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A Conjoint Analysis of Preference Heterogeneity among Day and Overnight Visitors to the Okefenokee Wilderness

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The purpose of this study is to examine preference heterogeneity among day non-motorized, day motorized and overnight visitors to the Okefenokee Wilderness using conjoint analysis. Study results support the hypothesis that the subgroups of Okefenokee Wilderness visitors considered in this study are not homogeneous with respect to their wilderness setting preferences and that they may be better understood by studying similarities and differences in preferences among them. The study findings suggest that the issue most likely to be a source of contention among day motorized, day non-motorized and overnight Okefenokee Wilderness visitors is the percentage of water trail miles motorized visitors are allowed to use, while there was general agreement among the subgroups of visitors considered in this study about what constitutes reasonable numbers of encounters with other boating groups.

KEYWORDS: *Okefenokee National Wildlife Refuge, wilderness, day users, conjoint analysis, heterogeneity.*

Introduction

Recent research has used stated preference techniques such as stated choice and conjoint analysis to develop quantitative estimates of the relative importance visitors place on selected attributes of the wilderness setting and the extent to which they support alternative management practices designed to optimize tradeoffs related to wilderness management. A strength of stated choice and conjoint analysis methods is that rather than asking respondents to express their preferences and provide importance weightings for a single attribute at a time, respondents are asked to rank, rate or choose among

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profiles that describe alternative configurations of the set of attributes under consideration. Consequently, respondents are forced to weigh tradeoffs among the attributes in the process of evaluating each profile. Thus, stated preference studies provide measures of the *relative* importance of the attributes being evaluated. In contrast, single attribute at a time question formats, such as those commonly used in recreation norms research and importance-performance analysis, measure *absolute* importance which is subject to the possibility of a ceiling effect where all attributes are found to be important to respondents (Oh, 2001). As a result, stated preference methods may provide managers with better insight into how respondents would prefer wilderness setting attributes to be prioritized when preferred conditions cannot be provided for all attributes simultaneously. For example, while absolute importance measures tend to suggest that visitors prefer fewer encounters with other groups and freedom from management restrictions (Cole, 2000; Hendee & Dawson, 2002), relative importance weights derived from a conjoint analysis or stated choice study can help managers judge which of these preferred conditions visitors would rather "protect" when it is not possible to have both simultaneously. Furthermore, stated preference models can be used to rank alternative configurations of the study attributes (i.e., alternative management programs) from most preferred to least preferred (Teisl, Boyle, & Roe, 1996).

Recent applications of stated preference techniques to wilderness management include a study by Lawson and Manning (2002), in which they developed a stated choice model of Denali National Park and Preserve Wilderness visitors' management preferences by asking respondents to evaluate pairs of hypothetical wilderness management scenarios. Results of the study suggest that the majority of current wilderness visitors support permit quotas at Denali National Park and Preserve to protect overnight wilderness visitors' opportunities to experience solitude and to maintain relatively undisturbed campsite and trail conditions, while a substantial minority of visitors prefer freedom from management restrictions even if it means increased contact with other groups while hiking and camping. In a similar study, a choice experiment was used to ask visitors to weigh tradeoffs among social, resource and management conditions of the Yosemite National Park Wilderness setting (Newman, Manning, Dennis, & McKonly, 2005). Findings from the study suggest that, as with visitors to the Denali Wilderness, Yosemite Wilderness visitors preferred a certain degree of regulations in order to provide greater opportunities for solitude and to protect resource conditions. Other recent examples of stated preference applications in outdoor recreation research include a stated choice analysis of use and non-use values of forest recreation sites in Helsinki, Finland (Horne, Boxall, & Adamowicz, 2005), a choice experiment designed to assess visitor preferences concerning the management of crowding in backcountry campsites at Isle Royale National Park (Lawson & Manning, 2003), stated choice modeling of mountain bike riders' preferences concerning trail characteristics and user fees (Morey, Buchanan,

& Waldman, 2002), and a conjoint analysis of anglers' preferences for alternative fisheries management programs on the Penobscot River, Maine (Teisl et al., 1996).

Several stated preference studies have noted the importance of taking into account the possibility of heterogeneous preferences among subgroups of study participants and developed analytical techniques to examine preference heterogeneity (Bullock, Elston, & Chalmers, 1998; Carmichael, 1996; Hunt, Haider, & Bottan, 2005; Molin, Oppewal, & Timmermans, 2001). However, while the heterogeneity of stated preferences has been examined in a number of research contexts, applications of stated preference methods to wilderness management have, for the most part, implicitly treated all visitors within a study area as a homogeneous group by reporting study results for the sample as a whole. The only exception to this that the authors are aware of is a study of preference heterogeneity for wilderness attributes in five wilderness parks in eastern Manitoba, western Ontario, and northern Minnesota (Boxall & Adamowicz, 2002). Within the study, choice models were developed for four visitor subgroups that were segmented based on their responses to a 20-item scale concerning motivations for visiting backcountry or wilderness areas. The authors concluded that taking heterogeneity into account in studies of wilderness recreationists' preferences provides more complete and valid information than treating all visitors as a homogeneous group. Furthermore, the authors suggested that theoretical and empirical bases for defining meaningful segments of wilderness recreationists are well established as a result of the abundance of research on attitudes, perceptions, and behavior of wilderness visitors.

Previous research on the attitudes, perceptions, and behavior of wilderness visitors suggests that, in addition to motivations for visiting wilderness, several other factors may help explain differences in how wilderness recreationists evaluate wilderness conditions and management (Hall & Shelby, 1996; Manning, 1999). For example, an analysis of visitor survey data from seven wilderness areas across the United States suggest that day users of wilderness may be more tolerant of encounters with other groups and human impacts to natural resources than overnight visitors (Cole, 2001a). Day users were also found to be more supportive than overnight visitors of facilities and conveniences in wilderness such as bridges, interpretive signs, and outhouses. Similarly, normative research in outdoor recreation suggests that subgroups of visitors differentiated by trip characteristics, such as mode of travel (e.g., motorized versus non-motorized recreationists), may have different tolerances or norms for encounters with other groups (Hall & Shelby, 1996; Manning, 1999). If different subpopulations of visitors have different ideas about what is appropriate or preferable in wilderness, studies that treat all wilderness visitors as a homogeneous group (e.g., by reporting a single stated preference model for all visitors) run the risk of providing insight into the preferences of the infamous "average camper who does not exist" (Shafer, 1969).

Study Purpose

The purpose of this study is to extend existing applications of stated preference methods to wilderness management by examining whether there are differences in wilderness setting preferences among day and overnight visitors to the Okefenokee Wilderness. We hypothesized that Okefenokee Wilderness visitors are not a homogeneous group with respect to their wilderness setting preferences. More specifically, we hypothesized that day use visitors traveling in the Okefenokee Wilderness by non-motorized boats, day use visitors traveling by motorboat, and overnight visitors constitute three discrete subgroups of visitors with distinct wilderness setting preferences. We further hypothesized that overnight visitors place greater importance on opportunities for solitude, are less supportive of motorized use of the water trails within the wilderness, and prefer fewer facilities, conveniences, and development than either day non-motorized or day motorized visitors. Moreover, we hypothesized that day non-motorized visitors are less tolerant of encounters with other groups, prefer fewer miles of water trails open to motorboats, and are less supportive of facilities, conveniences, and development within the wilderness than day motorized visitors. Lastly, we hypothesized that the preferences of non-motorized day use visitors are more similar to overnight visitors than to other day use visitors traveling by motorboat. This study used conjoint analysis to examine these hypotheses.

Study Area

Okefenokee Wilderness

The Okefenokee National Wildlife Refuge was established in 1937 to protect the unique environmental qualities of the Okefenokee Swamp ecosystem and is managed by the United States Fish and Wildlife Service. The 396,000 acre refuge is a swamp, a vast reserve of wet prairies, cypress forests, and pine uplands on isolated islands that can be reached by boat only. In 1974, the United States Congress designated the interior 353,981 acres of the refuge as wilderness, making the Okefenokee Wilderness the third largest wilderness area east of the Mississippi River.

Approximately 120 miles of water trails are maintained within the refuge. Almost all visitors access the water trails in the Okefenokee Wilderness from the Unites States Fish and Wildlife Service's Suwannee Recreation Area and Kingfisher Landing, and Georgia's Stephen C. Foster State Park. A very small number of people enter the Wilderness through Okefenokee Swamp Park, a private recreation area on the north side of Okefenokee Wilderness. Non-motorized use of the water trails is primarily by paddle canoe and kayak. U.S. Public Law 93-429, which established the Okefenokee Wilderness, also created unique management challenges and research opportunities. The law permitted the continued use of powered watercraft, propelled by motors of ten or less horsepower, on about 70 of the 120 miles of water trails in the wilderness. Thus today, large numbers of day users, frequently in motorboats,

share narrow and sometimes winding water routes through the wilderness with overnight canoeists.

Overnight camping in the Okefenokee Wilderness is permitted at seven designated campsites located along 12 canoe routes, portions of which are closed to motorboats. No camping platform in the Okefenokee Wilderness is accessible by motorboat. Only one group is allowed to stay at each camp spot per night, thus guaranteeing that a maximum of seven groups will be spending the night in the 353,981 acre wilderness at any one time. Most of the campsites within the swamp consist of raised wooden platforms located in the water with little or no land surrounding them. A wilderness permit is required for overnight stays in the swamp; these are available by phone up to two months in advance of the trip, and the limited permits are often taken within minutes of their becoming available each day. Permitees are given an assigned travel route and camp locations, which they must arrive at by sunset and stay only one night. Overnight trips can last no more than five days, and overnight visitors pay a $10 per person per night use fee.

In contrast to the relatively restrictive regulations governing overnight use of the Okefenokee Wilderness, there is no limit on day use, and day visitors do not pay a fee for boating in the wilderness. Day visitors have the opportunity to take daily scheduled or on-demand fee-based motorized interpretive tours into the wilderness, which are provided by concessionaires at the Suwannee Canal east entrance and at the west entrance through Stephen C. Foster State Park. Thus, segments of the general public who might typically make little use of designated wilderness areas are provided a relatively rare opportunity to experience a wilderness setting. Given the mix of motorized, non-motorized, overnight and day use of the swamp, it is likely that the wilderness setting preferences of visitors to the Okefenokee Wilderness are diverse.

Study Methods

Conjoint Analysis

Conjoint analysis was originally developed to study individuals' preferred levels and relative importance of the multiple attributes of market goods (Louviere, 1988; Green & Srinivasan, 1990). In recent years, conjoint analysis has been extended to study public attitudes and preferences concerning the provision and management of public goods (e.g., Dennis 1998; Kneeshaw, Vaske, Bright, & Absher, 2004; Stevens, Belkner, Dennis, Kittredge, & Willis, 2000). In this study, Okefenokee Wilderness visitors were asked to rate a series of wilderness setting profiles using a scale ranging from 1 ("Unacceptable") to 10 ("Ideal"). The profiles included in this study describe varying conditions or levels of six wilderness setting attributes relevant to the management of the Okefenokee Wilderness. Separate conjoint models were developed for day non-motorized, day motorized and overnight visitors to the Okefenokee Swamp using double-censored tobit and ordered probit regression analyses. The conjoint models provide information concerning the

relative importance and preferred conditions of the study attributes for the three visitor subgroups, as well as a "policy simulator" designed to estimate each subgroup's level of support (i.e., conjoint ratings) for alternative management programs. The following sections of this paper describe the design and analysis of the conjoint profiles used in this study.

Design of the Wilderness Setting Profiles

As noted in the previous section of this paper, the wilderness setting profiles used in this study are composed of varying conditions or levels of six wilderness attributes. The attributes and their levels are presented in Table 1, along with abbreviations for the levels of each attribute (e.g., BOATS

TABLE 1
Okefenokee Wilderness Setting Attributes and Levels
(Abbreviations in Parentheses)

Number of other boats seen per day:
Encounter 5 other boats per day (BOATS 1)
Encounter 15 other boats per day (BOATS 2)
Encounter 30 other boats per day (BOATS 3)

Cost per day:
No use fee (COST 1)
$10 per person per day (COST 2)
$20 per person per day (COST 3)

Percentage of water trail miles open to motorboats:
5% of water trail miles open to motorboats (MOTOR TRAILS 1)
25% of water trail miles open to motorboats (MOTOR TRAILS 2)
50% of water trail miles open to motorboats (MOTOR TRAILS 3)
100% of water trail miles open to motorboats (MOTOR TRAILS 4)

Freedom to enter and travel where you want:
Assigned entry point and assigned travel route (FREEDOM 1)
Assigned entry point and then travel where you want (FREEDOM 2)
Enter where you want but travel route is assigned (FREEDOM 3)
Enter where you want and travel where you want (FREEDOM 4)

Amount of information and educational materials available to visitors:
No information provided except maps (INFORMATION 1)
Only minimal information, like maps and simple directional and distance signs (INFORMATION 2)
Much information, like maps and educational materials about swamp history and ecology (INFORMATION 3)

Amount of facility development along water routes:
No developments along the water routes for visitors (DEVELOPMENT 1)
A few simple facilities like existing pit toilets and camping/rest platforms (DEVELOPMENT 2)
A few simple facilities like pit toilets, boardwalks, observation platforms, and screened-in camping/rest platforms (DEVELOPMENT 3)

1 for the first level of the "Number of other boats seen per day" attribute). The Wilderness Act of 1964 mandates that Congressionally designated wilderness be managed to, among other things, provide "outstanding opportunities for solitude" (U.S. Public Law 88-577). The number of encounters visitors have with other groups has often been used to operationalize the concept of solitude in studies of wilderness and outdoor recreation experiences (Cole, 2001b; Lawson & Manning, 2001). Thus, "Number of other boats seen per day" was selected as an attribute to serve as a proxy for wilderness solitude in this study. The range of encounters considered includes a level close to the status quo at the time of the study, as well as somewhat lower and higher encounter levels to represent conditions that might occur if management actions were taken to reduce encounters or if visitor use were to increase in the future, respectively.

As noted earlier, overnight visitors to the Okefenokee Wilderness pay a fee of $10 per person per day, while there is no fee for day use of the swamp. We included the "Cost of visit per day" attribute to assess the importance of use fees to current visitors relative to the other wilderness setting attributes considered. Day and overnight visitors evaluated the same range of levels of the "Cost per day" attribute, which includes no use fee, and $10 and $20 fees per person per day.

Generally speaking, motorized recreation is prohibited in Congressionally designated wilderness. However, motorized recreation has been "grandfathered" into enabling legislation as an allowable activity in a relatively small number of wilderness areas (Hendee & Dawson, 2002). Currently, about 50% of water trail miles in the Okefenokee Wilderness are open to motorboats, making the refuge the site of a rather unique wilderness area. To gauge current visitors support for motorboat use in the swamp, we included "Percentage of water trail miles open to motorboats" as an attribute in the conjoint design, with levels ranging from a low of 5% to a high of 100% of water trail miles open for motorboat use.

In addition to mandating that wilderness areas be managed for solitude, the Wilderness Act of 1964 stipulates that wilderness areas should be places where visitors can experience "a primitive and unconfined type of recreation" (U.S. Public Law 88-577). Ideally then, wilderness visitors should be relatively free from management regulations and restrictions (Hendee & Dawson, 2002). The "Freedom to enter and travel where you want" attribute is included in the study to represent the extent to which visitors are free to travel in the wilderness in an unconfined and spontaneous manner. The categories of the "Freedom to enter and travel where you want" attribute range from requiring visitors to begin their visit from an assigned entry point and travel an assigned route through the swamp, to allowing visitors to enter the wilderness and travel where they want.

While wilderness is defined in the Wilderness Act of 1964 as "an area of undeveloped Federal land . . . without permanent improvements," the "imprint of man's work" is noticeable in some places within the Okefenokee Wilderness where facilities have been developed for visitors' safety and convenience. For example, directional and distance signs are posted along water

trails to aid visitors as they navigate their boats through the swamp, and platforms and pit toilets provide places for visitors to camp or rest in the wilderness. Two attributes were included in the conjoint design to evaluate respondents' preferences concerning alternative levels of information, facilities and development within the Okefenokee Wilderness—"Amount of information and educational materials available to visitors" and "Level of development along the water trails in the swamp."

A full factorial design involving the attributes and levels presented in Table 1 would produce $3^4 \times 4^2 = 1{,}296$ possible combinations. Clearly, presenting this many wilderness setting profiles to respondents was not feasible. Instead, an orthogonal fractional factorial design was used to combine the attributes at varying levels into a total of 80 wilderness setting profiles. To further reduce respondent burden, the profiles were blocked into eight questionnaire versions, each containing ten unique wilderness setting profiles. Consequently, the experimental design allows for estimation of main effects-only conjoint models for the visitor subgroups, which requires the assumption that all interaction effects among the attributes are not significantly different than zero. While this is a limitation of the current study, it is common practice to estimate main effects-only stated preference models, in part to avoid the respondent burden associated with designs that allow for estimation of interaction effects. Another explanation for the common use of main effects-only models is that even in cases where interaction effects are estimated in linear models and found to be statistically significant, they typically account for relatively little of the explained variance (Louviere, Hensher, & Swait, 2000). Thus, while the main effects only conjoint model estimated in this study is subject to omitted variable bias, it is expected that this bias is minimal and that little variance would be explained by the omitted interaction effects. An example of a representative Okefenokee Wilderness setting profile rated by respondents is presented in Figure 1.

Survey Administration

The conjoint analysis presented in this paper was conducted as part of a larger study of Okefenokee Wilderness visitors. The study population was defined as all adult visitors who made a boat trip in the Okefenokee Wilderness from October, 1999 through May, 2000. Sampling was limited to these months because they represent the high use season in the wilderness.

Visitors were contacted for participation in this study at the three primary locations where boaters can enter the Okefenokee Wilderness: Suwannee Canal Recreation Area, Kingfisher Landing, and Stephen C. Foster State Park. Sampling was conducted on a total of 36 days and sampling days were stratified by entry location, day of week and month, based on visitor use statistics from the 1998-1999 visitor use season. All sampling days within a month were consecutive, with the starting date randomly determined. When allocating sampling days to the three sampling locations, sampling days at Stephen C. Foster State Park were grouped together to reduce traveling ex-

Instructions: Please rate your personal preference for the scenario on a scale of 1 to 10 (where 1 = unacceptable and 10 = ideal).

- You encounter 15 other boats per day.
- You pay no use fee to boat in the swamp.
- 50% of water trail miles are open to motorboats.
- You may enter where you want and travel where you want.
- Only minimal information, like maps and simple directional and distance signs are provided along swamp routes.
- No developments are provided along the water routes for visitors.

Rating Scale:	1	2	3	4	5	6	7	8	9	10
	unacceptable				fair					ideal

Your Rating:_____

Figure 1. Sample wilderness setting profile and conjoint rating question.

penses. Sampling days at Kingfisher Landing and Suwanee Canal were alternated freely because of the relatively short distance between the sites. Consecutive weekend days were not spent at the same sampling site.

Individuals who agreed to participate in the study were given a one-page contact sheet on which they were asked to record their name and address so that a mail survey could be sent to them. During the onsite contact, information about respondents' trip length (i.e., day or overnight) and type of watercraft (i.e., motorized or non-motorized boat) were recorded. A mail survey was sent to all individuals who provided a name and address on the onsite contact sheet within one to two weeks of the onsite contact. A modified Dillman (1978) mail survey method was used to administer the mail survey, including an initial questionnaire mailing, postcard reminder/thank you, and a second and third mailing of the questionnaire to non-respondents.

Data Analysis

All respondents to the conjoint rating questions were categorized as either overnight, day non-motorized or day motorized visitors and conjoint rating models were estimated for each subgroup of visitors. Conjoint rating

models were estimated separately using double-censored tobit and ordered probit procedures (Boyle, Homes, Teisl, & Roe, 2001; Harrison, Stringer, & Prinyawiwatkul, 2002; Teisl et al., 1996; Tobin, 1958). Within each model, the conjoint ratings were entered as the dependent variable and the six wilderness setting attributes as the independent variables. All of the independent variables were entered into the regression model using effects coding (Boxall, Adamowicz, Swait, Williams, & Louviere, 1996; Hardy, 1993). We only report the results of the censored tobit models because the estimation results were similar to those of the ordered probit models and the interpretation of the coefficients of the censored tobit models is similar to that of models estimated using ordinary least squares regression.

A series of Wald tests were used to compare estimated regression coefficients across the three visitor subgroup models to see if the groups were statistically different with respect to their evaluations of the Okefenokee Wilderness setting descriptions presented to them. Wald tests were also used to rank the relative importance of the six wilderness setting attributes to respondents within each of the three visitor subgroups. In particular, Wald tests quantified the relative effect of excluding each attribute, one at a time, on the overall fit of the subgroup models. Those attributes with larger Wald test chi-square values were interpreted as being of greater relative importance than those attributes with smaller chi-square values on the Wald tests. Heteroscedasticity-consistent standard errors were estimated with the tobit models in this study, consequently, Wald tests were used for the analyses outline above, rather than likelihood ratio tests (Hayes & Cai, 2004; Stata Corporation, 2003; White, 1980).

Results

Response Rates

Of the people contacted onsite, 82.9% agreed to provide their names and addresses so that they could be sent the mail survey, and of those who received a mail survey, 767 (70.3%) returned completed questionnaires. The majority of respondents were categorized as day motorized visitors (62.2%), while approximately one-quarter of the sample were day non-motorized visitors (23.7%) and less than one-fifth were overnight visitors (14.1%).

Estimated Equations

The results of the regression analyses for overnight, day non-motorized and day motorized visitors to the Okefenokee Wilderness are reported in Table 2.[1] Using a Wald test, statistically significant differences in the vectors of coefficients were found between day non-motorized and overnight visitors

[1]There is the possibility that the coefficient estimates may be biased because there may be people in the sample who exhibit lexicographic preferences or preference reversals.

TABLE 2
Conjoint Model Coefficient Estimates, by Visitor Subgroup (Heteroscedasticity-Consistent Standard Errors In Parentheses)

	Day Non-Motorized	Day Motorized	Overnight
Constant	4.498***	4.476***	4.207***
	(0.091)	(0.066)	(0.115)
BOATS 1	0.812***	0.598***	0.929***
	(0.120)	(0.086)	(0.147)
BOATS 2	−0.008	0.275***	0.034
	(0.129)	(0.095)	(0.157)
BOATS 3	−0.805***	−0.873***	−0.963***
	(0.131)	0.093	(0.165)
COST 1	0.657***	0.079	0.208
	(0.121)	(0.088)	(0.146)
COST 2	−0.066	0.256***	0.129
	(0.128)	(0.093)	(0.159)
COST 3	−0.591***	−0.336***	−0.336**
	(0.120)	(0.085)	(0.146)
MOTOR TRAILS 1	1.521***	−0.302**	2.310***
	(0.179)	(0.128)	(0.208)
MOTOR TRAILS 2	1.015***	0.286***	0.948***
	(0.130)	(0.092)	(0.157)
MOTOR TRAILS 3	−0.376**	0.232**	−0.444**
	(0.151)	(0.110)	(0.190)
MOTOR TRAILS 4	−2.159***	−0.216	−2.813***
	(0.200)	(0.134)	(0.255)
FREEDOM 1	−0.245*	−0.214*	−0.327*
	(0.152)	(0.111)	(0.184)
FREEDOM 2	0.406***	0.326***	0.233
	(0.148)	(0.107)	(0.176)
FREEDOM 3	−0.486***	−0.252**	0.220
	(0.171)	(0.122)	(0.210)
FREEDOM 4	0.325**	0.140	−0.126
	(0.148)	(0.108)	(0.180)
INFORMATION 1	−0.131	−0.543***	−0.221
	(0.128)	(0.095)	(0.160)
INFORMATION 2	−0.120	0.050	0.147
	(0.119)	(0.085)	(0.143)
INFORMATION 3	0.251*	0.493***	0.074
	(0.125)	(0.093)	(0.161)
DEVELOPMENT 1	−0.382***	−0.489***	−0.379**
	(0.124)	(0.090)	(0.153)
DEVELOPMENT 2	0.128	0.266***	0.164
	(0.122)	(0.088)	(0.155)
DEVELOPMENT 3	0.254**	0.223**	0.215
	(0.126)	(0.091)	(0.150)

*$0.10 > p$-value ≥ 0.05; **$0.05 > p$-value ≥ 0.01; ***p-value < 0.01

(χ^2 = 25.98, d.f. = 15, p = 0.04), day motorized and overnight visitors (χ^2 = 188.69, d.f. = 15, p <0.01), and day non-motorized and day motorized visitors (χ^2 = 197.07, d.f. = 15, p <0.01). These results support our hypothesis that day non-motorized, day motorized and overnight visitors to the Okefenokee Wilderness constitute three discrete subgroups of visitors with different wilderness setting preferences. These results also support our hypothesis that the preferences of non-motorized day use visitors are more similar to overnight visitors than to other day use visitors traveling by motorboat. In particular, while the statistical test results presented above suggest that all three subgroups differ with respect to their wilderness setting preferences, the relative magnitude of the chi-square statistics suggest that the greatest differences are between day non-motorized and day motorized visitors.

Day non-motorized visitors. In the day non-motorized visitors equation, all of the coefficients are significantly different than zero, except the coefficients on the intermediate levels of "Number of other boats seen per day," "Cost per day," and "Level of development along the water trails in the swamp," and on the lowest and intermediate levels of "Amount of information and educational materials available to visitors." The signs of the significant coefficients suggest, as expected, that day non-motorized visitors prefer to see fewer boats while visiting the Okefenokee Wilderness and prefer that no user fees be charged for visiting the swamp. In addition, the coefficients related to the "Percentage of water trail miles open to motorboats" attribute suggest that day non-motorized visitors would prefer that only 5% of water trail miles be open to motorboats and strongly oppose opening all water trail miles to motorized use. The coefficients for the four levels of the "Freedom to enter and travel where you want" attribute suggest that having the freedom to travel where they want once they enter the Okefenokee Wilderness is more important to day non-motorized visitors than having the freedom to choose the actual point from which they enter the swamp. The day non-motorized visitors equation suggests that these visitors support having some development and visitor facilities in the Okefenokee Wilderness, preferring that refuge managers provide visitors with much information about the swamp and providing pit toilets, boardwalks, observation platforms, and screened platforms for resting along the water routes. Furthermore, day non-motorized visitors opposed having no developments along the water routes for visitors.

Day motorized visitors. While day motorized visitors preferred to see fewer other boats while traveling along the water trails in the Okefenokee Wilderness, they evaluated favorably encountering as many as 15 other boats per day. Surprisingly, day motorized visitors evaluated a $10 per person per day use fee more favorably than no fee at all, although they were opposed to a $20 per person per day fee. It may be that motorized users are more accustomed to paying a use fee as a result of visiting recreation areas that have boat ramps and other boating facilities that are financed in part by user fees. Consequently, motorized visitors may equate a user fee with improved

boating facilities such as boat ramps and docks. Furthermore, more than half of all day motorized visitors to the Okefenokee Wilderness (57.7%) took a guided interpretive boat tour of the swamp, for which they paid a fee. It may be that some respondents interpreted the "Cost per day" attribute as a fee that would include a guided interpretive tour of the swamp and would prefer to pay $10 to be guided through the swamp than to pay no fee but have to navigate the swamp on their own. Day motorized visitors opposed restricting motorboat use to just 5% of the water trail miles and instead favored allowing motorboats on 25% or 50% of the water trail miles. While it might be expected that day motorized visitors would favor opening all water trail miles in the swamp to motorboats, the results suggest that they were indifferent about allowing motorboats on 100% of the water trail miles. Like the day non-motorized visitors, day motorized visitors favored unrestricted itineraries along the water trails more than having the freedom to enter the Okefenokee Wilderness where they choose. The coefficients for the three levels of the "Amount of information and educational materials available to visitors" attribute suggest that day motorized visitors prefer that visitors be provided with much information and educational materials about the swamp and oppose having visitors provided with no information except maps. While day motorized visitors evaluated unfavorably having no developments provided along the water trails in the Okefenokee Wilderness, they preferred the intermediate level of visitor facilities development over the highest amount of development considered.

Overnight visitors. As with the two day visitor subgroups, overnight visitors preferred seeing fewer other boats while traveling the water trails of the Okefenokee Wilderness, evaluating encounters with five other boats per day favorably, demonstrating indifference about encountering 15 other boats per day, and rating 30 encounters with other boats per day unfavorably. The results suggest that, while overnight visitors do not favor a use fee of $20 per person per day, they neither favor nor oppose the current overnight use fee of $10 per person per day, and, in general, user fees are not very important to overnight visitors compared to the other attributes considered in this study. In contrast, overnight visitors have much stronger preferences concerning motorboat access in the swamp. While overnight visitors were moderately favorable of allowing motorboat use on 25% of the water trail miles in the Okefenokee Wilderness, they strongly preferred that only 5% of the water trail miles be open to motorized use. Furthermore, overnight visitors evaluated the status quo (50% of water trail miles open to motorboats) unfavorably and strongly opposed allowing motorboats on 100% of the water trail miles. The results also suggest that requiring overnight visitors to enter the Okefenokee Wilderness from an assigned entry point and follow an assigned travel route through the swamp was the least preferred level of the "Freedom to enter and travel where you want." However, the coefficients on the other three levels of the attribute were all non-significant, suggesting that overnight visitors may be generally less concerned about regulations on visitors' travel routes and camping locations in the swamp than they are

about other wilderness setting attributes included in the study. The coefficients on all three levels of the "Amount of information and educational materials available to visitors" attribute were non-significant, suggesting that overnight visitors may be indifferent about the amount of information provided to visitors. Overnight visitors opposed providing no developments along the water routes for visitors, but gave similar ratings to the intermediate and higher levels of development considered in the conjoint rating questions.

Statistical Comparisons of Visitor Subgroups' Preferences

Day non-motorized versus overnight visitors' preferences. Comparing the day non-motorized and overnight visitors equations, the combined linear effect of the "Cost per day" attribute is significantly different between the two groups ($\chi^2 = 5.80$, d.f. = 2, $p = 0.06$), with day non-motorized visitors more strongly in favor of having no use fee to visit the Okefenokee Wilderness than overnight visitors. Furthermore, day non-motorized and overnight visitors' preferences differed significantly with respect to the percentage of water trail miles open to motorboats ($\chi^2 = 8.66$, d.f. = 3, $p = 0.03$). Overnight visitors were more strongly opposed than day non-motorized visitors to allowing motorboats on 100% of the water trail miles in the Okefenokee Wilderness, and were more strongly in favor of limiting motorized use to just 5% of the water trail miles. Day non-motorized visitors had significantly different and stronger preferences than overnight visitors concerning the "Freedom to enter and travel where you want" attribute ($\chi^2 = 7.94$, d.f. = 3, $p = 0.05$). The coefficient on "Enter where you want but travel route is assigned" was negative and significant in the day non-motorized equation, while it was negative and non-significant in the overnight visitors equation. In addition, the coefficient on "Enter where you want and travel where you want" was positive and significant in the day non-motorized equation but non-significant in the overnight visitors equation. No statistically significant differences were found between day non-motorized and overnight visitors' preferences concerning "Number of other boats seen per day" ($\chi^2 = 0.64$, d.f. = 2, $p = 0.73$), "Amount of information and educational materials available to visitors" ($\chi^2 = 2.12$, d.f. = 2, $p = 0.35$), or "Level of development along the water trails in the swamp" ($\chi^2 = 0.05$, d.f. = 2, $p = 0.98$).

Day motorized versus overnight visitors' preferences. Comparing the day motorized and overnight visitors equations, the two groups' preferences for the "Percentage of water trail miles open to motorboats" differed significantly ($\chi^2 = 145.49$, d.f. = 3, $p = <0.01$). Overnight visitors strongly opposed allowing motorboats access to all water trail miles in the Okefenokee Wilderness, while the coefficient on "100% of water trail miles open to motorboats" was not significant for day motorized visitors. In addition, overnight visitors were strongly in favor of limiting motorboats to just 5% of the water trail miles while day motorized visitors opposed this policy. Overnight and day motorized visitors' preferences also differed significantly with respect to

the "Amount of information and educational materials available to visitors" ($\chi^2 = 5.30$, d.f. = 2, $p = 0.07$). Overnight visitors were generally indifferent about the "Amount of information and educational materials available to visitors," while day motorized visitors opposed the option of providing visitors with no information except maps and supported providing visitors with much information. There were no statistically significant differences between day motorized and overnight visitors preferences concerning the "Number of other boats seen per day" ($\chi^2 = 4.06$, d.f. = 2, $p = 0.13$), "Cost per day" ($\chi^2 = 0.68$, d.f. = 2, $p = 0.71$), "Freedom to enter and travel where you want" ($\chi^2 = 4.05$, d.f. = 3, $p = 0.26$), and "Level of development along the water trails in the swamp" ($\chi^2 = 0.47$, d.f. = 2, $p = 0.79$).

Day motorized versus day non-motorized visitors' preferences. Comparing the day motorized and day non-motorized equations, day non-motorized visitors evaluated user fees less favorably than motorized users ($\chi^2 = 14.96$, d.f. = 2, $p = 0.001$). In particular, the coefficient on "$0 per person per day" was positive and significant in the day non-motorized equation, while it was non-significant in the day motorized equation. In addition, while day non-motorized visitors were generally indifferent about a user fee of $10 per person per day, the coefficient on this level of the "Cost per day" attribute in the day motorized visitors equation was positive and significant, suggesting they would support a day use fee to visit the Okefenokee Wilderness. However, both motorized and non-motorized day use visitors opposed a user fee of $20 per person per day. The two groups' preferences concerning the "Percentage of water trail miles open to motorboats" differed significantly ($\chi^2 = 108.60$, d.f. = 3, $p = <0.01$). Day non-motorized visitors strongly preferred limiting motorboat access to the water trails in the swamp and demonstrated strong disapproval for allowing motorboats to travel all of the water routes in the Okefenokee Wilderness. In contrast, while the coefficient on "100% of water trail miles open to motorboats" was not statistically significant in the day motorized visitors equation, day motorized visitors opposed limiting motorboat use to just 5% of the water trail miles and instead preferred that about one-quarter or one-half of the water trail miles be open for motorized use. Day non-motorized visitors' preferences for the "Amount of information and educational materials available to visitors" differed significantly from those of day motorized visitors ($\chi^2 = 6.74$, d.f. = 2, $p = 0.03$). While day non-motorized and motorized visitors evaluated the intermediate and highest levels of the "Amount of information and educational materials available to visitors" attribute similarly, motorized users were opposed to providing visitors with no information except maps while day non-motorized visitors were generally indifferent about this option. There were no statistically significant differences between the groups in terms of their preferences for the "Number of other boats seen per day" ($\chi^2 = 3.65$, d.f. = 2, $p = 0.16$), "Freedom to enter and travel where you want" ($\chi^2 = 1.88$, d.f. = 3, $p = 0.60$), and "Level of development along the water trails in the swamp" ($\chi^2 = 0.92$, d.f. = 2, $p = 0.63$).

Relative Importance of Wilderness Setting Attributes

As noted earlier in the paper, a strength of conjoint analysis is that it provides estimates of the relative importance of study attributes to respondents. That is, the conjoint rating questions used in this study required respondents to weigh tradeoffs among the conditions of Okefenokee Wilderness setting attributes, thus the results reflect the relative importance respondents place on the attributes considered in the study. Estimates of the relative importance of the wilderness setting attributes included in this study provide another basis of comparison among the three subgroups of visitors considered in this paper. For each of the wilderness setting attributes, Wald tests were used to test whether the attribute as a whole was significant within each subgroup model. This was done by testing, one attribute at a time, the joint hypothesis that the coefficients on all of the levels of the attribute were simultaneously zero. The chi-square value and p-value for each test is interpreted as a measure of the relative importance of the corresponding attribute to the corresponding subgroup of visitors. Table 3 reports the chi-square values, p-values and rank order of importance of the attributes for day motorized, day non-motorized and overnight visitors resulting from this analysis.

The magnitude of the chi-square values reported in Table 3 suggest that the "Percentage of water trail miles open to motorboats" is considerably

TABLE 3
Relative Importance of Wilderness Setting Attributes, by Visitor Subgroup (Wald Test Results in Parentheses)

Day Non-Motorized	Day Motorized	Overnight
Percentage of water trails open to motorboats ($\chi^2 = 166.75$, $p < 0.01$)	Number of other boats seen per day ($\chi^2 = 96.76$, $p < 0.01$)	Percentage of water trails open to motorboats ($\chi^2 = 187.25$, $p < 0.01$)
Number of other boats seen per day ($\chi^2 = 57.40$, $p < 0.01$)	Amount of information and education materials available to visitors ($\chi^2 = 38.45$, $p < 0.01$)	Number of other boats seen per day ($\chi^2 = 49.42$, $p < 0.01$)
Cost per day ($\chi^2 = 37.69$, $p < 0.01$)	Level of development along water trails ($\chi^2 = 29.81$, $p < 0.01$)	Level of development along water trails ($\chi^2 = 6.26$, $p = 0.04$)
Freedom to enter and travel where you want ($\chi^2 = 18.75$, $p < 0.01$)	Percentage of water trails open to motorboats ($\chi^2 = 17.19$, $p < 0.01$)	Cost per day ($\chi^2 = 5.63$, $p = 0.06$)
Level of development along water trails ($\chi^2 = 9.80$, $p = 0.01$)	Cost per day ($\chi^2 = 16.25$, $p < 0.01$)	Freedom to enter and travel where you want ($\chi^2 = 4.64$, $p = 0.20$)
Amount of information and education materials available to visitors ($\chi^2 = 4.04$, $p = 0.13$)	Freedom to enter and travel where you want ($\chi^2 = 15.54$, $p < 0.01$)	Amount of information and education materials available to visitors ($\chi^2 = 2.12$, $p = 0.35$)

more important to day non-motorized and overnight visitors than any of the other attributes. In contrast, day motorized visitors were less concerned about the amount of motorboat access to water trails, relative to other wilderness setting attributes included in the study. All three subgroups of visitors considered the "Number of other boats seen per day" to be an important attribute of the wilderness setting. In particular, day motorized visitors placed more importance on encounters with other boats than any of the other attributes considered and it was the second most important attribute to both day non-motorized and overnight visitors. The "Amount of information and educational materials available to visitors" was the second most important attribute to day motorized visitors, but was the least important attribute to both day non-motorized and overnight visitors. Day non-motorized visitors placed more importance on the "Cost per day" attribute and less importance on the "Level of development along the water trails in the swamp" than either day motorized and overnight visitors. Across all three subgroups of visitors, the "Freedom to enter and travel where you want" attribute was generally less important than most of the other wilderness setting attributes considered.

Most and Least Preferred Wilderness Setting Profiles

A benefit of the conjoint models presented in Table 2 is that they can be used to estimate how the subgroups of visitors considered in this study would rate any possible combination of the study attributes. Estimated ratings from the conjoint models were used to identify the most and least preferred wilderness setting profiles (given the possible combinations of the study attributes and levels) for day non-motorized, day motorized and overnight visitors, which are presented in Tables 4 and 5, respectively. The most notable differences include the fact that both day non-motorized and overnight visitors' most and least preferred profiles included the most and least restrictive limits on motorboat access to the water trails, respectively. Day motorized visitors' preferred wilderness setting profile included motorboat access to 25% of the water trail miles in the Okefenokee Wilderness, while their least preferred alternative included limiting motorboats to just 5% of the water trail miles. Another notable difference is that the preferred profile for day motorized visitors included a cost of $10 per person per day to visit the swamp, while day non-motorized and overnight visitors' preferred profiles included no use fees. Other than the differences concerning motorboat access to the water trails in the swamp outlined above, all three subgroups' least preferred wilderness setting profiles were similar.

Discussion

The results of this study support our hypothesis that Okefenokee Wilderness visitors are not a homogeneous group with respect to their wilderness setting preferences and that they may be better understood by identi-

TABLE 4
Most Preferred Wilderness Setting Profiles, by Visitor Subgroup

Wilderness Setting Attribute	Day Non-Motorized	Day Motorized	Overnight
BOATS	Encounter 5 other boats per day	Encounter 5 other boats per day	Encounter 5 other boats per day
COST	No use fee	$10 per person per day	No use fee
MOTOR TRAILS	5% of water trails open to motorboats	25% of water trails open to motorboats	5% of water trails open to motorboats
FREEDOM	Assigned entry point and travel where you want	Assigned entry point and travel where you want	Assigned entry point and travel where you want
INFORMATION	Much information, like maps and educational materials about swamp history and ecology	Much information, like maps and educational materials about swamp history and ecology	Only minimal information, like maps and simple directional and distance signs
DEVELOPMENT	A few simple facilities like pit toilets, boardwalks, observation platforms, and screened-in camping/rest platforms	A few simple facilities like existing pit toilets and camping/rest platforms	A few simple facilities like pit toilets, boardwalks, observation platforms, and screened-in camping/rest platforms

TABLE 5
Least Preferred Wilderness Setting Profiles, by Visitor Subgroup

Wilderness Setting Attribute	Day Non-Motorized	Day Motorized	Overnight
BOATS	Encounter 30 other boats per day	Encounter 30 other boats per day	Encounter 30 other boats per day
COST	$20 per person per day	$20 per person per day	$20 per person per day
MOTOR TRAILS	100% of water trails open to motorboats	5% of water trails open to motorboats	100% of water trails open to motorboats
FREEDOM	Enter where you want but travel route is assigned	Enter where you want but travel route is assigned	Assigned entry point and assigned travel route
INFORMATION	No information provided except maps	No information provided except maps	No information provided except maps
DEVELOPMENT	No developments along the water routes for visitors	No developments along the water routes for visitors	No developments along the water routes for visitors

fying meaningful subgroups of visitors and studying similarities and differences in preferences among these groups. For example, as part of the larger research project of which this study is a part, a single conjoint model was estimated for the full sample of Okefenokee Wilderness visitors. While it is outside the scope of this paper to present detailed results of the full sample conjoint model, one finding illustrates the potential consequences of ignoring differences among subgroups. In particular, the results of the full sample model suggest that the most preferred wilderness setting profile for Okefenokee Wilderness visitors included allowing motorboats on just 5% of the water trail miles in the swamp. This result obscures the fact that for day motorized visitors, who constitute the majority of current visitors to the Okefenokee Wilderness, their *least* preferred wilderness setting profile included motorboat access to 5% of the water trail miles in the swamp. Relying simply on sample averages, in this case, could suggest a substantively different course of action for managers than results that capture differences in preferences within the visitor population.

The coefficients of the conjoint models and the results of the Wald tests presented in this paper support our second hypothesis that day non-motorized, day motorized, and overnight visitors to the Okefenokee Wilderness constitute three discrete subgroups of visitors with distinct wilderness setting preferences. An implication of this finding is that any decision about how to reconcile tradeoffs associated with managing the Okefenokee Wilderness may be more favorable to some visitors than others and this might cause or intensify conflict among different types of visitors (Teisl et al., 1996; Vaske, Beaman, Stanley, & Grenier, 1996). The issue that is most likely to be a source of contention among day motorized, day non-motorized and overnight visitors to the Okefenokee Wilderness is the percentage of water trail miles motorized visitors are allowed to use. As we hypothesized, overnight visitors were less supportive of motorized use of the water trails than either day non-motorized or day motorized visitors, although non-motorized day users' preferences were more similar to those of overnight visitors than to motorized day users. Not only are the visitor groups considered in this study divided on the preferred policy for motorized access to the water trails, the issue ranked as the most important of the wilderness setting attributes included in the study for day non-motorized and overnight visitors. It is interesting to note, however, that the coefficients of the conjoint models suggest that all three visitor groups would prefer fewer miles of water trails be open to motorized use than is currently allowed. While this finding was expected for day non-motorized and overnight visitors, this result was unanticipated for motorized day users. It may be that motorized users feel that at least some parts of the wilderness should be without motorized recreation and that visitors traveling by paddle canoe should be able to visit some portions of the wilderness without encountering motorboats.

As noted earlier in this paper, results of a study of visitors in seven wilderness areas across the United States suggest that day users of wilderness may be more tolerant of encounters with other groups than overnight visitors

(Cole, 2001a). Thus, we hypothesized that overnight visitors would prefer fewer encounters with other groups than either day non-motorized or day motorized visitors. Our study results, however, did not support this hypothesis. Rather, we found that all three groups of visitors generally preferred, not surprisingly, to see fewer other boats. Furthermore, while all three groups evaluated encountering 30 other boats per day unfavorably, day motorized visitors rated the status quo of about 15 encounters with other boats per day (based on average reported encounters at the time of the study) favorably and day non-motorized and overnight visitors were indifferent about this level of encounters. Furthermore, the results of this study suggest that among the attributes included in this study, day motorized visitors consider the number of encounters with other boats to be the most important wilderness setting attribute and day non-motorized and overnight visitors consider encounters to be the second most important wilderness attribute. These findings imply that crowding while traveling by boat on the water trails of Okefenokee Wilderness may not have been a problem for most visitors at the time of the study and that visitors may generally be in agreement about what constitutes reasonable amounts of contact between visitor groups. These findings also suggest that visitors to the Okefenokee Wilderness are sensitive to the issue of crowding and would evaluate increased encounters between boating visitors in the Okefenokee Wilderness unfavorably.

We also hypothesized, as Cole (2001a) found in his analysis of visitor survey data from seven U.S. wilderness, that overnight visitors to the Okefenokee Wilderness would be generally less supportive than day use visitors of facilities and conveniences in wilderness. However, we found no statistically significant differences between non-motorized day visitors' preferences for the amount of information available to visitors and level of development along the water trails in the swamp and those of overnight visitors and the differences between day motorized visitors and overnight visitors were relatively subtle. Our findings did suggest, however, that overnight visitors' most preferred wilderness setting profile includes the highest level of development along the water routes considered, while the most preferred profile for day motorized visitors included the intermediate level of development. This may be due, in large part, to the unique nature of the Okefenokee Wilderness which makes camping in the swamp very difficult without developed facilities such as platforms and pit toilets.

One unanticipated difference among the subgroups of visitors considered in this study concerned opinions about use fees to visit the swamp. As expected, day non-motorized visitors preferred paying no use fee to visit the Okefenokee Wilderness, however, they were indifferent about paying a $10 per person per day fee. Perhaps more surprisingly, day motorized visitors most preferred wilderness setting profile included a use fee of $10 per person per day. As discussed earlier in the paper, motorized users may be more likely to visit recreation areas with more developed facilities (e.g., concrete boat ramps, boat docks, etc.) that are more likely to charge user fees. Consequently, motorized visitors may be willing to pay a use fee for boating in

the Okefenokee Wilderness in order to have the facilities they prefer. These findings suggest that there would not be considerable opposition from visitors if managers of the Okefenokee Wilderness instituted a day use fee of up to $10 per person to boat along the water routes in the swamp. However, the introduction of a day use fee might increase expectations, particularly among motorized users, that boating facilities and services would be provided and maintained for visitors' convenience. Furthermore, as noted earlier in the paper it may be that some day motorized visitors who participated in the study interpreted the "Cost per day" attribute as a fee that includes a guided interpretive boat tour of the Okefenokee Wilderness. Consequently, a day use fee might create the false expectation that visitors would be provided with a guided interpretive boat tour of the water trails, when in fact visitors would have to pay an additional charge to a concessionaire for a tour of the swamp. The study findings also suggest that overnight visitors are generally accepting of the current fee of $10 per person per night charged for overnight use of the swamp. While both day and overnight visitors appear willing to pay a use fee to boat in the Okefenokee Wilderness, our findings suggest that all three groups would oppose having to pay $20 per person per day to visit the swamp. Consequently, while a decision to introduce a day use fee of $10 per person per day may not be contentious, it might not be well received, particularly by day motorized visitors, if it is not accompanied by increased boating facilities and visitor services. Furthermore, attempting to increase overnight fees to $20 per person per day would probably not be well received by current visitors.

While the results of this study demonstrate the potential for using conjoint analysis and related stated preference methods to assess differences in management preferences among subpopulations of visitors, the research approach presented in this paper has limitations. For example, the conjoint analysis conducted in this study examined differences among three subgroups of Okefenokee Wilderness visitors and this information helps managers to better understand the preferences of the groups considered. However, there are likely to be a number of other subgroups of Okefenokee Wilderness visitors with distinct preferences not considered in this study. For example, first time visitors to the Okefenokee Wilderness might have different preferences than those who have boated in the swamp a number of times previously. Similarly, visitors on guided boat trips into the swamp might have different opinions about the management of the Okefenokee Wilderness than non-guided visitors. While there are a potentially large number of meaningful ways in which to segment visitors, the associated analyses can become increasingly burdensome and the interpretation of study findings can become complex. Consequently, a challenge in examining preference heterogeneity is deciding which visitor segments or subpopulations are the most meaningful from applied and theoretical perspectives. An alternative to the a priori segmenting approach used in this study is to derive segments empirically based on differences in preferences observed in the analysis of

stated preference data using random parameters logit or latent class modeling (Boxall & Adamowicz, 2002; Hunt et al., 2005). In cases where there is no a priori basis for defining segments, or in studies designed to identify many or all sources of preference heterogeneity, these empirical approaches may be more advantageous than a priori segmentation. However, in some cases it is arguably preferable to define segments within a sample based on theoretical foundations and/or managerial relevance (Carmichael, 1996). Wilderness recreation use trends suggesting increasing day use of wilderness areas, coupled with relatively limited previous research on day users of wilderness, suggest that there are managerially and academically relevant reasons to study wilderness setting and management preference heterogeneity among day and overnight visitors to wilderness areas (Cole, 2001a; Roggenbuck, Marion, & Manning, 1994). Thus, this study's focus is limited to the managerially relevant subgroups of day motorized, day non-motorized and overnight visitors. However, as noted above, by segmenting visitors based on *their length of stay and whether they traveled by motorized or non-motorized* watercraft, there may be some unobserved factors associated with preference heterogeneity that this study does not account for. Future studies of wilderness recreationists' stated preferences should examine the relative utility of alternative segmenting approaches to study preference heterogeneity among subgroups of visitors differentiated by personal, trip and other characteristics not considered in this study or previous stated preference research. Another limitation of this and all stated preference studies is that difficult choices have to be made about what attributes to include in the study design and which to exclude. It is likely that for most Okefenokee Wilderness visitors there are other attributes of the wilderness setting that are important to them beyond those considered in this study. Consequently, the choice of attributes and levels in stated preference studies of wilderness visitors should be guided by previous research, theory, and management considerations. Lastly, it should be noted that in some stated preference studies, the experimental design includes alternatives or scenarios that allow the researcher to test for inconsistent respondents. For example, in stated choice designs, the research may include what is referred to as a dominant pair where one alternative in the choice set is theoretically "better" (e.g., lower price and higher air quality) than the other. The data are searched to identify and remove respondents who choose the theoretically "worse" alternative—these respondents are classified as inconsistent respondents and removed from the dataset before estimating the empirical model. While there may be advantages to designing consistency tests into stated preference studies, doing so reduces the efficiency of the design and the percentage of the sample classified as inconsistent respondents can be quite low with little effect on the results of model estimation (Phillips, Maddala, & Johnson, 2002). The experimental design used in this study did not include any scenarios that allowed us to test for inconsistent respondents, thus the model was estimated with the full sample of respondents answers.

Conclusion

Understanding the wilderness setting preferences of different subgroups of visitors allows managers to anticipate potential conflict that might occur as a result of management decisions and could help tailor management actions to accommodate a wide spectrum of tastes and interests when appropriate. The findings from this study suggest that day non-motorized, day motorized and overnight visitors to the Okefenokee Wilderness do have different wilderness setting preferences, particularly with respect to how motorboat use of the swamp is managed. However, the results also suggest that the visitor groups considered in this study generally share similar preferences for some attributes of the Okefenokee Wilderness, such as the number of encounters with other boats and use fees to boat in the swamp. The results of the conjoint analysis presented in this paper can assist managers in coming to consensus with visitors on how to manage the Okefenokee Wilderness by identifying common ground and areas where visitors differ with each other in their wilderness setting preferences.

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