation rate (Rushing et al., 2021) while we found a 94.03% overall outdoor recreation participation rate. These differences could be due to the many options our survey had in outdoor recreation activities, as the OIA

surveyed for 51 activities (Outdoor Industry Association, 2021) many of which were variation of other activities, and the Alabama Statewide Comprehensive Outdoor Recreation Plan surveyed for 57 activities (Rushing et al., 2021), while we surveyed for 73 activities. However, the OIA found in 2020 that the average number of outdoor recreation outings were 91.2 (Outdoor Industry Association, 2021) which was similar to our average number of outdoor recreation outings 92.26. Many of our activities were casual outdoor recreation activities as well, such as any walking or jogging, any biking, any nature observation, and "hanging out"/ actively trying to relax outdoors. Expanding the definition of outdoor recreation may show that more people recreate outside than previously considered, but as the average number of outings did not change between the OIA's collection and our own, there is little evidence that Alabama residents participate in outdoor recreation more than the national average. The OIA also found in 2020 33% of outdoor recreation participants were considered "core" participants, meaning they participated in over 52 outings per year (Outdoor Industry Association, 2021) which was similar to our findings of 32.7% of participants in this category. However, they found less "moderate" participants than we did, as they found only 34% of outdoor recreationalists participated in 12-51 outings per year (Outdoor Industry Association, 2021), whereas we found 41.4% of participants were in the moderate category. They also found more participants in the "casual" (1-11 outings per year) category (Outdoor Industry Association, 2021),while we found that 25.9% of our respondents fell into this category. This could also be due to our expanded definition of outdoor recreation creating more "moderate" participants as they have extra opportunities to count their activities as outdoor recreation.

Walking, jogging/ running, hiking, playground play, and fishing all ranked highly in participation rates in the 2021 Alabama Statewide Comprehensive Outdoor Recreation Plan (Rushing et al., 2021), which is similar to our findings which ranked walking, jogging/ running, hiking, and freshwater fishing as among the top five outdoor recreation activities. The OIA found that the top three outdoor recreation activities for Black Americans were running/ jogging/ trail running, road biking/ mountain biking/ BMX, and freshwater/ saltwater/ fly fishing (Outdoor Industry Association, 2021). Our findings showed that Black respondents participated highly in running as well as fishing, but only showed a 9.8% participation rate in mountain biking while having a 41% participation rate in biking in general. This could be due to the wording of our survey as we asked for all types of biking participated in near to home instead of

singling out road biking, which may have a connotation of competitiveness that some Black respondents would not identify with. The OIA also found that the top three outdoor recreation activities for White Americans were hiking, freshwater/ saltwater/ fly fishing, and car/ backyard/ backpacking/ and RV camping (Outdoor Industry Association, 2021), which closely mirrored our data, although we found a large percent of White respondents participating in outdoor swimming as well.

We found in accordance with (Xiao et al., 2021) that Black respondents were more likely to highly rate cultural motivations than White respondents, and were more motivated by their own personal development. Black respondents were also more motivated to get outside to lessen their risk of being exposed to COVID, which is reflected in data showing that Black Americans are more concerned about COVID than White Americans. Whiting et al. (2017) found that Black respondents tended to rate nature interaction as less important than the other motivation categories, however our results showed that these ratings were not significantly less than the other motivations and showed no significant difference between Black and White respondents of nature interaction motivation. As there has been a recent push to get Black communities involved in nature, there could a trend of increased Black connection to nature. Overall, the top three motivations of respondents to the 2021 Alabama Statewide Comprehensive Outdoor Recreation Plan were to enjoy nature, relax, and to promote their physical health (Rushing et al., 2021), however our research found that respondents did not rank enjoying nature or promoting physical health highly, although our data showed that relaxation was the highest motivating factor for our respondents.

(Chavez, 2012) found that the biggest constraints to participating in outdoor recreation for minority populations were discomfort outdoors, discrimination while traveling/ recreating, and travel/ outdoor recreation being too difficult. However, our data only found discomfort to be a constraining factor and found that the Black respondents of our survey were more constrained by COVID concerns, wanting to do other things with their free time, and lacking free time. This is more in line with (Xiao et al., 2021) who found that Black, Hispanic, and low-income respondents were also more constrained by safety concerns and preferred other, non-outdoor recreation activities. This could potentially show a trend of falling discrimination concerns outdoors as on average Black respondents did not rank discrimination, lack of travel options, and feelings of unsafety above a 3 (the middle of the constraint scale).

Our results showed marked differences between the two current standard outdoor recreation trend reports, which we theorize may be due to a poor distribution of panel survey respondent. The 2021 Alabama Statewide Comprehensive Outdoor Recreation Plan utilized the Qualtrics panel surveys as well and while they also experienced similar demographic trends, including the over representation of female respondents (Rushing et al., 2021) their results still showed differences in the recreation motivation analysis, which was implemented in a similar method as our own. It could be to get accurate data from panel surveys for outdoor recreation reports, an exceptionally large survey size is needed, which may not be feasible due to budget constraints.

Conclusion

While the benefits of outdoor recreation are not evenly distributed, with an expanded view of what constitutes as outdoor recreation, there may be a greater number of outdoor recreation participants than initially assumed, even amongst minority populations. Stodolska, (2018) posits that the benefits of recreation and spending time outdoors may be culturally dependent and that it is more important for managers to consider the wants of minority communities instead of insisting they participate in outdoor recreation in the traditional, nature focused or achievement oriented ways. These minority populations may be more inclined to participate in outdoor recreation that does not fit the mold of exercise intensive or contemplative recreation in nature. If managers cannot identify these differences, they cannot provide opportunities for these minorities to participate in forms of outdoor recreation that they enjoy. By examining currents trends trend in outdoor recreation through the lenses of differences between racial groups, managers can be more effective in the analysis of minority recreation participation. This analysis can pave the way for a more inclusive view of outdoor recreation that can provide all the benefits of spending time outdoors, and can allow for managers to engage with minority communities more successfully.

Chapter 2 Ecosystem Services Valuation

Ecosystem services are the conditions and processes through which natural ecosystems and the species that make them up sustain and fulfill human life (Reid et al., 2005). Benefits from ecosystem services include not only tangible products but regulation of vital resources and intangible cultural benefits as well (S. T. Asah & Blahna, 2020).The Millennium Ecosystem Assessment separates ecosystem services in four categories, provisioning, regulating, supporting, and cultural services (Reid et al., 2005). Provisioning services are material goods such as timber, food, and fiber; these services tend to be the basis of many economies and are vital to fulfilling society's needs. Regulating services involve the control and tempering of natural processes such as water flow regulation, health regulation, and pollution sinks. Supporting services provide the foundation for the other ecosystem services including the many nutrient cycles, soil formation, and other essential ecological building blocks. Cultural services apply to human perception of ecosystems with concepts such as spirituality gained from interacting with the ecosystem, traditional uses of ecological materials, social identity, education, and heritage (Reid et al., 2005). Outdoor recreation is also considered a cultural service in the Millennium Ecosystem Assessment, however according to the social ecological complex adaptive systems model developed by Morse et al. (2022), recreation is also a system that can facilitate the cultural benefits from ecosystem services.

People's perception of ecosystem services influences their behaviors and the level of intensity of their behaviors, therefore appreciation towards nature and compliance towards nature regulations can be measured through their appreciation for ecosystem services (S. Asah et al., 2014,). If we are to measure attitudes towards nature, measuring participant valuation of the benefits they may receive from nature and their experiences outdoors will help to create a clearer picture on the impact of outdoor recreation on people. (Felipe-Lucia et al., 2015) paper proposes that for proper social valuation of ecosystem services that the temporal and spatial location of the services must be considered, while a variety of stakeholders must be examined and grouped based on their demographics and use of these services, as well as surveying for identification and preference ranking of ecosystem services. Through the analysis of the social and cultural understandings of ecosystem services, researchers can use individual's perceptions, knowledge, and values to create synergistic groupings of ecosystem services.

Currently, there is a disconnect between the ecosystem services examined by scientists and the ecosystem services identified by the general public. For example, the lack of consistency between the definition of ecosystem services used by researchers is often not the same one presented to public, as distinctions between services that provide for the ecosystem and services that benefit the people become muddled (Nahlik et al., 2012). Being cognizant of public perceptions of ecosystem services may provide a better background for ecosystem management strategies (Martin-Lopez et al., 2012). Cultural services are of highly important to the public, however there is need to continue defining these social benefits of nature (Daniel et al., 2012). In Larson et al. (2016), an analysis of public perspectives on ecosystem services and urban greenways found that the public recognized three categories of ecosystem services; environmental benefits, cultural benefits, and experiential benefits. Experiential benefits included items that acknowledge that the environment is providing a place for people and nature to go. Experiential benefits fall under the category of "intermediate ecosystem services" as it must be combined with other inputs in order to create a final ecosystem service. These experiential benefits were deemed most important to urban greenway users. According to the authors (L. Larson et al., 2016), focusing on the social benefits of greenspaces can create more conservation buy in from stakeholders. An understanding of the nuances of stakeholder views on ecological systems and their management can help direct land management initiatives. Both ecologists and land managers can benefit from understanding how society perceives the ecosystems that they study and manage.

Measure of ecosystem services

There are three methods to assign value to ecosystem services; ecological, economic, and social. While ecological and economic valuation methods have experienced widespread use, social valuation is often either lumped in with cultural ecosystem services or replaced by economic valuation (Felipe-Lucia et al., 2015).This is an issue as it can obfuscate our understanding of human behavior in relation to natural resources by focusing on perceptions of worth that do not address how one's environment can influence their values and actions (Martin-Lopez et al., 2012). Many ecologists recognize the importance of collaboration with social scientists in the way that they may highlight the importance of ecological findings, introduce

new perspectives, and improve understanding of socio-ecological systems (Phillipson et al., 2009). These ecologists do have some struggles with this interdisciplinary work however due to the differences between ecological and social scientific methods and frameworks (Phillipson et al., 2009). Ecologists find it easier to work with social scientists that practice quantitative methodology, similar to their own methods; however the social science discipline that tends to be the most quantitative is economics, a field seen as being "at odds" with many ecologists' philosophies (Phillipson et al., 2009).

As managers are required to work with landscapes that provide many different ecosystem services (Lovell & Taylor, 2013; Steiner, 2014), an understanding of how people perceive and value these services is necessary. There is little research that looks at the subjective views of ecosystem services beyond the traditional ecological and economic valuations (Gómez-Baggethun & Barton, 2013; L. Larson et al., 2016). Through the analysis of ecosystem service bundles in a socio-cultural framework, researchers can use individual's perceptions, knowledge, and values to create synergistic groupings of ecosystem services (Martin-Lopez et al., 2012). This method of social valuation is rarely utilized to assess the value of regulating and provisioning ecosystem services despite the researchers and managers recognizing the need for stakeholder engagement in all aspects of decision making, and a lack of a consistent social valuation framework is cited as the reason for this trend (Felipe-Lucia et al., 2015).)Martin-Lopez et al.(2012) study used people's abilities to recognize ecosystem services and the importance they placed on individual categories compared to their demographics to study what influences their preferences of ecosystem services and how those might create ecosystem service bundles. They found that different stakeholders valued ecosystem services differently, based strongly on a rural-urban gradient defined preferences towards ecosystem services as largely based local ecological knowledge versus formal ecological education. The authors theorized that this may be a consequence of land management strategies that prevent human intervention on the landscape and create a perception amongst urban residents that the primary role of natural spaces is recreation and education (Martin-Lopez et al., 2012).

As Kline et al. (2013) pointed out, the social and behavioral aspects of ecosystem services and how the public reacts to management actions taken on these services is poorly understood compared to the ecological and economic aspects. Asah et al. (2014) posits that the because of this incomplete understanding of how people perceive and use ecosystem services,

strategies for influencing behavioral compliance and volunteerism may be inadequate. In this study the authors developed a focus group of tribal members who utilize Deschutes National Forest in Oregon where the interviewers asked the group to identify the benefits they and others receive form the national forest and how they receive these benefits (S. Asah et al., 2014). Their study found that the indirect services provided by interaction with nature were more salient and important to their focus group members compared to the direct services they acquired. This understanding of how people value their interaction with the ecosystem was presented as an opportunity for managers to express the value of management and policy actions in a way that encourages pro-environmental behavior (S. Asah et al., 2014). To continue addressing this gap and to develop a better metric for social valuation of ecosystem services and biodiversity, S. T. Asah & Blahna, (2020) developed a questionnaire through the participation of experts and non-experts identifying which ecosystem aspects they assign value to, then testing this questionnaire. They found that through these co-designed metrics they were able to identify novel social valuations that could provide managers with information that was better suited to guide decision-making and communication with the public (S. T. Asah & Blahna, 2020). As we develop a greater understanding of how people interact and view the environment, it is imperative to move away from the perspective of nature-based recreation being purely based on leisure and instead move towards a perspective that recognizes how recreation creates connections between people and the land they use (Blahna et al., 2020).

Early nature-based recreation research focused heavily on public interaction with natural resources through the lens of what we think of as traditional outdoor recreation activities, such as hiking, mountain biking, and fishing, however there is a wider variety of ways people interact with the environment (S. T. Asah & Blahna, 2020). Interactions that do not fit this traditional view of recreation, such as cultural services, spiritual experience, educational opportunities, and the harvesting of resources for household use are still important to how the public experiences the environment. These "cultural services" shape the context in which people value the environment and create a broader understanding of the ecosystem services that their public lands provide them (S. T. Asah & Blahna, 2020), however the outcomes of these services are often not assessed for by the public. These interactions create a complex motivation web that influence the values, attitudes, and beliefs surrounding natural resources and natural resource management (Blahna et al., 2017), which in turn can influence environmental policy decisions. Due to the

nature of outdoor recreation management is key to the management of providers of other ecosystem services, as the settings and systems that provide services such as clean water or timber also are potential settings for recreation. However by also collecting data on the values, attitudes, and beliefs about nature, we can create a holistic approach to public interaction and land management. Including these socio-economic monitoring systems alongside measurements of perceived ecosystem services will create a more informed planning approach that goes beyond the scope of what the other recreation surveys offer and give land managers the tools to make decisions more reflective of public sentiments.

Recreation and stewardship

Increasing pro-environmental behaviors of the public has been touted as a way to help solve environmental problems (Gardner & Stern, 2002) as issues of increasing participation in ecological sustainability initiatives drives many solutions to these problems (Turaga et al., 2010). With the management of ecological degradation becoming a global priority, developing an understanding of how the public participates in conservation activities is necessary. Research suggests that increased exposure to nature through outdoor recreation may create stronger pro-environmental beliefs (Kareiva, 2008; Tarrant & Green, 1999). Many variables contribute to the development of pro-environmental behaviors, from pro-environmental attitudes to personal norms, to problem awareness, to personal habits. Value orientations, ones judgement of importance, and belief structures, ones acceptance policies, create the foundation for actions in outdoor recreation (Vaske, 2008), and therefore examining value orientations may predict pro-environmental behavior. Previous research has shown weak correlation between attitudes and behavior (Heimlich & Ardoin, 2008), and other researchers have posited that personal investment and emotional involvement may have stronger influence on pro-environmental behavior (Ardoin et al., 2013). Studies have shown that outdoor recreation does have a significant impact on pro-environmental behavior, notable in the case of place attachment (Halpenny, 2010). Those who express greater connection to nature have been seen to show more appreciation towards nature and what it provides compared to those with a weaker connection (L. Larson et al., 2018; Rosa & Collado, 2020). Other studies have shown that nature connectedness is positively associated with pro-environmental behavior and there is evidence

that it may even drive pro-environmental behavior (Davis et al., 2009; Zelenski et al., 2015). The theory behind this is that if people feel like they are connected with nature, then they may feel more strongly about ecological threats such as climate change and pollution than those who don't (M. T. Schmitt et al., 2019) and will participate in pro-environmental behavior to fight these threats (M. Schmitt et al., 2018). Rosa et al., (2020) found that higher connection to nature was associated with greater preference for outdoor recreation environments, and greater preference for outdoor recreation environments was associated with greater levels of participation in nature-based recreation.

There has been recent research to support the assumption that both increased levels of place attachment and increased levels of outdoor recreation increase greater expression of pro-environmental behaviors (L. R. Larson et al., 2017; Riper & Kyle, 2014). White et al. (2008) found specifically that those who visited a natural area often had a greater awareness of environmental impacts and anything that may cause the area to experience deterioration. Larson et al. (2018) found there were strong connections between nature based recreation, place attachment, and pro-environmental behavior, with place attachment strengthening the connection between recreation and pro-environmental behavior. This concept of place attachment creating environmental stewards was explored further in Schild (2019), which looked at how the growing trend of recreation advocation groups fits in the current land-management paradigm. This study focused on civic recreation, defined in Schild (2017) as when groups of recreationalist participate in stewardship and advocacy with the intent to create, preserve, and restore the natural resources that facilitate their recreation. According to this study, these groups emerged from and operated at a local level, often through repeated nature-based recreation in a specific place, and are connected to a national network of similar organization, wherein individuals can become active environmental advocates and stewards that effectively provide necessary recreational amenities and preserve important ecological areas (Schild, 2019).

Through the deeper understanding of this context, recreation professionals may also work to develop an environmental stewardship ethic within outdoor recreation participants. With the COVID-19 pandemic increase in outdoor recreation participation (Outdoor Industry Association, 2021), public lands are more prone to being "loved to death" due to concentrations of overuse, especially in popular areas like National Parks (Timmons, 2019). However this increase in participation may also lead to an increase in environmental stewardship that occurs when

participants have a strong sense of connection to their public outdoor recreation areas (L. Larson et al., 2018). Bramston et al., (2011) study cite the three most important reasons for participating in environmental stewardship activities being social belonging, helping the environment, and learning while similarly Schultz, (2001) showed that environmental concern was supported by the three legs of self, other, and biosphere. As ecosystem services fall under these environmental and biosphere categories, those with a greater appreciation of ecosystem services may have the potential to become environmental stewards.

Diversity in recreation

At the forefront of modern recreation research is the question of increasing diversity in recreation, a push meant to make up for the discrimination faced by disadvantaged populations in outdoor recreation as well as increasing the body of people who advocate for the environment. To "bring more groups to the table" first an understanding of how these groups perceive the environment in which they may recreate in must be developed. Cordell et al. (2002) used increased income and higher education levels as indicators for pro-environmental orientations. However a study by Whittaker et al. (2005) examining pro-environmental views across racial and ethnic considerations showed that wealth and education may not always explain increased conservation values and pro-environmental ethos. Finally, Vaske (2001) has suggested gender and ethnicity should be examined as predictors of pro-environmental behavior. While disadvantaged groups do not display less concern for the state of the environment despite having to meet dire economic needs (Whittaker et al., 2005), a study of participation in pro-environmental behaviors showed lower levels in ethnic minorities (C. Y. Johnson et al., 2004, p. 20), perhaps due to socio-economic and cultural barriers (Jones & Rainey, 2006). Larson et al. (2011) found that women and racial minorities were shown to have more biocentric value orientations than men and Whites, with outdoor recreation participation also have a positive influence on pro-environmental behavior. As access to outdoor recreation areas may be limited for disadvantaged groups, focus on local areas and diverse options for outdoor recreation is crucial the development of pro-environmental across the demographic spectrum (L. Larson et al., 2011).

Our paper

Our survey is meant to measure the importance of different ecosystem services to the public and across racial and ethnic groups. Following the stewardship and recreation literature, we examine whether increased participation in outdoor recreation is related to an increased importance placed on the ecosystem services that are ascribed to recreation areas. The inclusion of the ecosystem service scales in our survey will be combined with other potential predictors of behavior to create a comprehensive picture of recreationists values. These results will help provide guidance for future public land management decisions and give us a way to measure the shifting perspectives of Americans on natural resource management. We looked at whether there are differences in evaluation of the importance of different ecosystem services by race in Alabama. We also examined whether increased recreation (near home or away from home) leads to increased valuation of importance of different ecosystem services.

We had three overarching research questions:

1. How important does the public rank the importance of different ecosystem services?
2. Do different racial groups evaluate the importance of different ecosystem services differently?
3. Does an increase in recreation participation increase the importance of ecosystem services to different groups?

Study Site

Alabama is a diverse state in the southeast with a population of 5,039,887 with approximately 69% of the population being White, 26% of the population being Black, and 5% of the population being Latino (*U.S. Census Bureau QuickFacts*, 2020). According to the US Geological Survey Protected Area Database, only 4.77% of Alabama's 33,548,850 acres is permanently protected from development for the majority of the area, and only 3.02% of Alabama's total acreage is open to the public (U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2022). This means ability to access public recreation land is limited for Alabama residents, especially for those who have less resources to facilitate travel to recreational areas. By analyzing how ecosystem services are valued in a state where nature-based recreation may be

difficult to achieve by disadvantaged groups, we can look for connections between access and appreciation of nature.

Methods

We distributed a web-based survey as a self-administered questionnaire taken on a computer, phone, or other electronic device. Issues with this approach include non-response and self-selection errors, as well as errors more unique to the medium, such as missing populations who may not have internet access (*Coverage Error in Internet Surveys" Pew Research Center*, 2015). To minimize these errors we implemented the use of panels such as those often used in marketing research, selecting people who are most representative of the general population. (Callegaro et al., 2015). This online panel survey was administered by the survey company Qualtrics, which also guarantee an adequate response rate even if the survey is at a length that may dissuade randomly selected potential respondents from participating (Kost & Rosa, 2018). Online panel surveys have a pre-recruited respondents who are on call to be contacted to complete web surveys faster than randomly selected respondents (Callegaro et al., 2015). This survey was distributed to a general population panel, in which the participants are selected to include all types of populations in a manner that is representative of the general population (Callegaro et al., 2015). While some online panel survey methods have been shown to have low data quality, a higher amount of population variables selected for will increase the data quality (*Assessing the Accuracy of Online Nonprobability Surveys*, 2016).

Qualtrics participants are recruited through many different sources, such as website intercept, member referrals, targeted email list, web gaming sites, customer loyalty web portals, and social media (*Online Research Panels & Samples for Surveys*, n.d.). The panel member names, addresses and dates of birth are verified through a third-party company to ensure validity. To guarantee data quality and integrity, Qualtrics uses evaluation methods to scrub panels for respondents running bots, incorrect IP addresses, and other poor-quality panelist indicators. During the survey respondents who show poor survey taking strategies, such taking the survey

too fast, are also scrubbed from the data, as well as those who fail other logic checks throughout the survey.

Questionnaire Components and Design

We designed our questionnaire based off of the Dillman et al. (2014) tailored design method using the best practices described to write the questions. The National Survey on Recreation and the Environment (USDA Forest Service, 2014) was used as the basis of the activities questionnaire and we also utilize several Statewide Comprehensive Outdoor Recreation Plan scales to design the activity questionnaire and create a list of common outdoor recreation activities to gauge participation. Oregon's Statewide Comprehensive Outdoor Recreation Plan survey (O. Parks & Department, 2019) provided the basis for our activity section, in which we have selected 60 activities from the Oregon list with some activities, such as the different classes of ATV riding, condensed into one activity for added brevity. Some activities were also taken from the California Statewide Comprehensive Outdoor Recreation Plan survey (C. S. Parks, 2014) and the Outdoor Industry Association 2018 Annual Report (Outdoor Industry Association, 2018). To measure ecosystem service valuation, we used modified version of a social valuation of biodiversity and ecosystem services survey from Asah and Blahna (S. T. Asah & Blahna, 2020). This questionnaire was modified to be shorter with simpler language to be easier to understand by a wider audience (Dillman et al., 2014). The questionnaire on ecosystem services was divided into four parts in accordance with S. T. Asah & Blahna (2020) questions on the valuation of cultural services, questions on the valuation of provisioning services, questions on the valuation of regulating services, and questions on ecosystem services pertaining to biodiversity, hereby known as biodiversity services. The ecosystem service valuation questionnaire is on a five-point Likert scale with 1 being "Not important" and 5 being "Very important."

To increase the efficiency of our survey and decrease the amount of mental load due to time spent taking the survey for participants (Kost & Rosa, 2018) we programmed skip patterns into the online survey. Skip patterns are when a survey taker selects a response, and this response determines if they skip or fill out the following questions. These skip patterns were primarily used in the activity participation of the survey as answers to these questions can be specific

whether a survey taker participated in certain activities. This method reduced the number of questions most survey takers will have to answer therefore decreasing the amount of time spent filling out the survey.

Demographics Comparison	Panel demographics %	Alabama Census %
Race		
White Population Percentage	69.1%	68.9%
Black Population Percentage	25.1%	26.9%
Gender		
Male Population Percentage	24.9%	48.6%
Female Population Percentage	75%	51.4%

Table 8: Demographics comparison between survey respondents and Alabama census

The racial demographics from the Qualtrics panel were close to Alabama's own demographics, however 75% of respondents were female as opposed to the 51% female population. In order to analyze the data to reflect a representative population, the values had to be weighted to reflect higher female participation than the Alabama population (Needham & Vaske, 2019a).

Analysis

For our analysis we weighted the female data by 0.68 and the male data by 2.103 to simulate the data of a representative Alabama population. Then we used survey weighted generalized linear models for each ecosystem valuation scale versus race, and then collected the total weighted mean score for each valuation. We also used survey weighted generalized linear models for activity participation against each category of ecosystem service valuation. We modeled overall near home recreation days, overall away from home recreation days, and overall days from each away from home recreation category against overall score for each ecosystem service valuation category.

Results

Ecosystem Service Valuation by Race	Black Mean	**White Mean**	p-value	**Total Mean**

Cultural Services	**3.531**	**3.393**	**0.0304***	**3.462**
Improving Mental and Physical Health	3.68	3.7	0.84	3.69
Preserving Cultural Heritage	3.64	3.62	0.873	3.63
Preserving Natural Heritage	3.51	3.71	0.104	3.61
Educational Values	3.73	3.34	0.00285*	3.535
Inspirational Values	3.67	3.39	0.0291*	3.53
Recreation Opportunities	3.45	3.4	0.733	3.425
Aesthetic Values	3.39	3.41	0.827	3.4
Tourism Opportunities	3.49	3.18	0.0129*	3.335
Developing Social Relationships	3.35	3.19	0.213	3.27
Spiritual Values	3.4	2.99	0.00396*	3.195
Provisioning Services	**3.0812**	**3.085**	**0.478**	**3.083**
Fresh Drinking Water	3.71	3.77	0.662	3.74
Fresh Water for Industry and Other Purposes	3.55	3.51	0.763	3.53
Vegetation as Food	3.34	3.14	0.129	3.24
Wild Game and Fish as Food	3	3.13	0.312	3.065
Minerals and Metals	3.19	2.88	0.0314*	3.035
Forage for Grazing	2.84	3.06	0.107	2.95
Non-timber Products	2.64	2.62	0.849	2.63
Timber Harvest	2.38	2.57	0.152	2.475
Regulating Services	**3.648**	**3.719**	**0.0507**	**3.683**
Water Purification	3.9	3.84	0.66	3.87
Clean Air	3.76	3.82	0.686	3.79
Pollination	3.66	3.92	0.0405*	3.79
Storm Protection	3.67	3.77	0.435	3.72
Pest Control	3.64	3.78	0.294	3.71
Water Regulation	3.61	3.78	0.198	3.695
Carbon Storage	3.59	3.61	0.848	3.6
Erosion Control	3.52	3.67	0.221	3.595
Weather Moderation	3.65	3.48	0.189	3.565
Urban Sprawl Regulation	3.48	3.52	0.756	3.5
Biodiversity Services	**3.428**	**3.801**	**8.86E-06***	**3.614**
Protect a Variety of Ecosystems	3.61	3.93	0.0145*	3.77
Habitat for Threatened and Endangered Species	3.43	3.99	8.12E-06*	3.71
Protect a Variety of Organism	3.48	3.84	0.00638*	3.66

Protect Aquatic Biodiversity	3.43	3.84	0.00163*	3.635
Maintain Soil Formation	3.49	3.78	0.0203*	3.635
Protect Genetic Resources	3.48	3.76	0.032*	3.62
Maintain Biodiversity for Ecosystem	3.28	3.79	7.88E-05*	3.535
Protecting Materials for Pharmaceuticals	3.44	3.61	0.204	3.525
Habitat for Game Species	3.21	3.67	0.00082*	3.44

*<0.05, **<0.01, ***<0.001

Bold designates categories and the beginning of the category color code

Table 9: Mean ecosystem service valuation by race and overall

We found that participants valued regulating ecosystem services the most (mean= 3.6835), biodiversity ecosystem service second most (mean=3.614), cultural services third (mean=3.462), and provisioning least (mean=3.083). Many of the ecosystem service valuations were similar between Black and White respondents, and as the questions were asked on a five point Likert scale with 3 representing "Important," generally ecosystem services were found to be important to both racial groups. Many of the differences were differences of degrees of importance placed on the ecosystem services as opposed to one group finding some services to be unimportant. Notably however, White respondents found the spiritual values of public lands (mean= 2.99) and minerals and metals for mining from public lands (mean=2.88) to be not important while Black respondents found spiritual values and minerals/metals to be significantly more important (mean=3.4, p-value= 0.00396; mean=3.19, p-value= 0.0314). In general, Black respondents placed slightly more importance on cultural services (p-value= 0.030411373) and less importance on biodiversity services (p-value= 8.86197e-06) than White respondents.

Effect of Activities on Ecosystem Service (ES) Valuation (On a scale from 1-5)	Change in ES for every 100 days participating in near home activities	p-value - Near Home	Increase in ES for every 100 days participating in away from home activities	p-value - Away from Home
Cultural Services	0.0402	0.0865	0.06581	0.0974
Provisioning Services	-0.014	0.607	0.08515	0.0252*
Regulating Services	0.06431	0.0628	0.01388	0.806
Biodiversity Services	0.07124	0.0495*	0.09950	0.0123*

*<0.05, **<0.01, ***<0.001

As the scale of ecosystem service valuation was from 1-5, an increase of 1 point would be considered a 25% increase in ecosystem service valuation, and smaller point value increases are still socially significant. Increased recreation near to home was significantly positively correlated with increased valuation of biodiversity ecosystem services (p-value= 0.0495), while increased recreation away from home was significantly and positively correlated with increased valuation of provisioning services (p-value= 0.0252) and biodiversity services (p-value= 0.0123).

Effect of Individual Away From Home Activities on Ecosystem Service (ES) Valuation (On a scale from 1-5)	Change in ES for every 100 days participating in trail activities	p-value – Trail	Increase in ES for every 100 days participating in hunting activities	p-value - Hunt	Increase in ES for every 100 days participating in camping activities	p-value - Camp
Cultural Services	0.04848	**0.577**	0.2837	**0.185**	0.01839	**0.951**
Provisioning Services	-0.02223	**0.787**	0.73054	**1.43e-14***	0.2538	**0.429**
Regulating Services	-0.2223	**0.0439***	-0.3824	**0.27**	-0.1389	**0.669**
Biodiversity Services	-0.1452	**0.245**	0.2846	**0.0581**	0.1521	**0.655**

*<0.05, **<0.01, ***<0.001

Table 11: Effect of away from home categories of activity participation on ecosystem service valuation

Increased participation in trail based away from home recreation activities was significantly correlated with a decreased valuation of regulating ecosystem services (p-value=0.0439). Increased participation in hunting based away from home recreation activities was significantly correlated with a large increase in valuation of provisioning services (p-value=1.43e-14).

Effect of Individual Away From Home Activities on Ecosystem Service (ES) Valuation (On a scale from 1-5)	Change in ES for every 100 days participating in nature observing activities	p-value - Nature Observing	Increase in ES for every 100 days participating in fresh water activities	p-value - Fresh Water	Increase in ES for every 100 days participating in ocean/ coastal activities	p-value - Ocean
Cultural Services	0.04825	0.402	0.4109	0.0062**	0.2182	0.0299*
Provisioning Services	0.07592	0.133	0.08464	0.646	0.15785	0.0623
Regulating Services	0.06923	0.443	0.216	0.312	0.34242	0.000103
Biodiversity Services	0.14	0.0834	0.3633	0.0171*	0.40739	5.87e-06***

*<0.05, **<0.01, ***<0.001

Table 12: Effect of away from home categories of activity participation on ecosystem service valuation (cont.)

Increased participation in fresh water away from home activities resulted in a significantly correlated increase in valuation of cultural services (p-value=0.0062), as well as an increased in valuation of biodiversity services (p-value=0.0299). An increase in participation in ocean based away from home activities correlated with a significant increase in cultural (p-value=0.0299), regulating (p-value=0.000103), and biodiversity services (p-value=5.87e-06).

Discussion

Our findings support the assertion that there is variation between minority environmental values and attitudes and White environmental values and attitudes. However, while L. Larson et al., (2011) found that racial minorities had stronger association with biocentric value orientations than Whites, our data showed that Black respondents valued biodiversity ecosystem services less than White respondents. While these are two different scales, the biodiversity services given in our survey often revolved around biocentric perspectives, for example valuing the protection of endangered species or the protection of aquatic habitats. However, the results did not show that

Black respondents did not find biodiversity services nonvaluable, as the mean scores were still above 3, the designated "important" value. Placing less importance on biocentric ecosystem services could be due to the effects of lower socioeconomic status leading to more anthropogenic values (Cordell et al., 2002) as Black Alabama residents have a median income of $20,779 as opposed to the median income $32,939 for White Alabama residents (*Explore Per Capita Income in the United States | 2021 Annual Report*). The fact that Black respondents still categorized the biocentric ecosystem services as important is consistent with the recent research showing that Black Americans care highly about environmental issues ("Which Racial/Ethnic Groups Care Most about Climate Change?," n.d.). The difference between these finding and those are that the general trend in high Black concern for environmental issues may stem from historic exposure of Black communities to environmental hazards (E.P.A., 2021) as opposed to views based around the existence value of other species and ecosystems. Interestingly, Black respondents valued metals and mineral from the land while White respondents did not, which could be due to the history of the mining and steel production industries in Alabama (*Iron and Steel Production in Birmingham*, n.d.), which while not as prolific now, may be more salient to lower income and working class respondents. This suggests that when engaging minority populations in pro-environmental behavior, care must be taken to emphasize the ecosystem services these populations find valuable. By connecting actions to values, managers may encourage more consistent and enthusiastic participation in pro-environmental behavior.

Our other results show that increased participation in near home activities and away from home activities increased the valuation of biodiversity ecosystem services, however the only increase in other ecosystem service valuations was an increase in valuing provisioning services for those who participated in more days of away from home activities. In the (L. Larson et al., 2011) paper on the influence of outdoor recreation on pro-environmental behavior, the authors found that participation in outdoor recreation was significantly related to highly biocentric value orientations. This is reflected in our analysis wherein the most biocentric value measurement were located in the biodiversity services category, which much like in S. T. Asah & Blahna, (2020), who found that biodiversity ecosystem services were valued the most on a similar measurement scale, were rated as the most important category overall. These findings contradict (L. Larson et al., 2016) study on the public attitudes towards ecosystem services from urban greenways that found greenway users perceived cultural benefits the most important of the

ecosystem services. However, this could be explained by the differing urban-suburban-rural makeup of the survey respondents, as greenway users would be an inherently more urban demographic while the Alabama population is only partially urban. In the future, an analysis of the differences in urban, suburban, and rural valuations of ecosystem services may yield interesting results. Rosa et al. (2020) found that college students in the US and Brazil who rated themselves as highly connected to nature also showed a stronger preference for pursuing recreation outdoors, and in turn a stronger preference for nature based recreation. This high connection to nature could also be interpreted as a predisposition to valuing biocentric ecosystem services over anthropocentric ecosystem services. (White et al., 2008) White et al. 2008 found that more time spent visiting a site for outdoor recreation was correlated with the visitors having a stronger perception of negative environmental impacts at that site. As most outdoor recreation is done in a 100 mile radius around the home (Outdoor Industry Association, 2018) it can be assumed that people who report high levels of outdoor activity frequent the same places to participate in outdoor recreation. This could be one explanation for why those who participated in outdoor recreation heavily rated the protection and maintenance of biodiversity ecosystem services as they have a stronger perception of the degradation that happens to habitats and ecosystems in the places they frequent. Thapa (2010) found that for those who participated in appreciative outdoor recreation, defined as outdoor recreation based on enjoying the natural environment in a non-consumptive manner, their incidences of pro-environmental behavior were mediated by their participation in outdoor recreation. This is similar to our findings that activity participation for the most part correlates with an increase in valuing ecosystem services, however Thapa (2010) found little correlation between pro-environmental behavior and consumptive outdoor recreation, which was not supported by our analysis of the away from home activity categories.

Our findings showed that only some of the categories of away from home activities had effect on the valuation of ecosystem services and the degree and direction was distinct for the different types of activities that did effect valuation. This is consistent with Bright & Barro (2000) who found that participation in outdoor activities may have some importance in forming environmental values, however variables such as the type of outdoor recreation also provided mediating effects. For example, the hunting activity category showed a strong significant effect on the valuation of provisioning services, correlating with a 18.3% increase in provisioning

service valuation. This supports L. Larson et al. (2018) findings that hunting contributed to increased pro-environmental behavior due to their familiarity and dependence on their environment to provide them directly with food. As an increase in valuation of ecosystem services could be the driver behind increased participation in pro-environmental behavior (Vaske, 2008), the increasing number of people and number of days spent hunting could be one potential method of increasing pro-environmental behavior in a population. There was also an increase in valuation of cultural and biodiversity services for those who participated more in water based outdoor recreation, whether in freshwater or coastal environments. The increase in cultural service valuation could be due to the social nature of the water-based activities, which often require participation of several people at a time and the ownership of watercraft which often is a large expense that must be shared over a family unit. Increased participation in coastal activities also had a positive correlation with the valuation of regulating services, perhaps due to the large effect that coastal areas have on regulating storm damage (Rao et al., 2015), which may be more apparent to those who visit coastal areas more often, especially due to the increased severity of tropical storms in recent years (Knutson et al., 2010). Conversely, increased trail-based recreation was correlated with a decrease in valuation of regulating services, however unlike Thapa, (2010) we did not divide motorized outdoor recreation from the non-consumptive outdoor recreation in this category, and as their study found motorized recreation correlated with less pro-environmental behavior, perhaps this effect extends to environmental values as well. These results imply that managers could potentially create more compliance with behaviors that benefit their sites through the encouragement of certain recreation activities. Furthermore, it shows that some avenues of developing strong valuations of ecosystem services are more impactful than others, and that perhaps more focus should be on encouraging these avenues.

Conclusion

As the increase of pro-environmental behaviors from the public may be vital to solving ecological problems in the United States and around the world (Turaga et al., 2010), finding ways to engage everyone in pro-environmental actions that are important to them may be key to longevity of these behaviors. By targeting information of certain types of behaviors that can maintain the types of ecosystem services that certain populations value, environmental agencies

and land managers may create more effective engagement. From our study, this could mean encouraging White populations to participate in actions that ensure the preservation of critical habitat for endangered or threatened species; or encouraging Black populations to participate in actions that maintain the cultural components of their public lands. Greater understanding of population's values may be instrumental to the development of a nationwide pro-environmental ethic. As personal involvement (Ardoin et al., 2013) and place attachment (L. Larson et al., 2018; L. R. Larson et al., 2017; Riper & Kyle, 2014) strongly correlate with increased pro-environmental behavior, promoting certain types of outdoor recreation may be key to achieving these desired behaviors. By focusing on specific ways to promote outdoor recreation and to which groups, promotion of pro-environmental attitudes and behaviors can be more successful.

References

Ardoin, N., Heimlich, J., Braus, J., & Merrick, C. (2013). *Influencing conservation action: What research says about environmental literacy, behavior, and conservation results*. National Audubon Society.

Asah, S., Guerry, A., Blahna, D., & Lawler, J. (2014). Perception, Acquisition and Use of Ecosystem Services: Human Behavior, and Management and Policy Implications. *Ecosystem Services*, *10*, 180–186. https://doi.org/10.1016/j.ecoser.2014.08.003

Asah, S. T., & Blahna, D. J. (2020). Involving Stakeholders' Knowledge in Co-designing Social Valuations of Biodiversity and Ecosystem Services: Implications for Decision-Making. *Ecosystems*, *23*(2), 324–337. https://doi.org/10.1007/s10021-019-00405-6

Assessing the accuracy of online nonprobability surveys. (2016). Pew Research Center.

> https://www.pewresearch.org/methods/2016/05/02/assessing-the-accuracy-of-online-
>
> nonprobability-surveys/

Beall, J., Jackson, S., Casola, W., Larson, L., Stevenson, K., & Seekamp, E. (2022). *Self-reported*

> *participation in outdoor and nature-based recreation before and during the COVID-19 pandemic*
>
> *supports psychological health and well-being*. *3*, 100094.
>
> https://doi.org/10.1016/j.wss.2022.100094

Blahna, D. J., Asah, S. T., & Deal, R. L. (2017). An Ecosystem Services Framework. In *Olson, D. H., Van*

> *Horne, B. (eds) People, Forests, and Change*. Island Press.

Blahna, D. J., Cerveny, L. K., Williams, D. R., Kline, J. D., Helmer, M., McCool, S. F., Valenzuela, F., Selin, S.,

> Cerveny, L. K., Blahna, D. J., & Miller, A. B. (2020). *Chapter 5: Rethinking "outdoor recreation" to*
>
> *account for the diversity of human experiences and connections to public lands* (pp. 65–84)
>
> [Tech. Rep. PNW-GTR-987.]. U.S. Department of Agriculture.

Bowser, B. P. (2007). *The Black Middle Class*. Lynne Rienner.

Bramston, P., Pretty, G., & Zammit, C. (2011). Assessing Environmental Stewardship Motivation.

> *Environment and Behavior*, *43*(6), 776–788. https://doi.org/10.1177/0013916510382875

Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., Vries, S., Flanders, J., & Daily, G. C. (2019).

> Nature and mental health: An ecosystem service perspective. *Science Advances*, *5*(7), 0903.

Bright, A. D., & Barro, S. C. (2000). The mediating effects of values on the relationship between outdoor

> recreation participation and pro-environment behavior. *In: Schneider, Ingrid E.; Chavez,*
>
> *Deborah; Borrie, Bill; James, Katherine, Eds. The 3d Symposium on Social Aspects Amnd*
>
> *Recreation Research; 2000 February 16-19; Tempe, AZ. Tempe, AZ: Arizona State University: 39-*
>
> *42*. http://www.fs.usda.gov/treesearch/pubs/12445

Browning, M. H., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PloS One*, *16*(1), 0245327.

Callegaro, M., Manfreda, K. L., & Vehovar, V. (2015). 5.2 Online Panels. In *Web survey methodology* (pp. 205–215).

Carter, W. M. (2019). Improving Physical Activity and Outdoor Recreation in Rural Alabama Through Community Coalitions. *Preventing Chronic Disease*, *16*. https://doi.org/10.5888/pcd16.190062

Chavez, D. (2012). *Latinos and outdoor recreation* (H. K. Cordell, Ed.; pp. 74–77). U.S. Department of Agriculture.

Cordell, H. K. (2004). *Outdoor Recreation for 21st Century America*. Venture Publishing Inc.

Cordell, H. K., Betz, C., English, J. M., Mou, D. B. K., Bergstrom, J. C., Teasley, R. J., & Tarrant, M. A. (1999). *Outdoor recreation in American life: A national assessment of demand and supply trend*. Sagamore Publishing LLC.

Cordell, H. K., Betz, C. J., & Green, G. T. (2002). Recreation and the environment as cultural dimensions in contemporary American society. *Leisure Sciences*, *24*(1), 13–41.

Corning, S., Mowatt, R., & Chancellor, H. (2012). Multiuse Trails: Benefits and Concerns of Residents and Property Owners. *Journal of Urban Planning and Development*, *138*, 277–285. https://doi.org/10.1061/(ASCE)UP.1943-5444.0000124

Coverage Error in Internet Surveys" Pew Research Center. (2015). https://www.pewresearch.org/methods/2015/09/22/coverage-error-in-internet-surveys/

Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., & Rajaratnam, S. M. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States. *Morbidity and Mortality Weekly Report*, *69*(32), 1049.

Daniel, T. C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J. W., Chan, K. M. A., Costanza, R., Elmqvist, T.,

    Flint, C. G., & Gobster, P. H. (2012). Contributions of cultural services to the ecosystem services

    agenda. *Proc. Natl. Acad. Sci*, *109*(23), 8812–8819. https://doi.org/10.1073/pnas.1114773109.

Davis, J. L., Green, J. D., & Reed, A. (2009). Interdependence with the environment: Commitment,

    interconnectedness, and pro-environmental behaviour. *Journal of Environmental Psychology*,

    29, 173–180.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The*

    tailored design method (4th ed.). John Wiley & Sons.

Dorwart, C. E., Cornelous, S. S., & Patterson, A. F. (2019). "Just More Comfortable in the Gym": An

    Exploration of the Constraints That Contribute to Adult Black Females' Lack of Participation in

    Outdoor Recreation Activities. *Journal of Outdoor Recreation, Education, and Leadership*, *11*(3),

    Article 3. https://doi.org/10.18666/JOREL-2019-V11-I3-8878

Douthit, N., Kiv, S., Dwolatzky, T., & Biswas, S. (2015). Exposing some important barriers to health care

    access in the rural USA. *Public Health*, *129*(6), 611–620.

    https://doi.org/10.1016/j.puhe.2015.04.001

Driver, B. L. (2009). *Managing to optimize the beneficial outcome of recreation*. Venture Publishing, Inc.

E.P.A. (2021). *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts*. U.S.

    Environmental Protection Agency.

Explore Per Capita Income in the United States | 2021 Annual Report. (n.d.). America's Health Rankings.

    Retrieved August 16, 2022, from

    https://www.americashealthrankings.org/explore/annual/measure/PerCapIncome/population/

    PerCapIncome_White/state/ALL

Felipe-Lucia, M. R., Comín, F. A., & Escalera-Reyes, J. (2015). A framework for the social valuation of

    ecosystem services. *AMBIO*, *44*(4), 308–318. https://doi.org/10.1007/s13280-014-0555-2

Floyd, M. F., & Stodolska, M. (2014). *Theoretical frameworks in leisure research on race and ethnicity* (E. Race, M. S. Leisure, K. J. Shinew, M. F. Floyd, & G. J. Walker, Eds.). Human Kinetics.

Fortuna, L. R., Tolou-Shams, M., Robles-Ramamurthy, B., & Porche, M. V. (2020). Inequity and the disproportionate impact of COVID-19 on communities of color in the United States: The need for a trauma-informed social justice response. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(5), 443–445.

Gardner, G., & Stern, P. C. (2002). *Environmental problems and human behavior* (2nd ed.). Allyn & Bacon.

Gargely, K. J., & McKerrow, A. (2013). *PAD-US - National Inventory of Protected Areas Fact Sheet*. US Geological Service.

Godbey, G., Crawford, D., & Shen, X. (2010). Assessing hierarchical leisure constraints theory after two decades. *Journal of Leisure Research*, *42*(1), 111–134.

Gómez-Baggethun, E., & Barton, D. N. (2013). Classifying and valuing ecosystem services for urban planning. *Ecological Economics*, *86*, 235–245. https://doi.org/10.1016/j.ecolecon.2012.08.019

Green, G. T., Bowker, J. M., Wang, X. F., Cordell, K., & Johnson, C. Y. (2012). A National Study of Constraints to Participation in Outdoor Recreational Activities. In *In: Cordell, H. Ken, ed. 2012. Outdoor Recreation Trends and Futures. Gen. Tech. Rep. SRS-150. Asheville, NC: U.S. Department of Agriculture Forest Service. Southern Research Station. 70-74.* (Vol. 150, pp. 70–74). https://www.fs.usda.gov/treesearch/pubs/42114

GreenInfo Network. (2016). *Completing America's Inventory of public parks and protected areas: An action plan for 2016-2020*. GeenInfo Network. http://www.protectedlands.net/wp-content/uploads/2014/09/ParksOpenSpace_PolicyPaperNov2016Final.pdf

Guzman, G., Posey, K. G., Bishaw, A., & Benson, C. (2021, October 8). *Poverty rates higher, median household income lower in rural counties than in urban areas*. Census.Gov.

https://www.census.gov/library/stories/2018/12/differences-in-income-growth-across-united-states-counties.html

Hall, T. E., Farnum, J., Slider, T. C., & Ludlow, K. (2009). *New planning approaches to forest planning: Inventorying and mapping place values in the Pacific Northwest Region* (PNW-RN-562). US Department of Agriculture, Forest Service, Pacific Northwest Research Station. https://www.fs.fed.us/pnw/pubs/pnw_rn562.pdf

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology*, *30*(4), 409–421.

Harris, B., Larson, L., & Ogletree, S. (2018). Different Views From The 606: Examining the Impacts of an Urban Greenway on Crime in Chicago. *Environment and Behavior*, *50*(1), 56–85. https://doi.org/10.1177/0013916517690197

Hartig, T., Mitchell, R., Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*, 207–228.

Heimlich, J. E., & Ardoin, N. M. (2008). Understanding behavior to understand behavior change: A literature review. *Environmental Education Research*, *14*(3), 215–237. https://doi.org/doi:10.1080/ 13504620802148881.

Holman, E. A., Thompson, R. R., Garfin, D. R., & Silver, R. C. (2020). The unfolding COVID-19 pandemic: A probability-based, nationally representative study of mental health in the United States. *Science Advances*, *6*(42), 1–7.

Hooper, M. W., Nápoles, A. M., & Pérez-Stable, E. J. (2020). COVID-19 and racial/ethnic disparities. *Journal of the American Medical Association*, *323*(24), 2466–2467.

Hrymkowski, D. H., Manning, R. E., & Valliere, W. A. (2014). Race, ethnicity, and visitation to national parks in the United States: Tests of marginality, discrimination, and subculture hypotheses with national-level survey data. *Journal of Outdoor Recreation and Tourism*, *7*(8), 35–43.

Hubbard, J., & Mannell, R. C. (2001). Testing Competing Models of the Leisure Constraint Negotiation

    Process in a Corporate Employee Recreation Setting. *Leisure Sciences*, *23*(3), 145–163.

    https://doi.org/10.1080/014904001316896846

Immergluck, D., & Balan, T. (2018). Sustainable for whom? Green urban development, environmental

    gentrification, and the Atlanta Beltline. *Urban Geography*, *39*(4), 546–562.

    https://doi.org/10.1080/02723638.2017.1360041

Iron and Steel Production in Birmingham. (n.d.). Encyclopedia of Alabama. Retrieved August 16, 2022,

    from http://encyclopediaofalabama.org/Article/h-1638

Jackson, E. L., Crawford, D. W., & Godbey, G. (1993). Negotiation of leisure constraints. *Leisure Sciences*,

    15(1), 1–11. https://doi.org/10.1080/01490409309513182

Jenkins, E. K., McAuliffe, C., Hirani, S., Richardson, C., Thomson, K. C., McGuinness, L., & Gadermann, A.

    (2021). A portrait of the early and differential mental health impacts of the COVID-19 pandemic

    in Canada: Findings from the first wave of a nationally representative cross-sectional survey.

    Preventive Medicine, *145*, 106333.

Johnson, C. Y., Bowker, J. M., & Cordell, H. K. (2004). Ethnic variation in environmental belief and

    behavior: An examination of the New Ecological Paradigm in a social psychological context.

    Environment and Behavior, *36*(2), 157–186.

Johnson, J., Irizarry, M., Nguyen, N., & Maloney, P. (2018). Part 1: Foundational Theories of Human

    Motivation. In *Motivation 101: A Guide for Public Servants* (Vol. 1).

Jones, R. E., & Rainey, S. A. (2006). Examining linkages between race, environmental concern, health,

    and justice in a highly polluted community of color. *Journal of Black Studies*, *36*(4), 473–496.

Kareiva, P. (2008). Ominous trends in nature recreation. *Proceedings of the National Academy of*

    Sciences, *105*(8), 2757–2758.

Kline, J. D., Mazzotta, M. J., Spies, T. A., & Harmon, M. E. (2013). Applying the ecosystem services

    concept to public land management. *Agric. Resour. Econ. Rev*, *42*(1), 139–158.

Knutson, T., Landsea, C., & Emanuel, K. (2010). Tropical cyclones and climate change: A review. *Global*

    Perspectives on Tropical Cyclones: From Science to Mitigation, 243–284.

Kost, R. G., & Rosa, J. (2018). Impact of survey length and compensation on validity, reliability, and

    sample characteristics for ultrashort-, short-, and long-research participant perception surveys.

    Journal of Clinical and Translational Science, *2*(1), 31–37.

Kuo, M. (2015). How might contact with nature promote human health? Promising mechanisms and a

    possible central pathway. *Frontiers in Psychology*, *6*, 1093.

Larson, L., Cooper, C., Stedman, R., & Gagnon, R. (2018). Place-Based Pathways to Proenvironmental

    Behavior: Empirical Evidence for a Conservation–Recreation Model. *Society & Natural*

    Resources, *31*, 1–21. https://doi.org/10.1080/08941920.2018.1447714

Larson, L., Keith, S., Fernandez, M., Hallo, J., Shafer, C., & Jennings, V. (2016). Ecosystem services and

    urban greenways: What's the public's perspective? *Ecosystem Services*, *22*, 111–116.

    https://doi.org/10.1016/j.ecoser.2016.10.004

Larson, L. R., Usher, L. E., & Chapmon, T. (2017). Surfers as environmental stewards: Understanding

    place-protecting behavior at cape hatteras national seashore. *Leisure Sciences*.

    https://doi.org/doi:10.1080/ 01490400.2017.1305306.

Larson, L., Whiting, J., & Green, G. (2011). Exploring the influence of outdoor recreation participation on

    pro-environmental behaviour in a demographically diverse population. *Local Environment*, *16*,

    67–86. https://doi.org/10.1080/13549839.2010.548373

Larson, L., Whiting, J. W., Green, G. T., & Bowker, J. M. (2014). Physical activity levels and preferences of

    ethnically diverse visitors to Georgia state parks. *Journal of Leisure Research*, *46*(5), 540–562.

Le, L. (2012). Hispanic and White visitors in us national parks: Meta-analysis of visitor use survey. *Journal of Park & Recreation Administration*, *30*(4), 1–20.

Lee, K. J. J., & Scott, D. (2017). Racism and Blacks' travel behavior: The utility of habitus and vignette technique. *Journal of Travel Research*, *56*(3), 381–392.

Loucks-Atkinson, A., & Mannell, R. C. (2007). Role of Self-Efficacy in the Constraints Negotiation Process: The Case of Individuals with Fibromyalgia Syndrome. *Leisure Sciences*, *29*(1), 19–36. https://doi.org/10.1080/01490400600983313

Lovell, S. T., & Taylor, J. R. (2013). Supplying urban ecosystem services through multifunctional green infrastructure in the United States. *Landscape Ecology*, *28*(8), 1447–1463. https://doi.org/10.1007/s10980-013-9912-y

Manfredo, M., Driver, B. L., & Tarrant, M. (1996). Measuring Leisure Motivation: A Meta-Analysis of the Recreation Experience Preference Scales. *Journal of Liesure Research*, *28*(3), 188–213.

Martin-Lopez, B., Iniesta-Arandia, I., Garcia-Llorente, M., Palomo, I., Casado-Arzuaga, I., Del Amo, D. G., Gomez-Baggethun, E., & Oteros-Rozas, E. (2012). Uncovering ecosystem service bundles through social preferences. *PLos One*, *7*(6), 38970. https://doi.org/10.1371/journal.pone.0038970.

McCormack, G. R., Rock, M., Toohey, A. M., & Hignell, D. (2010). Characteristics of urban parks associated with park use and physical activity: A review of qualitative research. *Health & Place*, *16*(4), 712–726. https://doi.org/10.1016/j.healthplace.2010.03.003

Moore, L. V., Roux, A. V. D., Evenson, K. R., McGinn, A. P., & Brines, S. J. (2008). Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas. *American Journal of Preventive Medicine*, *34*(1), 16–22. https://doi.org/10.1016/j.amepre.2007.09.021

Moore, R. L., & Driver, B. L. (2005). *Introduction to outdoor recreation: Providing and managing resource based opportunities*. Venture Publishing, Inc.

Morse, W. (2020). Recreation as a Social-Ecological Complex Adaptive System. *Sustainability*, *12*, 753.

https://doi.org/10.3390/su12030753

Morse, W. C., Cerveny, L. K., & Blahna, D. J. (2022). *Coordinating and standardizing outdoor recreation*

supply and demand databases to facilitate management and promote conservation, health, and

accessibility. *40*(1), 175–194.

Morse, W. C., Stern, M., Blahna, D., & Stein, T. (2022). Recreation as a transformative experience:

Synthesizing the literature on outdoor recreation and recreation ecosystem services into a

systems framework. *Journal of Outdoor Recreation and Tourism*, *38*, 100492.

https://doi.org/10.1016/j.jort.2022.100492

Mowatt, R. A. (2020). A people's history of leisure studies: The Great Race and the national parks and

U.S. forests. *Journal of Park & Recreation Administration*, *38*(3), 152–172.

https://doi.org/10.18666/JPRA-2019-9674

Nahlik, A. M., Kentula, M. E., Fennessy, M. S., & Landers, D. H. (2012). Where is the consensus? A

proposed foundation for moving ecosystem service concepts into practice. *Ecol. Econ*, *77*, 27–

35.

National Park Service Department of the Interior. (2008). *Land and water conservation fund state*

assistance program (Federal Financial Assistance Manual No. 69). National Park Service

Department of the Interior.

National Survey on Recreation and the Environment (NSRE). (2002). The Interagency National Survey

Consortium, Coordinated by the USDA Forest Service, Recreation, Wilderness, and

Demographics Trends Research Group, Athens, GA and the Human Dimensions Research

Laboratory, University of Tennessee, Knoxville Tennessee.

Needham, M. D., & Vaske, J. J. (2019a). Implementation, sampling, and weighting (Chapter 8. *J. J. Vaske*

(Ed.), Survey Research And, *(2nd ed.*, 189-254-.

Needham, M. D., & Vaske, J. J. (2019b). Survey implementation, sampling, and weighting data. In J. J.

Vaske (Ed.), *Survey research and analysis* (2nd ed., pp. 189–254). Sagamore-Venture.

Online Research Panels & Samples for Surveys. (n.d.). Qualtrics. Retrieved August 18, 2022, from

https://www.qualtrics.com/research-services/online-sample/

Outdoor Industry Association. (2018). *2018 annual report*. Oudoor Industry Association.

https://outdoorindustry.org/what-we-do/annual-reports/

Outdoor Industry Association. (2021). *2021 Outdoor Participation Trends Report*. Oudoor Industry

Association. https://outdoorindustry.org/resource/2021-outdoor-participation-trends-report/

Parks, C. S. (2014). *Survey on Public Opinions and Attitudes on Outdoor Recreation in California 2012

Complete Findings*.

Parks, O., & Department, R. (2019). *Outdoor Recreation in Oregon: Responding to Demographic and

Societal Change*.

Pennington-Gray, L., & Kerstetter, D. (2002). Testing a Constraints Model within the Context of Nature-

Based Tourism. *Journal of Travel Research - J TRAVEL RES*, *40*, 416–423.

https://doi.org/10.1177/0047287502040004008

Perry, E. E., Xiao, X., & Manning, R. E. (2015). Barrier or bridge? The role of transportation in national

park visitation by racial and ethnic groups. *World Leisure Journal*, *57*(3), 173–184.

Pew Research Center, Washington D. C. (2019, February 27). *Response rates in telephone survey have

resumed their decline*. https://www. pewresearch.org/fact-tank/2019/02/27/response-rates-in-

telephone-surveys-have-resumed-their-decline/

Phillipson, J., Lowe, P., & Bullock, J. M. (2009). Navigating the social sciences: Interdisciplinarity and

ecology. *Journal of Applied Ecology*, *46*(2), 261–264. https://doi.org/10.1111/j.1365-

2664.2009.01625.x

Rao, N. S., Ghermandi, A., Portela, R., & Wang, X. (2015). Global values of coastal ecosystem services: A

spatial economic analysis of shoreline protection values. *Ecosystem Services*, *11*, 95–105.

https://doi.org/10.1016/j.ecoser.2014.11.011

Reid, W., Mooney, H., Cropper, A., Capistrano, D., Carpenter, S., & Chopra, K. (2005). *Millennium*

Ecosystem Assessment. Ecosystems and human well-being: Synthesis.

Riper, C. J., & Kyle, G. T. (2014). Understanding the internal processes of behavioral engagement in a

national park: A latent variable path analysis of the value-belief-norm theory. *Journal of*

Environmental Psychology, *35*, 506–522. https://doi.org/10.1016/j.jenvp.2014.03.002.

Roberts, H., McEachan, R., Margary, T., Conner, M., & Kellar, I. (2018). Identifying Effective Behavior

Change Techniques in Built Environment Interventions to Increase Use of Green Space: A

Systematic Review. *Environment and Behavior*, *50*(1), 28–55.

https://doi.org/10.1177/0013916516681391

Rosa, C. D., & Collado, S. (2020). Enhancing nature conservation and health: Changing the focus to active

pro-environmental behaviours. *Psychological Studies*, *65*(1), 9–15.

https://doi.org/10.1007/s12646-019-00516-z

Rosa, C. D., Larson, L. R., Silvia Collado, Cloutier, S., & Profice, C. C. (2020). Gender Differences in

Connection to Nature, Outdoor Preferences, and Nature-Based Recreation Among College

Students in Brazil and the United States. *Leisure Sciences*, *0*(0), 1–21.

https://doi.org/10.1080/01490400.2020.1800538

Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., & Lorenzo, G. (2020). COVID-19 pandemic

and lockdown measures impact on mental health among the general population in Italy.

Frontiers in Psychiatry, *11*, 790.

Rushing, B., Leavell, M., Kilungu Nzaku, & Nyesha Black. (2021). *Outdoor Recreation in Alabama*

2021Statewide Comprehensive Outdoor Recreation Plan.

Schild, R. (2017). Fostering environmental citizenship: The motivations and outcomes of civic recreation. *J Environ Plann Manage*, *61*(5–6), 1–26.

Schild, R. (2019). Civic Recreation: Outdoor Recreationists as Advocates, Stewards, and Managers of Natural Resources. *Environmental Management*, *63*. https://doi.org/10.1007/s00267-019-01151-0

Schmitt, M., Aknin, L., Axsen, J., & Shwom, R. (2018). Unpacking the relationships between pro-environmental behavior, life satisfaction, and perceived ecological threat. *Ecological Economics*, *143*, 130–140.

Schmitt, M. T., Mackay, C. M. L., Droogendyk, L. M., & Payne, D. (2019). What predicts environmental activism? The roles of identification with nature and politicized environmental identity. *Journal of Environmental Psychology*, *61*, 20–29.

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, *21*(4), 327–339.

Scott, D. (2014). *Race, ethnicity and leisure services practice: Can we hope to escape the past?* (E. Race, M. S. Leisure, K. J. Shinew, M. F. Floyd, & G. J. Walker, Eds.). Human Kinetics.

Scott, D., & Lee, K. J. J. (2018). People of color and their constraints to national parks visitation. *In ά e George Wright Forum*, *35*(1), 73–82.

Sene-Harper, A., Mowatt, R. A., & Floyd, M. F. (2022). A People's Future of Leisure Studies: Political Cultural Black Outdoors Experiences. *Journal of Park and Recreation Administration*, *40*(1), Article 1. https://doi.org/10.18666/JPRA-2021-11006

Shanahan, D. F., Bush, R., Gaston, K. J., Lin, B. B., Dean, J., Barber, E., & Fuller, R. A. (2016). Health benefits from nature experiences depend on dose. *Scientific Reports*, *6*(1), 1–10.

Silva, O., & Correia, A. (2008). Facilitators and constraints in leisure travel participation: The case of the

    southeast of Portugal. *International Journal of Culture, Tourism and Hospitality Research*, *2*, 25–

    43. https://doi.org/10.1108/17506180810856121

Smiley, K. T., Sharma, T., Steinberg, A., Hodges-Copple, S., Jacobson, E., & Matveeva, L. (2016). More

    Inclusive Parks Planning: Park Quality and Preferences for Park Access and Amenities.

    Environmental Justice, *9*(1), 1–7. https://doi.org/10.1089/env.2015.0030

Son, J., Kerstetter, D., & Mowen, A. (2008). Do Age and Gender Matter in the Constraint Negotiation of

    Physically Active Leisure. *Journal of Leisure Research*, *40*, 267–289.

    https://doi.org/10.1080/00222216.2008.11950141

Stanis, S. A. W., Schneider, I. E., Chavez, D. J., & Shinew, K. J. (2009). Visitor constraints to physical

    activity in park and recreation areas: Differences by race and ethnicity. *Journal of Park and*

    Recreation Administration 27(3): 78-95, *27*(3), 78–95.

Stedman, R. C., Connelly, N. A., Heberlein, T. A., Decker, D. J., & Allred, S. B. (2019). The end of the

    (reseearch) world as we know it? Understanding and coping with declining response rates to

    mail surveys. *Society and Natural Resources*, *32*(10), 1139–1154.

Steiner, F. (2014). Frontiers in urban ecological design and planning research. *Landscape and Urban*

    Planning, *125*, 304–311. https://doi.org/10.1016/j.landurbplan.2014.01.023

Stodolska, M. (2015). Recreation for all: Providing leisure and recreation services in multi-ethnic

    communities. *World Lesiure Journal*, *57*(2), 89–103.

Stodolska, M. (2018). Research on Race, Ethnicity, Immigration, and Leisure: Have We Missed the Boat?

    Leisure Sciences, *40*, 43–53. https://doi.org/10.1080/01490400.2017.1376013

Stodolska, M., Shinew, K., & Camarillo, L. (2020). Constraints on Recreation Among People of Color:

    Toward a New Constraints Model. *Leisure Sciences*, *42*, 533–551.

    https://doi.org/10.1080/01490400.2018.1519473

Tarrant, M. A., & Green, G. T. (1999). Outdoor recreation and the predictive validity of environmental

    attitudes. *Leisure Sciences*, *21*(1), 17–30.

Thapa, B. (2010). The Mediation Effect of Outdoor Recreation Participation on Environmental Attitude-

    Behavior Correspondence. *The Journal of Environmental Education*, *41*(3), 133–150.

    https://doi.org/10.1080/00958960903439989

Theriault, D., & Mowatt, R. A. (2020). Both Sides Now: Transgression and Oppression in Blacks' Historical

    Relationships with Nature. *Leisure Sciences*, *42*(1), 15–31.

    https://doi.org/10.1080/01490400.2018.1448024

Timmons, A. L. (2019). Too Much of a Good Thing: Overcrowding at America's National Parks, 94 Notre

    Dame L. *Rev*, *985*.

Turaga, R. M. R., Howarth, R. B., & Borsuk, M. E. (2010). Pro-environmental behavior: Rational choice

    meets moral motivation. *Annals of the New York Academy of Sciences*, *1185*(1), 211–224.

U.S. Census Bureau QuickFacts: Alabama. (2020). https://www.census.gov/quickfacts/AL

Forest and Rangeland Renewable Resources Planning Act of 1974, Pub. L. No. 06–580 (2000).

U.S. Geological Survey (USGS) Gap Analysis Project (GAP). (2022). *Protected Areas Database of the*

    United States (PAD-US) 3.0 Spatial Analysis and Statistics [Data set]. U.S. Geological Survey.

    https://doi.org/10.5066/P9KLBB5D

USDA Economic Research Service. (2022, June 3). *State Data*.

    https://data.ers.usda.gov/reports.aspx?StateFIPS=01&StateName=Alabama&ID=17854

USDA Forest Service. (2014). *National Survey on Recreation and the Environment: NSRE survey*

    questions. USDA Forest Service. https://www.srs.fs.usda.gov/trends/nsre-

    directory/questions.html

USDA Forest Service. (2021). *National Survey on Recreation and the Environment: NSRE survey questions*. USDA Forest Service. https://www.srs.fs.usda.gov/trends/nsre-directory/questions.html

Vaske, J. J. (2001). Demographic influences on environmental value orientations and normative beliefs about National Forest management. *Society and Natural Resources*, *14*(9), 761–776.

Vaske, J. J. (2008). *Survey research and analysis: Application in parks, recreation, and human dimensions*. Venture Publishing, Inc.

Vaske, J. J., Don Carlos, A. W., Manfredo, M. J., & Teel, T. L. (2022). Evaluating alternative survey methodologies in human dimensions of wildlife research. *Human Dimensions of Wildlife*. https://doi.org/10.1080/10871209.2022.2057622

Wardropper, C. B., Dayer, A. A., Goebel, M. S., & Martin, V. Y. (2020). Conducting conservation social science surveys online. *Conservation Biology*, *35*, 1650–1658.

Weber, S., Boley, B. B., Palardy, N., & Gaither, C. J. (2017). The impact of urban greenways on residential concerns: Findings from the Atlanta BeltLine Trail. *Landscape and Urban Planning*, *167*, 147–156. https://doi.org/10.1016/j.landurbplan.2017.06.009

Which racial/ethnic groups care most about climate change? (n.d.). *Yale Program on Climate Change Communication*. Retrieved August 16, 2022, from https://climatecommunication.yale.edu/publications/race-and-climate-change/

White, D. D. (2008). A Structural Model of Leisure Constraints Negotiation in Outdoor Recreation. *Leisure Sciences*, *30*(4), 342–359. https://doi.org/10.1080/01490400802165131

White, D. D., Virden, R. J., & van Riper, C. J. (2008). Effects of Place Identity, Place Dependence, and Experience-Use History on Perceptions of Recreation Impacts in a Natural Setting. *Environmental Management*, *42*(4), 647–657. https://doi.org/10.1007/s00267-008-9143-1

Whiting, J. W., Larson, L. R., Green, G. T., & Kralowec, C. (2017). Outdoor recreation motivation and site

preferences across diverse racial/ethnic groups: A case study of Georgia state parks. *Journal of*

Outdoor Recreation and Tourism, *18*, 10–21. https://doi.org/10.1016/j.jort.2017.02.001

Whittaker, M., Segura, G. M., & Bowler, S. (2005). Racial/ethnic group attitudes toward environmental

protection in California: Is "environmentalism" still a White phenomenon? *Political Research*

Quarterly, *58*(3), 435–447.

Wilhelm-Stanis, S. A., Schneider, I. E., Chavez, D. J., & Shinew, K. J. (2009). Visitor constraints to physical

activity in park and recreation areas: Differences by race and ethnicity. *Journal of Park and*

Recreation Administration, *27*(3), 78–95.

Xiao, X., Jerry Lee, K., & Larson, L. R. (2021). Who visits U.S. national parks (and who doesn't)? A national

study of percieved constraints and vacation preferences across divers populations. *Journal of*

Leisure Research, *53*(3), 404–425.

Zelenski, J. M., Dopko, R. L., & Capaldi, C. A. (2015). Cooperation is in our nature: Nature exposure may

promote cooperative and environmentally sustainable behavior. *Journal of Environmental*

Psychology, *42*, 24–31.