

Constraints to Outdoor Recreation: Exploring the Effects of Disabilities on Perceptions and Participation

Robert C. Burns, Ph.D.

Recreation, Parks, and Tourism Resources Program
West Virginia University

Alan R. Graefe, Ph.D.

Department of Recreation, Park and Tourism Management
The Pennsylvania State University

Understanding the constraints of persons with disabilities has long been a concern of natural resource managers, particularly since the inception of the Americans with Disabilities Act of 1990. This study examines National Forest visitation and perceived constraints of recreationists in relation to the presence of a person with a disability in one's household. Data were collected through telephone surveys of the general population in three western states. The respondents were segmented into groups based on disability status (personal or within household) and whether the disability hampers their recreation in National Forests. Results showed that 40% of respondents living in a household that included a person with a disability were not constrained by the presence of a person with a disability regarding their National Forest visitation. Being constrained from National Forest use was largely a function of the importance attached to key disability-related constraints. Regression analysis showed that the presence of a disability, age, and other demographic factors influenced these constraints. The existence of a personal disability was a much greater constraint to outdoor recreation visitation than the presence of a person with a disability in one's household.

KEYWORDS: *Disability, constraints, outdoor recreation participation.*

Introduction

As of 2002, the Census Bureau estimated that the U.S. population of 288 million includes over 63 million persons with a disability, or about 22% of the total population (US Census, 2002). The Census Bureau also reported that 33 million people are over the age of 65, and of those, 14 million (42%) reported a disability. Participation in outdoor recreation activities by the US population is remarkably high, with nearly all Americans reporting that they participate in some form of outdoor activity (Cordell et al., 1999). But to what extent do all segments of the population share in outdoor recreation activities? In particular, do certain segments of society, such as persons with

Address correspondence to: Dr. Robert C. Burns, Recreation, Parks, and Tourism Resources Program, Division of Forestry, PO Box 6125, West Virginia University, Morgantown, WV 26506-6125. Phone: 304-293-2941 ext. 2416, Fax 304-293-2441, Email: robert.burns@mail.wvu.edu.

Author note: Funding for this research was provided by the USDA Forest Service, Region 6, Recreation, Land, and Minerals.

disabilities and those who care for them, participate at the same rate as others and, if not, what are the factors that limit their recreation participation?

It is important that we know more about the people who comprise such a large and growing percentage of the population, and it is equally important that recreation/land managers facilitate recreational opportunities for persons with disabilities. In 1990, Public Law 101-336, also known as the Americans with Disabilities Act, addressed the special needs of persons with disabilities. This law required land managers and recreation providers to consider the personal preferences, social support systems, and personal abilities of persons with disabilities in facilitating their recreation opportunities (Bedini, 2000; Coyle & Kinney 1990; Devine & Datillo, 2000; Mactavish & Schleien, 2000; Smith, Austin & Kennedy, 2001; Taylor & Bogdan, 1993; Wachter & McGowan, 2002).

This study builds upon the afore-mentioned literature by examining the influence of disability status on national forest visitation, outdoor recreation participation patterns, and perceived constraints. More specifically, we addressed the following research questions:

1. To what extent is participation in outdoor recreation hampered by the presence of a disability within one's household, and how do those whose recreation is hampered differ from those who are not impacted by the disability?
2. How do outdoor recreation interests, participation patterns, and perceived constraints differ between those with a personal disability and those with a household member with a disability?
3. What is the influence of disability status and various socio-economic characteristics on selected constraints to outdoor recreation?

Review of the Literature

Leisure Constraints

Recreation constraints have been the topic of many studies over the past few decades. These studies have focused on activity specific constraints such as card playing, hiking, camping or golfing (Backman & Crompton, 1990; McCarville & Smale, 1991; Scott, 1991), and on various subgroups of the population such as the elderly, persons with disabilities, and females (Henderson & Bialeschki, 1991; Farbman & Ellis, 1987). The hierarchical model of leisure constraints, including three types of constraints (structural, interpersonal, and intrapersonal) was introduced by Crawford, Jackson, and Godbey in 1991. This model included a clearly defined hierarchy, beginning with constraints that affect preferences (intrapersonal constraints) and leading to those that affect participation (structural constraints). According to Raymore, Godbey, Crawford, and von Eye (1993), each level must be overcome in order for an individual to face the subsequent level of constraint. Given the absence of or negotiation through intrapersonal and interpersonal con-

straints, participation would then result from the absence or negotiation of structural constraints. If structural constraints are sufficiently strong, however, the outcome may be nonparticipation (Jackson, Crawford, & Godbey, 1993).

In 1993, Jackson developed a list of constraint items, ranging from work commitments to financial costs to physical disability. These items were ranked in degree of importance, with time being one of the primary constraints. Other studies have also noted that lack of money, transportation, and other structural items were constraining factors (Coyle & Kinney, 1990; Kay & Jackson, 1991; Samdahl & Jekubovich, 1997; Williams & Fidgeon, 2000).

Jackson (1994) examined constraints to participation by focusing on factors related to recreation preferences. In this study, Jackson showed that age itself was not a constraint, but the combined effect of age and activity preference better explained peoples' constraints. This work extended previous research (Boothby, Tungatt, & Townsend, 1981; Francken & van Raaij, 1981; Romsa & Hoffman, 1980; Witt & Goodale, 1981) by postulating that it is not one single thing, but a host of different barriers (i.e., time, money, transportation), that constrains prospective recreationists. Also related to the hierarchical constraints model, Shaw, Bonen, and McCabe (1991), examined internal and external constraints. Internal constraints included personal skills, abilities, and health while external constraints included time, money and transportation.

In 1997, Jackson redefined constraints as "factors that are assumed by researchers and perceived or experienced by individuals to limit the formation of leisure preferences and to inhibit or prohibit participation and enjoyment in leisure" (p. 461). This updated definition was the result of numerous empirical and theoretical studies on constraints, and followed intense critique and reexamination by Samdahl and Jekubovich (1997) and Henderson (1997). Jackson indicated that this updated definition was preferable because it recognized that constraints could lead to outcomes other than non-participation, and acknowledged the differences between perception and reality and between an individual's perspective and a researcher's perspective of constraints.

More recently, Jackson (2005) stressed the importance of understanding structural constraints, opining that "no constraint or type of constraint is experienced with equal intensity by everyone, although time-related and cost-related constraints rank among the most widely and intensely experienced inhibitors of the achievement of leisure goals and a balanced lifestyle" (p. 7). Jackson also discussed the importance of realizing that constraints may vary greatly across any number of different subgroups of the population, and across individuals.

In 1993, Jackson, Crawford and Godbey discussed the concept of "negotiation," suggesting that participation in leisure activities is dependent on how people negotiate through constraints. Thus, it is not necessarily the absence of constraints that enables people to participate in recreational ac-

tivities, but their negotiation through those constraints. Jackson et al. identified a series of cognitive (reducing cognitive dissonance) and behavioral (change in behavior) strategies, and postulated that the negotiation strategy would depend on the situation that was encountered.

Jackson and Rucks (1995) extended the earlier work by Jackson et al. (1993) by focusing on the patterns of constraint negotiation. Their study of school children found that people often negotiate through a specific constraint by adopting negotiation strategies related to that particular constraint (e.g., changing the use of time for a time-related constraint). The authors postulated that this information was valuable in understanding that people rearrange things in their lives so that they can participate in leisure opportunities.

Henderson, Bedini, Hecht, and Schuler (1993) investigated the strategies used by women with disabilities to negotiate through constraints. This research identified groups consisting of passive responders (no participation), achievers (no change in participation levels despite constraints), and attempters (did participate, but altered participation in leisure activities). Their findings indicated that other environmental factors (lack of energy, time, safety, etc.) accounted for some degree of non-participation, and that the disability itself was also a contributing factor.

More recently, Hubbard and Mannell (2001) studied the negotiation strategies of employees in a corporate setting, measuring how the respondents negotiated time, skills, interpersonal, and financial constraints. Respondents' motivation and participation levels were also examined in this effort. The findings showed that the original negotiation process identified by Jackson et al. (1993) was stronger than alternative models, supporting the idea that constraints trigger negotiation efforts, which can then negate the effects of the constraint (Hubbard & Mannell).

Raymore (2002) discussed the notion of leisure facilitators, in an effort to understand what gives people the freedom to participate in leisure activities. Raymore theorized that people face things or events that constrain them as well as things or events that facilitate their participation in leisure activities. The notion of leisure participation was examined through an ecological perspective, where the individual's environment must be understood in order to understand what facilitates or constrains people from leisure participation.

Leisure and People with Disabilities

Persons with disabilities are generally presented with more challenges than those without disabilities in regards to recreational pursuits and facilities. These challenges include, among others, access to facilities and equipment, the need for individualized services, and the availability of leisure education (Bedini, 1991; Coyle & Kinney, 1990; Farbman & Ellis, 1987; West, 1984; Zoerink, 1989). In an early study, Coyle and Kinney (1990) observed that the typical adult who has a physical disability is single, lives with mem-

bers of his or her immediate family, and resides in an urban environment. The individual has at least a high school diploma or G.E.D., is unemployed, and lives on an extremely limited income. Employment opportunities, social and recreational activities, and the prospect of marriage and family are severely limited for this population (Zoerink, 1988). Wright (1983) indicated that adults with disabilities assume a position that is similar to other underserved communities, such as religious, ethnic and other minority groups.

Germ and Schleien (1997) examined constraints to leisure participation for persons with disabilities in the context of community leisure agencies. The results of the study showed that transportation and programming issues were major constraining factor to their participation. Programming barriers included a lack of variety in times when programs were offered, a lack of skill development opportunities at the appropriate levels, and a lack of programming designed for teenagers and adult males with disabilities.

Sparrow and Mayne (1990) examined the recreation patterns of 18-35 year-olds with intellectual disabilities. The results of this study showed that participation levels were low, regardless of whether the recreation participation was in the home or in a community setting. The participants were constrained by many factors, including the "distant location and lack of availability of the facility, lack of transportation, skills, finance, opportunity, and attitudinal barriers. . ." (p. 48.)

Wilhite and Keller (1992) examined the leisure involvement of older adults with developmental disabilities. The most prevalent leisure constraints reported in the study were transportation, money, physical accessibility, concerns about their behavior, and discomfort in large public groups. Some respondents reported constraining factors such as not feeling integrated and feeling that members of the community were not sensitive to their needs and not willing to allow them to be included in community life and activities.

Ross (1993) found that young adults with recent spinal cord injuries reported several constraints to outdoor recreation pursuits. The lack of leisure partners, transportation issues, mobility issues, self-consciousness, and attitudes of significant others were found to be factors constraining their outdoor recreation pursuits. In spite of the prevalence of research on leisure constraints as well as special populations such as persons with disabilities, "surprisingly little research has been conducted into the constraints faced by people with various disabilities" (Williams, et al., 2004, p. 88).

Still other research investigated the concept of disenfranchised groups such as persons with disabilities (Crawford et al., 1991; Devine & Datillo, 2000). The findings of this research suggested that persons without disabilities identify standards of social acceptance, and tend to rank persons with disabilities according to these standards. Previous research agreed that when people with disabilities do not meet that standard, their inclusion in society (and recreation) is limited (Hahn, 1987; Oliver, 1989).

McAvoy (2001) suggested that there are several prevailing myths regarding outdoor recreation and people with disabilities, including the ideas that people with disabilities do not prefer the same kinds of outdoor environ-

ments, do not participate in outdoor recreation/adventure activities, and cannot attain a full range of benefits from outdoor recreation programs and activities. Contrary to these myths, previous research showed that people with disabilities tend to seek the same experiences and achieve the same benefits from outdoor recreation as people without disabilities (McAvoy & Lais, 1999; McCormick, 2001). Providing outdoor and adventure activities has become a growing trend in the delivery of services to people with disabilities, with benefits to both disabled and non-disabled participants in inclusive programs (Mactavish & Schleien, 2004; Smith, 1995). Finally, it has been shown that people with disabilities and those without disabilities display few differences in preferred outdoor recreation experiences (Brown, Kaplan, & Quaderer, 1999).

Analyses of data from the National Survey on Recreation and Environment (NSRE, 2000) have shown mixed results regarding the relationship between outdoor recreation participation and disabilities. Findings included a selection of questions concerning disabilities, and showed that a smaller proportion of people with disabilities participated in outdoor recreation than among those respondents without disabilities. When focusing on specific outdoor activities, however, results varied. Participation rates for many outdoor recreation activities were the same for persons with disabilities and able-bodied respondents. For some activities such as participating in nature study, persons with disabilities reported higher participation rates. There was no clear and consistent relationship between the presence of a disability and rates of participation in individual outdoor recreation activities.

In a further analysis of the NSRE data, McCormick (2001) found different patterns of activity participation while controlling for age. His findings showed that, for the youngest and oldest age categories, people with disabilities participated at higher rates than people without disabilities, implying that age is a confounding variable influencing the relationship between outdoor recreation and disability status. Williams, Vogelsong, Green, and Cordell (2004) also analyzed outdoor recreation participation of people with mobility disabilities using the nationally representative NSRE data. They found that people with mobility disabilities: (a) participate in fewer outdoor recreation activities, and (b) experience greater constraints to outdoor recreation participation. However, the differences were not consistent across all of the activities and constraints examined (e.g., only structural constraints were considered). Clearly, more research is needed to understand the full range of constraints that may impact outdoor recreation participation for people with disabilities.

Family Members, Caregivers and Persons with Disability

Beyond personal disabilities, the role of family members or caregivers can play a role in the recreation patterns of persons with disabilities (Shaw & Dawson, 1998; Singer & Powers, 1993; Witt & Goodale, 1981). Witt and Goodale reported that families with a person with a disability in their house-

hold face difficulties in making decisions regarding recreation participation, and family obligations present the most significant constraint to the enjoyment of family recreation. Mactavish and Schleien (2004) studied the effect of having children with developmental disabilities in the household with regards to impacts on outdoor recreation. The results of this study highlighted the difficulty in collecting information that is needed in order to plan a recreational event for the family. In addition, the findings showed that enhanced self-perceptions and feelings of acceptance were benefits of participating in recreation activities.

In a previous study focusing on the patterns of family recreation in families including a child with a developmental disability, Mactavish and Schleien (2000) found three patterns. The most prevalent pattern was that of a sub-unit of the family participating in recreational activities (e.g., one parent only, children only, parents only, etc.). The second most often seen pattern was that of equal participation, which involved sub-units of the family participating in about the same proportions, while the least likely pattern was that of the entire family participating equally.

Bedini (2002) examined the role of family caregivers in leisure participation. Her findings indicated that family caregivers (spouses, children, parents and other relatives) have multiple responsibilities in addition to caring for their loved ones. This multitude of responsibilities, combined with the care of family members, can cause increased stress and health problems for the caregiver. Still other research has indicated that caregivers vary greatly in their perceptions of their entitlement to leisure, and that not all caregivers perceive leisure in the same manner. Mothers may feel constrained in their ability to participate in recreational activities (Miller & Brown, 2005; Shaw, 2001; Wimbush, 1986). Some authors have suggested that it is important for family caregivers not to give up their own leisure interests, and not to ignore their own leisure needs (Bedini & Guinan, 1996; Dunn & Strain, 2001).

Stokowski and Lee (1991) acknowledged that people with strong family ties are more likely to participate in recreation activities with family members, and that leisure choices are influenced by family members. Parents have been thought of as the strongest influence on children's participation rates (Hultsman, 1993), and children, in return can influence parents in their recreation participation decisions (Mills & Grusec, 1988). Brown, Brown, Miller and Hansen (2001) indicated that mothers with young children overwhelmingly desired to be more physically active, and that the lack of time to do so was a major constraining factor. The notion of the stigma associated with having a family member with a disability was studied by several researchers (Green, 2002; Schneider & Conrad, 1980), again demonstrating the importance of the role of being a parent or sibling of a person with a disability.

Other research has elaborated on the impact of having a child with a disability on the lives and leisure patterns of a parent. The results of this research showed that families are involved in nearly every aspect of medical services for their child, and that parental satisfaction is predicted by the number of developmental problems experienced by their child (Law et al.,

2003). It is apparent that caregivers' lives are intimately connected with the lives of the person with a disability in their household. Although caregivers are often quite willing to give up their leisure opportunities to facilitate their loved ones, it is clear that the caregivers may be impacted in some way by the presence of a person with a disability in a household.

Summary

Previous research has examined recreation participation and constraints among persons with disabilities and their caregivers. However we still lack a clear understanding of how, and to what extent, disabilities hinder outdoor recreation participation, and how this may differ for individuals with disabilities and their caregivers. This paper seeks to address this gap in knowledge by examining National Forest recreation participation and constraints in relation to disability status among Pacific Northwest households.

Methodology

This study presents a secondary analysis of data collected through two telephone surveys of residents in Oregon, Washington, and the Denver, Colorado metropolitan area. The surveys were conducted in two iterations as part of the US Forest Service's evaluation of the recreation fee demonstration program in the Pacific Northwest region. Both surveys included the basic measures of recreation participation and constraints, but the second wave included more detailed questions regarding disability status that were needed to address some of the research questions examined in this paper.

The telephone calls for both surveys were made by a university-supported survey research center between the hours of 4 pm-9 pm (Pacific Standard Time). The interviewers were trained in telephone survey methods, including proper use of terms and place names specific to the study, knowledge about the subject, and methods of building rapport with the interviewees.

In the initial survey, conducted between September and December, 2001, a total of 3,775 households in Oregon and Washington were contacted and 2,005 interviews were completed. The follow-up survey was conducted in January and February, 2004 and resulted in a total of 847 completed interviews from households in Oregon, Washington, and the Denver, Colorado metropolitan area. There are various ways to define and interpret response rates, and different definitions for common terms such as response, refusal, and contact (American Association for Public Opinion Research, 1998; Groves et al., 2001). For the purposes of this study, the response rate was defined as the number of completed interviews divided by the number of eligible reporting units in the sample. Accordingly, the resulting response rate for the first survey was 53% (3775 households contacted, 2005 completed interviews, 1989 useable). The response rate for the 2004 survey was 32% (847 completed telephone interviews, 710 useable). The lower response

rate for the more recent survey is consistent with the current trend of declining response rates for telephone surveys. Reasons for lower response rates include the growing availability of intercept technologies, such as call blocking and caller-ID, and the growth of telemarketing (McGuchin, Keyes, & Liss, 2004). Another factor may be the length of the instrument (De Vaus, 2002). This study was a part of a larger study using a 14-page questionnaire, which took an average of 40 minutes to complete. The response rates to the two surveys examined here are similar to those typically found in surveys with the general public (20%-40%) (Zimowski, Tourangeau, Ghadialy, & Pedlow, 1997).

Instrumentation

Screening questions were used to initiate the interview. People who answered the phone that were under 18 years of age were asked to give the phone to someone in the household who was at least 18 years old. The interviews began by asking respondents how interested they were in outdoor recreation and whether they had ever visited a National Forest in their area. Those who had visited were asked the number of times they visited a National Forest during the past 12 months. Both the National Forest visitors and non-users were asked the number of outdoor recreation trips they took to non-Forest Service lands in the past 12 months.

A series of socio-demographic questions were asked, including each respondent's age, gender, race/ethnicity, education level, income, whether children were in the household, place of residence, and whether their household included a person with a disability. Respondents who indicated that their household included a person with a disability were asked to specify the type of disability, whether or not the disability limited their ability to recreate in National Forests, and what accommodation or assistance the Forest Service could offer that would help to improve their recreational experience.

Many of the survey questions in the 2001 survey were replicated in the 2004 study. The question of disability was expanded in the 2004 survey to determine whether the reported disability was that of the respondent or another person in the household. Perceived constraints to visiting National Forests were assessed through 17 items using a three-point scale where (3) indicates a major reason, (2) a minor reason, and (1) not a reason for not visiting the Forests. The constraint items used in the instrument were similar to those used in previous studies (Crawford et al., 1991; Raymore et al., 1993), and included structural, interpersonal and intrapersonal constraints.

Data Analysis

Responses to the various questions were compared across several variables in the two studies. In the initial analysis of the 2001 survey data, respondents reporting the presence of a person with a disability within their household were divided into two groups: those whose participation in out-

door recreation was hampered by the presence of the disability and those who were not hampered by the disability. These groups were compared against those including no person with a disability in the household. In the follow-up analysis of the 2004 survey data, respondents were separated into those with a personal disability, those with a person with a disability in their household, and those who had no persons with disabilities within their household. Dependent variables for each of these analyses included demographic and outdoor recreation participation variables and perceived constraints. For most of the dependent variables, one-way analysis of variance with Scheffe's post hoc tests provided the tests of statistically significant differences between the groups being compared. For the categorical variables, chi square tests were used. The final stage of the analysis used logistic regression to examine the influence of disability-related and other demographic variables on the importance of two key constraints.

Results

Study results are presented in sections corresponding to the aforementioned research questions.

Research Question 1. To What Extent is Participation in Outdoor Recreation Hampered by the Presence of a Disability within One's Household, and How do Those Whose Recreation is Hampered Differ from Those Who Are not Impacted by the Disability?

In the initial 2001 survey, nearly one-fifth of the respondents (17%) reported that their household included a person with a disability. A follow-up question asked the respondent whether the presence of a person with a disability in their household affected their National Forest visitation patterns. The majority of respondents (60%) whose household included a person with a disability stated that the reported disability did hamper their recreation pursuits in Oregon/Washington National Forests. The remaining 40% stated that their use of Oregon/Washington National Forests was not hampered by the presence of a disability within their household. These two groups were labeled "constrained" and "unconstrained," respectively, and were compared with households containing no reported persons with disabilities.

Respondents whose National Forest use was constrained by the presence of a person with a disability were distinctly different from "unconstrained" respondents and those without a person with a disability in their household (Table 1). "Constrained" respondents were older and reported the lowest income levels and the lowest number of people in their households. The "constrained" respondents also were less likely to have children in the household. In terms of education levels, respondents who reported the presence of a person with a disability in their household were less likely to have a college education than those without a person with a disability in their household, with little difference between the "constrained" and "unconstrained" respondents.

TABLE 1
*Socio-demographic Characteristics and Outdoor Recreation Participation, by
 Influence of a Person with a Disability within the Household*

	No person with disability in household (<i>n</i> = 1653)	At least one person with disability in household		Test Statistic
		Unconstrained ¹ (<i>n</i> = 135)	Constrained ² (<i>n</i> = 201)	
Mean age	44.4 ^a	49.5 ^b	56.8 ^c	<i>F</i> = 57.6***
Education				
Associate's degree or less	64.5%	74.8%	72.1%	$\chi^2 = 12.3^*$
Bachelor's degree	20.1%	11.9%	12.9%	
Graduate or professional degree	15.3%	13.3%	14.9%	
Income				
\$10,000 or less	4.7%	17.6%	22.0%	$\chi^2 = 118.5^{***}$
\$10,001 to \$30,000	24.8%	32.8%	30.8%	
\$30,001 to \$50,000	29.6%	27.2%	28.0%	
\$50,001 or more	40.8%	22.4%	19.2%	
Mean number of people in household	2.7 ^a	2.8 ^a	2.3 ^b	<i>F</i> = 5.9**
Percent with children under 6 years in household	19.4%	14.7%	10.7%	$\chi^2 = 7.8^*$
Percent with children between 6-18 years in household	39.3%	35.3%	20.8%	$\chi^2 = 19.8^{***}$
Level of interest in outdoor recreation activities?				
Very interested	60.2%	57.0%	45.7%	$\chi^2 = 45.5^{***}$
Somewhat interested	32.5%	33.3%	33.2%	
Not at all interested	7.2%	9.6%	21.1%	
Percent who participated in any outdoor recreation activities during the past 12 months?	84.6%	69.6%	58.7%	$\chi^2 = 89.7^{***}$
Mean number of trips to a <i>National Forest</i> within the past 12 months	8.0 ^{ab}	11.1 ^a	5.9 ^b	<i>F</i> = 3.2*
Mean number of trips to <i>non-National Forest lands</i> within the past 12 months	11.6	13.4	10.2	<i>F</i> = 0.8

¹An unconstrained household was one where the respondent reported that the disability does not hamper his/her ability to recreate in National Forests in Oregon or Washington.

²A constrained household was one where the respondent reported that the disability does hamper his/her ability to recreate in National Forests in Oregon or Washington.

* $p < .05$, ** $p < .01$, *** $p < .001$

^aMeans with different superscripts differ significantly from each other.

The influence of a person with a disability within one's household was also related to level of interest and participation in outdoor recreation (Table 1). Respondents whose households included a person with a disability (constrained and unconstrained) reported less interest in outdoor recreation and were less likely to participate during the previous year. However, the "constrained" individuals generally stood out from the other two groups. Over one-fifth (21%) of these individuals were "not at all interested" in outdoor recreation, and nearly half of them (41%) reported no participation in outdoor recreation during the previous 12 months. The "constrained" respondents also reported visiting National Forests about half as often as those who said the disability did not hamper them (Table 1). Interestingly, the "unconstrained" individuals actually reported visiting the National Forests more often than any other group. There was no significant difference among the three groups in the number of trips to other, non-National Forest, lands during the previous 12 months.

Besides examining reported forest use patterns, the survey also included a list of 17 potential constraints, or reasons for not visiting National Forests (Table 2). Those who had never visited a National Forest were asked to indicate the importance of each item *as a reason for not visiting the forests*, while those who had visited, but did not visit as often as they would like to, were asked how important each item was *as a reason for not visiting as often as desired*. The most commonly cited constraints to visiting National Forests were related to lack of time or desire (too busy, don't have enough time, like to do other things for recreation). These constraints showed slight differences when compared across groups based on the influence of a person with a disability in the household. The constraints showing the greatest difference among the three types of households included "poor health" ($F = 221.6$) and "I, or someone I travel with, is physically unable to visit National Forests" ($F = 207.2$). While these were not relevant factors to people in households with no persons with disabilities, they were the most important reasons for not visiting among respondents who were constrained by the presence of a person with a disability in their household. Among respondents whose household included a person with a disability, the response to these two constraints differed greatly between the "constrained" and "unconstrained" respondents. These two groups did not differ significantly from each other regarding the importance of most of the other constraints examined, although they did differ (were more constrained) from the responses of those with no person with a disability in the household for most of the remaining constraints (Table 2).

Research Question 2. How Do Outdoor Recreation Interests, Participation Patterns, and Perceived Constraints Differ between Those with a Personal Disability and Those with a Household Member with a Disability?

This question was addressed with the follow-up 2004 survey involving a sample of 710 residents of Oregon, Washington, and Colorado. As in the

TABLE 2
Perceived Constraints to National Forest Visitation, by Influence of a Person with a Disability within the Household

	No person with disability in household (<i>n</i> = 1653)	At least one person with disability in household		<i>F</i> Value
		Unconstrained ¹ (<i>n</i> = 135)	Constrained ² (<i>n</i> = 201)	
Poor health	1.2 ^a	1.5 ^b	2.2 ^c	221.6***
I, or someone I travel with, is physically unable to visit National Forests	1.2 ^a	1.3 ^b	2.1 ^c	207.2***
Don't have enough time	2.5 ^a	2.2 ^b	2.0 ^b	25.6***
Have no way to get to the forests	1.2 ^a	1.4 ^b	1.6 ^b	25.0***
Can't afford to go to the National Forests	1.3 ^a	1.6 ^b	1.6 ^b	21.8**
Too busy with other activities	2.4 ^a	2.1 ^b	2.1 ^b	17.4***
Don't have anyone to go with	1.4 ^a	1.5 ^{ab}	1.7 ^b	16.2**
Don't like to do things outdoors	1.1 ^a	1.2 ^{ab}	1.2 ^b	7.6**
Fear of crime	1.2 ^a	1.3 ^b	1.3 ^b	7.5**
National Forests are too far away	1.4 ^a	1.5 ^{ab}	1.6 ^b	7.2**
Like to do other things for recreation	1.7 ^a	1.7 ^b	1.8 ^a	3.9*
Areas are closed when I want to visit	1.4	1.4	1.5	2.8
Fear of the outdoors	1.1	1.1	1.1	2.6
National Forests have too many rules that I don't like	1.3	1.4	1.4	1.1
Lack of information about the forests or things to do there	1.5	1.4	1.4	1.0
Don't like the facilities in National Forests	1.2	1.2	1.2	1.0
National Forests are too crowded	1.3	1.3	1.4	0.6

Response scale is 1 = Not a reason, 2 = Minor reason, 3 = Major reason for not visiting National Forests

¹An unconstrained household was one where the respondent reported that the disability does not hamper his/her ability to recreate in National Forests in Oregon or Washington.

²A constrained household was one where the respondent reported that the disability does hamper his/her ability to recreate in National Forests in Oregon or Washington.

* $p < .05$, ** $p < .01$, *** $p < .001$

^aMeans with different superscripts differ significantly from each other.

earlier survey, nearly one-fifth of the respondents reported that their household included a person with a disability. In this case, however, we were able to distinguish between respondents with a *personal disability* (10.2%) and those *whose household included a person with a disability* (6.6%). The following discussion builds upon the previous analysis by focusing on this variable.

Respondents reporting a personal disability were distinctly different in several respects (Table 3). These individuals tended to be older and have less income and formal education than those with either a member of their household or no household member having a disability. Those with a personal disability also lived in smaller households, although they did not differ significantly with respect to the presence of children in the household.

The disability status (personal versus household) was not significantly related to level of interest in outdoor recreation, but was related to frequency of visits to National Forests and other outdoor recreation areas (Table 3).

TABLE 3
Socio-Demographic Characteristics and Outdoor Recreation Participation, by Type of Disability within the Household

	No person with disability in household (<i>n</i> = 580)	Type of disability in household		Test Statistic
		Personal (<i>n</i> = 74)	Household (<i>n</i> = 56)	
Mean age	46.1 ^a	53.8 ^b	45.5 ^a	<i>F</i> = 10.2**
Education				$\chi^2 = 31.3^{**}$
Associate's degree or less	51.4%	81.7%	68.5%	
Bachelor's degree	28.7%	11.0%	16.7%	
Graduate or professional degree	19.9%	7.3%	14.8%	
Income				$\chi^2 = 80.8^{**}$
\$10,000 or less	2.8%	23.5%	3.9%	
\$10,001 to \$30,000	15.5%	28.4%	11.8%	
\$30,001 to \$50,000	27.9%	19.8%	35.3%	
\$50,001 or more	53.8%	28.4%	49.0%	
Mean number of people in household	2.5 ^a	2.1 ^b	3.3 ^c	<i>F</i> = 12.8**
Percent with children under 6 years in household	18.5%	10.9%	18.9%	$\chi^2 = 2.0$
Percent with children between 6-18 years in household	36.0%	32.7%	41.5%	$\chi^2 = 0.9$
Level of interest in outdoor recreation activities?				$\chi^2 = 7.1$
Very interested	59.7%	59.3%	55.6%	
Somewhat interested	34.4%	28.4%	40.7%	
Not at all interested	5.8%	12.3%	3.7%	
Mean number of trips to a National Forest within the past 12 months	5.9 ^a	3.0 ^b	5.8 ^a	<i>F</i> = 4.0*
Mean number of trips to non-National Forest lands within the past 12 months	7.4 ^a	2.4 ^b	7.1 ^a	<i>F</i> = 5.8*

* $p < .05$, ** $p < .001$.

^aMeans with different superscripts differ significantly from each other.

Respondents with a personal disability made only half as many outdoor recreation trips to both National Forests and other non-National Forest lands. In this case, there was no difference in the reported number of outdoor recreation trips between those reporting a person with a disability in their household and those with no person with a disability in their household.

As in the previous analysis, the constraints showing the greatest difference based on disability status (personal versus household) included "poor health" and "I, or someone I travel with, is physically unable to visit National Forests" (Table 4). In this case, the "poor health" constraint was far more important to those reporting a personal disability (mean = 2.2) than to those

TABLE 4
Perceived Constraints to National Forest Visitation, by Type of Disability within the Household

	No person with disability in household (n = 580)	Type of disability in household		Test Statistic (F Value)
		Personal (n = 74)	Household (n = 56)	
Poor health	1.18 ^a	2.19 ^b	1.44 ^c	118.6***
I, or someone I travel with, is physically unable to visit National Forests	1.18 ^a	1.85 ^b	1.76 ^b	66.62***
Don't have enough time	2.43 ^a	2.07 ^b	2.38 ^{ab}	7.9***
Have no way to get to the forests	1.16 ^a	1.57 ^b	1.28 ^a	21.9***
Can't afford to go to the National Forests	1.28 ^a	1.66 ^b	1.32 ^a	14.3***
Too busy with other activities	2.39 ^a	2.05 ^b	2.32 ^{ab}	6.6***
Don't have anyone to go with	1.41 ^a	1.68 ^b	1.36 ^a	5.7**
Don't like to do things outdoors	1.15	1.16	1.14	0.1
Fear of crime	1.14 ^a	1.31 ^b	1.14 ^a	5.29**
National Forests are too far away	1.53	1.51	1.54	0.1
Like to do other things for recreation	1.86 ^a	1.65 ^b	1.66 ^{ab}	4.5*
Areas are closed when I want to visit	1.26	1.46	1.25	2.04
Fear of the outdoors	1.10 ^a	1.21 ^b	1.14 ^{ab}	3.3*
National Forests have too many rules that I don't like	1.24	1.19	1.20	0.4
Lack of information about the forests or things to do there	1.51	1.31	1.54	2.9
Don't like the facilities in National Forests	1.19	1.24	1.32	2.2
National Forests are too crowded	1.42	1.50	1.34	1.0

Response scale is 1 = Not a reason, 2 = Minor reason, 3 = Major reason for not visiting National Forests

* $p < .05$, ** $p < .01$, *** $p < .001$

^aMeans with different superscripts differ significantly from each other.

with a household member with a disability (mean = 1.4) or those with no person with a disability in their household (1.2). In fact, poor health was the most important constraint among the complete list of constraints for respondents reporting a personal disability. The constraint, "I, or someone I travel with, is physically unable to visit National Forests," was far more important to those whose households included a person with a disability, regardless of whether it was a personal or household disability.

Many of the other constraint items followed a consistent pattern, with the respondents with a personal disability generally standing out from the other groups with higher constraint scores. For the transportation ("have no way to get to the forests"), financial ("can't afford to go to the National Forests") and interpersonal ("don't have anyone to go with") items, those with a personal disability reported significantly higher scores than both other groups. For some of the remaining items, the differences between the personal and household disability groups were not statistically significant, due to the relatively small sample sizes involved in these comparisons. However, these differences showed a consistent pattern, with the household disability group closer to the no disability group than to those with a personal disability. In sum, those with a personal disability tended to report significantly higher levels of constraints than the other respondents.

Research Question 3. What Is the Influence of Disability Status and Various Socio-Economic Characteristics on Selected Constraints to Outdoor Recreation?

Based on the previous results, regression analysis was conducted to examine the combined effects of disability status and various demographic factors on the two key disability-related constraints. This analysis was repeated with both of the datasets in order to provide a replication and extension of the analysis of the effects of disability status and other variables on these constraints. Logistic regression was used rather than ordinary least squares regression because the response scale for the dependent variables was a 3-point scale that may not reflect true interval level properties and because the responses were highly skewed toward the unconstrained end of the scale (about 80% of respondents indicated most items were not a constraint, with the remaining 20% indicating either a minor or major constraint). For this analysis, the minor and major constraint responses were collapsed and the analysis focused on predicting whether "poor health" and "I, or someone I travel with, is physically unable to visit National Forests" were or were not reasons constraining visitation to National Forests among the survey respondents.

Results for the first analysis (2001 dataset) showed that several demographic variables (age, income, education, size of household, and presence of a person with a disability in the household) were related to the importance of the two disability-related constraints (Table 5). In the case of "poor health," three variables (all but education and size of household) accounted for 32% of the variance in this constraint. Age and presence of a person

TABLE 5
*Multiple Regression Analysis of Presence of a Disability in the Household,
 Demographics and Perceived Constraints to National Forest use (2001 Survey)*

Independent Variable	Dependent Variable			
	Importance of Constraint: Poor Health ^a		Importance of Constraint: I, or someone I travel with, is physically unable to visit National Forests ^a	
	Wald	Exp (B)	Wald	Exp (B)
Age	86.62***	1.05	39.31***	1.04
Income	9.09*	0.85	0.56	0.96
Education	2.98	0.91	5.84*	0.87
Size of Household	0.33	0.97	8.23**	0.82
Presence of Person with a Disability in the Household	71.58***	4.55	81.73***	5.21
	Nagelkerke $R^2 = .32$		Nagelkerke $R^2 = .27$	

^aResponse scale is 0 = Not a reason, 1 = Minor reason or Major reason for not visiting National Forests

* $p < .05$, ** $p < .01$, *** $p < .001$.

with a disability within one's household showed far more influence than the other demographic variables. Considering the odds ratios, with each additional year of age, the odds of reporting being constrained by poor health increased by a factor of 1.05. The odds of reporting poor health as a reason for not visiting more than quadrupled (Exp (B) = 4.55) for those reporting the presence of a person with a disability in their household. Similarly, four variables explained about 27% of the variance in the importance of the constraint, "I, or someone I travel with, is physically unable to visit National Forests." Again, age and the presence of a disability within the household were the dominant predictor variables, and the presence of the disability increased the odds of reporting this constraint more than five times (Exp (B) = 5.21).

The multiple regression analysis was repeated with the 2004 data to examine the combined effects of various demographic factors on the two key constraints to people whose household included a person with a disability (Table 6). In this case, however, the existence of a personal disability and presence of a person with a disability within one's household were entered as two separate dummy variables. Results showed that the independent variables (age, income, education, size of household, personal disability, and presence of a person with a disability in the household) were related to the importance of these two disability-related constraints. In the case of "poor

TABLE 6
*Multiple Regression Analysis of Disability Status (Personal Versus Household),
 Demographics and Perceived Constraints to National Forest Use (2004 Survey)*

Independent Variable	Dependent Variable			
	Importance of Constraint: Poor Health ^a		Importance of Constraint: I, or someone I travel with, is physically unable to visit National Forests ^a	
	Wald	Exp (B)	Wald	Exp (B)
Age	37.93***	1.05	6.70**	1.02
Income	7.66**	0.81	3.48	0.88
Education	1.21	0.92	0.20	1.03
Size of Household	0.32	1.06	1.43	0.89
Personal Disability	53.00***	10.38	25.79***	4.45
Presence of Person with a Disability in the Household	5.85*	2.53	30.23***	6.70
	Nagelkerke R ² = .35		Nagelkerke R ² = .18	

^aResponse scale is 0 = Not a reason, 1 = Minor reason or Major reason for not visiting National Forests

* $p < .05$, ** $p < .01$, *** $p < .001$.

health," four variables (all but education and size of household) accounted for 35% of the variance in this constraint. Having a personal disability was the strongest predictor in this model, followed by age, with income and presence of a person with a disability in the household making a minor contribution. Notably, having a personal disability increased the odds of reporting poor health as a constraint by more than tenfold (Exp (B) = 10.38) versus a 2.53 odds increase based on the presence of someone else in the household with a disability. Similarly, three variables explained 18% of the variance in the importance of the constraint, "I, or someone I travel with, is physically unable to visit National Forests." In this instance, the two disability items (personal and household) were the dominant predictor variables, with age also contributing significantly to the regression model. In this case the presence of someone else in the household with a disability showed a greater effect (Exp (B) = 6.70) than the presence of a personal disability (Exp (B) = 4.45) on whether or not this was a constraint.

Discussion and Conclusions

This study contributes to existing constraints research as well as to our understanding of the needs of persons with disabilities with regards to out-

door recreation. The findings in this study agree with previous research in some respects and introduce some new findings relative to the original research questions motivating this study.

The first research question addressed the extent to which outdoor recreation on National Forests is constrained by the presence of a disability with one's household, and how individuals who are constrained from visiting National Forests by the presence of a person with a disability in their household differ from those who are unconstrained by the presence of a person with a disability. Consistent with the notion that constraints do not always lead to reduced participation, we found that a substantial proportion (40%) of the respondents whose households included a person with a disability were not hampered in their outdoor recreation on National Forests by the presence of the disability. As suggested by McAvoy (2001), these people showed levels of interest in outdoor recreation that were equal to those with no disabilities within their households. Further study is needed to determine if, and how, such individuals have negotiated their way through this constraint.

Study results confirmed that households including persons with a disability are different from those with no disabilities, and in essence represent an underprivileged group in more ways than just the presence of a disability. Respondents whose households included a person with a disability were older and reported significantly lower income and education levels. Regarding the perception of constraints, those with a personal disability as well as those with a disability within their household reported higher levels of constraints related to health and disability status. These results are consistent with McCormick's (2001) and Williams et al.'s (2004) analyses of national survey data showing that people with disabilities report higher levels of constraints due to health and physical reasons, but fewer time constraints. Results of this study also showed greater constraints related to transportation, affordability, and availability of a social group for outdoor recreation among those with a person with a disability in their household. They extend previous research by adding a broader range of interpersonal and intrapersonal constraints to the equation.

Williams et al. (2004) suggested that people with mobility disabilities participate less frequently in outdoor recreation than people without disabilities. Their finding was based on analysis of differing rates of participation, defined in terms of percentages of people reporting participation in various outdoor activities. This study also found lower participation (defined as participation in any outdoor recreation activities during the previous year) among respondents with a person with a disability in their household. We also examined level of participation in terms of numbers of reported trips to National Forests and other areas for outdoor recreation purposes. Results with respect to frequency of participation showed no significant differences for trips to non-National Forest areas. For trips to National Forests, only those who reported being constrained by the presence of a disability made fewer trips, while those who were unconstrained made as many trips as those who did not have to contend with a disability.

A second line of inquiry in this study focused on whether outdoor recreation interests, participation and perceived constraints differ between those with a personal disability and those whose household included a person with a disability. Results showed that there are differences in the impact of disability status (personal versus within household). Those with a personal disability were much more likely to report health as a major constraint. The only constraints that were less important to those with a personal disability were the two time-related items ("don't have enough time" and "too busy with other activities"). In both cases, those whose households included a person with disability were more similar to those with no person with a disability in the household than they were to respondents with a personal disability. As the literature shows, care-giving for a person with a disability in their household contributes to the time constraint for some of these individuals (National Family Caregiver Association, 1986; White-Means & Chang, 1994). Another key difference relates to the frequency of outdoor recreation participation. Respondents with a personal disability reported fewer outdoor recreation trips to both National Forests and other non-National Forest lands than those reporting a person with a disability in their household and those with no person with a disability in their household. Apparently the existence of a personal disability is a much greater constraint to outdoor recreation visitation than the presence of a person with a disability in one's household.

The final research question examined the influence of disability status and various socio-economic characteristics on selected constraints to outdoor recreation. The presence of a disability was a relatively strong predictor of the prevalence of two key constraints ("poor health" and "I, or someone I travel with, is physically unable to visit National Forests"). Both a personal disability and the presence of a disability within one's household contributed to the explanation of the importance of these constraints. Age was also a significant factor above and beyond the influence of disability status, while other demographic factors were less important.

Study results suggest that for households including a person with a disability, being constrained from National Forest use was largely a function of the importance attached to the disability-related constraints. Regression analyses showed that the presence and type of disability, age, and other demographic factors, in turn, influenced these constraints. The odds ratios for age suggest that with increasing age, people face greater health problems and become less physically able to visit the forests. The smaller coefficients for the other demographic variables suggest that the importance of the disability constraint is greater for individuals with lower education, income, and household size. The results of the analysis, however, suggest that age exerts far more influence on this relationship than the other variables.

Implications and Recommendations

Resource managers are charged with the goal of providing barrier-free recreation opportunities. This study underscores the unfortunate fact that

many people living in households including a person with a disability still perceive limited accessibility to recreating on National Forests, fifteen years after the Americans with Disabilities Act became law. While constraints may limit the outdoor recreation pursuits of anyone, respondents whose households include a person with a disability face greater constraints than households with no reported disabilities, and those with a personal disability report poor health as the strongest factor affecting their ability to recreate in the National Forests.

Improving public health is not beyond the scope of natural resource management, as evidenced by the recent surge of attention paid to linkages between physical activity, outdoor recreation and overall health. The ease of access to National Forests and similar areas is something that resource managers can act upon (e.g., through improved facilities, trail access, and so forth). Open-ended suggestions from respondents indicate that further improvements in access are necessary to facilitate recreational opportunities for persons with disabilities. Beyond facilities, resource managers should seriously consider the role of the National Forest in serving particular communities. For example, National Forest resource managers should perhaps consider providing some form of transportation to persons with disabilities. The transportation constraint documented in this study has been noted in previous constraints-related research as well (Bedini & Henderson, 1994; Johnson, Bowker, & Cordell 2001). As resource managers continue to improve the recreational opportunities within the National Forests, they will need to understand the needs of all segments of their existing and potential customer base.

Limitations

This study was limited in scope to include a randomly drawn sample of adults with home telephones living in Oregon, Washington, and in the Denver, Colorado metropolitan area. The study may not be representative of US residents living in other areas of North America. The study was administered in English only, thus not providing non-English speaking respondents with an opportunity to participate. In addition, respondents were limited to those who were able-bodied to the point that they could make use of a telephone. Conversely, a strength of this study was that the use of a telephonic survey allowed us to interview non-Forest users as well as Forest users.

Further Research Needs

Overall, the respondents living in households with a person with a disability made about as many trips to a National Forest in the 12 months previous to the study as households with no persons with disabilities. However, the responses from individuals with a disability within their household were almost evenly divided between those who were constrained and those who were not constrained from visiting National Forests. The "constrained"

respondents, or those indicating that their visitation was hampered by the presence of a person with a disability in their household (60%), were far less interested in outdoor recreation activities, were less likely to have participated in any outdoor recreation activities in the previous 12 months, and visited the National Forests less frequently than the remaining 40% of "unconstrained" recreationists. Relative to the difference between a personal disability versus one within the household, those with a personal disability made far fewer outdoor recreation trips, although their interest in outdoor recreation was equivalent to that of the other groups. These findings suggest the need for further research about how persons with disabilities, as well as the family members of persons with disabilities, negotiate through a disability to participate in outdoor recreation activities.

Consideration of some of the other constraints examined helps to reveal other factors that may affect people's ability to negotiate a disability constraint. While the differences were much smaller than those for the health and disability items, "constrained" respondents also reported greater constraints related to availability of transportation and people to travel with. Conversely, they were less constrained due to lack of time and being too busy with other activities. Understanding these factors may help resource managers and recreation providers to better assist people to negotiate through their constraints.

Finally, it should be recognized that there are many potential other variables that may influence people's ability to negotiate constraints to forest visitation. Future studies should attempt to better explain why some individuals with disabilities choose to overcome this potential constraint while others remain hampered in their ability to pursue outdoor recreation in the forests. Future research could attempt to further segment the two groups (persons with disabilities and those with a person with a disability in their household). Specifically, what things constrain different segments within these groups, and what are the common constraints items across the various socio-demographic categories? Another topic that should be examined in future studies is how constraints may differ across different settings. This study took place in only three US states, and the findings may not be representative of other North American settings.

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