

**Knowledge and Meanings of Wilderness and Wildlife Refuges
Among Okefenokee Visitors on Interpretive Tours**

by

Rachel Brooke Kennon

Thesis Submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

MASTER of SCIENCE

in

FORESTRY

APPROVED:

Joseph W. Roggenbuck, chair
Danny Axsom
R. Bruce Hull
Harold E. Burkhart, Dept. Head

April 24, 2002

Blacksburg, Virginia

ABSTRACT

Past research has shown that interpretive tour visitors at Okefenokee National Wildlife Refuge do no better than other visitors on knowledge and value questions about federal wilderness areas and national wildlife refuges. Tours into the Okefenokee Swamp Wilderness are conducted by a National Wildlife Refuge concessionaire. Interpretive tour guides participated in a training session on the purposes and values of wilderness and wildlife refuges. Visitors who took guided interpretive tours in the spring of 2001 with trained and untrained guides completed knowledge surveys immediately after taking the boat tour. Results indicate that there were no differences in visitor knowledge scores with trained versus untrained guides. A small sample of interpretive tour visitors was also interviewed in an effort to understand the meanings they ascribe to wilderness. Visitors were able to describe and articulate their views of wilderness with considerable clarity. Recommendations for future research include monitoring the guides' interpretive messages, conducting more in-depth interviews with visitors and guides, assessing visitors' and guides' prior knowledge of wilderness and wildlife refuge purposes and values, and developing guide training based on the principles of persuasive communication.

ACKNOWLEDGEMENTS

I am grateful to the many people who encouraged and supported me in the pursuit of a Master's degree. From my undergraduate advisors to the faculty at Virginia Tech, I have had tremendous encouragement to do my best in the field. Dr. Joseph Roggenbuck guided me through several projects and gave me the freedom to do what interests me the most. Thank you, Joe, for sticking with the wilderness.

None of this would be possible without the staff at Okefenokee National Wildlife Refuge and employees at Okefenokee Adventures. They allowed me to camp out at their picnic tables and implore unsuspecting visitors to fill out my survey. Their help and humor made the long trips to southern Georgia more enjoyable. Also, thanks goes to the Aldo Leopold Wilderness Research Institute for funding this project.

My friends in Blacksburg and around the country cannot be thanked enough. They were always willing to listen, advise, and be there when I needed them. Thanks, guys, for just being you.

Finally, I am grateful to my family, Tom, Jennifer, and Jonathan Kennon for putting up with my adventures. Your encouragement of my interests and patience with my travels has made me the person I am today. All those years of listening to John Denver and exploring the woods by foot and canoe really had an impact! Thank you, Mom and Dad, for letting me follow my dreams.

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CHAPTER 1. INTRODUCTION

Wilderness Management on National Wildlife Refuges

In 2000, the former director of the U.S. Fish and Wildlife Service, Janice Rappaport Clark, called for a more comprehensive consideration of wilderness within the National Wildlife Refuge System. Although 20 million acres of wilderness were already protected on 63 refuges, most areas were in Alaska. Clark recognized that wilderness values were very much a part of the American way of life, and that it was time for the Fish and Wildlife Service to reconcile some the conflicts between game management and wilderness preservation. Specifically, Clark (2000) provided four reasons for valuing wilderness in wildlife refuges: protecting ecological integrity, as a setting for recreation, as a connection to cultural heritage, and as a bequest for the future. While these reasons are often cited for valuing wilderness in general (Nelson, 1998), they are especially timely for the FWS whose goals in the past were often focused on enhancing specific species and their habitat for game production purposes. Habitat manipulation in the form of dams, dikes, crops and fire suppression was common in the past (Clark, 2000). Thus, Clark's invocation "to learn more about how wildlife and ecological values can coalesce with the evolving social and psychological meanings of wilderness..." (2000, 11) was a call to action.

Okefenokee National Wildlife Refuge has had 350,000 acres of federally designated wilderness since 1974. The swamp encompasses nearly 400,000 acres in southern Georgia and contains seven distinct habitat types – from upland forest to wet prairie – and a wide variety of flora and fauna, including several threatened and endangered species. First established as a refuge in 1937, Okefenokee has a long and diverse history of human occupation. From Native Americans to early settlers, Okefenokee has experienced human use at varying intensities for thousands of years. Arguably the most dramatic human manipulation was the extensive railroad logging in the interior of the swamp in the late 19th century. Subsequent settlement in the area led to the digging of a canal into the east side of Okefenokee in an attempt to drain the swamp and convert it to farmland. Lack of technology and cost effectiveness soon stopped these efforts, and they were never reinitiated. By 1937, Okefenokee was designated a National Wildlife Refuge, and these intensive commercial activities ended indefinitely.

The 1964 Wilderness Act declares that a wilderness "is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man is himself a visitor who does not remain" (Public Law 88-577). It further states that a wilderness should be affected principally by the forces of nature and have little evidence of man (Public Law 88-577). In addition to this preservation mandate is the recognition that wilderness areas are to provide outstanding opportunities for solitude and for primitive or unconfined recreation. At times, these dual mandates conflict, forcing managers to place priority on one or the other. The conflicting mandates on wilderness areas in general are present at Okefenokee NWR as well. Okefenokee – with its canal, railroad ties, second growth forest, and old homesteads – has not been unaffected by man. But in the 1970s, Congress recognized the potential for previously disturbed lands to return to a more natural state and included such lands in the National Wilderness Preservation System (NWPS) (Woods, 1998). Thus, despite its past history, Okefenokee's ability to function as a natural swamp ecosystem in the future sanctioned its wilderness designation. But managers must balance the recreational use of the area with the mandate to help the swamp heal from past human disturbances.

In addition, scientists and researchers have questioned the wilderness management goals of wildness, naturalness, and solitude (Cole and Hammitt, 2000; Landres, Brunson, Merigliano, Sydorik, and Moton, 2000). While these goals seemed synonymous at the time the Wilderness Act was written, they now not only conflict at times, but also provide managers with a new dilemma. As Cole and Hammitt (2000, 59) state, "Management cannot have wild use (unrestricted and unconfined) and provide outstanding opportunities for solitude where demand for access to wilderness is high and supply is limited." The emphasis that former director Clark and others place on managing wilderness for both ecological integrity and recreation opportunities creates a need to balance these two goals through appropriate management techniques. Moreover, appropriate management techniques involve much more than manipulating (or not manipulating) the natural environment; much of wilderness management is in fact management of human activities in wilderness (Woods, 1998). As Woods (1998, 147) explains, "Requirements for wilderness management can supersede both requirements for naturalness and for solitude and recreation when human activities allowed in wilderness areas necessitate intervention."

Yet, the opportunities for solitude and primitive or unconfined recreation occur because of the naturalness of an area, and certainly not in spite of it (Woods, 1998). Thus, allowing humans to use wilderness for these and other recreation purposes helps them experience the ecological integrity managers desire to retain and/or improve. Furthermore, support for wilderness comes from people who understand and appreciate the values it holds for society. Although many people support wilderness for its existence value, those who visit wilderness areas are more likely to know and support appropriate management actions (Watson, 1989). For wilderness managers, then, gaining and increasing support for the sometimes conflicting mandates of wilderness management and preservation requires an informed public who understands the agency and legislative goals of wilderness.

Clark and other natural resource professionals have recognized that for an area to be managed for both ecological integrity and recreational values, managers must look beyond single species or production management to the role of large-scale natural processes such as fire, wind, disease, and other disturbances in ecosystems. Similarly, managers must incorporate societal values associated with wilderness and outdoor recreation, and how they affect, and are affected by, the resource. A holistic perspective involves going beyond the traditional commodity values of natural resources (Williams, 2000) and must incorporate non-traditional and non-economic values. Within the U.S. Fish and Wildlife Service, wilderness perpetuates and expands what Clark (2000, 9) calls the "community-of-life perspective." By approaching management as dynamic and evolving, managers are able to adapt to changes brought on by both physical changes and shifts in social values.

In Okefenokee NWR, this holistic approach, and the role of fire in particular, is acutely salient. Personnel are committed to managing the swamp for ecological purposes. Specific objectives include: protection of the unique environmental qualities of the Okefenokee Ecosystem; providing optimum habitat and protection for endangered and threatened species; providing optimum habitat for a wide diversity of fish, birds, mammals, reptiles, and amphibians; and providing opportunities for fish- and wildlife-oriented recreation, interpretation, and

environmental education (Okefenokee National Wildlife Refuge guide information packet, 2001). Additionally, the swamp is a fire-dependent ecosystem. Each of its habitat types was shaped by frequent, low-intensity fires. The lack of fire in recent years has not only changed the landscape, but also how people perceive fire and other processes in the swamp. While managers agree that allowing natural processes to continue is top priority in both refuge and wilderness management, the acceptance of natural processes by visitors and locals may affect how well this priority play a role in Okefenokee management (www.okefenokee.fws.gov, 2001).

Another important issue at Okefenokee National Wildlife Refuge are the nonconforming uses allowed by the 1964 Wilderness Act. Intense debate over the designation of Wilderness - and what some thought of as the locking up of perfectly usable land - led to clauses permitting these nonconforming uses that would otherwise disqualify an area as Wilderness (Public Law 88-577). Combining wilderness designation with wildlife refuge goals creates additional issues for managing the ecosystem. In Okefenokee National Wildlife Refuge, motorboat use has long been a primary means for both managers and visitors to travel into the swamp, and such use is still permitted in portions of the Okefenokee Wilderness.

Although wilderness designation confers further protection to the swamp, it also may conflict with other legislation such as the Endangered Species Act. Refuge managers have developed Standard Operating Procedures based on the minimum tool rule (www.okefenokee.fws.gov, 2000). The use of motorized equipment such as chainsaws, airboats, and helicopters is often the only way to maintain critical endangered species habitat. In accordance with the Standard Operating Procedures, refuge staff use motorized equipment as necessary to fulfill management goals for recreational use such as trail maintenance and rescue operations (www.okefenokee.fws.gov, 2000).

When the Okefenokee Wilderness was created, established recreational motorboat use was permitted to continue in designated areas of the swamp, while other areas, mostly in the interior of the swamp, were open only to human-powered crafts such as canoes. There are approximately 120 miles of canoe trails, with 70 miles also open to motorized use. While overnight use is restricted to non-motorized travel, many day-users rent or bring small motorized boats. As Hockett, Roggenbuck and Yoder (2000) note, about 86% of visitors surveyed in 1999-2000 were day users, and most (62%) traveled by motorized crafts. For many visitors to Okefenokee National Wildlife Refuge, then, motorized use is the preferred way to see the swamp.

The 1997 FWS Organic Act recognized several wildlife-dependent recreation activities appropriate to national wildlife refuges (Public Law 105-57) – hunting, fishing, wildlife observation, nature photography, environmental education, and interpretation. Okefenokee National Wildlife Refuge must accommodate these directives while also incorporating diverse goals such as wilderness preservation, wildlife protection, habitat manipulation, and protection of endangered species. Reconciling the various laws and regulations associated with the legislation governing Okefenokee's management is difficult to say the least. Recreation use and management must be congruent with the goals, rules, and guidelines of both wildlife and wilderness management.

Need for Public Support for Management

Although public support for wilderness and natural areas is high (USDA Forest Service, 2000), it does not guarantee that visitors and non-users will support management actions laid out by wilderness and wildlife refuge legislation. Little research has been conducted in the United States to compare public and managerial or legislative conceptions of natural areas. However, Shultis (1998) examined popular and political conceptions of wilderness in New Zealand. He found that although New Zealanders supported the political conception of wilderness, their own views of what constitutes a wilderness were more congruent with a national park than a designated wilderness. Shultis (1998, 402) concluded, "Despite high levels of support, the public's equivocal image of wilderness areas may compromise future support of these protected areas." Gaining and maintaining support for wilderness and wildlife refuge values may help ensure its existence and future preservation. As Bennett (1994, 208) states, "If arguments for the protection of wilderness are to successfully compete with arguments for other uses of the land, the unique values ascribed to wilderness must be identified, defined, and promoted."

In addition, recreational visitors may know very little about the relevant legislation that permits them to use and enjoy public lands. If the public inadvertently supports inappropriate management practices and techniques, then the image of what constitutes a wilderness may increasingly diverge from legal mandates. The laws that created and subsequently determined appropriate management practices for wilderness and natural resource areas were based on cultural definitions of wilderness (Stankey, 1993). But as those cultural definitions shift to include developments, structures, and manipulations not originally conceived by wilderness legislators, managers must decide whether these evolving views are acceptable. As Dustin and McAvoy (1982) explain, if the public becomes used to more developments and impacts at recreation sites, they may accept these developments and impacts as typical and therefore appropriate. Then the integrity of those sites is compromised.

Thus, managers want visitors and non-users alike to know and understand their definitions of wildlife refuges and wilderness, and the implications of appropriate and inappropriate management techniques. Although the Discovery Channel and other mass media programs provide nature education and even environmental education, they seldom address legal definitions of wilderness and wildlife refuges, and almost never present and comment on issues of management. For visitors to natural resource and wilderness areas, this knowledge is most often available through on-site visitor education programs. Managers at places like Okefenokee use bulletin boards, signs, brochures, slide shows, and guided walks and talks are used to teach visitors not only the rules and regulations of an area, but also things such as the area's legal missions and mandates, its ecological significance, and preferred ways to manage ecological and cultural resources to achieve area mandates.

Problem Statement

Education and learning theorists suggest three types of knowledge that can be learned: information or factual knowledge, attitude-based knowledge, and holistic knowledge that incorporates larger conceptual learning and schema formation (Roggenbuck, Loomis and Dagastino, 1990). Past research shows that increasing information and attitude-based knowledge is possible through guided interpretation (Bobinski, 1985; Dowell and McCool, 1986). But little research has been conducted on the effect of guided interpretive tours on holistic learning.

Visitors to Okefenokee National Wildlife Refuge seem to lack knowledge of U.S. Fish and Wildlife Service mandates, as well as an understanding of the management techniques applied to both wilderness and wildlife refuge management. Data from a 1999-2000 research program at Okefenokee NWR suggest that visitors on motorized interpretive tours were no more knowledgeable about the swamp than those on private motorized or non-motorized trips (Hockett, Roggenbuck and Yoder, 2002). This seems quite startling since visitors on guided interpretive tours have both the advantage of a guide's knowledge about Okefenokee and the opportunity to ask questions. This becomes a problem when managers want visitors to know that Okefenokee is not a national park; that as a refuge, wildlife and habitat protection are the main goals of Okefenokee management; and that recreation is acceptable only if it is wildlife-dependent. In addition, Okefenokee is a federally declared wilderness, and, as such, management must recognize the values of naturalness, and provide opportunities for solitude and primitive recreation.

Data from the 1999-2000 research program (Hockett, Roggenbuck and Yoder, 2002) shows that while 79% of visitors knew that their boat trip was in a National Wildlife Refuge, only 48% knew that the Fish and Wildlife Service managed it, and nearly one-third thought it was managed by the National Park Service. Concerning wildlife refuge management, fully 77% of guided respondents agreed with the statement: "Managers should follow a preservation policy; they should not manipulate the environments in NWRs." Yet, nearly 37% said harvesting timber, 55% said controlled burns, and 37% said growing crops for wildlife were acceptable ways to create better areas for wildlife in National Wildlife Refuges.

Knowledge of wilderness designation and familiarity with some of the purposes and values of Wilderness were also quite low. While 65% of guided visitors said they had some or a lot of knowledge of federally designated wilderness areas, only 34% knew that Okefenokee was a Wilderness (Hockett, Roggenbuck and Yoder, 2002). Fifty-seven percent of guided visitors disagreed with the statement that unconfined recreation should be a management ideal in Wilderness Areas, while 62% of unguided visitors either agreed or were neutral about that statement. About 43% and 48% of guided respondents, respectively, agreed that rustic cabins and restrooms with flush toilets should be provided in Wilderness. Another 51% of guided visitors agreed that campgrounds accessible by car should be provided in Wilderness (Hockett, Roggenbuck and Yoder, 2002).

Additional data from the 1999-2000 research shows that many Okefenokee visitors might be considered non-typical wilderness visitors (Hockett, Roggenbuck and Yoder, 2002). Across the NWPS, the typical wilderness visitor tends to be young, male, have a higher than average income, and is well educated (Cole, 1996; Watson, Williams, Roggenbuck, and Daigle, 1992). While Okefenokee visitors also have higher than average incomes and are well educated, they tend to be much older than is typical for wilderness. For example, while the mean age for all visitors was 49 years, day visitors were slightly older at 53 years, and guided visitors had a mean age of 57 years (Hockett, Roggenbuck and Yoder, 2002). Day visitors were also more likely to be female (47%) than is typical, and 55% of guided visitors were female (Hockett, Roggenbuck and Yoder, 2002). Okefenokee visitors also tend to be day users. They do not spend the night in the swamp; indeed, 86% of respondents surveyed on a random sample of days during the high

use months from October 1999 to May 2000 were day users. Similarly, the typical Okefenokee visitor sees the swamp by way of motorboats. Of the 770 visitors surveyed in 1999-2000 (with all overnight visitors using non-motorized crafts), 62% traveled by motorboat and 37% were on motorized interpretive tours (Hockett, Roggenbuck and Yoder, 2002), reflecting the high proportion of day users to enter the swamp.

The salience of the lack of knowledge about federally designated wilderness and wildlife refuges becomes apparent when the fact that many Okefenokee visitors are considered non-typical wilderness users is considered. These are visitors who are less likely to visit and experience wilderness in other areas of the National Wilderness Preservation System. Their conceptions of wilderness likely come not from the Wilderness Act or visits to Wilderness Areas in other agencies, but from media, family, friends, and other sources. These visitors, like many Americans, likely have little exposure to wilderness or wild nature in their everyday lives (Cole, 1996a). They often have a nonpurist definition of wilderness that incorporates facilities and developments not supported by federal wilderness legislation (Shin and Jaakson, 1997). Similarly, for them, all public lands are likely seen as “national parks” and all personnel are park rangers. It is difficult to explain to someone the differences among agency mandates and values unless that person has actually visited, and learned about, the purposes of an area. Therefore, motorized interpretive tours into Okefenokee Wilderness may be the best available opportunity to provide first-hand exposure and explanation of the values and purposes of wilderness and wildlife refuges.

Information about holistic knowledge among Okefenokee visitors is nonexistent. The 1999-2000 research program only looked at factual and attitude-based knowledge, and did not ask visitors to reveal the broader themes and concepts they may have gained from their Okefenokee Wilderness experience. Past research suggests that learning is an important benefit of the interpretive experience (Ham, 1992; Ham and Weiler, in press; Roggenbuck, Loomis, and Dagastino, 1990). Because of the historical roots of leisure as introspection, contemplation, and personal development, Roggenbuck et al. (1990) wonder why the learning benefits of leisure have received little attention by managers. Similarly, thematic communication in interpretation provides enduring outcomes through the moral or message that participants’ take-home with them (Ham and Weiler in press). While measurable outcomes such as knowledge gains have been shown to increase through guided interpretation (Bobinski, 1985; Dowell and McCool, 1986), perhaps the more important outcomes are the lasting values associated with interpretive learning. As Ham and Weiler (in press) state in their analysis of cruise-based nature-guiding, “The stronger (more profound and compelling) the take-home message, the deeper and more enduring the impact interpretation will have on visitors.”

In order to address the lack of knowledge about the purposes and values of federally designated wilderness areas and national wildlife refuges, a training session with guides on the east side of Okefenokee National Wildlife Refuge was conducted. In general, current visitors to Okefenokee Swamp know little about wilderness and wildlife refuges. Moreover, results from the 1999-2000 research program shows that guided visitors are no more knowledgeable than other visitors. Indeed, most overnight and some unguided day visitors had higher self-assessed knowledge about wilderness and wildlife refuges, as well as higher knowledge about appropriate management actions (Hockett, Roggenbuck, and Yoder, 2002). By incorporating information

about appropriate management actions and techniques into the motorized interpretive tours, Okefenokee managers will be able to reach a wide audience. In particular, these interpretive tour visitors represent an audience who rarely visits federally designated wilderness areas, and who have the opportunity to experience “wild nature” in a relatively safe environment. Moreover, accessing visitors’ holistic knowledge through interviews may help managers understand the conceptual and schematic underpinnings of their knowledge of wilderness and wildlife refuges.

Objectives

This study sought to better understand the effectiveness of increasing visitor knowledge through guided, motorized interpretive programs into Okefenokee Wilderness, and a guide training session to introduce Wilderness and Wildlife Refuge purposes and values into those programs. It also sought to determine whether motorized boat tour guides could increase visitors’ knowledge of Wilderness purposes and values as stated in the Wilderness Act and wildlife refuge purposes and values as stated in the National Wildlife Refuge System Improvement Act. The specific objectives were:

- To determine the knowledge of wilderness purposes and values among Okefenokee Wilderness visitors with trained versus untrained guides.
- To determine the knowledge of wildlife refuge purposes and values among Okefenokee National Wildlife Refuge visitors with trained versus untrained guides.
- To gain insight into Okefenokee Wilderness visitors’ perceptions of the meaning of wilderness after participating in a motorized boat tour.

CHAPTER 2. LITERATURE REVIEW

Visitor versus Management Conceptions of Wilderness

Support for wilderness among the general public and Okefenokee visitors is evident. The National Wilderness Preservation System (NWPS) has grown from nine million acres of wilderness originally only in national forests to about 105 million acres of wilderness across four federal natural resource management agencies, including the U.S. Fish and Wildlife Service (Pinchot Report, 2001). Cordell, Tarrant, McDonald, and Bergstrom (1998) report that while only 44.4% of the people surveyed in the NSRE know of the existence of the National Wilderness Preservation System, 56% of all respondents felt that there is not enough designated wilderness. The survey also indicates that certain values of wilderness – protecting air and water quality, protecting wildlife habitat, protecting wilderness for future generations, and scenic beauty, for example – are also very important to the American public (Cordell et al., 1998). Examining use trends since the passage of the Wilderness Act reveals steady increases in wilderness recreation (Cole, 1996a). Cole (1996b, 5) states, “Recreation use of the original 54 wilderness areas increased 86% between 1965 and 1994.” Non-users cite other values such as existence value and aesthetic appreciation as reasons to preserve wilderness (Roggenbuck, 1990; Watson, 1989). The actual number of wilderness visitors still makes up a small percentage of the United States population as a whole, but the evidence from increasing use, increasing support from non-users, and amount of land designated as wilderness since 1964 points to support for federal wilderness areas.

The apparent gap between federal and lay definitions of wilderness, between the meaning given to wilderness by the public and the values espoused in the Wilderness Act, and between wilderness management practices and people’s knowledge of them is disconcerting (Hockett and Hall, 2000; Roggenbuck, 1990; Watson, 1989). This shared lack of knowledge among wilderness visitors signals that they are less likely to recognize and support appropriate wilderness management interventions as well as the distinction between federal wildernesses and natural areas in general. Although support for wilderness is high as evidenced by the growth of the NWPS (Pinchot Report, 2001), support does little good if advocates are not also wilderness stewards. As the Pinchot Report (2001, 3) states, “Survival of the wilderness... is dependent on the capacity of the American public to renew its commitment to the ideals of wilderness, and its willingness to ensure wilderness preservation.” One of the ways to achieve, and maintain, support is through wilderness education. The Pinchot Report (2001, 19) suggests, “A well-informed public that understands what wilderness is and is not is important in providing a mandate for wilderness and its stewardship.”

Similarly, the learning benefits of leisure activities have been well documented in recent years. Leisure learning outcomes include learning new skills, learning low impact behaviors, direct visual memory, information learning, concept learning, schemata learning, metacognition learning, attitude learning, and increases in environmental sensitivity and citizenship (Roggenbuck, Loomis, and Dagostino, 1990). In areas committed to outdoor recreation such as national parks and national wildlife refuges, learning is an important component of the recreation experience. Moreover, managers recognize the benefits of visitors who are informed on specific management topics, and often use educational programs to communicate with visitors (Roggenbuck, Passineau and Stubbs, 1993). While the learning benefits of leisure may have

been overlooked in the past, managers now realize that learning is an integral part of many recreation and wilderness visits. As Roggenbuck, Loomis, and Dagostino (1990, 120) state, “Learning is a high priority motivator for engaging in leisure activities, often following only relaxation in importance.”

But the importance that visitors typically assign to learning in a leisure setting does not guarantee that it happens. That the general public knows very little about the legally defined purposes and values of federally designated wilderness is well documented (Fly, Jones, and Cordell, 2000; USDA Forest Service, 2000). In a summary report on the National Survey on Recreation and the Environment (NSRE) (USDA Forest Service, 2000), only half of the respondents knew of the existence of a National Wilderness Preservation System. In Shenandoah National Park, Hockett and Hall (2000) found that more than 90% of visitors had low self-assessed knowledge of the wilderness land classification system and also could not name specific federally designated wilderness areas. Specific management actions in federal wilderness areas are also unknown. For example, in the Southern Appalachian Ecoregion, knowledge that such activities as timber harvesting and motor vehicle use are inappropriate in wilderness was also low (Fly, Jones, and Cordell, 2000). Roggenbuck, Widner, and Williams (1994) found that only 33% visitors knew that there were two wilderness areas in Mt. Rogers National Recreation Area. Similarly, 41% of visitors felt that rustic cabin were appropriate in wilderness, 54% felt using chainsaws to clear trails in wilderness was appropriate, and 44% felt that wells with pumps were an appropriate way to provide water in wilderness areas (Roggenbuck, Widner and Williams, 1994). Results from the National Survey on Recreation and the Environment (USDA Forest Service, 2000) indicate that 44% of respondents believed motor vehicles are allowed in wilderness, 54% believed that all National Park lands are part of the United States wilderness system, 62% believed that bicycles *are* allowed in wilderness areas, 73% believed that roads are developed in wilderness for fire protection and recreational access, and 57% believed that small cabins are allowed in wilderness for overnight visits. Thus, the purposes and values of wilderness – the issues and management goals made explicit in laws such as The Wilderness Act and in individual wilderness management plans – seem poorly understood.

One of the most striking aspects of the general public’s knowledge of natural resources and wilderness is how different it is from the knowledge of scientists, researchers, and managers. Although the official definition of federally designated wilderness and wildlife refuges is well known to managers, it appears unclear to the layperson, even those who go to wilderness areas (Hockett and Hall, 2000). Phillips, Boyle, and Clark (1998) conducted a survey of wildlife managers and heads of households in Maine. They found that wildlife managers’ knowledge and opinions on wildlife management and endangered species differed significantly from that of the general public. Vining (1992) interviewed forest managers, members of an environmental group, and members of a regional public constituency and found that in response to a hypothetical forest management problem, forest managers differed from the environmental group and the public constituency group. closely with the legal characteristics of national parks than with those of wilderness. Furthermore, Roggenbuck (2000, 15) suggests the likely new meanings of nature and wilderness in the 21st century. He states, “The new Nature of the masses is *clean, comfortable, safe, and sanitized.*” It is the Nature found at Disney and the mall, and not the Nature found in Wilderness as it was conceptualized by philosophers such as Thoreau and Muir or the politicians who created the Wilderness Act (Roggenbuck, 2000).

Okefenokee National Wildlife Refuge and Wilderness visitors are no exception. In their 1999-2000 research study, Hockett, Roggenbuck and Yoder (2002) found that only 32% of all respondents knew that Okefenokee was a Wilderness area, and 45% knew that it was managed by the U.S. Fish and Wildlife Service. Similarly, about 40% of respondents agreed that flush toilets and rustic cabins should be provided in wilderness, while 45% *disagreed* that providing for unconfined recreation should be a management ideal in wilderness. Knowledge of the appropriate purposes and values of the Okefenokee Wilderness seems to be quite low.

The Wilderness Idea

Wilderness as a land classification, however, cannot be understood without discussion of wilderness as a cultural idea. As Nash (1982) makes explicit in his seminal *Wilderness and the American Mind*, wilderness is a state of mind; it is more of an idea than anything else.

Wilderness was legally defined in the 1964 Wilderness Act, of course, but to many people the term “wilderness” carries many implications. Indeed, wilderness as an idea, like anything given meaning by a culture, is a social construction (Liebrucks, 2001). Social constructionism suggests that the way people attempt to understand social objects, as well as physical objects, is a product of their social worlds and their past experiences (Belsky, 2000). An individual’s conception of reality is colored by social interactions which, in turn, create and re-create both social institutions and personal views of things such as fashion, beauty, and nature (Liebruck, 2001). Reality (i.e., the physical, living world) itself is not constructed. Rather, it is the understanding of reality, the meanings people give to it, that resides in the realm of social interactions (Liebruck, 2001).

Wilderness, then, is a cultural resource whose meaning is dependent on the values of society as a whole; conversely, not all societies or subcultures place the same value on wilderness as America does (Roggenbuck, 1990). For example, many Native Americans conceive wilderness not as something separate from man, but a part of his existence. As Chief Luther Standing Bear (1933, 201) said, wilderness is a white man’s invention: “We did not think of the great open plains, the beautiful rolling hills, and winding streams with tangled growth, as ‘wild.’ Only to the white man was nature a ‘wilderness’...to us it was tame.” In other indigenous and third-world cultures, traditional societies literally live off the land. Designating wilderness often causes unintended problems for indigenous populations, such as taking away their main source of income and giving more power to a small, elite class (Gomez-Pompa and Kaus, 1992). In all cultures, then, the role and definition of wilderness is very subjective. As Nash (1982, 1) states, “Wilderness, in short, is so heavily freighted with meaning of a personal, symbolic, and changing kind as to resist easy definition.”

In the United States, protecting land for wilderness values is a recent phenomenon. Early advocates for preservation were an anomaly among the dominant utilitarian and product-centered conservationists. The shift occurred as wildland resources became scarcer and more people realized the value of protecting wild lands (Roggenbuck, 1990). The current values placed on wilderness are not exhaustive and not necessarily stable. As Roggenbuck (2000, 14) states, the redefinition of wilderness “appears to be less and less shaped by living on the land, or in a place, or even by science, and more and more shaped by the virtual reality of television, the mall, Disney, and now the World-Wide Web.”

The meaning of wilderness is based on its legal, political, and social classifications as well as an individual's experience with and knowledge of it. Critics of the constructionist viewpoint charge that the physical reality of wilderness is undeniable and therefore that wilderness itself is not a construction (Foreman, 2000). The constructionist counterargument is not that reality is false, but that how one sees it is a product of culture, construals, and history (Callicott, 2000). As Edley (2001, 439) states, "descriptions are seldom neutral; they are typically purpose-built for the contexts in which they make their appearance." So, it is not wilderness as a landform or a physical space of trees and animals and minerals and water that is questioned, but the language of wilderness that gives it meaning. According to Nash (1982, xii), "today's appreciation of wilderness represents one of the most remarkable intellectual revolutions in the history of human thought about the land." It is the melding together of different points of view – Romantic, Utilitarian, Biocentric, Anthropocentric – in a specific time and place with specific cultural and historical influences. Yet, very few people know the legal definitions or implications of wilderness designation.

The construction of knowledge is also influenced by factors such as past experience, prior knowledge, and social realities. Knowledge is not necessarily Truth; rather, it is a conception of what can be known. In effect, knowledge can be broken down into three components. First, there are things with an obvious right or wrong answer. Who is the president of the United States? What state is Yosemite National Park in? Knowledge is based on facts and demonstrations. As Klein and Merritt (1994, 15) state, "This type of instruction is based on a theory that students learn because teachers teach." Yet, many so-called facts are based upon one person's, or one culture's, interpretation of an event. Another form of knowledge is that which is constructed by the learner (Klein and Merritt, 1994). Like social constructivism, constructivism in educational settings says, "No one true reality exists, only individual interpretations of the world" (Klein and Merritt, 1994: 15). Thus, learners determine what they know, and meanings are ascribed by individual conceptions of that knowledge. Finally, from facts and meanings come attitudes and opinions toward certain objects. This type of knowledge is again determined by past experience and interpretation. But it also shapes how people respond to events such as management actions. As Johnson (1994, 561) states, "Knowledge frequently originates in pursuit of particular goals, and knowledge once gained, in turn, can have motivational impact." The differences in opinion knowledge among forest managers, an environmental group, and a regional public constituency described by Vining (1992) illustrate motivational knowledge. Each group has specific goals for forest management, but those goals are determined by different motivations and opinions.

For natural resource and wilderness management, then, understanding what people know, how they know it, and how they use their knowledge is important in gaining acceptance and appreciation for management goals. When visitors have little factual knowledge of appropriate management techniques that are based on science, legislation, and agency policy, they may be less likely to understand and support management actions. Similarly, visitors may have well-defined knowledge structures of their own conceptions of nature and wilderness that do not match those of managers and scientists. This lack of knowledge causes problems when visitors are unaware and inadvertently support inappropriate uses of wilderness. Ironically, that many people do not know the legal values and purposes of wilderness does not deter them from placing far-reaching meaning on the idea of wilderness (Cordell et al., 1998). Changing or increasing

knowledge goes beyond teaching objective facts to inviting learners to examine their role in natural resource management and environmental education (Klein and Merritt, 1994). Determining “correct” answers is a subjective way for managers and researchers to understand how closely visitors’ conceptions match theirs. Using knowledge tests to assess what visitors know about wilderness and wildlife refuge management only gets at one facet of visitor “knowledge.” Understanding that this visitor knowledge may be different than the knowledge of managers does not mean that it is wrong. It presents an opportunity for managers to help visitors understand why certain management actions are undertaken, and, in turn, create visitors who are aware of, and support, appropriate management techniques.

Past Education Efforts to Increase Knowledge in Natural Resource Settings

Managers agree that lack of time, money, and personnel make it difficult to reach a large number of visitors. Communication on appropriate wilderness uses, management goals and purposes, and other objectives is often accomplished with signs and brochures (Douchette and Cole, 1993). Yet signs are not always an effective way to reach visitors because many visitors either do not read the signs or only stop for a few seconds (Hockett, 2001). The use of interpretative communication is a more recent attempt to convey uses and values associated with a natural area. The content itself varies from traditional nature topics like wildlife and habitat to more holistic concepts such as the role of fire in the ecosystem. Recently, managers have turned to interpretation to increase visitor support for management actions (Ververka, 1997). But support is not a given unless interpretation is effective. Similarly, past efforts to increase knowledge of various management purposes and values have had mixed results.

In wilderness and wildland recreation settings, most research on use of interpretation to increase visitor knowledge and subsequent attitudes or behavior has addressed the following topics: reducing impacts and depreciative behavior (Oliver, Roggenbuck, and Watson, 1985; Widner and Roggenbuck, 2000); teaching low impact ethics and techniques (Cole, 1998; Cole, Hammond and McCool, 1997; Dowell and McCool, 1985; McCool and Cole, 2000; Stubbs, 1985); testing knowledge of regulations (McAvoy and Hamborg, 1984); and dispersing use from heavily-used areas (Krumpe and Brown, 1982; Roggenbuck and Berrier, 1982).

The message generally appears in the form of a written appeal either on a trailhead bulletin board, in a visitor center, or in the form of a brochure. In Great Smoky Mountains National Park, Hammitt (1984) tested the effectiveness of a signed interpretive trail in increasing visitors’ familiarity and knowledge of the content of the sign messages. He found that 73% of respondents were able to recognize the sign messages after their trip, and 90% felt the presence of signs improved their hike. Manfredo and Bright (1991) assessed Boundary Waters Canoe Area Wilderness visitors’ knowledge of regulations after registering for a permit and receiving six Forest Service brochures. They interviewed participants at put-in/take-out points and found that 41% who recalled receiving the packet changed at least one belief. They also found that prior experience mediated the effect of the brochures, with those with more experience less likely to be swayed by the message. McAvoy and Hamborg (1984) reached similar conclusions with Boundary Waters visitors living in Minneapolis/St. Paul. Their knowledge test of regulations had a mean score of 8.19 out of 10. Long-term visitors scored significantly higher, suggesting that, in some instances, past experience has more influence than educational communication.

Other studies have tested the effectiveness of widely distributed brochures in increasing visitors' knowledge of an area. Moscardo (1999) found that brochures used on large (> 100 people per boat) guided tours to the Great Barrier Reef (GBR) in Australia were not effective in increasing knowledge. Visitors in control and treatment conditions were no different in their knowledge of the GBR's designation as a World Heritage Site and Marine Park, the typical animals found in the reef, and whether certain ecosystems were part of the Marine Park. Also, many visitors had high knowledge levels of certain concepts prior to receiving the brochure.

Little research has been conducted on the effects of verbal communication to increase knowledge in wilderness settings. In frontcountry settings, rangers or uniformed personnel (Oliver, Roggenbuck, and Watson, 1985; Widner and Roggenbuck, 2000), slide shows (Dowell and McCool, 1986), and television (Fazio, 1979) have been used to increase visitor knowledge and change visitor behavior. Dowell and McCool (1986) used brochures versus a slide show to increase knowledge, attitudes, and behavioral intentions among Boy Scouts and found no differences between the two types of media. Oliver, Roggenbuck, and Watson (1985) tested three interventions to change impact behavior in a developed campground: a brochure, a brochure plus ranger contact, and a brochure, ranger contact, and a request for campers to report impact behaviors to the park ranger. The brochure plus ranger contact was significantly more effective in reducing depreciative behavior than the brochure alone, but the addition of a request for camper assistance did not increase behavior change. In four Ohio nature preserves, Olson, Bowman and Roth (1984) found that brochures and personal services such as guided hikes and off-site presentations were more effective than signs in increasing knowledge of preserve management concepts.

The use of guides and interpreters as agents of personal interpretation has also received little attention in either wilderness or frontcountry settings. At a National Park Service site, Indiana Dunes National Lakeshore, Roggenbuck and Passineau (1986) found knowledge and attitude increases after students participated in an on-site interpretive program. Children who participated in the interpretive program increased their knowledge of appropriate national park behavior as well as the history of Indians, pioneers, and fur traders in the area. There was less knowledge gain, however, on two other tests about pioneer farmers and a "Discovery Checklist" which used matching to see how well the children could integrate knowledge of different people and cultures. Both of these interpretive efforts relied on a "one-stop" shot. Roggenbuck and Passineau concluded that "park interpreters should expect greater gains on content covered more on the interpretive walk," i.e., on content that was repeated at several stops.

In a study of the effectiveness of providing whitewater raft guides with a training session to increase their knowledge and enhance their interpretation skills at the National Park Service's New River Gorge National River, Bobinski (1985) found that visitors on trips with guides who had attended a training session were more knowledgeable about New River Gorge natural and cultural history. He also found that the training session seemed to increase posttest knowledge scores of customers with inexperienced guides more than it helped guides who worked two or more previous seasons. Bobinski (1985, 81) concluded that "Visitor knowledge gains...can be highly significant, and if educating the public is a National Park Service management priority,

then results of the study suggest that guide training programs can be effective at achieving these goals.”

Partnerships across the country, particularly in river settings, reflect a growing dependence on commercial guides to provide interpretive service. Texas River Expeditions, a concessionaire in Big Bend National Park that conducts guided river trips and jeep tours, developed an interpretive guide-training manual to enhance guides’ knowledge of the area’s history, ecology, and connection to the national park (Kennon, 1999). Similarly, many natural resource agencies provide training or training materials for commercial guides. In Okefenokee National Wildlife Refuge, guides leading overnight trips participate in agency-led training. Interpreters at nearby Stephen Foster State Park also receive formal training.

Research suggests that verbal communication through guides and interpreters may be more effective than written communication. Source credibility, for example, may be enhanced by the interpreter’s ability to engage participants’ attention. Arnould and Price (1993) report that the guide plays a subtle but necessary role in creating extraordinary experiences on an extended river trip. At Kakadu National Park in Australia, visitors had more satisfaction with face-to-face interpretation because they could ask questions that nearby signs did not answer (Beckmann, 1999). On nature-based cruises, passengers describe high-quality guides as those who were passionate, enjoyable, provided new insights, provided relevant information, and presented things in a logical order (Ham and Weiler, in press). In more formal interpretive settings, guides can control several aspects that may enhance visitors’ ability to retain knowledge. They have an audience that has chosen to participate and may therefore be motivated to listen to the message. Visitor accountability may be enhanced by the fact that the visitor has chosen to participate and wants to learn about the topic at hand. Also, visitors are often given the opportunity to ask questions, which may affect their motivation, ability, and receptiveness to the message (Ham, 1996).

Using commercial guides as interpreters in natural resource settings has been called into question, though. Are guides really interpreters or do they merely fulfill the service of the company they work for by providing enjoyment to customers? Bobinski (1985) suggests that New River Gorge river guides have more contact with visitors than National Park Service employees and are indeed effective interpreters. Likewise, guides lead trips because that is what they want to do, and they often have a special passion for the resource. Parker and Avant (2000) interviewed nine outfitter/guide permittees in the Sierra Nevada area of California who described their own values of wilderness. Although individual values differed among the guides, many had common goals for the wilderness. Parker and Avant (2000, 201) concluded: “Because of their underlying wilderness values and their willingness to help maintain wilderness, these permittees could be a valuable tool in wilderness management in the future.”

Interpretation in Natural Resource Settings

Interpretation is “an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply communicate factual information” (Tilden, 1957: 8). Ham (1992) says that interpretation can be thought of as simply a special approach to communication. However, it is different from formal education in that the interpretive audience is non-captive. As Ham (1996, 13) states,

“Audiences of interpretive programs...freely choose whether to attend, and they are free to decide not only how long they will pay attention to communication content but also their level of involvement with it.” Tilden (1967) lists six principles for interpretation: 1) it must relate to what is being displayed or the visitor’s experience; 2) it is revelation based upon information, but not information per se; 3) it is an art and as such combines the art of many disciplines, 4) it is provocation not instruction; 5) it should present a whole rather than a part; 6) when presented to children, it should not be an adult program in miniature.

Ham (1992) adds the importance of a theme in environmental interpretation, which allows the interpretation to have a message and thus be easier for people to follow and comprehend. Subsequently, the listener knows immediately what kind of information she is getting and that information is more interesting because it revolves around an identified theme (Ham, 1992). For the presenter or guide, having a theme allows one to both prepare the information to be presented, and structure the presentation into a story that makes sense and is enjoyable (Tilden, 1967). Making the language of science understandable to a lay audience – interpreting the environment – also becomes more easily accomplished with a theme. As Tilden (1967: 31) eloquently states, “The interpreter who creates a whole, pares away all the obfuscating minor detail and drives straight toward the perfection of his story will find that his hearers are walking along with him – are companions on the march.” What separates interpretation from other forms of communication and education is that interpretation is designed to be pleasurable, relevant, organized, and have a theme (Ham, 1992). Indeed, good communication is the key to successful interpretation. Putting the subject into a language that listeners can understand is not always easy (Grater, 1976), and the interpreter who can relate to his or her listener has a greater chance of helping that listener retain information.

Many people on park, forest, and wildlife refuge staffs are asked to act as an interpreter. But not everyone is born a good interpreter. Lewis (1981) describes an interpreter as a member of the team of people who not only provide for the enjoyment of visitors, but also protect the resource from the people and the people from the resource. The team includes everyone from paid interpreters to maintenance workers, administrative staff, and concessionaire employees. Anyone of these members of the team will be called upon to answer questions sought by visitors. The proliferation of interpretive manuals and books illustrates that many people need training in the techniques of interpretive communication, thematic construction, and overall presentation (Grater, 1976; Ham, 1992; Lewis, 1981; Tilden, 1967). Similarly, interpretive training is not a one-time shot. It involves learning new ideas, new ways of presenting information, and developing and practicing talks and tours that will be relevant to the visitor (Ham, 1992).

Interpretation through personal communication, and specifically guided tours, is unique in that the tour guide plays a central role in creating the interpretive experience. Interpreters giving talks that stay in one place may use props and visual aids to emphasize their points, but guided tours are not stationary and the guide’s role is to gain and keep the audience’s attention while moving (Ham, 1992). Guided tours may have several advantages over other forms of interpretation. First, the guide determines the information given. While this is true in talks and even audio tours, the guided tour is more dynamic (Grater, 1976). This dynamism allows the interpreter to not have the same tour everyday because “New things constantly come to his attention...[and] anything can happen, and often does” (Grater, 1976: 39). The tour guide

manipulates the information to allow for unexpected or interesting events. While guided tours follow thematic patterns common to all interpretive communication (see above), guides encourage interaction between themselves and the audience (Ham, 1992). In contrast to signs and brochures that communicate an unchanging set of information, tours vary day-to-day, and usually tour-to-tour. Finally, guided tours promote a sense of discovery. Participants can touch, smell, look, listen and feel immersed in the natural world – things that often are not possible in a nature center or auditorium (Grater, 1976). Self-guided nature tours often have this advantage, but on a water setting such as Okefenokee, self-guided motorized boat tours are impractical. Also, interpretation through personal contact relies on two-way communication between the interpreter and the visitor; self-guided interpretation is somewhat static. Grater (1976) lists several disadvantages to self-guided interpretation: lack of personal contact with a trained interpreter, the facility cannot answer specific questions occurring to the visitor, advantage cannot be taken of the unexpected, and it does not allow the visitor to follow up on specific interests. Similarly, the water setting precludes certain types of interpretive displays and signs. Furthermore, Okefenokee's wilderness status makes electronic displays common to some self-guided tours undesirable.

Another form of interpretation is its use as a management tool. There are two ways interpretation can fulfill this role: by reducing impacts to the resource and by gaining support for management purposes and values (Hooper and Weiss, 1990). Managers use interpretation to reduce impacts through teaching a low-impact ethic (Cole, 1998; Cole, Hammond, and McCool, 1996), redistributing use (Roggenbuck and Berrier, 1982), and reducing depreciative behavior such as littering (Christensen and Clark, 1983; Oliver, Roggenbuck, and Watson, 1985), theft (Widner and Roggenbuck, 2000), and the destructive behavior of youth groups on historical military equipment (VanderStoep and Gramann, 1987).

Agencies using interpretation as a management tool must take into consideration the similarities and differences between traditional interpretive services and the goals of gaining support for specific management objectives. As Veverka (1997, 7) states, "it is first important to remember that interpretation is an 'objective based' communication process." By explicitly stating objectives, interpretation can incorporate specific information that management wants the visitor to know. But managers must be aware that, as Tilden and others make clear, interpretation is more than relaying information. Furthermore, the setting for the interpretation may affect how well it is received. Some people may want nothing more than to enjoy the scenery. Forcing interpretation down visitors' throats, especially interpretation about site problems, simply to accomplish management objectives may be inappropriate.

Roggenbuck et al. (1993) also questioned if education efforts are even reaching the right people in wilderness settings. Many wilderness visitors, particularly those with prior experience, are already very knowledgeable about both minimum impact camping and agency rules and regulations (Fazio, 1979; Manfredo and Bright, 1991). Dustin (1985) wonders if interpretation is really what managers are looking for. Compromising the creativity and intangible contributions of interpretation by making it a part of a management regime may undermine its effectiveness (Dustin, 1985). McAvoy (1985), for example, raises several concerns about interpretation as a management tool: Is visitor knowledge (or attitudes or behavior) change really evidence of good interpretation? Can we assess interpretive effectiveness with measurable outcomes? Are we

assessing the interpreter or the interpretation? As books on interpretation invariably state, it is not about spewing facts and figures, but about developing curiosity and interest (Grater, 1976; Ham, 1992; Tilden, 1967), what Rachel Carson calls a sense of wonder.

But how to evaluate that effectiveness of interpretation through personal contact is questionable. Do we look at what and how the guides present? Or do we measure the direct knowledge gains of the visitor? Evaluation is complicated by the fact that directly observing a guide's tour may bias or influence what he or she says, and how the tour visitors respond. Interpretive training must ensure that the guide gives an authentic program, and does not simply spew facts and figures. Balancing the need to convey specific knowledge-based information with the objectives of interpretation is delicate.

Determining the effectiveness of an interpretive program, then, is not an easy task. Evaluating interpretive programs can help managers determine what works and what does not, what should be added or deleted. In other words, it is a way to know what kinds of improvements to interpretation are needed (Ham, 1986). Similarly, as discussed above, measuring knowledge is not an easy task. Are we looking for unequivocal correct answers? Is there always a correct answer, or should managers look at how visitors are currently constructing nature and wilderness? If we measure simple knowledge gains, are we missing the big picture? Using knowledge gains to determine the effectiveness of an interpretive program is only one way to see changes in what a visitor knows. Other techniques such as interviews and open-ended questions allow visitors to share their story of nature and wilderness in their own words. As Seidman (1998, 1) states, "stories are a way of knowing." When people share their stories through interviews, they are giving meaning to their experiences (Seidman, 1998). Thus, looking for correct answers may be incomplete; instead, we should perhaps access the construction of knowledge.

Visitors to natural resource areas and federally designated wilderness often have low knowledge about appropriate management techniques. Using interpretation has been shown to be an effective way to increase visitors' knowledge of certain management practices in natural resource settings. Yet, all knowledge is not created equally. Accessing visitors' knowledge in several ways allows visitors to express their personal meanings and attitudes toward management, while allowing managers to understand the various knowledge structures visitors bring with them to wilderness. Thus, the following hypotheses arise:

H1a: At the completion of their boat trip into Okefenokee wilderness/wildlife refuge, visitors on guided boat tours with trained versus untrained guides will be more knowledgeable about the purposes and values of federal wilderness areas.

H1b: At the completion of their boat trip into Okefenokee wilderness/wildlife refuge, visitors on guided boat tours with trained versus untrained will be more knowledgeable about the purposes and values of National Wildlife Refuges.

While no hypotheses were developed regarding guide or guide training effect upon visitors' holistic conceptions of the meanings of wilderness-wildlife refuges and their management, the study did explore this phenomenon through in-depth interviews with a sample of guests at the end of their boat trips.

CHAPTER 3. METHODOLOGY

Study Area

Okefenokee National Wildlife Refuge is located in southern Georgia, just north of the Florida border. The refuge contains 396,000 acres of the swamp, the second-largest swamp ecosystem protected in the United States. (Only the Everglades is larger.) About 350,000 acres, or 90%, of Okefenokee is federally designated wilderness. There are seven distinct habitats: upland, forested upland, forested wetland, wetland scrub-shrub, emergent wetland prairie, floating aquatic wetland prairie, and open water (www.okefenokee.fws.gov, 2001). A variety of wildlife and birds make their home in the swamp or use Okefenokee as a migratory route. Species include black bears, beavers, otter, turkey vultures, great blue herons, egrets, and endangered species such as the red cockaded woodpecker. But perhaps the most famous of all Okefenokee's inhabitants is the American alligator.

The refuge has three main entrances, two of which provide concession services. Stephen Foster State Park serves as the portal to the west side of the swamp. Management of cabins, a campground, a small store, and guide services are contracted out by the Fish and Wildlife Service to the state park. Refuge headquarters and the other major entrance are located on the east side of the swamp, the Suwanee Canal entrance, seven miles south of Folkston, GA (see map, Appendix A). A visitor center run by the Fish and Wildlife Service and a concession-run store provide visitor services. Additionally, the concessionaire rents canoes and motorboats, and provides guided tours into the Okefenokee Wilderness. North of Folkston is another entrance, Kingfisher Landing, where no services are provided. Although it is not an official entrance into the wildlife refuge, there is also a private park featuring swamp habitat and wildlife adjacent to the wildlife refuge just outside of Waycross, GA.

Recreation activities on the refuge follow the guidelines of wildlife-dependent recreation set forth by the Fish and Wildlife Service. These include interpretation, environmental education, wildlife observation, nature photography, and fishing. Visitors are free to explore Okefenokee on foot via a series of trails, by car or bicycle, or by boat, either motorized or non-motorized. Motorized boats are only allowed on certain water trails. Canoes are allowed on all designated water trails, but must stay on those trails. All overnight users must have a permit and must camp on designated platforms. More than half of the interior of the swamp is off-limits to any recreational activity.

In an effort to reduce study expenses and focus on the guides with both the least previous interpretive training and the most visitors, only the visitors at the Suwanee Canal, or east, entrance were included. This East entrance to Okefenokee is approximately one hour from Jacksonville, FL, and is a popular day trip for Jacksonville residents. The Suwanee Canal entrance is also easily accessed from Interstate 95, and many people make Okefenokee a stop on their north-south traverse. The east side visitors were also more likely to be first-time visitors, older, and more likely to be female than west side interpretive tour visitors (Hockett, Roggenbuck, and Yoder, 2002). For this reason, the East side was chosen to participate in this study.

General Study Approach

In an effort to increase the knowledge of purposes and values of wilderness and wildlife refuges among visitors taking guided interpretive tours, this study sought to train the guides conducting the actual tours. Training guides in this manner has been shown to be effective in conveying additional knowledge to their customers. For example, Bobinski (1985) used a training session for New River Gorge river guides to increase whitewater rafting customers knowledge of the New River's natural and cultural history. In any interpretive setting, interpreter training is an integral part of both telling the story and gaining the listener's attention. Thus, visitors on guided interpretive tours were surveyed before and after the guide training session was conducted. Interviews were also conducted with some boat tour participants, but they were not separated into control and treatment groups.

Study Population

The study population included Okefenokee Adventures guides and their customers on motorized interpretive tours on the East side of the refuge/wilderness from March 2001 to May 2001. March, April, and May represent the spring high-use season at Okefenokee. Customers on guided tours are visitors to Okefenokee National Wildlife Refuge who paid to take a guided boat tour with Okefenokee Adventures.

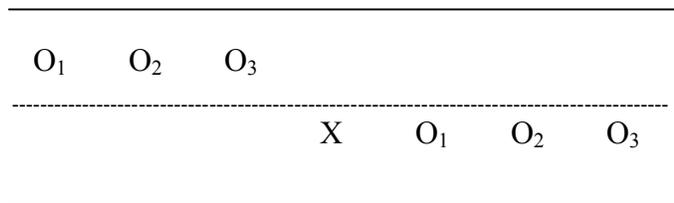
Tours run during normal operating hours, and must be off the water by 6:00 p.m. The number of people per boat tour varies considerably, from as few as one or two to as many as fourteen on one boat. Additionally, large groups such as Elderhostels or school groups sometimes made up "one" tour with multiple boats, although each boat had a different guide. In these cases, the researcher tried to connect the correct guide to each customer on the tour; if that was not possible, all guides were credited for the tour.

The guides were all employees of Okefenokee Adventures who agreed to participate in the study. Participation was encouraged by the concession owner and Okefenokee NWR, but was not required. Guides who participated in the training session were considered trained. Altogether, eight guides received training. Due to scheduling conflicts, only five guides who participated in the training session actually conducted pre- and post-treatment boat tours.

The control group included those visitors on motorized interpretive tours given by Okefenokee Adventures guides prior to a training session on the purposes and values of wilderness wildlife refuges. The guides delivered their usual program, and visitors were contacted on the boat dock by the researcher as they left the tour. The treatment included those visitors on motorized interpretive tours given by Okefenokee Adventures guides who participated in the training session. Trained guides were encouraged to deliver a program that stresses the purposes and values of federal Wilderness and National Wildlife Refuges. Again, visitors were contacted immediately after the interpretive tour.

Research Design

A quasi-experimental posttest-only design with nonequivalent groups was used to collect surveys in control and treatment conditions in the following manner:



The O's are survey collection periods and X is the training session. Each O represents a three- to four-day survey collection period for a total of ten control collection days and ten treatment collection days (see Appendix B). Data were collected between Thursdays and Mondays on six occasions during the high use season from March 2001 to May 2001. Although the author recognizes the potential biases created when data are collected on weekend days only, this was done for several reasons. First, Okefenokee NWR is accessible from several major cities (i.e., Atlanta, Savannah, Jacksonville) as well as interstate traffic along I-95. Many visitors took weekend trips to the refuge. Also, spring represents travel time for many families and students on spring break. While some visitors were obviously missed on the Tuesdays and Wednesdays when data were not collected, it was assumed that the highest amount of visitation would come on the weekends even during spring break. Finally, the author's own class schedule limited travel to and from Okefenokee to long weekends.

Quasi-experimental designs allow researchers to draw causal inferences when randomization is not possible (Cook and Campbell, 1979). They are particularly useful in field and evaluative settings where alternative variables are difficult to control. Cook and Campbell (1979, 6) define quasi-experiments as "experiments that have treatments, outcomes measures, and experimental units, but do not use random assignment to create the comparisons from which treatment-caused change is inferred." Furthermore, quasi-experiments do not assume equivalent groups, or groups may differ on variables other than the treatment effect. In essence, non-equivalent groups may have similar demographic characteristics, but "at least one characteristic of the groups is not equal in absence of a treatment effect" (Cook and Campbell, 1979: 148).

Random assignment of treatment to groups was not possible or desirable either for the guides or for the customers on each trip for several reasons. The study participants, instead, represent a convenience sample of Okefenokee NWR visitors. First, as mentioned above, guide participation was voluntary. Guides often had other obligations or jobs and could not guarantee their involvement would stay the same throughout the study or that they would be able to attend the training session. Also, Okefenokee Adventures is a small company with a somewhat high turnover rate. Several guides quit or were fired and new guides hired during the time of the study. Most importantly, one of the goals of the training session was to expose the guides to information *they* did not previously know. Randomly assigning guides to control and treatment conditions would have been futile. Similarly, it was assumed that only training certain guides would be ineffective because trained guides could share information with untrained guides. The hope was that the training session would be the first step in getting all guides to share information on the purposes and values of wilderness and wildlife refuges with Okefenokee visitors.

Visitors were also not randomly assigned to treatment or control groups. First, the researcher had no control over who signed up for a tour, or when they took the tour. Indeed, many people

simply booked a tour in person and were on the water within minutes of arrival. Generally, only large groups booked in advance. People took the boat tours in groups with family and friends and it was infeasible to separate them. Finally, guides conducted tours on a rotating basis according to who was working that day, who arrived first that morning, and who had seniority. Although there was not a set schedule, tours often left every 45 minutes, and often at least one guide was already giving a tour as another one left.

Treatment

The guide training session took place in two parts: a classroom session where the researcher and Okefenokee National Wildlife Refuge employees conducted training on the purposes and values of Wilderness, wildlife refuges, the role of fire in the swamp ecosystem, and management at Okefenokee; and a field session that stressed principles of interpretive communication and included a mock boat tour.

The training session took place on March 29 and 30, 2001, after nine days of control group data collection had been completed. The classroom session took place in the Okefenokee National Wildlife Refuge administrative building. The evening was chosen to allow Okefenokee Adventures to conduct a full day of business. The researcher and two Okefenokee NWR employees facilitated this portion of the guide training. Agenda topics included (see Appendix E):

- Introduction
- What is a National Wildlife Refuge?
- What is a Federally Declared Wilderness?
- Okefenokee: A Wilderness Wildlife Refuge
- Natural Role of Fire
- Key Points to Leave with the Visitor

The guides were also given several handouts that reiterated the main points of the training session (see Appendix E).

The information used in the classroom training session was based on information available from Okefenokee NWR, the Arthur Carhart Wilderness Training Center, and other wilderness and wildlife refuge management texts and videos. For example, overnight guides into Okefenokee Swamp must participate in refuge training sessions. Material from those sessions was used for the Okefenokee Adventures guide training. Material was also available on the Okefenokee NWR website (www.okefenokee.fws.gov). Several Okefenokee NWR employees contributed their knowledge of wilderness, wildlife refuges, and fire, and led parts of the training session. The Arthur Carhart Wilderness Training Center, a federally run training center that provides information for teaching in and teaching about Wilderness, was an excellent source of information. The Carhart Center provides free training materials and information on various aspects of Wilderness and Wilderness management. Finally, a video was shown to convey the historical context of wilderness preservation.

The second day of training covered interpretive techniques and tour guiding, and included one hour of information on interpretation for the tour guide, and a two-hour mock boat tour. An environmental education specialist was brought in to conduct this part of the guide training

session. Like the classroom session, the environmental education specialist facilitated the first part of this session in a semi-structured fashion. Agenda topics included (see Appendix F):

- Introduction
- Role as a Tour Guide
- Beyond “Hosting”: What do you actually do as an interpreter and tour guide?
- Additional Resources
- Critiques

The mock boat tour served two purposes. First, it allowed guides to practice using the information conveyed during the training sessions. Second, guides were able to give and receive feedback about incorporating desired topics into the boat tour, using interpretive techniques to make the boat tour more effective, and to test efforts to make the boat tour informative but not overbearing. One guide was chosen to actually conduct the mock boat tour, but all guides were encouraged to make comments, ask questions, and clarify what information should and should not be included in the boat tour. The environmental education specialist continued to serve as the facilitator for this part of the training, but the researcher and Okefenokee Adventures owner were available for assistance.

Data Collection Instruments

Surveys

The on-site survey/ knowledge quiz consisted of 22 questions related to content of the interpretive tour (see Appendix C). The questions were designed to reflect knowledge about the purposes and values of Wilderness and Wildlife Refuges based on information relayed to guides during the training session. The questions fell into five categories: wilderness, wildlife refuges, fire, Okefenokee management, and wilderness wildlife refuges. Some demographic data was collected (age, gender) for comparative purposes. Additionally, visitors were asked how many times they had been to Okefenokee, if they took motorboat or canoe trips on previous visits, if they took a guided tour on previous visits, how far they traveled to get to Okefenokee, how familiar they were with the purposes and characteristics of both wildlife refuges and federally declared wilderness, and if they had been to the refuge visitor center prior to taking the boat tour.

Interviews

In addition to the surveys, short interviews were conducted with some interpretive tour visitors. No one completed both the survey and the interview. For this study, the interviews are used to gain a more in depth understanding of the way visitors constructed the meaning of wilderness in general and of Okefenokee specifically. Visitors were asked about their perceptions of the uniqueness of Okefenokee compared to other natural areas, if they considered Okefenokee a wilderness area, and what features they use to distinguish a wilderness area from other natural areas (see Appendix D). The interviews also allowed visitors to state their enjoyment of the boat tour, to express the values of wilderness in their own words, and the value of this type of wilderness trip. This allowed the researcher to understand how so-called non-typical wilderness visitors construct the term wilderness. The interviews together with survey results provided an understanding of the range and extent of knowledge of the purposes and values of Wilderness

and Wildlife Refuges. There was no effort to draw conclusions about control versus treatment groups based upon the interviews.

Data Analysis Procedures

Surveys

Independent samples t-tests and analysis of variance (ANOVA) were used to look for differences between control and treatment group scores on the knowledge quiz. Chi-square tests were also used to analyze non-parametric data when necessary.

Interviews

Interview respondents were able to articulate their likes and dislikes about the boat trip, what they thought was most interesting, what, if anything, made Okefenokee more special than other natural areas they had visited, if they thought Okefenokee was wilderness, what a wilderness area “looks” like, and whether or not prescribed fires were appropriate in wilderness areas. The interviews are used to highlight individual conceptions of wilderness as well as the quality of the boat tour regardless of control or treatment condition.

Analysis of the interviews, then, was not an attempt to cover the depth and range of wilderness meanings Okefenokee visitors ascribe to federally designated wilderness. By including the interviews in the data analysis, the author wishes to showcase some visitor conceptions of the boat tour itself as well as how wilderness visitors define the term wilderness in their own words.

The actual analysis of the interviews was based of the constant comparative method of qualitative data analysis described by Merriam (1998). It involved reading interview transcripts several times to find categories based on participants’ answers for each topic, or “recurring regularities in the data” (Merriam, 1998: 180). Next, themes that emerged for each category were identified. These themes are used to highlight the similarities among visitors’ responses to interview questions. While this analysis does not go beyond categories and themes to theory development, it does provide a basis for interpretation of the interview data (Merriam, 1998). This basic level of analysis allows the researcher to describe the data in narrative format (Merriam, 1998).

CHAPTER 4. RESULTS

Surveys

Background Variables

A total of 150 respondents in the control group, and 183 respondents in the treatment group completed the knowledge survey. The average age for visitors in both control and treatment conditions was older than the typical wilderness visitor (Table 1). Visitors in the control condition were, on average, older than those in the treatment condition

Table 1 – Age Distribution of Respondents*

	Control	Treatment	Significance
Age	54.3	49.6	.018
N	150	183	

*t-test, $p < .05$

Comparisons of gender distributions show that, on average, there were more female than male visitors at Okefenokee NWR during the study period (Table 2). This is also higher than the average for typical National Wilderness Preservation System visitors. Chi-square analysis shows that there were no significant differences between treatment and control for percent of male and female respondents.

Table 2 – Percentage of male and female respondents

	Control	Treatment	Total
Male	43.8	42.3	42.9
Female	56.3	57.7	57.1

For approximately 75% of visitors in both control and treatment conditions, the guided interpretive tour was their first boat trip into Okefenokee Swamp (Table 3). Chi-square analysis reveals no significant differences between treatment and control.

Table 3. Previous visits to Okefenokee NWR

	Control %	Treatment %
1st boat trip in Okefenokee Swamp	73.8	76
N	150	183

About 80% of visitors in the control condition and 70% of visitors in the treatment condition said they had some knowledge or knew a lot about the purposes and characteristics of National Wildlife Refuges (Table 4). Chi-square analysis shows no significant differences between the two groups.

Table 4. Percent of respondents stating familiarity with purposes and characteristics of National Wildlife Refuges

Familiarity with purposes and Characteristics of National Wildlife Refuges	Control (N)	Treatment (N)
not familiar	4.1 (6)	8.8 (16)
know a little	16.2 (24)	21.4 (39)
some knowledge	62.8 (93)	57.1 (104)
know a lot	16.9 (25)	12.6 (23)

Stated familiarity with the purposes and characteristics of federally designated wilderness areas was slightly less than that of National Wildlife Refuges. Seventy percent and 65% of control and treatment visitors, respectively, felt they had some knowledge or knew a lot about the purposes and characteristics of federally designated wilderness areas (Table 5). Chi-square analysis shows no significant differences between the groups.

Table 5. Percent of respondents stating familiarity with purposes and characteristics of federally designated wilderness

Familiarity with purposes and characteristics of federally designated wilderness areas	Control (N)	Treatment (N)
not familiar	6 (9)	12.7 (23)
know a little	22.8 (34)	21.5 (39)
some knowledge	60.4 (90)	56.4 (102)
know a lot	10.7 (16)	9.4 (17)

Knowledge Variables

Responses to each question asked on the visitor survey are broken down by percent correct as well as overall percent for each answer choice. “Correct” answers were determined by the researcher based on definitions of wilderness and wildlife refuges from sources such as the Wilderness Act, the National Wildlife Refuge System Improvement Act, Okefenokee National Wildlife Refuge Management plan, wilderness researchers, and wilderness and wildlife refuge managers. Although the author recognizes that the “correct” answers on the knowledge test do not reflect visitor conceptions of wilderness and wildlife refuge meanings, it was necessary to establish an objective measure of right and wrong answers. Table 6 shows the overall percentage of correct answers by control and treatment groups for survey questions 10-29, the 20 knowledge items on the survey. Table 7 shows how many people identified each activity as allowed in National Wildlife Refuges, while Table 8 shows how many people identified each facility as appropriate for Wilderness areas. Tables G-1 to G-20 in Appendix G show the individual breakdown of answers for the control and treatment groups, as well as the overall total for all respondents. Answers that were coded as correct are italicized. T-tests reveal that there were no

significant differences between control and treatment scores for any of the individual survey/knowledge quiz questions.

Table 6. Percent of correct responses to knowledge questions by control and treatment groups

	Control (N = 150)	Treatment (N = 183)
Why is Okefenokee swamp special?	89.1	87.7
Federal wilderness areas are protected to:	90.7	87.7
What is the purpose of a wildlife refuge?	82.6	77.9
Okefenokee Swamp is a:	93.9	97.1
Why can fire play a natural role in Okefenokee Swamp?	45.3	37.4
Managers of wilderness areas:	43.1	48.6
Okefenokee Swamp is managed by:	46.8	51.2
Forest fires in Okefenokee Swamp:	76.4	75.7
Motorboats are allowed in federally designated wilderness areas:	33.8	33.1
In a National Wildlife Refuge:	55.1	52
Forest fire has the following values for Okefenokee Swamp:	72.2	70.4
Most of Okefenokee Swamp is managed:	97.3	94.4
Federal wilderness has the following characteristics:	54.7	61.5
Prescribed fires:	95.9	92.8
Wilderness areas:	95.8	90.3
If people are quiet in the swamp:	95.2	91.1
Okefenokee Swamp is a:	80	86.6
In a wilderness wildlife refuge:	34.5	34.3
Wildlife refuges provide for:	90.1	86.1
These kinds of opportunities are found in wilderness wildlife refuges:	89.9	83.4

Table 7. Percent of Respondents identifying activities allowed in National Wildlife Refuges

Which of the following activities are typically allowed in a National Wildlife Refuge?	Control	Treatment
Mining	1.4	0
<i>Fishing</i>	65.5	72
Swimming	16.2	14.8
Mountain Biking	20.4	14.8
Motorboating	22.5	32.4
Horseback Riding	19.7	15.4
<i>Hunting</i>	9.2	7.1
<i>Nature Photography</i>	92.9	95.1
<i>Environmental Education</i>	92.9	97.3

Table 8. Percent of respondents identifying facilities provided for in federally designated wilderness

Which of the following activities are typically provided for recreationists in federally designated wilderness?	Control	Treatment
Rustic Cabins	21.1	20.9
<i>Walking Trails</i>	90.1	90.1
RV Campgrounds	10.6	10.4
Flush Toilets	23.9	28.2
Picnic Areas	60.6	60.4
Scenic Roads	44.4	35.2
Bike Trails	35.2	25.8
<i>Horse Trails</i>	24.6	19.2
<i>Backcountry Campsites</i>	59.9	56

The overall scores and average for the control and treatment conditions indicate that although the treatment group scored slightly higher on the visitor knowledge survey, a t-test shows that there was not a significant difference between the two groups (Table 9). Scores ranged from 4 to 25 out of a possible 27 correct answers for the control group, and from 8 to 25 for the treatment group. Indeed, the group averages, or percent of questions answered correctly, was the same for treatment and control at 64%. When scores are compared by gender, men did score significantly higher than women in the treatment condition (Table 10).

Table 9. Scores and Averages on Visitor Knowledge Survey

	Score	Average (%)
Control	17.3	0.64
Treatment	17.5	0.64

Table 10. Scores for Visitor Knowledge Survey by gender

	Control (N)	Treatment* (N)	Overall* (N)
Male	17.9 (63)	18.1 (77)	18 (140)
Female	17.2 (81)	16.9 (105)	17.1 (186)

*significant, t-test $p < .05$

When the scores on the visitor knowledge survey are broken down by individual guide, they indicate that there were no significant differences between control to treatment conditions. ANOVA analysis also shows no significant differences among the visitors' scores with different guides within either the treatment or control groups (Table 11).

Table 11. Scores on Visitor Knowledge Survey by Guide

	N (control)	Control	N (treatment)	Treatment
Guide 1	38	17.8	46	17.8
Guide 2	24	18.5	36	17.3
Guide 3	25	16.3	45	16.9
Guide 4	6	16.7	10	16.5
Guide 5	3	14	2	18.5
Guide 6*	9	18.1	17	18.5
Guide 7	1	18	1	14
Guide 8*	11	18		
Guide 9*	5	14.4		
Guide 10			11	18.5
Guide 1 & 2			9	17.7
Guide 1 & 6	17	17.1	5	17.4
Guide 3 & 6	10	17		

*Guide did not participate in training session

Scores on the knowledge survey were also compared for the six guides who conducted tours in both the control and treatment conditions and participated in the guide training session (Table 12). A t-test revealed no significant differences between the mean scores of visitors in either the control or treatment group with these six guides.

Table 12. Scores on Visitor Knowledge Survey for Guides who Participated in Training Session

	Control	Treatment
Score	17.8	17.8
N	38	46

Visitors were asked if they had been to the Okefenokee NWR visitor center *on this visit* prior to taking the guided interpretive tour. While 68% of respondents in the control group said they had been to the visitor center, only 58% in the treatment group went before taking the boat tour (Table 13). Chi-square analysis revealed no significant differences, however. The visitor center had recently been remodeled, and the new exhibits provide information on Wilderness and the role of fire in Okefenokee NWR. This may have been a confounding factor to the effect of the actual treatment intervention. Table 14 indicates significant differences between visitor scores in the treatment conditions for those who had gone to the visitor center before taking the guided boat tour versus those who had not. Table 15 shows visitor scores on the knowledge survey by whether or not the visitors said they had been to the visitor center and by which guide they had. Several guides had significant differences between scores for the visitors who had and had not been to the visitor center in the control condition.

Table 13. Percent of respondents who went to visitor center prior to the boat tour

Went to visitor center before boat trip	Control (N)	Treatment (N)	Total (N)
Yes	68.1 (98)	58.5 (107)	62.7 (205)
No	31.9 (46)	41.5 (76)	37.3 (122)

Table 14. Overall visitor knowledge scores by visitors who did or did not go to the visitor center

	Visitor Center		Significance*
	yes	no	
Control	17.7	17.3	0.442
Treatment	17.9	16.9	0.031

*t-test, $p < .05$

Table 15. Visitor scores on Knowledge Survey by visitor center visit and guide

	Control (N=150) visitor center			Treatment (N=183) visitor center		
	yes	no	significance*	yes	no	significance*
Guide 1	17.7	18.7		18.5	16.8	0.063
Guide 2	18.8	18		17.5	16.8	
Guide 3	17.2	12	0.032	17.4	15.7	
Guide 4	18	14	0.003	16	16.6	
Guide 5	14			18.5		
Guide 6	17	18.7		19.4	17.4	
Guide 7	18			14		
Guide 8	18.3	16.5				
Guide 9	19	17.5				
Guide 10				18.8	18.2	
Guide 1 & 2				18	17.3	
Guide 1 & 6	17.1	17			17.4	
Guide 3 & 6	17.5	18.1				

*t test, $p < .05$

In summary, results indicate that there were not significant increases in scores on the visitor knowledge survey as a result of the guide training session. Although there were some differences between visitors of a few guides who had been to the visitor center prior to taking the guided interpretive tour versus those who hadn't, between male and female respondents in the treatment condition, these do not merit a conclusion that other relevant variables may have masked a positive treatment effect. A discussion of this lack of change, and several recommendations for future research, are found in the implications and conclusions section.

Interviews

The interviews revealed several key ideas about the importance of federally designated wilderness to Okefenokee NWR visitors who took guided boat tours. A total of 27 visitors were interviewed over the two-month study period. Like the survey respondents, most ($n = 17$) had been to the visitor center prior to taking the guided interpretive tour. However, while visitors were asked if they had been to the visitor center at the beginning of the interview, it most likely did not remain salient to the conversation. Respondents were immediately asked about the likes and dislikes of the boat tour itself, as well as about anything the guide said that was particularly interesting. There were very few dislikes about the boat tour, but comments did include that the tour did not go far enough into the swamp and that the engines were distracting to the natural experience. The likes were numerous and diverse, but several themes emerged. First, most people liked the peace of nature. Respondents described the setting itself as well as parts of their

experience in nature with words such as “peaceful”, “pristine”, and “quiet”. As one woman (#17) said, “I just liked being out in nature, just enjoying the peace and quiet and seeing different things that I don’t normally see.” Second, many people enjoyed the learning aspect of the boat tour. To some visitors, it was informative and educational: “...(the guide) pointed out a lot of things...just drew our attention to things we wouldn’t have noticed otherwise” (Male, #27). The most mentioned like, however, seemed to be the value of the guides themselves. Regardless of which guide, time of day, or month, nearly every respondent had something positive to say about the guide. Descriptions ranged from entertaining and informative, to one woman’s (#3) explanation of the gleam in her guide’s eye: “He has a wonderful light. And when he talks, he just, you know, he just loves it.” Another respondent said the guide made the trip: “I think a lot of guides and stuff that are good bring out the best in an area” (Male, #15).

When asked if anything the guide said was particularly interesting, responses again ran the gamut of answers. Several people declared that it was all interesting, or that there was not one thing that stood out. For example, one man (#5) thought it was all good: “Everything was interesting, I mean[the guide] was very good...we asked him a lot of questions and he took the time to stop and answer them.” Another respondent (Male, #21) said, “I couldn’t tell you anything that wasn’t interesting...it’s all fascinating!” Others, though, mentioned specific topic-related information such as the history of the swamp, seeing wildlife, Indians, and vegetation. One man (#12), for example, mentioned vegetation: “He told us a lot about the vegetation, the things that you could eat and things like that. So I thought that was pretty interesting.” Another theme was that of the entertainment value of the boat tour, including the guide’s background, stories and jokes, and folklore: “I thought [the guide] had quite a bit of folklore about the swamp...it’s the kind of stuff you don’t read in books” (Male, #13).

Many respondents mentioned the natural environment when asked if there was anything that made Okefenokee special. In particular, the swamp itself sets Okefenokee apart from other natural areas. Several respondents said this was the first swamp they had visited. It was also different from the typical natural area with mountains and forests: “We’ve been to a lot of national parks and everything, but this is a swamp so it’s completely different from where, you know, where we’ve been” (Female, #3). Okefenokee was also compared to another swamp, the Everglades, by a few people who had been there. One woman (#22) said that Okefenokee was different because it was more diverse: “We were just in the Everglades, but the boat tours there, the vegetation on the side is so dense and so uniform that you just don’t see the variety you do here. And that prairie where it opens up and you can see great distances is particularly interesting.” The theme of Okefenokee’s diversity was also repeated by several respondents: “You’ve got the swamp and you’ve got the dry islands and the prairie, but it changed as we went along” (Male, #13). Finally, many people said that Okefenokee is unique in its own way and not because it is any more special than other natural areas: “I mean it just stands out because it has its own beauty. I think every place, though, has its own beauty or has its own specialness...” (Female, #4).

After discussing the boat trip and Okefenokee’s qualities, respondents were asked if they thought Okefenokee was wilderness. Most said yes (n = 20) and elaborated on why they said it was wilderness, but a few said that it was not wilderness (n = 7). First, those who said that Okefenokee was a wilderness gave reasons ranging from the way it looks to its lack of

civilization and commercialization. The major themes that developed in this section included lack of people/civilization, presence of animals and wild nature, and the natural appearance of the landscape. The majority of interview respondents said that lack of people and lack of civilization is what made Okefenokee a wilderness. One woman (#4) stated:

“Well, you can tell it’s...untampered. I mean us even cruising in a little bit, I mean it’s obviously...you don’t have hordes meandering along...so it’s quiet. You can tell that the wildlife are undisturbed, I mean, it does not appear that man is tampering with...some sort of...I’m trying to say the absence of man or the absence of the presence of man.”

Several people also mentioned specific symbols of civilization, such as McDonald’s or Disney World, or other sights and sounds that are now part of everyday life: “...you don’t get out there and find a concession stand at the end of the trail...the fact that you can’t see anything else, you can’t see the road, you can’t see cars, you can’t see houses or telephone poles or billboards or anything, it’s just complete nature” (Female, #17). Many people said that seeing animals and wild or untouched nature made it a wilderness. One respondent said, “...there’s lots of animal life, and what we’ve seen was pretty spectacular” (Male, #15). Similarly, the natural appearance of the landscape was important to the wilderness aspect of Okefenokee. For example, one man (#19) said, “Everything’s natural. I mean there’s nothing...nothing artificial. Natural plants and flora and fauna and animals, a very non-touristy feeling.”

The presence of human activity was the major reason stated for those who did not think Okefenokee was wilderness. Themes included the boat tour activities and closeness to civilization. Several respondents felt that going into the swamp on a boat excluded it from being wilderness: “...because we’re on a boat going out in it. That’s not wilderness. I mean, it is if we’re not there, but when we get there, we’re there so it changes everything” (Male, #2). Another group of respondents felt that the sights and sounds of civilization were still too close for the area of the boat tour to be considered wilderness: “When he [boat guide] said we were going into the wilderness, it didn’t seem very far from civilization” (Female, #23). Another man (#6) said:

“I usually think of wilderness as where there aren’t too many people. Maybe deeper into the swamp, but where we are, probably not...I’m not enough of an outdoors person to know a lot about wilderness, but I just think where you give tours and all that it’s not quite what I would think.”

Another respondent (Female, #14) said that seeing too many people made the boat tour not a wilderness trip: “The area we toured, not really because there was a lot of traffic. And I would hope all the other area is untouched and that would be wilderness.”

For all respondents, regardless of whether they felt Okefenokee was a wilderness, the defining characteristics of a wilderness area fell into roughly three categories: the absence of people/human habitation, its physical characteristics such as size, remoteness, and vegetation, and its protection from development. First, many visitors felt that a wilderness is a place where people are not: “this would be [a wilderness] if we weren’t allowed to go in it” said one man (#2) in reference to his boat tour into the swamp. Similarly, the fact that an area looks like it has not

been touched by humans makes it a wilderness: "...wilderness is something that is not, that has not been treaded by man, let's put it that way. It's something that man has not come through" (Female, #3). Second, respondents used physical descriptions to define a wilderness area: "...woods and wildlife and that kind of thing" (Male, #12). Finally, many people said that protecting a natural area from development, and subsequently not having commercialization, makes it wilderness. One respondent stated, "It's the least modification possible...without denying humans access" (Male, #11)

Respondents were asked if they thought prescribed fires should be allowed in wilderness areas. Answers fell into four categories: those who felt like they did not know enough to say one way or the other, those who disagreed, those who agreed because managers think it is a good idea, and those who agreed because it is good for the ecosystem. Some respondents felt that prescribed fires were incompatible with wilderness or not a good idea in general. One man stated, "...I guess when they said they were controlling fires, that seemed incompatible. The natural state would be the fires should burn and I guess it seems if they're under control, then it doesn't seem to be wilderness." From what they read at the visitor center or heard on the boat tour, some people felt that managers knew what is best for the ecosystem. One woman (#1) said, "From what I read at the visitor center, it's a must. So, I mean, who am I to tell people who really know what they're doing? Obviously they know far more than I do!" Others felt that prescribed fires are necessary part of ecosystem processes: "...it's the only way you can maintain the areas that you need because if you don't, you may go 30 years with no forest fire and then a drought comes along and you get a fire that destroys everything massively. If you do it every so often, you don't lose that growth" (Male, #2). Indeed, one woman (#22) said in reference to fires in the swamp, "You're at a disadvantage because I've read all the brochures and seen all the information on how very important that is!"

Finally, respondents were asked about the personal relevance of this particular visit to Okefenokee NWR. Again, answers covered nearly every possible reason, but fell into four broad, and often overlapping, themes: get back to nature/get away from stress, see something new, spend time with family/ have fun, and just stumbled across it. Almost everyone said that coming to Okefenokee was a way to enjoy nature. One man (#18), for example, said, "I like the outdoors is the main thing. The trees and everything that's out here. You're always looking, seeing something new." There were several first-time visitors to Okefenokee who came specifically to see a new environment: "I'm from Colorado so it's absolutely thrilling for me to be in environments that are totally different from my home landscape. And this is a really novel place" (Female, #22). Many people were taking a day trip from a nearby city and wound up at Okefenokee as "a relaxing way to spend an afternoon" (Female, #23). One woman (#14) was "hoping that my kids will get a feel of what nature is like and preserve it for future generations." Finally, several respondents said they saw a sign and decided to come: "Actually, we just stumbled across it. I didn't even know where the Okefenokee was" (Male, # 12).

Discussion of Interviews

Interviews revealed that visitors to Okefenokee NWR are able to articulate their views of wilderness and the role of fire in the swamp, as well as integrate recently acquired information into their construction of knowledge. While visitors' self-assessed familiarity of the purposes and values of federally designated wilderness was most often a little or some knowledge, the

interviews revealed that many visitors had a highly developed conception of what constituted Wilderness and what a Wilderness Area looks like. Furthermore, many of these conceptions quite closely matched definitions of Wilderness put forth in the Wilderness Act and used by managers and researchers. Similarly, the role of fire was often accepted as an inevitable part of the ecosystem. Although the recognition that natural processes such as fire are necessary for an ecosystem to function in a healthy manner is relatively recent for managers and researchers alike, it is already accepted by many of these visitors.

Wilderness Meanings

Researchers and managers often fear that visitors have a conception of Wilderness that does not match their own. However, as stated above, three themes emerged in the way interview respondents defined Wilderness regardless of whether or not they felt that Okefenokee was a wilderness. First, there was the absence of people/human habitation. The Wilderness Act (Public Law 88-577) states, “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” Woods (1998, 134) also explains, “The use of the word ‘untrammelled’ then denotes the opposite of a human-dominated landscape: the nonhuman forces of nature are to be given free rein in wilderness.” For several Okefenokee visitors, this is almost exactly how they described Wilderness. For example, one woman (#1) said, “I live in a relatively large city so...this is so much different than what we see everyday...Like when you go out on the trails and you don’t see anything but nature. I’ve been to places where highways run through it...Things like this [are wilderness]. This is just a beautiful landscape.” Another respondent (Male, #9) put it more succinctly: “Nobody lives out here and it’s protected.” Thus, some Okefenokee visitors seem to agree with researchers, managers, and wilderness legislation that a Wilderness is where people are not.

Next, respondents used the physical characteristics of a place to describe it as Wilderness. Again, the 1964 Wilderness Act also uses physical criteria such as size and natural features to define Wilderness. Specifically, the Wilderness Act (Public Law 88-577) describes Wilderness as an area “which generally appears to have been affected primarily by the forces of nature,...has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” Nelson (1998) provides 30 arguments used for wilderness preservation, including several which recognize the unique physical attributes of Wilderness. For example, in “The Standard of Land Health Argument,” Nelson (1998, 170) states, “In order to serve as measure of land health...designated wilderness areas must be large and varied; for there are many distinct types of biotic communities.” For several interview respondents, these physical characteristics were the reason why Okefenokee, and other areas, are Wilderness. One woman (#3) said: “I think it’s something kind of overgrown...the natural, you know, trees and plants. Wilderness is something that has not been treaded by man, let’s put it that way.” Another respondent (Female, #14) said Okefenokee was a special place because of its size: “I like the fact that it’s a big area, the size of the swamp. It is more of a complete area, a balanced habitat than just having a smaller habitat.” Like legislation such as the Wilderness Act, some Okefenokee visitors use characteristics like size, remoteness, and natural features to define Wilderness.

For other Okefenokee NWR visitors, an area's protection from development is what makes it wilderness. According to the Wilderness Act (Public Law 88-577), wilderness areas are administered "for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character." Early wilderness advocates such as John Muir, Aldo Leopold, and Robert Marshall called for areas to be set aside from the ever-encroaching development that defined America. In a poetic passage, Muir (1901, 50) claims:

None of Nature's landscapes are ugly so long as they are wild; and much, we can say comfortingly, must always be in great part wild, particularly the sea and sky, the floods of light from the stars, and the warm, unspoilable heart of the earth, infinitely beautiful, though only dimly visible to the eye of the imagination."

Leopold revealed the eye of the imagination to a broader public with his calls for wilderness preservation. He imagined wilderness preservation on a continuum that "[varies] in degree from the wild, roadless spot of a few acres...to wild, roadless regions approaching in size a whole national forest or a whole national park" (1925, 77).

Some interview respondents had similar criteria for Wilderness. For one woman (#7), "Wilderness is an area that's protected and not commercialized." Several people compared Okefenokee to places that were more developed. For them, Okefenokee represented Wilderness because of the lack of buildings and Disney-like features. One respondent (Male, #12) said, "Well, it's not a resort, you know...That's what keeps it so peaceful." Another respondent (Female, #16) said, "No McDonalds! No trash floating around, no noise. At one point (the guide) turned off the boat and it was just amazing how quiet and peaceful it was." These responses imply that the Okefenokee Wilderness, and wilderness in general, is not something with developments and commercialization. As one man (#25) simply states, "Well, it's a national wilderness preserve, so I guess by definition it has to be [wilderness]." Wilderness, for many interview respondents, is an area that is preserved in a wild state.

Wilderness, it seems, is not as foreign to the layperson, at least in this small sample, as managers and researchers thought. While the interview respondents may not use the sophisticated language of legislation such as the Wilderness Act or of writers and philosophers such as Muir and Leopold, they are able to articulate what a Wilderness is and is not. Moreover, visitors' conceptions of Wilderness are very similar to the conceptions of managers and researchers. However, it is difficult to know if the wilderness of the interview respondents refers to federally designated wilderness. As Hockett and Hall (2000) found, only 13% of respondents at Shenandoah National Park were judged as knowledgeable about federally designated wilderness. When asked to name specific Wilderness areas they had been to, most respondents named one wilderness area and one nonwilderness area, or only named areas that were nonwilderness. Hockett and Hall (2000, 126) concluded, "Managers might conclude that their visitors are experienced, and therefore knowledgeable about policy, behavior or regulations, when in fact they are not."

The Role of Fire

Over the last 20 years, scientists and managers of natural areas have begun to recognize the benefits of fire to the ecosystem. While fire was suppressed on public lands for most of the 20th Century, the last decades brought the realization that the lack of fire caused more harm than good (Parsons, 2000). In Wilderness ecosystems, the restoration of natural fire regimes is difficult. As Parsons (2000, 276) states, “Prescribed fire is considered by some to be inappropriate manipulation of wilderness, yet, continued suppression can be expected, in many cases, to increase levels and homogeneity of hazardous fuels, change successional patterns and increase the threat of wildfire to surrounding areas.” In the Okefenokee Wilderness, managers struggle with the role of both natural ignition fires, and prescribed burns used to restore certain habitats (Okefenokee National Wildlife Refuge Guide Information Packet, 2001). Two of the goals of fire management at Okefenokee NWR that affect the Wilderness are to: replace historic fire seasons and frequencies with prescribed fire to restore and maintain longleaf pine community habitats throughout the refuge, and restore habitat diversity throughout refuge wetlands making use of prescribed and natural fire as it occurs.

Interview respondents were asked if they thought prescribed or managed fires should be allowed in wilderness. For many respondents, fire was a good and necessary part of the ecosystem. Like scientists and managers, these visitors felt that fire represents a natural process and should be used to help restore habitats. Although managers often worry that the public is consumed by media messages on the destructiveness of wildfire, these visitors seemed to recognize that prescribed fires are okay. One man (#23) put it this way: “Normally fires are necessary for wildlife, for the growth of new plants. Fires are a natural process. In the wilderness situation, that is. At my house it’s different!” Another respondent (Male, #27) had experience with prescribed burns in another part of the country: “The same thing works on the prairies of Wisconsin... You’ve got to have fire to keep it natural, part of the process.” Several respondents thought prescribed fires are okay because they trusted the managers to know what they are doing. One man (#21) thought natural ignition fires were inevitable. When he was probed about prescribed fires, he said: “I think that’s fine because these people obviously know what they’re doing and why. So I don’t have a problem with that at all.”

The question about the role of prescribed fire in the Okefenokee Wilderness also highlighted the new information that visitors integrated into their knowledge of fire. Some respondents, for example, specifically said they learned about the role of fire from their guide: “(The guide) was telling us about that today... and I don’t know enough about it to think, but he way saying some of the advantages of fire. He seemed to think it would be very useful, so I’m all for it” (Female, #23). Others had read about it at the visitor center or in brochures. One respondent (Female, #1) said, “From what I read in the visitor center, it’s almost a must... They explain (fire) in pretty good detail, and I could see why they would have to do that.” Although this does not represent knowledge gained during the boat tours, it does suggest that visitors are able to understand and integrate new information presented to them in a natural resource setting.

Not all interview respondents agreed that prescribed fires were acceptable in Wilderness, of course. But those who did showed an understanding of the role of fire that was congruent with what managers and scientists believe. In Okefenokee, this is an important finding because of the emphasis on prescribed burns for the swamp ecosystem. Indeed, according to Parsons (2000),

“...the FWS relies almost entirely on prescribed fire to accomplish wilderness management objectives.” Since 90% of the swamp is Wilderness, it is crucial that managers maintain support for these prescribed burns.

Implications for Knowledge Survey

The interviews were aimed at providing a richer and deeper understanding of how visitors make sense of their Wilderness boat tour. Yet, they also provide a glimpse at what is missed with traditional quantitative survey methods. Although the interviews were rather short (approximately five minutes each), many respondents mentioned new information gained from the boat tour. Sometimes the information was a fact such as how many bird species live in the swamp, but often the information was more nuanced, at least when the visitor repeated it during the interview. While the interviews were not designed to ask respondents about specific knowledge they learned on the boat tour, they reveal that visitors do pay attention to what is being said and understand some of the complexities associated with managing a natural area. However, many interview respondents said they took the boat tour for fun and entertainment, which may mean any learning benefits were secondary to enjoyment. It is possible that scores on the knowledge quiz reflect this enjoyment component of the boat tour, and not what visitors are truly capable of learning.

CHAPTER 5. CONCLUSIONS and IMPLICATIONS

Limitations of the Study

As the results indicate, there was no significant change in the construction of knowledge about the purposes and values of wilderness and wildlife refuges as a result of the treatment intervention. There are several possible explanations for this lack of change.

The inclusion of a pretest for both the treatment and control groups would have increased the validity of the research design. According to Cook and Campbell (1979, 102), a series or pretest observations help establish inference that “the introduction of a treatment was not associated with extreme values in the pretest.” Without a pretest, there is no way to know whether either group had high levels of knowledge before taking the guided interpretive tour. Thus, the effects of the treatment intervention cannot be inferred (Cook and Campbell, 1979). Introducing a pretest, however, has its own issues. Respondents who have seen a pretest instrument may be cued to listen for correct answers, or they may simply do better on the posttest because they have seen the material before (Babbie, 1995). Furthermore, a pretest was not feasible due to the often short amount of time between visitors signing up for a boat tour and taking the tour.

Another factor was that the concessionaire used in the study, Okefenokee Adventures, was new to Okefenokee National Wildlife Refuge. The concessionaire for the 1999-2000 study (Hockett, Roggenbuck, and Yoder, 2002) relinquished its permit in the summer of 2000. All but one of the guides were new, as well. Observation and communication by the author with the owners of Okefenokee Adventures indicate that they were committed to sharing information about wilderness, wildlife refuges, natural processes of the Okefenokee ecosystem, and an enjoyment of the outdoors with their customers. While this does not guarantee that all guides will have the same knowledge and commitment, the concession owners monitored in-house guide training and encouraged guides to share similar information. Perhaps the guides’ knowledge base was higher than anticipated, and the training session did little more than reiterate already known concepts.

Guides were also encouraged to make their stories personal, and many guides shared information that was unique to their own experiences in Okefenokee. Thus, each guide had somewhat different information to give, and each trip was different in some aspect from every other trip. While all guides were given the same information during the training session, they were also encouraged to keep the story interesting and fun. For many guides, this meant including aspects of the “routine” that was already familiar to them. As a result, it appears that changing the story guides were accustomed to giving was more difficult than anticipated. While evidence from the interviews indicates that visitors found the guides to be one of the most enjoyable features of the guided interpretive boat tours, this does not help us understand what knowledge was or was not gained during the boat tour. The guides are as much a part of the study subjects as the visitors themselves. Future research using interpretive tour guides should take into consideration guides’ experience levels as well as how they already construct their interpretive story. Actually testing the guides by giving them the knowledge survey both before and after the guide training session would have helped us understand what they knew prior to the training session, as well as any information gained as a result of the training session.

Because of the differences in guides' stories and communication styles, it was difficult to account for information conveyed during each boat tour. Several techniques were discussed, but none proved appropriate, at least for this study. Using anonymous monitors on each boat tour, for example, was not feasible both for expense and personnel reasons. The distance to the study site and time of year prohibited the use of undergraduate research assistants. Similarly, using the same monitor or monitors on all boat tours was not realistic. First, boat tours were staggered throughout the day, and two or more boats were often on the water at the same time. While one research assistant did accompany the author to Okefenokee on several occasions, she could not be on every boat tour. The author was occupied with handling surveys and conducting interviews and also could not regularly monitor the boat tour program. Finally, using the same monitor for each tour may have changed the guides' message. If the guides were aware of being watched and their content checked, they may have delivered a very different program. This may have made inclusion of information from the training session more pronounced, of course, but it also violates the nature of interpretation and the dynamism of guided tours.

The researcher attempted to determine the specific topics each guide talked about during his or her boat tour. After each boat tour, the guides were given a list of topics, including some that were to be covered during the training session. They were asked to circle any topic they talked about on the tour. After doing this for several days at the beginning of the study, the researcher noted that the guides were circling nearly every topic for every boat tour. It was difficult to determine whether the guide merely mentioned the topic, or actually discussed it at length with his or her customers. These checklists were determined to be ineffective in light of this fact. One option not tried in this study was the use of tape recorders or cameras. Placing a recording device in a strategic location on the boat to capture the guide's interpretation would provide researchers with the actual content of the program without being too intrusive. Problems with this method, however, include noise from the boats, the inability to capture some visitors' comments, and technical problems associated with any electronic device.

Perhaps the short-term nature of the evaluative procedures did not do justice to visitors' knowledge of the purposes and values of wilderness and wildlife refuges. As many researchers have noted, any evaluation, in this case the knowledge survey, is nothing more than a snapshot of a person's knowledge at that moment (Van Tilburg, 1987). There are always extenuating factors in a field setting than can affect both how well visitors attend to the message and the evaluation instrument itself. On the boat tour, for example, people are interested in seeing wildlife and other parts of nature, and are not necessarily paying attention to the guide's story. Similarly, an extraordinary event can cause the boat tour to focus on one aspect of the story for the entire trip. While people choose to participate in the guided boat tours, they are not required to listen to things that do not interest them. For many visitors, taking a boat tour Okefenokee National Wildlife Refuge is nothing more than an enjoyable way to spend an afternoon.

Not all boat tour participants agreed to fill out the survey. The author's observations indicate that the people most likely to not fill out the survey were families with young children, those who had a set agenda at the refuge such as Elderhostel participants, and those who had very little time to spend at Okefenokee. Extenuating factors during the evaluation process included an outdoor setting with factors such as weather and other people, and people filling out surveys together (i.e., husbands and wives). As Wagar (in Hammitt, 1984: 12) points out, "interpreters

often put far too much faith in the changes resulting from a 30-minute encounter. Educators have long recognized that it may take years of sequenced experiences to achieve some results.” Perhaps the interpretive tours actually made visitors unsure of the “right” answer. The guides may have fostered increased thought on subjects such as wilderness, wildlife refuges, and the role of fire in the swamp ecosystems, leading visitors to wonder where they stand on such issues, and, thus, what their “knowledge” truly is. Furthermore, understanding these issues, particularly for people who are novice natural resource and wilderness visitors, takes more than a two-hour interpretive tour. The tours may have a long-term effect that cannot be captured in a snapshot survey. Follow-up surveys and interviews may be necessary for researchers to recognize the long-term knowledge retention of interpretive tour participants.

The training session for the interpretive tour guides was another possible factor in the lack of change in visitors’ construction of knowledge. Although the two components of the training session spanned approximately six hours, this is merely a small step in educating guides on the purposes and values of wilderness and wildlife refuges espoused by the Wilderness Act, the National Wildlife Refuge System Improvement Act, and other laws and legislation. Many interpreters spend four or more years obtaining a college degree based on the principles and practices of natural resource interpretation. A six-hour training session cannot be expected to do more than expose guides to facts and concepts they may not have known. Past research has shown that short training interventions may be effective in increasing visitor knowledge (Bobinski, 1985), at least immediately after the interpretive program, but few studies have been conducted to assess long-term construction of knowledge by either guides or visitors. Future training interventions should consider multiple training sessions for guides. Similarly, managers should provide training and educational materials to all guides who interpret the resource under their command. Effective interpretation relies on managers and guides who are committed to bringing in new ideas, and not simply repeating the “story” that has worked for the past 20 years.

Implications for Future Research

The lack of a positive increase in knowledge of the purposes and values of wilderness and wildlife refuges for visitors to Okefenokee National Wildlife Refuge has several implications for future research. First, the tenets of persuasive communication are important for effective changes in attitudes, beliefs, and behavior to occur. Persuasion has many similarities with interpretation, particularly in field experiment settings and where interpretation is used as a management tool. Also, researchers and managers must be aware of visitors’ prior knowledge and involvement with the resource. Creating effective messages begins with understanding where the visitor is coming from. Finally, it is important to understand how increasing knowledge by means of interpretation helps managers reach visitors and improve the resource.

Persuasion has been used for millennia to change people’s attitudes, knowledge, beliefs, and behavior. In recreation settings, this translates into influencing visitors through direct techniques such as rules and regulations or indirect techniques such as education and interpretation (Roggenbuck, 1992). While regulations are necessary to both protect the resource and enforce legislative mandates, managers are turning to more indirect techniques of visitor management to communicate resource issues, reduce noncompliant or depreciative behavior, and increase

visitors' knowledge. Indirect techniques allow more visitor freedom and may reduce pressure on already stressed management budgets.

Persuasive communication is the use of a verbal or written message designed to influence a person's beliefs, attitudes, and behaviors, often through a process of reasoning (Ajzen, 1992). There are several routes to persuasion including coercion, subliminal cues, conditioning, and subterfuge (Ajzen 1992), but the most commonly used path in recreation follows the principles of the elaboration likelihood model (Roggenbuck, 1992). According to the elaboration likelihood model (ELM) developed by Petty and Cacioppo (1986), the sustained effects of persuasion are the result of the cognitive process of elaboration. In this model, two routes to persuasion are possible. In the peripheral route, persuasion results in little cognitive processing; instead people are influenced by cues irrelevant to the message itself and only short term changes occur (Fazio, 1979; Manfredo and Bright, 1991; Petty, 1995). The peripheral route to persuasion recognizes that people can process only so many messages at a time (Petty, 1995). The ability to process the message is based on motivation, involvement, and desired outcomes. As Ajzen (1992, 13) states, "When the message has few implications for enduring values, for important outcomes, or for self-presentation, it produces little motivation to carefully deliberate its contents." Factors such as source credibility and attractiveness may influence processing, but often people rely on heuristics, or peripheral cues, instead of thoroughly considering the message (Ajzen, 1992). In recreation settings, and particularly with interpretive services, the absence of motivation to pay attention to the message will result in the visitor choosing to leave the situation in body or in mind.

The central route, on the other hand, is characterized by high motivation to pay attention to the message content, high ability to process the information, acceptance of the message arguments, and the skill to act upon these arguments (Roggenbuck, 1992). Additionally, several studies (Manfredo and Bright, 1991; Roggenbuck and Berrier, 1982) suggest that prior experience plays an important role in how effective persuasive communication is. Visitors with little prior experience, and thus low prior knowledge and attitudes, are more likely to be influenced by persuasion. However, visitors with more knowledge or experience will be able to process the message more effectively (Srull, 1983). As Srull (1983, 572) states, "Quite simply, greater prior knowledge should facilitate the subsequent learning of new information." Thus, while visitors with little prior knowledge must be motivated to pay attention to the message, those with more prior knowledge must be given strong arguments if managers wish to increase or change their beliefs. In the present study, estimates of prior knowledge of visitors was based on results from an earlier study (Hockett, Roggenbuck, and Yoder, 2002). Future research should consider what the current population knows by collecting pretest information for at least some of the visitors in each treatment condition.

High motivation to pay attention to the message content is the first step to the central route to persuasion. This is affected by factors such as personal relevance, prior knowledge, source credibility, and accountability. As Petty (1995, 210), suggests, "When the personal importance of an issue is high, people are motivated to scrutinize the information in a message." Similarly, source credibility influences whether the message is received or dismissed (Ajzen, 1992). Credibility is linked to attractiveness, or how well the source is liked. As car salesman around the world can attest, the power of liking is very strong. Attractiveness, similarity, compliments,

and contact affect how well a source is liked (Cialidini, 1993) and thus how credible it is. For in-person communication this is very important. Accountability of the receiver also plays a role. The less the listener shares responsibility with others, the more he or she is likely to feel personally responsible for the message (Petty, 1995).

Next, the ability to process the message must be present. People literally receive hundreds of messages each day and can only truly process a few of them. Irrelevant and weak messages will be lost in seconds (Roggenbuck, 1992). Repetition is beneficial as long as it is not so often that people get tired of hearing the message (Petty, 1995). Accepting the message argument follows motivation and processing. As Roggenbuck (1992, 173) states, "If arguments are weak, the message will be rejected and pre-existing positions and behavior will be reinforced." Finally, the skill to act upon the argument is necessary for change in beliefs and behavior to occur. When these factors are present, people are active receivers who integrate and construct available information (Ajzen, 1992). The central route, then, requires receivers to elaborate on the information presented in such a way that cognitive processing determines the direction and degree of change in attitudes, beliefs, and behavior (Ajzen, 1992).

Implications for Management

For guided interpretive tours, the lack of increases in visitors' knowledge of the purposes and values of wilderness and wildlife refuges may be related to several principles of the ELM. First, there was likely a mismatch between the message and the processing level of the recipients. Content in the guide training session emphasized five to six main points to be covered in the interpretive tour. Yet, Ham (1992) and others (Grater, 1977; Tilden, 1967) suggest covering no more than two or three main points in an interpretive program. The message itself was perhaps too in-depth and/or complex for the visitors to fully elaborate on. Other factors such as noise, wildlife, and other participants acted as distractions to elaboration. Short of changing the visitors to guarantee they will listen to the message, the solution to this lack of processing is to change the message itself. This, of course, begins with the guide training session. Understanding what the guides already know and how they present their program is crucial in developing a training program that will be effective. The training session must not only incorporate principles of interpretive communication, but also principles of persuasive communication so that guides will first process and accept the information they are given. Then the message given to participants is more likely to reflect the information managers want visitors to know.

In a model recently developed for educational purposes, the Cognitive Reconstruction of Knowledge Model (CKRM), Dole and Sinatra (1998) propose that changing knowledge has as much to do with what the learner already knows as it does with how the message is formed and received. The CKRM is based on existing models of persuasion and knowledge change, including the ELM, but it takes into account the factors associated with learning in a classroom environment, as opposed to the more pure persuasive context of the ELM. It also looks at cognitive processing as a continuum from low cognitive engagement to high metacognitive engagement: "Individuals' processing of a message is not an all-or-none phenomenon, even if they are motivated to process the message (Dole and Sinatra, 1998: 121). Following educational constructivism, the CKRM recognizes that a person is an active participant in the construction of knowledge (Dole and Sinatra, 1998). Thus, knowledge structures are more than objective facts. Similarly, changes in knowledge take time: "Substantial change does not occur quickly, and

relatively stable intermediate states of understanding exist for some time before new concepts are fully formed” (Dole and Sinatra, 1998: 112). While interpretation in a field setting is different from teaching in a classroom, many of the issues addressed in the CKRM can be applied to developing messages for interpretive services. Dole and Sinatra (1998, 120) suggest, “that a message must be *comprehensible* and *plausible* to a particular individual.” Furthermore, like the ELM, the CKRM says that individuals must be motivated to process the message. But motivation does not equal immediate cognitive change. The lack of change in knowledge by boat tour visitors could signal not a failure of the guide training and subsequent interpretation, but too short a time period to measure any real change.

Moreover, a new metaphor for many teaching settings has been “teaching as persuasion.” Teachers realize that persuasion is more than simply getting someone to do what you want. According to Fives and Alexander (2001, 242), “Educators want to influence, change, or enhance the minds and motivations of their students...in effect, teachers want to persuade their students toward learning.” Like all persuasion, teaching relies on source credibility, strong arguments, an understandable message, and the listener motivation to process the given information (Petty and Cacioppo, 1986; Murphy, 2001). And similar to the ELM and CKRM, teaching as persuasion recognizes that learners do not come into a situation with a blank slate. As Murphy (2001, 224) states, “What students bring to the learning process affects what they can gain from the educational experience.” For interpretation, then, this metaphor requires interpreters and managers who support interpretive services to recognize the influence of the past on visitors’ present motivations to partake in interpretation.

Indeed, this is not a completely new objective for interpretation in natural areas. As Ham and Krumpe (1996, 13) suggest, “Design of an intervention strategy should begin with a clear recognition of the problems or threats to a person’s protected values that are to be addressed through interpretive programs.” This is only possible when managers know visitors’ prior experience and knowledge, as well as what visitors want to get out of the interpretive program. As people make sense of the world around them, they draw on past experiences. Similarly, understanding what is being interpreted, whether it is identifying trees or conceptualizing the interrelationships of the ecosystem, is also shaped by what someone already knows. As Moscardo (1999) found in her study of an interpretive brochure for visitors to the Great Barrier Reef in Australia, the brochure was not very effective in increasing knowledge because visitors already had a high level of knowledge. She states, “This reinforces the need for interpretive designers to investigate existing levels of knowledge in target audiences before completing interpretive tools or services” (Moscardo, 1999: 34). For Okefenokee NWR visitors in this study, existing knowledge was not measured. A better understanding of these prior knowledge levels would have helped the development of training materials, and what new information the guides should incorporate into their programs. Future studies should consider visitor knowledge levels prior to any sort of interpretive or treatment intervention an integral part of the research plan.

As stated above, prior experience may also affect involvement in that those persons with more experience are more likely to pay attention, or process, the message (Johnson and Eagley, 1989). Johnson and Eagley (1989, 293) define involvement as “the motivational state induced by an association between an activated attitude and some aspect of the self-concept.” Moreover,

people with prior information are able to draw on past experiences and make quick judgments, and are less likely to be persuaded by weak arguments (Johnson, 1990). Similarly, if a message has a high level of personal relevance, it is more likely to be effective (Manfredo and Bright, 1991). For people with little prior experience, however, “messages might have a greater influence on low-rather than high-knowledge subjects because the new information receives relatively more weight for low-than for high-knowledge subjects” (Johnson, 1990: 559). Thus, it is important to determine what level of involvement and how much experience or knowledge visitors bring with them. For Okefenokee NWR wilderness visitors with little knowledge about the purposes and values of wilderness or wildlife refuges, strong messages should change their knowledge base. However, if some Okefenokee NWR visitors on guided boat tours already have a high amount of prior information, and a high level of involvement, the message must be designed to cover new material and not repeat already known concepts. It is important for managers and researchers to regularly determine existing knowledge levels through various methods (interviews, open-ended questions) when providing interpretive services. Additionally, interpretation is dynamic. Manipulating the message to suit audience needs creates the potential for more effective training interventions in the future.

Moreover, educating guides with high levels of knowledge and prior experience with the resource must go beyond a one-shot training session. Changing the beliefs of the guides may be particularly difficult because of their involvement and attachment to the resource. Several Okefenokee Adventures guides, for example, grew up in and around the swamp, and have extensive family histories that precede the establishment of the Wilderness or Wildlife Refuge. Therefore, managers who want guides to reflect management purposes and values of wilderness and wildlife refuges must present strong arguments to convince guides of their appropriateness. As Petty (1995, 204) states, “...when people are actively thinking about the message arguments and evaluating them, their own evaluative thoughts are a more important determinant of attitude change than is their ability to learn and remember the exact information presented.” Guides, then, are less likely to process arguments that are weak. When they have the motivation and ability to evaluate an argument, the guides may change their own knowledge structures to include purposes and values already known to managers.

In wilderness settings, like other recreation settings, changing a person’s knowledge requires understanding prior knowledge and experience and how it affects attitudes, behavior, and beliefs. Attitudes are based on affect and behavior, but they also have a cognitive, or belief, component (Petty, 1995). While many attempts have been made to influence visitors’ affect and behavior in natural resource settings, attempts to change knowledge have been less frequent. As Petty (1995, 196) states, however, “The advantage of attitude change over behavioral compliance is that when people’s internalized attitudes are changed, they will presumably chose to engage in consistent behavior even if the person who brought about the attitude change is not present.” The three components of attitude – beliefs, affect, and behavior – are connected but may also be formed, and accessed, separately. Furthermore, the underlying role of attitudes is as a basis of knowledge (Petty, 1995). Thus, changing the attitudes of visitors through persuasive communication and interpretation can enhance not only what they know, but also their feelings and behaviors, and subsequent support for appropriate management actions and the purposes and values of such things as wilderness and wildlife refuges. Once sparked, an interest in wilderness and wildlife refuge purposes and values may last a lifetime.

What This Means in the Grand Scheme of Things

On a warm Sunday afternoon in early spring, the breeze is softly blowing the new leaves on the oaks and redbuds while the lives of the cypress and long-leaf pine are announced through the songs of their inhabitants. A great blue heron lifts his wings in a silent swoop that says “Welcome to my world.” An alligator glides quietly through the still waters to a sunny spot on the edge of the bank. Children’s voices cry out in wonder and amazement at the alligator’s size and commanding presence. This swamp is hers.

Soon the quiet hum of a motor can be heard through the accord of sounds. An interpretive boat tour is returning. As the guide directs the pontoon boat into its slot at the boat dock, he can be heard telling the same joke he’s told to a thousand other visitors. But they all laugh and smile and thank him as they get off the boat. They have been down the Suwanee Canal and out to Chesser Prairie where the water lilies are beginning to bloom, the herons and egrets and sandhill cranes are nesting and feeding, and the alligators make no attempt to hide the fact that this swamp is where they belong.

These visitors are soon convinced to fill out a survey about the boat tour they just took. Several fill it out quickly, without asking questions or wondering what it means. Others, however, take their time and think about what the questions ask. They wonder if there is a right answer for some of the survey items. They contemplate what their guide just told them and what they thought they already knew. They are told to choose the answer that, in their opinion, is the best one. They ask if they were supposed to learn the answers to these questions on the boat tour, because, if so, their guide didn’t mention any of this stuff.

These visitors took a tour with a guide who had participated in a guide training session the week before. He attended both the classroom and field sessions, and was very interested and talkative during both. He wanted to know more about Wilderness, about why certain activities are not compatible with it and what he, as a tour guide, could tell people who wondered what was so special about Wilderness designation. He was also curious about fire in the swamp. Why don’t managers let natural fires burn? Why do they do controlled burn with helicopters in the Wilderness? Why *hasn’t* there been a fire in so long? Will a fire be more likely because of the years-long drought?

This guide, like many of the other guides, grew up in the swamp. He came fishing here with his Dad and now brings his own kids here on his days off. He has stories that span generations, of swampers long gone who helped log much of the Okefenokee swamp and then built homesteads on the cleared land. He can tell you about Indians and how they trapped an alligator, and about explorers and how they lived off the land. His accent is thick and sometimes hard to understand, but it makes him more authentic to the visitors. Whenever a group comes off his boat tour, they say, “He was wonderful!”

As the interviews suggest, visitors had an enjoyable and informative experience on the guided boat tours at Okefenokee National Wildlife Refuge. While the interview results are not a reliable measure of the general population’s ideas, meanings, and experiences, they do suggest that some knowledge was gained as a result of the boat tours. As one woman (# 14) stated, “...we asked a

lot of questions about the wild animals in the area and we got a lot of... understanding of the habitat.” Others were able to articulate the importance of fire in the Okefenokee ecosystem because of the information the guides shared with them. One respondent (Female, #23) mentioned what her guide said about fires: “He was telling us about that today... I mean he was saying some of the advantages of fire... He seemed to think it would be very useful, so I’m all for it.” Even for people who had been to the refuge before, the boat tour was interesting and instructive. One man (#27) referred to a previous visit: “It’s only improved since I was here 25 years ago... There’s a little more here to bring the family to... and it was interesting and educational.” The interviews permitted some visitors to provide a richer description of their Okefenokee Wilderness experience, allowing meaning- and opinion-based knowledge that is often missed in traditional surveys to surface.

The surveys measured mainly one realm of knowledge: that based in facts and right or wrong answers. While some of the survey questions dipped into meaning- or opinion-based knowledge, all answers were marked as correct or incorrect. The visitors themselves wondered if they *had* to choose a “right” answer. They often wanted to know what their score was. If they got something wrong, they wanted an explanation for why the right answer was correct. Ultimately, visitors on guided boat tours were never given a chance to “show their stuff,” to demonstrate what they may or may not have learned from the boat tour.

But were they even there to learn? Although survey respondents were not asked about their motivations to come to Okefenokee or take a guided boat tour, evidence from the interviews suggest that, for many people, the visit was simply an enjoyable way to spend an afternoon. Yet, what is the definition of enjoyable? Is it escaping the troubles and worries of the work-week? Is it seeing alligators and other wildlife in a natural setting? Can learning about new things be enjoyable? Do these, or any natural area visitors for that matter, even care what the guide says as long as they are having a good time?

Talking to both survey respondents and interview participants in an informal manner reveals more about people’s knowledge and motivations than any survey question could hope to do. Survey respondents were given a bounded set of questions to answer, ones that attempted to measure what the guides told them on the boat tour. From the survey the results, it appears that the guides were unable to increase even basic knowledge such as “Who manages Okefenokee?” But the comments and interviews from visitors on guided boat tours tell another story. This is the story not of changing or increasing knowledge, but of getting people to think in a new way, a way that integrates many aspects of the boat tour experience. In an article entitled “The Light Which Experience Gives,” Watson (1995) talks about the value of interpretation. He states, “Interpretation, which is a process that is not based upon the delivery of facts, makes it easier to take the questioner beyond the ‘what’ question... Beyond the ‘what’ questions is the much more intellectually challenging ‘why’ question” (1995, 9).

As Watson (1995) and other interpreters (Grater, 1976; Tilden, 1967) claim, interpretation is much more than teaching facts and right or wrong answers. Interpretation is “revelation based upon information” (Tilden, 1967: 12). Information, facts, and knowledge are a component of interpretation, but they do not make up the crux of the message. The interpretive message should inspire thinking and create new opportunities to explore. It should produce experiences that

people can reflect on. As Watson (1995, 10) says, “When we are looking for meaning in things, we are interpreting what we experience.” As people draw upon their experiences, they integrate their perceptions of that experience into what they know and believe.

What this means, of course, is that the survey results don’t go near the deeper why questions. Expecting the boat tour guides to teach their visitors over twenty fact-based answers to the knowledge questions was perhaps too ambitious. Instead, we should expect visitors to be able to talk about their experience, to tell us not the who and what, but the why. Why did they come to Okefenokee? Why is a boat tour important to them? Why do they care about the swamp and the alligators and Wilderness? Why not sit at home and watch football from the comfort of your own couch?

As the interviews show, boat tour visitors were able to expound on many “why” questions. Although a few specifically mentioned the learning aspect of the boat tours, most respondents only alluded to it. However, the ability to process information, to go beyond facts and correct answers was evident in many of the interviews. For example, these visitors had well-developed conceptions of Wilderness whether they thought of Okefenokee as one or not. In their own words, they talked about the duality of wilderness and how letting people in somehow takes away from the wilderness itself. Most likely they have not read the Wilderness Act. They probably have not read John Muir or Aldo Leopold or Henry David Thoreau. Yet, they know why there is wilderness and why wilderness is different from other areas. They know that a wilderness is a special place because it protects wildlife and habitat, and it cannot be tampered with. So what if only 47% percent of survey respondents know that Okefenokee is managed by the Fish and Wildlife Service? Perhaps the real test should be to see if visitors know why there are national parks, national forests, and national wildlife refuges, and not just one land management agency.

Regardless of these visitors’ motivations to come to Okefenokee – whether it was to have fun, relax, see alligators, or learn about wilderness – they took away an experience. Interpretation is not about producing generic visitors who can list agency mandates and objectives. Although interpretation can be used as a management tool, it must be done carefully. It is more important to have visitors who, as one interview respondent said, come here for “a reminder of what I should commit to help preserve the areas we haven’t already overpopulated” (Male, #2). Once visitors discover “how what they are learning fits into the world around them” (Watson, 1995: 9), they can draw their own conclusions about what kind of knowledge they want and need. By providing interpretation, managers are fostering an informed public that will support and understand appropriate management techniques and values associated with wilderness and wildlife refuges.

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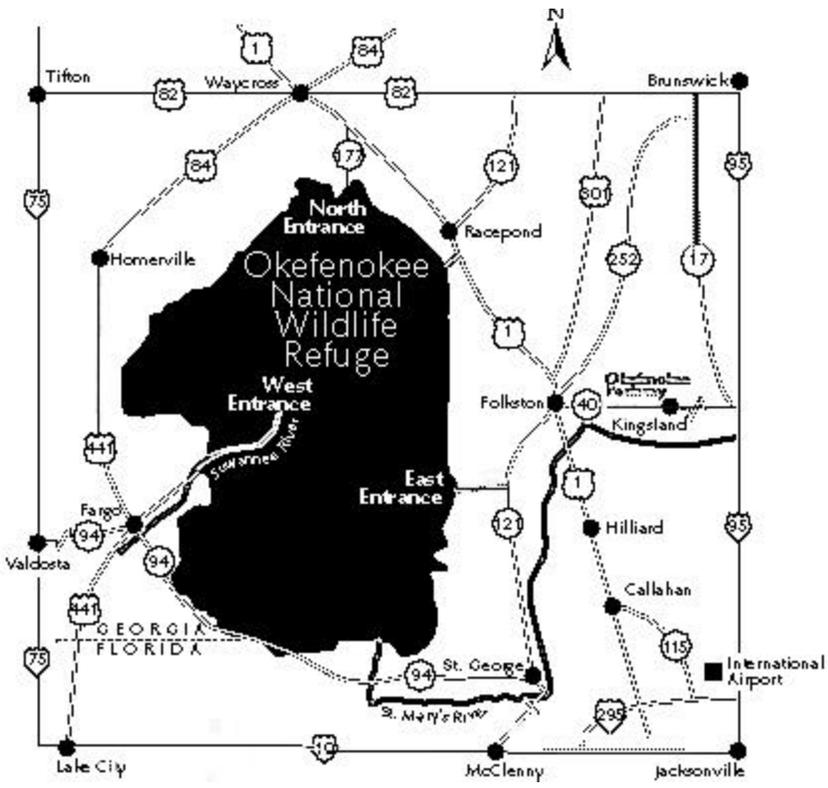
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APPENDIX A: OKEFENOKEE NATIONAL WILDLIFE REFUGE MAP



APPENDIX B: SAMPLING DATES

Dates Sampled March-May 2001

Control:

O₁ – March 3, 4, 5

O₂ – March 9, 10, 11

O₃ – March 23, 24, 25

Treatment:

O₁ – March 31, April 1

O₂ – April 20, 21, 22

O₃ – May 3, 4, 5, 6

Training Session:

March 29 & 30

APPENDIX C: OKEFENOKEE SWAMP SURVEY



Okefenokee Swamp Survey

1. Was this your first boat trip into Okefenokee Swamp?
 Yes (please go to Question 6).
 No (please continue to Question 2).
2. How many times have you traveled by boat in Okefenokee Swamp before this trip? _____
3. How many of these trips were day-use versus overnight in the swamp?
_____ number of day trips
_____ number of overnight trips
4. How many of these trips were by motorboat or canoe? _____ number by motorboat
_____ number by canoe
5. How many of these trips were guided versus non-guided trips?
_____ number of guided trips
_____ number of non-guided trips
6. How far from your current residence did you travel to get to Okefenokee Swamp?
One-way distance in miles: _____
7. Is Okefenokee Swamp the only destination on your recreation trip?
 Yes.
 No. How many other recreation destinations do you have on this trip? _____
8. How familiar are you with the purposes and characteristics of National Wildlife Refuges?
 I am not familiar – I have never heard of National Wildlife Refuges.
 I have heard of National Wildlife Refuges, but I know little about their purposes and characteristics.
 I have some knowledge about the purposes and characteristics of National Wildlife Refuges.
 I know a lot about the purposes and characteristics of National Wildlife Refuges.
9. How familiar are you with the purposes and characteristics of federally designated wilderness areas?
 I am not familiar – I have never heard of federally designated wilderness areas.
 I have heard of federally designated wilderness areas, but I know little about their purposes and characteristics.
 I have some knowledge about the purposes and characteristics of federally designated wilderness areas.
 I know a lot about the purposes and characteristics of federally designated wilderness areas.

(OVER)

For questions 10-29, please select the ONE best answer.

10. Why is Okefenokee Swamp special?

- It has never been used by humans.
- It's the only swamp in the United States with large cypress trees.
- It provides habitat for animals that need large, undeveloped spaces to live and move.
- It's the only place to find alligators in the United States.

11. Federal wilderness areas are protected to:

- provide for sightseeing and pleasure driving.
- provide opportunities for hiking and mountain biking.
- provide for solitude and primitive recreation.
- provide for motorboating and auto-access camping.

12. What is the purpose of a wildlife refuge?

- To provide habitat for wildlife.
- To protect and enhance biological diversity.
- To protect migratory waterfowl.
- All of the above.

13. Okefenokee Swamp is a:

- National Forest.
- National Park.
- National Wildlife Refuge.
- Georgia State Park.

14. Why can fire often play its natural role in Okefenokee Swamp?

- The swamp is large.
- Fires historically burned large parts of Okefenokee Swamp.
- Fire is necessary to maintain certain plant and animal habitats.
- All of the above.

15. Managers of wilderness areas:

- let nature take its course in wilderness.
- help restore natural conditions in wilderness.
- keep people out of wilderness.
- keep fire out of wilderness.

16. Okefenokee Swamp is managed by:

- United States Fish and Wildlife Service.
- National Park Service.
- Georgia Department of Natural Resources.
- United States Forest Service.

17. Forest fires in Okefenokee Swamp:

- help maintain the open prairies.
- help the swamp stay young and healthy.
- help provide habitat for some wildlife species.
- all of the above.

18. Motorboats are allowed in federally designated wilderness areas:
- some of the time.
 - all of the time.
 - only in special cases.
 - none of the time.
19. In a National Wildlife Refuge:
- environmental education is more important than recreational activities.
 - timber is sometimes harvested to enhance wildlife habitat.
 - protecting wildlife is more important than providing for outdoor recreation.
 - all of the above.
20. Forest fire has the following values for Okefenokee Swamp:
- It helps longleaf pine communities to survive.
 - It helps keep the forest understory clean of a tangle of shrubs and vines.
 - It helps produce a diversity of forest habitats.
 - all of the above.
21. Most of Okefenokee Swamp is managed:
- as a wilderness area.
 - for timber harvesting.
 - for recreational use.
 - as a reservoir for drinking water.
22. Federal wilderness has the following characteristics:
- large size, no roads, no permanent structures.
 - sightseeing roads, large size, no permanent structures.
 - off-road recreational vehicle use, large size, no permanent structures.
 - large size, no roads, rustic cabins.
23. Prescribed fires:
- destroy the forest.
 - destroy certain wildlife populations.
 - help restore certain forest ecosystems.
 - ruin wildlife habitat.
24. Wilderness areas:
- have roads.
 - provide opportunities for solitude.
 - allow motorized dirt bikes.
 - have summer homes.
25. If people are quiet in the swamp:
- they are more likely to be harmed by alligators.
 - wildlife are more likely to stay hidden.
 - wildlife are not affected.
 - there is an increased chance of seeing wildlife.

(OVER)

100

26. Okefenokee Swamp is a:
- World Heritage site.
 - National Recreation Area.
 - Federally declared wilderness area.
 - Audubon sanctuary.
27. In a wilderness wildlife refuge:
- managers use the minimum tools necessary to protect wildlife.
 - managers do not intervene with nature.
 - managers plant food crops to benefit wildlife.
 - all of the above.
28. Wildlife refuges provide for:
- protection of game and non-game species of wildlife.
 - protection of endangered species.
 - environmental education.
 - all of the above.
29. These kinds of opportunities are found in wilderness wildlife refuges:
- wildlife observation, solitude, natural conditions.
 - wildlife observation, auto camping, nature films.
 - solitude, auto camping, nature films.
 - wildlife observation, nature films, interpretive driving tours.
30. Which of the following activities are typically allowed in a National Wildlife Refuge? (Check all that apply)
- | | | |
|-----------------------------------|---|--|
| <input type="checkbox"/> mining | <input type="checkbox"/> mountain biking | <input type="checkbox"/> hunting |
| <input type="checkbox"/> fishing | <input type="checkbox"/> motorboating | <input type="checkbox"/> nature photography. |
| <input type="checkbox"/> swimming | <input type="checkbox"/> horseback riding | <input type="checkbox"/> environmental education |
31. Which of the following recreational facilities are typically provided for recreationists in federally designated wilderness: (Check all that apply)
- | | | |
|---|--|--|
| <input type="checkbox"/> rustic cabins | <input type="checkbox"/> flush toilets | <input type="checkbox"/> bike trails |
| <input type="checkbox"/> walking trails | <input type="checkbox"/> picnic areas | <input type="checkbox"/> horse trails |
| <input type="checkbox"/> RV campgrounds | <input type="checkbox"/> scenic roads | <input type="checkbox"/> backcountry campsites |
32. Have you been to the Okefenokee Swamp visitor center on this trip?
- Yes No
33. Your age: _____
34. Are you: Male Female

Thank You!

Rachel Kennon, Graduate Research Assistant
 Joseph W. Roggenbuck, Professor
 Virginia Tech, Dept. of Forestry
 Blacksburg, VA 24061

APPENDIX D: INTERVIEW GUIDE

Okefenokee Interview Guide

Hi, my name is Rachel Kennon. I'm a masters student at Virginia Tech and I'm here at Okefenokee collecting data for my thesis. Could I take a few minutes to ask you a few questions about your boat trip today?

(If they agree) I'd like to tape record our conversation. It makes things go quicker and I won't hold you up for so long. Is that okay?

1. Is this your first time at Okefenokee?
(Yes: go on)
(No: How many times have you been here before? Was this your first time to take a guided boat tour? Have you ever taken an overnight trip into the swamp? Have you been on motorboats? Canoes? Tell me about your previous trip(s)).
2. Have you been to the visitor center on this trip?
3. What were some of the things you liked about your boat tour? Disliked?
4. Was there anything the guide said that struck you as particularly interesting?
5. Is there anything special about this place that you think makes it different from other natural places you have visited?
(if wilderness mentioned, prompt to talk about it some more: You mentioned wilderness. Can you tell me some more about that. What is wilderness?)
6. Do you think of this place as wilderness?
What characteristics are wilderness-like? What are the characteristics that are inconsistent with wilderness?
What are some of the things people do in wilderness? Tell me what a wilderness area looks like.
(Note: We are trying to understand how visitors "characterize" wilderness. What is their cognitive map of wilderness?)
7. Do you have any thoughts about how the Fish and Wildlife Service should manage this place?
8. Should prescribed or managed fires be allowed in wilderness? Why or why not?
9. What is the meaning of this visit to you personally?
10. Are there any additional comments you would like to make about your visit?

APPENDIX E:
AGENDA and HANDOUTS FOR GUIDE TRAINING SESSION
CLASSROOM PORTION

AGENDA

Okefenokee Guide Training

Dates: Thursday, March 29, 5:00 - 9:00 p.m.
Refuge Administrative Building
Friday, March 30, 4:30 - 7:30 p.m.
Concession Building/Swamp

Thursday, March 29:

I. 5:00: Introduction (Rachel)

- A. Purpose of training
- B. Introduce guides

II. 5:10 - 5:30: Brief Overview of Okefenokee Swamp (Rachel)

- A. Size and shape
- B. Human history
- C. FDR makes it a National Wildlife Refuge
- D. Bio-physical characteristics
 - 1. Swamp
 - 2. Wet prairies and islands
 - 3. Trees and vegetation
 - 4. Wildlife

III. 5:30 - 6:00: What is a National Wildlife Refuge? (Maggie)

VIDEO

- A. Not a national park; wildlife comes first
- B. USFWS Organic Act -- 1997
 - 1. (we need to get copies of the Act)
 - 2. Purposes of wildlife refuges
- C. Wildlife refuge-dependent recreation activities
 - 1. Fishing
 - 2. Hunting
 - 3. Wildlife observation
 - 4. Nature photography
 - 5. Nature interpretation
 - 6. Environmental education
- D. On boat tour we are doing four of these six activities !!!
- E. National Wildlife Refuges are managed by U.S. Fish and Wildlife Service

6:15 - 6:30: Break

IV. 6:30 - 7:15: What is Federally Declared Wilderness? (Rachel)

- A. Legal definition of wilderness (1964 Wilderness Act)
 - 1. Natural or natural-appearing area
 - 2. "Big"
 - 3. No mechanized travel
 - 4. Solitude
 - 5. Primitive recreation
- B. Other wilderness values
 - 1. Personal Benefits
 - a. Skill development (outdoor skills/adventure)
 - b. Self-reliance
 - c. Primitive living
 - d. Nature appreciation
 - e. Environmental ethic
 - f. Spiritual values: awe, humility, connection with nature
 - 2. Social/Environmental Benefits
 - a. Benefits to non-humans
 - i. Species diversity
 - ii. Wildlife
 - iii. Natural functioning ecosystems
 - b. Benefits to humans
 - i. Air quality
 - ii. Water quality
 - iii. Scientific laboratory
 - iv. Source of medicine?
 - v. Economic values -- tourism
- C. Okefenokee Wilderness Description
 - 1. Okefenokee Wilderness Law
 - 2. Size and shape
 - 3. Allowable exceptions
 - a. Motors for recreation
 - b. Motors for trail maintenance
 - c. Motors for endangered species management

V. 7:15 – 7:30: Okefenokee: A Wilderness Wildlife Refuge (Rachel)

- A. A Special Place -- Why?
 - 1. A special kind of wildlife
 - a. Red-cockaded woodpecker
 - b. Bears

- c. Sandhill cranes
- d. Alligators
- e. Indigo snake
- f. Gopher tortoise

- B. A special level of recreation
 - 1. See wild wildlife in context (in natural systems)
 - 2. Must expend some effort to see wildlife
 - 3. We are visitors to the wildlife's home
- C. A special kind of management
 - 1. Minimum tool
 - a. Wildlife management
 - b. Recreation management
 - 2. Fire plays its natural role

VI. 7:30 – 8:00 p.m.: Natural Role of Fire (Jim)

- A. Okefenokee Swamp depends on fire
 - 1. Wet prairies would happen without fire
 - 2. Longleaf pine/wiregrass ecosystem would disappear without fire (?)
 - 3. Wildlife dependent upon fire (?)
- B. Managed fire/prescribed fire
 - 1. Managers manage fire to keep the swamp healthy
 - 2. Managed fire is good

VII. 8:00 – 8:15 p.m.: Key Points to Leave with the Visitor

- A. Okefenokee is a National Wildlife Refuge
 - 1. A wildlife refuge has the following values
 - a. List them
- B. Okefenokee is a federally declared Wilderness
 - 1. A wilderness area has the following values
 - a. List them
- C. Okefenokee is a really special place because it is a wilderness wildlife refuge
 - 1. List reasons why
- D. The U.S. Fish and Wildlife Service is the manager of this special place
- E. Important role of fire and fire management in maintaining the health of the swamp
- F. Boat tour to develop understanding, appreciation, and excitement for this special place: Okefenokee, the Land of the Trembling Earth.



U.S. Fish & Wildlife Service

National Wildlife Refuge System Improvement Act of 1997

Wild Things

Landmark Law

During the 105th Congress, a bipartisan congressional coalition joined with a diverse group of non-governmental organizations, state fish and wildlife agencies, and the Interior Department to craft the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57). This Act supplies much-needed organic legislation for the first time in the National Wildlife Refuge System's nearly 100-year history. Signed by President Clinton on October 9, 1997, the Act amends the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-ee), and provides significant guidance for management and public use of the Refuge System.

New Statutory Mission Statement

"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Administration of the Refuge System

The Refuge System is to be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management. The Refuge Improvement Act also requires maintenance of the Refuge System's biological integrity, diversity, and environmental health; and monitoring of the status and trends of refuge fish, wildlife, and plants. Continued growth of the Refuge System is to be planned and directed in a manner that will contribute to conservation of the ecosystems of the United States.

Management Hierarchy

As a first priority, the Refuge Improvement Act requires that each refuge be managed to fulfill the Refuge System Mission as well as the specific

purpose(s) for which the refuge was established. The Act also declares that compatible wildlife-dependent recreational uses are legitimate and appropriate, priority general public uses of the Refuge System. These six uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) are to receive enhanced consideration, in planning and management, over all other general public uses of the Refuge System. When compatible, these wildlife-dependent recreational uses are to be strongly encouraged.

Compatibility Determination

A compatibility determination is required for a wildlife-dependent recreational use or any other public use of a refuge. A compatible use is one which, in the sound professional judgement of the Refuge Manager, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s).

Comprehensive Conservation Plan

The Act requires development of a comprehensive conservation plan for each refuge and management of each refuge consistent with the plan.

Interagency Coordination and Public Involvement

When planning for expanded and new refuges, and when making refuge management decisions, the Act requires effective coordination with other Federal agencies, state fish and wildlife or conservation agencies, and refuge neighbors. In addition, a refuge is to provide opportunities for public involvement when making a compatibility determination or developing a comprehensive conservation plan.



U.S. Fish & Wildlife Service

Refuges

National Wildlife Refuge System



National Wildlife Refuge System Improvement Act of 1997 Public Law 105-57

For nearly a century, the 93-million-acre National Wildlife Refuge System has been managed by the U.S. Fish and Wildlife Service under a variety of laws without an "Organic Act" or comprehensive legislation spelling out how it ought to be managed and used by the public.

On October 9, 1997, President Clinton signed the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57 ([text](#)) ([pdf](#))). The Act amends the National Wildlife Refuge System Administration Act of 1966 in a manner that provides an "Organic Act" for the Refuge System.

It was passed to ensure that the Refuge System is managed as a national system of related lands, waters, and interests for the protection and conservation of our Nation's wildlife resources.

The only system of Federal lands devoted specifically to wildlife, the National Wildlife Refuge System is a network of diverse and strategically located habitats. More than 500 national wildlife refuges and thousands of waterfowl production areas across the United States teem with millions of migratory birds, serve as havens for hundreds of endangered species, and host an enormous variety of other plants and animals. Over 34 million people visit units of the National Wildlife Refuge System each year to enjoy a wide range of wildlife related recreational opportunities.

The passage of this Act gave guidance to the Secretary of the Interior for the overall management of the Refuge System. The Act's main components include:

- a strong and singular wildlife conservation Mission for the Refuge System;
- a requirement that the Secretary of the Interior maintain the biological integrity, diversity and environmental health of the Refuge System;
- a new process for determining compatible uses on refuges;
- a recognition that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible, are legitimate and appropriate public uses of the Refuge System;
- that these compatible wildlife-dependent recreational uses are the priority general public uses of the Refuge System; and
- a requirement for preparing a comprehensive conservation plan for each refuge.

National Wildlife Refuges

Purpose: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

U.S. Fish and Wildlife Service Activities:

- Recovers endangered species
- Manages national wildlife refuges
- Conserves migratory birds
- Preserves marine mammals
- Restores depleted fisheries
- Enforces wildlife laws
- Provides technical expertise
- Aids underprivileged youth
- Distributes federal aid

Okefenokee NWR Objectives:

- To provide protection of the unique environmental qualities of the Okefenokee Ecosystem.
- To provide optimum habitat and protection for endangered and threatened species.
- To provide optimum habitat for a wide diversity of fish, birds, mammals, reptiles, and amphibians.
- To provide for fish and wildlife oriented recreation, interpretation, and environmental education.

Wildlife Dependent Recreation:

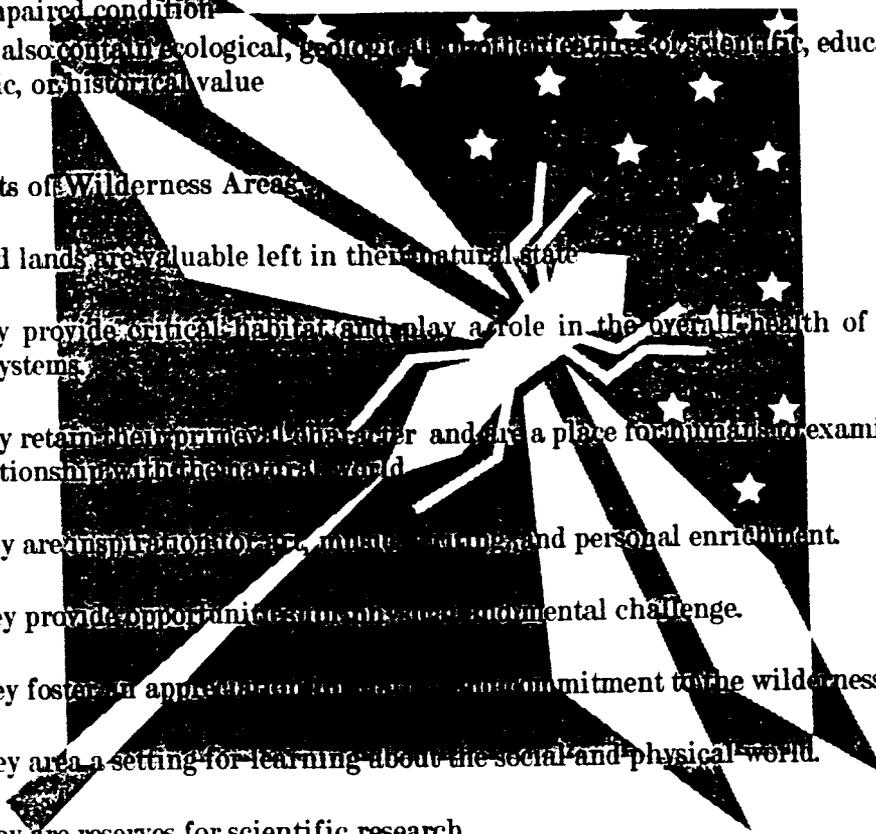
1. Fishing
2. Hunting
3. Wildlife observation
4. Nature photography
5. Nature interpretation
6. Environmental education

What is Wilderness?

Wilderness – A wilderness...is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man is a visitor who does not remain.

- Generally appears to have been affected primarily by the forces of nature
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- Is of sufficient size as to make practicable its preservation and use in an unimpaired condition
- May also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

The Benefits of Wilderness Areas

- 
- Wild lands are valuable left in their natural state
 - They provide critical habitat and play a role in the overall health of natural ecosystems
 - They retain their primitive character and are a place for humans to examine their relationship with the natural world
 - They are inspirational to art, music, writing, and personal enrichment.
 - They provide opportunities for personal and intellectual challenge.
 - They foster an appreciation for nature and commitment to the wilderness area.
 - They are a setting for learning about the social and physical world.
 - They are reserves for scientific research
 - They provide a glimpse to our past through cultural and historical sites
 - The National Wilderness Preservation System contains unique ecological, historical, and scenic values.

Personal values: skill development, self-reliance, primitive living, nature appreciation, environmental ethic, spiritual

Non-human values: species diversity, natural functioning ecosystems, habitat

Values to humans: air and water quality, scientific laboratory, source of medicine, tourism

Key Points to Leave with the Visitor

- Okefenokee is a National Wildlife Refuge
 - Wildlife are the first priority.
 - Wildlife refuges are managed for migratory birds, endangered species, or to ensure biological diversity.
 - Recreation here is wildlife dependent.
- The U.S. Fish and Wildlife Service manages Okefenokee
- Okefenokee is a federally declared wilderness
 - Wilderness areas are natural, big, provide opportunities for solitude and primitive recreation, and usually do not have motorized travel.
 - Wilderness areas provide many benefits to humans and wildlife.
- Okefenokee is special because it is a wilderness wildlife refuge
 - Wildlife rely on wilderness aspects of Okefenokee
 - Recreation here is both wildlife dependent and wilderness dependent
 - Management ensures the protection of the wilderness and wildlife
- Fire is important to the management of the swamp
 - Fires keep the swamp young and healthy
 - Plant communities depend on fire
 - Managed fire is a good thing
- Boat tours provide understanding, appreciation, and excitement for “The Land of Trembling Earth”

APPENDIX F:
AGENDA and HANDOUTS – FIELD TRAINING SESSION

Rough draft!

I. Introduction:

II. Role as Tour Guide: 15-20 minutes

III. Beyond "hosting," what do you actually do as an interpreter and tour guide?

- as an interpreter, you are helping create or facilitate memorable experiences - What makes a swamp tour a memorable experience?

- A. The tour is thematic.
- B. Tour is enjoyable.
- C. Tours are interpretive.

IV. Additional Resources

- Tilden and Sam Ham's books
- Website for NPS www.nps.gov/idp/interp

V. Critique Form

This serves as a review. We'll go through the sheet, and each participant will bring one along on the mock tour. After the tour we'll discuss/wrap up....

Evaluation/Feedback Guide for _____

The tour guide served in the role of a:



As a Host, the tour guide:

- _____ was concerned about protecting the site, but didn't get carried away with reprimands and frequent reminders about rules and etiquette.
- _____ had a organized and planned program, yet didn't regurgitate from memory the entire tour narration.
- _____ was knowledgeable about the site, but didn't *inflict* his or her knowledge.
- _____ was friendly and made visitors feel welcome, used two-way communication and respected the audience.

The tour was thematic.

The theme (not topic!) of the tour was

- The theme relates to the mission of the agency and/or site: yes no
- The theme is stated at the beginning and restated at the end: yes no
- The theme was used to connect the narrated/interpretive stops (the theme was used to support the body of the tour): yes no

The tour was enjoyable.

- Visitors were immersed in the resource through learning activities, questions, stories, etc. yes no
- Visitors seemed to be enjoying themselves. yes no
- The tour guide was enthusiastic and seemed to be enjoying the tour. yes no

The tour was interpretive.

The tour guide emphasized ideas and meanings, rather than isolated facts and figures. yes no

The tour guide moved or encouraged visitors toward higher-level concepts (such as resource protection, stewardship, critical resources, global issues, etc.) yes no

The tour guide created opportunities for visitors to form their own connections to the resource (emotional and/or intellectual connections with the meanings/significance inherent in the resource). yes no



Key Points to Leave with the Visitor

Circle the messages that the tour guide conveyed. Indicate if the message was conveyed during introduction, conclusion, during a specific stop along the tour or as the theme.

1. Okefenokee is a National Wildlife Refuge/a NWR has the following values.
2. Okefenokee is a federally declared Wilderness/designated Wilderness has the following values.
- (3. Okefenokee is a special place because it is a wilderness wildlife refuge.)
4. The US Fish and Wildlife Service is the manager of this special place.
5. Fire/fire management plays an important role in maintaining the health of the swamp.
6. Okefenokee (the Land of the Trembling Earth) is deserving of understanding, appreciation and excitement.

APPENDIX G: RESPONSES TO INDIVIDUAL SURVEY ITEMS

Table G-1. Why is Okefenokee Swamp special?

Why is Okefenokee Swamp special?	Control %	Treatment %	Total%
It has never been used by humans	1.4	5	3.4
It's the only swamp in the U.S. with large cypress trees	9	6.1	7.4
<i>It provides habitat for animals that need large, undeveloped spaces to live and move</i>	89	87.2	88
It's the only place to find alligators in the U.S.	0.7	1.1	0.9

Table G-2. For what reasons are federal wilderness areas protected?

Federal wilderness areas are protected to:	Control%	Treatment%	Total%
Provide for sightseeing and pleasure driving	3.6	8.8	6.4
Provide opportunities for hiking and mountain biking	2.1	1.8	1.9
<i>Provide for solitude and primitive recreation</i>	90.7	87.7	89.1
Provide for motorboating and auto-access camping	3.6	1.2	2.3

Table G-3. What is the purpose of a wildlife refuge?

What is the purpose of a wildlife refuge?	Control%	Treatment%	Total%
To provide habitat for wildlife	11.1	18.2	15.1
To protect and enhance biological diversity	4.9	3.3	4
To protect migratory waterfowl	1.4	0.6	0.9
<i>All of the above</i>	82.6	77.9	80

Table G-4. What is the land classification of Okefenokee Swamp?

Okefenokee Swamp is a:	Control%	Treatment%	Total%
National Forest	0.7	0.6	0.6
National Park	3.4	1.7	2.5
<i>National Wildlife Refuge</i>	93.9	97.1	95.7
Georgia State Park	2	0.6	1.2

Table G-5. Why can fire often play its natural role in Okefenokee Swamp?

Why can fire often play its natural role in Okefenokee Swamp?	Control%	Treatment%	Total%
The swamp is large	1.4	1.1	1.2
Fires historically burned large parts of Okefenokee Swamp	2.7	7.3	5.2
Fire is necessary to maintain certain plant and animal habitats	50.7	54.2	52.6
<i>All of the above</i>	45.3	37.4	41

Table G-6. What are management actions taken by managers of wilderness areas?

Managers of wilderness areas:	Control%	Treatment%	Total%
Let nature take its course in wilderness	56.9	50.8	53.6
<i>Help restore natural conditions in wilderness</i>	43.1	48.6	46.1
Keep people out of wilderness	0	0.6	0.3
Keep fire out of wilderness	0	0	0

Table G-7. Who manages Okefenokee Swamp?

Okefenokee Swamp is managed by:	Control%	Treatment%	Total%
<i>United States Fish and Wildlife Service</i>	46.8	51.2	49.2
National Park Service	30.5	27.9	29.1
Georgia Department of Natural Resources	11.3	13.4	12.5
United States Forest Service	11.3	7.6	9.3

Table G-8. What are benefits of forest fires Okefenokee Swamp

Forest fires in Okefenokee Swamp:	Control%	Treatment%	Total%
Help maintain open prairies	4.1	3.9	4
Help the swamp stay young and healthy	12.2	14.4	13.4
Help provide habitat for some wildlife species	7.4	6.1	6.7
<i>All of the above</i>	76.4	75.7	76

Table G-9. How often are motorboats allowed in federally designated wilderness?

Motorboats are allowed in federally designated wilderness areas:	Control%	Treatment%	Total%
Some of the time	49	53.4	51.4
All of the time	5.5	7.9	6.8
<i>Only in special cases</i>	33.8	33.1	33.4
None of the time	11.7	5.6	8.4

Table G-10. What are appropriate uses in a National Wildlife Refuge?

In a National Wildlife Refuge:	Control%	Treatment%	Total%
Environmental education is more important than recreational activities	5.4	6.8	6.2
Timber is sometimes harvested to enhance wildlife habitat	2	2.8	2.5
Protecting wildlife is more important than providing for outdoor recreation	37.4	38.4	38
<i>All of the above</i>	55.1	52	53.4

Table G-11. What are values of forest fire for Okefenokee Swamp?

Forest fire has the following values for Okefenokee Swamp:	Control%	Treatment%	Total%
It helps longleaf pine communities to survive	0	1.7	0.9
It helps keep the forest understory clean of a tangle of shrubs and vines	11.8	15.6	13.9
It helps produce a diversity of forest habitats	16	12.3	13.9
<i>All of the above</i>	72.2	70.4	71.2

Table G-12. Most of Okefenokee Swamp is managed for what purpose?

Most of Okefenokee swamp is managed:	Control%	Treatment%	Total%
<i>As a wilderness area</i>	97.3	94.4	95.7
For timber harvesting	0.7	1.7	1.2
For recreational use	2	3.9	3
As a reservoir for drinking water	0	0	0

Table G-13. What are the characteristics of federal wilderness?

Federal wilderness has the following characteristics:	Control%	Treatment%	Total%
<i>large size, no roads, no permanent structures</i>	54.7	61.5	58.5
sightseeing roads, large size, no permanent structures	32.1	22.4	26.7
off-road recreational vehicle use, large size, no permanent structures	3.6	9.8	7.1
large size, no roads, rustic cabins	9.5	6.3	7.7

Table G-14. What are outcomes of prescribed fires?

Prescribed fires:	Control%	Treatment%	Total%
Destroy the forest	0	2.8	1.5
Destroy certain wildlife populations	2.7	3.3	3
<i>Help restore certain forest ecosystems</i>	95.9	92.8	94.2
Ruin wildlife habitat	1.4	1.1	1.2

Table G-15. What are characteristics of wilderness areas?

Wilderness areas:	Control%	Treatment%	Total%
Have roads	4.2	7.4	6
<i>Provide opportunities for solitude</i>	95.8	90.3	92.8
Allow motorized dirt bikes	0	1.1	0.6
Have summer homes	0	1.1	0.6

Table G-16. What are the benefits of people being quiet in the swamp?

If people are quiet in the swamp:	Control%	Treatment%	Total%
They are more likely to be harmed by alligators	0	0.6	0.3
Wildlife are more likely to stay hidden	1.4	2.2	1.8
Wildlife are not affected	3.4	6.1	4.9
<i>There is an increased chance of seeing wildlife</i>	95.2	91.1	93

Table G-17. What is the land designation of Okefenokee Swamp?

Okefenokee Swamp is a:	Control%	Treatment%	Total%
World Heritage site	2.9	2.8	2.8
National Recreation Area	15	9.5	11.9
<i>Federally declared wilderness area</i>	80	86.6	83.7
Audubon sanctuary	2.1	1.1	1.6

Table G-18. What are management actions taken by managers in a wilderness wildlife refuge?

In a wilderness wildlife refuge:	Control%	Treatment%	Total%
<i>Managers use the minimum tools necessary to protect wildlife</i>	34.5	34.3	34.3
Managers do not intervene with nature	40.8	36.5	38.4
Managers plant food crops to benefit wildlife	2.1	3.3	2.8
All of the above	22.5	26	24.5

Table G-19. What are benefits of wildlife refuges?

Wildlife refuges provide for:	Control%	Treatment%	Total%
Protection of game and non-game species of wildlife	7	4.4	5.6
Protection of endangered species	1.4	7.2	4.7
Environmental education	1.4	2.2	1.9
<i>All of the above</i>	90.1	86.1	87.9

Table G-20. What are the kinds of recreation opportunities found in wilderness wildlife refuges?

These kinds of opportunities are found in wilderness wildlife refuges:	Control%	Treatment%	Total%
<i>wildlife observation, solitude, natural conditions</i>	89.9	83.4	86.3
wildlife observation, auto camping, nature films	0	2.3	1.9
solitude, auto camping, nature films	1.4	2.9	1.6
wildlife observation, nature films, interpretive driving tours	8.6	11.4	10.2

VITA

Rachel Brooke Kennon was born in Memphis, TN on January 25, 1976. She completed her B.S. in Recreation Management at the University of Montana in 1999. Rachel has worked seasonally for Colorado State Parks, the U.S. Forest Service, and a river outfitting company. She entered Virginia Tech University as a Master's student in May 2000, and received a M.S. in Natural Resource Recreation in April 2002. She is currently a natural resource specialist (recreation) for the Dixie National Forest, Powell Ranger District, in Panguitch, Utah.