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Equity in Access to Outdoor Recreation—Informing a Sustainable Future

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Abstract: Despite an increasingly ethnically and racially diverse population in the United States (U.S.), growing evidence indicates that minorities are underrepresented in national forest visitation. Many reasons for continuing underrepresentation have been examined, involving research reaching back multiple decades. In the current study, a random sample of residents ($n = 1977$) from four large metropolitan statistical areas in California was involved in a telephone survey about forest visitation. Analysis revealed a continuing pattern of inequities in lifetime visitation to a national forest, as well as recency of visitation. Constraints to national forest visitation show similarities among groups. Lack of time was the most often mentioned constraint, with resource-related constraints more frequently cited by minority respondents. In contrast to prior studies, a lack of information or concerns about discrimination were not cited by survey respondents, though the open-ended approach to top constraints may underpin some of this variation from prior research. The primary information source for outdoor recreation used most frequently and most trusted was the Internet, followed closely by social networks (family and friends). In the presentation of U.S. outdoor recreation information, natural resource management agencies, use groups, and opportunity providers would benefit from incorporating culturally relevant messaging and images to affirm the message of inclusion and welcome.

Keywords: outdoor recreation; cultural diversity; equity; barriers; cultural competence

1. Introduction

Inquiries surrounding racial and ethnic disparities in United States (U.S.) outdoor recreation participation have been the focus of ongoing research for the past 40 years [1]. Research focused on equitable recreation participation in European countries is less abundant [2,3]. The U.S.-based research has consistently indicated that members of racial and ethnic minorities are not proportionally represented from proximate geographic areas among the visitors to federally managed natural resource areas, including national parks and national forests [4–6]. Although efforts in natural resource recreation management agencies have focused on increasing representation of ethnic and racial minorities to address concerns over equity, much remains to be done [1,5]. For example, U.S. national statistics show forest visitation by individuals of Hispanic or Latino descent is not proportionate to the overall population. The National Visitor Use Monitoring Survey Report (2013), the U.S. Forest Service systematic monitoring survey, showed that only 5.5 percent of national forest visits were from visitors of Hispanic or Latino origin [7], whereas Hispanics were 16.2 percent of the nation's 2010 population [8]. Ghimire et al. [4] reported that the most likely visitors to national forests and grasslands are Caucasian,

and least likely visitors are the elderly and ethnoracial minorities. Flores et al. [9] examined racial and ethnic demographic data for U.S. counties within a 50 mile radius of national forest boundaries against national forest visitation estimates across the U.S. to develop an equity index. Overall findings for the nation show an average equity gap of about 23.8 percent, suggesting a continuing issue of disproportionate use of national forest lands among ethnic and racial minorities. Forest Service regional differences were likewise concerning. For example, the Pacific Southwest Region, covering California, had an ethnoracial minority population of about 49.7 percent (+/-6.47) and a reported 21.5 percent (+/-2.51) minority use, resulting in a 28.2 (+/-5.85) equity gap score [9]. Under-representation of ethnic minority groups has also been reported in European studies [2].

With an increasingly diverse population in the U.S., inequities in forest recreation use require continuing exploration to understand underlying factors that help explain differences in participation, and further, remedies that will aid improvements in equity and address environmental justice [10–14]. In part, increasing the share of population that engage in outdoor recreation may require specific attention to ethnoracial variations [12]. Such efforts to engage underrepresented groups are reflective of agency climate contributing to the sustainability of programs and the inclusion of natural resource managing agencies as a part of communities [15]. Broader conceptualizations of sustainability elevate the importance of equity, including the role of nature in contributions to well-being [16]. A number of studies have illuminated the benefits of outdoor recreation and nature exposure, including the benefits of such exposure in remedying income-related inequalities in health [17]; the psychological benefits of nature-based physical recreation [18]; contributions to social cohesion and social interaction [14]; and the myriad emotional, cognitive, and behavioral benefits of nature exposure for young people [19]. The equitable distribution of such benefits helps improve the longer-term prospects of socioecological resilience at the societal scale.

Work on inequities in recreation use has expanded over the years to incorporate a greater number of multi-ethnic groups and methodologies in comparative studies [1]. Some of this work has incorporated heterogeneity within a broader ethnoracial category (cf. [20–22]). Racial and ethnic preference differences for park amenities have been identified in many studies [13,20,23,24]. For example, Latino recreationists' preferences for developed sites (such as restrooms and picnic sites in group configurations), and amenities in areas designed for dispersed use (such as parking areas and trash cans along the river) support use patterns involving extended family or larger groups (see [24] for a review). Whiting et al. [25] associated the preference for developed and maintained areas with social interaction motivations during outdoor recreation outings, and reported this motivation was strongest among Latino visitors. Kloek et al. [26] reported similar preferences for amenities that would support large, recreating groups among Turkish immigrants to the Netherlands, but not among Chinese immigrants to the same region. They found that Chinese immigrants participating in their study tended to engage in outdoor recreation in smaller groups or alone.

Other factors, too, have been implicated in the complex issue of underrepresented ethnic groups' forest visitation. Over the years, research primarily in the U.S. has identified many barriers to racial and ethnic minority groups' wider use of recreational facilities, including differences in leisure time preferences [27,28], and a lack of time, money, or access [13,29–31].

Another set of studies has pointed to the role of perceived racism/discrimination [5,10,13,20,31,32], and perceptions of compromised safety [23,33,34] as constraints to ethnoracial minority participation in outdoor recreation. Roberts and Chitewere [35] reported experiences of discrimination and 'silent exclusion' as a shared constraint among ethnic minorities that limits visitation to the Golden Gate National Recreation Area. Krymkowski et al. [5] reported differences in outdoor recreation visitation between African Americans and Whites growing over time, owing in part to experiences of discrimination and concerns surrounding safety. General statements indicating perceived lack of safety may also be attributed to these more subtle, yet influential perceptions of discrimination, which may be expressed as not feeling part of the community of recreationists [32,36], or not feeling as though one belongs in a place or among a group [26].

Contemplating the potential role of perceived discrimination benefits from consideration of two general models of discrimination. Gordon's theory of the process of assimilation suggests that as minority groups become increasingly incorporated into the mainstream (majority) society, discrimination will eventually dissipate [37]. In Gordon's view, the problem of ethnic discrimination may prove self-correcting, because as minority groups become more assimilated into the mainstream, prejudice and discrimination may be expected to abate. Following the application of this theory, we would expect that as a nation's ethnic diversity grows, underrepresentation in national forest visitation would abate, and recreating publics would be proportionally representative of the larger population.

This idea stands in stark contrast to that of Portes and his colleagues [38,39], who suggested that as minority groups move into the majority culture they do not all necessarily become more integrated or assimilated; rather, their gradual and segmented movement into the mainstream poses an acute economic and social threat to others occupying subordinate roles. As such, growing (and economically expanding) minorities are more, rather than less likely to face discriminatory treatment (for underlying factors see [40,41]). An unavoidable conclusion arising from Portes' idea is that the current disparities in the use of public and private recreational facilities will widen as time passes, assuming minority groups' economic progress continues. In part, this view reflects a perception of society as increasingly separated by racial and ethnic factors, and as increasingly segregated. Following this approach, the social hierarchy would limit access to resources for some groups, including access to leisure activities.

Additional cultural and social factors likewise influence segmented recreation use by ethnic and racial minorities. For example, ethnic subgroups may prefer to spend their leisure time, composed of discretionary activities, with individuals from similar backgrounds, or engaged in similar recreation activity and forest use practices. Ethnically concentrated use may reflect normative mechanisms helping to define a 'place' and the common activities occurring within it, in part inspired by information transmitted through community networks and direct experience [1,33,42]. Or, ethnic concentrations may reflect the underlying desire to avoid conflict and tension among groups with differing expectations and demands upon a shared space [32,33,42].

A lack of awareness of opportunities or general lack of information has also been more frequently identified as a barrier to outdoor recreation use among minority groups in the U.S. and other countries [21,30,31,33,43]. Researchers have offered communication-based solutions to problems of unequal access. These solutions are of sufficient generality to potentially mitigate some factors that lead to ethnic-based inequalities in natural resource area recreation use [24,29,44]. Communication approaches may be particularly helpful in increasing awareness of opportunities and programs that may be of interest, as well as incorporating messages of inclusion and expanding the awareness of active engagement of diverse cultural groups in outdoor recreation [11,24,30]. Additionally, work has shown the value of targeting messaging paths that reflect cultural variations in information sources that are relied upon and trusted [44–46]. Focused programming is instituting a message of outdoor recreation as a shared cultural experience among ethnoracial minorities to advance inclusion through various means, including the use of social media platforms [11], and involving representatives from members of minority groups to share culturally relevant messages [45,46] and experiences [21,30]. These efforts aim to improve equity through affirming a message that outdoor recreation is part of ethnoracial minority cultures, increasing messages of belonging, and contributing to outdoor recreation as a part of cultural identity [11,26].

Earlier work [29] reported a continuing pattern of ethnoracial differences in reliance on, and trust in various sources for information about outdoor recreation. For example, pre-visit communications among ethnoracial minorities rely heavily on word-of-mouth [24], including from family and friends and other social networks. A detailed examination of information sources (e.g., magazines and newspapers, or radio) used in one culturally diverse region of California revealed a pattern of more frequent reliance on ethnic media outlets and programming among ethnoracial minorities [29,44]. The Internet was reported as a common information source that study participants used and trusted [29]. Inequitable access to computers and the Internet was offered as a cautionary note in this earlier work,

however, as a limitation to using the Internet to reach out to diverse communities regarding outdoor recreation opportunities [44]. The digital divide has been remedied to some degree given broader adoption of smartphone use among Blacks and Hispanics in the U.S., although traditional access through a home computer remains inequitably distributed for these same groups when compared to Whites [47]. Maintenance of culture through enjoyment of ethnic media continues [48], suggesting that although a platform may be similar (e.g., the Internet), particular message streams (e.g., specific webpages) or information sources tailored to communities of interest may be more powerful than a general expectation that increased access will facilitate generic messaging approaches across all ethnic/racial groups [48].

The issues addressed in the present U.S.-based research speak to many of the questions that arise from this brief consideration of research surrounding equity in national forest visitation. The current work contributes to the state of knowledge by advancing assessment of whether or not inequities in forest visitation persist, and reasons reported for non-visitation or less frequent visitation. Further, the work contributes to current practice by augmenting the ability to use the most effective information dissemination routes for outdoor recreation information. Specifically, this paper examines reported outdoor recreation participation, whether or not respondents have ever visited a national forest (and reasons provided for not doing so), and recency of national forest visitation among those who had visited (and reasons for not visiting more often). These outdoor recreation participation questions are examined by ethnoracial group. In addition, aspects of intersectionality concerning gender and age cohorts are explored to continue to contribute to the dialogue focused on the nuances of diversity [21,26,36,49].

Earlier research [30] revealed ethnoracial variations in access to information, furthering the idea that culturally competent information delivery may help address some constraints on ethnic groups' participation in recreation on national forest lands (cf. [4,24]). Information sources used and trusted among study respondents are reported to improve efforts that focus on information routes and messaging to address recreation inequities. Although prior work demonstrated patterns of inequity and attributed barriers for underrepresented groups, and in some cases addressed information sources that may aid in remedying gaps, continuing work is important in assessing evolving trends, as well in identifying information paths and messaging aligned with societal shifts.

Owing to the nature of the research, causal statements will be avoided [50]. However, this limitation may be offset by information that is sensitive to subpopulation differences, where the utility of findings may be high despite the restriction on causal inferences imposed by the non-experimental research design. Although patterns of outdoor recreation use by population subgroups may vary across nations, studies of equitable access and strategies aimed at improving equitable use outside the region of study may be informed by the findings in this paper.

2. Materials and Methods

Two phases of telephone interviews were conducted involving residents of selected regions from California, a state that is known for its ethnic and racial diversity and abundant national forest lands. Both phases were designed and overseen by the first and second authors of this report, adhering to the overall approved information collection with the Office of Management and Budget (OMB, control # 0596-0221), designed to reduce the paperwork burden of the public from federal information collections. The first phase of work covered San Diego County, California, and was administered under contract with the Survey Research Center at the University of Georgia. The second phase of work covered three large regions defined as Northern Sierra, Southern Sierra, and Ontario/Riverside/San Bernardino, made up of grouped metropolitan statistical areas within California, and was completed under contract with the Social and Economic Sciences Research Center at Washington State University. For each of these research centers, an Institutional Review Board approval was granted, covering the procedures for the study and the survey instrument. In general, the approach in both phases was modelled after earlier work involving a similar emphasis focusing on Los Angeles County [29]. The

findings are designed to aid forest recreation management and planning, and communication with the public surrounding forest lands.

2.1. Sampling Approach—Phase I

The Center purchased a Random Digit Dial (RDD) sample from Survey Sampling International (SSI), following SSI's Random B methodology, which uses a measure of size (MOS)—typically estimated telephone households—to allocate sample by county such that sampling units are proportional to their size in each county. Numbers were drawn from landlines only. The method helps to prevent bias toward counties with larger proportions of listed households and ensures unlisted households are adequately represented among the sampling units. Random B methodology is a variation of the Waksberg [51] method, which results in a more efficient hit rate of working household numbers.

The household sample consisted of 4879 RDD phone numbers that were dialed at least once to attain the final sample of respondents. Approximately half of all numbers dialed ($n = 2439$ numbers) were either of unknown eligibility or resulted in a non-interview (e.g., the phone line was busy), were not eligible (e.g., disconnected numbers), technological circumstances impeded interview (e.g., number changed, mobile phone), or the number was not a household (e.g., was a business). Of the 2440 eligible phone numbers, 39.6% were refusals, 31.7% were connected to answering machines, and 5.8% were callbacks. The final sample consisted of 508 complete interviews (20.8% of all 2440 eligible attempts), with 8 partial interviews, which were not included in the analyses. Using the American Association for Public Opinion Research (AAPOR) [52] guidelines for survey results, these figures resulted in a cooperation rate of 34.3%, using the cooperation rate 3 formula (cooperation rate = interviews/(interviews + partials + refusals) [52]). Estimates based on this sample were subject to a sampling error of $\pm 4.3\%$ at the 95% confidence interval overall based on the area population at the time of the survey, although these estimates vary for specific question items.

2.2. Sampling Approach—Phase II

A dual frame random digit dial survey distributed proportionally across landlines and cell phones was used for each of the three regions in this phase of our research. Cellular phones were included in this phase in recognition of the continuing transition to wireless service among adult populations [52]. This work began with the purchase of 17,926 telephone numbers from SSI—4675 were landline numbers and 13,251 were wireless numbers. Equal probability selection methods based on telephone area codes and known prefixes or exchanges were used, sampling with equal probability within eligible 100-blocks of numbers. Numbers for the landline sample were selected using standard RDD methods from active blocks (area code + exchange + two-digit block number) that contained three or more residential directory listings. All nonworking and nonresidential numbers (e.g., businesses or schools) were screened out. The cellular sample was not list-assisted, but was drawn through a systematic sampling from dedicated wireless 100-blocks and shared service 100-blocks with no directory-listed landline numbers.

Sampling included a random probability sample within each of the selected metropolitan statistical areas (MSAs) with a goal of gathering 500 fully completed interviews from each regional area proximate to urban national forests, for a goal of 1500 completed interviews as outlined below:

- Region 1: 'Inland Empire': California MSA #40140 (Riverside–San Bernardino–Ontario).
- Region 2: 'Southern Sierras': California MSAs Bakersfield–Delano (12540), Visalia–Porterville (47300), Hanford–Corcoran (25260), Fresno (23420), Madera–Chowchilla (31460), Merced (32900), and Modesto (33700).
- Region 3: 'Northern Sierras': California MSAs Stockton (44700), Sacramento–Arden–Arcade–Roseville (40900), Yuba City (49700), Chico (17020), and Redding (39820).

Using the household as the unit for sampling, a randomly selected adult (age 18 or older) was invited to participate in the phone survey, asking for the adult in the household with the most recent

birthday. In the cellular sample, an adult would be interviewed if they agreed to participate, after ensuring the adult was not currently driving an automobile.

Using the AAPOR guidelines for survey results, these figures result in a cooperation rate of 34.3%, using the rate 3 formula (cooperation rate = interviews/(interviews + partials + refusals), see [52]). Estimates based on this sample within each region were subject to a sampling error of $\pm 5.0\%$ at the 95% confidence interval overall, although these estimates varied for specific question items and the number of respondents answering each question.

2.3. Survey Instrument

The survey instrument used in both phases for the telephone interview was programmed into computer-assisted telephone interviewing systems at the respective research centers, maintaining question structure, order, and response options to ensure compliance with the OMB approval, covering both phases of work and to ensure the capacity to compare phases of work. The first author reviewed training protocols and interviewer instructions to ensure comparability of procedures and approach between the two phases. The telephone interview consisted of open- and close-ended questions designed to explore respondent's self-identified ethnicity and primary racial identity, estimates of time spent outdoors and recreating outdoors, national forest visitation, methods and common sources of information when seeking information about natural resource recreation and sources trusted, and demographic items in addition to ethnicity. Respondents were presented a list of 14 common sources of information and were asked to indicate how frequently they used these sources of information to learn more about outdoor recreational opportunities (using the options: 1 (never), 2 (sometimes), 3 (frequently), 4 (very frequently), or 5 (don't know—then coded as missing)). The 14 common sources of information were television, radio, newspapers, magazines, land management agencies, pamphlets, books, the Internet, relatives, church, neighbors, work, friends, and community organizations. A subset of these were explored for more general weekly exposure to the source, by asking number of hours the respondent watched television, listened to the radio, read magazines, spent time on the Internet, participated in community-based organizations, and participated in faith-based organizations. As a follow-along, respondents were asked which sources they trusted most for information about outdoor recreational opportunities (posed as an open-ended question and then coded to reflect the common sources of information).

2.4. Respondents

For purposes of analyses and reporting in this paper, the two datasets were combined into a singular dataset, yielding 1977 usable responses from California residents aged 18 or older residing in the San Diego MSA, Inland Empire MSA, Southern Sierra MSAs, and Northern Sierra MSAs. Seeking to examine broad patterns, rather than to characterize the similarities and differences that may describe each of these MSA groupings, determined our approach. Slightly more females (50.9%) than males completed the phone survey. A majority of respondents self-identified as White/non-Hispanic (55.9%), about one-fifth (21.8%) as Hispanic/Latino, with the remainder indicating they were multi-racial (8.5%), Black/African-American (4.8%), Asian/Pacific Islander (3.8%), or American Indian/Alaskan Native (2.2%). For purposes of this paper, multi-racial respondents were excluded from in-depth analyses contrasting ethnoracial groups. Mean respondent age was 49.01 years ($SD = 18.11$, $n = 1908$), and a mean residency of 44.32 years in the United States ($SD = 20.84$, $n = 1927$). Questions surrounding use of English or another primary language in the home were designed to further understand degree of acculturation or maintenance of subculture within the home. The vast majority had primarily English language reading materials in the home (88.7%), or a combination of English and Spanish (2.7%), although almost one-tenth had primarily Spanish language reading materials (7.4%). Similarly, English was the primary language spoken in the home (80.8%), or a combination of English and Spanish (2.8%), though more than one-tenth spoke primarily Spanish in the home (13.3%). Additional languages beyond English, Spanish, or a combination spoken in the home included Chinese, Russian,

French, Tagalog, Japanese, Greek, Yaqui, Hmong, Portuguese, Korean, Mede, Persian, Hindi, Bulgarian, Cambodian, Mandarin, Armenian, and Turkish. Each of these was mentioned by less than 1% of respondents as a group. About one-third (37.0%) had completed a bachelor's degree, its equivalent, or greater, whereas another third (36.2%) had attained a high school diploma or less. The remainder (25.5%) had completed some college, or refused to answer (0.5%).

3. Results

3.1. Time Spent Outdoors

Average time spent outdoors on a weekly basis was about 18 h ($M = 17.73$, $SD = 18.43$, median = 10, $n = 1935$) after adjusting for extreme outliers through Winsorizing. This first analysis grouped respondents by combined ethn racial category and gender, yielding 10 subgroups. The number of hours spent outdoors varied significantly by ethn racial category and gender (ANOVA, $F_{9, 1707} = 10.79$, $p < 0.001$); missing from this analysis were respondents who did not answer the question on time spent outdoors. Post-hoc comparisons (Scheffé tests; $p < 0.05$) revealed males spent more time outdoors than their female counterparts among White/Caucasian respondents as well as for Hispanic/Latino respondents. Number of hours spent outdoors was not significantly different within Black/African American, Asian/Pacific Islander, and American Indian/Alaskan native groups by gender (Table 1).

Table 1. Average hours spent outdoors per week by ethn racial category and gender (adjusted for extreme outliers).

| Gender | White/Caucasian | Hispanic/Latino | Asian/Pac Islander ^a | Black/Afr American ^b | Amer Ind/ Alaska Native ^c |
|--------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) |
| Female | 14.33 (13.61, 571) | 11.97 (14.84, 218) | 14.54 (12.96, 28) | 14.17 (16.96, 41) | 21.05 (20.35, 19) |
| Male | 21.85 (20.33, 524) | 20.48 (21.48, 198) | 15.93 (17.37, 45) | 22.43 (24.27, 49) | 31.38 (28.19, 24) |

^a Abbreviation for Asian/Pacific Islander. ^b Abbreviation for Black/African American. ^c Abbreviation for American Indian/Alaska Native.

However, for the question of how many hours per week were spent recreating outdoors, the ANOVA ($F_{9, 1104} = 0.977$, $p = 0.457$) revealed no statistically significant effects (grand mean = 10.57, $SD = 10.31$, mode = 10, $n = 1264$), after adjusting for extreme outliers through Winsorizing (Table 2).

Table 2. Average hours per week spent outdoors recreating by ethn racial category and gender (adjusted for extreme outliers).

| Gender | White/Caucasian | Hispanic/Latino | Asian/Pac Islander | Black/Afr American | Amer Ind/ Alaska Native |
|--------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) | <i>M</i> (<i>SD</i> , <i>n</i>) |
| Female | 9.66 (9.04, 363) | 10.06 (12.51, 107) | 11.25 (12.64, 12) | 8.96 (8.11, 24) | 11.88 (10.46, 16) |
| Male | 11.38 (12.43, 396) | 11.39 (11.68, 105) | 9.81 (10.64, 36) | 12.69 (15.19, 36) | 13.89 (14.74, 19) |

3.2. National Forest Visitation

Respondents were asked if they had ever visited a national forest. The vast majority of respondents (83.5%) had visited a national forest in their lifetime, whereas more than one-tenth (15.6%) had not (the remainder were uncertain or refused to answer). National forest visitation history was distributed

unequally across ethnoraical categories by gender ($\chi^2(9, n = 1733) = 325.60, p < 0.001$). Where the majority of all respondent groups had visited a national forest, Latinas, and Black/African American males and females were much less likely to have done so (Table 3).

Table 3. Respondents who had ever visited a national forest by ethnoraical category and gender.

| Gender | White/Caucasian | Hispanic/Latino | Asian/Pac Islander | Black/Afr American | Amer Ind/ Alaska Native |
|--------|------------------|-----------------|--------------------|--------------------|-------------------------|
| | Pct ^a | Pct | Pct | Pct | Pct |
| Female | 94.1 | 54.5 | 74.2 | 63.6 | 78.9 |
| Male | 96.4 | 71.9 | 73.3 | 56.2 | 100.0 |

^a Abbreviation for percent.

An ANOVA was conducted to examine age by ethnoraical category combined with gender. Age varied significantly in the 10 ethnoraical/gender subgroups (ANOVA, $F_{9, 1681} = 22.74, p < 0.001$). Older groups included White/Caucasian male and female respondents (Table 4), Black/African American females, and American Indian/Alaska Native males and females. Youngest were Asian American/Pacific Islander males. The remaining groups averaged around early to mid-40s. These differences indicated the need to include age in subsequent analyses regarding ethnoraical groups, gender, and outdoor recreation patterns.

Table 4. Respondent age by ethnoraical category and gender.

| Gender | White/Caucasian | Hispanic/Latino | Asian/Pac Islander | Black/Afr American | Amer Ind/ Alaska Native |
|--------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| | <i>M</i> (<i>SD, n</i>) | <i>M</i> (<i>SD, n</i>) | <i>M</i> (<i>SD, n</i>) | <i>M</i> (<i>SD, n</i>) | <i>M</i> (<i>SD, n</i>) |
| Female | 54.58 (17.83, 559) | 40.50 (14.89, 215) | 41.57 (18.01, 30) | 50.29 (18.67, 42) | 47.58 (14.26, 19) |
| Male | 52.40 (17.70, 514) | 42.02 (16.42, 194) | 34.98 (16.52, 44) | 42.86 (17.27, 50) | 50.08 (15.47, 24) |

Lacking sufficient numbers of respondents in some groups, we focused on Whites/Caucasians and Hispanic/Latino respondents exploring the combination of gender (male/female), ethnoraical identity (Whites/Caucasians; Hispanic/Latino), and age group (by seven decades grouped 18–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70 and over) to predict whether or not the respondent had visited a national forest. Using a binary logistic regression analysis in SPSS, the full model was statistically reliable, $\chi^2(6, n = 1467) = 279.36, p < 0.001$ (Table 5). The predictors reliably accounted for 0.17 (Cox and Snell R^2) to 0.31 (Nagelkerke R^2) of the variance. The Wald criterion revealed each predictor (gender, ethnoraical identity, and age group) as a significant contributor to the model at $p < 0.001$. Males were more likely to have visited national forests, as were older respondents and those who self-identified as White/Caucasian.

Table 5. Factors predicting lifetime national forest visitation.

| Variable | B ^a | SE ^b | Wald | df ^c | <i>p</i> |
|------------------------------|----------------|-----------------|---------|-----------------|----------|
| Gender | −0.656 | 0.176 | 13.878 | 1 | <0.001 |
| Ethnoraical cat ^d | −2.200 | 0.183 | 143.944 | 1 | <0.001 |
| Age group | −0.308 | 0.055 | 31.366 | 1 | <0.001 |
| Constant | 0.853 | 0.235 | 13.168 | 1 | <0.001 |
| Observations | 1467 | | | | |
| Wald χ^2 | | | 0.17 | | |
| Nagelkerke R^2 | | | 0.31 | | |
| Overall % | | | 86.4 | | |

^a Abbreviation for beta, the unstandardized coefficient. ^b Abbreviation for standard error of the coefficient.

^c Abbreviation for degrees of freedom. ^d Abbreviation for ethnoraical category.

Respondents who had never visited a national forest ($n = 309$) were asked the primary reason why they had not visited a national forest. Of the 258 specific reasons provided to the open-ended question (excluding 'don't know' or reasons that were not listed by others) the majority involved a lack of time (including work, school, or family responsibilities—106 mentions), a lack of money (35 mentions), lack of interest (27 mentions), distance to the forest (23 mentions), lack of information (18 mentions), or transportation (17 mentions) as barriers.

Among the respondent majority ($n = 1650$) who had visited a national forest in their lifetime, the recency of the last visit was queried using the response categories of last week, last month, last six months, last year, and more than one year (Table 6). Variation in recency was different by ethnoracial group (comparing recency of visitation measured in five response categories by the five ethnoracial groups; insufficient numbers within some cells limited the ability to apply valid statistical comparisons across all groups and response categories). Specifically, the majority of Black/African American respondents (66.7%) had visited more than a year prior, in comparison to a majority of American Indian/Alaska Native (62.5%) and the slight majority of Whites/Caucasians (50.6%) who had visited within the last six months. Respondents who had visited a national forest in the last 12 months reported a median of 2 visits ($n = 1182$).

Table 6. Last time visited national forest by ethnoracial group.

| Last Time Visited | White/Caucasian | Hispanic/Latino | Asian/Pac Islander | Black/Afr American | Amer Ind/ Alaska Native |
|--------------------|-----------------|-----------------|--------------------|--------------------|-------------------------|
| | Pct, <i>n</i> | Pct, <i>n</i> | Pct, <i>n</i> | Pct, <i>n</i> | Pct, <i>n</i> |
| Last week | 10.1, 105 | 5.7, 15 | 7.1, 4 | 5.6, 3 | 17.5, 7 |
| Last month | 14.3, 149 | 7.2, 19 | 8.9, 5 | 9.3, 5 | 17.5, 7 |
| Last six months | 26.2, 272 | 24.9, 66 | 30.4, 17 | 7.4, 4 | 27.5, 11 |
| Last year | 13.0, 135 | 18.1, 48 | 21.4, 12 | 11.1, 6 | 10.0, 4 |
| More than one year | 36.4, 378 | 44.2, 117 | 32.1, 18 | 66.7, 36 | 27.5, 11 |

Respondents were further asked to identify constraints to more frequent forest visitation. Of 1754 responses (where multiple responses for one respondent were possible), most often listed were lack of time (360 mentions), work or school (322 mentions), lack of money (264 mentions), too far/distance to national forest (151 mentions), health or physical limitations (124 mentions), age (93 mentions), family responsibilities (61 mentions), and transportation (49 mentions). These represent responses to an open-ended question, with up to three responses allowed for any one individual.

Pooling responses into four major categories of lack of time (including general response, family, work or school), travel (too far/distance and transportation), age or health/physical limitations, and lack of money allowed comparisons across selected sociodemographic categories (following [45]). Given the lower number of survey participants within some ethnoracial categories, and challenges of using an open-ended format, the first approach was to explore the frequency of listings for each of the four major barrier types by assigning ranks, moving from most to least often mentioned (Table 7) similar to Crano et al. [29]. Patterns indicate that across ethnoracial groups, time was the main constraint cited, though ethnoracial minorities were more likely to cite resources-related issues of money and travel/transportation concerns compared to White/Caucasian respondents who cited age/health related constraints second-most often.

Additional responses not falling into these top five categories were also considered. A general lack of interest was mentioned 26 times among those who had visited a national forest in their lifetime, but cited this constraint for not visiting the forest more often. Fear-related issues were mentioned 23 times, with general fears, concerns about crime, fears about snakes or animals, or fire listed as the source of concern. "No one to go with" was mentioned 19 times as a constraint to more frequent forest visitation; a lack of information was mentioned only 9 times as a constraint. Discrimination was not specifically cited as a constraint.

Table 7. Respondents listing any of four major constraints by ethnoraical category.

| Constraint | White/Caucasian | Hispanic/Latino | Asian/Pac Islander | Black/Afr American | Amer Ind/ Alaska Native |
|------------|-----------------|-----------------|--------------------|--------------------|-------------------------|
| | Rank | Rank | Rank | Rank | Rank |
| Time | 1 | 1 | 1 | 1 | 1 |
| Age/health | 2 | 4 | 4 | 3 | 3 |
| Money | 3 | 2 | 3 | 2 | 2 |
| Travel | 4 | 3 | 2 | 3 | 4 |

3.3. Sources for Outdoor Recreation Information

The source most frequently used for information about outdoor recreation was the Internet (Table 8), which was the second highest weekly exposure to a potential information source (Table 9). The Internet was also selected as the most trusted source for information about outdoor recreation (Table 10). Response patterns were similar across the five ethnoraical categories considering trust in Internet as an information source for outdoor recreation ($\chi^2(4, n = 1625) = 2.519, p > 0.10$).

The second-most frequently used source for information about outdoor recreation was friends (Table 8), also the second-most trusted source (12.6% of respondents). Relatives were listed third-most frequently as a source for information (Table 8), but were the most trusted as an information source by less than one-tenth of respondents (Table 10). Forms of social networks were also reflected in frequent use of faith-based organizations as a source of information (Table 8), with a reported average of 2 h per week spent at church or a faith-based organization (Table 9). Other possible social networks included work, community-based organizations, and neighbors as frequent information sources for outdoor recreation (Table 8). Respondents spent an average of 3 h per week involved in community-based organizations (Table 9).

Magazines were listed as the fourth-most frequently used source for information about outdoor recreation (Table 8), with an average of less than 3 h per week spent reading magazines (Table 9). As a trusted information source for outdoor recreation they were infrequently listed (Table 10). Newspapers were sometimes used as an information source (Table 8) for outdoor recreation, but were only read about 2 h per week (Table 9). Other print materials queried as sources of information were pamphlets and books (Table 8).

Respondents reported the highest average weekly time watching television (Table 9), considering general information pathways. Television was used by about one-tenth of the respondents as a frequent source of information about outdoor recreation (Table 8), and was least often listed among the top-trusted sources for information (Table 10). Radio was listened to about 10 h per week (Table 9), and was used as an information source for outdoor recreation by less than one-tenth of respondents (Table 8). A number of the radio stations that respondents listened to featured ethnic oriented programming, and about one-tenth listened to programming with Spanish language, or Spanish and English (11.8%).

Visitor centers or park offices from land management agencies were frequently used by more than one-tenth of respondents (Table 8), and were listed as the third most trusted source for information about outdoor recreation (Table 10). Notably, the Hispanic/Latino respondents less often cited these information sources as most trusted (5.6% compared to a range of 9% to 11.6% among the other groups, $\chi^2(4, n = 1625) = 9.617, p < 0.05$). Travel-related agencies and member organizations such as the auto club were listed less frequently as top information sources (provided as open-ended response), but were cited among sources most trusted (Table 10).

Table 8. Frequently used sources for information about outdoor recreation.

| Used for Outdoor Recreation Info | | |
|----------------------------------|------|----------|
| Source | Pct | <i>n</i> |
| Internet | 57.1 | 1129 |
| Friends | 27.4 | 540 |
| Family | 24.6 | 486 |
| Magazines | 17.9 | 354 |
| Visitor ctrs/parks ^a | 15.3 | 303 |
| Pamphlets | 14.5 | 288 |
| Newspapers | 12.8 | 253 |
| Books | 12.3 | 243 |
| Work | 10.6 | 210 |
| Television | 10.4 | 206 |
| Community based org ^b | 10.1 | 160 |
| Faith based org/church | 8.4 | 165 |
| Neighbors | 7.7 | 153 |
| Radio | 7.3 | 144 |

^a Abbreviation for visitor centers/parks. ^b "Org." is abbreviation for organization.

Table 9. Average weekly exposure to selected information sources.

| Source | <i>M</i> | <i>SD</i> | <i>n</i> |
|--|----------|-----------|----------|
| Watch television | 14.14 | 14.10 | 1942 |
| Use the Internet | 12.00 | 15.05 | 1963 |
| Listen to radio | 10.30 | 15.81 | 1946 |
| Participate in community organizations | 3.00 | 7.64 | 1949 |
| Read magazines | 2.58 | 4.96 | 1958 |
| Read newspapers | 2.47 | 4.00 | 1960 |
| Participate in faith-based organizations | 2.11 | 5.07 | 1958 |

Table 10. Sources trusted most for information about outdoor recreation.

| Most Trusted | | |
|------------------------------|------|----------|
| Source | Pct | <i>n</i> |
| Internet | 52.0 | 1029 |
| Friends | 12.6 | 250 |
| Visitor ctrs/parks | 9.3 | 183 |
| Family | 6.7 | 132 |
| Magazines | 3.6 | 71 |
| Television | 3.0 | 60 |
| Auto club or travel agencies | 1.9 | 37 |

4. Discussion

Prior studies exploring outdoor recreation on forest lands have highlighted disparities in national forest visitation associated with traditionally marginalized groups [1,4,5,9–15]. In lieu of inequities abating, as might have been expected in an increasingly diverse state following Gordon's hypothesis [37], we observed marked patterns of continuing inequities. Others have noted the inequities in participation appear to be increasing over time [5]. The current research also demonstrated marked inequities and are cause for continuing concern, where lifetime visitation experience (had/had not visited), as well as recency of national forest visitation among those who reported prior visitation were inequitably distributed among the ethnoracial categories of survey respondents. Prior visitation was more likely among males, Whites/Caucasians, and elderly respondents (with significant differences

comparing White/Caucasians with Latino/Hispanic respondents). Prior national forest visitation reports among older respondents could be a reflection of extended life opportunity aligned with the number of years lived, or could be a reflection of a decreasing trend of forest visitation among younger respondent cohorts.

The main constraints cited for not having visited a national forest primarily aligned with those most often cited for not visiting the forest more often (e.g., lack of time [13], money, distance [6], or transportation [13]). The exceptions to the set of constraints for lack of lifetime visitation include a lack of interest, cited as the second-highest constraint, and lack of information. Lack of interest may be reflective of more subtle aspects of discrimination, as was mentioned, where respondents may have used this general explanation for a feeling of not being welcomed, not fitting in, wishing to avoid a negative experience, or more generally not having developed an interest through lack of access and opportunity while growing up [26]. Studies applying specified response sets, and those employing in-depth qualitative approaches, have revealed some of these nuances in past research [24]. However, intensive efforts to include diverse ethnoraical communities in outdoor recreation, particularly on national forest lands, warrants ongoing studies to determine if these patterns are shifting over time, or showing increased patterns of exclusion or segregation of experiences [5].

Recency of visitation revealed a somewhat different pattern, where ethnoraical variations were again evident, with ethnoraical minorities reporting greater gaps in the last visit to national forest lands, especially among Black/African American respondents. However, American Indian/Alaska Native respondents were similar in frequency of visitation to White/Caucasian respondents, indicating the importance of considering heterogeneity among ethnoraical minorities, where minorities are not homogeneous [22,26].

Constraints in information about outdoor recreation were reported as reasons for a lack of national forest visitation entirely, as well for more frequent visits (though less often a constraint when assessing frequency), in keeping with prior findings pointing to lack of information as a constraint to recreation use [13,29]. To remedy the gap in lack of information, we explored information sources typically exposed to on a weekly basis, sources used specifically for outdoor recreation, and sources trusted. Used and trusted information sources in the current study point to the Internet primarily, and secondarily to family and friends (though these associations may have been categorized as being from church, community, neighborhood, or work depending on how respondents viewed the response categories). Use of social networks again suggests the importance of understanding recreation patterns among known individuals and associates with whom one may recreate or share an experience, but more broadly, with one who may share information about places to go and likely enjoyable activities. Information from trusted sources is important as a leverage point for change in addressing inequities, where, for example, the desire to recreate with similar others may hinge in part on these others being aware of opportunities [30]. Additionally, among different age cohorts, younger groups may benefit from knowing about places where emerging trends in recreation may be experienced, or among older groups, locations, and opportunities that fit shifting interests and patterns, including perhaps those that may accommodate physical challenges associated with advanced age [4]. As the aging cohort in the U.S. continues to increase with the longevity of the baby-boomer generation, messaging about appropriate opportunities to encourage continued use will increase in importance [4].

Implications of our research approach are worth noting. We selected telephone surveys over the internet-administered approach. We held a lingering concern over internet access, particularly among ethnoraical minorities, as well as a desire to ensure inclusion of older age cohorts. In the second phase of work we included a portion of cellphone numbers in our sample. This step led to more young adults included as respondents, including those who relocated but kept the same telephone number. In an area-specific analysis we would have lost a portion of our completed surveys as a result. Using a single method may not be ideal; however, larger scale surveys still hold considerable merit in informing assessment of trends and can be informed by a solid review of studies relying on other methods, such as was done here. Finally, the use of open-ended questions addressing barriers to recreation and

information sources most trusted was an approach designed to limit the time burden of each individual participant. Presenting established response categories would have facilitated comparison to prior research, especially regarding the role of discrimination as a specific perceived barrier.

Natural resource managers may use these findings as inspiration to ongoing programs designed for outreach to engage ethnoracially diverse audiences. Further, the indication that the Internet is the most used and trusted resource is encouraging it as a pathway to provide information, given its broader reach and capacity to provide timely updates of content. Findings about the Internet may be of assistance in determining information platforms for natural resources outdoor recreation messaging, where radio, newspapers, and magazines may prove less fruitful, given that our study respondents tended to indicate less exposure and trust in these sources. Information sources will continue to shift over time with media and technology, thus it will remain important to replicate studies examining information sources that are used and trusted. That said, it was more typical among respondents to report spending hours on a weekly basis interacting with members of community organizations and faith-based organizations, representing a continuing pathway for sharing information about outdoor recreation

Extending the value of our current findings and other recent studies of ethnoracial groups and outdoor recreation access involves myriad possibilities. As recommended by Jay et al. [2], cooperation of scientists in different nations to address ethnicity and use of natural areas would contribute considerably to the understanding and improvement of planning and design for equitable access and use. In the near-term, the value of continuing assessments of outdoor recreation on national forest lands and other natural resource areas remains. This is especially true given the myriad contributions that equitable access and use make to a sustainable future. Although we were not encouraged by the continuing gaps in national forest recreation use, the continuing identification of information pathways, updated as media and information pathways shift with generations and cultural changes, may be especially helpful in working to address outdoor recreation inequities. This may be accomplished by providing basic information about outdoor recreation locations and activities that may be of likely interest to different age cohorts, physical abilities, and cultural traditions. It is likely further accomplished by ensuring messages appealing to individuals focused on culturally relevant and valued themes, and through using pathways trusted and relied upon.

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