

recreation

Recreation Equity: Is the Forest Service Serving Its Diverse Publics?

David Flores, PhD, Gennaro Falco,
Nina S. Roberts, PhD, and Francisco P. Valenzuela III

In 2044 the United States is expected to be a majority-minority nation. Promoting participation in outdoor recreation among racial and ethnic minority populations has long been a challenge facing the contemporary recreation manager. In this article, we compare data from the US Forest Service National Visitor Use Monitoring program from 2010–2014 to US Census data from 2010 in order to examine whether there is disproportionate utilization of recreation resources on US Forest Service lands across the entire US Forest Service system. Our findings suggest an *inequity gap* wherein racial minorities are still not utilizing Forest Service recreation opportunities at the same rate as their white counterparts. Racial and ethnic minority demographic data for US counties located within fifty-miles of a national forest boundary were compared to overall national forest visitation estimates to calculate an *inequity index* that was then compared across each national forest and region in the contiguous United States. Results from this analysis show an average inequity gap of -23.8%. We present these findings in light of a recent January 12, 2017 Presidential Memorandum calling for diversity and inclusion across public lands and the agencies that manage them.

Keywords: racial diversity, recreation, visitor-use, demographic trends

In 2044, for the first time in American history, the United States is expected to be a majority-minority nation (Colby and Ortman 2015). If recreation professionals are unable to match management techniques with rapid demographic changes in the United States, they risk ignoring and alienating a sizeable portion of the population (Chavez 2000), and ultimately becoming less relevant to the public (Dawson et al. 2016). Numerous studies since the 1960s have provided greater context for the underrepresentation of minority groups (Bullard 1993; Dwivedi et al. 2016; Johnson and English 2007; Meeker 1973; ORRRC Study Report 19, 1962), and have shown

that in comparison to white Americans, those who identify as black, Latino, Asian, Pacific Islander, or Native American have differences in access to public lands, constraints to outdoor recreation, attach different meanings to places and activities, and have different outdoor recreation patterns and motivations (Parker and Green 2015; Pease 2011; Rodriguez and Roberts 2002).

In particular, for several racial or ethnic minority groups, outdoor recreation is the avenue through which they are exposed to, and can experience, national forests and grasslands (Chavez 2012). Moreover, land managers are concerned that within the next 20 years, public lands will experience

less political and financial support, disconnected urban audiences, and incompatible land uses (Dawson et al. 2016). Thus, as scholars of outdoor recreation conclude, just as all species of flora and fauna, whether common or rare, survive with support of legislation, agency mandates, and protection practices, so should the utilization of recreation opportunities for American racial minorities (Cordell 2012; Gomez 2008; Vial 1999).

Diverse racial groups have distinct historical connections to public lands as well as different ways they have been excluded from participating in decision-making, specifically concerning parks and natural resources (Rodriguez and Roberts 2002). For example, this work has been explored for nearly 25 years, indicating that black communities have historically been left out of environmental policy decisions that directly impact their communities, leading to systemic environmental racism (Bullard 1993). Relatedly, more current work reflects similar issues, thereby noting that a dearth of progress has really been made; Taylor (2015), for example, examines the disproportionate price that low-income communities, African Americans, and other people of color pay for our environmental problems. She exposes failings of our government and the environmental community to adequately address the inequities at the

Received February 7, 2017; accepted April 10, 2018; published online XXXX XX, 2018.

Affiliation: David Flores (davidflores@fs.fed.us), Research Social Scientist, USDA Forest Service, Rocky Mountain Research Station. Gennaro Falco (gennaroafalco@fs.fed.us), USDA Forest Service, Carson National Forest, Tres Piedras, NM. Nina S. Roberts, PhD (nroberts@sfsu.edu), Professor, Dept. of Recreation, Parks, & Tourism, San Francisco State University. Francisco P. Valenzuela III (fvalenzuela@fs.fed.us), Director of Sustainable Recreation, Heritage and Wilderness, Southwest Region, Forest Service.

heart of widespread environmental injustice to blacks and other racial minorities. In addition, contrary to conventional beliefs that blacks tend to be less environmentally concerned than whites, studies have found blacks to hold similar environmental attitudes, while their opportunities for participation in outdoor activities are considerably less than whites (Lee 2008; Parker and McDonough 1999; Payne et al. 2002).

Decades of research on Latinos show they may also differ considerably from whites in their opportunities for participation in outdoor recreation. While Latinos are often treated by the US Census and mainstream society as a homogeneous group based on Spanish being a unifying language, Latinos are highly diverse in racial and cultural background, country of origin, patterns of immigration, levels of assimilation into mainstream society, and for the purposes of this article, diverse in their motivations, patterns, and familiarity with outdoor recreation (Hong and Anderson 2006; Schultz et al. 2000; Stodolska et al. 2010). Furthermore, Asians are a racial group even more diverse ethnically than Latinos, due to differences not only in country of origin but also in language, culture, and belief systems (Pease 2011), yet they have been studied less frequently than other racial groups. Nonetheless, research on Asian recreation participation shows diverse within-group patterns and motivations for outdoor recreation, and perceived constraints to visiting public lands are affected by the interaction of income, education, discrimination, linguistic acculturation, cultural group, and gender but not by any variable individually (Bengston et al. 2008; Stodolska and Yi 2003; Winter et al. 2004).

For Native Americans, public lands that are now managed by the US government are still often seen as places of humiliation, symbols of whites conquering the West, and the destruction of Native American culture (McAvoy 2002; Meeker 1973; Henn et al. 2010). The inequitable inclusion and distribution of recreation resources, as well as differences in recreation motivations, behaviors, and preferences of racial minority groups, has led to a wealth of studies that work to unpack this persistent equity gap through lenses of class, race, culture, and recreation patterns and motivations, including what lies at their intersection (Brehm 2007; Floyd

1998; Johnson and Bowker 2004; McCool and Freimund 2016).

While researchers continue to analyze barriers and constraints to outdoor recreation on public lands for racial and ethnic minorities, ongoing demographic shifts in the United States require ongoing research regarding access issues, in particular, to outdoor recreation across cultures (Shinew et al. 2006). The present study examines whether there is disproportionate utilization of recreation resources on US Forest Service lands across the entire national US Forest Service system. Decades of research on race, class, and gender, for instance, has occurred regarding visitor use and subsequent resource allocation (Taylor 2015); hence, results of the current study argue that an *inequity gap* exists wherein racial minorities are currently underserved by the US Forest Service and are not utilizing Forest Service recreation opportunities at the same rate as racial whites. The inequity gap in this article is presented in light of numerous successful US Forest Service initiatives, such as the Youth Conservation Corps, Kids in the Woods (followed by More Kids in the Woods) Children's Forest Network, and Discover the Forest PSA, which are effective in engaging multiple racial and ethnic communities, and in closing the inequity gap. In addition to national policy efforts such as the Healthy Kids Outdoors Act (H.R. 3353/S. 1802) and the No Child Left Inside Act (H.R. 2547/S. 1372), a recent January 12, 2017, Presidential Memorandum called for continued progress in diversity and inclusion across public

lands and the agencies that manage them (US President, 2017).

While the individual case studies mentioned above address unique barriers to outdoor recreation for racial and ethnic minorities, the authors are aware of no such study that examines equity of service across the entire US National Forest System. This present study contributes to filling this void. Based on the inequity index created, what follows are inequity gaps for each of the eight Forest Service regions across the continental United States that are included in this study. The inequity gap is also placed into the context of ongoing research about motivations, patterns, preferences, and constraints, as well as national policy efforts adopted to increase diversity on public lands.

Subsequently, this study compares US Forest Service National Visitor Use Monitoring (NVUM) datasets from 2010 to 2014 to 2010 US Census data. NVUM is a national program managed by the US Forest Service that is responsible for providing reliable estimates of the volume and quality of recreation visitation on National Forest System lands. An *inequity index* was developed by authors of this paper and operationalized as percent racial and ethnic minority population within 50 miles of a national forest boundary compared with percent national forest visitors belonging to a racial or ethnic minority. This was completed for each national forest and region administered by the US Forest Service in the contiguous United States.

Management and Policy Implications

The results from this study suggest there is disproportionate utilization of forest recreation opportunities for most racial and ethnic minority groups. From the perspective of public land management in the United States, these findings are alarming, especially when considering that national forests are managed under the USDA Forest Service mission statement "to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations." Results from this current study demonstrate the need for the US Forest Service, and other public land management agencies, to scrutinize and evaluate strategies that would enhance greater racial and ethnic inclusion in outdoor recreation. Additionally, the development of repeatable, comparable, and statistically robust metrics to monitor trends in racial and cultural diversity, pertaining to public land use, is vital. The *inequity index* developed and presented in this paper was recently adopted by the Southwestern Region of the US Forest Service as a recreation performance (reporting) measure through their 2015 Sustainable Recreation Strategy. The authors encourage public land managers and policymakers to continue refining measures of diversity and all-inclusive visitation in their decision-making and planning processes relating directly to sustaining future relevance and serving *all* of the public these lands are intended to serve.

Methods

Datasets

National forest visitation data for racial and ethnic minority and non-minority user groups was obtained from the NVUM program (USDA Forest Service 2014a). Visitor inventories are conducted on a five-year cycle; the most recent datasets from 2010 to 2014 were utilized for this study. The NVUM data was then compared with 2010 county demographic data obtained from the US Census Bureau (US Census Bureau 2010). The NVUM uses the same race and ethnicity categories as the US Census datasets, allowing for efficient comparison of racial minority and non-minority populations. Racial minority populations are defined as persons self-identifying as Hispanic/Latino, black, Native American, Pacific Islander, Asian, or other minority group in the US Census and NVUM data-

$$\% \text{ County Minority} = \frac{\sum_{i=\infty}^n \text{Minority Population in County}(i_n)}{\sum_{i=\infty}^n \text{Total Population of County}(i_n)} \times 100$$

sets. Non-minority population was then defined as all Census or NVUM respondents who identified as being “white

$$\text{Inequity Index} = \% \text{ Forest Visitor Minority} - \% \text{ County Minority}$$

American.” NVUM respondents who are foreign nationals comprise less than 2.2% of National Forest and Grasslands visitors (USDA Forest Service 2014a). US Forest Service Region 10 (Alaska Region), El Yunque National Forest, Savannah Prairie National Grassland, and the Lake Tahoe Management Area were excluded from this analysis due to a lack of data (e.g., Savannah Prairie National Grassland), or inconsistencies within the dataset (e.g., the Tongass National Forest in Alaska collects information on the island and not the entire forest).

US Decennial Census data from 2010 was obtained for every US county within a 50-mile radius of a national forest or grassland boundary (US Census Bureau 2010). For each county, the percentage of the total population belonging to an ethnic or racial minority group was calculated. The percentage of total estimated national forest or grassland visitors who identified themselves as belonging to a specific racial

minority was also calculated using NVUM visitation estimates. A national forest or grassland inequity index was operationalized as the difference between percent of racial and ethnic minority population in local counties (i.e., within 50 miles) and the percent of visitors belonging to a minority group.

Eq. 1.1. % County Minority: County data are summated across all counties within 50 miles of National Forest boundary.

Eq. 1.2. Inequity Index: The difference between NVUM (% Forest Visitor Minority) and US Census (% County Minority) is computed.

Possible index values range from -100 to +100. An index value of 0 can be interpreted as no difference in racial/ethnic demography between national forest visitors and neighboring counties. As values deviate from 0, this represents a larger disparity between

demographics. Negative index values represent a smaller percentage of minority populations visiting a national forest or grassland

than actually reside in neighboring counties, whereas positive values represent a condition where the minority population visiting a national forest or grassland is greater than the neighboring counties.

County demographic data (percent racial minority) and National Forest or Grassland inequity index was mapped in ArcGIS to interpret the inequality index values and to look for trends or patterns across the contiguous United States.

Analysis

After calculating inequity index values for each national forest or grassland in the contiguous United States, differences were tested within the NVUM dataset to inform patterns that initially emerged in the inequity map (Figure 1). All statistical comparisons were conducted using two-sample Kolmogorov-Smirnov (K-S) tests (Conover 1999). A K-S test is a non-parametric statistical hypothesis test that estimates the

probability that two continuous probability functions are equal (Conover 1999). Estimates were compared for national forest visits (persons/year), distance traveled to a national forest (in miles), and total trip spending, between minority and non-minority visitor groups. Differences were also compared in national forest visitation rates, distance traveled, and total trip spending across annual income brackets of national forest visitors. Finally, differences were tested between county minority population percentages of national forest visitors who identify with a minority group with inequity index values across US Forest Service regions.

Assumptions and Limitations

Several assumptions associated with this analysis must be acknowledged before discussing the significance of the results. The comparison between US Census and NVUM datasets considered only local Census populations (i.e., within 50 miles of a national forest boundary), while national forest visitation estimates represent all visitors regardless of the distance they traveled. In cases where a large percentage of national forest visitors are non-local (e.g., popular skiing destinations or forests adjacent to national parks), inequity values could be less accurate. In some instances, this can be an important limitation. For example, NVUM results for the Kaibab National Forest, which is adjacent to Grand Canyon National Park, estimate that 80.2% of visitors traveled greater than 50 miles to recreate in the forest. Any future analysis of individual national forests and grasslands should incorporate some type of sensitivity analysis for defining “local” communities. For the sake of this study, defining a threshold and acknowledging variation between national forests and grasslands, in this respect, was a necessary trade-off for making nationwide comparisons.

It is also important to acknowledge there are obvious geographic patterns correlated with population demographics. For example, racial and ethnic minorities are more heavily concentrated in urban communities that tend to be more geographically isolated from national forests and grasslands (Byrne and Wolch 2009). This isolation and indirect marginalization from National Forest System lands is also often compounded by economic disparities that make access to these areas even more

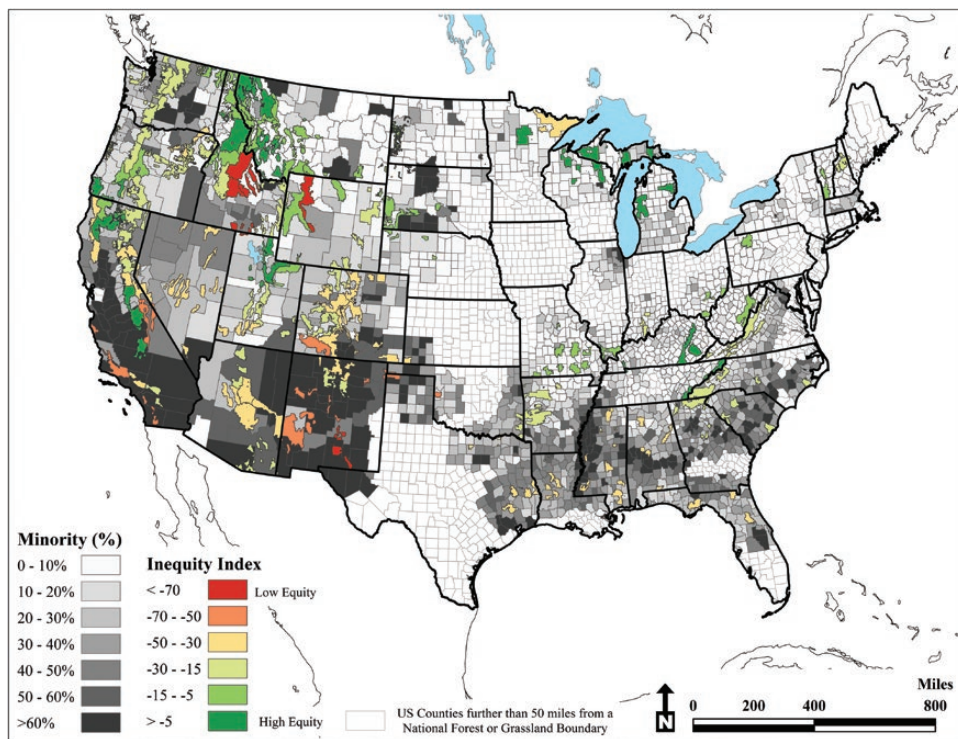


Figure 1. National Inequity Index Map. Percentage of county populations composed of racial and ethnic minority groups (within 50 miles of a National Forest boundary) displayed in relationship to National Forest visitation inequity index (percent national forest visitors belonging to a minority group minus percent local county population belonging to a minority). Counties are labeled in grayscale. National forests and grasslands are color coded.

difficult. A final limitation is that inequity estimates could be skewed by how often certain visitors recreate in a given national forest, or are repeat visitors within a racial/ethnic group. For example, if a certain ethnic or racial group were to visit a national forest more often than another group, their contribution to the total estimated national forest visits could be disproportionately represented. This could also be the case with repeat visitors within the same racial and ethnic group. A deeper analysis on this limitation was conducted, and there were no results showing major differences between minority and non-minority

populations with respect to National Forest site visits. Therefore, no significant difference was found between the average number of national forest visits of racial minority (2.6 ± 1.5) and non-minority (2.5 ± 1.0) groups across all national forests and grasslands (Kolmogorov-Smirnov test, $\alpha=.05$; Conover 1999). Differences may exist on specific national forests or grasslands; however, in this study, the assumption was only tested at a national level.

Results

The results of this study are divided into two main sections. First, presented below is

a breakdown of the inequity index by US Forest Service regions across the contiguous United States. In this study, there are eight US Forest Service regions,¹ and the study compares each region's visitor demographics for racial and ethnic minority groups to US Census demographic data within a 50-mile radius of each forest within each regional management area. Second, 2010 US Census data are compared to US Forest Service NVUM data between 2010 and 2014, providing a within-group analysis of the inequity index by racial or ethnic subgroup.

Inequity Index by US Forest Service Region

The map in Figure 1 displays the percentage of racial and ethnic minority populations across counties within a 50-mile radius of a national forest boundary and the estimated inequity index for each national forest in the contiguous United States. The darker colors on the map represent areas across the United States with a high inequity index, whereas lighter colors represent areas in the US with a lower inequity index.

The National Inequity Index Map above represents the percent of county populations composed of racial and ethnic minority groups in relationship to the national forest visitation inequity index. The map provides a reference for land managers to compare their region's inequity index to other regions throughout the country in order to think about where and how to focus resource priorities to close the equity gap.

Table 1 displays (\pm standard error) inequity index estimates for Forest Service regions across the contiguous United States. The inequity index value for the national forest system as a whole across the contiguous United States is -23.8 ± 1.92 (Table 1). Region 1 (Northern Region) and Region 9 (Eastern Region) had the lowest estimated equity gaps (i.e., inequity indexes): -6.7 and

Table 1. Comparison of local (within 50 miles of a National Forest boundary) and National Forest visitor demographics for racial/ethnic minority (i.e., non-White, not Hispanic/Latino) groups for Forest Service regions in the contiguous United States.²

Demographic Variables & Inequity Index	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 8	Region 9	NFS
Local minority population (%)	12.1 \pm 0.40	40.1 \pm 6.95	60.6 \pm 4.93	41.5 \pm 8.01	49.7 \pm 6.47	28.8 \pm 1.44	34.3 \pm 3.52	20.2 \pm 3.66	35 \pm 2.17
Visitor population belonging to minority (%)	5.4 \pm 1.07	7.1 \pm 0.71	18.8 \pm 2.12	9.9 \pm 1.55	21.5 \pm 2.51	9.1 \pm 1.10	11.9 \pm 1.69	8.2 \pm 1.57	11.7 \pm 0.79
Inequity index	-6.7 ± 1.04	-32.9 ± 7.02	-41.8 ± 4.70	-31.6 ± 8.23	-28.2 ± 5.85	-19.7 ± 1.96	-22.4 ± 3.91	-12.0 ± 3.26	-23.8 ± 1.92

−12.0, respectively (Table 1). Nonetheless, of all eight US Forest Service regions, the forests in these regional areas also serve the lowest percentage of racial minority groups. In contrast, Regions 3, 2, and 4 were ranked the least equitable, at −41.8, −32.9, and −31.6, respectively, but have the highest percentage of racial minority groups within a 50-mile radius of their forests. Therefore, across the national system, forests that are in areas with the greatest level of racial diversity are less likely to equitably serve their local communities. In addition, no Forest Service region throughout the system had an index greater than or equal to zero (i.e., equal rate of recreation between racial minority population and non-minority population, or racial minority populations recreating at a higher rate than non-minority populations). Table 1, below, is a comparison of local (within 50 miles of a national forest boundary) and national forest visitor demographics for racial and ethnic minority groups (i.e., non-white) for Forest Service regions in the contiguous United States.

Based on the results reflected in Table 1, despite efforts by land management agencies to better serve racial minorities (Clarke et al. 2015), an equity gap remains across all racial minority groups in the United States. In order to assess representation on Forest Service lands across racial minority subgroups, the following considers the inequity index across racial groups represented in the 2010–2014 NVUM dataset.

Inequity Index across racial subgroups

A within-group comparison of racial minority subgroups was conducted to analyze the rate at which diverse groups across race are utilizing US Forest Service recreation opportunities. To develop the model, national US Census demographic data was compared against NVUM data. The findings reveal that, while in 2010, 62.6% of the US population was

white, NVUM estimates show an overrepresentation of white visitors of 94.6%. Thus, with the exception of Hawaiians and Pacific Islanders, racial and ethnic minority groups in the sample are less represented within the national forest visitor population compared to their representation among the general US population (see Table 2). Blacks were found to be the least represented racial minority group; while consisting of 13.2% of the US population in 2010, blacks consisted of only 1.2% of visitors to national forests across the country. Meanwhile, proportionate to their population size, Asians consist of the highest percentage of minority visitors, consisting of 5.3% of the US population and 2.6% of national forest visitors, followed by Hispanic/Latinos, who comprised 17.1% of the US population and 5.7% of visitors to forests and grasslands. Table 2 is a comparison of racial demographic data between the 2010 US Census and US Forest Service NVUM data from 2010 to 2014.

Results from this analysis suggest that disproportionate utilization of recreation opportunities by racial minority groups persists. On average, 35.5% of people living within 50 miles of a national forest boundary belong to a racial background that is non-white. At the same time, racial and ethnic minority populations (on average) only comprise 11.7% of the annual national forest visitors. According to the 2010 US Census, 30.3% of the US population self-identifies as being black/African American or Hispanic/Latino, while NVUM estimates show that only 6.2% of national forest visitors identified with those groups. The analysis included 109 national forests and grasslands managed by the US Forest Service, and findings reveal that only 17% of these forests and grasslands exhibited high visitor equity (inequity index > 5). However, these forests and grasslands also have a much smaller local racial and ethnic minority demographic: 15.0% vs. 35.5% (Table 1).

Table 2. Inequity by racial minority subgroup.

Racial/ethnic population	2010 US Census population (%)	NVUM annual National Forest visits
White	62.6%	94.6%
Black/African American	13.2%	1.2%
Asian	5.3%	2.6%
Hawaiian/Pacific Islander	0.2%	1.4%
American Indian/Alaska Native	1.2%	2.4%
Hispanic/Latino	17.1%	5.7%

Comparison of racial/ethnic demographic data between the 2010 US Census population estimates and US Forest Service National Visitor Use Monitoring (NVUM; 2010–2014) annual National Forest visitation estimates. Total percentage is greater than 100%, as survey respondents are allowed to identify themselves as belonging to more than one racial/ethnic group.

Discussion

Our findings reveal that the most racially diverse regions in the United States are more likely to have higher inequity gaps. Within-group analysis also shows that national forest visitors who identify as white comprise 94.6% of all visitors between 2010 and 2014, while visitors who identify as Hispanic or Latino comprise only 5.7% of visitors during this same time frame; visitors identifying as black make up a mere 1.2% of total visitors to national forests across the continental United States. Meanwhile, in 2013, for the first time in the history of the United States, more than half of children under age one were racial minorities (Cohn 2016).

While an inequity index score of 0 or within the positive range may not be fully possible, monitoring across time and moving closer to equity is desired. To close the inequity gap, scholars of outdoor recreation suggest agencies partner with local city officials, community-based organizations, schools, universities, and environmental organizations. Additionally, they suggest hiring more racially diverse staff from natural resource and environmental sciences programs (Sharik et al. 2015), basing recreation programs on topics relevant to the environments of cultural minority groups (Roberts 2015), building relationships with communities of interest (Brehm 2007), and providing transportation arrangements from surrounding communities (Burns and Graefe 2007). Also, working with schools to provide child and adult education programs that move beyond nature awareness to include topics more relevant to environmental issues on the local level (Gaither et al. 2015; Johnson et al. 1997) is becoming more essential. Recent case studies also offer suggestions on how to engage racial minority populations through the media and broadcast electronic communications (Roberts et al. 2009; Roberts et al. 2015).

Chavez (2000) also advocates that professionals should not be afraid to innovate. This includes the recommendation that the US Forest Service should consider partnering with diverse community organizations regarding inclusion of the following vital considerations: citizen science and data collection (Thelen and Thiet 2008), urban ecology programs (Barnett et al. 2006), storytelling (Arning 2009), planning and decision-making (Rodriguez

and Roberts 2002); and moving beyond outreach to build and restore relationships with racial minority communities (Roberts 2015).

In addition to notable differences across racial groups in access to public lands and constraints to outdoor recreation, the lack of diversity in land management staff, their cultural irrelevancy, and language constraints create sociocultural barriers that alienate many racial minorities from natural resource agencies. Corroborating with results of this present study, public land managers need not only to engage racial minority groups who have been distanced from the work they do, but also to include them in their decision-making process when feasible. For example, due to statutory requirements, the US Forest Service has a long history of partnering with Native American tribes. Drawing on these long partnership frameworks, such as developing programmatic agreements with Tribes (Jurney et al. 2017), land agencies can acknowledge underrepresented groups as partners through educational initiatives such as the No Child Left Inside Act, which adopts an educational approach to partnerships.

Nonetheless, this is easier said than done. As was found in comparative studies of national forest visitation in the US Southwest and Southeast, “a common theme across all forests in both regions is the lack of funding and staffing to address the most basic tasks associated with national forest recreation” (Gaither et al. 2015, p. 19). Moreover, addressing the lack of diversity in land management workforce to achieve racially proportional staffing is an even greater challenge when less than 15% of natural resource students at colleges and universities are racially diverse (Sharik et al. 2015). Thus, the onus of creating a more robust, vibrant, and inclusive recreation program does not rest exclusively on individual recreation managers. The problem, while some successful efforts have been implemented, requires a systemic alteration in priorities across all state and federal land management agencies, and in natural resources programs at colleges and universities. Hence, increasing equitable service to diverse publics involves both shifting the approach to recreation situations, solutions, and problems along with developing a diverse workforce that is representative of the American people.

The tremendous growth in racial, ethnic, and cultural diversity in our society provides an opportunity for developing transformative solutions to many of the challenging questions land managers face. Innovative solutions to equitable recreation transform communities and provide a greater vision and purpose for federal agency recreation programs. Each region of the Forest Service has achieved certain milestones programmatically and in their efforts to diversify. For example, the southwest region of the US Forest Service recently developed a robust sustainable recreation strategy to provide guidelines for forests to develop projects that emphasize stimulating economies, promoting health and well-being, building family and community, promoting democracy, and restoring spiritual benefits of outdoor experiences (USDA Forest Service 2014b). Another comprehensive look at the US Forest Service Pacific Southwest Region, plus examples from states across the country, can be found in Roberts et al. (2009), where a team of scholars created a resource guide providing model programs and initiatives to help mitigate the current inequity gap as found in this study.

Conclusion

This study examines recreation equity across the entire US National Forest System. We compared 2010 national US Census data and 2010–2014 NVUM data to calculate and create an *inequity index* across all Forest Service regions in the continental United States to learn whether the US Forest Service serves its diverse publics equitably through recreation. Results of this study show a disproportionate utilization of recreation resources on US Forest Service lands, leading to a national inequity gap of –23.8%.

Thus, US Forest Service and other land management agencies can use the inequity gap, identified in this study, for their respective region as a vital tool to think about how and where to target limited resources. Agencies can also greatly benefit from a more careful and deliberate analysis of efforts to improve equity along with an analysis of projects that are effective and those that may have failed. Therefore, knowing their region’s inequity index can be the first step in sharing their concerns with others about disproportionate utilization by minority groups both within the various US Forest Service regions and across the

national forest system as a whole. There are always competing priorities that may have a greater impact on managing our forests. All public lands and their inequities are ubiquitous; the gaps, such as reflected in this study, need to be brought to the forefront as a matter of both environmental and social justice, as these affect everyone. Not acting on these needs would be a loss to visitors, potential visitors, and the US Forest Service.

Endnotes

¹The eight US Forest Service regions in the contiguous United States are Region 1 (Northern Region), Region 2 (Rocky Mountain Region), Region 3 (Southwestern Region), Region 4 (Intermountain Region), Region 5 (Pacific Southwest Region), Region 6 (Pacific Northwest Region), Region 8 (Southern Region), and Region 9 (Eastern Region). Region 7 was eliminated in 1965 when the current Eastern Region (Region 9) was created from the former Eastern and North Central Regions.

²Inequity index is equal to the difference in the local minority population (%) minus the % of National Forest visitors who identified themselves as belonging to a minority group.

Literature Cited

- ARNING, C. 2009. Telling stories in someone else’s house. *Legacy* 20(2):18–23.
- BARNETT, M., C. LORD, E. STRAUSS, C. ROSCA, H. LANGFORD, D. CHAVES, AND L. DENI. 2006. Using the urban environment to engage youths in urban ecology field studies. *J. Env. Ed.* 37(2):3–11.
- BENGTSON, D.N., M. SCHERMANN, M. MOUA, AND T.T. LEE. 2008. Listening to neglected voices: Hmong and public lands in Minnesota and Wisconsin. *Soc. Natr. Res.* 21(10):876–890.
- BREHM, J.M. 2007. Community attachment: The complexity and consequence of natural environment facet. *H. Ecol.* 35:477–488.
- BULLARD, R.D. 1993. *Confronting environmental racism: Voices from the grassroots*. South End Press, Cambridge, MA. 259 p.
- BURNS, R.C., AND A.R. GRAEFE. 2007. Constraints to outdoor recreation: Exploring the effects of disabilities on perceptions and participation. *J. Leis. Res.* 39(1):156–181.
- BYRNE, J., AND J. WOLCH. 2009. Nature, race, and parks: Past research and future directions for geographic research. *Prog. Hum. Geo.* 33(6):743–765.
- CHAVEZ, D.J. 2000. Invite, include and involve! Racial groups, and leisure. In *Diversity and the recreation profession*, Allison, M., and Schneider, I. (eds.), pp. 179–194. Venture Publishing, State College, PA.
- CHAVEZ, D.J. 2012. Latinos and outdoor recreation. In H.K. Cordell (ed.), *Outdoor recreation trends and futures: A technical document supporting the Forest Service 2010 RPA assessment*. US For. Serv. Gen. Tech. Rep. SRS-GTR-150. 74–77.

- CLARKE, T., D. RODRIGUEZ, and J. ALAMILLO. 2015. Engaging Latino/a communities in national park programs: Building trust and providing opportunities for voice. *Env. Man. Sus. Dev.* 4(1):136–148.
- COHN, D. 2016. It's official: Minority babies are the majority among the nation's infants, but only just. Available online at <http://pewrsr.ch/28UIGZG>; last accessed May 13, 2017.
- COLBY, S.L., and J.M. ORTMAN. 2015. Projections of the size and composition of the US population: 2014 to 2060. *Curr. Pop. Rep.* 25–1143. Available online at <https://census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf>; last accessed Feb. 28, 2018.
- CONOVER, W.J. 1999. Practical nonparametric statistics, 3rd ed. *Wiley series in probability and statistics: Applied probability and statistics section*. John Wiley and Sons, Hoboken, NJ. 583 p.
- CORDELL, H.K. 2012. *Outdoor recreation trends and futures: A technical document supporting the Forest Service 2010 RPA assessment*. US For. Serv. Gen. Tech. Rep. SRS-GTR-150.
- DAWSON, C.P., K. CORDELL, A.E. WATSON, R. GHIMIRE, and G.T. GREEN. 2016. The wilderness managers survey: Charting a path for the future. *J. For.* 114(3):298–304.
- DWIVEDI, P., A. JAGADISH, and J. SCHELHAS. 2016. Perceptions of stakeholder groups about the participation of African American family forest landowners in federal landowner assistance programs. *J. For.* 114(2):89–96.
- FLOYD, M.F. 1998. Getting beyond marginality and ethnicity: The challenge for race and ethnic studies in leisure research. *J. Leis. Res.* 30(1):3–22.
- GAITHER, C.J., N.S. ROBERTS, and K.L. HANULA. 2015. *Visitor diversity through the recreation manager lens: Comparing Forest Service regions 8 (US South) and 5 (California)*. USDA For. Serv. Tech. Rep. SRS-GTR-205. 22 p.
- GOMEZ, E. 2008. Race, ethnicity, recreation, and leisure: An identification of research gaps. In D.J. Chavez, P.L. Winter, and J.D. Absher (eds.), *Recreation visitor research: Studies of diversity*. USDA For. Serv. Gen. Tech. Rep. PSW-GTR-210. 75–84.
- HENN, M., D. OSTERGREN, and E. NIELSEN. 2010. Integrating traditional ecological knowledge (TEK) into natural resource management: Perspectives and projects within western US national parks. *Park. Sci.* 27(3). 48–55.
- HONG, A., AND D.H. and ERSON. 2006. Constraints to participation for Latino people at Dodge Nature Center. *J. Env. Ed.* 37(4):33–44.
- JOHNSON, C.Y., AND J.M. BOWKER. 2004. African American wildland memories. *Environmental Ethics* 26(1):57–75.
- JOHNSON, C.Y., J.M. BOWKER, D.B.K. ENGLISH, and D. WORTHEN. 1997. *Theoretical perspectives of ethnicity and outdoor recreation: A review and synthesis of African-American and European-American participation*. USDA For. Serv. Gen. Tech. Rep. SRS-GTR-11. 16 p.
- JOHNSON, C., and D.B.K. ENGLISH. 2007. Visitor diversity on national forests—How should managers respond? In Kruger, L.E., R. Mazza, and K. Lawrence (eds.), *Proceedings: National workshop on recreation research and management*. USDA For. Serv. Gen. Tech. Rep. PNW-GTR-698. 13p.
- JURNEY, D.H., D.C. BRAGG, R.E. COLEMAN, AND B. GONZALEZ. 2017. Lessons from a programmatic agreement and heritage-based consultations between Tribes and the National Forests of Arkansas and Oklahoma. *J. For.* 115(5):458–467.
- LEE, E.B. 2008. Environmental attitudes and information sources among African American college students. *J. Env. Ed.* 40(1):29–42.
- MCAVOY, L. 2002. American Indians, place meanings and the old/new west. *J. Leis. Res.* 34(4):383–396.
- MCCOOL, S.F., and W.A. FREIMUND. 2016. Maintaining relevancy: Implications of changing societal connections to wilderness for stewardship agencies. *Journal of Forestry* 114(4):405–414.
- MEEKER, J.W. 1973. Red, white, and black in the national parks. *Nor. Amer. Rev.* 259(Fall):3–7.
- ORRRC STUDY REPORT 19. 1962. *National recreation survey: Report of the Outdoor Recreation Resources Review Commission*. Prepared by A.L. Ferries, B.C. Churchill, C.H. Proctor, and L.E.H. Zastow. Washington, DC, Bureau of Census Data, 394 p.
- PARKER, J.D., AND M.H. MCDONOUGH. 1999. Environmentalism of African Americans: An analysis of the subculture and constraints theories. *Env. Behav.* 31:155–177.
- PARKER, S.E., and G. T. GREEN. 2015. A comparative study of recreation constraints to National Forest use by ethnic and minority groups in north Georgia. *J. For.* 114(4):449–457.
- PAYNE, L., A. MOWEN, and E. ORSEGA-SMITH. 2002. An examination of park preferences and behaviors among urban residents: The role of residential location, race, and age. *Leis. Sci.* 24:181–198.
- PEASE, J.L. 2011. Parks and under-served audiences: An annotated literature review. Iowa State University, Ames, IA. Available online at <http://www.nps.gov/hfc/services/interp/interp-Planning/literatureReview.pdf>; last accessed April 18, 2016.
- ROBERTS, N.S. 2015. Effectively connecting with communities across cultures: There's no app for that! *J. Inter. Res.* 20(1):7–10.
- ROBERTS, N.S., D.J. CHAVEZ, B.M. LARA, and E.A. SHEFFIELD. 2009. Serving culturally diverse visitors to forests in California: A resource guide. USDA For. Serv. Gen. Tech. Rep. PSW-GTR-222. 76 p.
- ROBERTS, N.S., K.M. POZZOBONI, R. SAMI, and T. SIKAND. 2015. *Outside your door: Young producers bridge the divide between urban youth and public lands*. San Francisco State University, San Francisco, CA. Available online at <http://bit.ly/1I8rxmo>; last accessed Feb. 13, 2016.
- RODRIGUEZ, D.A., and N.S. ROBERTS. 2002. *State of the knowledge report: The association of race/ethnicity, gender and social class in outdoor recreation experiences*. Colorado State University.
- SCHULTZ, P.W., J.B. UNIPAN, and R.J. GAMBA. 2000. Acculturation and ecological worldview among Latino Americans. *J. Env. Ed.* 31(2):22–27.
- SHARIK, T.L., R.J. LILIEHOLM, W. LINDQUIST, and W.W. RICHARDSON. 2015. Undergraduate enrollment in natural resource programs in the United States: Trends, drivers, and implications for the future of natural resource professions. *J. For.* 113(6):538–551.
- SHINEW, K.J., M. STODOLSKA, M. FLOYD, D. HIBBLER, M. ALLISON, C. JOHNSON, and C. SANTOS. 2006. Race and ethnicity in leisure behavior: Where have we been and where do we need to go? *Leis. Sci.* 28(4):403–408.
- STODOLSKA, M., K.J. SHINEW, and M.Z. LI. 2010. Recreation participation patterns and physical activity among Latino visitors to three urban outdoor recreation environments. *J. Par. Rec. Admin.* 28(2):36–56.
- STODOLSKA, M., and J. YI. 2003. Impacts of immigration on ethnic identity and leisure behavior of adolescent immigrants from Korea, Mexico and Poland. *J. Leis. Res.* 35(1):49–79.
- TAYLOR, D.E. 2015. *The rise of the American conservation movement: Power, privilege, and environmental protection*. Duke University Press, Durham, NC.
- THELEN, B.A., and R.K. THIET. 2008. Cultivating connection: Incorporating meaningful citizen science into Cape Cod National Seashore's estuarine research and monitoring programs. *Park. Sci.* 25(1): 74–80 Available at <https://www.nature.nps.gov/ParkScience/index.cfm?ArticleID=236>; last accessed Feb. 28, 2018..
- US CENSUS BUREAU. 2010. *Decennial Census: 2010*. US Census Bureau, Washington, DC. Available online at https://www.census.gov/mp/www/cat/decennial_census_2010/; last accessed Feb. 3, 2016.
- US PRESIDENT. 2017. Promoting diversity and inclusion in our national parks, national forests, and other public lands and waters, Memorandum of January 12. *Federal Register* 82, no. 12. Available online at <https://obamawhitehouse.archives.gov/the-press-office/2017/01/12/presidential-memorandum-promoting-diversity-and-inclusion-our-nation>; last accessed Apr. 3, 2017.
- USDA FOREST SERVICE. 2014a. *National visitor use monitoring results: National summary report*. USDA For. Serv. Washington, DC. Available online at <https://www.fs.fed.us/recreation/programs/nvum/>; last accessed Feb. 3, 2016.
- USDA FOREST SERVICE. 2014b. Southwestern Region sustainable recreation strategy. Southwestern Region of the Forest Service. Available online at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fse-prd495959.pdf; last accessed May 23, 2017.
- VIAL, R. 1999. *People, places, and cultural diversity in the natural environment*. 1999 Interpretive Sourcebook, Proceedings of the National Interpreters Workshop. 123–124.
- WINTER, P.L., W.C. JEONG, and G.C. GODBEY. 2004. Outdoor recreation among Asian Americans: A case study of San Francisco Bay Area residents. *J. Par. Rec. Admin.* 22(3):114–136.