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recreation

Who Recreates Where: Implications from a National Recreation Household Survey

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Given the growing US population and its relatively stable supply of publicly owned forests, it seems likely that future demand for outdoor recreation will be increasingly satisfied by privately owned forests. Therefore, it becomes important to understand whether visitors to publicly and privately owned forests have different characteristics. Using data from a US household survey, we found that college graduates and water-based consumptive recreationists (e.g., fishermen) were more likely to recreate on publicly owned forests and females and land-based consumptive recreationists (e.g., hunters) were more likely to recreate on privately owned forests. Our findings also suggested that elderly people and ethnic minorities appeared to be underutilizing public recreation lands in the United States.

Keywords: consumptive and nonconsumptive recreation, land-based and water-based recreation, National Survey on Recreation and the Environment (NSRE), private and public forests

Forests have long been used as places for outdoor recreation. Each year, Americans spend billions of dollars and activity days engaging in a range of consumptive and nonconsumptive recreational activities in forested settings (e.g., US Fish and Wildlife Service and US Census Bureau 2011, White et al. 2013). For instance, in 2007–2008, Americans spent 7.5 billion activity days on walking, 6.2 billion activity days on viewing/photographing natural scenery, 1.3 billion activity days on day hiking, and 0.28 billion activity days on big game hunting in forested settings. Because of increases in income and the expected changes in population, these numbers are projected to grow to 8.5, 6.6, 1.4, and 0.29 billion annual activity days, respectively, by 2015 (Bowker et al. 2012, USDA Forest Service 2016).

Broadly speaking, these activities happen in two types of forests: public (owned by federal, state, or local governments) and private (owned by industrial and nonindustrial landowners) forests.[1] There are some differences and similarities between these broad categories of recreation lands. Public forests are generally more accessible for a variety of activities. In many cases, providing opportunities for recreation and tourism are integral parts of the management plans of most public landholding agencies. In contrast, markets for recreation and tourism services provided by private landowners are not well developed and can be fragmented (Poudyal et al. 2012). Recreational use of private forests is relatively restricted, and many landowners impose restrictions either by posting signs on their lands (e.g., signs stating no trespassing, no hunting or no fishing, or requesting users to ask for permission) or by charging fees. In some cases, landowners also offer recreational services in their forests to help generate additional revenue (Tew and Barbieri 2012, Sotomayor et al. 2014). Furthermore, amenity (e.g., natural or physical) characteristics could also be different in public and private forests (Poudyal et al. 2012, Snyder and Butler 2012). Therefore, considering the differences in the type and nature of amenities and level of public access, users of these lands could have different characteristics.

Studies have analyzed factors affecting visitors' participation in outdoor recreation (forests and nonforest settings) (e.g., Kelly 1996, Floyd 1998, Payne et al. 2002, White and Stynes 2008) and landowners' willingness to provide recreation access to the public (e.g., Poudyal et al. 2012, Snyder and Butler 2012). However, only a few studies have considered whether users of public or private forests have different characteristics. To address this knowledge gap, we analyzed the characteristics of users of public and private forests in the United States.

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The availability of forests, public parks, and other open spaces in a neighborhood significantly increases the likelihood that a person will engage in physical activities, especially in urban areas where gaining access to the open countryside can be difficult (Maas et al. 2006, Coombes et al. 2010). However, due to the shortfall of operational budgets and staff, many public recreation sites either have experienced limited services (e.g., reduced hours of operation or outsourced services) or have closed down entirely (Yardley 2011). Whereas the demand for public recreation land is increasing as a result of population growth, the supply of these lands is relatively stable. In this regard, private forestlands could serve as an important venue for accommodating this demand-supply imbalance. In many cases, private lands are also used for outdoor recreation even though access to the public is often restricted. Consequently, public agencies and private land managers would benefit from knowing the characteristics of their user groups. Such knowledge would allow managers to better understand their market segments and to redesign their marketing and broaden their promotional efforts. This study would also help managers to understand which segments of the general population are currently being underserved in public recreation lands in the United States and help them create new strategies to engage these underserved populations.

Recreational Use of Public and Private Forests

Ownership type (public or private) is one generic criterion that distinguishes forests along a variety of factors that define the accessibility, appropriateness, and desirability of sites for outdoor recreation. It should be noted that not all public or private forestlands are homogeneous because substantial variation in the nature of resources exists within each ownership category, and thus the opportunities for recreation also vary. Because both ownership types provide a wide array of recreational opportunities, it is perhaps unwise to broadly label them as mutually exclusive resources. These ownership categories also possess many similarities in terms of the regulation/restriction of access, management objectives, and provision of supporting amenities. In this section, we discuss the contrasting differences between these two landownership categories, which could have implications for recreational use.

With few exceptions, public forests are open for recreation, but recreational access/opportunities may vary by the type of activity. In contrast, access to private forests is often restricted to the public in many ways and is often only open to landowners and their families, friends, relatives, and perhaps leaseholders. According to the 2006 National Woodland Owner Survey, more than 42% of the family forestland had posted signs to restrict access to consumptive activities such as hunting or fishing, but sometimes did not restrict nonconsumptive activities such as walking, hiking, and viewing nature/birds (Butler 2008). In many cases, forest owners who post signs are willing to provide access if asked, under conditions that are agreeable to the owners (Snyder et al. 2009). Posting laws, however, vary by state; in some states, posting is not required to limit access to one's land.[2] In many locations, private landowners, particularly corporate owners, provide recreation access to the public by leasing their land to hunting clubs or similar groups (Teasley et al. 1999). Further, private forest landowners allow for some recreation activities not allowed on public forestlands. For instance, the use of off-road vehicles is forbidden in many public forests (especially parks or wilderness areas), whereas private forest owners often allow the use of such vehicles.

Recreation activities allowed to visitors may also vary on public forestlands. Many publicly owned forests heavily used for recreation limit or prohibit consumptive activities including hunting, fishing, and collection of fruits, mushrooms, ramps, roots, vines, and pinecones (Chamberlain et al. 2002). For instance, hunting and commercial fishing are strictly prohibited in National Parks, but these activities tend to be allowed in national forests and on state park lands (Huso 2010). Collection, in general, is sharply prohibited or limited (e.g., in quantity and for noncommercial uses) in many national forests (US Department of Agriculture [USDA] Forest Service 2015), National Parks (National Park Service 2015), and state park lands (e.g., California) (California Department of Parks and Recreation 2015), but collection may be allowed in privately owned forests.

For certain activities, users are required to pay access fees on both private and public forestlands (Siderelis and Smith 2013). However, recreational access to private forests can be more expensive to certain users required to pay for accessing the recreational rights from the landowners. Those costs are in addition to the license fees required for some outdoor recreation activities such as hunting and fishing (Poudyal et al. 2012). Natural and physical amenity characteristics could also be different in public and private forests. Many public forestlands protected for regional, national, or global significance contain spectacular scenery and offer unique recreational opportunities (e.g., watching endangered species, viewing old-growth coastal redwoods [*Sequoia sempervirens*] or giant sequoia [*Sequoiadendron giganteum*] forests, and wilderness) rarely found or not available on most private lands. Further, unlike many public forestlands heavily used for recreation, physical amenities (e.g., pavilions, paved trails, accessible facilities, restrooms, and informative signs) tend to be minimal in many private forestlands. Although both public and private lands can be crowded during high-use seasons (e.g., hunting season), private lands, due to more controlled access, tend to be less crowded than comparable public lands (Snyder et al. 2009). Recent studies have also indicated that hunters prefer private over public lands to avoid crowding and are often willing to pay a premium to hunt on private land (Munn et al. 2011).

On most public sites, users share recreation resources with other users. Conversely, use is generally restricted to particular user

Management and Policy Implications

Recreation resource planners and local recreation businesses benefit from knowing the characteristics of visitors that recreate in different types of forests. Ownership type (public or private) is one generic criterion that distinguishes forests along a variety of factors that define the appropriateness, accessibility, and desirability of sites for recreation. Findings indicate that visitors of publicly and privately owned forests have different characteristics. Models of visitation trends analysis, recreation demand projection, and business marketing to promote recreation on these lands should account for these differences. These findings also help public land managers understand which segments of the general population are being underserved so they can craft appropriate marketing strategies.

Table 1. Description and summary statistics.

Variable	Variable description	Whole sample (n = 1,328)		Recreate on public forests (n = 536)		Recreate on private forests (n = 303)		Not recreate on forests (n = 489)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Public forests	One if the respondent recreated on public forests, zero otherwise	0.53	0.50						
Private forests	One if the respondent recreated on private forests, zero otherwise	0.30	0.34						
Age	Age of the respondent in years	51	16	50	15.10	49	16	53	16
Female	One if the respondent was female, zero otherwise	0.53	0.50	0.51	0.50	0.55	0.50	0.56	0.50
Income >$50,000	One if the respondent had family income >$50,000 a year, zero otherwise	0.66	0.47	0.69	0.46	0.60	0.49	0.66	0.47
College graduates	One if the respondent had at least college degree, zero otherwise	0.55	0.50	0.61	0.49	0.45	0.50	0.52	0.50
Nonwhites	One if the respondent belonged to black or African Americans, American Indian or Alaska Native, Asians, and Native Hawaiian or other Pacific Island, zero otherwise	0.13	0.33	0.12	0.32	0.11	0.31	0.15	0.35
Retired	One if the respondent was retiree, zero otherwise	0.23	0.42	0.20	0.40	0.22	0.41	0.26	0.44
Urban	One if the respondent lived in urban area, zero otherwise	0.80	0.40	0.83	0.38	0.67	0.47	0.82	0.39
Water-based consumptive activities	One if the respondent participated in water-based consumptive activities, zero otherwise	0.33	0.47	0.42	0.48	0.37	0.50	0.25	0.43
Land-based consumptive activities	One if the respondent participated in land-based consumptive activities, zero otherwise	0.11	0.32	0.10	0.30	0.29	0.46	0.06	0.24
South	One if the respondent belonged to the Southern region, zero otherwise	0.29	0.46	0.25	0.43	0.37	0.48	0.31	0.46
Pacific	One if the respondent belonged to the Pacific region, zero otherwise	0.21	0.40	0.24	0.43	0.09	0.28	0.20	0.40
Rocky Mountain	One if the respondent belonged to the Rocky Mountain region, zero otherwise	0.11	0.31	0.12	0.33	0.04	0.20	0.10	0.30
North	One if the respondent belonged to the Northern region, zero otherwise	0.39	0.49	0.39	0.48	0.50	0.50	0.37	0.48

Respondents were asked the following statements to know whether they recently used public forests or private forests for their outdoor recreation: "You indicated you do some recreation activities in forest areas. Who owns the forestlands where you do most of your activities? Would you say it is: (a) all or mostly government owned, (b) half government and half private, (c) mostly privately owned by someone else, or (d) family owned."

groups on private recreation sites. This resource sharing could have implications for privacy of activity choices and physical safety of recreation sites. A recent study indicated that maintaining privacy in activities is an important reason for owning forestland in the United States (Butler 2008).[3] Anecdotally, we can expect that recreating in one's own forest or in a forest owned by family, friends, relatives, or recreation clubs may be perceived as safer than recreating in public forests. Ethnic minorities, in general, tend to perceive public recreation sites as unsafe places to recreate (Burns et al. 2008, Parker and Green 2016).

Whereas the literature that has been reviewed suggests notable differences in recreation potential between public and private forests, whether and to what extent such differences exist in recreationists' characteristics has not been studied. Therefore, the objective of this study was to examine whether and to what extent the socioeconomic and demographic characteristics and recreation preference of recreationists affect their decisions to recreate on public or private forests.

Methods

Survey Data

Data for this study came from the National Survey on Recreation and the Environment (NSRE) conducted in 2008 (NSRE 2008). The NSRE is a nationwide, random-digit-dialed telephone survey of individuals, aged 16 years or older living in the United States. The NSRE collects responses only from civilian, noninstitutionalized Americans (i.e., it does not collect responses from people who are in retirement facilities, hospitals, and military camps).[4] The NSRE uses a stratified random sampling approach, based on urban, near-urban, and rural locations to ensure adequate sampling units from these regions. The survey gathers information on a number of outdoor recreation and environmental topics, including outdoor recreation participation, environmental attitudes, natural resources values, attitude toward natural resource management policies, and demographic and lifestyle characteristics of household. Data are weighted using poststratification procedures to adjust for sampling error according to age, race, gender, education, and rural/urban strata (Cordell et al. 2004).

In the 2008 NSRE, in addition to the outdoor recreation participation, individuals were asked whether they recently used forest settings for their recreation, and, if so, what was the ownership type of the forest they visited. Approximately 1,500 completed responses were collected, and 1,011 respondents indicated that they recently used forest settings for recreation. Among them, 53% of respondents indicated that they used only public forests (owned by federal, state, or local government), 30% of respondents indicated that they used only private forests (owned by industrial and nonindustrial landowners), and 17% of respondents indicated that they used both public and private forests for recreation (Table 1). However, to identify the characteristics of visitors to public or private forests, this study excluded the group of visitors who used both public and private forests. Thus, there are three types of respondents: those who recreated only in public forests

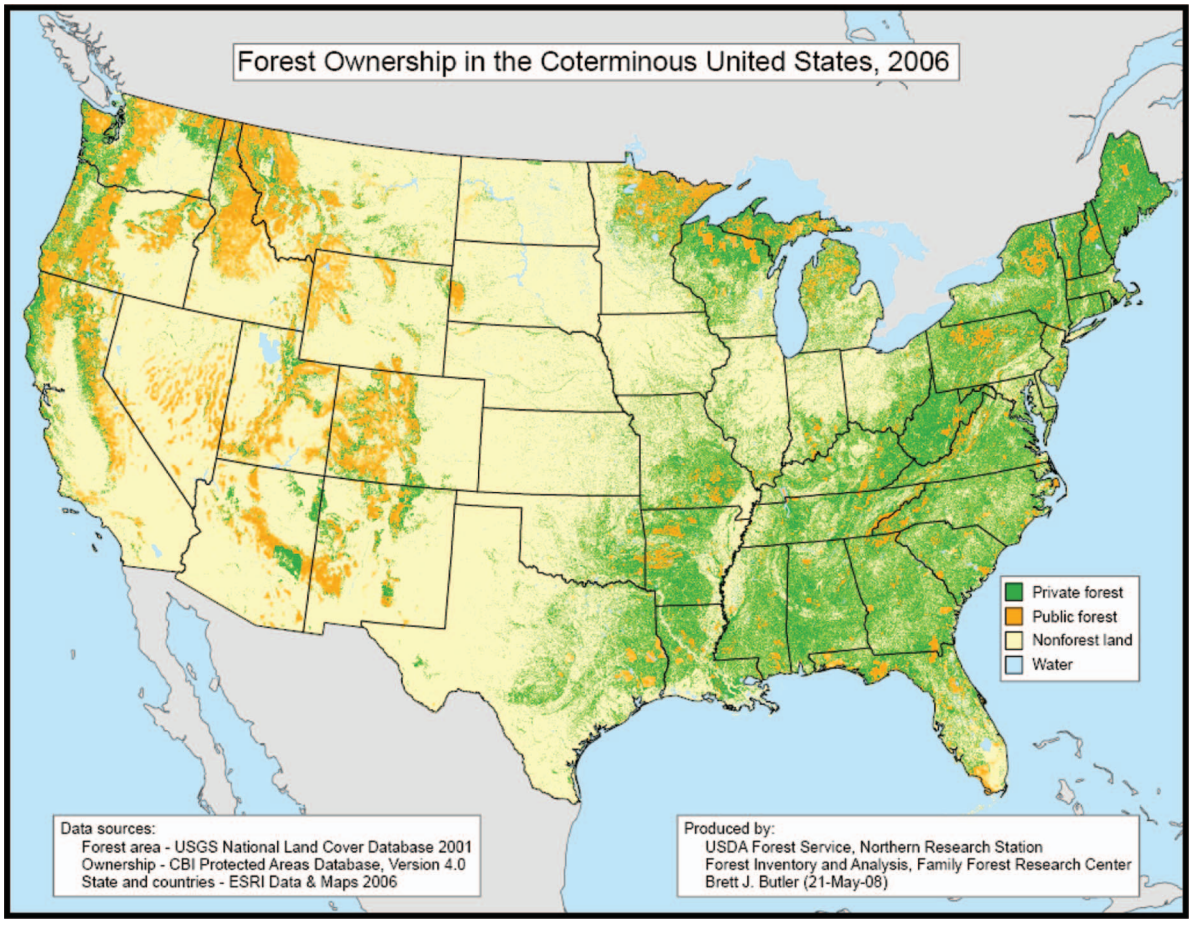

Figure 1. Forest ownership in the United States. Source: Butler (2008).

(n = 536), those who recreated only in private forests (n = 303), and those who did not recreate in forest settings but participated in outdoor recreation (n = 489). A total of 1,328 observations were used for this analysis.

Recreation Model Design

The outdoor recreation participation literature suggests that some key socioeconomic and demographic characteristics, such as age, gender, ethnicity, income, education, residency location, and employment status probably affect an individual's decision to participate in outdoor recreation (Scott and Munson 1994, Kelly 1996, Scott and Jackson 1996, Floyd 1998, Payne et al. 2002, Zheng and Zhang 2013). Accordingly, a given individual's probability of recreating in forests (public or private) was modeled as a function of age, income, education, gender, ethnicity, residency location, and employment status.

The literature on recreation site selection indicates that a visitor's choice of site partly depends on the type of activity he or she is interested in (Floyd and Lee 2002). For instance, someone looking for a primitive wilderness experience might have to choose among strictly public lands, where visitor numbers are strictly regulated by management agencies. On the other hand, someone interested in deer hunting may join a hunting club to hunt on a less-crowded hunting ground leased from a private landowner. To control for this difference in activity preferences, two separate dummy variables, water-based consumptive recreation and land-based consumptive recreation, were introduced in the recreation model (Ghimire et al. 2014a). The water-based consumptive recreation dummy variable was coded "1" if visitors participated in any form of water-based consumptive recreation (e.g., fishing) and "0" otherwise. Likewise, the land-based consumptive recreation dummy variable was coded "1" if visitors participated in any form of land-based recreation (e.g., hunting or gathering mushrooms/berries, firewood, or other natural products), and "0" otherwise. Finally, differences in climate, topography, culture, rules and regulations, and availability of forests and outdoor recreation resources across the United States may lead to variations in preferences to recreate on public or private forests.[5] Figure 1 provides the geographic distribution of these forestlands. Accordingly, geographic effects were controlled using four regional dummy variables: North, Pacific, Rocky Mountain, and South.[6] Following Hardy (1993), we treated the North as a reference category among regional dummy variables as it included the largest number of respondents.

Because we modeled the probability of recreating in a particular forest as a binary response ("1" if the user chose a public or private forest and "0" otherwise), logistic regression was the most appropriate approach (Wooldridge 2002). The logistic regression models the log odds of the outcome as a linear function of the predictor variables and can be specified as

$$\text{Prob(forest)} = \frac{\exp(XB)}{1 + \exp(XB)} \quad (1)$$

where X is a vector of explanatory variables (socioeconomic and demographic character-

Table 2. Factors related to visitors' choice of forests for recreation, by ownership types.

Variable	Public forest model		Private forest model	
	Coefficients	AMEs	Coefficients	AMEs
Age	−0.007 (0.004)*	−0.001 (0.000)*	−0.007 (0.006)	−0.000 (0.000)
Female	−0.067 (0.115)	−0.015 (0.026)	0.487 (0.187)***	0.052 (0.019)***
Income >$50,000	0.028 (0.121)	0.006 (0.028)	−0.154 (0.169)	−0.016 (0.018)
College graduates	0.448 (0.114)***	0.105 (0.026)***	−0.254 (0.164)	−0.027 (0.017)
Nonwhites	−0.272 (0.167)*	−0.064 (0.039)*	−0.070 (0.269)	−0.007 (0.028)
Retired	−0.118 (0.161)	−0.027 (0.037)	0.059 (0.234)	0.006 (0.025)
Urban	0.157 (0.141)	0.036 (0.030)	−0.531 (0.180)***	−0.056 (0.019)***
Water-based consumptive activities	0.412 (0.127)***	0.097 (0.029)*	0.025 (0.204)	0.002 (0.021)
Land-based consumptive activities	−0.423 (0.195)**	−0.099 (0.045)**	1.594 (0.238)***	0.170 (0.024)***
South	−0.206 (0.135)	−0.048 (0.031)	−0.067 (0.177)	−0.007 (0.018)
Pacific	0.419 (0.148)***	0.098 (0.034)*	−1.054 (0.284)***	−0.112 (0.030)***
Rocky Mountain	0.369 (0.185)**	0.086 (0.043)*	−1.510 (0.391)***	−0.161 (0.041)***
Constant	−0.321 (0.270)		−1.128 (0.368)***	
Wald χ^2	62.36		107.13	
Pr > χ^2	0.000		0.000	
McFadden's pseudo R^2	0.033		0.106	
Observations	1,328		1,328	

Heteroscedasticity-consistent robust SEs are shown in parentheses. AME, average marginal effects.
* Significant at the $\alpha = 0.1$ level.
** Significant at the $\alpha = 0.05$ level.
*** Significant at the $\alpha = 0.01$ level.

istics suggested by the literature, outdoor recreation activity choices, and geographic regions) and B is a vector of parameters to be estimated. The variables used in the logistic regression fitting process, thus, were based on outdoor recreation participation and site selection literature.

Results

Sample Description

Descriptive statistics reported in Table 1 show that compared with users of private forests, a relatively large percentage of public forests users had annual incomes greater than $50,000, were college graduates and urban residents, and participated in water-based consumptive activities. A relatively large percentage of users of private forests were female and participated in land-based consumptive activities. Whereas users of private forests were relatively younger, people who did not recreate in forests (public or private) were relatively older. Likewise, a relatively large percentage of nonwhites and retired people did not recreate on forests. A large percentage of users of both forests were from the Northern region, followed by Southern, Pacific, and Rocky Mountain regions, suggesting that the sample distribution, overall, is consistent with population distribution across the regions (US Census Bureau 2011).

Regression Results

Results from the logistic regression are presented in Table 2. The model was statistically significant, as indicated by the Wald χ^2 statistics, although values for McFadden's pseudo R^2, a proxy for goodness of fit, were low (0.03 and 0.10 in public and private forest models, respectively). Because the coefficients of the logistic regression did not correspond to the marginal effects, we computed average marginal effects to explain how the predicted probabilities change in response to a unitary change in each predictor variable. Heteroscedastic-consistent robust standard errors were used to correct for potential bias arising from heteroscedastic residuals. The decision criteria for hypothesis testing were based on $P < 0.10$.

Public Forest Model. College graduates and those who participated in water-based consumptive activities had a 0.10 higher probability of recreating on public forests than their counterparts. In contrast, nonwhites and those who participated in land-based consumptive activities had 0.06 and 0.09 lower predicted probabilities, respectively, of recreating on public forests, than their counterparts. People who live in the Pacific and Rocky Mountain regions had 0.09 higher predicted probability to recreate in public forests than those living in the North. Age was negatively significant to explain the probability of recreating on public forests though the marginal effect was small (0.001).

Private Forest Model. Females and those who participated in land-based consumptive activities had 0.05 and 0.17 higher predicted probabilities, respectively, to recreate on private forests than their counterparts. In contrast, people from urban areas and the Pacific and Rocky Mountain regions had 0.5, 0.11, and 0.16 lower predicted probabilities, respectively, than their counterparts to recreate on private forests. Although females, in general, were more likely to recreate in private forests, this probability was significant only for the Pacific region.[7]

Although land-based consumptive recreationists, in general, were more likely to recreate on private forestlands and less likely to recreate on public forestlands, this probability did not significantly covary with geographic regions.[8]

Discussion

Research on outdoor recreation participation suggests significant variations in recreation participation or activity choices among demographic groups (West 1989, Floyd 1998), and our results are consistent with these findings. Elderly people and nonwhites were less likely to recreate on public forests, and females were more likely to recreate on private forests. According to the literature, elderly people are less likely or less willing to participate in outdoor activities because of their physical constraints, in particular, their difficulty or inability to walk over a variety of natural settings (Floyd et al. 2006). Ageism may also partly explain this behavior as elderly people tend to be skeptical about their abilities for outdoor activities and socialization skills (Gross et al. 1978).

The literature also suggests that percep-

tion of outdoor risk and safety are significantly higher among females, elderly people, and ethnic minorities (Frederick and Shaw 1995, Johnson et al. 2001, Ghimire et al. 2014b, Parker and Green 2016). This safety concern may partly explain females' preference for private forests as they may feel safer to recreate in their own forests or in forests owned by their family, friends, or neighbors than in public forests. There are also significant differences in recreation participation or preferences by culture/ethnicity. For instance, compared to whites, blacks and ethnic minorities tend to spend less on outdoor recreation-related expenditures (Zheng and Zhang 2013). Compared with whites, blacks are significantly less likely to participate in most forms of nonconsumptive activities such as camping and hiking in forest settings, but they are more likely to recreate in team sports and fitness activities (Dwyer 1994, Johnson and Bowker 1999). Further, blacks and Hispanic/Latinos tend to use national forests less than whites for nonconsumptive activities such as camping and hiking (Parker and Green 2016). Findings suggest that blacks and ethnic minorities may be less likely to engage in outdoor recreation activities or have different recreation preferences, which may partly explain their probabilities to not recreate on public forests.

Although we do not have information on places visited or distance traveled to recreate on these lands, studies have shown that ethnic minorities tend to have lower rates of vehicle ownership (West 1989, Berube et al. 2006), limiting their ability to travel far from home to access recreational opportunities (Ghimire et al. 2014b). Considering the fact that 52% of the area of family forests is owned by elderly people (65 years and older) and 5% of the area of family forests is owned by nonwhites (Butler 2008), these landholding patterns are likely to influence the choices of recreation lands by these demographic groups.

College graduates were more likely to recreate in public forests. This finding is consistent with those of Lucas (1990), who found that 60 to 85% of national park visitors in the United States were college graduates and of Parker and Green (2016), who reported that approximately three-quarters of visitors of national forests in Georgia were college graduates. Although education greatly contributes to the outdoor recreation participation culture (Lee et al. 2001), college graduates' choice of public forests could be related to their geographic proximity to public recreation lands. The majority of college graduates live in urban areas, and these graduates are more likely to face time constraints traveling to private recreation lands that are typically located at a distance (Ghimire et al. 2014b, Miller 2014). Our data also show a positive correlation between college graduates and urban location (0.15). In addition, the availability of private recreation land is very limited, particularly in urban areas, and these lands are generally not accessible to the public (Butler 2008). Our findings also indicated that urban people were less likely to recreate in private forests. Furthermore, land-based consumptive recreationists (e.g., hunters) were less likely to recreate on public forests and more likely to recreate on private forests.

A recent study conducted by the US Fish and Wildlife Service and the US Census Bureau (2011) also indicated that about 78% of total hunting days occurred on private lands that include both forested and nonforested lands. Further, studies have consistently showed hunters' higher preference for hunting on private lands (e.g., Anderson and Hill 1995, Munn et al. 2011). In addition, because of more restricted access, the possibility of harvesting game tends to be higher on private lands than on comparable public lands (Poudyal et al. 2012). In contrast, water-based consumptive recreationists (e.g., fishers) were more likely to recreate in public forests. A recent study conducted by the American Sportfishing Association and Responsive Management (2010) also indicated that 64% of anglers used public land for fishing. This finding is not surprising given the fact that noncommercial fishing is allowed in many public forests, and aquatic resources in these forests are relatively better as these forests are protected at varying levels (USDA Forest Service 2011). Furthermore, these waterbodies tend to be easily accessible to the public for different activities.

The Rocky Mountain and Pacific regions are rich in public forestland with approximately 75% of forest area in the Rocky Mountain and 67% of forest area in the Pacific regions being publicly owned. In contrast, the Northern and Southern regions are rich in private forests with 75% of forest area in the North and 86% of forest area in the South being privately owned (Butler 2008). These ownership patterns help to explain a large portion of the regional variation in the choices of recreation lands. Our findings also indicated that people in the Rocky Mountain and Pacific regions were more likely to recreate in public forests and less likely to recreate on private forests. In addition, this regional variation may be partly explained by a relatively large percentage of the population living in urban areas in the western states (e.g., Pacific region and some states in the Rocky Mountain region), compared with their counterparts in the eastern United States (US Census Bureau 2012).

Although income is an important determinant of people's outdoor recreation participation (Scott 2013), income did not significantly affect the probability of recreating in public or private forests. Whereas income may partly determine whether and how many trips people make, it may have little or no effect on the choice of site between public and private forests. This explanation is particularly plausible considering the fact that markets for fee-based recreation are not well developed for many forest-based recreation activities (Poudyal et al. 2012).

Conclusion

Recreation resource managers should be interested in the characteristics of users of their lands to better serve existing user groups and to reach out to unrepresented communities or individuals in their marketing efforts. Observations from our study indicate some notable differences between the characteristics of public and private forest users. From a recreational planning and management perspective, managers of these two forest types seem to have different user groups to serve, and any models to project trends in visitation to public or private land should account for these differences in visitors' characteristics. Findings also suggest that elderly and nonwhite ethnic groups seem to be underutilizing public recreation lands even though these lands are relatively more accessible to the public than private lands. Because the share of elderly people and these ethnic groups in the US population is expected to expand in the future with the aging of the Baby Boomers, immigration, and the high growth of Hispanic and Asian populations (Cordell et al. 2002, Taylor 2014), innovations in marketing, outreach, and recruitment may be needed to increase outdoor recreation participation of these groups.

Two caveats of this study should be noted. First, there may be distinct subgroups within the visitors to private forests, depending on whether they pay substantial access

fees to recreate on others' land or receive free access to family members' land. However, we do not have information on how the visitors obtain access to private lands for recreation. We recommend that future studies of demand for recreation land should investigate this issue to better understand why visitors prefer private land over public land to recreate and whether and how much premium they want to pay for having desirable amenities on private lands. This information will be useful to private landowners in increasing their lease revenue and will guide public land managers in increasing the recreational appeal of public lands by providing similar amenities and services. Second, the econometric analysis used in this study evaluates the behavior of a group in general but may fail to reveal any underlying variations in behavior among subsegments therein. Therefore, it may not be possible to generalize the results to specific individuals.

Endnotes

1. Forest area in the United States is estimated to be just over 766 million acres. Almost 42% of this land is owned by government (federal, state, or local government), about 19% is owned by private corporations, and almost 39% is owned by private noncorporate landowners, such as individuals or families (Figure 1) (Oswalt et al. 2014). The forestland owned by private noncorporate landowners is also known as family forestland (Butler 2008).
2. Posting is not required in some states (e.g., Alabama, Maryland, and Minnesota), which means it is against the law to trespass on private property without the landowner's permission even if the land is not posted (FindLaw 2015).
3. The top five (most important or important) reasons for owning family forests in the United States are to protect beauty/scenery, to pass land on to heirs, to maintain privacy in activities, to protect nature, and to have land around a home or cabin (Butler 2008).
4. The NSRE used landline telephone numbers to contact people for the survey. As most institutionalized people (e.g., people who are in retirement facilities, hospitals, and military camps) do not have personal landline numbers to be contacted, the NSRE did not collect responses from them even though many of them may still participate in outdoor recreation. Because fewer people use landline telephones than cell phones, the inclusion of households with only landline telephones may lead to a coverage error, and, hence, is a limitation of the NSRE data. However, response rates are typically lower for cell phone surveys than for landline surveys and there are other issues associated with using cell phones for surveys (e.g., reaching out to the targeted people, data quality, and others) (Pew Research Center 2015). The NSRE used multivariate weights to mitigate this coverage issue. Detail description of the NSRE is available at www.srs.fs.usda.gov/trends/nsre-directory/questions.html.
5. Many of the northern states in the United States have Managed Forest Laws that give landowners (including corporate ones) certain property tax breaks in return for public access to their lands (e.g., Wisconsin's Managed Forest Law [Wisconsin Department of Natural Resources 2015], Michigan's Commercial Forest program [Michigan Department of Natural Resources 2015], Maine's Open Space Tax Law [Maine Revenue Services 2013], and others).
6. Region classification is based on the USDA Forest Service Resource Planning Act (RPA) map (www.fs.fed.us/research/rpa/regions.php). States included in these regions are as follows: North: Connecticut, Delaware, Iowa, Illinois, Indiana, Massachusetts, Maryland, Maine, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Washington, DC, Wisconsin, and West Virginia; Pacific: Alaska, California, Hawaii, Oregon, and Washington; Rocky Mountain: Arizona, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, North Dakota, Nebraska, South Dakota, Utah, and Wyoming; and South: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.
7. In the private recreation model, we interacted the variable female with region dummies and estimated the regression equation. The interaction term was significant only in the Pacific region (results are not shown here for brevity but are available on request).
8. In both public and private recreation models, we interacted the variable land-based consumptive recreation with region dummies and estimated the regression equation. The results suggested that none of the interaction terms were significant (results available on request).

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