

CHARACTERISTICS OF VISITORS AND  
RECREATIONAL USE OF THE UPPER  
KIAMICHI RIVER WILDERNESS  
IN OKLAHOMA

By

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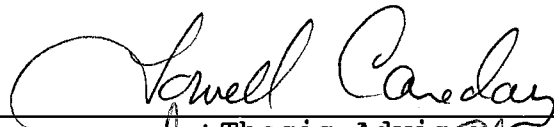
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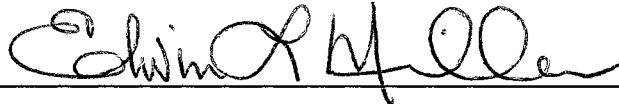
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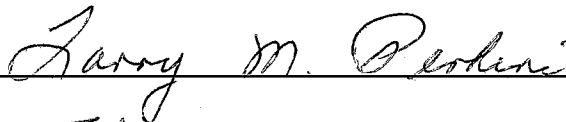


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## CHAPTER I

### INTRODUCTION

#### Wilderness Definition, Values and Management Mandate

**Wilderness<sup>a</sup>**, as stipulated by the Wilderness Act of 1964 (P.L. 88-577), is an area of undeveloped federal land of at least 5000 acres in area, retaining its primeval character, untrammelled by man, without permanent improvements, where man is a visitor who does not remain. This legislation created a National Wilderness Preservation System and established the mandate that designated wilderness be protected and managed as an enduring resource, so as to preserve its natural condition.

The definition of wilderness was broadened by the Eastern Wilderness Act of 1975 (P.L. 93-622) to include areas east of the 100th meridian which did not qualify for addition to the National Wilderness Preservation System under the prevailing interpretation of the 1964 Act. The 1975 legislation facilitated the designation of certain areas less than 5000 acres and those exhibiting some

<sup>a</sup>Terms in the text (excluding titles) highlighted by **bold-face** type are defined in the Glossary of Terminology beginning on page 12.

evidence of past human activity as wilderness. In essence, it paved the way for locating wilderness closer to eastern population centers and proclaimed that human-impacted lands can renew or revert to a more wild state by natural processes to once again become wilderness.

The values and benefits of wilderness as a preserved natural resource and as an experience opportunity have been espoused and analyzed by many (Cheek and Burch 1976, Kaplan and Talbot 1983, Young and Crandall 1986, Driver *et al.* 1987, McDonald *et al.* 1988, Driver *et al.* 1990, Haas 1990, Leoni 1990, Taylor 1990). Wilderness offers unique and distinctive opportunities for a primitive and unconfined type of outdoor recreation experience, where individuals can explore, meet challenges, develop interpersonal bonds, relax, take risks, and study ecosystem processes in a relatively unaltered natural setting that provides an element of solitude, essentially free of the developments and pace of modern human society. In addition to recreational pursuits, wilderness affords present and future society with a broad realm of other opportunities and values (Barrick 1986, Butler and Roberts 1986, Manning 1988, Cordell *et al.* 1990, Hendee *et al.* 1990, Krumpe 1990, McCloskey 1990, McDonald 1990).

The value of wilderness to current and future generations will not be realized solely by designating federal lands as part of the National Wilderness Preservation System. Those who visit wilderness must

exercise care and ethical restraint in the course of their use. With use, whether intentional or inadvertent, comes impact. Hence, management is an obvious necessity for many wilderness areas, to minimize the impacts of visitors on the wilderness resource and on the character of the wilderness experience to which visitors aspire (Stankey 1972, Nash 1982, McDonald 1987, Hendee *et al.* 1990).

Present society is faced with the challenge for wise use and management of wilderness and similar wildland resources that are essentially limited in supply, yet faced with increasing pressures for use (Wellman 1987, Dustin and Knopf 1989). Though an anthropocentric philosophy has shaped and guided the management of much of the wilderness resource of the United States since its inception, the present emphasis is on a management philosophy that is more biocentric in thrust, permitting natural ecological processes to operate as freely as possible (Worf 1985, Hendee *et al.* 1990).

Studying and monitoring the condition and integrity of wilderness poses but a segment of the wilderness management challenge. The more critical task involves the understanding and management of the people who visit and use the wilderness resource in any way. The relevancy and necessity of studying wilderness use flows from the premise that wilderness management is essentially visitor management (Nash 1982, Roggenbuck *et al.* 1982, Roggenbuck and Lucas 1987, Hendee *et al.* 1990).

The study of wilderness users and their use preferences and patterns is a prerequisite to the development and currency of a sound wilderness management plan that has as its focus, the sustainment of a quality natural environment and a quality experience opportunity. The wilderness attributes of solitude, independence, unconfinement, and primitiveness are upheld by a well-conceived plan that delineates subtle, light-handed and unobtrusive management. Studying use and users enables the identification of causes of social and ecological impacts in wilderness, and directs in part, the development of a strategy for solving present or impending problems. The users of wilderness can appropriately provide valid feedback as to whether or not wilderness values are sustained by present management (Roggenbuck and Lucas 1987, Watson *et al.* 1992).

The character of the wilderness recreation experience, as conceptualized by wilderness legislation, is unlike many others resulting from outdoor recreation activities in other less primitive settings (Haas *et al.* 1979, Brown 1981, Hendee *et al.* 1990). The nature of experience opportunities flowing from the pursuit of outdoor recreation is partially dependent upon the character of the recreational setting (Peterson 1974, Driver and Brown 1978, Haas 1979, Taylor 1990), though different individuals likely vary in their experiences, depending upon their frames of reference and individual conceptions (Knopf 1983, Moore 1991). The wilderness recreation experience hovers at one end of the

Recreation Opportunity Spectrum, as theorized by Driver *et al.* (1987), dependent upon the availability of a particular combination of activity and setting characteristics.

Wilderness managers must define the experience for which they are charged to manage. They need to determine which area characteristics and attributes are most highly valued by users.

Each unit of the National Wilderness Preservation System is uniquely distinct. Though federal wilderness legislation and individual enabling acts of legislation for each area set the mandate for management, such legislation also affords a margin of opportunity for interpretation of its spirit and intent. Hence, each individual unit can be, and ought to be managed in a unique way, based on its inherent attributes and likelihood of providing opportunities for unique wilderness-dependent experiences (Hendee *et al.* 1968, Rosenthal *et al.* 1982, Joy 1985, Weingart 1985, Driver *et al.* 1987, Manning 1987).

The visitors of a wilderness area are most appropriately the best source of input and feedback for management planning for recreational use of the area. Wilderness managers need to understand their visitor clientele, incorporating their aspirations, perceptions and preferences into the planning and management process (Hartmann *et al.* 1987, Cole and Lucas 1987, Brown 1989, Lucas 1989, Fege 1990, Hendee *et al.* 1990, Watson 1990). As well, it is especially critical to identify the

characteristics of the recreation experience that are perceived as being most important for the realization of satisfaction, particularly those characteristics that are malleable by management (Connelly *et al.* 1986, Williamson *et al.* 1990, Watson *et al.* 1992).

The problem is, however, that not all visitors have uniform perceptions, preferences and motives, and it is certainly a fallacy to consider managing a resource for a homogeneous visitor population that most likely does not exist (Wenger and Gregersen 1964, Lime *et al.* 1981, Schreyer *et al.* 1984, Williams *et al.* 1990). Quality in wilderness recreation is perhaps best assessed by examining the extent to which the motivations and objectives of the visitor who seeks the unique type of opportunity provided by wilderness are fulfilled (Stankey 1972, Vaske *et al.* 1980, Stankey and Schreyer 1987).

#### The Importance of Wilderness Use Monitoring and Measurement

Most current wilderness recreational use and user research information exists as a result of extensive studies, primarily of western wilderness areas. Its utility and applicability for management of eastern wilderness areas is questioned by some (Roggenbuck *et al.* 1982, Roggenbuck and Lucas 1987, Watson *et al.* 1992). Further, most existing research data spans only the summer use season for areas where studies have been conducted, occasionally including

data as early and as late as the spring and fall hunting seasons, respectively, at some wildernesses. Many new areas have been established in the past 10-15 years as a result of the Eastern Wilderness Act of 1975 and designations stemming from releases on National Forest lands through the Second Roadless Area Review and Evaluation of the late 1970s. At present, there exists no baseline data for many units of the National Wilderness Preservation System, and many units have no on-going use monitoring program (Watson *et al.* 1987, Reed *et al.* 1989, U.S. General Accounting Office 1989, Cole 1990, Watson *et al.* 1992).

There is a critical need for research in monitoring and measuring wilderness use, assessing wilderness values and benefits, defining the character of the wilderness experience, understanding wilderness visitor motivations and behavior, and in monitoring and managing the social and ecological impacts of wilderness recreation use (Stankey 1979, Knopf 1986, Lucas and Krumpel 1987, Driver *et al.* 1990, Roggenbuck 1990). As well, there exists a need for research that spans more than just the summer use season, especially for wilderness areas where visitors recreate throughout the year (Hammit and Hughes 1984, Roggenbuck and Lucas 1987). Finally, longitudinal studies need to be established in order to monitor change and trends in wilderness use and users (Lucas 1985, Roggenbuck and Lucas 1987, Stankey and Schreyer 1987).



A limitation of many use surveys conducted during one season of use is that they represent but one static slice in time (Schreyer and Roggenbuck 1978, Schreyer 1980, Williamson et al. 1990). The visitor clientele of any one wilderness area is subject to change over time. As social use patterns change and impacts begin to become more obvious, some users may alter their normative definition of the wilderness experience at an area, resulting in an experience "product shift." Visitor succession or displacement may result in a marked shift in the attitude-behavior framework of the visitor population of a given area (Heberlein 1977, Becker 1981, Anderson and Brown 1984, Hughes 1985, Moore 1991), confounding effective management and the sustainment of wilderness values.

#### **Statement of Problem**

The Upper Kiamichi River Wilderness (UKRW) is a recent addition to the National Wilderness Preservation System, designated by Congress on October 18, 1988, under the Winding Stair Mountain National Recreation and Wilderness Area Act of 1988 (P.L. 100-499). The Ouachita National Forest serves as the managing agency of the UKRW. To date, a draft plan for management of the UKRW has been assembled by an interdisciplinary team of agency professionals and interested citizens (U.S. Forest Service 1992). However, the Ouachita National Forest has neither any baseline visitor-use data nor a system in place for monitoring and

collecting use information to guide the planning and management of the UKRW.

Though a review of the literature identifies a general characterization of the wilderness visitor, the range of research studies and investigations describes a diverse visitor population on a national basis. Wilderness visitors are often very diverse with regard to their demographics, motives, wilderness knowledge, use patterns, preferences for setting attributes, and preferences for resource management. Further, visitors often differ in their understanding of what constitutes appropriate wilderness-dependent use versus nonconforming and illegal use. Wilderness meanings and definitions vary from individual to individual and often, they are not congruent with the spirit and intent of the Wilderness Act of 1964. Finally, the descriptive and demographic structure of the visitor clientele using any one wilderness may be very dynamic, changing from season to season and from year to year. The UKRW visitor population is likely a diverse and dynamic one.

There are some who argue that no land resources of the Ouachita National Forest in Oklahoma fulfill the criteria and spirit of wilderness, as defined by the Wilderness Act of 1964 and despite the modification of the definition of wilderness by the Eastern Wilderness Act of 1975. The UKRW poses a unique setting for the wilderness visitor and some unique circumstances and potential dilemmas for management of the area.

A paved scenic highway, the Talimena Scenic Drive, flanks the northern border of the UKRW (see map, inside back cover). A gravel road joins its eastern border in several places. The geometry of the 9,691-acre UKRW is such that a visitor centrally-located in the area would be but 1.5 - 2.0 miles from paved highways to the north and south.

Only one major trail, the Ouachita National Recreation Trail, traverses the area, bisecting it diagonally from the northeast to the southwest. This trail is well-marked and maintained, as it receives the bulk of visitor travel in the wilderness. A few traces of old trails and old roads that once penetrated the UKRW remain faintly visible in places. These, however are not marked, nor are they maintained as routes of travel, unless they are utilized as a portion of the Ouachita National Recreation Trail corridor.

The UKRW includes seven **inholdings** (one of which was subdivided and sold as individual 5-acre private hunting camps prior to wilderness designation), totalling 1458 acres. Wilderness legislation makes a provision for access by the private owners (**inholdees**) to their inholdings. Hence, it is quite probable that some UKRW recreational visitors may hear or see motor vehicles from both within and outside of the area. Further, some visitors may even encounter an occasional private inholdee travelling in a motor vehicle along an old roadway within the wilderness. Illegal use of all-terrain vehicles is known to occur at UKRW. Forest Service managers consider it to be a

particular problem during the fall and spring hunting seasons.

### Objectives of the Study

This study was conceived and designed to probe several objectives.

- 1.) Initiate a visitor-use monitoring scheme at UKRW utilizing voluntary registration at trailhead registers, to establish a source of data for:
    - a.) estimating the extent of visitor-use by month and **season**;
    - b.) survey sampling the characteristics, patterns of use, **motives**, and preferences of **wilderness visitors**;
    - c.) acquiring baseline data as part of a longitudinal study of recreational use trends;
    - d.) continued monitoring by the U.S. Forest Service after the study is completed.
  - 2.) Develop a motive profile of the UKRW visitor population and discern similarities and differences in the motives of 14 specific visitor subgroups, organized into seven comparative pairs, including:
    - a.) **hikers** and **horse-riders**;
    - b.) **hunters** and **non-hunters**;
    - c.) **day-visitors** and **overnight-visitors**;
    - d.) **local-visitors** and **distant-visitors**;
    - e.) **first-time-visitors** and **repeat-visitors**;
-

- f.) male visitors and female visitors; and
  - g.) **solo-visitors** and **group-visitors**.
- 3.) Analyze the seasonal variation of UKRW visitor demographic characteristics, use patterns, motives and preferences, determining if statistically significant differences exist between the UKRW visitor subgroups noted in Objective #2. (See "**significance level**" in the Glossary of Terminology, page 12.)
  - 3.) Measure preferences for wilderness management, perceptions of **wilderness character**, perceptions of **use-conflict**, and perceptions of **use-impact** of the UKRW visitor subgroups noted in Objective #2.
  - 4.) Measure the satisfaction of the UKRW visitor subgroups noted in Objective #2 with their wilderness visits, testing two satisfaction scales.
  - 5.) Develop a **wilderness knowledge** scale and measure the wilderness knowledge of the UKRW visitor subgroups noted in Objective #2.
  - 7.) Analyze the relationship between wilderness knowledge and wilderness use motives of UKRW visitors.
  - 8.) Analyze the relationship between wilderness knowledge and wilderness visit satisfaction of UKRW visitors.

#### Glossary of Terminology

The following are definitions of specific terms as they apply in the context of this study. These terms are print-

ed in **bold-face type** the first time they are encountered in the text.

**Bushwhack Off-Trail** - An entry to or exit from the UKRW at any point along the eastern, southern, and western borders (at other than established trailheads), directly into the bush.

**Day-use** - use of the Upper Kiamichi River Wilderness for recreational pursuits during any portion of a day, but without spending an evening camping in the area.

**Day-visitor** - a "wilderness visitor" spending any portion of a day within the Upper Kiamichi River Wilderness, without spending an evening camping in the area.

**Distant-visitor** - an individual not fitting the definition of "local-visitor" as noted below.

**First-time-visitor** - a "wilderness visitor" entering the Upper Kiamichi River Wilderness for the first time, having never visited the area previously.

**Group-visitor** - a "wilderness visitor" who enters, recreates, and departs the Upper Kiamichi River Wilderness with one or more companion visitors.

**Hiker** - a "wilderness visitor" who travels on foot as their primary mode of travel in the Upper Kiamichi River Wilderness.

**Horse-rider** - a "wilderness visitor" who utilizes a horse or any other domestic stock animal for their primary mode of travel in the Upper Kiamichi River Wilderness.

Hunter - a "wilderness visitor" whose main objective in the Upper Kiamichi River Wilderness is the pursuit of wild game by any means of lawful harvest.

Inclement Weather - any episode of rainstorm, extremes of temperature, or high humidity reported by a UKRW visitor, that limited their activity or reduced the quality of their visit.

Inholdee - an individual or group who owns a private land parcel totally within the boundaries of the Upper Kiamichi River Wilderness. (See "inholding" below.)

Inholding - a parcel of privately-owned land totally within the boundaries of the Upper Kiamichi River Wilderness. (See "inholdee" above.)

Local-visitor - a "wilderness visitor" whose home residence is in any county immediately adjoining the Upper Kiamichi River Wilderness, including LeFlore, Latimer, Pushmataha and McCurtain Counties in Oklahoma, and Scott, Polk and Sevier Counties in Arkansas, but not more than 60 miles from the nearest border of the wilderness.

Loop Trip - a visit to the Upper Kiamichi River Wilderness originating and concluding at the same portal (see "Portal" below), regardless of the route travelled within the area.

Motive - a recreation experience preference based upon a desired psychological outcome or probable personal benefit.

Non-hunter - a "wilderness visitor" whose main objective in the Upper Kiamichi River Wilderness is any recreational pursuit other than hunting as defined above.

One-way Trip - a visit to the Upper Kiamichi River Wilderness originating and concluding at different portals (see "Portal" below), regardless of the route travelled within the area.

Overnight-use - use of the Upper Kiamichi River Wilderness for recreational pursuits while spending at least one evening camping in the area.

Overnight-visitor - a "wilderness visitor" spending at least one evening camping in the Upper Kiamichi River Wilderness.

Portal - one of six entry and exit locations on the boundary of the Upper Kiamichi River Wilderness (see map, inside back cover), including:

Pashubbe Creek Trailhead

Kiamichi River Trailhead

Horsepen Creek Trailhead

Stateline Trailhead

Talimena Drive Off-Trail (see definition below)

Bushwhack Off-Trail (see definition above).

Proximity of Home Residence to UKRW - Any of two categories delineated as follows:

Local: see "Local-Visitor" above.

Distant: see "Distant-Visitor" above.



Repeat-visitor - a "wilderness visitor" who has had at least one previous visit to the Upper Kiamichi River Wilderness at any previous time.

Season - any of four subdivisions of portions of the 1991-1992 calendar year spanning the study, delineated as follows:

Spring: March 1991, April 1991, and May 1991.

Summer: June 1991, July 1991, and August 1991.

Fall: September 1991, October 1991, and November 1991.

Winter: December 1991, January 1992, and February 1992.

Significance Level - The probability of rejecting a null hypothesis when it is true. The significance level used in this study is 5 percent. Only those differences statistically significant at the 5 percent level are reported.

Solo-Visitor - a "wilderness visitor" who enters, recreates, and departs the Upper Kiamichi River Wilderness alone, as a solitary individual.

Survey Population - All individuals, 16 years of age or older, who visited the Upper Kiamichi River Wilderness for recreational purposes between April 1, 1991, and March 31, 1992, and who registered at one of four voluntary trail registers.

Talimena Drive Off-Trail - An entry to or exit from the UKRW at any point along the Talimena Scenic Drive flanking the northern border, directly into the bush.

Target Population - All individuals, 16 years of age or older, who visited the Upper Kiamichi River Wilderness for recreational purposes, between April 1, 1991 and March 31, 1992.

Type of Home Residence - Any of five categories delineated as follows:

Farm or Rural: having a population of less than 2500 people.

Town: having a population of 2500 to 9999 people.

Small City: having a population of 10,000 to 49,999 people.

Medium City: having a population of 50,000 to 99,999 people.

Large City: having a population of 100,000 or more people.

Use-conflict - An experience by a UKRW visitor at the UKRW with one or more of the following:

- a. hearing a mechanical noise originating from within the area;
- b. unfavorable encounter between a hiker and horseback rider;
- c. encountering a private land ownership (inholding) within the area;
- d. encountering a individual who owns private

land within the UKRW (inholdee) operating a vehicle;

- e. encountering any individual operating a motorized all-terrain vehicle
- f. unfavorable encounter between a hunter and a non-hunter.

Use-impact - Cognizance by a UKRW visitor at the UKRW of one or more of the following:

- a. obvious evidence of use of the area by others;
- b. evidence of past logging activity;
- c. trash and litter commonly seen;
- d. obvious campsites of previous visitors;
- e. badly eroded and poor quality trails.

Weekday - Designation given to a wilderness visit that occurred on a Monday, Tuesday, Wednesday, and/or Thursday.

Weekend - Designation given to a wilderness visit that occurred on a Friday, Saturday, and/or Sunday.

Wilderness - any federal land resource designated by Congress as a unit of the National Wilderness Preservation System, in accordance with provisions of the Wilderness Act of 1964 (P.L. 88-577), the Eastern Wilderness Act of 1975 (P.L. 93-622), or other applicable legislation.

Wilderness Character - Cognizance by a UKRW visitor of one or more of the following:

- a. UKRW provides a great opportunity for solitude;

- b. UKRW is large enough to provide a true wilderness experience;
- c. UKRW is clean, pure, and little impacted by humans;
- d. UKRW provides a high quality wilderness experience;
- e. UKRW has a great sense of wildness.

Wilderness Knowledge - Congruence of an individual's knowledge of wilderness with the definition and provisions of wilderness as delineated in the Wilderness Act of 1964 (P.L. 88-577).

Wilderness Visitor - any individual who knowingly enters a unit of the National Wilderness Preservation System expressly for the purpose of recreational pursuits.

## CHAPTER II

### LITERATURE REVIEW

#### Current Status of Wilderness

#### Use and Management

Recreational use of wilderness in the United States, particularly hiking and backpacking, continues to increase, though use is levelling off on many units of the National Wilderness Preservation System and other backcountry on federal lands (Spencer *et al.* 1980, Petersen 1981, Lucas 1989, Lucas and Stankey 1989, Cordell *et al.* 1990). Cordell and Hendee (1982) predicted a moderate increase in the demand for wilderness opportunity to the year 2000 at a rate slightly greater than population growth, but less than the rate for the 1970s. Hendee and Ewert (1993) predicted that the National Wilderness Preservation System will grow in size to about 120 million acres (currently 95 million acres) as the allocation process continues.

Though use records for many units are scant or non-existent, data on the use of U.S. Forest Service (FS) wilderness presently comprise the main available record of wilderness recreational use and trends (Roggenbuck and Lucas 1987). Per-acre use densities are highest on FS units and lowest on units administered by the U.S. Fish and Wildlife

Service (FWS), whereas per-mile trail densities are highest on FWS units and lowest on those administered by the Bureau of Land Management (BLM) (Washburne and Cole 1983).

On National Forests, use peaked in the 1970s and early 1980s for some areas. In 1986, wilderness use accounted for six percent of all recreational use on FS lands, and the level of wilderness use was 35 percent of that of total campground use (Lucas 1989). By 1991, recreation on FS wilderness accounted for 12.8 million visitor-days or 4.6 percent of the total recreation visitor-days on FS lands, despite an increase in total FS wilderness area (USDA Forest Service 1992).

On wilderness administered by the National Park Service (NPS), use similarly peaked before 1982 and has leveled off since then, accounting for about seven percent of all overnight use. Wilderness use is expected to remain an important form of recreational use at National Forests and National Parks (Lucas 1989).

Summarizing a survey of wilderness managers, Washburne and Cole (1983) concluded that problems with crowding, use conflicts, and resource damage appear to be most pronounced and the need for management was greatest in FS units. Often cited problems included lack of solitude, litter, hiker conflicts with hunters and outfitters, and illegal uses, especially use of motor vehicles and illegal grazing. Nonconforming but legal uses, including private inholding

use and mineral activities, also posed conflicts at some units. Many managers noted that lack of buffering results in visual and sound intrusion, trespass, and pollution problems.

Problems were less pronounced in NPS units, likely due to more intensive management, including the establishment of carrying capacities and the institution of controls before potential damage or impact occurs. Forest Service tradition has emphasized freedom of choice in wilderness use, applying restriction only after significant resource damage or lack of solitude has occurred. The use of the Limits of Acceptable Change (LAC) tool in FS wilderness planning presently has altered this tradition somewhat. Rather than solely relying on carrying capacities, the LAC management planning approach focuses on defining appropriate wilderness conditions and opportunities and on identifying cost-effective, measurable, and manageable indicators of quality for a wilderness area (Stankey *et al.* 1985, Brown *et al.* 1987, Watson *et al.* 1992).

Citing that wilderness use and user research was less common in the 1980s than in previous decades, Roggenbuck and Lucas (1987) stressed its critical importance for present and future effective wilderness planning and management. Knowledge about the numbers and types of users, their characteristics, use patterns, and preferences is fundamental to wilderness planning and management, aiding in predicting the effects of alternative management on visitor

choices, behavior and experiences (Clark 1986, Hammitt and Cole 1987, Krumpe and Lucas 1987, Stankey and Schreyer 1987, Watson *et al.* 1992).

### Visitor-Use Measurement Techniques

Techniques tested and utilized to estimate and measure wilderness visitor use and use characteristics have been reviewed extensively in the literature (James 1971, Lucas and Oltman 1971, Leonard *et al.* 1980, Saunders 1982, Roggenbuck and Lucas 1987, Burde and Daum 1990, Chilman *et al.* 1990, Hendee *et al.* 1990). Mechanical devices, including traffic counters on access roads (Lucas 1964, James and Henley 1968), electric-eye counters on trails (James and Schreuder 1972, Leonard *et al.* 1980), movie and time-lapse camera systems (Leatherberry and Lime 1981, Marnell 1977) and pressure-plates (Lucas *et al.* 1971, Leonard *et al.* 1978, Leonard *et al.* 1980) have been used in many wilderness, backcountry and river recreation studies. Bloedel (1987) recommended that procedures and techniques used to monitor visitor use should be compatible with the ethic of minimum impact (i.e. non-motorized, non-mechanical, temporary, and sensitive to wilderness preservation).

Monitoring use with voluntary self-registration stations at trailheads was first tested by Wenger (1964), and has since been modified and refined through research by Wenger and Gregerson (1964), James and Schreuder (1971), Lucas *et al.* (1971), Echelberger and Moeller (1977), Leonard



et al. (1980), Echelberger et al. (1981), Leatherberry and Lime (1981) and Petersen (1985). Though voluntary registers have been demonstrated to be effective for wilderness visitor use estimation (James and Schroeder 1971, Echelberger et al. 1981, Scotter 1981), erratic compliance rates in some studies have prompted some concern. Not all visitors uniformly register at trailheads. Hunters, visitors on horseback, outfitted groups and repeat visitors particularly have exhibited low rates of compliance in many studies (Lucas et al. 1971, Lucas 1975, Lucas and Kovalicky 1981, Roggenbuck and Lucas 1987).

Several reports have noted that trail registers placed some distance up the trail typically yield higher rates of registration compliance (Leatherberry and Lime 1981, Lucas and Kovalicky 1981, Scotter 1981, Petersen 1985). Wenger (1964), Leonard et al. (1980), Leatherberry and Lime (1981) and Petersen (1985) recommended that trail registers in U.S. Forest Service (USFS) wilderness areas incorporate standard USFS signage, with a simple and straightforward request that visitors register each time they visit the area, stating the importance of visitor registration for future wilderness management.

According to standard USFS procedure, one member of each group, typically a designated group leader, is requested to complete a registration card on behalf of the group. Survey samples can then be drawn from the total registration list for an area. Surveying only group

leaders, however, may result in potential survey response bias, particularly as it relates to socioeconomic characteristics of the group (Jubenville 1971, Peterson and Lime 1973). Registration instructions that direct visitor groups to include the names and mailing addresses of all group members may elicit a sampling pool that more accurately reflects visitor traits and characteristics.

A trail map should also be made available to all visitors at trailhead registers, to assist them in developing a mental plan for use of the area (Ormrod 1984). A calendar, an ample supply of registration forms, and a supply of pencils placed at each trail register will facilitate the registration process. Moreover, a well-supplied and a well-maintained register is indicative of the wilderness management commitment of the administering agency.

Lucas (1983) reported voluntary registration compliance rates ranging from 20 to 74 percent in a review of 11 studies, prompting a suggestion for the consideration of a mandatory wilderness use permit system. Earlier, Hendee and Lucas (1973) called for mandatory permits, though Behan (1974) argued that such a posture was too authoritarian, heavy-handed, and the antithesis of wilderness recreation. Lucas and Kovalicky (1981) later suggested the use of self-issued permits at trailheads. Regardless where this debate heads in the future, reported voluntary compliance rates of 70 percent (Leatherberry and Lime 1981), 78 percent (Scotter

1981) and 88 percent (Petersen 1985) qualify self-registration at trailheads as a valid and unobstructive tool.

### Visitor Survey Methods

The range of survey methodologies for acquiring wilderness visitor use characteristics and patterns has included mail surveys, household surveys, roadside surveys along access roads (cordon sampling), sampling from those who purchase hunting and fishing licenses or those who use outfitter services, on-site interviews, interviewing while roaming through the area, and waiting at fixed points along travel routes within the area (Lucas and Oltman 1971, Bowley 1979, Fazio 1979, Leonard *et al.* 1980, Lucas 1980a, Lucas 1980b, Wellman *et al.* 1982, Warren 1980, Roggenbuck and Lucas 1987). Though each technique has proved to be of value in one or more research situations, caution and consideration must be exercised in designing and implementing wilderness visitor surveys that are unobtrusive and not a hindrance to visitor privacy and the character of the wilderness experience (Robertson 1986, Roggenbuck and Lucas 1987).

Dillman (1978) and Brown and Wilkins (1978) have presented guidelines for conducting successful mail sample surveys that potentially render high rates of response. Their methodology included the development of a survey questionnaire of general pleasing appearance, visually

uncluttered, printed on high quality paper, and bound in an easy-to-use booklet format. They encouraged that this be accompanied by a cover letter of similar quality, designed to motivate response by explaining the usefulness of the research and the importance of the results. Follow-up to nonrespondents included a series of reminders sent at intervals of about two weeks. Two or three follow-ups were recommended, typically starting with a reminder postal card, followed later by a second cover letter and replacement survey, and if the situation warrants, a third registered mailing including yet another cover letter and a survey form.

Brown and Wilkins (1978) demonstrated that even with a rate of response as high as 70 percent, nonresponse can strongly bias variable estimates. Choi *et al.* (1992) found significant differences across three respondent groups for most variables in a study of anglers. Dolsen and Machlis (1991) expressed concern about nonresponse bias when mail survey response rates fall below 65 percent.

On the other hand, Becker and Iliff (1983) and Hammitt and McDonald (1982) reported, that when dealing with certain homogeneous groups in which respondents have a common interest, high response rates, and therefore, extensive follow-ups were not necessary to avoid nonresponse bias. Wellman *et al.* (1980) reported that no important differences were identified in a date-of-return analysis, suggesting that the time, effort and dollars spent in intensive follow-

ups, which may be bothersome to respondents, might be better expended on other phases of the research process.

### Wilderness Visitor Demographic Characteristics

Lucas (1985), Roggenbuck and Lucas (1987), Lucas (1989), Roggenbuck and Watson (1989), Hendee *et al.* (1990) and Watson *et al.* (1992) have provided thorough profiles of modern wilderness recreational visitors, and their use characteristics and patterns, dispelling the stereotypical myth of wilderness visitors as being primarily wealthy, eastern, male urbanites. Wilderness visitors tend to be younger than the general population, yet all age groups are fairly well represented. Physical ability is less critical as a barrier to participation than is lack of interest. Women account for about 25% of all use of wilderness, currently, especially on smaller areas where hiking is the dominant mode of travel. Christensen *et al.* (1987) reported that males have a longer history of use in dispersed wildland recreation areas of the Pacific Northwest, but that females are expected to increase their visitation in the near future.

Most wilderness visitors are from urban areas, as are most Americans. However, because visitors do not typically travel long distances to visit wilderness, the proportion from urban areas depends largely on the degree of nearby urbanization. Norgaard *et al.* (1979) reported that almost

80 percent of visitors to wilderness areas in Montana were Montana residents. Lucas (1989) noted that over 90 percent of visitors to wilderness areas in southern California came from cities in the region having populations in excess of one million people. Watson *et al.* (1992) determined that in-state residents were the predominant visitors of the Cohutta Wilderness in Georgia (83 percent) and the Upland Island Wilderness in Texas (99 percent). Though the percentage of in-state residents visiting the Caney Creek Wilderness in Arkansas was much lower (23 percent), the highest proportion of out-of-state visitors were urbanites from Louisiana and Texas.

Visitors to most wilderness areas are typically above average in income, as are almost all types of outdoor recreationists, but usually only moderately so (Vaux 1975, Lucas 1989, Hendee *et al.* 1990). Persons in professional-technical occupations and students form the majority of visitors to most wildernesses. Twenty to 40 percent of visitors of working age represent occupations that emphasize working with people, ideas or abstractions, including the fields of education, research, social service, and religion, rather than working with things. About 25 percent of wilderness visitors are students, with housewives and skilled-laborers each accounting for about 10 percent of use in the areas studied.

Twenty to 30 percent of wilderness visitors belong to a conservation group or outdoor recreation activity club, the

affiliation of about 40 percent of these being of a wilderness or preservation orientation.

The characteristic that most distinguishes wilderness visitors from the general population is a high educational level. From a range of studies, it has been discerned that with few exceptions, 50 to 85 percent of wilderness visitors have attended college, and 20 to 40 percent have done graduate study (Roggenbuck and Lucas 1987, Lucas 1989, Hendee *et al.* 1990, Watson *et al.* 1992).

#### Wilderness Visitor Use Characteristics and Patterns

Most wilderness visits are short, with overnight trips averaging two to three days. Day-use is common, and it is the primary mode of use at many smaller wilderness areas. Trips exceeding one week are becoming less common. Group size is typically small, with two- to four-person parties accounting for 50 to 75 percent of use. Lone visitors are uncommon, as are visitor groups exceeding 10 individuals in number.

Hiking is the most common mode of travel, except in some western wilderness where users on horseback account for more than half of the use, and in the Boundary Waters Canoe Area Wilderness where 80 percent of the visitors travel by canoe. In addition to travel activities, other common recreational pursuits in wilderness include fishing, photography, nature study, wildlife observation, and

swimming. Hunting ranges from minor to common in those areas open to hunting.

Summer is the peak season of use, even in areas that experience high rates of use by hunters in the fall. Some areas of the South, Southwest, and lower elevations of California receive much of their use during spring or winter. Weekend peaks are typical, but becoming less common (Roggenbuck and Lucas 1987, Lucas 1989, Hendee *et al.* 1990).

The principal visitor unit in wildland recreation is the established social group, particularly the family (Cheek and Burch 1976, Kelly 1981, Allen and Donnelly 1985). Wilderness users are no exception. Most people visit in family groups, followed in importance by groups of family and friends, and groups of friends. One-third to one-half of all wilderness visitor groups include children under 16 years of age. Use by large organized groups is declining in importance (Roggenbuck and Lucas 1987, Lucas 1989, Hendee *et al.* 1990). Hendee *et al.* (1977), Cheek (1981), Twight *et al.* (1981) and Hammitt (1982) suggested that intimacy in a small group of friends, including the freedom to limit one's attentions and degree of interaction with others is an integral component of the wilderness and similar backcountry solitude experience.

Use patterns within many wilderness areas are uneven. In some areas, only a small proportion of entry portals, trails and/or water routes account for the greatest proportion of all use. Use is mostly trail-related, with



fewer than 20 percent of visitors to Forest Service wilderness doing any off-trail travelling. Campsite use is often uneven at many areas as well. Such data is critical for wilderness management, since use distribution strongly affects two very critical wilderness qualities: natural ecosystems with little or no evidence of human impact, and visitor experiences affording an unconfined sense of solitude (Lucas 1989, Hendee et al. 1990, Lucas 1990).

#### Wilderness Visitor Preferences for Wilderness Management

Visitor preferences for management have been studied and reviewed by many (Stankey 1973, Echelberger and Moeller 1977, Anderson and Manfredo 1986, Stankey and Schreyer 1987, Shindler and Shelby 1993). Though preferences vary somewhat, most wilderness visitors prefer indirect light-handed, and unobtrusive management that fosters and provides optimal opportunities for primitive experiences in primitive environments. The views of wilderness managers are very similar. Bury and Fish (1980) reported results of a survey of all units of the National Wilderness Preservation System, noting that managers favor light-handed techniques and controls congruent with the legal mandate for challenge, freedom, and unconfined recreation in wilderness.

Stankey and Schreyer (1987) were more cautious, stating that not all wilderness visitors have their own unique conception about how to manage wilderness, and that there is

considerable variation in the attitudes of visitors to management. Based on review of limited cross-sectional studies and the trend study by Lucas (1985), they point out, however, that there appears to be a move toward a more appreciative and less consumptive style of wilderness recreation use, leading to a decline in support for development and heavy-handed forms of management, with increasing support for educational and information-based management. When overuse becomes a problem, visitors are inclined to accept more direct and heavy-handed controls, but they also desire to understand the base of support for use restrictions when conditions warrant them (Anderson and Manfredo 1986, Stankey and Schreyer 1987, Shindler and Shelby 1993).

#### Wilderness Visitor Motives

The fact that not all wilderness visitors have similar philosophies, value systems, motive profiles, preferences, and behaviors constitutes the crux of the wilderness management dilemma. Godin and Leonard (1979) discerned that many wilderness visitors and even many managers of wilderness are often confused about the definition and meaning of wilderness. Despite this, managers must be able to gauge visitor expectations and motives as they strive to provide opportunities for high quality and satisfying wilderness experiences.

Driver (1977) conceptualized the reasons or motives for people engaging in recreational behavior as "recreation experience preferences," further expanding and refining the conceptual nature of leisure motives in more recent reports (Driver 1983, Driver *et al.* 1991). Driver and Brown (1978) further theorized that need initiates behavior, leading to a fulfilling outcome. They refined the concept of needs, to that of motives that act upon a set of needs, thereby referring to motives as "desired psychological outcomes." In a review of the probable personal benefits of outdoor recreation, Driver and Brown (1987) posed a taxonomy of personal benefits and a recreation experience scale comprised of experience preference domains.

The structure of motivations typically does not generalize across the individuals who visit any given wilderness (Roggenbuck and Schreyer 1977, Bowley 1979, Haas *et al.* 1979, Schreyer *et al.* 1984, Hammitt *et al.* 1986, Williams *et al.* 1990). Multiple motives underlie most wilderness participation (Driver and Knopf 1976, Haas 1979, Stankey and Schreyer 1987), and socioeconomic variables alone are inadequate to fully explain variations in wilderness participation (Young 1983).

Since motives represent reasons why individuals visit wilderness, it is reasonable to assume that they are related to satisfaction with the character and conditions of the wilderness area that are encountered. For a motive that is high, such as the motive for solitude, it is anticipated

that a close correlation would exist between the extent to which the motive is satisfied and the actual use conditions that foster its realization, such as a low level of encounters.

Further, the specificity and intensity of motives is likely influenced by factors such as previous wilderness experience and extent of wilderness knowledge. It would prove useful to focus on identifying variations in the intensity with which motives are held and the specificity with which they are defined by different subgroups within the wilderness visitor population of an area (Stankey and Schreyer 1987).

#### Wilderness Purism and Knowledge Scales

Some wilderness researchers have suggested that the ideas and inputs of certain visitors may be more relevant and useful as feedback in the planning and management of wilderness than those of others. Hendee *et al.* (1968) devised a "wildernism" attitude scale to discern varying levels of wilderness purism. They posited that the views of wilderness purists represented the opinions of the group of visitors most perceptive of wilderness values and should receive added consideration, where appropriate, to prevent contemporary change in wilderness qualities. They further stressed that wilderness management should not be as

sensitive to the preferences of users whose activities do not depend exclusively on wilderness for their satisfaction.

Stankey (1972) similarly stated that the quality of wilderness recreation can be judged only by examining the extent to which the motivations and objectives of the visitor who seeks the type of opportunity provided by wilderness are fulfilled. To identify this type of visitor from the wilderness visitor population, he proposed an attitude scale designed to measure the extent to which an individual's perception coincided with the objectives embodied in the Wilderness Act of 1964. Responses were scored along a purism continuum, with strong purists suggested as the most relevant user group for wilderness management decisions. He concluded that the development of a management orientation closely aligned with purist views and motivations will likely foster the continued existence of purist attitudes within the visitor clientele of an area.

Stankey (1972) did exercise caution, however, pointing out that the purist concept, as an attitudinal concept, only taps the affective element of attitude and not the cognitive and behavioral elements. Heberlein (1977) argued that although attitude surveys can provide management with valid and useful information about user preferences, they must be utilized with great caution since the bulk of empirical evidence suggests no clear linear relationship between single attitudes and behavior. Stankey and Schreyer (1987) also pointed out that wilderness purism scales have not

achieved widespread concurrence and utilization, suggesting that the purist label may carry with it an elitist connotation that runs contrary to the more democratic notion of management.

Other refinements of such scales have been tested. Schreyer and Roggenbuck (1978) and Warren (1980) devised wilderness attitude scales similar to that of Stankey (1972). Young (1982) utilized Stankey's scale to gauge a difference in wilderness purism between users and non-users of the Boundary Waters Canoe Area.

Earlier, Young (1980) developed an "information index" to measure the amount of factual knowledge that survey respondents had regarding wilderness. Items in the index related to the definition and management of wilderness as inferred in the Wilderness Act of 1964. He also constructed an "approval scale" designed to determine the amount of support respondents had for the wilderness concept and uses that they considered acceptable. He found that those who had the highest knowledge index in wilderness had the highest approval rating, substantiating his theory that informational context or level is a major factor in influencing opinions in environmental issues.

In a later study designed to ascertain the factors that are most important in influencing wilderness participation, Young (1983) reported that his wilderness knowledge scale (Young 1980) was the second most important factor, behind gender, for predicting who used or intended to use

wilderness. Stankey's (1972) scale was also effective as a predictor, but to a lesser extent.

Fazio (1979) developed a wilderness knowledge questionnaire to aid in the identification of Selway-Bitterroot Wilderness visitors who would be logical choices for a prioritized information campaign and to help in tailoring communication messages to specific target groups. His instrument tapped five domains, including wilderness concept, wilderness ethics, wilderness management, personal safety and equipment, and biophysical knowledge of the area.

Despite some questions regarding the suitability and utility of such wilderness knowledge and purity scales, there seems to exist some continued support for basing wilderness management strategies on the aspirations and inputs of individuals whose knowledge of wilderness and whose definition of the wilderness experience aligns closely with the spirit and intent of the Wilderness Act of 1964, and with existing wilderness management objectives (Vaske et al. 1980, Weingart 1985, McDonald 1987).

#### Wilderness Experience and Level of Specialization

Several investigators have suggested that the motives and inputs of those wilderness visitors with a more diverse wilderness experience use history and a greater level of specialization for wilderness dependent activity be relied upon more heavily in wilderness planning and management. It

is thought that such individuals are more sensitive to various conditions that enhance or detract from the wilderness character of an area and its ability to provide a true wilderness experience (Ditton *et al.* 1983, Hammitt and McDonald 1983, Schreyer and Lime 1984, Graefe *et al.* 1986, Lucas 1986, Hammitt *et al.* 1989). Virden and Schreyer (1988) noted that highly specialized backpackers were less likely to prefer settings characterized by intensive management, such as directional signing and trail maintenance, and more likely to prefer rugged terrain, naturalness, party size limits, and fewer encounters. Schreyer and Lime (1984) however cautioned that a novice at a specific area may actually have considerable experience from other areas.

Williams *et al.* (1990) reported that the motive factor structure of distinct "experience use history" groups became increasingly complex with higher levels of experience, suggesting that as a person gains more experience, their psychological representation of complex domains like motivation evolve in content and complexity. Patterson and Hammitt (1990), however, discerned no relationship between a past experience index and encounter norm groupings as related to wilderness solitude, concluding that other factors, such as the characteristics and behavior of those encountered, may have more critical relevance.

The reasons why visitors engage in specific activities or why they visit certain recreational environments can



influence the degree of impact that they might have on the area (Hammit and Cole 1987). For example, an individual who is motivated to visit an area for the purpose of solitude is likely to produce less negative impact on the experience quality of others than another whose motive is affiliation with others in a motorized form of recreation. As well, a visitor to wilderness motivated to study and experience nature is less likely to produce impact than one whose motivation is simply to escape the home and work environment.

Yet, caution must be exercised in speculating on visitor motivations, their relationship to impact, and their relevancy in wilderness planning and management. McDonald and Hammit (1986), Schreyer and Roggenbuck (1978) and Brown and Haas (1980), among others, have demonstrated that visitors engage in different activities, in different ways, for different reasons, and they participate in the same activities for different reasons. Lime *et al.* (1981) posed the tenet that recreationists seeking different experiences react differently to particular environmental features, assign different priorities to alternate management strategies, and find different sources of satisfaction.

Obviously then, a sound management plan must identify subgroups (i.e. hunters and non-hunters, hikers and horse-riders, etc.) in the visitor population and determine how they differ with respect to support for management actions. As well, it must specify how and if the likely diverse needs

of each subgroup will be met. The call for management from each will most likely be different (Schreyer and Roggenbuck 1978, Bowley 1979, McDonald and Hammitt 1986).

### Quality and Satisfaction in Wilderness Recreational Use

The fact that visitors to wilderness seek quality or satisfaction in their experiences has long been recognized by managers of wilderness. There still remains a critical need for identifying the factors that lead to satisfaction and for assessing the extent to which satisfaction is realized by various users and user subgroups.

Schreyer and Roggenbuck (1978) equated quality or satisfaction in recreational experience with expectations being met by perceived realities, citing reference to expectancy theory. They further drew on discrepancy theory, stating that satisfaction is determined by differences between perceived outcomes an individual receives and the outcomes an individual thinks they should receive. Overall satisfaction in any situation, then, is influenced by the sum of the discrepancies that exist for each facet of the situation at hand.

Dorfman's (1979) results suggested that an individual's overall satisfaction was most dependent upon their perceived degree of presence of the conditions deemed valuable to the experience. Components frequently associated with camping satisfaction were quality conditions (e.g. scenic beauty,

good weather, absence of crowding), a setting that provided opportunities for peace, tranquility, relaxation and mental rest, and the opportunity to engage in social-interpersonal relationships. Secondly, satisfaction was influenced by the difference between what visitors perceived and what they preferred. Least of all, satisfaction reflected differences in what was perceived and what was expected, contrary to discrepancy theory. Dorfman (1979) further pointed out that many factors that detract from satisfaction, such as crowding, are directly amenable to management control, whereas intervening variables, such as weather, are important and possibly the single largest contribution to satisfaction and dissatisfaction for most outdoor activities. Unfortunately, such intervening variables are not subject to management control.

Haas *et al.* (1979) reported that physical setting attributes, including meadows, forests, water, wildlife and unique natural features contributed most to satisfaction, whereas man-made intrusions and nuisances detracted most from satisfaction. The factors considered most critical in selecting a specific wilderness environment are likely to vary depending upon the location and type of environment involved, and the range and extent of experience of the visitors (Beaulieu and Schreyer 1985, Lucas 1990).

Unnatural sounds in wilderness, particularly mechanical sounds originating from within or from the outside of the area may play a critical role in determining experience

quality. Anderson *et al.* (1982) discerned that natural sounds, such as birds, water, and wind, are perceived as more aesthetic than human-caused sounds, and that sounds are perceived as louder in more vegetated, rural settings, where quiet and privacy are expected to a greater degree than in public areas in urban settings. Also, some sounds are better tolerated when they are deemed appropriate.

Certain specialized or experienced users in a wildland recreation activity may be more sensitive and discriminating in their evaluations of sounds in outdoor areas, such as parks, forests, and wilderness, where people seek peace, quiet and relaxation. Kariel (1980) concluded that mountaineers considered natural sounds to be more pleasant, and human-related and technological sounds more annoying than did other visitors to such areas. Mountaineers were more intolerant of sounds which interfered with the desire to enjoy the natural scene and to escape from the technological, urban environment.

Stankey (1973), Vaske *et al.* (1982), West (1982), Stankey and Schreyer (1987), and Watson *et al.* (1992) noted that the most commonly cited sources of dissatisfaction have to do with the presence of others, their behavior, or their perceived impacts. Litter is probably the single greatest negative factor encountered in a wilderness setting, a factor that is somewhat subject to management control either through education or enforcement. Much of the undesirable human behavior with which management must contend in

wilderness is behavior that disrupts the natural order or the ability of others to experience it (Wallace 1990).

Watson *et al.* (1992) discovered five factors that could be utilized as potential indicators of experience quality at the Caney Creek Wilderness. In order of importance to visitors of the area, these indicators included site impacts, sound and sight intrusion, the number of wild animals seen per day, horse encounters, and encounters with other visitors.

Potentially perplexing to management is the likelihood that the perception of satisfaction varies across the range of visitors at any given area, each having varied and perhaps conflicting motives. Anderson (1980) discerned differences in the evaluations of impact across four motive profile types created from analysis of visitors to the Boundary Waters Canoe Area Wilderness. Vaske *et al.* (1980) showed that individuals who had first visited the Apostle Islands National Lakeshore several years earlier tended to evaluate environmental damages and use levels more negatively than those who visited more recently. Shindler and Shelby (1993) concluded that traditional wilderness groups, such as hunters, horsepackers, and backpackers are often tolerant of impact on the physical resource, and that they tend to judge the quality of their experience more on the basis of social conditions or crowding levels.

Heberlein *et al.* (1982) recognized that hunting is characterized by having multiple satisfactions beyond

seeing, shooting, and bagging game. They reported that density of hunters was found to have both positive and negative effects on satisfaction, suggesting that management consider providing different density opportunities for different satisfying hunting experiences. The applicability of this finding to the management of wilderness visitor densities is intriguing.

Vaske et al. (1982) noted that consumptive recreationists typically report significantly lower satisfaction than do nonconsumptive recreationists. Satisfaction ratings for successful hunters and fishermen were higher than those reported by unsuccessful consumptive recreationists, but lower than those reported by nonconsumptive user groups. Similarly, Applegate and Clark (1987) showed that more knowledgeable birders reported significantly lower satisfaction levels than less knowledgeable birders, suggesting that differences may be related to the goal specificity of advanced birders which renders this activity more similar to a consumptive form of recreation.

Visitor dissatisfaction may result as much from differences in individuals as it does from objective conditions of the environment. Variations in motivations, previous experience, type of recreation activity, and goal specificity all play a significant role in evaluations regarding satisfaction (Stankey and Schreyer 1987).

Measurement and quantification of visitor satisfaction is a critical, yet perplexing task for managers of wildland resources (Dorfman 1979, Williamson *et al.* 1990, Hawkes *et al.* 1992). Schomaker and Knopf (1982a) devised a scale that taps five contributing elements of satisfaction, including general enjoyment, comparison with an ideal, equitable fulfillment, behavioral intention, and dissatisfaction. Their scale was developed and refined through pretesting of a 15-item inventory on a sample of 1000 river users. Schomaker and Knopf (1982b) concluded that the scale is adaptable to other activities and settings by substituting the appropriate referent for "river" in selected items. Vaske *et al.* (1982) proposed a satisfaction scale that asked a single question: "Overall, how would you rate your day/trip?", coding responses on a six-point response scale. This single-item scale has been tested and compared in 12 separate studies across the United States.

Satisfaction alone, however, may not be the best criterion used to shape and evaluate management. Since the segment of the user population that spent more time and energy in the pursuit of their activity (birdwatching) reported lower satisfaction than their more casual counterparts, Applegate and Clark (1987) concluded that measures of satisfaction may be poor indicators of social benefits. Stressing the multidimensional nature of satisfaction, Shelby (1980) suggested that satisfaction is not likely a useful criterion for managing use levels.

Shelby and Heberlein (1986) concluded that neither use levels nor encounters are useful as predictors of satisfaction. If use increases on an area, displacing certain visitors with those more tolerant of higher use levels, management will likely discover that satisfaction levels remain high despite the fact that the nature of the experience has changed. Heberlein and Shelby (1977), Manning and Ciali (1980), Manning (1986) and Williamson *et al.* (1990) similarly stated that the phenomena of displacement and product shift may redefine the visitor population and the experience, yet resulting in consistent high satisfaction levels of visitors.

Heberlein and Shelby (1977), Brown *et al.* (1987), Stankey and Schreyer (1987), Hendee *et al.* (1990) stressed that management must be based on values, specifying as clearly as possible the consequences of management alternatives in terms of the character of the experience. By understanding how visitors evaluate their experiences, managers can better manage wilderness resources and those who use them for recreational purposes (Driver *et al.* 1987, Driver *et al.* 1990). Research can assist management by providing information on the characteristics of the experience that are most important for a satisfying experience, particularly focusing on characteristics that are indeed manageable (Williamson *et al.* 1990, Watson *et al.* 1992, Shindler and Shelby 1993).



## CHAPTER III

### METHODS AND PROCEDURES

#### Delimitations

The study was delimited to the Upper Kiamichi River Wilderness of the Ouachita National Forest in Oklahoma (Figure 1), and to those individuals 16 years of age or older who registered their visit at one of four trailhead registers there, between April 1, 1991 and March 31, 1992.

#### Geographic Location and Description of the Upper Kiamichi River Wilderness

The Upper Kiamichi River Wilderness (UKRW) is located in LeFlore County, Oklahoma, about 30 miles south of Poteau and 30 miles east of Talihina, Oklahoma (see map, inside back cover). Four major metropolitan areas lie within a three- to five-hour drive of the UKRW. Tulsa is situated 135 miles to the northwest, Oklahoma City lies 160 miles to the west, Dallas, Texas, is 220 miles southwest, and Little Rock, Arkansas, is 140 miles to the east. The area encompasses 9691 acres of the Ouachita National Forest, and it includes 1458 acres of private inholdings comprising eight distinct blocks of land.

The UKRW is flanked in part to the north, west and south by units of the Winding Stair Mountain National Recreation Area, including the Beech Creek Botanical Area, the Black Fork Mountain Wilderness Area, and the Robert S. Kerr Memorial Arboretum, Nature Center, and Botanical Area, all administered by the U.S. Forest Service. Other lands adjoining the area to the west, south, and east include portions of the Ouachita National Forest managed for multiple uses, interspersed with some private ownerships.

The Talimena Scenic Drive (Oklahoma Highway 1) delineates the northern boundary of the UKRW, a meandering U.S. Forest Service road and the Oklahoma-Arkansas state line mark the eastern boundary, and a Kiamichi Electric powerline and an old forest road (road-blocked) form the western border. The Ouachita National Trail marks the western half of the southern boundary of the UKRW, while topographic features and old forest roads delineate the eastern half of the southern boundary. The boundary is clearly marked by closely-spaced, standard U.S. Forest Service wilderness boundary signs nailed to trees. Access is provided by four official trailheads (Pashubbe Creek, Kiamichi River, Horsepen Creek, and Stateline) and the bordering roads and right-of-way as noted above (Table 1, page 50).

The northern portion of the UKRW is situated along the south-facing slope of Rich Mountain, with elevations approaching 2600 feet above sea level. The headwaters of

the Kiamichi River lie between Rich Mountain and the northern flanks of Pine Mountain (elevation 2143 feet) in the eastern portion of the UKRW. Horsepen Creek flows to the southeast from Pine Mountain. In the western portion, Pashubbe Creek drains the area bounded to the north by Rich Mountain and flanked to the east by Wilton Mountain (elevation 2556). The lowest elevation (1080 feet) is at the point where the Kiamichi River flows across the southern border near the Kiamichi River trailhead. Slopes range from nearly level along river and creek terraces to almost vertical at points along the ridges. Rock outcroppings and rock flows are common on upper slopes.

TABLE 1  
UPPER KIAMICHI RIVER WILDERNESS PORTALS<sup>a</sup>

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Pashubbe Creek Trailhead  
 Kiamichi River Trailhead  
 Horsepen Creek Trailhead  
 Stateline Trailhead  
 Talimena Drive Off-Trail<sup>b</sup>  
 Bushwhack Off-Trail<sup>b</sup>

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<sup>a</sup>See map (inside back cover) for location of portals.

<sup>b</sup>See Glossary of Terminology (p. 12) for definition.

Forests comprise the principal vegetative cover of the UKRW. Shortleaf pine and several species of oak and hickory

dominate the slopes and ridges. Broadleaf species, including sweetgum, American beech, American holly, and several species of oak are commonly found along stream-courses. The forest understory includes flowering dogwood, serviceberry, eastern redbud and silverberry.

Grassy knolls and shrubby thickets are found along some of the dry ridgetops. In addition to a wide diversity of herbaceous plants, some site-specific or sensitive plants, including ginseng, jewel slip flower, and southern yellow lady's slipper can be found at UKRW (U.S. Forest Service 1992).

Wildlife species associated with the UKRW include white-tailed deer, wild turkey, fox squirrel, and an occasional black bear. Fish populations are limited to those species, such as sunfish, which can withstand the dry summer season in small pools along watercourses (U.S. Forest Service 1992).

A segment of the Ouachita National Recreation Trail (11.5 miles) traverses the UKRW from the Pashubbe Creek trailhead at the southwest corner of the area to the Stateline trailhead at the northeast corner. The five-mile segment between the Pashubbe Creek and Kiamichi River trailheads lies along the wilderness boundary, but to the outside of the boundary. The other six and one-half miles of the Ouachita National Recreation Trail are situated through the UKRW from the Kiamichi River trailhead to the Stateline trailhead.

The Ouachita National Recreation Trail is the only trail maintained by the U.S. Forest Service in the UKRW. It is well-marked with blue paint blazes on trees and rocks. In general, the trail is in good condition, with very few erosional rills or washouts.

Portions of the trail corridor follow old roadways that existed in the area prior to wilderness designation. The two-mile segment immediately east of the Kiamichi River trailhead leads to one of the private inholdings. Owners of land within this inholding occasionally travel along the segment in motor vehicles to access their property, and hence, tire ruts in the roadbed are commonly visible. Two over-grown, unmanaged wildlife food plots are situated along this two-mile segment of old road. The plots each are roughly one acre in size, and deteriorated barbed-wire fencing is present along the plot perimeters. Traces of other old trails and roads are evident elsewhere at UKRW, though none are marked nor are any maintained by the U.S. Forest Service.

Evidences of 13 campsites within the UKRW are clearly discernable along the Ouachita National Recreation Trail and other trails. At each site, one or more stone fire rings are visible, typically situated within five to 50 feet of the trail. Remnants of litter are visible at many of these camps. No fire rings or campsites have been discovered elsewhere within the UKRW. Campsites with fire rings are in

abundance immediately adjacent to the four trailheads, outside of the wilderness boundary.

Regional weather is mild in the spring and fall. Rain showers are common in April and May. Summers tend to be hot and humid, with afternoon thunderstorms commonly occurring from late June through August. Winters are mild and characterized by little snowfall.

### Research Hypotheses

Several hypotheses were investigated and tested during the course of this study. The hypotheses are listed in Table 2 in the order that they will be reviewed and discussed in Chapter IV.

TABLE 2

RESEARCH HYPOTHESES TESTED IN THE UPPER KIAMICHI RIVER WILDERNESS VISITOR SURVEY, 1991 - 1992

Hypothesis Number	Statement of Hypothesis
1	<p><math>H_0</math>: Expected frequencies within subcategories of demographic characteristics (Table 3, page 62) of visitors to the Upper Kiamichi River Wilderness (UKRW) are in equal proportion to one another.</p> <p><math>H_A</math>: Expected frequencies within subcategories of demographic characteristics (Table 3) of visitors to the UKRW are not in equal proportion to one another.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
2	<p><math>H_0</math>: Demographic characteristics (Table 3, page 62) of visitors to the UKRW are independent of seasonal influence.</p> <p><math>H_A</math>: Demographic characteristics (Table 3) of visitors to the UKRW are not independent of seasonal influence.</p>
3	<p><math>H_0</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4; page 63), viewed one pair at a time, are in equal proportion to one another.</p> <p><math>H_A</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time, are in equal proportion to one another.</p>
4	<p><math>H_0</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time, are independent of seasonal influence.</p> <p><math>H_A</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time, are not independent of seasonal influence.</p>
5	<p><math>H_0</math>: Expected frequencies within subcategories of UKRW visitor use characteristics (Table 5; page 64) are in equal proportion to one another.</p> <p><math>H_A</math>: Expected frequencies within subcategories of UKRW visitor use characteristics (Table 5) are not in equal proportion to one another.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
6	<p><math>H_0</math>: Expected frequencies within subcategories of UKRW visitor use characteristics (Table 5, page 64) are independent of seasonal influence.</p> <p><math>H_A</math>: Expected frequencies within subcategories of UKRW visitor use characteristics (Table 5) are not independent of seasonal influence.</p>
7	<p><math>H_0</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4, page 63) viewed one pair at a time and within subcategories of visitor use characteristics (Table 5, page 64) are in equal proportion at each of the six UKRW entry portals (Table 1; page 50).</p> <p><math>H_A</math>: Expected frequencies of UKRW visitor subgroups organized in seven pairs (Table 4) viewed one pair at a time and within subcategories of visitor use characteristics (Table 5) are not in equal proportion at each of the six UKRW entry portals (Table 1).</p>
8	<p><math>H_0</math>: There are no differences in the <b>motive</b> structures of UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in the motive structures of UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
9	<p><math>H_0</math>: The motive structure of UKRW visitors does not vary from season to season.</p> <p><math>H_A</math>: The motive structure of UKRW visitors varies from season to season.</p>



TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
10	<p><math>H_0</math>: There are no differences in the <b>wilderness knowledge</b> scale scores of UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in the wilderness knowledge scale scores of UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
11	<p><math>H_0</math>: The wilderness knowledge scale scores of UKRW visitors do not vary from season to season.</p> <p><math>H_A</math>: The wilderness knowledge scale scores of UKRW visitors vary from season to season.</p>
12	<p><math>H_0</math>: There are no differences in the perception of <b>wilderness character</b> of the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in the perception of wilderness character of the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
13	<p><math>H_0</math>: The perception of wilderness character of the UKRW expressed by UKRW visitors does not vary from season to season.</p> <p><math>H_A</math>: The perception of wilderness character of the UKRW expressed by UKRW visitors does vary from season to season.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
14	<p><math>H_0</math>: There are no differences in the perception of wilderness character of the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p><math>H_A</math>: There are differences in the perception of wilderness character of the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p>
15	<p><math>H_0</math>: There are no differences in the perception of use levels and crowding at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in the perception of use levels and crowding at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
16	<p><math>H_0</math>: The perception of use levels and crowding at the UKRW expressed by UKRW visitors does not vary from season to season.</p> <p><math>H_A</math>: The perception of use levels and crowding at the UKRW expressed by UKRW visitors does vary from season to season.</p>
17	<p><math>H_0</math>: There are no differences in the perception of use levels and crowding at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p><math>H_A</math>: There are differences in the perception of use levels and crowding at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
18	<p>H<sub>O</sub>: There are no differences in the perception of visitor <b>use-impact</b> at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p>H<sub>A</sub>: There are differences in the perception of visitor use-impact at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
19	<p>H<sub>O</sub>: The perception of visitor use-impact at the UKRW expressed by UKRW visitors does not vary from season to season.</p> <p>H<sub>A</sub>: The perception of visitor use-impact at the UKRW expressed by UKRW visitors does vary from season to season.</p>
20	<p>H<sub>O</sub>: There are no differences in the perception of visitor use-impact at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p>H<sub>A</sub>: There are differences in the perception of visitor use-impact at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p>
21	<p>H<sub>O</sub>: There are no differences in the perception of <b>use-conflict</b> at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p>H<sub>A</sub>: There are differences in the perception of use-conflict at the UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
22	<p><math>H_0</math>: The perception of use-conflict at the UKRW expressed by UKRW visitors does not vary from season to season.</p> <p><math>H_A</math>: The perception of use-conflict at the UKRW expressed by UKRW visitors does vary from season to season.</p>
23	<p><math>H_0</math>: There are no differences in the perception of use-conflict at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p><math>H_A</math>: There are differences in the perception of use-conflict at the UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p>
24	<p><math>H_0</math>: There is no correlation between UKRW visitor six-item satisfaction scale scores and single-item satisfaction scale scores.</p> <p><math>H_A</math>: There is a correlation between UKRW visitor six-item satisfaction scale scores and single-item satisfaction scale scores.</p>
25	<p><math>H_0</math>: There are no differences in the satisfaction scores of UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in the satisfaction scores of UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
26	<p>H<sub>O</sub>: UKRW visitors who report that they are successful at bagging game or catching fish while hunting or fishing have satisfaction scale scores that are no different from visitors who report that they are not successful in bagging game or catching fish while hunting or fishing.</p> <p>H<sub>A</sub>: UKRW visitors who report that they are successful at bagging game or catching fish while hunting or fishing have satisfaction scale scores that are different from visitors who report that they are not successful in bagging game or catching fish while hunting or fishing.</p>
27	<p>H<sub>O</sub>: UKRW visitors who report that they experience <b>inclement weather</b> during their visit have satisfaction scale scores that are no different from visitors who do not report experiencing inclement weather.</p> <p>H<sub>A</sub>: UKRW visitors who report that they experience inclement weather during their visit have satisfaction scale scores that are different from visitors who do not report experiencing inclement weather.</p>
28	<p>H<sub>O</sub>: UKRW visitors who report that they experience a use-conflict during their UKRW visit have satisfaction scale scores that are no different from visitors who do not report experiencing a use-conflict.</p> <p>H<sub>A</sub>: UKRW visitors who report that they experience a use-conflict during their UKRW visit have satisfaction scale scores that are different from visitors who do not report experiencing a use-conflict.</p>

TABLE 2 (Continued)

Hypothesis Number	Statement of Hypothesis
29	<p><math>H_0</math>: The satisfaction scale scores of UKRW visitors do not vary from season to season.</p> <p><math>H_A</math>: The satisfaction scale scores of UKRW visitors do vary from season to season.</p>
30	<p><math>H_0</math>: There are no differences in the satisfaction scale scores of UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p><math>H_A</math>: There are differences in the satisfaction scale scores of UKRW visitors belonging to different wilderness knowledge subgroups.</p>
31	<p><math>H_0</math>: There are no differences in preferences for management of UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4, page 63), viewed one pair at a time.</p> <p><math>H_A</math>: There are differences in preferences for management of UKRW expressed by UKRW visitor subgroups organized in seven pairs (Table 4), viewed one pair at a time.</p>
32	<p><math>H_0</math>: UKRW visitor preferences for management of UKRW do not vary from season to season.</p> <p><math>H_A</math>: UKRW visitor preferences for management of UKRW vary from season to season.</p>
33	<p><math>H_0</math>: There are no differences in preferences for management of UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p> <p><math>H_A</math>: There are differences in preferences for management of UKRW expressed by UKRW visitors belonging to different wilderness knowledge subgroups.</p>

TABLE 3  
 CATEGORIES OF DEMOGRAPHIC CHARACTERISTICS OF  
 THE UPPER KIAMICHI RIVER WILDERNESS (UKRW)  
 VISITOR SURVEY POPULATION

Category	Subcategories
Age	16 - 25 years of age 26 - 35 years of age 36 - 45 years of age 46 - 55 years of age 56 - 65 years of age 66 years of age or older
Gender	Male Female
Highest Level of Education	8th grade or less 9th to 12th grade Some college Bachelors degree Some graduate study Masters or Doctorate degree
State of Residence	Name of state
Type of Home Residence <sup>a</sup>	Farm or rural Town Small city Medium city Large city
Proximity of Home Residence to UKRW <sup>a</sup>	Local Distant
Membership in One or More Conservation Organizations	Yes No
Previous Wilderness Visitation Experience	Yes No

TABLE 3 Continued)

Category	Subcategories
Occupation	Professional - Technical Business Management Clerical - Sales - Service Craftsman - Operations - Laborer Farmer - Rancher Military Home-maker Student Unemployed Retired
Annual Income	Under \$10,000 \$10,000 - \$19,999 \$20,000 - \$29,999 \$30,000 - \$39,999 \$40,000 - \$49,999 \$50,000 - \$59,999 \$60,000 - \$69,999 \$70,000 or more

<sup>a</sup>See Glossary of Terminology for definition of terms.

TABLE 4

UPPER KIAMICHI RIVER WILDERNESS VISITOR  
SURVEY POPULATION SUBGROUP PAIRINGS<sup>a</sup>

Hikers and Horse-riders  
Hunters and Non-hunters  
Day-visitors and Overnight-visitors  
Local-visitors and Distant-visitors  
First-time-visitors and Repeat-visitors  
Male visitors and Female visitors  
Solo-visitors and Group-visitors

<sup>a</sup>See Glossary of Terminology for definition of subgroup names.



TABLE 5  
 CATEGORIES OF PATTERNS OF USE OF THE  
 UPPER KIAMICHI RIVER WILDERNESS  
 VISITOR SURVEY POPULATION

Category	Subcategories
Major Activity	Hiking or walking Camping Backpacking Hunting Wildlife Observation Photography Horseback Riding
Group Composition	Family Friend(s) Group of Family & Friend(s) Organized Club or Group Solo Visitor
Period of Week	Weekday <sup>a</sup> Weekend <sup>a</sup>
Day of Week of Day-Use	Days of Week
Entry and Exit Portal	Horsepen Creek Trailhead Kiamichi River Trailhead Pashubbe Creek Trailhead Stateline Trailhead Bushwhack Off-Trail <sup>a</sup> Talimena Drive Off-Trail <sup>a</sup>
Type of Trip	One-way <sup>a</sup> Loop <sup>a</sup>
Type of Stay	Day-use <sup>a</sup> Overnight-use <sup>a</sup>
Miles Travelled	Number of Miles

TABLE 5 (Continued)

Category	Subcategories
Seasonal Stratum <sup>a</sup>	Spring Summer Fall Winter
Month of Use	Months of the Year

<sup>a</sup>See Glossary of Terminology for definition of terms.

#### Sampling Design and Determination of Target Population and Survey Population

Since no previous data or information existed regarding UKRW visitation trends prior to the initiation of this study (i.e. the size of the visitor population was unknown), it was decided to conduct a census of visitors who registered at one of the four UKRW trailhead registers. All registrants were tallied on a chronological visitor log, and it was intended that all be sent a survey questionnaire. Prior to initiating the study, however, a conservative estimate of an anticipated sample size (n) was calculated, utilizing the following formula:

$$n = \frac{t^2}{E^2} P(1 - P)$$

where:

t = 1.96 (for 95% confidence level)

E = 5% (maximum desired error rate)

P = 0.50 (conservative probability of response)

Thus, a desired sample size of 385 visitors was determined. If the actual census count of UKRW registrants were to exceed 385 individuals during the course of the study, a randomization process would be utilized to select sample elements. If not, it was planned to use the registrant census as a sample of UKRW visitation, assuming that not all visitors would actually register at a trailhead or enter at a trailhead.

The **target population** for this study consisted of all individuals, 16 years of age or older, who visited the UKRW for recreational purposes, between April 1, 1991, and March 31, 1992. The **survey population** size, however, was expected to be lower than that of the target population. Since not all visitors are likely to register at trailheads, and since some visitors may enter the area at a location other than at a designated trailhead portal, the survey population was comprised of all individuals, 16 years of age or older, who visited the UKRW for recreational purposes, between April 1, 1991, and March 31, 1992, and who registered their visit at one of four voluntary trail registers.

#### Trail Register Design and Placement

Standard U.S. Forest Service (USFS) trail registers were established by the USFS at the four UKRW trailhead portals: Pashubbe Creek, Kiamichi River, Horsepen Creek, and Stateline (see map inside back cover). The registers were constructed of wood and finished with light gray paint. To

each was affixed a standard USFS Upper Kiamichi River Wilderness sign, another simple and straightforward sign requesting that each visitor group provide the name and address of all group members of age 16 or older and stating the importance of registering for future UKRW management (Appendix A), an ample supply of USFS visitor registration cards (Appendix B), a supply of trail maps of the UKRW (Appendix C), a calendar, and several pencils. In addition to information about the UKRW, some descriptive information about the visitor-use survey was incorporated into the trail map brochure.

Registers were placed either immediately at a trailhead or within 500 feet of a trailhead as the situation dictated. The registers at Pashubbe Creek and Stateline were situated up-trail, whereas the registers at Kiamichi River and Horsepen Creek were placed along the trail at the wilderness boundary, since in each case, the visitor had a choice of two directions of trail travel at those points.

#### Trail Register Maintenance and Registration Card Collection

Trail register cards were collected and the registers received routine maintenance on a weekly basis by a U.S. Forest Service employee. Ordinarily, this collection took place on Fridays, to insure that a supply of trail register cards was available for a probable surge in visitation on weekends. Occasionally, severe weather or a scheduling

difficulty necessitated that the card collection and register maintenance be delayed at one or more trailheads until the following Monday.

### Organization of Survey

#### Population Data Set

All registration cards were coded by trailhead in order to tally visitor entrance and exit distribution. Names from the cards were compiled chronologically onto a survey population master list. Each visitor group was assigned a group number, and an observation number was assigned to each individual visitor.

### Determination of Voluntary Trail

#### Registration Compliance Rate

#### and Use Estimates

Since not all visitors were likely to register at trailheads, the rate of compliance was ascertained by conducting compliance rate assessment samples throughout the study. On four randomly selected days of each month of the sampling year, a trained observer was stationed up trail from one of the trailheads to monitor compliance for an eight-hour period, commencing at sunrise. Two of the days each month were a Saturday and a Sunday. The other two sample days were randomly selected from the remaining days of the week.

Standing out of obvious view of arriving visitors, the observer recorded whether or not registration occurred. Visitors who appeared to have registered were recorded as compliants on a tally sheet (Appendix D). To verify compliance, the observer examined the registration card at the trailhead register, after the visitor had proceeded well beyond the trailhead.

Those visitors who did not register voluntarily were approached by the observer (who identified himself as a member of the study team), greeted in a friendly manner, and asked if they had registered. Those who answered in an affirmative manner were thanked, and then tallied as noncompliant. Those visitors who admitted that they had not registered were asked if they would like to fill out a registration card offered by the observer. As well, they were requested to provide one or more reasons for opting not to register at the trailhead. Those who consented to register when invited to do so were tallied accordingly, whereas those who declined were tallied as hard-core refusals.

Obvious demographic and visitor-use information was tallied for all noncompliant who registered after being asked to do so, and for all hard-core refusals, to compare with the data from those visitors who voluntarily complied, in order to ascertain if differences exist between them.

Compliance rates were calculated for each sample day, and compiled to calculate rates by month, season, and for

the study year. These compliance rates were utilized to calculate ratio estimates of visitor use of the UKRW.

#### Data Collection Instrument

A 12-page survey questionnaire (Appendix E) was designed to generate data regarding visitor use characteristics and patterns at UKRW; motives for visiting the UKRW; the level of wilderness knowledge of visitors; extent of visitor satisfaction with their UKRW visits; visitor perceptions of crowding, use-impact, use-conflict, and the wilderness character of the UKRW; preferences of visitors for management of the UKRW; and visitor demographics. The instrument was scrutinized by and received the approval of the Institutional Review Board at Oklahoma State University prior to its use in the study.

#### Visitor Use Characteristics and Patterns

Survey respondents were requested to indicate the recreational activities that they pursued during their visits to the UKRW, noting which activity was their principal one. Visitors that engaged in hunting and fishing were queried about their success in bagging game and catching fish. Respondents were asked to indicate the various sources of information that they utilized in becoming aware of the UKRW and in planning their visits to the area. Use characteristics, including UKRW visitation history, length of stay, day or days of the week of visits,

social group of visitation while at UKRW, group size, age distribution of the group, primary mode of travel, and trip expenditure were also ascertained.

On a sketch map of the UKRW included in the survey, visitors were instructed to indicate their entry and exit portals, their route of travel, the location of their campsites, and the number of nights spent at each camp, to ascertain visitor travel patterns and trends. The ratio of **loop trips to one-way trips** was discerned, as was the distance travelled per visitor. A summary of trail use and campsite use intensity was also tabulated for the survey population.

#### Motive Scale

An instrument aimed at assessing the motives of individuals for visiting the UKRW was incorporated into the survey questionnaire. This instrument was comprised of scale items extracted from the Recreation Experience Preference (REP) scales developed from the extensive research of Driver and his associates (Driver 1977, Driver 1983, Driver et al. 1991). Tinsley et al. (1981) verified the reliability and concurrent validity of the scales. Rosenthal et al. (1982) tested the construct validity of eight of the scales, concluding that they are valid for measuring recreationists' preferences and suitable for continued use in recreation planning and management. It was hypothesized that 12 of Driver's (1983) domains likely



applied to the wilderness experience at UKRW. Forty scale items extracted from those domains were utilized to compile the motive instrument used in this study (Table 6).

TABLE 6  
MOTIVE DOMAINS AND SCALE ITEMS USED IN  
THE VISITOR MOTIVE INSTRUMENT<sup>a</sup>

Domain	Scale Items
Achievement/Stimulation	Have a Stimulating and Exciting Experience Develop My Skills and Abilities Rely on My Wits and Skills Gain a Sense of Self-Confidence
Autonomy/Leadership	Be at a Place Where I Can Make My Own Decisions Feel My Independence Be in Control of Things That Happen
Risk-Taking	Chance Dangerous Situations Take Risks Experience Uncertainty of Not Knowing What Will Happen
Family Togetherness	Do Something With the Family Bring My Family Closer Together Do Something the Entire Family Would Like
Similar People	Be With Friends Be With Other Who Enjoy the Same Things That I Do Be With People Having Similar Values
New People	Meet Other People in the Area Talk to New and Varied People Observe Other People in the Area

TABLE 6 (Continued)

Domain	Scale Items
Learning	Learn More About Things There Get to Know the Lay of the Land Experience New and Different Things Learn More About Nature
Enjoy Nature	Be Close to Nature View the Scenery Enjoy the Smells and Sounds of Nature
Introspection	Think About Who I Am Think About My Personal Values Be in Closer Touch With Higher Spiritual Values
Physical Fitness	Get Exercise Keep Physically Fit Feel Good After Being Physically Active
Escape Personal-Social Pressures	Get Away From the Usual Demands of Life Have a Change From My Daily Routine Help Release or Reduce Some Built-up Tensions Give My Mind a Rest
Escape Physical Pressure	Be Alone Experience Solitude Be Away From Crowds of People Get Away From Noise Back Home

<sup>a</sup>Source: Driver (1977), Driver (1983).

Survey respondents were asked to rate the relative importance of the randomly ordered scale items as reasons for deciding to visit the UKRW, using a five-point Likert-

style response scale ranging from "Extremely Important" to "Not at All Important." Responses were then factor-analyzed in order to elucidate the motive profile of UKRW visitors and in an attempt to confirm Driver's (1977, 1983) REP scales in the context of the UKRW setting and experience.

#### Wilderness Knowledge Scale

A 15-item wilderness knowledge scale was designed to ascertain the congruence of UKRW visitors' knowledge about wilderness with the definition and description of wilderness as delineated in the Wilderness Act of 1964, similar to the technique of Stankey (1972) and Young (1980). Each of the scale items dealt with either an attribute, characteristic, recreational activity or management strategy placed in the context of U.S. Forest Service wilderness, in general (Table 7, page 75). Visitors were requested to respond to the scale items using a five-point Likert-style response scale ranging from "Very Appropriate" to "Very Inappropriate." Survey respondents were then placed into one of three knowledge level subgroups for further analysis.

The reliability of this scale was verified through testing on various groups, including university students and natural resource management professionals. The validity was verified through inspection and analysis by several natural resource managers and educators. Though wilderness knowledge has been viewed as a unidimensional construct in many studies (Stankey 1972, Schreyer and Roggenbuck 1978,

Young 1980), its likelihood as a multidimensional concept (Schreyer and Roggenbuck 1978, Stankey and Schreyer 1987) was tested in this study through exploratory factor analysis.

TABLE 7  
SCALE ITEMS USED IN THE WILDERNESS  
KNOWLEDGE INSTRUMENT

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POSITIVE-ORIENTED SCALE ITEMS:

Solitude (not seeing others except those in your own group).  
Covers a large area (5 - 10 square miles or more).  
Little or no evidence of other visitors before you.  
Fishing for native fish within legal limits.  
Hunting according to state regulations.

---

NEGATIVE-ORIENTED SCALE ITEMS:

Gravel roads.  
Privately-owned cabins.  
Hearing mechanical noises coming from within the area.  
Use of motorized recreational and all-terrain vehicles.  
Logging or other commercial timber cutting.  
Trash containers along the trail and at popular camping areas.  
Use of non-motorized mountain bikes.  
Stocking streams with non-native fish.

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### Satisfaction Scales

Satisfaction of UKRW visitors with their wilderness visits was ascertained utilizing the six-item scale of Schomaker and Knopf (1982b) and the single-item scale of Vaske *et al.* (1982). Survey respondents were asked to evaluate their UKRW visit by responding to the items of the Schomaker and Knopf (1982b) scale (Table 8), utilizing a Likert-style scale ranging from "Strongly Agree" to "Strongly Disagree." The Vaske *et al.* (1982) scale, slightly modified for this study, asked the visitor, "Overall, how would you rate your visit to the Upper Kiamichi River Wilderness?" Visitors were directed to check one of the responses listed in Table 9 (page 77).

TABLE 8

SIX-ITEM SATISFACTION SCALE USED IN THE UPPER  
KIAMICHI RIVER WILDERNESS VISITOR SURVEY<sup>a</sup>

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SCALE ITEMS:

I thoroughly enjoyed my visit.

I cannot imagine a better visit.

The trip was well worth the money I spent to take it.

I want to visit the area again.

I was disappointed with some parts of my visit.

I do not want to visit any more areas like this one.

---

<sup>a</sup>Source: Schomaker and Knopf (1982b).

TABLE 9  
 SINGLE-ITEM SATISFACTION SCALE USED IN THE UPPER  
 KIAMICHI RIVER WILDERNESS VISITOR SURVEY<sup>a</sup>

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SCALE ITEM:

Overall, how would you rate your visit to the Upper Kiamichi River Wilderness?

---

RESPONSE OPTIONS:

Poor.

Fair; it just didn't work out very well.

Good, but I wish a number of things could have been different.

Very good, but could have been better.

Excellent; only minor concerns.

Perfect.

---

<sup>a</sup>Source: Vaske et al (1982).

The correlation of the Vaske et al. (1982) with the Schomaker and Knopf (1982b) scale was tested in this study, to determine their likely similarity and ability to effectively quantify satisfaction. In addition, visitors were invited to offer the "high" and "low" points of their UKRW visits in open-ended questions.

#### Visitor Perceptions and Preferences

UKRW visitor perceptions of use-impact, use-conflict, and wilderness character of the UKRW were sought by probing respondent reactions to a series of 25 statements, with responses being scored on a Likert-style scale ranging from

"Strongly Agree" to "Strongly Disagree." These statements are grouped by category in Table 10. Visitors were queried regarding their perceptions of crowding and their opinions about group size limits, activities to discourage at UKRW, and the most outstanding characteristic or feature of the UKRW that makes it a quality wilderness area. Also, respondents were asked if they had encountered inclement or unexpected weather that limited or reduced the quality of their visit to the UKRW.

TABLE 10

STATEMENTS USED TO PROBE VISITOR PERCEPTIONS OF USE-IMPACT,  
USE-CONFLICT, AND WILDERNESS CHARACTER AT THE  
UPPER KIAMICHI RIVER WILDERNESS

---

USE-IMPACT STATEMENTS:

The evidence of use by others is obvious.

Trash and litter is a common sight.

There is little disruption of the natural ecosystem by visitors at Upper Kiamichi.

Upper Kiamichi is clean, pure, and little impacted by humans.

The campsites of previous visitors are obvious.

Finding a lot of litter is more disturbing than seeing a lot of people at Upper Kiamichi.

The trails are of poor quality and badly eroded.

TABLE 10 (Continued)

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USE-CONFLICT STATEMENTS:

Mechanical noises from within the area are commonly heard.

Conflicts regularly occur between hikers and horseback riders.

Illegal use of motorized all-terrain vehicles is a problem at Upper Kiamichi.

Conflicts regularly occur between hunters and non-hunters.

---

WILDERNESS CHARACTER STATEMENTS:

Upper Kiamichi provides a great opportunity for solitude.

Mechanical noises from outside of the area are commonly heard.

There is evidence of past logging activity.

Upper Kiamichi is large enough to provide a true wilderness experience.

Private land ownerships within Upper Kiamichi are evident.

Upper Kiamichi has a high quality wilderness character.

Upper Kiamichi is clean, pure, and little impacted by humans.

The trails are of poor quality and badly eroded.

Upper Kiamichi provides a high quality wilderness experience.

The Upper Kiamichi setting has a great sense of wildness.

---

The survey questionnaire also included a series of questions designed to tap the preferences of visitors for behavioral, resource manipulation, and informational/



educational modes of management of recreational use of the UKRW (Table 11). Respondents were asked to review 18 suggestions for the management, and then to state their preferences utilizing a Likert-style response scale ranging from "Very Much in Favor" to "Very Much Oppose." The pool of wilderness attributes, situations, and management options for these questions was compiled by reviewing the literature and through discussions with U.S. Forest Service personnel.

TABLE 11

STATEMENTS USED TO PROBE VISITOR PREFERENCES FOR  
BEHAVIORAL, RESOURCE MANIPULATION, AND INFORM-  
ATIONAL/EDUCATIONAL MODES OF MANAGEMENT  
OF RECREATIONAL USE OF THE UPPER  
KIAMICHI RIVER WILDERNESS

---

BEHAVIORAL STATEMENTS:

- Allow camping only in certain areas.
- Require visitors to pack out all trash.
- Require that all campsites be at least 200 feet or more away from the trail.
- Require all visitors to obtain a permit at the ranger station in town.
- Prohibit the use of horses in the area.
- Limit the amount of people camping at any one site.
- Require that all campsites be at least 200 feet or more away from streams.
- Have frequent ranger patrols to reduce illegal use.

TABLE 11 (Continued)

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 RESOURCE MANIPULATION STATEMENTS:

Build more trails.

Plant trees on old roadways.

Provide campsites with picnic tables, fire grates, and pit toilets.

Provide sources of drinking water.

Have special trails for horse use only.

Plant food plots and construct water holes to attract more wildlife.

---

## INFORMATIONAL/EDUCATIONAL STATEMENTS:

Provide interpretive signs and displays.

Have regular ranger visits to provide information and educational programs.

Put in more trail and distance markers.

Provide more information about the area and its recreational opportunities.

---

Visitor Demographics

Survey questionnaire respondents were requested to provide a range of demographic information, including age; gender; educational level; **type of home residence**; occupation; income level; membership in outdoors, sporting, or conservation organizations or clubs; and previous federal wilderness visitation history. Through sorting of postal Zip Codes, respondents were segregated as either **local-visitors** or **distant-visitors**.

## Administration and Coding of Survey Questionnaires

The guidelines of Dillman (1978) and Brown and Wilkins (1978) for successful mail sample surveys rendering high response rates were followed in this study. This included designing a survey questionnaire of a general pleasing and visually-uncluttered appearance, incorporating the UKRW logo on the cover; using high quality paper of light-green color; staple-binding the survey in an easy-to-use, 6.0 by 8.5-inch booklet format; providing straightforward instructions; and including a statement of appreciation to survey respondents (Appendix E). It was accompanied by a cover letter of similar quality, printed on Oklahoma State University letterhead bond paper, individually hand-signed by the principal investigator, and composed to motivate response by explaining the usefulness of the research and importance of the results to future management of the UKRW (Appendix F). A statement insuring respondent confidentiality and an expression of appreciation were also included in the cover letter.

Immediately upon receiving trailhead registration cards collected weekly by the U.S. Forest Service, a packet containing a cover letter, a survey questionnaire, and a pre-addressed and pre-stamped return business envelope were mailed in a manila envelope to each valid member of the survey population. Since confidentiality of survey

responses had been guaranteed in the cover letter, a numerical code on the survey forms was utilized in order to monitor response compliance and return rates. Individually-prepared OSU mailing labels were affixed to the manila envelopes. The packets were dispatched through the campus central mailing service.

Two weeks after the initial mailing, a follow-up reminder postcard was sent to nonrespondents (Appendix G). If two more weeks passed without a response, a replacement questionnaire and a pre-addressed and pre-stamped business envelope were mailed with a more emphatic cover letter, encouraging the visitor to complete and return the survey (Appendix H).

As surveys were received from respondents, the date of return to the OSU campus and the number of days to respond were recorded for each. Survey responses were coded by the principal investigator and trained assistants on a weekly basis throughout the duration of the study. All Likert-style scale responses were coded utilizing a numeric score ranging from "5" at the "Strongly Agree," "Extremely Important," "Very Appropriate," and "Very Much in Favor" ends of the various scales, to a "1" at the opposite ends of each scale utilized in the survey instrument. For certain statements in the survey instrument purposefully designed with a connotation that was negative or contrary to wilderness ideology, the scoring was reversed. Self-explanatory numeric responses, such as length of stay and

trip expenditure, were recorded as reported. Open-ended items were coded using designated categories established in order to reduce the spectrum of responses to fewer, manageable groupings for subsequent data analysis.

All coding sheets were reviewed and double-checked by the principal investigator prior to computer entry of the raw data. The data set was compiled onto a computer file by the principal investigator and a sole assistant.

#### Assessment of Potential Nonresponse Bias

At the conclusion of the one-year data collection process, a random sample of survey nonrespondents was drawn in order to assess the potential of bias in the data set due to the lack of information about this group. Selected individuals were contacted by telephone and asked a brief set of questions regarding their UKRW visit, their perceptions about the character and use of the area, their preferences for management of the area, and their satisfaction with their visit (Appendix I). Also, demographic and visitation data provided by all visitors who completed a registration card at one of the trailheads was utilized to discern possible differences between survey respondents and nonrespondents.

#### Assumptions

Certain specific assumptions were recognized and considered during the planning phase of the study and

throughout the conduct of the field research, data analysis, and interpretation of the results. They are enumerated as follows:

- 1.) Regular weekly trail register servicing and upkeep would elicit a high rate of registration compliance, minimize the potential for loss of data, and reduce the potential for trail register vandalism as suggested by the research literature.
- 2.) Simple and straightforward instructions, pencils, a calendar, and trail maps for visitors arriving at trailhead registers would elicit proper registration and a good rate of registration compliance, as suggested by the research literature.
- 3.) Registrants who enter and use the UKRW do so for recreational and related personal purposes (i.e. educational, therapeutic, developmental).
- 4.) Individuals who register at the Pashubbe Creek trailhead, hike the portion of the Ouachita National Recreation Trail that flanks the UKRW to the outside of its border, and then depart the area at the Kiamichi River trailhead (or vice versa), essentially would attain a wilderness experience. Hence, they were included in the survey population.
- 5.) Private inholdees would not register their visits, though they likely pursued recreational activities

while passing through the UKRW enroute to their lands. They likely travelled through the UKRW to their inholdings by motor vehicle.

- 6.) Trailhead use would not likely be uniform, yet there would be no significant difference in visitor characteristics from trailhead to trailhead at the UKRW.
- 7.) Crowding, excessive use-impact, and excessive use-conflict were not likely problems at the UKRW.
- 8.) Some nonconforming and illegal uses would occur at UKRW. Individuals involved in such activities would not likely register their visits. Hence, such individuals would be missing elements of the survey population.
- 9.) Visitors under the age of 16 would not be able to respond in a valid way to the motive scale constructs, and they would not have the necessary wilderness experience to have established preference patterns for alternative management practices.

#### Limitations

Certain specific limitations were recognized and considered during the planning phase of the study and throughout the conduct of the field research, data analysis, and interpretation of the results. They are enumerated as follows:

- 1.) Not all UKRW visitors likely registered at the trailhead registers. Certain visitor subgroups were possibly less likely to register than others. Such individuals were considered as missing elements of the survey population. The exact enumeration of these individuals was not possible without constant surveillance of the registers.
- 2.) Visitors who did not enter or exit the UKRW at a trailhead and register their visits, or otherwise pass a register during the course of their visits and complete registration cards, were considered as missing elements and excluded from the registration list and the survey population. The exact enumeration of these individuals was not possible without constant surveillance of the registers and the UKRW boundaries.
- 3.) Some individuals may have registered at a trailhead, but did not actually proceed further into the UKRW for recreational pursuits, but instead, immediately departed the area. Such individuals were considered as foreign elements of the survey population. The exact enumeration of these individuals was not possible without constant surveillance of the registers.
- 4.) Individuals who registered at the Pashubbe Creek trailhead, hiked the Ouachita National Recreation Trail, and then departed the area at the Kiamichi



River trailhead (or vice versa) were not actually within the UKRW border, unless they stepped into the UKRW for a portion of their activity or to camp. Regardless, such individuals were considered as UKRW visitors, though the exact enumeration of these individuals was not possible without constant surveillance of that segment of the trail.

- 5.) Nonregistrants and other missing elements could likely be significantly different in one or more criteria from the survey population. Hence, there existed the possibility for some bias in the summary of survey responses of the actual survey population.
- 6.) Some registrants did not provide complete addresses to facilitate the mailing of a survey and their receipt of such. Hence, though such individuals were tallied as visitors and they contributed to the data set for visitor-use estimation, they were missing elements of the survey population.
- 7.) Not all visitors who were mailed survey questionnaires completed and returned them. Hence, the potential for nonresponse bias may have occurred.
- 8.) Visitors under the age of 16 were not included in the survey population, since it was decided that

such individuals did not have decision-making autonomy in the planning and conduct of their UKRW visit, nor did they have sufficient depth of experience to provide a valid set of motives for visiting the area. Yet, they represented valid use of the area, and hence, they were tallied in the overall visitor-use estimate.

- 9.) Motives for visiting the UKRW were requested in the survey questionnaire, after the visit, rather than before. Hence, such motives of visitors reported in returned surveys were possibly dulled or otherwise altered by circumstances during or after the trip.
- 10.) Intervening variables, such as inclement weather, may have possibly distorted or otherwise altered one or more visitor's evaluation of trip satisfaction. As well, with one or more visitors, one very positive element of a visit such as hunting success may have compensated for one or more negative elements, or vice versa.
- 11.) The wilderness experience-use history of visitors was not a completely qualifiable and quantifiable variable in this study. Hence, it was possible, for example, that a first-time visitor to UKRW who might typically have been considered as a novice wilderness user may in fact have had an extensive history of use at several other wilderness areas.

Such a person would likely be more knowledgeable and sensitized to wilderness than would a true novice with no previous wilderness experience.

12.) The self-report survey was essentially a task of recall, undertaken at a point removed from the actual recreational visit. Recall potentially decreases or alters with time, due to memory decay or subsequent feedback and evaluation. Hence some survey respondent inaccuracy and bias may have affected the data analysis and interpretation of the results.

#### Statistical Analysis and Treatment of Data

A 5% **significance level** (95% level of confidence) was assumed for all statistical tests and analyses utilized in the study. Only those differences significant at the 5% level were reported in Chapter IV. All statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) "Release 4" (SPSS 1990, Norusis 1990) on the IBM 3090-200S mainframe computer at Oklahoma State University, Stillwater, Oklahoma.

Voluntary trail register compliance rates, estimates of visitor use of the UKRW, and the mail survey response rates were calculated. Student t-tests were conducted to determine if differences existed between survey questionnaire respondents and nonrespondents. Analysis of

variance (ANOVA), least significant difference (LSD) tests, and cross-tabulations (contingency tables) were utilized to discern possible differences between respondents to the first, second, and third survey mailings.

Visitor demographic characteristics and characteristics and patterns of recreational use of the UKRW by visitors were depicted in frequency tables. Comparisons between various visitor subgroups identified in Table 4 (page 63) and across the four seasons were made and differences analyzed utilizing Chi-square analysis and cross-tabulations.

Visitor responses to the motive scale were factor analyzed (principal components analysis with varimax rotation) to generate a profile of motive domains of the survey population. Only factors (domains) having eigenvalues of 1.0 or greater or accounting for more than five percent of the common variance were included in the motive profile as recommended by Williams *et al.* (1990) and Driver *et al.* (1991). Minimum reliability criteria for factor loading of scale items to a domain were a Pearson product-moment correlation of 0.4 and a Cronbach's Alpha of 0.6 (a measure of internal consistency among scale items of a domain), as utilized by Driver (1977), Roggenbuck (1980) and Hammitt and Brown (1984), and as recommended by Driver *et al.* (1991).

Bartlett's test of sphericity was utilized to test the hypothesis that the correlation matrix of the factor

analysis was an identity matrix. A rejection of the hypothesis indicates the appropriateness of factor analysis for discerning factor relationships within a data set.

A Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was generated during the factor analysis. The KMO measure is an index for comparing the magnitudes of observed correlation coefficients to the magnitudes of partial correlation coefficients. If the sum of squared partial correlation coefficients between all pairs of variables is small when compared to the sum of the squared correlation coefficients, the KMO measure will be close to one. Measures in excess of 0.9 are considered as "marvelous" and those in the 0.8's as "meritorious." KMO measures below 0.5 are typically considered as unacceptable, indicating the inappropriateness of factor analysis of variables of a given data set (Norusis 1990).

Separate factor analyses of motive scale responses were also conducted for the previously noted UKRW visitor subgroups delineated in Table 4 (page 63), for the visitor groups from each of the four seasons of the study, and for visitors organized into the first, second, or third mailing respondent groups, in order to elucidate potential differences in motive profile structure and complexity on a descriptive basis.

Motive factor scores were calculated for each respondent, using their mean response to the items of each domain of the survey population motive profile. Student t-

tests were used to determine if differences existed between motive factor scores of the UKRW visitor subgroups (Table 4, page 63), testing one motive domain at a time.

Motive factor scores of all respondents were further investigated by cluster analysis to potentially delineate distinct motive typologies within the survey population. The measure utilized in this analysis was squared Euclidian distance, and average linkage between groups was the clustering method used. Identified typologies were described according to the demographic and use characteristics of the individuals clustered within each.

Wilderness knowledge scale scores of UKRW visitors were computed by summing the scores assigned to responses to the 15 scale items delineated in Table 7 (page 75). Score values assigned to the positive-oriented scale items were a "5" for a "Very Appropriate" response, descending to a "1" for a "Very Inappropriate" response. The negative-oriented scale items were scored in reverse, with a "5" value assigned to a "Very Inappropriate" response, and so on. Composite scores, then, could range from a low of "15" to a high of "75." Based on composite scores from the wilderness knowledge scale, all UKRW survey respondents were placed into one of three wilderness knowledge subgroups, as presented in Table 12 (page 94).

The rationale for the distinction between the three groups is based on the forementioned scoring system. Visitors that placed in the "High Knowledge" group had at

least an average score of 4.5 points per scale item (i.e. on the average, they received scores of "4" and "5" on the 15 scale items). Those grouped in the "Medium Knowledge" category averaged 3.0 to 4.4 points per scale item (i.e. they were at least neutral or undecided, on the average, but did not attain an average of 4.5 points). Respondents placed in the "Low Knowledge" group averaged less than 3.0 points per scale item, essentially responding to the items with an appropriate posture when an inappropriate response was more valid, and vice versa.

TABLE 12  
UPPER KIAMICHI RIVER WILDERNESS  
VISITOR KNOWLEDGE SUBGROUPS

Knowledge Subgroup	Knowledge Scale Score Range <sup>a</sup>
High Knowledge	67 to 75 points
Medium Knowledge	45 to 66 points
Low Knowledge	15 to 44 points

<sup>a</sup>Score range for the Knowledge Scale is 15 to 75 points; the scale consists of 15 items, each scored from one to five points.

Seasonal variation in mean wilderness knowledge scale scores for the three knowledge groups of the survey population was investigated, using ANOVA and LSD tests.

Satisfaction scores were tallied for all respondents, employing the two satisfaction scales. Scores generated from the Schomaker and Knopf (1982b) six-item scale were calculated by summing response scores to each of the scale items as presented in Table 8 (page 76). For the first four items, a score of "5" was assigned to the "Strongly Agree" response, descending to a score of "1" for a "Strongly Disagree" response. Scoring for the remaining two scale items was reversed, since the items had a negative connotation. Composite scores for the six-item satisfaction scale ranged from a possible low of "6" to a possible high of "30." Scoring for the single-item Vaske *et al.* (1982) scale (Table 9, page 77) was more straightforward. A score of "6" was assigned to the "Perfect" response, descending to a score of "1" for a "Poor" response by a visitor.

Using the scores of all members of the survey population, the extent of likely Pearson product-moment correlation between the two satisfaction scales was investigated. Student t-tests were used to determine if differences existed between the UKRW visitor subgroups (Table 4, page 63) when compared in pairs. Also, seasonal variation in satisfaction for the survey population, and variation in level of satisfaction between the three wilderness knowledge score groups was assessed by ANOVA, using LSD tests to delineate differences.

Responses to survey questions and statements regarding preferences for management and perceptions of crowding, use-



impact, use-conflict, and UKRW character were analyzed utilizing Student t-tests to determine if differences existed between the UKRW visitor subgroups (Table 4, page 63) when compared in contrasting pairs. Seasonal variation of these preferences and perceptions was assessed by ANOVA, with differences discerned by LSD tests.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### Voluntary Trail Registration, Compliance Rates, and Reasons for Noncompliance

A total of 588 visitor registrations, comprising 154 groups, were recorded at the four UKRW trailheads over the year of data collection (Table 13, page 98). The 588 registered visitors constituted the **survey population** for the study. Though most groups registered as they entered the area, several did not complete a registration card until they passed a trailhead register as they exited. Group size ranged from solo individuals to an organized unit (Boy Scouts) of 60 visitors. Average group size was 3.8 visitors, though this declined to 3.2 visitors when three individual groups of 22, 30 and 60 were omitted from the calculation.

Based on an adult-to-youth breakdown provided by visitors representing 146 of the 154 surveyed groups, 82 percent of the visitors were adults of age 16 or greater, and 18 percent were youths. The bulk (81.5 percent) of registered groups were comprised completely of adults, whereas fewer than 19 percent of the groups had an adult and youth composition.

TABLE 13  
 GROUP SIZE DISTRIBUTION OF VISITORS TO  
 THE UPPER KIAMICHI RIVER WILDERNESS

Group Size	Number of Groups
1	29
2	58
3	22
4	15
5	4
6	10
7	2
8	2
9	3
10	1
11	2
12	3
22	1
30	1
60	1
<b>Total:</b>	<b>154</b>

Trailhead registration varied across the **seasons** of the year (Table 14, page 99). Registration was highest during the fall and spring (241 and 197 visitors, respectively) and was lowest during the summer and winter (84 and 66 visitors, respectively). Average group size was highest in the fall (4.5 visitors) and was lowest during the summer and winter (3.1 visitors).

TABLE 14  
REGISTRATION OF UPPER KIAMICHI RIVER  
WILDERNESS VISITORS BY SEASON

Season	Visitors		Groups		Mean Group Size	Group Size Range
	Number	% of Total	Number	% of Total		
Spring	197	33.5	53	34.4	3.7	1 - 30
Summer	84	14.3	27	17.6	3.1	1 - 12
Fall	241	41.0	53	34.4	4.5	1 - 60
Winter	66	11.2	21	13.6	3.1	1 - 6
Total	588	100.0	154	100.0	3.8	1 - 60

Likewise, registration varied by month within the year of data collection (Table 15, page 100). Peak visitor registration occurred during October (135 visitors comprising 28 groups), accounting for 23 percent of the total of UKRW registered visitors. The months of June (16 visitors in four groups) and January (17 visitors in seven groups) received the lowest amount of visitor registration (2.7 and 2.9 percent of total registration, respectively). Average group size ranged from a low of 1.8 visitors in August to a high of 8.6 in December.

TABLE 15  
 REGISTRATION OF UPPER KIAMICHI RIVER  
 WILDERNESS VISITORS BY MONTH

Month & Year	Visitors		Groups		Mean Group Size	Group Size Range
	Number	% of Total	Number	% of Total		
April 1991	74	12.6	18	11.7	4.1	1 - 30
May 1991	56	9.5	17	11.0	3.3	1 - 8
June 1991	16	2.7	4	2.6	4.0	1 - 12
July 1991	44	7.5	6	3.9	7.3	2 - 12
August 1991	32	5.4	18	11.7	1.8	1 - 4
September 1991	22	3.7	7	4.5	3.1	1 - 7
October 1991	135	23.0	28	18.2	4.8	1 - 60
November 1991	76	13.0	18	11.7	4.2	1 - 22
December 1991	26	4.4	6	3.9	8.6	2 - 8
January 1992	17	2.9	7	4.5	2.4	1 - 6
February 1992	23	3.9	8	5.2	2.9	1 - 6
March 1992	67	11.4	17	11.0	3.9	2 - 11
<b>Total</b>	<b>588</b>	<b>100.0</b>	<b>154</b>	<b>100.0</b>	<b>3.8</b>	<b>1 - 60</b>

Registration varied by trailhead, with the Stateline, Pashubbe Creek and Kiamichi River trailheads receiving more than 96 percent of total registration (198, 192 and 176 visitors, respectively) over the year (Table 16, page 102). These three trailheads provide relatively easy access from state highways to the Ouachita National Recreation Trail that passes through the UKRW (see map, inside back cover). Though the approach to the Kiamichi River trailhead requires that vehicles ford the river, registration there was just slightly less than that at the Stateline and Pashubbe Creek trailheads.

Only 22 of the 588 registrants entered the UKRW at the Horsepen Creek trailhead (Table 16). Though readily accessible from the highway, use of this trailhead was low, likely due to the lack of an established trail system linked to the Ouachita National Recreation Trail corridor. Average group size was highest at the Kiamichi River trailhead (5.9 visitors) and lowest at Horsepen Creek (1.8 visitors).

Fourteen of the 588 total registrants were repeat visitors to the UKRW during the year of data collection (Table 17, page 102). These 14 individuals accounted for 35 registered visits (six percent of total registration), whereas 553 registrants each made a single visit to the UKRW (94 percent of total registration). Hence, only 567 different individuals actually registered visits at UKRW trailheads during the year.

TABLE 16

REGISTRATION OF UPPER KIAMICHI RIVER  
WILDERNESS VISITORS BY TRAILHEAD

Trail-head	Visitors		Groups		Mean Group Size	Group Size Range
	No.	% of Total	No.	% of Total		
Pashubbe Creek	192	32.7	59	38.3	3.3	1 - 12
State-line	198	33.7	53	34.4	3.7	1 - 22
Kiamichi River	176	29.9	30	19.5	5.9	1 - 60
Horsepen Creek	22	3.7	12	7.8	1.8	1 - 4
<b>Total</b>	<b>588</b>	<b>100.0</b>	<b>154</b>	<b>100.0</b>	<b>3.8</b>	<b>1 - 60</b>

TABLE 17

REPEAT REGISTRATION OF UPPER KIAMICHI  
RIVER WILDERNESS VISITORS

Number of Visits to UKRW	Number of Registrants	Cumulative Number of Registrants
1	533	533
2	9	18
3	3	9
4	2	8
<b>Total:</b>	<b>567</b>	<b>588</b>

Over 64 percent of visitors entering the UKRW at the four established trailheads voluntarily registered their visits over the year (Table 18, page 104). Registration varied by season and was somewhat erratic, particularly during the summer and winter seasons. None of the visitors observed on trailhead compliance sample days in June and December completed registration cards. Visitor registration compliance rates were highest in the fall (83.3 percent) and lowest during the summer (37.5 percent). The group registration compliance rate exceeded 70 percent for the year, ranging from a high of 85.7 percent in the fall to a low of 50 percent during winter.

Voluntary registration compliance rates were not uniform from trailhead to trailhead (Table 19, page 105). All visitors observed on sample days entering the UKRW at the Stateline trailhead complied with voluntary registration, but the rate dropped to 65.5 percent at the Kiamichi River trailhead and to 42.8 percent at the Pashubbe Creek trailhead. Unfortunately, no visitors were observed at the Horsepen Creek trailhead on any of the sample days, hence, a compliance rate could not be calculated. No apparent reason for the fluctuation in compliance rates between trailheads was readily discernable based on field observations.



TABLE 18

REGISTRATION COMPLIANCE OF UPPER KIAMICHI RIVER  
WILDERNESS VISITORS BY SEASON AND MONTH

Month	No. Groups Obs.	No. Groups Reg.	Group Comp. Rate	No. Visitors Obs.	No. Visitors Reg.	Visitor Comp. Rate
<u>Spring</u>						
Mar. 1992	6	3	50.0%	23	9	39.1%
Apr. 1991	2	2	100.0%	4	4	100.0%
May 1991	2	2	100.0%	4	4	100.0%
Season:	10	7	70.0%	31	17	54.8%
<u>Summer</u>						
Jun. 1991	1	0	0.0%	5	0	0.0%
Jul. 1991	1	1	100.0%	2	2	100.0%
Aug. 1991	1	1	100.0%	1	1	100.0%
Season:	3	2	66.6%	8	3	37.5%
<u>Fall</u>						
Sept. 1991	2	2	100.0%	2	2	100.0%
Oct. 1991	2	2	100.0%	8	8	100.0%
Nov. 1991	3	2	66.6%	8	5	62.5%
Season:	7	6	85.7%	18	15	83.3%
<u>Winter</u>						
Dec. 1991	1	0	0.0%	2	0	0.0%
Jan. 1992	2	1	50%	13	11	84.6%
Feb. 1992	1	1	100.0%	2	2	100.0%
Season:	4	2	50.0%	17	13	76.4%
Study Year:	24	17	70.8%	74	48	64.8%

TABLE 19  
 REGISTRATION COMPLIANCE OF UPPER KIAMICHI  
 RIVER WILDERNESS VISITORS BY TRAILHEAD

Trail-head	No. Groups Obs.	No. Groups Reg.	Group Comp. Rate	No. Visitors Obs.	No. Visitors Reg.	Visitor Comp. Rate
Pashubbe Creek	9	5	55.6%	28	12	42.8%
Stateline	7	7	100.0%	17	17	100.0%
Kiamichi River	8	5	62.5%	29	19	65.5%
Horsepen Creek <sup>a</sup>	--	--	---	--	--	---
Total	24	17	70.8%	74	48	64.8%

<sup>a</sup>No visitors were observed at the Horsepen Creek trailhead on any of the sample days, hence, a compliance rate could not be calculated.

From the limited data observed from UKRW nonregistrants on trailhead compliance sample days, only one distinct difference was discerned between them and visitors who registered. Thirty-one percent of the observed nonregistrants travelled into the area on horseback, whereas horseback riders accounted for only two percent of the registrants. Lower rates of horseback rider and hunter registration compliance as compared to rates for foot travellers and nonhunters have been reported often in the literature (Lucas *et al.* 1971, Roggenbuck and Lucas 1987).

There was no difference in compliance between hunters and nonhunters, however, in this study.

Noncompliers did offer various reasons for not registering when asked to do so by trailhead observers. Each of the seven observed noncompliant groups provided different reasons not unlike those delineated in the research literature (Table 20). At the request of trailhead observers, four groups (16 visitors) of noncompliers completed registration cards, whereas three groups (10 visitors) refused (Table 21, page 107).

TABLE 20

REASONS GIVEN BY UPPER KIAMICHI RIVER WILDERNESS  
VISITORS FOR NOT VOLUNTARILY REGISTERING  
THEIR VISITS AT TRAILHEADS<sup>a</sup>

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Did not see registration sign.  
Did not think it was important.  
Did not want to take the time.  
Registered earlier in the year.  
Local resident; registration not necessary.  
Registered on trail at nearby state park.  
Eager to get started on the trail.  
Intended to register later.

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<sup>a</sup>Each reason was given one time.

TABLE 21

REACTIONS OF NONREGISTRANT UPPER KIAMICHI RIVER  
WILDERNESS VISITORS WHEN REQUESTED TO  
REGISTER BY A TRAILHEAD OBSERVER

Reaction	Number of Groups	% of Total	Number of Visitors	% of Total
Registered When Asked	4	57.1	16	61.5
Refused to Register When Asked	3	42.9	10	38.5
Total	7	100.0	26	100.0

Estimate of Visitor-Use and Delineation of  
Survey Population and Target Population

Based on the 588 visitor registrations (survey population) and the registration compliance rate of 64.8% (Table 18, page 104), the ratio estimate of the **target population** is 907 visitors (238 groups) for the year of data collection (Table 22, page 108). This figure is conservative, since it is not weighted for compliance rate fluctuation across the seasons and trailheads. Utilizing the compliance rates for each of the seasons, a target population of 958 visitors (252 groups) was determined (Table 22). Since a compliance rate could not be determined for Horsepen Creek as previously noted, total visitor-use incorporating the individual trailhead data depicted in Table 19 (page 105) was not estimated.

TABLE 22  
ESTIMATES OF VISITOR-USE OF THE UPPER  
KIAMICHI RIVER WILDERNESS

Season	Visitors Registered	Registration Compliance Rate	Estimate of Actual Visitation
Calculation by Season:			
Spring	197	54.8%	359
Summer	84	37.5%	224
Fall	241	83.3%	289
Winter	66	76.4%	86
Total:	588	---	958
Calculation for Total Year:			
Total:	588	64.8%	907 <sup>a</sup>

<sup>a</sup>Also a conservative estimate of the size of the target population.

The UKRW boundary was not monitored for **bushwhack off-trail** and **Talimena Drive off-trail** visitor entrances and exits. No private inholdees were encountered during the conduct of the study, hence it was neither possible to evaluate their registration compliance nor to gauge the extent of their impact on the size of the target population at UKRW. Nevertheless, the target population likely exceeded the conservative estimate of 907 visitors, though the extent of excess could not be quantified in this study.

## Mail Survey Response Rate

Survey questionnaires were mailed to 262 of the 588 UKRW registrants. Of the remaining 326 visitors, 313 did not provide sufficient information on their registration cards to enable a mailing. Thirteen repeat visitors who had made a recent visit to the area (within two weeks) or who had not yet returned a survey that had been mailed to them earlier were not sent surveys. It was thought that this would be an imposition to those visitors. Of the 262 mailings, five were returned as undeliverable by the postal service. Hence, the study incorporated a total of 257 valid mailings in the survey sample. The mean number of days for visitors to respond and return completed surveys was 28 days, with a range of three to 277 days. The postmark on the return envelope was used to determine the number of days to respond.

A response rate of 72.0% was realized for the mail survey (three mailings) over the year-long study. A total of 185 surveys were returned (Table 23, page 110). The rates of response after the first and second mailings were 37.3% and 52.5%, respectively. Response rates varied across the seasons, ranging from a low of 68.2% for visitors from the spring to a high of 87.9% for winter visitors. Table 23 also presents the range of number of first, second, and third mailings by season, as well as the response rate by season after each mailing.

TABLE 23  
 NUMBER OF MAILINGS AND RESPONSE RATES IN  
 SURVEY SAMPLE OF UPPER KIAMICHI RIVER  
 WILDERNESS VISITORS

Season	Number of Mailing:			Number of Mailings Not Sent Due To:	
	First	Second	Third	Recent Repeat	Insufficient Address
<u>Spring:</u>				2	85
No. of Surveys Mailed:	110	64	53		
Cumulative No. of Responses:	43	56	75		
Cumulative Response Rate:	39.0%	50.9%	68.2%		
<u>Summer:</u>				2	46
No. of Surveys Mailed:	36	18	11		
Cumulative No. of Responses:	16	23	25		
Cumulative Response Rate:	44.4%	63.9%	69.4%		
<u>Fall:</u>				9	151
No. of Surveys Mailed:	78	52	43		
Cumulative No. of Responses:	24	37	56		
Cumulative Response Rate:	30.8%	47.4%	71.8%		

TABLE 23 (Continued)

Season	Number of Mailing:			Number of Mailings Not Sent Due To:	
	First	Second	Third	Recent Repeat	Insufficient Address
<u>Winter:</u>				0	31
No. of Surveys Mailed:	33	23	17		
Cumulative No. of Responses:	13	19	29		
Cumulative Response Rate:	39.4%	57.6%	87.9%		
<u>Total Year:</u>				13	313
No. of Surveys Mailed:	257	157	124		
Cumulative No. of Responses:	96	135	185		
Cumulative Response Rate:	37.3%	52.5%	72.0%		

UKRW survey respondents were ascertained to be a very homogeneous group. An analysis (ANOVA) of selected data variables for first, second, and third respondents elicited no differences between them as related to their overall satisfaction ratings, their **wilderness knowledge scores**, their preferences for management of the UKRW, and their assessments of **wilderness character, use-impact, use-conflict**, and crowding at UKRW.



Chi-square analysis of selected demographic variables resulted in no differences between first, second, and third respondents in age structure, gender proportion, educational background, state of home residence, **type of home residence, proximity of home residence to UKRW**, occupational structure, and income levels. Likewise, Chi-square analysis of selected variables related to characteristics and patterns of use demonstrated no differences between these three respondent groups in terms of the portals that they used at UKRW, the activities they pursued while in the area, their mode of travel in the area, their group composition, their seasonal use distribution, the proportion of **day-visitors to overnight-visitors**, and the proportion of **first-time-visitors to repeat-visitors**.

Based on the homogeneity of the three respondent groups, the second and third follow-up mailings were not critically important in the attempt to avoid nonresponse bias. Hammitt and McDonald (1982) reported similar findings. As suggested by Wellman *et al.* (1980), the time, effort and dollars expended in the two follow-ups could have been saved or utilized elsewhere in the research.

#### Representativeness of Data and Potential Sources of Bias

Based on the conservative estimate of 907 visitors to the UKRW during the study, the valid mailing of 257 questionnaires elicited a sampling intensity of 28.3% of the

target population. The ultimate data generated by the 185 respondents represented 20.4% of the target population.

Based on an analysis of the information provided by survey respondents and nonrespondents on trailhead registration cards, no differences were discerned between them in terms of season of visit to the UKRW, state of residence, **type of home residence, proximity of home residence** to the UKRW, average group size, trailheads used, and activities pursued at UKRW. Survey nonrespondents, however, tended to have longer visits than respondents (2.9 versus 1.9 days, respectively) but their percentage of overnight visits was less (64 versus 78 percent, respectively).

No additional data about the nonrespondent group was obtained through the follow-up telephone survey. Ten nonrespondents were randomly selected for this survey, but none were able to be contacted due to either a lack of an available directory listing, no answer after several dialing attempts, or no response to a message left on an answering machine.

Hence, the data generated from the respondents of the survey of UKRW registrants was deemed to be very representative of the UKRW target population. A potential source of bias in the representativeness of the data was discerned to be the lack of knowledge about nonregistrants, particularly those entering the area on horseback and those not utilizing one of the four trailheads with registration

stations. Other potential sources of bias were inholdees who might not have registered and registrants who did not provide a complete address for the mail survey. Finally, memory erosion at the time of completion of the mail survey (ranging from a few days to several weeks later) by respondents and other unaccounted-for intervening variables may have influenced some bias in the data and the interpretations of it that follow.

### Visitor Demographic Characteristics

The categories of demographic characteristics of UKRW visitors (Table 3, page 62) were the focus of Hypothesis 1 (Table 2, page 53). Chi-square analysis was utilized to discern significant differences between the expected and observed values of the subcategories within each of the demographic characteristic categories.

#### Age

Visitors to the UKRW tended to be middle-aged, averaging 36 years of age. One-third of the survey respondents were in the 26 to 35-year-old group, whereas 80 percent of all respondents were between 16 and 45 years of age and only four percent were older than 55 years (Table 24, page 115). Earlier studies revealed similar findings (Roggenbuck and Lucas 1987, Watson *et al.* 1992).

TABLE 24

AGE DISTRIBUTION OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Age Group	Percent of Survey Respondents
16 - 25 years	19
26 - 35 years	33
36 - 45 years	28
46 - 55 years	16
56 - 65 years	2
66 years or older	2

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 92.80, d.f. = 5,  $p < 0.001$ ); Hypothesis 1 rejected.

Gender

Males comprised over three-fourths of the UKRW visitor population (77 percent). Hendee *et al.* (1990) and Roggenbuck and Lucas (1987) reported that about one-fourth of all wilderness visitors were female, similar to the 23 percent identified in this study. The gender difference was significant (Chi-square = 51.20, d.f. = 1,  $p < 0.001$ ), resulting in a rejection of Hypothesis 1.

Highest Level of Education

UKRW visitors had particularly high education levels. Over 80 percent of the respondents reported that they have attended college. Over 50 percent of the respondents had at least a Bachelors degree and 20 percent reported having Masters or Doctorate degrees (Table 25, page 116).

Roggenbuck and Lucas (1987) and Hendee *et al.* (1990) stated that high education levels were the most distinguishing characteristic of wilderness visitors. They reported that greater than 40 percent of visitors have completed college and 20 to 40 percent have done graduate study. UKRW visitors definitely conformed to this trend.

TABLE 25  
HIGHEST LEVEL OF EDUCATION OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Education Group	Percent of Survey Respondents
8th grade or less	2
9th to 12th grade	18
Some college	30
Bachelors degree	19
Some graduate study	12
Masters or Doctorate degree	20

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 44.73, d.f. = 5,  $p < 0.001$ ); Hypothesis 1 rejected.

Watson *et al.* (1992) stressed that knowing visitors' education levels is likely most critical in planning and delivering visitor information programs. With education levels higher than that of the general United States population, most wilderness visitors could probably understand fairly complex justifications for low-impact procedures and use restrictions. Information programs and

appeals based on logic would likely prompt feelings of satisfaction and encourage compliance by UKRW visitors.

### State of Residence

Oklahomans and Texans accounted for over 83 percent of UKRW visitors (Table 26). Roggenbuck and Watson (1989) and Norgaard et al. (1979) pointed out that the majority of wilderness visitors resided in the state in which the wilderness was situated. UKRW visitation did not steadfastly adhere to the trend, though over 47 percent of the visitors reported Oklahoma residence.

TABLE 26

STATE OF RESIDENCE OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

State	Percent of Survey Respondents
Oklahoma	47.6
Texas	36.2
Arkansas	10.3
Louisiana	2.2
Kansas	1.1
Minnesota	1.1
Indiana	0.5
Michigan	0.5
Tennessee	0.5

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 428.99, d.f. = 8,  $p < 0.001$ ); Hypothesis 1 rejected.

Though the eastern boundary of the UKRW adjoins the Arkansas state line, only about 10 percent of the visitors

were Arkansas residents. Though it is likely that Arkansans might otherwise prefer to visit wilderness areas within their own state, Watson *et al.* (1992) reported that only 23 percent of the visitors to the nearby Caney Creek Wilderness in Arkansas were in-state residents. The highest proportion of Caney Creek visitors, on the other hand, were Texans. The bulk of Texans visiting the UKRW were urban residents, primarily from the Dallas-Fort Worth area. Quite likely the UKRW and Caney Creek have been popular with Texans since similar forested and mountainous wildernesses are unavailable to them in their home state.

#### Proximity of Home Residence to UKRW

Despite the fact that nearly one-half of all UKRW visitors were in-state residents, only one-fifth of the visitor population was deemed to be comprised of local residents from within a 60-mile radius of the UKRW. The bulk of Oklahomans who visited UKRW reported residences throughout the central and eastern regions of the state. The difference between local-visitors (20.5 percent) and distant-visitors (79.5 percent) was significant (Chi-square = 64.22, d.f. = 1,  $p < 0.001$ ), resulting in a rejection of Hypothesis 1.

#### Type of Home Residence

Sixty-three percent of the survey respondents indicated that they resided in an urban area having a population of

10,000 or greater. Yet, there were about as many visitors from large cities (population of 100,000 or more) as there were from farm or rural residences (population less than 2500), as depicted in Table 27. These data conform to the similar trends reported by Roggenbuck and Lucas (1987) and Hendee *et al.* (1990). Watson *et al.* (1992) however noted that urban residents comprised over 78 percent of the visitor population at the nearby Caney Creek Wilderness.

TABLE 27

TYPE OF HOME RESIDENCE OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Residence Group <sup>a</sup>	Percent of Survey Respondents
Farm or rural	25
Town	12
Small city	24
Medium city	16
Large city	23

<sup>a</sup>See Glossary of Terminology for definition of terms.

<sup>b</sup>Significant differences between observed and expected frequencies (Chi-square = 11.51, d.f. = 4,  $p = 0.021$ ); Hypothesis 1 rejected.

### Occupation

More than 35 percent of UKRW visitors were employed in professional-technical fields (Table 28, page 120), similar to the 30 to 40 percent range reported by Roggenbuck and Lucas (1987). Whereas Hendee *et al.* (1990) indicated that students comprised the second highest group of wilderness



visitors, typically about one-fourth of all visitors, only about 11 percent of UKRW visitors were students. The most underrepresented occupational groups at UKRW were the unemployed, farmers-ranchers, military personnel, home-makers, and retired persons. It is quite likely that the dominance of professional-technical individuals was related to the high education levels of visitors previously reported.

TABLE 28  
OCCUPATION OF VISITORS TO THE UPPER  
KIAMICHI RIVER WILDERNESS<sup>a</sup>

Occupation Group	Percent of Survey Respondents
Professional-Technical	35.4
Business Management	12.2
Clerical-Sales-Service	18.5
Craftsman-Operations-Laborer	11.8
Farmer-Rancher	1.1
Military	1.7
Home-maker	3.4
Student	11.8
Unemployed	0.6
Retired	3.4

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 187.73, d.f. = 9,  $p < 0.001$ ); Hypothesis 1 rejected.

#### Income

Previous research has noted that wilderness visitors tended to have above-average incomes, though only moderately so in most areas studied (Roggenbuck and Watson 1989, Hendee

et al. 1990). The data on UKRW visitors followed this trend somewhat. All annual income groups studied at UKRW were represented in the visitor population (Table 29), with the \$20,000 to \$29,999 group accounting for the greatest proportion of visitors (20.6 percent). Twenty percent of the visitors reported annual incomes in excess of \$50,000, though 16 percent reported less than \$10,000. Since actual income levels were not requested in the survey, a mean income could not be calculated.

TABLE 29

ANNUAL INCOME OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Income Group	Percent of Survey Respondents
Under \$10,000	16.0
\$10,000 - \$19,999	19.4
\$20,000 - \$29,999	20.6
\$30,000 - \$39,999	13.1
\$40,000 - \$49,999	10.9
\$50,000 - \$59,999	6.3
\$60,000 - \$69,999	3.4
\$70,000 or more	10.3

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 35.60, d.f. = 7,  $p < 0.001$ ); null hypothesis of Hypothesis 1 rejected.

Membership in Conservation Organizations

Thirty-nine percent of UKRW visitors declared membership in one or more conservation organizations (Table 30, page 122). The difference between the proportion

reporting such membership and those who did not was significant (Chi-square = 5.25, d.f. = 1,  $p = 0.022$ , Hypothesis 1 rejected). Roggenbuck and Lucas (1987) concluded that 20 to 35 percent of wilderness visitors typically belong to conservation or outdoor recreation activity clubs.

TABLE 30

MEMBERSHIP OF VISITORS TO THE UPPER KIAMICHI RIVER  
WILDERNESS IN CONSERVATION ORGANIZATIONS<sup>a</sup>

Number of Organization Memberships	Percent of Survey Respondents
0	61.1
1	26.5
2	9.2
3	2.2
4	1.0

The organizations reported by UKRW visitors were grouped into four general categories as depicted in Table 31 (page 123). Forty-three percent of the reported memberships were in preservation or wilderness-oriented organizations, whereas the remaining memberships included outdoor recreation activity-oriented clubs (24.2 percent), wildlife conservation organizations (9.4 percent), and special interest groups (23.2 percent). The data cast doubt on the suggestion by some that wilderness enthusiasts are solely comprised of a relatively small but distinct sector of society that is committed to wilderness preservation.

TABLE 31

CONSERVATION ORGANIZATION MEMBERSHIPS REPORTED BY  
VISITORS OF THE UPPER KIAMICHI RIVER WILDERNESS

Name of Organization	Percent of Survey Respondents
<b>Preservation and Wilderness-Oriented Organizations:</b>	
Sierra Club	25.2
The Nature Conservancy	6.4
The Wilderness Society	3.2
National Audubon Society	3.2
National Parks & Conservation Association	2.1
Greenpeace	2.1
Environmental Resources Defense Council	<u>1.0</u>
Cumulative Group	43.2
<b>Outdoor Recreation Activity-Oriented Clubs:</b>	
Hunting Clubs	8.5
Hiking Clubs	5.3
Backpacking Club	3.2
Camping Clubs	2.1
North American Hunting Club	2.1
School Outdoors Club	1.0
Recreational Vehicle Club	<u>1.0</u>
Cumulative Group	23.2
<b>Wildlife Conservation Organizations:</b>	
State Wildlife Federations	3.2
Ducks Unlimited	2.1
Wild Turkey Federation	2.1
National Wildlife Federation	1.0
The Wildlife Society	<u>1.0</u>
Cumulative Group:	9.4

TABLE 31 (Continued)

Name of Organization	Percent of Survey Respondents
<b>Special Interest Groups:</b>	
National Rifle Association	9.5
Boy Scouts of America	8.5
Recreational Equipment Inc.	4.2
Society of American Foresters	<u>1.0</u>
Cumulative Group	23.2

Previous Wilderness Visitation Experience

Seventy-five percent of the survey respondents declared that they had previously visited other federal wilderness areas. The difference between the proportion of UKRW visitors who indicated that they had visited other wilderness areas and those who had not was significant (Chi-square = 47.26, d.f. = 1,  $p < 0.001$ ), resulting in a rejection of Hypothesis 1. Yet, when requested on the survey to provide the name of one or more previously visited areas, only 54 percent of those who indicated a place name actually provided one that was in fact a designated federal wilderness. Since UKRW visitors did not exhibit a uniform understanding of what did and what did not constitute federal wilderness, the utility of wilderness experience data derived in this study should be viewed with skepticism.

### Seasonal Variation of Visitor Demographic Characteristics

Seasonal variation within the categories of demographic characteristics of UKRW visitors discussed above and delineated in Table 3 (page 62) was the focus of Hypothesis 2 (Table 2, page 53). Cross-tabulations were utilized to discern whether there was independence (null hypothesis) between each of the demographic characteristics and the four **seasons** of the year of the study. The null hypothesis could not be rejected for any of the demographic characteristics studied other than visitors' type of home residence. Chi-square analysis of this variable across the seasons elicited no significant differences for the summer, fall, or winter. Spring visitors exhibited a difference, however, with those from towns having populations of 2500 to 9999 being markedly underrepresented (Chi-square = 11.73, d.f. = 4,  $p = 0.019$ ).

### Visitor Use Characteristics and Patterns

#### Survey Population Subgroup Pairings

Seven distinct pairings of UKRW visitor subgroups (Table 4, page 63), viewed one pair at a time, were the focus of Hypothesis 3 (Table 2, page 53). Chi-square analysis was utilized to test the null hypothesis of no difference between the expected and observed values of the two visitor subgroups within each pair. The observed values (presented as percentages) and results of the Chi-square analysis are depicted in Table 32 (page 126).

TABLE 32  
 PROPORTIONS OF UPPER KIAMICHI RIVER WILDERNESS  
 VISITOR SUBGROUPS IN PAIRS

Visitor Subgroup Pairs	Percent of Survey Respondents	Chi-square (d.f.)
Hikers vs. Horse-riders	96 4	147.44 <sup>a</sup> (1)
Hunters vs. Non-hunters	15 85	89.19 <sup>a</sup> (1)
Day-visitors vs. Overnight-visitors	22 78	56.18 <sup>a</sup> (1)
Local-visitors vs. Distant-visitors	20 80	64.22 <sup>a</sup> (1)
First-time-visitors vs. Repeat-visitors	47 53	0.68 <sup>b</sup> (1)
Male visitors vs. Female visitors	77 23	51.2 <sup>a</sup> (1)
Solo-visitors vs. Group-visitors	9 91	120.72 <sup>a</sup> (1)

<sup>a</sup>Significant differences between observed and expected frequencies,  $p < 0.001$ , Hypothesis 3 rejected.

<sup>b</sup>Difference not significant,  $p = 0.408$ , Hypothesis 3 not rejected.

Hiking was the dominant travel mode at UKRW. Ninety-six percent of the visitors hiked through the area, whereas only four percent travelled by horseback. The very low percentage of horse-riders in the survey population may have been influenced by the very low rate of registration compliance of this group as noted on page 105.

Though hunting was anticipated to be a dominant use of the UKRW, only 15 percent of the visitors pursued hunting as an activity (Table 32, page 126). Overnight-visitors far outnumbered day-visitors (78 versus 22 percent, respectively). The area received four times as much use from distant-visitors as compared to local-visitors (as noted on page 118). There was no significant difference in the percentages of first-time-visitors (47 percent) versus those who had previously visited UKRW (53 percent). As previously discussed on page 115, over three-fourths of the visitors were males. Finally, less than ten percent of the survey respondents visited the area alone. Most visitors recreated in the area in groups of two or more individuals.

Cross-tabulations were used to ascertain whether or not variation of proportions within the pairs of UKRW visitor subgroups (Table 4, page 63) was independent of seasonal influence (Hypothesis 4, Table 2, page 53). The null hypothesis of independence could not be rejected for any of the visitor subgroup pairs. In other words, there were no significant differences in the percentages presented in



Table 32 (page 126) for each of the seven pairs across the four seasons.

#### Patterns of Use of the UKRW

Differences within the categories of patterns of use of the UKRW delineated in Table 5 (page 64) were tested in Hypothesis 5 (Table 2, page 53) to determine if they were statistically significant. Chi-square analysis was utilized to test the null hypothesis of no difference between the expected and observed values of the subcategories within each use category.

Activities. UKRW visitors pursued a variety of activities during their visits to the area (Table 33, page 129). Ninety percent of the visitors hiked or walked in the area and 79 percent engaged in backpacking or camping. Nearly one-half of the visitors participated in wildlife observation, and 39 percent reported that they had observed plants and pursued photography while visiting UKRW. Only 15 percent of the visitors hunted, and far fewer engaged in fishing or berry-picking (six and four percent, respectively). Six percent reported that they rode horses at UKRW, though this posed a slight discrepancy with the data exhibited in Table 32 (page 126) that was derived from a different question in the survey questionnaire. In an open-ended response, less than one percent of the visitors

indicated that they had engaged in swimming and in fellowship with friends while in the area.

TABLE 33  
PARTICIPATION OF UPPER KIAMICHI RIVER WILDERNESS  
VISITORS IN RECREATIONAL ACTIVITIES

Activity	Percent of Visitors Participating	Percent of Visitors Not Participating	Chi-square (df)
Hiking or Walking	90	10	116.49 <sup>a</sup> (1)
Backpacking/Camping	79	21	58.44 <sup>a</sup> (1)
Wildlife Observation	47	53	0.56 <sup>b</sup> (1)
Observing Plants	39	61	8.98 <sup>c</sup> (1)
Photography	39	61	8.11 <sup>d</sup> (1)
Hunting	15	85	89.19 <sup>a</sup> (1)
Picnicking	13	87	97.88 <sup>a</sup> (1)
Fishing	6	94	136.72 <sup>a</sup> (1)
Horseback Riding	6	94	136.72 <sup>a</sup> (1)
Picking Berries	4	96	146.44 <sup>a</sup> (1)

<sup>a</sup>Significant differences between observed and expected frequencies,  $p < 0.001$ , Hypothesis 5 rejected.

<sup>b</sup>Difference between observed and expected frequencies not significant,  $p = 0.454$ , Hypothesis 5 not rejected.

<sup>c</sup>Significant differences between observed and expected frequencies,  $p = 0.003$ , Hypothesis 5 rejected.

<sup>d</sup>Significant differences between observed and expected frequencies,  $p = 0.004$ , Hypothesis 5 rejected.

Hiking or walking was reported as the major activity pursued by 43 percent of the survey respondents (Table 34, page 130). The second most-mentioned activity was backpacking or camping, as reported by 37 percent of the visitors. These figures must be viewed carefully, however,

since many of the visitors who backpacked also obviously hiked in the area, and vice versa. Though 15 percent of the visitors indicated they had hunted during their visit to the UKRW, only 13 percent stated that this was their main activity. Two percent or less of the visitors reported that wildlife observation and photography were their major activities. Watson et al. (1992) reported a similar activity mix by visitors at the nearby Caney Creek Wilderness in Arkansas.

TABLE 34  
MAJOR ACTIVITY PURSUED BY VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Activity	Percent of Survey Respondents
Hiking	43
Backpacking/Camping	37
Hunting	13
Horseback Riding	4
Wildlife Observation	2
Photography	1

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 181.57, d.f. = 5,  $p < 0.001$ ); Hypothesis 5 rejected.

Roggenbuck and Lucas (1987) noted that hiking, fishing (where it is possible) and photography were the most common activities of wilderness visitors, followed closely in popularity by nature study (wildlife observation, observing plants, and amateur geology) and swimming. Hunting ranged

from fairly common to almost none, depending upon the region. UKRW visitor activity data conformed to these trends, though the report of fishing activity was very low. This was not surprising, however, since fishing opportunities at UKRW are considered to be fair to poor.

Group Composition. Groups of friends were the most common form of social group visitation at UKRW, accounting for 35 percent of all use (Table 35, page 132). Though family groups have been reported as the most common social group in wilderness, up to 40 percent of visitation at many areas (Roggenbuck and Lucas 1987, Hendee *et al.* 1990), only 25 percent of UKRW visitors were families. Organized clubs or groups comprised 21 percent of the visitation at UKRW (Appendix J), though use of wilderness by such groups is rarely exceeds ten percent (Roggenbuck and Lucas 1987). Solo individuals accounted for nine percent of UKRW visitation. Roggenbuck and Lucas (1987) indicated that lone individuals typically account for less than ten percent of wilderness visitation.

Less than 19 percent of the UKRW visitor groups included children of less than 16 years of age. Over 80 percent of those groups reported having three or less children. One group reported having as many as 20 children. The mean number of children for those groups reporting having a children component was 2.7.

TABLE 35  
COMPOSITION OF GROUPS OF VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Group Composition	Percent of Survey Respondents
Friends	35
Family	25
Organized Club or Group	21
Family and Friends	10
Solo Individual	9

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 42.48, d.f. = 4,  $p < 0.001$ ); Hypothesis 5 rejected.

Time and Length of Stay of Visit. Most visitation at the UKRW occurred during the **spring** and the **fall** (41 and 30 percent, respectively; Table 36, page 133). Spring "break" from regional colleges and universities, and the spring and fall hunting seasons likely influenced these seasonal peaks. Though summer typically accounts for up to 60 percent of visitation at most wilderness areas (Roggenbuck and Lucas 1987, Hendee et al. 1990), UKRW visitation was lowest during the summer (13 percent). Quite likely this was influenced by the perceived high incidence of ticks and snakes in the area during the summer, as well as the perceived high levels of heat and humidity in the region at that time of the year. Accordingly, the spring months of March, April, and May, and the fall months of October and November received the highest amount of visitation. Visitation was lowest during June (Table 37, page 133).

TABLE 36  
 VISITATION OF THE UPPER KIAMICHI  
 RIVER WILDERNESS BY SEASON<sup>a</sup>

Season	Percent of Survey Respondents
Spring	41
Summer	13
Fall	30
Winter	16

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 36.12, d.f. = 3,  $p < 0.001$ ); Hypothesis 5 rejected.

TABLE 37  
 VISITATION OF THE UPPER KIAMICHI  
 RIVER WILDERNESS BY MONTH<sup>a</sup>

Month	Percent of Survey Respondents
January	4.9
February	9.2
March	14.1
April	11.9
May	12.4
June	1.1
July	2.7
August	9.7
September	2.2
October	16.2
November	11.9
December	3.8

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 65.44, d.f. = 11,  $p < 0.001$ ); Hypothesis 5 rejected.

As previously delineated in Table 32 (page 126), **overnight-use** far exceeded **day-use** (78 versus 22 percent, respectively) at the UKRW. The mean length of stay for overnight visitors was 2.2 days. Over 80 percent of those UKRW visitors who camped indicated that they spent only one or two nights in the area (Table 38). Day-use visitors averaged 5.2 hours in the area (Table 39, page 135). These findings conform to the current trend toward shorter lengths of time for wilderness visits (2 to 3 days) across the country (Roggenbuck and Lucas 1987, Hendee *et al.* 1990, Watson *et al.* 1992).

TABLE 38

LENGTH OF STAY OF OVERNIGHT-VISITORS TO THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Length of Stay (days)	Percent of Overnight-Use Survey Respondents
1	34.8
2	45.7
3	8.0
4	4.3
5	1.4
6	1.4
7	1.4
8	0
9	1.4
10	1.4

<sup>a</sup>Mean = 2.2 days; standard deviation = 1.7 days.

TABLE 39  
 LENGTH OF STAY OF DAY-VISITORS TO THE  
 UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Length of Stay (hours)	Percent of Day-Use Survey Respondents
1	0
2	3.0
3	21.2
4	27.3
5	9.1
6	12.1
7	6.1
8	9.1
9	9.1
10	3.0

<sup>a</sup>Mean = 5.2 hours; standard deviation = 2.2 hours.

The UKRW received the bulk of its visitation on **weekends** (Table 40, page 136). A similar weekend peaking trend was identified by Lucas (1980) and Roggenbuck and Watson (1989). Saturdays and Sundays were the most popular days for visitors for **day-use**, while Mondays were the least used for day activities during the conduct of the study. Fridays and Saturdays received the greatest amount, and Tuesdays the least amount, of overnight-use by UKRW visitors (Table 41, page 136).



TABLE 40  
WEEKEND VERSUS WEEKDAY VISITATION OF THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Time Period	Percent of Survey Respondents
Weekend <sup>b</sup>	67
Weekday <sup>b</sup>	14
Weekend-Weekday Combination	19

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 71.05, d.f. =2,  $p < 0.001$ ); Hypothesis 5 rejected.

<sup>b</sup>See Glossary of Terminology for definition.

TABLE 41  
DISTRIBUTION OF UPPER KIAMICHI RIVER WILDERNESS  
VISITATION BY DAY OF THE WEEK

Day of the Week	Percent of Day-Use Visitors	Percent of Overnight-Use Visitors
Sunday	27.6	14.4
Monday	3.4	9.2
Tuesday	10.3	5.9
Wednesday	17.2	7.9
Thursday	6.9	9.5
Friday	10.3	20.3
Saturday	24.1	32.8

Trip Characteristics. Six portals were considered in surveying visitor entrances into and exits out of the UKRW (Table 1, page 50; see also map inside back cover). Though the UKRW boundary was not monitored for bushwhack entries

and exits, or for entries and exits from the Talimena Drive, many survey respondents recorded such an entry or exit coupled with their use of one of the four monitored trailheads.

More than 70 percent of the visitors utilized either the Pashubbe Creek Trailhead or the Stateline Trailhead for their entries and exits (Table 42, page 138). Hendee et al. (1990) noted that typically up to 60 percent of the visitors to most wildernesses access the areas through just one or two trailheads. The Kiamichi River Trailhead was used almost twice as much as an exit as it was an entrance. The Horsepen Creek Trailhead had the least use of the four established trailheads, with only six percent of the visitors accessing the UKRW there. The lack of an established trail system in the southeastern sector of the UKRW served by that trailhead likely influenced its minor use as a portal. Entries and exits from the Talimena Drive or from the bush were minimal (four percent or less).

Once inside the area, most visitors (96 percent) travelled on foot (see Table 32, page 126). Only four percent of the survey respondents noted that they travelled by horseback during their visit. Sixty percent of UKRW visitors made **loop trips** in the area. The difference between the proportion of loop and **one-way trips** was significant (Chi-square = 7.16, d.f. = 1,  $p = 0.007$ ). Most visitors (76 percent) travelled exclusively on existing trails, primarily along some portion of the Ouachita

National Recreation Trail. The trips of 30 percent of the visitors were a combination of trail and off-trail use, and only seven percent travelled exclusively off-trail.

TABLE 42  
DISTRIBUTION OF USE OF UPPER KIAMICHI  
RIVER WILDERNESS PORTALS<sup>a</sup>

Portal	% of Visitors Using Portal as Entry <sup>a</sup>	% of Visitors Using Portal as Exit <sup>b</sup>
Pashubbe Cr. Trailhead	41.9	28.0
Stateline Trailhead	35.8	42.3
Kiamichi Riv. Trailhead	11.2	18.9
Horsepen Cr. Trailhead	6.1	5.7
Bushwhack Off-Trail	3.4	2.3
Talimena Drive Off-Trail	1.7	2.9

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 165.82, d.f. = 5,  $p < 0.001$ ); Hypothesis 5 rejected.

<sup>b</sup>Significant differences between observed and expected frequencies (Chi-square = 137.24, d.f. = 5,  $p < 0.001$ ); Hypothesis 5 rejected.

Based on an analysis of trips made by one-way trail users along the Ouachita National Recreation Trail, it was discerned that 70 percent of the travel flow occurred in an eastward direction. Hence, visitors travelling eastward (with the flow) possibly encountered fewer other oncoming visitors on the Ouachita Trail than visitors who proceeded

in a westward direction (against the flow). This was not quantifiable, however, due to the unaccountable random occurrence of encounters of one-way travellers with loop-trip visitors.

Distances travelled by visitors were estimated to the nearest mile by scrutinizing itinerary sketches provided by survey respondents. Any reported trip less than one mile in length was tallied as a one-mile trip. The mean distance travelled by UKRW visitors was 9.0 miles, with a range of one to 23 miles (Table 43).

TABLE 43  
DISTANCE TRAVELLED BY VISITORS WITHIN THE  
UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Distance Travelled (miles)	Percent of Survey Respondents	Cumulative Percent of Survey Respondents
1	4.5	4.5
2	0.6	5.1
3	4.5	9.6
4	3.2	12.8
5	8.3	21.2
6	9.0	30.1
7	9.0	39.1
8	3.8	42.9
9	4.5	47.4
10	4.5	51.9
11	16.7	68.6
12	16.7	85.3
13	6.4	91.7
14	3.2	94.9
15	3.2	98.1
19	1.3	99.4
23	0.6	100.0

<sup>a</sup>Mean = 9.0 miles; standard deviation = 4.0 miles.

Significant differences in trip distance were discerned to exist between visitors making one-way and loop trips, between weekend and weekday travellers, and between visitors staying overnight and those only using the area for day-use (Table 44).

TABLE 44  
COMPARISONS OF MEAN DISTANCE TRAVELLED BY VISITORS  
WITHIN THE UPPER KIAMICHI RIVER WILDERNESS

Visitor Groups	Mean Distance Travelled (miles)	t-value (d.f.)
One-way Travellers vs. Loop Travellers	10.0 8.5	2.50 <sup>a</sup> (139)
Weekend Travellers vs. Weekday Travellers	9.7 11.9	-2.29 <sup>a</sup> (100)
Day-visitors vs. Overnight-visitors	6.2 9.8	4.53 <sup>b</sup> (150)

<sup>a</sup>Significant difference,  $p < 0.05$ .

<sup>b</sup>Significant difference,  $p < 0.001$ .

To gauge the uniformity of use of the 11.5-mile Ouachita National Recreation Trail, the trail was subdivided in a west-to-east direction into eleven 1.0-mile segments and one 0.5-mile segment. A tally of segments traversed by each survey respondent who provided an itinerary sketch was

then accumulated. There were no significant differences in travel use discerned between the trail segments.

After considerable exploration of the UKRW along all trails and throughout the accessible off-trail area, 13 camping sites were identified (see map inside back cover). These camps were readily discernable due to the presence of one or more rock fire rings, exposed and compacted soil (pathways and tent sites), visible accumulated litter, nails in trees, and hatchet marks in trees at most sites. No camp site was found more than 100 feet from a main trail. One survey respondent reported staying overnight at a private cabin within a private inholding. Several others who travelled within the area actually utilized base camps situated immediately outside of the UKRW boundary. Thus, a total of 18 distinct camping sites were identified.

Overnight use was far from uniform among the sites. The sites experiencing the greatest occupancy were Big River (site E), Kiamichi Trailhead (site K), Wilton Mountain (site B), and River Sign (site D) as delineated in Table 45 (page 142). Pine Grove (site G), Pashubbe Trailhead (site P), Lower Beech Grove (site L), Upper Beech Grove (site M), Pashubbe Trailhead (site P), and Old Landing (site Q) were also relatively popular with UKRW visitors.

Average group size of camping parties was 3.9 visitors, ranging from solo visitors to one group of 22 individuals. Overnight visitors camped an average of 1.3 nights each. Most overnight visitors (64.8 percent) camped at a sole

site, though many (34.1 percent) moved to a second camp sometime during their visit. Only one survey respondent reported using more than two camp sites during a visit to the UKRW. That solo visitor occupied five different sites on five consecutive nights (Table 46, page 143).

TABLE 45

CAMP SITE UTILIZATION BY OVERNIGHT VISITORS TO  
THE UPPER KIAMICHI RIVER WILDERNESS FROM  
APRIL 1, 1991, TO MARCH 31, 1992<sup>a</sup>

Camp Site Code & Name	Number of Nights Occupied <sup>a</sup>	Number of Camper-nights <sup>b</sup>
A Pashubbe Peak	8	40
B Wilton Mountain	30	112
C Mile 38	5	8
D River Sign	17	85
E Big River	43	201
F Valley	6	27
G Pine Grove	17	58
I Mile 43	8	24
J North Central	5	7
K Kiamichi Trailhead	30	152
L Lower Beech Grove	14	42
M Upper Beech Grove	18	35
P Pashubbe Trailhead	19	55
Q Old Landing	16	38
U Private Cabin	2	4
V Outside Horsepen	5	13
W Outside Pashubbe	3	3
X Outside Kiamichi	10	13
Z Outside Stateline	3	3

Total Occupancy (camper-nights): 920

<sup>a</sup>Figures reflect site use of estimated 707 overnight visitors (78% of the target population of 907 visitors).

<sup>b</sup>One camper-night is one individual camped for one night.

TABLE 46

NUMBER OF DIFFERENT CAMP SITES USED BY OVERNIGHT  
VISITORS TO THE UPPER KIAMICHI RIVER  
WILDERNESS DURING EACH VISIT

Number of Sites	Percent of Groups	Percent of Visitors
1	64.8	64.5
2	34.1	35.2
5	1.1	0.3

Based on analysis of the sketched itineraries of survey respondents, it appeared as if all reported overnight camping occurred at one of the 18 identified sites. As evidenced by the close proximity of all 18 sites to a trail and obvious litter and deterioration at many of them, it was apparent that UKRW visitors, in general, were not uniformly conscious of minimum-impact or no-trace wilderness camping practices. If visitors were aware of such practices, it did not appear as if they were being uniformly applied in the area over time.

UKRW visitors generally did not spend large sums of money to take their trips to the area. Over 70 percent of the visitors spent \$50 or less, and nearly one-third spent \$25 or less. Five percent of the survey respondents indicated that they spent nothing, while one respondent reported an expenditure as high as \$1000 (Table 47, page 144).



TABLE 47  
 REPORTED EXPENDITURES OF VISITORS TO THE  
 UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Expenditure	Percent of Survey Respondents
\$25 or less	32.9
\$26 - \$50	37.8
\$51 - \$75	6.6
\$76 - \$100	7.2
\$101 - \$125	3.6
\$126 - \$150	4.2
\$151 - \$175	0.6
\$176 - \$200	3.0
More than \$200	4.2

<sup>a</sup>Mean = \$66; standard deviation = \$99.

#### Seasonal Variation in Visitor Use Characteristics and Patterns

The null hypothesis (Hypothesis 6, Table 2, page 53) of independence between each of the use characteristics discussed above (and delineated in Table 5, page 64) and the four **seasons** of the year of the study was not rejected in any cross-tabulation analysis. Visitation characteristics and patterns did not exhibit seasonal influence or variation.

#### Variation in Visitor Use Characteristics and Patterns by Entry Portal

Variation between the seven pairs of UKRW visitor subgroups (Table 4, page 63) within each of the use characteristics discussed above (and delineated in Table 5,

page 64) across the six entry portals (Table 1, page 50; see map inside back cover) was the focus of Hypothesis 7 (Table 2, page 53). Cross-tabulations were utilized to discern whether there was independence (null hypothesis) between each of the variables above and use of entry portals. Only those cases in which portal dependence was identified (i.e. rejection of null hypothesis) are discussed below.

Visitors travelling by horseback in the UKRW accessed the area using only the Pashubbe Creek Trailhead or the Horsepen Creek Trailhead (Chi-square = 19.42, d.f. = 5,  $p = 0.002$ ). The parking area near the Horsepen Creek Trailhead was designed specifically with long diagonal parking lanes and hitching racks, to accommodate horse trailers and horse handling. Though not similarly designed, the parking area at the Pashubbe Creek Trailhead allowed for easy access by individuals with horse trailers.

Proximity to the traffic of the Talimena Drive and the steepness of the trail at the Stateline Trailhead likely discouraged horse use there. Similarly, the rocky and rugged ford of the Kiamichi River en route to the Kiamichi River Trailhead most likely prohibited horse trailer crossings. Interestingly enough, horse-riders who reported travelling in the UKRW from the Horsepen Creek Trailhead quite likely did not actually enter the area, since there is no established trail system in that sector. It was more probable that such visitors travelled along an old, closed

roadway that flanks the southern boundary of the UKRW, east of the Horsepen Creek Trailhead.

A pattern of substantially higher overnight-use versus day-use held firm for all portals except the Horsepen Creek Trailhead. Though 78 percent of UKRW visitors indicated that they spent one or more nights in the area, as previously noted in Table 32 (page 126), only 36 percent of those entering at Horsepen Creek camped (Table 48).

TABLE 48  
DISTRIBUTION OF DAY-USE AND OVERNIGHT-USE BY  
VISITORS TO THE UPPER KIAMICHI RIVER  
WILDERNESS BY ENTRY PORTAL<sup>a</sup>

Entry Portal	Percent of Survey Respondents	
	Overnight-Use	Day-Use
Pashubbe Creek Trailhead	85	15
Kiamichi River Trailhead	65	35
Horsepen Creek Trailhead	36	64
Stateline Trailhead	82	18
Talimena Drive Off-Trail <sup>b</sup>	100	0
Bushwhack Off-Trail <sup>b</sup>	80	20

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 16.84, d.f. =5,  $p = 0.005$ ); Hypothesis 7 rejected.

<sup>b</sup>See Glossary of Terminology for definition.

Similarly, a pattern of much higher use by distant-visitors versus local-visitors occurred for all portals but Horsepen Creek. Whereas 80 percent of UKRW visitation was by distant-visitors, as indicated in Table 32 (page 126), such individuals accounted for only 45 percent of the

visitors entering at Horsepen Creek (Table 49). Across the UKRW, 40 percent of the local-visitors accessed the area at the Pashubbe Creek Trailhead, with the Kiamichi River Trailhead, Stateline Trailhead, and Horsepen Creek Trailhead each accounting for about 20 percent of the local-visitors.

TABLE 49

DISTRIBUTION OF LOCAL-VISITOR AND DISTANT-VISITOR  
USE OF THE UPPER KIAMICHI RIVER WILDERNESS  
BY ENTRY PORTAL<sup>a</sup>

Entry Portal	Percent of Survey Respondents	
	Local-Visitors <sup>b</sup>	Distant-Visitors <sup>b</sup>
Pashubbe Creek Trailhead	20	80
Kiamichi River Trailhead	40	60
Horsepen Creek Trailhead	55	45
Stateline Trailhead	12	88
Talimena Drive Off-Trail <sup>b</sup>	0	100
Bushwhack Off-Trail <sup>b</sup>	0	100

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 17.22, d.f. = 5,  $p = 0.004$ ); Hypothesis 7 rejected.

<sup>b</sup>See Glossary of Terminology for definition.

The proportion of solo or lone individuals entering the UKRW at Horsepen Creek also deviated from the pattern established at all other portals. As previously delineated in Table 32 (page 126), only nine percent of UKRW visitors spent time in the area as lone individuals. Thirty-six percent of those entering at Horsepen Creek were by themselves (Table 50, page 148). More than one-fourth (27 percent) of the solo UKRW visitors accessed the area at

Horsepen Creek. One-third of the solo visitors entered at the Pashubbe Creek Trailhead, and another 33 percent went in at the Stateline Trailhead.

TABLE 50  
DISTRIBUTION OF SOLO-VISITOR AND GROUP-VISITOR  
USE OF THE UPPER KIAMICHI RIVER WILDERNESS  
BY ENTRY PORTAL<sup>a</sup>

Entry Portal	Percent of Survey Respondents	
	Solo-Visitors <sup>b</sup>	Group-Visitors <sup>b</sup>
Pashubbe Creek Trailhead	7	93
Kiamichi River Trailhead	0	100
Horsepen Creek Trailhead	36	64
Stateline Trailhead	8	92
Talimena Drive Off-Trail <sup>b</sup>	0	100
Bushwhack Off-Trail <sup>b</sup>	20	80

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 14.05, d.f. = 5,  $p = 0.015$ ); Hypothesis 7 rejected.

<sup>b</sup>See Glossary of Terminology for definition.

Hiking was the dominant activity pursued by visitors entering the UKRW at the Pashubbe Creek Trailhead, Stateline Trailhead, Talimena Drive Off-Trail, and Bushwhack Off-Trail portals, whereas hunting was the major pursuit of those entering at the Kiamichi River Trailhead and Horsepen Creek Trailhead. The distribution of visitor participation in the three most popular recreational activities (hiking, camping, and hunting) across the six UKRW portals is depicted in Table 51 (page 149). This information should be useful when

targeting distinct types of visitors in future UKRW management information and education programs.

TABLE 51  
DISTRIBUTION OF THREE MOST POPULAR ACTIVITIES OF  
UPPER KIAMICHI RIVER WILDERNESS VISITORS  
ACROSS SIX ENTRY PORTALS<sup>a</sup>

Entry Portal	Percent of Hikers	Percent of Campers <sup>b</sup>	Percent of Hunters
Pashubbe Creek Trailhead	39.4	21.4	36.4
Kiamichi River Trailhead	9.9	7.1	36.4
Horsepen Creek Trailhead	1.4	0	18.2
Stateline Trailhead	43.7	64.3	4.5
Talimena Drive Off-Trail <sup>c</sup>	1.4	0	0
Bushwhack Off-Trail <sup>c</sup>	4.2	7.1	4.5
Total:	100	100	100

<sup>a</sup>Significant differences between observed and expected frequencies (Chi-square = 89.78, d.f. = 30,  $p < 0.001$ ); Hypothesis 7 rejected.

<sup>b</sup>Includes camping and backpacking.

<sup>c</sup>See Glossary of Terminology for definition.

#### Sources of Information Used by Visitors

Most visitors (45.3 percent) first learned about the UKRW from family members or friends (Table 52, page 150). Many others initially became aware of the UKRW by either observing it on a map (16.7 percent) or by virtue of living nearby the area (12.5 percent). Fifteen distinct information sources were identified (Table 52). Similar to the findings of Fazio (1979), few visitors initially received information from the managing agency.

TABLE 52  
 INITIAL SOURCES OF UPPER KIAMICHI RIVER WILDERNESS  
 INFORMATION REPORTED BY VISITORS<sup>a</sup>

Information Source	Percent of Survey Respondents
Family or friend	45.3
Observed area on a map	16.7
Live nearby the area	12.5
Organization newsletter	6.5
U. S. Forest Service publications	5.4
U. S. Forest Service signs in area	4.8
U. S. Forest Service personnel	4.2
Newspaper	1.2
College hiking class	1.2
Referral by retail store	1.2
State Park personnel	0.6
Arkansas tourism packet	0.6

Future information programs by the U. S. Forest Service (USFS) aimed at prospective UKRW visitors could be channeled through some of the sources listed in Table 52, particularly USFS offices and visitor information stations, regional newspapers, special interest organization newsletters, and nearby state parks in Oklahoma and Arkansas. As well, information should be disseminated to organized groups that registered visits at the UKRW during the conduct of the study (Appendix J). Since, however, most visitors first learn about the area through family and friends, the USFS should direct attention toward improving communication with actual UKRW visitors, who by default would quite likely transfer information to potential users of the area.

## Motives of Visitors

The Recreation Experience Preference (REP) scales developed by Driver and his colleagues (Driver 1977, Driver 1983) were utilized to assess the motives of individual UKRW visitors and to discern a motive profile of the visitor population as a whole and as distinct subgroups. Results of a factor analysis (principal components analysis with varimax rotation) of responses of 179 visitors to 40 REP scale items representing 12 domains of Driver's (1977, 1983) scheme (Table 6, page 72) are presented below.

Bartlett's test of sphericity was utilized to test the hypothesis that the correlation matrix of the factor analysis was an identity matrix. The hypothesis was rejected ( $p < 0.0001$ ), indicating the appropriateness of factor analysis for discerning factor relationships within the motive scale data generated from the UKRW survey population.

A Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.84173 was generated during the factor analysis. The KMO measure is an index for comparing the magnitudes of observed correlation coefficients to the magnitudes of partial correlation coefficients. If the sum of squared partial correlation coefficients between all pairs of variables is small when compared to the sum of the squared correlation coefficients, the KMO measure is close to one. Measures in excess of 0.8 are considered as meritorious,



once again upholding the appropriateness of factor analysis with the data set in this study (Norusis 1990).

### Visitor Survey Population Profile

The motive factor structure of the 179 survey respondents who provided complete motive data closely resembled the factor structure of Driver's (1977, 1983) REP scales. However, though the survey instrument incorporated scale items from 12 of Driver's motive domains, only nine domains were identified through factor analysis in this study (Table 53, page 153). Eigenvalues for each of the nine factored domains and the percent of variance explained by each are depicted in Table 54 (page 156). The internal consistency reliability for scale items within each factored domain was well above the minimum Cronbach's Alpha value of 6.0 (Table 55, page 157).

The first domain extracted through factor analysis included 11 scale items closely representing three of the 12 REP or motive domains of Driver (1977, 1983) utilized in the study (Table 6, page 72), including "Achievement/Stimulation," "Autonomy/Leadership" and "Risk-Taking." UKRW visitors did not discriminate between these three domains, hence their combination as a single motive domain in this study was labeled "Autonomy/Risk/Achievement" (Table 53, page 153). UKRW visitors considered risk-taking, being in control of things that happen, experiencing uncertainty, and self-reliance to be related elements of autonomy during

wilderness experience. As dangerous situations are chanced, new circumstances are faced, and a sense of independence is felt, a stimulating and exciting experience likely unfolds and a sense of achievement is gained in the process. Based on the importance ranking of the motive domains discerned in the analysis (Table 56, page 158), UKRW visitors, in general, placed a relatively low priority on autonomy, risk, and achievement as a combined motive for visiting the area.

TABLE 53

FACTOR LOADINGS OF SCALE ITEMS OF NINE MOTIVE DOMAINS  
OF UPPER KIAMICHI RIVER WILDERNESS VISITORS<sup>a</sup>

Motive Domains & Scale Items	Factor Loading
<u>Motive Domain 1: Autonomy/Risk/Achievement</u>	
Be in control of things that happen	0.75473
Experience uncertainty of not knowing what will happen	0.74977
Chance dangerous situations	0.73394
Develop my skills and abilities	0.70771
Take risks	0.70038
Gain a sense of self-confidence	0.69444
Rely on my wits and skills	0.67440
Be at a place where I can make my own decisions	0.67410
Experience new and different things	0.57336
Feel my independence	0.53861
Have a stimulating and exciting experience	0.48260

Table 53 (Continued)

Motive Domains & Scale Items	Factor Loading
<u>Motive Domain 2: Escape Social Pressures/ Enjoy Nature</u>	
Enjoy the smells and sounds of nature	0.78625
Give my mind a rest	0.71578
Be close to nature	0.64986
Have a change from my daily routine	0.63101
View the scenery	0.61853
Be away from crowds of people	0.59196
Get away from the usual demands of life	0.56900
Help release or reduce some built-up tensions	0.54409
Have a stimulating and exciting experience	0.48419
<u>Motive Domain 3: Family Togetherness</u>	
Do something with the family	0.94259
Bring my family closer together	0.89870
Do something the entire family would like	0.85123
<u>Motive Domain 4: Introspection</u>	
Think about my personal values	0.76762
Think about who I am	0.72405
Be in closer touch with higher spiritual values	0.71073
Help release or reduce some built-up tensions	0.56328
Get away from the usual demands of life	0.41181
Experience solitude	0.40875
<u>Motive Domain 5: Physical Fitness</u>	
Get exercise	0.87863
Keep physically fit	0.86448
Feel good after being physically active	0.77770
<u>Motive Domain 6: Experience New People</u>	
Talk to new and varied people	0.83996
Observe other people in the area	0.81756
Meet other people in the area	0.75127

Table 53 (Continued)

Motive Domains & Scale Items	Factor Loading
<u>Motive Domain 7: Experience Similar People</u>	
Be with people having similar values	0.83790
Be with other who enjoy the same things that I do	0.82502
Be with friends	0.80295
<u>Motive Domain 8: Learning</u>	
Learn more about things there	0.76786
Get to know the lay of the land	0.75147
Learn more about nature	0.59546
<u>Motive Domain 9: Escape Physical Pressures</u>	
Be alone	0.71220
Get away from noise back home	0.55771
Be away from crowds of people	0.46491
Experience solitude	0.44918

<sup>a</sup>Based on factor analysis (principal components analysis with varimax rotation) of 40 REP scales (Driver 1977, 1983) by 179 visitors. Minimum criterion for factor loading was a Pearson product-moment correlation of 0.4.

TABLE 54

EIGENVALUES AND VARIANCE EXPLAINED BY NINE MOTIVE DOMAINS  
OF UPPER KIAMICHI RIVER WILDERNESS VISITORS<sup>a</sup>

Motive Domains	Eigen- value	% of Variance	Cumulative %
Autonomy/Risk/Achievement	11.81221	29.5	29.5
Escape Social Pressures/ Enjoy Nature	3.95441	9.9	39.4
Family Togetherness	3.01882	7.5	47.0
Introspection	2.34824	5.9	52.8
Physical Fitness	1.95556	4.9	57.7
Experience New People	1.68580	4.2	61.9
Experience Similar People	1.52229	3.8	65.7
Learning	1.29850	3.2	69.0
Escape Physical Pressures	1.10955	2.8	71.8

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Only factors (domains) having eigenvalues of 1.0 or greater were extracted.

TABLE 55

CRONBACH'S ALPHA RELIABILITY VALUES OF NINE MOTIVE DOMAINS  
OF UPPER KIAMICHI RIVER WILDERNESS VISITORS<sup>a</sup>

Motive Domain	Cronbach's Alpha
Autonomy/Risk/Achievement	.9057
Escape Social Pressures/Enjoy Nature	.8770
Family Togetherness	.9339
Introspection	.8725
Physical Fitness	.8976
Experience New People	.8665
Experience Similar People	.8464
Learning	.7496
Escape Physical Pressures	.7745

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Minimum internal consistency reliability criterion for retaining factors was a Cronbach's Alpha of 0.6.

TABLE 56

RANKING OF NINE MOTIVE DOMAINS BASED ON MEAN RESPONSE  
OF UPPER KIAMICHI RIVER WILDERNESS VISITORS  
TO SCALE ITEMS WITHIN EACH DOMAIN<sup>a</sup>

Motive Domains	Domain Mean <sup>b</sup>	Standard Deviation
Escape Social Pressures/ Enjoy Nature	4.245	0.673
Physical Fitness	3.853	0.941
Escape Physical Pressures	3.755	0.971
Learning	3.608	0.895
Experience Similar People	3.560	1.173
Introspection	3.557	1.001
Autonomy/Risk/Achievement	3.288	0.875
Family Togetherness	2.621	1.462
Experience New People	1.874	0.999

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153).

<sup>b</sup>Based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

The second motive domain identified in the factor analysis was a combination of Driver's (1977, 1983) "Escape Personal-Social Pressures" and "Enjoy Nature" domains. It was assigned the label "Escape Social Pressures/Enjoy Nature," since it appeared as if UKRW visitors linked

motives for seeking a change from daily routines and demands, getting away from crowds, and reducing built-up tensions with viewing scenery, being close to nature, and enjoying the smells and sounds of nature. UKRW visitors placed their highest relative priority on this domain as a motive for their wilderness experience (Table 56, page 158).

The third factored domain recapitulated Driver's (1977, 1983) "Family Togetherness" domain, hence it was assigned the same name. Factor loadings were very high for the three scale items of this domain (Table 53, page 153), yet "Family Togetherness" as a motive for visiting the UKRW was, in general, relatively unimportant for the survey population (Table 56, page 158).

The fourth discerned motive domain combined Driver's (1977, 1983) domain of "Introspection," two scale items from his "Escape Personal-Social Pressures" domain, and the solitude scale element from his "Escape Physical Pressures" domain. Since all of the scale elements factored into the fourth domain in this study related to introspection, reflective thought, and mental refreshment, it was labelled "Introspection." This motive domain was viewed as moderately important for UKRW visitors (Table 56, page 158).

Similar to what occurred with the third motive domain, the fifth through ninth motive domains identified through the factor analysis (Table 53, page 153) mirrored domains in Driver's (1977, 1983) REP scheme. The fifth domain was labelled "Physical Fitness," as it included elements of



exercise, fitness, and positive feelings after physical activity. In the relative ranking depicted in Table 56 (page 158), physical fitness was considered to be very important as a motive for visiting the UKRW.

The sixth and seventh domains related to "Experiencing New People" and "Experiencing Similar People," respectively. While many people value wilderness experience for the opportunity to be alone and intimate with one's own group (Hammit 1982, Hammit and Brown 1984), few people likely pursue wilderness activity for the opportunity of meeting and interacting with new people as they might at a more developed outdoor recreation setting (Bowley 1979, Brown and Haas 1980). UKRW visitors placed a moderately high priority on affiliation with members of their own groups, whereas affiliation with others not in their group was found to be very unimportant (Table 56, page 158).

Elements of "Learning," including getting to know the lay of the land, learning more about nature, and learning more about the UKRW comprised the eighth motive domain of visitors to the area (Table 53, page 153). Visitors regarded learning relatively high in importance as a motive (Table 56, page 158).

The ninth domain, "Escape Physical Pressures," mirrored Driver's (1977, 1983) similar REP domain, hence it was assigned the same label. Being alone, getting away from noise and crowds, and experiencing solitude were elements of this domain (Table 53, page 153), and visitors placed

relatively high importance on this form of escape as a motive for visiting the UKRW (Table 56, page 158).

#### Comparison of Visitor Subgroups

Comparison of the motive structure of the seven pairs of visitor subgroups depicted in Table 4 (page 63) was the intent of Hypothesis 8 (Table 2, page 53). The null hypothesis of no difference between the two subgroups in each pair (viewed one pair viewed at a time) was tested utilizing t-tests on the means for each of the nine motive domains elicited through the factor analysis described above, one domain at a time.

When subdivided by travel mode, there were no differences between hikers and horse-riders in the UKRW survey population regarding motives for visiting the area (Table 57, page 162). Motive rankings of these two subgroups were similar to those displayed previously in Table 56 (page 158).

Two differences were apparent when the survey population was subdivided into hunter and non-hunter groups for motive analysis. Hunters placed more importance on the "Learning" motive, but they viewed "Introspection" with less importance, when compared to non-hunters (Table 58, page 163). Otherwise, the motive ranking was similar to that depicted in Table 56 (page 158).

TABLE 57  
 COMPARISONS OF MEAN RESPONSES OF HIKERS AND  
 HORSE-RIDERS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Hikers	Horse-Riders	
Autonomy/Risk/ Achievement	3.30	3.04	0.82 <sup>b</sup> (172)
Escape Social Pressures/ Enjoy Nature	4.25	4.08	0.38 <sup>b</sup> (172)
Family Togetherness	2.56	3.50	-1.78 <sup>b</sup> (168)
Introspection	3.56	3.62	-0.19 <sup>b</sup> (172)
Physical Fitness	3.84	3.96	-0.34 <sup>b</sup> (172)
Experience New People	1.84	2.50	-1.20 <sup>b</sup> (169)
Experience Similar People	3.52	3.96	-1.01 <sup>b</sup> (171)
Learning	3.58	4.12	-1.68 <sup>b</sup> (172)
Escape Physical Pressures	3.76	3.34	1.20 <sup>b</sup> (172)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Differences not significant; Hypothesis 8 not rejected.

TABLE 58  
 COMPARISONS OF MEAN RESPONSES OF HUNTERS AND  
 NON-HUNTERS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Hunters	Non-Hunters	
Autonomy/Risk/ Achievement	3.45	3.25	1.05 <sup>b</sup> (172)
Escape Social Pressures/ Enjoy Nature	4.09	4.26	-1.17 <sup>b</sup> (172)
Family Togetherness	2.42	2.66	-0.76 <sup>b</sup> (168)
Introspection	3.19	3.61	-2.03 <sup>c</sup> (172)
Physical Fitness	3.57	3.88	-1.52 <sup>b</sup> (171)
Experience New People	1.67	1.89	-1.03 <sup>b</sup> (168)
Experience Similar People	3.51	3.55	-0.16 <sup>b</sup> (171)
Learning	3.92	3.53	2.00 <sup>c</sup> (172)
Escape Physical Pressures	3.79	3.74	0.24 <sup>b</sup> (172)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Difference not significant; Hypothesis 8 not rejected.

<sup>c</sup>Significant difference ( $p < 0.05$ ); Hypothesis 8 rejected.

Day-visitors and overnight-visitors demonstrated two differences in motives (Table 59, page 165). Day-visitors placed a lower premium of importance on the motive of "Autonomy/Risk/Achievement" than did overnight-visitors, likely due to perceived risks or uncertainties associated with overnight camping in a primitive setting. Not surprisingly, day-visitors placed higher importance on "Family Togetherness." Realistically, a visitor who places a high priority on family experience in wilderness may not be as likely concerned with many of the scale items that define the "Autonomy/Risk/Achievement" motive domain, such as chancing dangerous situations, relying on one's own wits, and feeling independent (Table 53, page 153). Otherwise, the motive ranking was similar to that depicted in Table 56 (page 158).

When the UKRW survey population was subdivided as local-visitors or distant-visitors, four differences were discerned regarding motives for visiting the area (Table 60, page 166). Local-visitors seemed to be somewhat more oriented toward social interaction during their UKRW visits. They expressed more importance on motives for "Family Togetherness," "Experiencing New People" and "Learning," but less importance on "Autonomy/Risk/Achievement," than did distant-visitors. Quite likely due to their familiarity with the surrounding region, local-visitors did not perceive the UKRW as a place that posed an element of challenge or risk, as compared to distant-visitors from varied and

different home settings. The motive ranking for this comparison was otherwise similar to that depicted in Table 56 (page 158).

TABLE 59  
COMPARISONS OF MEAN RESPONSES OF DAY-VISITORS AND  
OVERNIGHT-VISITORS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Day	Overnight	
Autonomy/Risk/ Achievement	2.79	3.44	4.21 <sup>b</sup> (172)
Escape Social Pressures/ Enjoy Nature	4.05	4.29	1.93 <sup>c</sup> (172)
Family Togetherness	3.36	2.38	-3.76 <sup>b</sup> (168)
Introspection	3.36	3.61	1.34 <sup>c</sup> (172)
Physical Fitness	3.68	3.90	1.24 <sup>c</sup> (171)
Experience New People	1.84	1.88	0.06 <sup>c</sup> (168)
Experience Similar People	3.48	3.58	0.45 <sup>c</sup> (171)
Learning	3.82	3.54	-1.76 <sup>c</sup> (172)
Escape Physical Pressures	3.62	3.79	0.96 <sup>c</sup> (172)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Significant difference ( $p < 0.001$ ); Hypothesis 8 rejected.

<sup>c</sup>Difference not significant; Hypothesis 8 not rejected.

TABLE 60  
 COMPARISONS OF MEAN RESPONSES OF LOCAL-VISITORS AND  
 DISTANT-VISITORS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Local	Distant	
Autonomy/Risk/ Achievement	3.02	3.60	-2.10 <sup>b</sup> (177)
Escape Social Pressures/ Enjoy Nature	4.16	4.26	-0.73 <sup>c</sup> (177)
Family Togetherness	3.55	2.37	4.59 <sup>d</sup> (173)
Introspection	3.51	3.56	-0.30 <sup>c</sup> (177)
Physical Fitness	3.86	3.85	0.09 <sup>c</sup> (176)
Experience New People	2.16	1.80	1.99 <sup>b</sup> (173)
Experience Similar People	3.82	3.49	1.52 <sup>c</sup> (176)
Learning	4.08	3.48	3.83 <sup>d</sup> (177)
Escape Physical Pressures	3.70	3.77	-0.41 <sup>c</sup> (177)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Significant difference ( $p < 0.05$ ); Hypothesis 8 rejected.

<sup>c</sup>Difference not significant; Hypothesis 8 not rejected.

<sup>d</sup>Significant difference ( $p < 0.001$ ); Hypothesis 8 rejected.

When the UKRW survey population was subdivided as first-time visitors or repeat visitors, several differences were identified regarding motives for visiting the area (Table 61, page 168). Repeat visitors placed higher importance on motives for "Escape Social Pressures/Enjoy Nature," "Family Togetherness," "Introspection," "Learning" and "Escape Physical Pressures" than did first-time visitors. Quite likely due to their familiarity with the UKRW, repeat visitors as a group have developed an attachment or a "sense of place" for the area. As a result, the UKRW was likely more instrumental to repeat visitors in fulfilling some motives for specific types of wilderness experience. The motive ranking for this comparison was otherwise similar to that depicted in Table 56 (page 158).

Viewed in gender subgroups, only one difference existed in motives between male and female visitors. Female visitors placed higher importance on the motive for "Family Togetherness" (Table 62, page 169) than did male visitors to the UKRW. Otherwise, the motive ranking for male and female visitors was similar to that depicted in Table 56 (page 158).



TABLE 61

COMPARISONS OF MEAN RESPONSES OF FIRST-TIME VISITORS  
AND REPEAT VISITORS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	First-Time	Repeat	
Autonomy/Risk/ Achievement	3.16	3.42	1.96 <sup>b</sup> (171)
Escape Social Pressures/ Enjoy Nature	4.11	4.36	2.39 <sup>c</sup> (171)
Family Togetherness	2.28	2.92	2.88 <sup>c</sup> (167)
Introspection	3.36	3.74	2.53 <sup>c</sup> (171)
Physical Fitness	3.82	3.86	0.36 <sup>b</sup> (168)
Experience New People	1.72	2.00	1.76 <sup>b</sup> (167)
Experience Similar People	3.38	3.72	1.90 <sup>b</sup> (170)
Learning	3.42	3.76	2.60 <sup>c</sup> (171)
Escape Physical Pressures	3.56	3.92	2.37 <sup>c</sup> (171)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Difference not significant; Hypothesis 8 not rejected.

<sup>c</sup>Significant difference ( $p < 0.02$ ); Hypothesis 8 rejected.

TABLE 62  
 COMPARISONS OF MEAN RESPONSES OF MALE VISITORS AND  
 FEMALE VISITORS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Male	Female	
Autonomy/Risk/ Achievement	3.31	3.13	1.16 <sup>b</sup> (172)
Escape Social Pressures/ Enjoy Nature	4.20	4.38	-1.53 <sup>b</sup> (172)
Family Togetherness	2.44	3.24	-3.00 <sup>c</sup> (168)
Introspection	3.50	3.77	-1.50 <sup>b</sup> (172)
Physical Fitness	3.80	4.02	-1.34 <sup>b</sup> (171)
Experience New People	1.84	2.02	-0.99 <sup>b</sup> (168)
Experience Similar People	3.50	3.78	-1.31 <sup>b</sup> (171)
Learning	3.64	3.52	0.82 <sup>b</sup> (172)
Escape Physical Pressures	3.75	3.75	-0.02 <sup>b</sup> (172)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Difference not significant; Hypothesis 8 not rejected.

<sup>c</sup>Significant difference ( $p = 0.003$ ); Hypothesis 8 rejected.

When the survey population was subdivided as solo-visitors or group-visitors, three differences were noted regarding motives for visiting the UKRW (Table 63, page 171). Group-visitors expectedly placed high importance on motives for "Family Togetherness" and "Experience Similar People," Solo-visitors, not surprisingly, placed significantly lower importance on these two motives, placing higher importance on motive of "Escape Physical Pressures," which includes components such as getting away from crowds and experiencing solitude (Table 53, page 153). The motive ranking for this comparison was otherwise similar to that presented in Table 56 (page 158).

TABLE 63

COMPARISONS OF MEAN RESPONSES OF SOLO-VISITORS AND GROUP-VISITORS TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean		t-value (df)
	Solo	Group	
Autonomy/Risk/ Achievement	3.60	3.26	1.48 <sup>b</sup> (173)
Escape Social Pressures/ Enjoy Nature	4.38	4.22	0.84 <sup>b</sup> (173)
Family Togetherness	1.24	2.74	-7.02 <sup>c</sup> (169)
Introspection	3.85	3.52	1.23 <sup>b</sup> (173)
Physical Fitness	4.14	3.82	1.33 <sup>b</sup> (172)
Experience New People	1.84	1.87	-0.11 <sup>b</sup> (169)
Experience Similar People	1.42	3.76	-8.77 <sup>c</sup> (172)

TABLE 63 (Continued)

Motive Domains	Domain Mean		t-value (df)
	Solo	Group	
Learning	3.79	3.58	0.88 <sup>b</sup> (173)
Escape Physical Pressures	4.25	3.70	2.15 <sup>d</sup> (173)

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Domain means based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

<sup>b</sup>Difference not significant; Hypothesis 8 not rejected.

<sup>c</sup>Significant difference ( $p < 0.001$ ); Hypothesis 8 rejected.

<sup>d</sup>Significant difference ( $p = 0.033$ ); Hypothesis 8 rejected.

Separate factor analyses for each of the fourteen visitor subgroups were explored to test the hypothesis (Hypothesis 8, Table 2, page 53) of no differences in the motive structures of the subgroups, viewed as pairs depicted in Table 4 (page 63). The results were erratic, primarily due to a low number of observations in several of the subgroup categories. The number of factors (motive domains) extracted varied from six to 11, Bartlett's test of sphericity suggested that factor analysis was appropriate for only eight of the 14 subgroups, and the Kaiser-Meyer-Olkin measure of sampling adequacy generated for each was acceptable for only six of the 14 subgroups. Hence, no conclusion was drawn regarding motive variation between subgroup pairs.

What remains to be tested empirically in future research is whether or not motives translate to behaviors expressed by visitors that result in desired benefit outcomes, and whether or not such behaviors can be influenced by management actions (Driver et al. 1991). Also, it is critically important that methodologies for measuring accrued benefits be discerned (Driver 1992).

#### Seasonal Variation of Motives

To determine whether the motive structure of UKRW visitors varied from season to season (Hypothesis 9, Table 2, page 53), separate factor analyses were conducted on survey responses to the 40 REP scale items (see page 151) of individuals grouped according to their season of visitation. As experienced with the individual factor analyses of the 14 visitor subgroups above, the results were erratic, likely due to low numbers of visitors, especially during the summer and winter. The number of factors (motive domains) extracted varied from eight to 10, Bartlett's test of sphericity suggested that factor analysis was appropriate only for spring and fall visitors, and the Kaiser-Meyer-Olkin measure of sampling adequacy was acceptable only for fall visitors. Hence, no conclusion was drawn regarding seasonal variation of motives for visiting the UKRW.

### Motive Typologies

Mean responses of UKRW visitors to the scale items representing each of the nine motive domains described above and listed in Table 56 (page 158) were cluster-analyzed to delineate distinct motive typologies within the survey population. The measure used in the analysis was squared Euclidian distance, and average linkage between groups was the clustering method utilized.

Using the REP scales of Driver (1977) and cluster-analytic procedures, Bowley (1979), Brown and Haas (1980), and Driver et al. (1991) similarly identified distinct visitor typologies. Segmenting the visitor population according to motive preferences facilitates the study of demographic characteristics, use characteristics, and perceptions of each visitor cluster or type, thereby possibly revealing how different types of visitors may benefit from their experiences in different ways (Driver et al. 1991). Such information will serve as a guide in the planning and management of an area for the provision of wilderness-dependent experience opportunities (Brown and Haas 1980).

Five clusters or motive typologies, representing 179 members of the UKRW survey population, were differentiated for further descriptive analysis. The number of visitors comprising each type and the level of importance placed on each of the nine motive domains are depicted in Table 64 (page 174). For comparative purposes, domain means from

Table 56 (page 158) were included in Table 64. The motive profiles of each of the five UKRW visitor types are depicted graphically in Figure 1 (page 175).

TABLE 64  
COMPARISONS OF MEAN RESPONSES OF FIVE TYPES OF  
UPPER KIAMICHI RIVER WILDERNESS VISITOR  
TO NINE MOTIVE DOMAINS<sup>a</sup>

Motive Domains	Domain Mean (n=179)	Type 1 (n=37)	Type 2 (n=111)	Type 3 (n=19)	Type 4 (n=10)	Type 5 (n=2)
Autonomy/Risk/ Achievement)	3.28	3.97	3.20	2.12	3.73	2.50
Escape Social Pressures/ Enjoy Nature	4.24	4.89	4.22	2.98	4.52	4.77
Family Togetherness	2.62	3.76	2.47	1.78	1.03	4.50
Introspection	3.56	4.58	3.44	1.77	4.25	4.08
Physical Fitness	3.85	4.60	3.72	3.19	4.43	1.67
Experience New People	1.87	3.21	1.60	1.08	1.66	2.66
Experience Similar People	3.56	4.40	3.56	3.08	1.20	2.16
Learning	3.60	4.61	3.35	3.07	3.90	3.50
Escape Physical Pressures	3.76	4.52	3.68	2.26	4.40	4.25

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 53 (page 153). Mean responses based on five-point Likert response scale:

- 1 = "not at all important"
- 2 = "slightly unimportant"
- 3 = "moderately important"
- 4 = "very important"
- 5 = "extremely important"

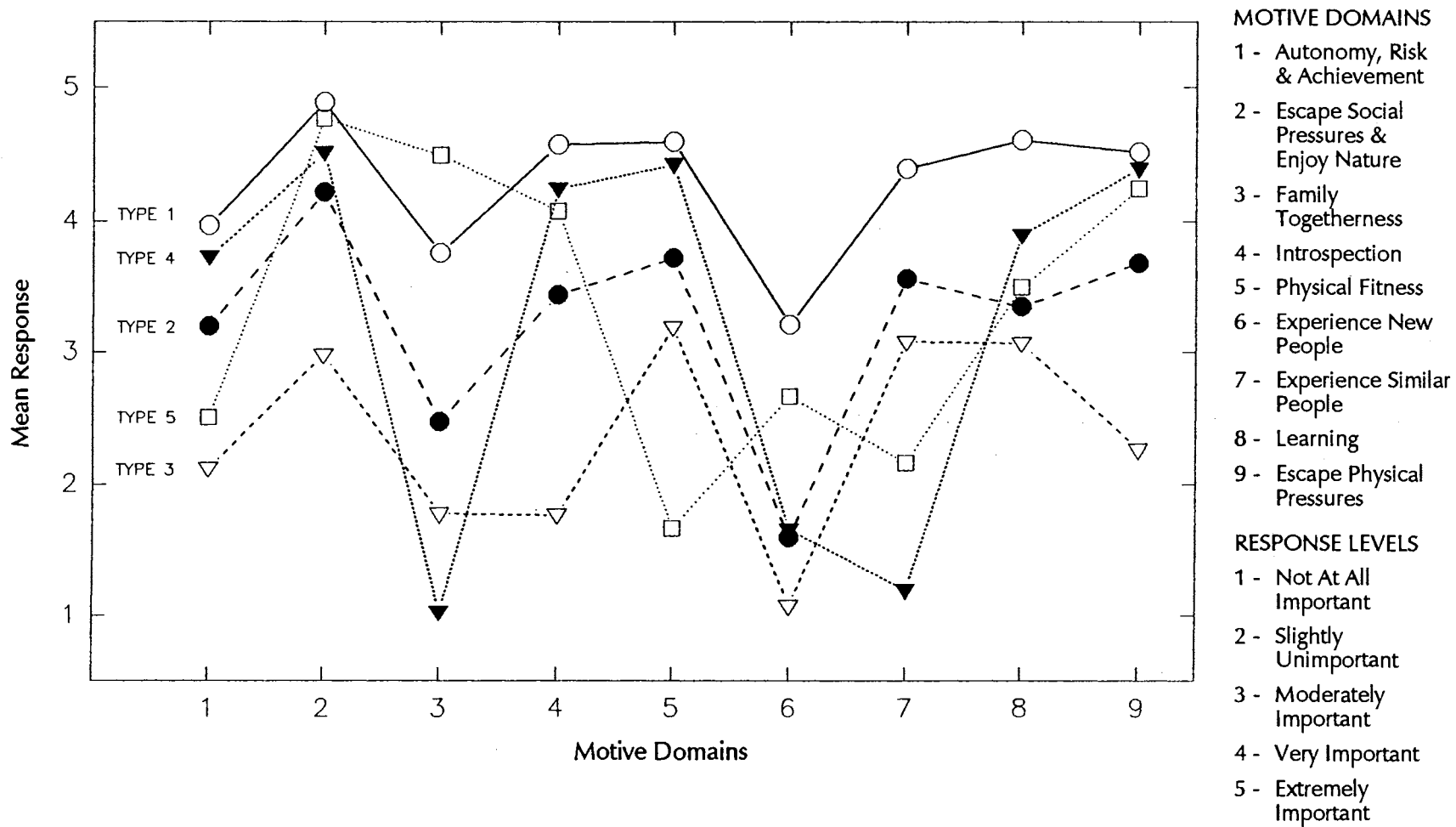


Figure 1. Motive Typologies of Upper Kiamichi River Wilderness Visitors



Visitors were compared in groups based upon their clustering into one of the five motive types, with regard to their demographic characteristics, their visit characteristics, their perceptions of conditions at the UKRW, and their preferences for management of the UKRW. Only those differences significant at the 5% level are discussed below. Unless otherwise noted, the demographic and use characteristics of visitors belonging to each motive type were similar to those described earlier for the survey population in general.

Visitors belonging to the first motive type (Type 1; n=37 or 21 percent of visitors) reported the highest mean level of importance to all but one of the nine motive domains (Table 64, page 174; Figure 1, page 175). Though Type 1 visitors placed less importance on "Family Togetherness" than did the members of Type 5, their mean response was above the average for the survey population. Type 1 visitors predominantly were repeat visitors (75 percent), high school educated (47 percent) and generally had annual incomes of less than \$20,000. They were more observant of evidence of use by others, as compared to visitors belonging to the other four motive types, and they exhibited the highest level of satisfaction with their visits to the area, based on their response to the six-item composite satisfaction scale (see page 212).

Type 2 accounted for more visitors (n=111 or 62 percent of the visitors) than any of the other motive clusters.

Mean responses of this group to each of the nine motive domains were very similar to the responses for the survey population in general (Table 64, page 174; Figure 1, page 175). The majority of Type 2 visitors were first-time visitors (51 percent), college-educated (92 percent), and had higher annual incomes (above \$30,000) than visitors belonging to the other motive types. They exhibited the highest level of **wilderness knowledge** (see page 179) of all motive groups.

Type 3 visitors (n=19 or 11 percent of visitors) reported the lowest mean level of importance to six of the nine motive domains as compared to visitors clustered in the other four motive types (Table 64, page 174; Figure 1, page 175). They assigned their highest priority on motives for "Physical Fitness, "Experience Similar People," and "Learning." The proportion of Type 3 individuals visiting the UKRW for the first time (61 percent) was higher than was discerned for the other motive types. Type 3 visitors were mostly college-educated (80 percent), had high annual incomes (near or above \$30,000), and they had the highest average group size (4.5 visitors) of all motive groups. Type 3 visitors expressed the highest level of support of all motive groups for frequent ranger patrols to reduce illegal activities in the area.

Type 4 visitors (n=10 or 6 percent of visitors) were the most erratic in their mean importance responses to the nine motive domains (Table 64, page 174; Figure 1, page

175). They assigned relatively high priorities on motives for "Escape Social Pressures/Enjoy Nature," "Physical Fitness," "Escape Physical Pressures," and "Introspection," placing very low importance on "Experiencing New People," "Experiencing Similar People," and "Family Togetherness," as compared to the other motive types.

Whereas more than 90 percent of the individuals in the other four motive types visited the UKRW in a group, 89 percent of Type 4 visitors were solo individuals. A slight majority (56 percent) were first-time visitors. Ninety percent of Type 4 visitors were college-educated (30 percent were students), but their annual incomes were relatively low (\$10,000 to \$19,000). Though all visitors except those clustered into Type 5 expressed opposition to the provision of campsites with picnic tables, fire grates, and pit toilets at the UKRW, Type 4 visitors were most opposed to the idea. As well, Type 4 visitors were slightly in favor of prohibiting horse use at the UKRW, and they were the only motive type group that opposed the provision of interpretive signs and displays in the area.

Type 5 included only two UKRW survey respondents (1.1 percent of the survey population). These individuals visited the area as a group of two persons (a married couple), and they were unique enough to form a separate cluster in the analysis. They assigned relatively high priorities on motives for "Escape Social Pressures/Enjoy Nature," "Family Togetherness," and "Escape Physical

Pressures," placing very low importance on "Physical Fitness," "Experiencing Similar People," and "Autonomy/Risk/Achievement," as compared to the other motive types (Table 64, page 174; Figure 1, page 175).

Type 5 visitors were repeat-visitors from an out-of-state residence, having high school educations and the lowest annual income level of visitors of all five motive types. They were the least cognizant of evidence of use by others and of private inholdings at UKRW, and the most in favor of developed campsites, horse use, and interpretive signs and displays in the area. Not surprisingly, Type 5 visitors exhibited the lowest level of wilderness knowledge (see page 179) of all motive groups. Yet, they exhibited the highest level of satisfaction with their visits to the area, based on their response to the single-item satisfaction scale (see page 212).

#### Wilderness Knowledge of Visitors

A scale was designed to ascertain the congruence of UKRW visitors' general knowledge about wilderness with the definition of wilderness as delineated in the Wilderness Act of 1964. The scale included items related to attributes, characteristics, appropriate activity, and management, in the context of wilderness administered by the U.S. Forest Service (Table 7, page 75).

Exploratory factor analysis (principal components analysis with varimax rotation) of responses of 175 UKRW

visitors to the 15-item scale yielded five knowledge domains, indicating that wilderness knowledge was a multidimensional construct in this study. The general theme of each domain and the items comprising each are presented in Table 65 (page 181). Eigenvalues for each of the five factored domains and the percent of variance explained by each are depicted in Table 66 (page 182). Bartlett's test of sphericity indicated the appropriateness of factor analysis for discerning item relationships within the wilderness knowledge scale, in that the hypothesis of an identity matrix was rejected ( $p < 0.0001$ ). A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.690 was generated during the factor analysis, further substantiating the appropriate use of factor analysis for identifying relationships between the knowledge scale variables.

The first wilderness knowledge domain included items related to human encroachment and management intervention incorporating the use of artificial physical items such as signs and trash containers. Items that dealt with mechanical noises or disruptions, such as logging and vehicle use, factored into the second knowledge domain. The third domain included attributes that related to naturalness and the primitive condition of wilderness. The potentially consumptive, but legal activities of fishing and hunting comprised the fourth domain. The fifth domain included a single item dealing with a physical attribute of wilderness, large size (5-10 square miles or more).

TABLE 65  
 FACTOR LOADINGS OF SCALE ITEMS OF FIVE WILDERNESS  
 KNOWLEDGE DOMAINS OF UPPER KIAMICHI RIVER  
 WILDERNESS VISITORS<sup>a</sup>

Wilderness Knowledge Domains & Scale Items	Factor Loading
<u>Knowledge Domain 1: Human Intervention/Encroachment</u>	
Interpretive signs and exhibits to explain the natural, cultural, and historic features of the area	0.77483
Trash containers along the trail and at popular camping areas	0.74944
Use of non-motorized mountain bikes	0.67200
Stocking streams with non-native fish	0.57411
Privately-owned cabins	0.53705
Gravel roads	0.49762
<u>Knowledge Domain 2: Mechanized Noise/Disruption</u>	
Use of motorized recreational and all-terrain vehicles	0.81640
Logging or other commercial timber cutting	0.79958
Hearing mechanical noises coming from within the area	0.56509
<u>Knowledge Domain 3: Naturalness/Primitiveness</u>	
Absence of man-made features	0.83370
Little or no evidence of other visitors before you	0.78662
Solitude (not seeing others except those in your own group)	0.57514

Table 65 (Continued)

Wilderness Knowledge Domains & Scale Items	Factor Loading
<u>Knowledge Domain 4: Activity</u>	
Fishing for native fish within legal limits	0.80009
Hunting according to state regulations	0.64832
<u>Knowledge Domain 5: Physical Attribute</u>	
Covers a large area (5-10 square miles or more)	0.81249

<sup>a</sup>Based on factor analysis (principal components analysis with varimax rotation) of 15 wilderness knowledge scale items by 176 visitors. Minimum criterion for factor loading was a Pearson product-moment correlation of 0.4.

TABLE 66

EIGENVALUES AND VARIANCE EXPLAINED BY FIVE WILDERNESS  
KNOWLEDGE DOMAINS OF UPPER KIAMICHI  
RIVER WILDERNESS VISITORS<sup>a</sup>

Motive Domains	Eigen- value	% of Variance	Cumulative %
Human Intervention/ Encroachment	3.37135	22.5	22.5
Mechanized Noise/ Disruption	1.95405	13.0	35.5
Naturalness/Primitiveness	1.58588	10.6	46.1
Activity	1.30423	8.7	54.8
Physical Attribute	1.00071	6.7	61.4

<sup>a</sup>Motive domains comprised of scale items as depicted in Table 65 (page 181). Only factors (domains) having eigenvalues of 1.0 or greater were extracted.

The procedure for scoring visitor responses to the knowledge scale was delineated on page 93. The possible range of composite scores for the scale was a low of "15" and a high of "75." Three knowledge subgroups were created based on scale scores (Table 12, page 94). In general, UKRW visitors demonstrated a "medium" knowledge level regarding wilderness, with a mean score of 58.4, a standard deviation of 7.3, and a range of 34 to 75 points. Eighty-two percent of the survey respondents received scores in the "medium" range. Four percent had "low" scores and 13 percent exhibited "high" wilderness knowledge. On the contrary, Stankey (1973) reported fairly high wilderness knowledge levels among visitors to three western wilderness areas and the Boundary Waters Canoe Area Wilderness.

Comparisons of wilderness knowledge scale scores of the UKRW visitor subgroups depicted in Table 4 (page 63) were the focus of Hypothesis 10 (Table 2, page 53). T-tests were utilized to test the null hypothesis of no difference between the mean scores of wilderness knowledge within each of the seven pairs of UKRW visitor subgroups. The results of these tests are presented in Table 67 (page 184). Hikers, overnight-visitors, distant-visitors, and male visitors had significantly higher wilderness knowledge scores than horse-riders, day-visitors, local-visitors, and female visitors, respectively. Fazio (1979) discerned that outfitters, backpackers, and group leaders tended to exhibit



higher levels of wilderness knowledge than did day-hikers and hunters.

Seasonal variation of wilderness knowledge of UKRW visitors was explored through Hypothesis 11 (Table 2, page 53). Knowledge scale scores ranged from a low of 57.7 in the fall to a high of 59.2 for winter visitors, though analysis of variance resulted in no significant difference between the mean scores of the survey population across the four seasons ( $F = 0.404$ ,  $d.f. = 3$ ,  $p = 0.750$ ). Hence, Hypothesis 11 was not rejected.

TABLE 67  
COMPARISONS OF WILDERNESS KNOWLEDGE OF  
UPPER KIAMICHI RIVER WILDERNESS  
VISITOR SUBGROUPS IN PAIRS

Visitor Subgroup Pairs	Wilderness Knowledge Scale Score	t-value (d.f.)
Hikers vs. Horse-riders	58.9 52.8	2.34 <sup>a</sup> (175)
Hunters vs. Non-hunters	57.6 58.7	-0.74 <sup>b</sup> (174)
Day-visitors vs. Overnight-visitors	54.4 59.8	4.17 <sup>c</sup> (174)
Local-visitors vs. Distant-visitors	54.8 59.4	-3.52 <sup>d</sup> (181)

TABLE 67 (Continued)

Visitor Subgroup Pairs	Wilderness Knowledge Scale Score	t-value (d.f.)
First-time-visitors vs. Repeat-visitors	58.6 58.7	0.01 <sup>b</sup> (173)
Male visitors vs. Female visitors	59.6 55.4	3.42 <sup>d</sup> (176)
Solo-visitors vs. Group-visitors	59.4 58.5	0.48 <sup>b</sup> (175)

<sup>a</sup>Significant difference ( $p = 0.02$ ); Hypothesis 10 rejected.

<sup>b</sup>Difference not significant ( $p > 0.20$ ); Hypothesis 10 not rejected.

<sup>c</sup>Significant difference ( $p < 0.001$ ); Hypothesis 10 rejected.

<sup>d</sup>Significant difference ( $p = 0.001$ ); Hypothesis 10 rejected.

#### Visitor Perceptions of Wilderness Character

The perceptions that visitors have regarding the attributes or character of a wilderness area, in general, often serve as motivators to influence them to either visit or not visit the area (Haas *et al.* 1979, Lucas 1990). Similarly, such perceptions are often critical elements utilized by visitors in assessing the quality of their wilderness experiences (Stankey and Schreyer 1987). Ten items were incorporated into the UKRW survey instrument in order to gauge visitor perceptions of wilderness character of the area (Table 10, page 78).

In general, visitors regarded the UKRW as having a relatively high, positive wilderness character (Table 68, page 187). Visitors were in strong agreement that the UKRW is large enough to provide a true wilderness experience; it has a great sense of wildness; it offers a great opportunity for solitude; and it is little impacted by humans; all definitional attributes of wilderness as stipulated in the Wilderness Act of 1964. Further, visitors generally disagreed that private inholdings are evident, that trails within the area are in poor condition, and that sounds originating outside of the area are commonly heard, despite the fact that vehicular noise from the adjoining Talimena Drive (see map inside back cover) and noise from the railway in the valley immediately north of the area was commonly heard by the principal investigator during the course of the study. Visitors mildly agreed that past logging activity in the area was still evident.

Hypothesis 12 (Table 2, page 53) probed potential differences in perceptions of wilderness character between the UKRW visitor subgroups organized in pairs, as presented in Table 4 (page 63). Hikers and horse-riders differed in only one of the items listed in Table 68 (page 186). Horse-riders had a higher response (mean = 4.71) than hikers (mean = 4.15) regarding whether "Upper Kiamichi is large enough to provide a true wilderness experience" ( $t = -2.75$ , d.f. = 173,  $p = 0.02$ ; Hypothesis 12 rejected). Otherwise, the mean

responses of these groups were similar to those depicted in Table 68 for the survey population.

TABLE 68  
RESPONSES OF VISITORS TO SURVEY ITEMS RELATED  
TO THE WILDERNESS CHARACTER OF THE UKRW<sup>a</sup>

Wilderness Character Survey Item	Mean Response <sup>a</sup>	Standard Deviation
Upper Kiamichi provides a great opportunity for solitude.	4.70	0.52
Mechanical noises from outside of the area are commonly heard.	2.90	1.37
There is evidence of past logging activity.	3.64	1.28
Upper Kiamichi is large enough to provide a true wilderness experience.	4.19	1.08
Private land ownerships within Upper Kiamichi are evident.	2.72	1.22
Upper Kiamichi has a high quality wilderness character.	4.22	0.81
Upper Kiamichi is clean, pure, and little impacted by humans.	3.70	1.06
The trails are of poor quality and badly eroded.	2.19	1.08
Upper Kiamichi provides a high quality wilderness experience.	4.41	0.74
The Upper Kiamichi setting has a great sense of wildness.	4.35	0.77

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

Four differences in perception were discerned between hunters and non-hunters. In each case, hunters were more perceptive of human-caused intrusions or impacts that likely detract from wilderness character (Table 69). Otherwise, the mean responses of hunters and non-hunters were similar to those depicted in Table 68 (page 186) for the survey population in general.

TABLE 69  
COMPARISON OF RESPONSES OF HUNTERS AND NON-HUNTERS  
TO SURVEY ITEMS RELATED TO THE WILDERNESS  
CHARACTER OF THE UKRW<sup>a</sup>

Wilderness Character Survey Item	Mean Response		t-value (df)
	Hunters	Non-Hunters	
Mechanical noises from outside of the area are commonly heard.	3.60	2.78	2.75 <sup>b</sup> (168)
There is evidence of past logging activity.	4.30	3.52	3.68 <sup>b</sup> (175)
Private land ownerships within Upper Kiamichi are evident.	3.34	2.62	2.81 <sup>b</sup> (174)
The trails are of poor quality and badly eroded.	2.65	2.09	2.52 <sup>c</sup> (173)

<sup>a</sup>Mean responses based on five-point Likert response scale:

1 = "strongly disagree"

2 = "mildly disagree"

3 = "neutral/undecided"

4 = "mildly agree"

5 = "strongly agree"

<sup>b</sup>Significant difference,  $p < 0.01$ ; Hypothesis 12 rejected.

<sup>c</sup>Significant difference,  $p < 0.05$ ; Hypothesis 12 rejected.

Day-visitors and overnight-visitors differed in only one of the items listed in Table 68 (page 187). Day-visitors had a higher response (mean = 4.89) than overnight-visitors (mean = 4.64) regarding whether "Upper Kiamichi provides a great opportunity for solitude" ( $t = -3.54$ , d.f. = 173,  $p = 0.001$ ; Hypothesis 12 rejected), yet both subgroups were in relative high agreement that opportunities for solitude exist at UKRW. Otherwise, the mean responses of these subgroups were similar to those depicted in Table 68 (page 187).

Four differences in perception of wilderness character of UKRW were identified between local-visitors and distant-visitors. In each case, local-visitors were more perceptive to both area attributes that enhance wilderness character and human-caused intrusions or impacts that likely detract from wilderness character (Table 70, page 190). Perhaps this is indicative of a slightly higher degree of place attachment of local-visitors to the UKRW. Otherwise, the mean responses of these subgroups were similar to those depicted in Table 68 (page 187) for the survey population in general.

Four differences in perception were discerned between first-time visitors and repeat visitors. In each case, repeat visitors were more perceptive to area attributes that enhance wilderness character (Table 71, page 191). Similar to local-visitors, it is likely that repeat visitors have developed a higher sense of place attachment to the UKRW

than have first-time visitors. Otherwise, the mean responses of these subgroups were similar to those depicted in Table 68 (page 187) for the survey population in general.

TABLE 70  
COMPARISON OF RESPONSES OF LOCAL-VISITORS AND  
DISTANT-VISITORS TO SURVEY ITEMS RELATED TO  
THE WILDERNESS CHARACTER OF THE UKRW<sup>a</sup>

Wilderness Character Survey Item	Mean Response		t-value (df)
	Local	Distant	
Mechanical noises from outside of the area are commonly heard.	3.52	2.73	3.16 <sup>b</sup> (174)
There is evidence of past logging activity.	4.23	3.48	3.32 <sup>b</sup> (181)
Upper Kiamichi is large enough to provide a true wilderness experience.	4.68	4.06	3.16 <sup>b</sup> (179)
Upper Kiamichi has a high quality wilder- ness character.	4.47	4.15	2.18 <sup>c</sup> (179)

<sup>a</sup>Mean responses based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

<sup>b</sup>Significant difference,  $p < 0.01$ ; Hypothesis 12 rejected.

<sup>c</sup>Significant difference,  $p < 0.05$ ; Hypothesis 12 rejected.

Three differences in perception were identified between male and female visitors (Table 72, page 192). Males were more perceptive of human activities that potentially erode

the wilderness character of an area. Females felt more strongly that "Upper Kiamichi provides a high quality wilderness experience." Otherwise, the mean responses of these subgroups were similar to those depicted in Table 68 (page 187) for the survey population in general.

TABLE 71

COMPARISON OF RESPONSES OF FIRST-TIME VISITORS AND REPEAT VISITORS TO SURVEY ITEMS RELATED TO THE WILDERNESS CHARACTER OF THE UKRW<sup>a</sup>

Wilderness Character Survey Item	Mean Response		t-value (df)
	First-Time	Repeat	
Upper Kiamichi is large enough to provide a true wilderness experience.	4.00	4.34	2.04 <sup>b</sup> (172)
Upper Kiamichi has a high quality wilderness character.	4.00	4.42	3.44 <sup>c</sup> (172)
Upper Kiamichi provides a high quality wilderness experience.	4.24	4.55	2.76 <sup>c</sup> (173)
The Upper Kiamichi setting has a great sense of wildness.	4.22	4.49	2.30 <sup>b</sup> (173)

<sup>a</sup>Mean responses based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

<sup>b</sup>Significant difference,  $p < 0.05$ ; Hypothesis 12 rejected.

<sup>c</sup>Significant difference,  $p < 0.01$ ; Hypothesis 12 rejected.



TABLE 72  
 COMPARISON OF RESPONSES OF MALE AND FEMALE VISITORS  
 TO SURVEY ITEMS RELATED TO THE WILDERNESS  
 CHARACTER OF THE UKRW<sup>a</sup>

Wilderness Character Survey Item	Mean Response		t-value (df)
	Males	Females	
Mechanical noises from outside of the area are commonly heard.	3.03	2.48	2.31 <sup>b</sup> (171)
There is evidence of past logging activity.	3.78	3.19	2.71 <sup>c</sup> (177)
Upper Kiamichi provides a high quality wilder- ness experience.	4.34	4.59	-2.21 <sup>b</sup> (176)

<sup>a</sup>Mean responses based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

<sup>b</sup>Significant difference,  $p < 0.05$ ; Hypothesis 12 rejected.

<sup>c</sup>Significant difference,  $p < 0.01$ ; Hypothesis 12 rejected.

No significant differences in perceptions of wilderness character of the UKRW were discerned between solo-visitors and group-visitors, hence Hypothesis 12 was not rejected in comparisons with these two subgroups.

In an open-ended question, the survey population was also asked to indicate the most outstanding characteristic or feature of the UKRW that makes it a quality wilderness area. Responses were coded to align with the general category statements listed in Table 73 (page 193). More than 70 percent of the survey population cited natural

scenic beauty and primitive conditions as the two most outstanding features of the UKRW.

TABLE 73  
 MOST OUTSTANDING CHARACTERISTIC OF THE UPPER  
 KIAMICHI RIVER WILDERNESS AS REPORTED BY  
 VISITORS TO THE AREA

Characteristic	Percent of Survey Respondents
Natural scenic beauty	39
Primitive conditions	32
Opportunity for solitude	16
Quality trails	7
Large size of area	6

Seasonal variation of visitor perception of wilderness character of the UKRW was investigated in Hypothesis 13 (Table 2, page 53). Analysis of variance of each of the wilderness character survey items listed in Table 68 (page 187) resulted in no significant differences in mean responses of the survey population for each item across the four seasons. As well, analysis of variance of the composite mean score of all of the wilderness character survey items listed in Table 68 (page 187) for visitors across the four seasons elicited no significant difference ( $F = 0.172$ ,  $d.f. = 3$ ,  $p = 0.916$ ). Hence, Hypothesis 13 was not rejected.

Variation of visitor perception of wilderness character of the UKRW between the three wilderness knowledge subgroups (Table 12, page 95) was explored in Hypothesis 14 (Table 2, page 53). Analysis of variance of the composite mean score of all of wilderness character survey items listed in Table 68 (page 187) for visitors belonging to each of the three wilderness knowledge subgroups resulted in no significant difference ( $F = 0.964$ ,  $d.f. = 2$ ,  $p = 0.383$ ). Thus, Hypothesis 14 was not rejected.

#### Visitor Perceptions of Crowding

Visitor perceptions of the level of use of the area by others during their wilderness visit often serve as a basis for evaluating experience quality, and they may also influence future decisions to visit the area. High levels of use at some wilderness areas have been shown to relate to relatively high levels of encounters among visitors. Encounters with others are generally associated with increased perceptions of crowding (Stankey and Schreyer 1987).

Nine items were incorporated into the UKRW survey instrument in order to gauge visitor perceptions of crowding at the area. Based on a review of mean responses to four items assessed with a Likert-style scale, UKRW visitors, in general, did not perceive the area as crowded during their visits (Table 74, page 195).

TABLE 74  
 RESPONSES OF VISITORS TO SURVEY ITEMS RELATED  
 TO PERCEPTIONS OF CROWDING AT THE UKRW<sup>a</sup>

Crowding Perception Survey Item	Mean Response <sup>a</sup>	Standard Deviation
Upper Kiamichi is too crowded to have a true wilderness experience.	1.88	1.03
The trails are often crowded with visitors.	1.92	0.95
Very few visitors leave the trail and go into the backcountry at Upper Kiamichi.	3.40	0.83
Horseback riders are commonly encountered.	2.26	0.98

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

The survey instrument included five additional questions that asked visitors to indicate actual numbers of other visitors and groups encountered during their visits, to provide the acceptable maximum numbers of other visitors and groups that they could tolerate at the UKRW, and to respond to a potential management control of group sizes. Respondents generally reported seeing fewer actual numbers of visitors (Table 75, page 196) or groups of visitors (Table 76, page 197) than their acceptable maximum numbers of each. Thirty-one percent of the respondents indicated that they encountered no other visitors during their visit,

and 42 percent reported seeing no other groups. Only 13 percent saw more than six visitors per day, and even a smaller proportion of visitors (six percent) saw more than two groups per day while visiting the UKRW.

TABLE 75

NUMBER OF OTHER VISITORS REPORTED SEEN PER DAY AND  
ACCEPTABLE MAXIMUM NUMBER OF OTHER VISITORS  
AT THE UPPER KIAMICHI RIVER WILDERNESS

Number of Other Visitors	Percent of Survey Respondents	
	Actual Number Seen Per Day <sup>a</sup>	Acceptable Maximum Number <sup>b</sup>
0	31	7
1 - 3	33	20
4 - 6	22	29
7 - 10	7	23
11 - 20	6	16
> 20	1	5

<sup>a</sup>Mean = 3.78; standard deviation = 6.22; range = 0 to 60.

<sup>b</sup>Mean = 8.85; standard deviation = 10.78; range = 0 to 100.

Fifty-six percent of the survey respondents agreed that there should be a limit to the size of any one group visiting the UKRW, though barely one-half of them offered a suggestion for a maximum number when requested to do so. Maximum group size suggestions ranged from two to 30 visitors (mean = 9.7, standard deviation = 5.0). Of those visitors providing data, 20 percent suggested a maximum of

five or less visitors per group, 56 percent suggested six to 10 visitors, 18 percent suggested 11 to 15 visitors, and only six percent suggested a group size maximum in excess of 15 individuals.

TABLE 76

NUMBER OF OTHER GROUPS REPORTED SEEN PER DAY AND  
ACCEPTABLE MAXIMUM NUMBER OF OTHER GROUPS  
AT THE UPPER KIAMICHI RIVER WILDERNESS

Number of Other Groups	Percent of Survey Respondents	
	Actual Number Seen Per Day <sup>a</sup>	Acceptable Maximum Number <sup>b</sup>
0	42	7
1	36	31
2	16	28
3	2	15
4	2	7
5	2	7
> 6	0	4

<sup>a</sup>Mean = 0.88; standard deviation = 1.04; range = 0 to 5.

<sup>b</sup>Mean = 2.36; standard deviation = 1.94; range = 0 to 12.

The survey instrument included one additional item that asked visitors, "How do you feel about the number of other visitors you saw during your visit to Upper Kiamichi"? Fifty-six percent of the respondents indicated that it was "about the right number," while only 10 percent thought that they encountered too many other visitors. Interestingly

enough, another 10 percent of the respondents considered the amount of other visitors that they saw as "too few," and 24 percent expressed no opinion (Table 77). Based on these findings, it is reasonable to conclude that crowding is not perceived as a problem by visitors, in general, at the UKRW.

TABLE 77

PERCEPTION OF UPPER KIAMICHI RIVER WILDERNESS  
VISITORS TO THE NUMBER OF OTHERS SEEN  
DURING VISITS TO THE AREA

Response to Survey Item <sup>a</sup>	Percent of Survey Respondents
Far too many	1
Somewhat too many	9
About the right number	56
Somewhat too few	6
Far too few	4
No opinion	24

<sup>a</sup>Survey item asked: "How do you feel about the number of other visitors you saw during your visit to Upper Kiamichi"?

Hypothesis 15 (Table 2, page 53) probed potential differences in perceptions of crowding between the UKRW visitor subgroups organized in pairs, as presented in Table 4 (page 63). Horse-riders felt that the number of other visitors that they saw during their visits was "far too few," whereas hikers considered the number of others to be "about the right number" ( $t = -2.57$ , d.f. = 173,  $p = 0.011$ ; Hypothesis 15 rejected). Local-visitors indicated that they

in Table 80 (page 206). Though both subgroups disagreed that conflicts regularly occurred between them, horse-riders were more emphatic (mean response = 1.50) than hikers (mean response = 2.28) that such conflicts were not prevalent at UKRW ( $t = 2.22$ , d.f. = 171,  $p = 0.028$ ; Hypothesis 21 rejected). Regarding whether "Mechanized noises from within the area are commonly heard," both subgroups again disagreed, but hikers were more emphatic in their disagreement ( $t = -2.16$ , d.f. = 173,  $p = 0.032$ ; Hypothesis 21 rejected). Otherwise, the mean responses of these groups were similar to those depicted in Table 80 (page 206) for the survey population.

Three differences in perception of use-conflict were discerned between hunters and non-hunters (Table 81, page 208). Both subgroups disagreed that conflicts regularly occurred between them at the UKRW, though hunters disagreed more strongly. Non-hunters more strongly disagreed that "Mechanical noises from within the area are commonly heard," and while non-hunters mildly disagreed that "Illegal use of motorized all-terrain vehicles is a problem at Upper Kiamichi," hunters were neutral in this regard.

Male-visitors and female-visitors differed in only one of the items listed in Table 80 (page 206). Though both subgroups disagreed that illegal use of all-terrain vehicles was a problem at UKRW, the disagreement by females was more emphatic (mean response = 2.09) than that expressed by males (mean response = 2.50) ( $t = 2.32$ , d.f. = 176,  $p = 0.021$ ;



Hypothesis 21 rejected). Otherwise, the mean responses of these groups were similar to those depicted in Table 80 (page 206).

TABLE 81  
COMPARISON OF RESPONSES OF HUNTERS AND NON-HUNTERS  
TO SURVEY ITEMS RELATED TO THE PERCEPTION OF  
USE-CONFLICT AT THE UKRW<sup>a</sup>

Use-Conflict Survey Item	Mean Response		t-value (df)
	Hunters	Non-Hunters	
Conflicts regularly occur between hunters and non-hunters.	1.96	2.73	-3.73 <sup>b</sup> (173)
Mechanical noises from within the area are commonly heard.	2.73	1.90	3.17 <sup>c</sup> (173)
Illegal use of motorized all-terrain vehicles is a problem at Upper Kiamichi.	3.08	2.28	3.79 <sup>b</sup> (174)

<sup>a</sup>Mean responses based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

<sup>b</sup>Significant difference,  $p < 0.001$ ; Hypothesis 21 rejected.

<sup>c</sup>Significant difference,  $p = 0.004$ ; Hypothesis 21 rejected.

No significant differences in perceptions of use-conflicts at the UKRW were discerned between overnight-visitors and day-visitors, first-time-visitors and repeat-visitors, local-visitors and distant-visitors, and solo-visitors and group-visitors. Hence Hypothesis 21 was not

rejected in comparisons between subgroups in each of these pairs.

It was thought that the presence of private inholdings and the authorized use of vehicles in the UKRW by inholdees travelling to their lands could be perceived as a use-conflict by some visitors pursuing recreational experiences there. Generally, however, survey respondents were mostly neutral or in disagreement that these two items posed conflicts in use at the area (Table 82).

TABLE 82  
RESPONSES OF VISITORS TO SURVEY ITEMS RELATED  
TO PRIVATE INHOLDINGS AT THE UKRW<sup>a</sup>

Private Inholding Survey Item	Mean Response <sup>a</sup>	Standard Deviation
Private land ownerships within Upper Kiamichi are evident.	2.72	1.22
Use of vehicles by owners of private land within the area is common.	2.66	1.02

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "strongly disagree"
- 2 = "mildly disagree"
- 3 = "neutral/undecided"
- 4 = "mildly agree"
- 5 = "strongly agree"

Also, visitors were asked if there were too many dogs seen or heard at the UKRW. Survey respondents, in general disagreed that dogs were a problem at UKRW (mean response = 2.20, standard deviation = 1.08).

Surveyed visitors were asked the open-ended question, "Did you encounter a conflict in use or behavior with another visitor or group during your visit to Upper Kiamichi?" Only ten respondents (five percent of the respondents) answered in an affirmative manner. Conflicts cited included arguments with others for a camp site, a non-hunter expressing conflict with a hunter, a hunter expressing conflict with a non-hunter, an encounter with a motor vehicle in the area, a conflict with the evidence of horse impact on the trail, a conflict with disruptive people camped nearby, and an encounter with a "large, military-style encampment" in the area.

To discern other possible use-conflicts experienced by UKRW visitors, a final open-ended survey item queried visitors about activities that they felt should be discouraged at the area. Sixty-eight percent of the survey respondents provided suggestions that could be construed as potential conflicts in use, depending upon individual perceptions. Most of the suggestions referred to types of recreational activities, while a few related to minimum-impact backcountry practices (Table 83, page 211). Though logging is prohibited in federal wilderness, a few visitors stressed that it not be done in the area. It is likely that respondents who mentioned logging either observed evidence of selective logging that had been done many years preceding the designation of the area as wilderness, or they observed

recent clearcut areas outside of the UKRW boundary, thinking that they were within the boundary.

TABLE 83  
VISITOR SUGGESTIONS OF ACTIVITIES TO DISCOURAGE  
AT THE UPPER KIAMICHI RIVER WILDERNESS<sup>a</sup>

Activity to Discourage	Percent of Survey Respondents
Use of motor vehicles	30.3
Hunting	10.8
Logging	8.1
Use of horses	5.9
Use of mountain bikes	4.9
Any form of resource disruption	2.2
Littering	1.6
Excessive noise	1.1
Cutting firewood	0.5
Leaving evidence of a camp site	0.5
Use of boats	0.5
Poor sanitary practices	0.5
Large campfires	0.5
Low-flying aircraft	0.5
No response	31.9

<sup>a</sup>Response to survey question: "Do you feel that there is any activity that should be discouraged at Upper Kiamichi?"

Seasonal variation of visitor perception of use-conflict at the UKRW was investigated in Hypothesis 22 (Table 2, page 53). Analysis of variance of each of the use-conflict survey items listed in Table 80 (page 206) and Table 82 (page 209) resulted in no significant differences

in mean responses of the survey population for each item across the four seasons. Hence, Hypothesis 22 was not rejected.

Variation of visitor perceptions of use-conflict between the three wilderness knowledge subgroups (Table 12, page 94) was explored in Hypothesis 23 (Table 2, page 53). Analysis of variance of the use-conflict survey items listed in Table 80 (page 206) and Table 82 (page 209) elicited in no significant differences in mean responses between the visitors belonging to the three wilderness knowledge subgroups. Hence, Hypothesis 23 was not rejected.

#### Visitor Satisfaction Levels

The concept of satisfaction has long been central to most discussions of recreation management. Both managers and researchers have argued that a critical goal of recreation management should be to maximize visitor satisfaction. Yet, satisfaction and quality in the recreational experience are complex constructs, and they have been difficult to measure (Dorfman 1979, Schomaker and Knopf 1982b, Vaske *et al.* 1982, Stankey and Schreyer 1987, Williamson 1990).

UKRW visitor satisfaction was gauged using a six-item scale developed by Schomaker and Knopf (1982b) and a single-item scale of Vaske *et al.* (1982), as presented in Table 8 and Table 9 (pages 76 and 77, respectively). The procedures

for scoring responses to each of the scales were outlined on page 94.

In general, visitors expressed relatively high levels of satisfaction with their UKRW experiences. Composite scores for the Schomaker and Knopf (1982b) scale averaged 26.1 points (range = 10-30; standard deviation = 3.6), with a range of possible scores of 6 to 30 points. More than 75 percent of the survey respondents had Schomaker and Knopf (1982b) scale scores between 25 and 30 points. With the Vaske *et al.* (1982) scale, more than 99 percent of the survey respondents reported that their visit to the UKRW ranged between "good" and "perfect" (Table 84).

TABLE 84

OVERALL RATING OF SATISFACTION WITH VISITS TO THE UPPER  
KIAMICHI RIVER WILDERNESS BY VISITORS TO THE AREA

Scale Response	Scale Value <sup>a</sup>	% of Visitors
Poor	1	0
Fair; it just didn't work out very well.	2	0.5
Good, but I wish a number of things could have been different.	3	6.0
Very good, but could have been better.	4	17.5
Excellent; only minor concerns.	5	58.5
Perfect.	6	17.5

<sup>a</sup>Mean = 4.86; standard deviation = 0.79.

The objectives of Hypothesis 24 (Table 2, page 53) were to determine if scores for the Schomaker and Knopf (1982b) scale were correlated with scores for the Vaske *et al.* (1982) scale, and if so, to determine the extent of correlation between them. A positive Pearson product-moment correlation of 0.67 indicated a significant linear correlation between visitor scores for the two scales ( $p < 0.001$ ; Hypothesis 24 rejected). Therefore, it would seem more logical to use the single-item Vaske *et al.* (1982) scale in future visitor surveys, to reduce the overall amount of questions in the survey instrument, but yet obtaining meaningful data on visitor satisfaction. In this regard, only the satisfaction scores from the Vaske *et al.* (1982) scale will be used in further analysis and discussion in this report.

Hypothesis 25 (Table 2, page 53) probed potential differences in reported satisfaction levels between the UKRW visitor subgroups organized in pairs (Table 4, page 63). There were no significant differences between any of the pairs other than that reported between first-time visitors and repeat-visitors (Table 85, page 215). Though both subgroups expressed relatively high levels of satisfaction, the level for repeat-visitors was higher, perhaps due to their development of a sense of place attachment to the UKRW.

TABLE 85  
 COMPARISONS OF SATISFACTION LEVELS OF  
 UPPER KIAMICHI RIVER WILDERNESS  
 VISITOR SUBGROUPS IN PAIRS

Visitor Subgroup Pairs	Satisfaction Score <sup>a</sup>	t-value (d.f.)
Hikers vs. Horse-riders	4.86 5.00	-0.46 <sup>b</sup> (174)
Hunters vs. Non-hunters	4.65 4.90	-1.49 <sup>b</sup> (174)
Day-visitors vs. Overnight-visitors	5.02 4.82	-1.42 <sup>b</sup> (174)
Local-visitors vs. Distant-visitors	5.00 4.82	1.00 <sup>b</sup> (181)
First-time-visitors vs. Repeat-visitors	4.68 5.01	2.79 <sup>c</sup> (173)
Male visitors vs. Female visitors	4.84 4.92	-0.56 <sup>b</sup> (176)
Solo-visitors vs. Group-visitors	4.68 4.88	-0.93 <sup>b</sup> (175)

<sup>a</sup>Based on Vaske *et al.* (1982) scale (Table 84, page 213).

<sup>b</sup>Difference not significant ( $p > 0.10$ ); Hypothesis 25 not rejected.

<sup>c</sup>Significant difference ( $p = 0.006$ ); Hypothesis 25 rejected.



Hypothesis 26 (Table 2, page 53) was generated to investigate whether or not reported satisfaction levels of UKRW visitors who hunted or fished at the area was influenced by their success at bagging game or catching fish. Scores on the Vaske *et al.* (1982) satisfaction scale for successful hunters and fishermen (mean = 4,.88) were not significantly different from those who were unsuccessful (mean = 4.46) ( $t = 0.99$ , d.f. = 21,  $p = 0.33$ ). Hence, Hypothesis 26 was not rejected.

Similarly, Hypothesis 27 (Table 2, page 53) considered whether or not UKRW visitors who experienced **inclement weather** during their visit would report different levels of overall satisfaction from those who did not experience such weather. There was a significant difference between these two groups ( $t = -2.65$ , d.f. = 174,  $p = 0.009$ ). Those reporting inclement weather had a mean Vaske *et al.* (1982) satisfaction scale score of 4.66, while those not experiencing such weather had a mean score of 4.99. Despite the difference, both groups indicated relatively high levels of visit satisfaction. Rainstorms and consequent high water levels along the Kiamichi River accounted for 88 percent of the indicated inclement weather problems, while heat and cold accounted for six and eight percent of the reported problems, respectively.

Hypothesis 28 (Table 2, page 53) considered whether or not UKRW visitors who experienced a use-conflict during their visit would report different levels of overall

satisfaction from those who did not have a use-conflict. There was no significant difference between these two groups ( $t = 0.06$ ,  $d.f. = 172$ ,  $p = 0.953$ ). The use-conflict group had a mean Vaske *et al.* (1982) satisfaction scale score of 4.88, while those not experiencing a conflict had a mean score of 4.87. Nevertheless, both groups expressed relatively high levels of satisfaction with their visits.

In open-ended questions in the survey instrument, visitors were asked to indicate the "high point" and the "low point" of their visits, assuming that the data generated could be utilized as potential indicators of satisfaction and quality in the wilderness experience at the UKRW. "High points" expressed by survey respondents were coded and then placed into either a physical attribute, activity attribute, social attribute, or miscellaneous attribute category, as presented in Table 86 (page 218).

More than one-half of those who responded indicated that the "high point" of their visit was related in some way to satisfaction with their activity, including the ability to experience nature or solitude at the UKRW. Many respondents (41.8 percent) noted a physical attribute of the UKRW as the most positive element of their visit. Very few individuals (1.1 percent) reported a social attribute as the highlight of their UKRW visit (Table 86, page 218).

TABLE 86

"HIGH POINTS" OF VISITS TO THE UPPER KIAMICHI RIVER  
WILDERNESS REPORTED BY VISITORS TO THE AREA

"High Points" Reported by Visitors	Percent of Survey Respondents
<b>Physical Attributes of the Area:</b>	
Scenic beauty	29.4
Resource in good shape	6.2
Wildlife sightings	5.1
Fresh air	<u>1.1</u>
Cumulative Group	41.8
<b>Activity Attributes:</b>	
Activity went well	24.9
Nature experience	13.6
Solitude	13.0
Got lost	<u>0.6</u>
Cumulative Group	52.1
<b>Social Attributes:</b>	
Nice people on the trail	<u>1.1</u>
Cumulative Group:	1.1
<b>Miscellaneous Attributes:</b>	
No negative elements/problems	2.9
Everything was great	<u>2.3</u>
Cumulative Group	5.2

"Low points" were coded and then organized in categories that reflected physical characteristics of the UKRW, problems in the pursuit of an activity, social

conflict/human impact concerns, personal problems, and weather-related problems (Table 87). Concerns or problems associated with physical characteristics of the resource accounted for nearly one-third of the reported "low points." Many visitors indicated weather-related or social conflict/human impact "low points" (23.9 and 22.0 percent of survey respondents, respectively).

TABLE 87

"LOW POINTS" OF VISITS TO THE UPPER KIAMICHI RIVER  
WILDERNESS REPORTED BY VISITORS TO THE AREA

"Low Points" Reported by Visitors	Percent of Survey Respondents
<b>Physical Characteristics of the Area:</b>	
Insects	8.2
Lack of wildlife	6.9
Evidence of past logging	3.8
Poison-ivy	2.5
Not enough hiking trails	2.5
Too many river crossings	2.5
Lack of drinking water	1.9
Evidence of old roads	1.9
Too many boundary signs	1.3
Not enough horse trails	<u>1.3</u>
Cumulative Group	32.8
<b>Problem Encountered in Pursuit of Activity:</b>	
Activity did not proceed as planned	9.4
Ran out of food or beverages	4.4
Poor opportunity for camping	<u>1.3</u>
Cumulative Group	15.1

TABLE 87 (Continued)

"Low Points" Reported by Visitors	Percent of Survey Respondents
<b>Social Conflicts/Human Impact:</b>	
Litter	6.3
Deteriorated camp sites and trails	5.0
Conflict with hunter	4.4
Noisy people camping nearby	2.5
Evidence of vehicle use in area	1.3
Lack of people	1.3
Confrontation with other visitor's dog	0.6
Desired camp site occupied by others	<u>0.6</u>
Cumulative Group:	22.0
<b>Personal Concerns/Problems:</b>	
Injury or health problem	3.1
Sad to leave area	<u>3.1</u>
Cumulative Group	6.2
<b>Weather-Related Problems:</b>	
Bad weather	21.4
High water/flooding after storm	<u>2.5</u>
Cumulative Group	23.9

From an applied standpoint, major consideration should be given to identifying variables that not only influence visitor satisfaction at an area, but those variables in particular that are susceptible to management control or modification should be targeted (Brown *et al.* 1987, Williamson *et al.* 1990, Watson *et al.* 1992). Obviously, wilderness managers have no control over inclement weather. Nor do managers have direct control over hunting/fishing

success, unless intensified wildlife management and stocking programs are pursued. Most would agree that such a heavy-handed approach would be contrary to the spirit and intent of wilderness management as implied in the Wilderness Act of 1964.

Managers could, however, institute practices or controls to retain or enhance the high perceived wilderness character of an area. Future management of the UKRW aimed at sustaining the physical attributes of the area and focused on sustaining opportunities for the pursuit of wilderness-related activities should foster continued expressions of "high points" of satisfaction by visitors.

Other than the construction of new trails and the removal of some boundary signs, most of the reported "low points" are not subject to management control, or management of them would constitute a contradiction of the mandate of the Wilderness Act of 1964. If deemed necessary, management could exercise visitor controls to reduce the negative impact of crowding, use-impact, and use-conflict on satisfaction levels. These, however, were not generally perceived as major problems at the UKRW, and visitor satisfaction levels were not adversely affected by them. Some of the social and impact-related "low points" expressed by visitors could be ameliorated somewhat by management efforts, primarily through the dissemination of suitable information, occasional ranger patrols, and rehabilitation of severely impacted trail segments and camp sites.

Seasonal variation of UKRW visitor satisfaction levels was investigated in Hypothesis 29 (Table 2, page 53). Analysis of variance of mean Vaske et al. (1982) satisfaction scale scores of visitors across the four seasons elicited no significant differences ( $F = 2.29$ , d.f. = 3,  $p = 0.08$ ; Hypothesis 29 not rejected).

Variation mean Vaske et al. (1982) satisfaction scale scores of UKRW visitors across the three wilderness knowledge subgroups (Table 12, page 94) was explored in Hypothesis 30 (Table 2, page 53). Analysis of variance resulted in no differences between them ( $F = 0.562$ , d.f. = 2,  $p = 0.570$ ). Thus, Hypothesis 30 was not rejected.

#### Visitor Preferences for Wilderness Management

Though visitor attitudes and preferences should not be construed as a direct prescription for management of a wilderness area, it is critical the managers have a sense of understanding of legitimate issues, concerns, and visitor support (or lack of support) for planning and management of an area. Many visitors have unique conceptions about how to manage wilderness, and often their views differ markedly from those of management. It is important that such differences be recognized and understood. Exploring visitor perceptions and attitudes may direct management to some fresh insights and viable alternatives. Further, it may cue management that some problems or misconceptions exist among

visitors to an area, indicating the need for a visitor information or education effort. Despite the fact that most research literature has pointed to the low predictability of attitudes for estimating behavior, attitudes do change in response to information programs instituted by management (Stankey and Schreyer 1987).

Mean UKRW visitor responses to 18 management preference survey items are presented in Table 88. The items included behavioral, resource manipulation, and informational/educational modes of management of recreational use of the UKRW.

TABLE 88  
MANAGEMENT PREFERENCES OF UPPER KIAMICHI  
RIVER WILDERNESS VISITORS

Management Preference Items	Item Mean <sup>a</sup>	Standard Deviation
RESOURCE MANIPULATION ITEMS:		
Build more trails.	3.26	1.30
Plant trees on old roadways.	3.96	1.24
Provide campsites with picnic tables, fire grates, and pit toilets.	1.75	1.22
Provide sources of drinking water.	3.10	1.44
Have special trails for horse use only.	3.62	1.22
Plant food plots and construct water holes to attract more wildlife.	3.72	1.30



TABLE 88 (Continued)

Management Preference Items	Item Mean <sup>a</sup>	Standard Deviation
BEHAVIORAL ITEMS:		
Allow camping only in certain areas	2.86	1.39
Require visitors to pack out all trash.	4.91	0.45
Require that all campsites be at least 200 feet or more away from the trail.	3.82	1.14
Require all visitors to obtain a permit at the ranger station in town.	2.48	1.40
Prohibit the use of horses in the area.	3.20	1.40
Limit the amount of people camping at any one site.	3.53	1.23
Require that all campsites be at least 200 feet or more away from streams.	3.72	1.36
Have frequent ranger patrols to reduce illegal use.	3.89	1.10
INFORMATIONAL/EDUCATIONAL ITEMS:		
Provide interpretive signs and displays.	3.38	1.34
Have regular ranger visits to provide information and educational programs.	3.05	1.24
Put in more trail and distance markers.	3.74	1.16
Provide more information about the area and its recreational opportunities.	3.70	1.08

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

UKRW visitors generally ranged between neutrality and slight favor regarding their preferences for resource manipulation modes of management of the area, especially for planting trees on old roads, planting food plots and constructing water holes to attract more wildlife, and building separate hiking and horse trails (Table 88, page 223). They opposed the provision of campsite developments such as picnic tables, fire grates, and pit toilets. Wilderness visitor preferences for a diversity of trails to accommodate different styles of travel and different types of experiences have been reported in the literature. Further, visitors typically prefer little or no campsite development in wilderness beyond the status quo, though supporting more primitive and nonconvenience-oriented approaches when deemed necessary (Stankey and Schreyer 1987, Hendee *et al.* 1990). UKRW visitors followed these trends.

UKRW visitors generally expressed a range of neutrality to slight favor toward behavioral modes of management that dealt with the siting of camps at least 200 feet away from streams and trails, restriction of the number of people camped in an area, the prohibition of horse-use at UKRW, and ranger patrols to reduce illegal activities. Though they strongly favored a requirement that visitors pack out all trash, survey respondents slightly opposed more heavy-handed restrictions that would limit camping to certain areas and require that they obtain a permit at the ranger office in town (Table 88, page 223). As reported previously (page

196), 56 percent of the survey respondents agreed that there should be a limit to the size of any one group visiting the UKRW. Maximum group size suggestions ranged from two to 30 visitors (mean = 9.7). Also, as noted earlier (page 210), many survey respondents provided suggestions about activities that they felt should be discouraged at the area. Most of the suggestions referred to types of recreational activities, minimum-impact backcountry practices, or resource utilization (Table 83, page 211). Again, UKRW visitors conformed to similar trends reported by Stankey and Schreyer (1987) and Hendee *et al.* (1990).

Regarding informational and educational modes of management, visitors generally hovered between neutrality and slight favor of the provision of more information about the UKRW, more trail and distance markers, the provision of interpretive signs and displays (which is contrary to the Wilderness Act of 1964), and regular ranger patrols to provide programs and information. These findings mirrored the trends for wilderness visitors reported by Stankey and Schreyer (1987) and Hendee *et al.* (1990).

At the end of the survey instrument, visitors were invited to offer other comments regarding management of the UKRW not addressed in the survey. All provided comments are presented in Appendix K in the order in which respondents returned surveys. Visitors to wilderness generally support the idea that some form of direct or indirect management is requisite to sustaining the kinds of conditions and quality

experiences that such areas are meant to provide (Stankey and Schreyer 1987, Hendee et al. 1990). As evidenced by their comments, UKRW visitors generally expressed satisfaction with the area, its condition, and its management by the Forest Service. The few negative comments mostly related to resource management activity and other human activity outside of the UKRW boundary, concern that logging was occurring within the UKRW, use of vehicles within the area (apparently by inholders), trail erosion, conflicts with other visitors, and the need for a new trail to minimize river crossings.

Hypothesis 31 (Table 2, page 53) probed potential differences among the UKRW visitor subgroups organized in pairs (Table 4, page 63) regarding the 18 management preference survey items listed in Table 11 (page 80). Heretofore, very few differences have been discerned between UKRW visitors in each of the subgroup pairings for many of the variables investigated in this study. Regarding visitor preferences for management of the UKRW, however, several differences emerged in the data analysis.

When subdivided by travel mode, there were seven differences between hikers and horse-riders (Table 89, page 228). Horse-riders expressed higher favor towards resource manipulation modes of management, including building more trails and providing sources of drinking water. Though both subgroups opposed campsite developments, hikers opposed them more than horse-riders. Both subgroups opposed a permit

requirement, but the preference of hikers was closer to neutrality. Horse-riders very much opposed the prohibition of horses at the UKRW, whereas hikers hovered near neutrality for the item. Finally, horse-riders reported a higher preference for more information about the UKRW and its recreational opportunities.

TABLE 89

COMPARISONS OF UPPER KIAMICHI RIVER  
WILDERNESS MANAGEMENT PREFERENCES  
OF HIKERS AND HORSE-RIDERS<sup>a</sup>

Management Preference Items	Item Mean		t-value (df)
	Hikers	Horse-Riders	
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	3.16	4.88	-10.70 <sup>c</sup> (169)
Plant trees on old roads.	3.96	3.66	0.57 <sup>b</sup> (168)
Provide campsites with picnic tables, fire grates, and pit toilets.	1.70	2.75	-2.41 <sup>d</sup> (169)
Provide sources of drinking water.	3.01	4.12	-2.16 <sup>d</sup> (170)
Have special trails for horse use only.	3.60	3.62	-0.05 <sup>b</sup> (164)
Plant food plots and con- struct water holes to attract more wildlife.	3.64	4.50	-1.80 <sup>b</sup> (170)
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	2.84	3.14	-0.55 <sup>b</sup> (167)

TABLE 89 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Hikers	Horse-Riders	
Require visitors to pack out all trash.	4.92	4.71	1.17 <sup>b</sup> (169)
Require campsites be at least 200 ft. or more away from trail.	3.83	3.25	1.40 <sup>b</sup> (169)
Require all visitors to obtain permit at ranger station in town.	2.52	1.00	13.95 <sup>c</sup> (162)
Prohibit the use of horses in the area.	3.32	1.00	22.28 <sup>c</sup> (163)
Limit the amount of people camping at any one site.	3.57	2.88	1.58 <sup>b</sup> (169)
Require campsites be at least 200 feet or more away from streams.	3.70	3.50	0.39 <sup>b</sup> (170)
Have frequent ranger patrols to reduce illegal use.	3.88	4.00	-0.29 <sup>b</sup> (170)

## INFORMATIONAL/EDUCATIONAL STATEMENTS:

Provide interpretive signs and displays.	3.32	4.25	-1.93 <sup>b</sup> (169)
Have regular ranger visits to provide information and educational programs.	3.00	3.62	-1.39 <sup>b</sup> (169)
Put in more trail and distance markers.	3.68	4.50	-3.89 <sup>d</sup> (170)
Provide more information about the area and its rec. opportunities.	3.64	4.62	-4.89 <sup>c</sup> (169)

TABLE 89 (Continued)

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<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

<sup>b</sup>Difference not significant; Hypothesis 31 not rejected.

<sup>c</sup>Significant difference at  $p \leq 0.001$ ; Hypothesis 31 rejected.

<sup>d</sup>Significant difference at  $p \leq 0.05$ ; Hypothesis 31 rejected.

Six differences were apparent when the survey population was subdivided into hunter and non-hunter groups (Table 90, page 231). Non-hunters were more in favor of resource management that included building more trails, having special trails for horse use, and planting trees on old roads in the area. Hunters more strongly favored the establishment of food plots and water holes to attract more wildlife to the area. Non-hunters were in slight favor of limiting the amount of people camping at any one site and to having more trail and distance markers, whereas hunters were neutral for these items.

Day-visitors and overnight-visitors demonstrated six differences in management preferences (Table 91, page 233). Day-visitors were in slight favor of resource manipulations such as providing sources of drinking water, but overnight-visitors slightly opposed this. Both subgroups opposed developed campsites in the area, though overnight-visitors expressed greater opposition. Overnight-visitors were against site restrictions for camping and in favor of

prohibiting horses at UKRW, in contrast to day-visitors. Day-visitors indicated greater opposition to permit requirements but greater favor toward interpretive signs and displays than did overnight-visitors.

TABLE 90

COMPARISONS OF UPPER KIAMICHI RIVER  
WILDERNESS MANAGEMENT PREFERENCES  
OF HUNTERS AND NON-HUNTERS<sup>a</sup>

Management Preference Items	Item Mean		t-value (df)
	Hunters	Non-Hunters	
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	2.42	3.40	-3.56 <sup>b</sup> (169)
Plant trees on old roads.	3.08	4.12	-4.02 <sup>b</sup> (168)
Provide campsites with picnic tables, fire grates, and pit toilets.	1.66	1.78	-0.40 <sup>c</sup> (169)
Provide sources of drinking water.	2.88	3.10	-0.73 <sup>c</sup> (170)
Have special trails for horse use only.	3.12	3.68	-2.07 <sup>d</sup> (164)
Plant food plots and construct water holes to attract more wildlife.	4.64	3.54	5.90 <sup>b</sup> (170)
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	2.92	2.88	0.13 <sup>c</sup> (167)
Require visitors to pack out all trash.	4.84	4.92	-0.65 <sup>c</sup> (169)
Require campsites be at least 200 ft. or more away from trail.	3.50	3.86	-1.43 <sup>c</sup> (169)



TABLE 90 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Hunters	Non-Hunters	
Require all visitors to obtain permit at ranger station in town.	2.16	2.52	-1.21 <sup>c</sup> (169)
Prohibit the use of horses in the area.	2.92	3.26	-1.15 <sup>c</sup> (170)
Limit the amount of people camping at any one site.	3.04	3.62	-2.23 <sup>d</sup> (169)
Require campsites be at least 200 feet or more away from streams.	3.44	3.74	-1.02 <sup>c</sup> (170)
Have frequent ranger patrols to reduce illegal use.	4.04	3.88	0.68 <sup>c</sup> (170)

## INFORMATIONAL/EDUCATIONAL STATEMENTS:

Provide interpretive signs and displays.	3.54	3.36	0.59 <sup>c</sup> (169)
Have regular ranger visits to provide information and educational programs.	3.42	2.98	1.58 <sup>c</sup> (169)
Put in more trail and distance markers.	3.08	3.84	-3.09 <sup>d</sup> (170)
Provide more information about the area and its rec. opportunities.	3.60	3.71	-0.48 <sup>c</sup> (169)

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

<sup>b</sup>Significant difference at  $p \leq 0.001$ ; Hypothesis 31 rejected.

<sup>c</sup>Difference not significant; Hypothesis 31 not rejected.

<sup>d</sup>Significant difference at  $p \leq 0.05$ ; Hypothesis 31 rejected.

TABLE 91

COMPARISONS OF UPPER KIAMICHI RIVER WILDERNESS MANAGEMENT  
PREFERENCES OF DAY-VISITORS AND OVERNIGHT-VISITORS<sup>a</sup>

Management Preference Items	Item Mean		t-value (df)
	Day	Overnight	
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	3.38	3.22	-0.69 <sup>b</sup> (169)
Plant trees on old roads.	4.05	3.94	-0.49 <sup>b</sup> (168)
Provide campsites with picnic tables, fire grates, and pit toilets.	2.26	1.62	-2.82 <sup>c</sup> (169)
Provide sources of drinking water.	3.64	2.90	-2.83 <sup>c</sup> (170)
Have special trails for horse use only.	3.68	3.59	-0.39 <sup>b</sup> (164)
Plant food plots and con- struct water holes to attract more wildlife.	4.02	3.59	-1.81 <sup>b</sup> (170)
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	3.30	2.76	-2.07 <sup>c</sup> (167)
Require visitors to pack out all trash.	4.90	4.92	0.23 <sup>b</sup> (169)
Require campsites be at least 200 ft. or more away from trail.	3.79	3.81	0.07 <sup>b</sup> (169)
Require all visitors to obtain permit at ranger station in town.	2.00	2.58	2.29 <sup>c</sup> (169)
Prohibit the use of horses in the area.	2.51	3.44	3.76 <sup>d</sup> (170)
Limit the amount of people camping at any one site.	3.38	3.58	0.86 <sup>b</sup> (169)

TABLE 91 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Day	Overnight	
Require campsites be at least 200 feet or more away from streams.	3.64	3.70	0.23 <sup>b</sup> (170)
Have frequent ranger patrols to reduce illegal use.	4.05	3.84	-1.05 <sup>b</sup> (170)

## INFORMATIONAL/EDUCATIONAL STATEMENTS:

Provide interpretive signs and displays.	3.87	3.25	-2.61 <sup>c</sup> (169)
Have regular ranger visits to provide information and educational programs.	3.30	2.98	-1.46 <sup>b</sup> (169)
Put in more trail and distance markers.	3.87	3.70	-0.81 <sup>b</sup> (170)
Provide more information about the area and its rec. opportunities.	3.84	3.64	-1.02 <sup>b</sup> (169)

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

<sup>b</sup>Difference not significant; Hypothesis 31 not rejected.

<sup>c</sup>Significant difference at  $p \leq 0.05$ ; Hypothesis 31 rejected.

<sup>d</sup>Significant difference at  $p \leq 0.001$ ; Hypothesis 31 rejected.

Local-visitors and distant-visitors differed in nine of the 18 management preference survey items (Table 92, page 235). Both subgroups opposed developed campsites, but distant-visitors were more strongly opposed. Distant-

visitors also opposed the provision of water sources by management, while local-visitors favored it. Local-visitors were in stronger favor of food plots and water holes to attract more wildlife to the area than were distant-visitors. Regarding behavioral modes of management, distant-visitors favored the prohibition of horses from the UKRW, but they opposed camp location restrictions, contrary to local-visitors. Both subgroups opposed permit requirements, but the opposition of local-visitors was stronger. Local-visitors expressed stronger favor to three of the informational and educational management practices, including the provision of interpretive signs and displays, the provision of more information about the UKRW and its opportunities, and regular ranger visits to the area for information and educational programs.

TABLE 92

COMPARISONS OF UPPER KIAMICHI RIVER WILDERNESS  
MANAGEMENT PREFERENCES OF LOCAL-VISITORS  
AND DISTANT-VISITORS<sup>a</sup>

Management Preference Items	Item Mean		t-value (df)
	Local	Distant	
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	3.39	3.22	0.72 <sup>b</sup> (176)
Plant trees on old roads.	4.00	3.94	0.25 <sup>b</sup> (175)
Provide campsites with picnic tables, fire grates, and pit toilets.	2.21	1.62	2.16 <sup>c</sup> (176)

TABLE 92 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Local	Distant	
Provide sources of drinking water.	3.82	2.90	3.59 <sup>d</sup> (177)
Have special trails for horse use only.	3.94	3.52	1.88 <sup>b</sup> (171)
Plant food plots and construct water holes to attract more wildlife.	4.42	3.53	3.87 <sup>d</sup> (177)
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	3.27	2.76	1.99 <sup>c</sup> (174)
Require visitors to pack out all trash.	4.86	4.92	-0.64 <sup>b</sup> (176)
Require campsites be at least 200 ft. or more away from trail.	3.74	3.84	-0.47 <sup>b</sup> (176)
Require all visitors to obtain permit at ranger station in town.	2.05	2.60	-2.12 <sup>c</sup> (176)
Prohibit the use of horses in the area.	2.24	3.46	-5.16 <sup>d</sup> (177)
Limit the amount of people camping at any one site.	3.21	3.62	-1.84 <sup>b</sup> (176)
Require campsites be at least 200 feet or more away from streams.	3.63	3.74	-0.42 <sup>b</sup> (177)
Have frequent ranger patrols to reduce illegal use.	4.16	3.82	1.67 <sup>b</sup> (177)
INFORMATIONAL/EDUCATIONAL STATEMENTS:			
Provide interpretive signs and displays.	3.82	3.26	2.28 <sup>c</sup> (176)

TABLE 92 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Local	Distant	
Have regular ranger visits to provide information and educational programs.	3.44	2.94	2.26 <sup>c</sup> (176)
Put in more trail and distance markers.	4.00	3.67	1.55 <sup>b</sup> (177)
Provide more information about the area and its rec. opportunities.	4.16	3.59	2.97 <sup>d</sup> (176)

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

<sup>b</sup>Difference not significant; Hypothesis 31 not rejected.

<sup>c</sup>Significant difference at  $p \leq 0.05$ ; Hypothesis 31 rejected.

<sup>d</sup>Significant difference at  $p \leq 0.001$ ; Hypothesis 31 rejected.

Only one difference in management preference was identified between first-time visitors and repeat visitors. Repeat visitors reported a stronger preference for the planting of food plots and the construction of water holes to attract more wildlife to the area. Otherwise, mean responses of first-time visitors and repeat visitors to the management preference items in the survey instrument were similar to those of the visitor population in general (Table 88, page 223).

Viewed in gender subgroups, only two differences existed. Both males and females expressed favor for the

building of more trails and the planting of trees along old roadways at the UKRW, but the preferences of females was stronger for each item. Otherwise, the preferences of males and females for management of the UKRW were similar to those of the visitor population in general (Table 88, page 223).

When the survey population was subdivided as solo-visitors or group-visitors, three differences in preferences for UKRW management were noted (Table 93). Neither subgroup favored restrictions on areas for camping, but solo-visitors expressed greater opposition. Both favored tree-planting on old roads in the area, though group-visitors indicated greater support of this. Group-visitors were in slight favor of regular ranger patrols for information dissemination and educational programs. Not surprisingly, solo-visitors opposed the idea.

TABLE 93

COMPARISONS OF UPPER KIAMICHI RIVER WILDERNESS  
MANAGEMENT PREFERENCES OF SOLO-VISITORS  
AND GROUP-VISITORS<sup>a</sup>

Management Preference Items	Item Mean		t-value (df)
	Solo	Group	
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	2.94	3.28	-1.00 <sup>b</sup> (170)
Plant trees on old roads.	3.31	4.02	-2.21 <sup>c</sup> (169)

TABLE 93 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Solo	Group	
Provide campsites with picnic tables, fire grates, and pit toilets.	1.62	1.78	-0.48 <sup>b</sup> (170)
Provide sources of drinking water.	2.56	3.12	-1.50 <sup>b</sup> (171)
Have special trails for horse use only.	3.53	3.62	-0.25 <sup>b</sup> (165)
Plant food plots and construct water holes to attract more wildlife.	3.25	3.74	-1.42 <sup>b</sup> (171)
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	2.00	2.95	-2.56 <sup>c</sup> (168)
Require visitors to pack out all trash.	5.00	4.90	0.80 <sup>b</sup> (170)
Require campsites be at least 200 ft. or more away from trail.	3.81	3.81	-0.01 <sup>b</sup> (170)
Require all visitors to obtain permit at ranger station in town.	2.00	2.50	-1.35 <sup>b</sup> (170)
Prohibit the use of horses in the area.	3.12	3.23	-0.30 <sup>b</sup> (171)
Limit the amount of people camping at any one site.	3.06	3.59	-1.65 <sup>b</sup> (170)
Require campsites be at least 200 feet or more away from streams.	3.94	3.66	0.75 <sup>b</sup> (171)
Have frequent ranger patrols to reduce illegal use.	3.56	3.93	-1.28 <sup>b</sup> (171)



TABLE 93 (Continued)

Management Preference Items	Item Mean		t-value (df)
	Solo	Group	
INFORMATIONAL/EDUCATIONAL STATEMENTS:			
Provide interpretive signs and displays.	2.94	3.42	-1.39 <sup>b</sup> (170)
Have regular ranger visits to provide information and educational programs.	2.37	3.12	-2.30 <sup>c</sup> (170)
Put in more trail and distance markers.	3.25	3.78	-1.73 <sup>b</sup> (171)
Provide more information about the area and its rec. opportunities.	3.44	3.72	-0.99 <sup>b</sup> (170)

<sup>a</sup>Based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

<sup>b</sup>Difference not significant; Hypothesis 31 not rejected.

<sup>c</sup>Significant difference at  $p \leq 0.05$ ; Hypothesis 31 rejected.

Seasonal variation of visitor preferences for management of the UKRW was investigated in Hypothesis 32 (Table 2, page 53). Analysis of variance of the mean response of survey respondents from each of the four seasons to the 18 management preference survey items listed in Table 11 (page 80) elicited a significant difference for only one item. Whereas spring, fall and winter visitors were uniformly opposed or neutral regarding the preference that management provide sources of drinking water at the UKRW, summer visitors were different in that they were in favor of

such a provision ( $F = 4.67$ , d.f. = 3,  $p = 0.004$ ; Hypothesis 32 rejected). Summer visitors were likely in favor of more water sources, since many ephemeral stream-courses within the UKRW run "dry" during that period of the year.

Variation of UKRW visitor management preferences across the three wilderness knowledge subgroups (Table 12, page 94) was explored in Hypothesis 33 (Table 2, page 53). To this point, very few differences have been discerned between UKRW visitors in each of the three wilderness knowledge groups for many of the variables investigated in the study. Regarding visitor preferences for management of the UKRW, however, significant differences between knowledge group mean responses to eight of the 18 management preference survey items listed in Table 11 (page 80) were identified by analysis of variance. These differences are delineated in Table 94 (page 242).

Regarding resource manipulation modes of management, visitors with higher levels of wilderness knowledge tended to express greater opposition toward developed campsites and the provision of sources of drinking water (Table 94, page 242). High knowledge individuals were neutral about planting food plots and constructing water holes to attract wildlife to the area, while those in the medium and low knowledge groups favored these practices. The Wilderness Act of 1964 discourages these forms of resource manipulation. Hence, these findings uphold the intent of

the wilderness knowledge instrument in distinguishing between visitors with varying concepts of wilderness.

TABLE 94

COMPARISON OF MANAGEMENT PREFERENCES OF THREE WILDERNESS KNOWLEDGE SUBGROUPS OF UPPER KIAMICHI RIVER WILDERNESS VISITORS<sup>1</sup>

Management Preference Items	Wilderness Knowledge Subgroup <sup>1</sup>		
	Low	Medium	High
--- Mean response to survey items <sup>2</sup> ---			
RESOURCE MANIPULATION STATEMENTS:			
Build more trails.	4.00 <sup>a</sup>	3.22 <sup>a</sup>	3.13 <sup>a</sup>
Plant trees on old roads.	3.71 <sup>a</sup>	3.97 <sup>a</sup>	4.00 <sup>a</sup>
Provide campsites with picnic tables, fire grates, and pit toilets.	3.00 <sup>a</sup>	1.71 <sup>b</sup>	1.52 <sup>b</sup>
Provide sources of drinking water.	4.00 <sup>a</sup>	3.14 <sup>a</sup>	2.39 <sup>b</sup>
Have special trails for horse use only.	3.42 <sup>a</sup>	3.66 <sup>a</sup>	3.24 <sup>a</sup>
Plant food plots and construct water holes to attract more wildlife.	4.42 <sup>a</sup>	3.80 <sup>a</sup>	3.04 <sup>b</sup>
BEHAVIORAL STATEMENTS:			
Allow camping only in certain areas.	3.57 <sup>a</sup>	2.94 <sup>a</sup>	2.17 <sup>b</sup>
Require visitors to pack out all trash.	4.57 <sup>a</sup>	4.91 <sup>a</sup>	5.00 <sup>a</sup>
Require campsites be at least 200 ft. or more away from trail.	3.71 <sup>a</sup>	3.86 <sup>a</sup>	3.60 <sup>a</sup>

TABLE 94 (Continued)

Management Preference Items	Wilderness Knowledge Subgroup <sup>1</sup>		
	Low	Medium	High
Require all visitors to obtain permit at ranger station in town.	1.86 <sup>a</sup>	2.59 <sup>a</sup>	2.00 <sup>a</sup>
Prohibit the use of horses in the area.	1.71 <sup>a</sup>	3.22 <sup>b</sup>	3.48 <sup>b</sup>
Limit the amount of people camping at any one site.	2.71 <sup>a</sup>	3.66 <sup>b</sup>	3.08 <sup>a</sup>
Require campsites be at least 200 feet or more away from streams.	3.14 <sup>a</sup>	3.74 <sup>a</sup>	3.78 <sup>a</sup>
Have frequent ranger patrols to reduce illegal use.	4.28 <sup>a</sup>	3.94 <sup>a</sup>	3.52 <sup>a</sup>

## INFORMATIONAL/EDUCATIONAL STATEMENTS:

Provide interpretive signs and displays.	4.57 <sup>a</sup>	3.46 <sup>b</sup>	2.39 <sup>c</sup>
Have regular ranger visits to provide information and educational programs.	3.00 <sup>a</sup>	3.12 <sup>a</sup>	2.65 <sup>a</sup>
Put in more trail and distance markers.	4.14 <sup>a</sup>	3.80 <sup>a</sup>	3.17 <sup>b</sup>
Provide more information about the area and its rec. opportunities.	4.14 <sup>a</sup>	3.73 <sup>a</sup>	3.30 <sup>a</sup>

<sup>1</sup>See pages 92-94 for description of wilderness knowledge subgroups.

<sup>2</sup>Means based on five-point Likert response scale:

- 1 = "very much oppose"
- 2 = "slightly oppose"
- 3 = "neutral/undecided"
- 4 = "slightly in favor"
- 5 = "very much in favor"

Means denoted with the same superscript are not significantly different at  $p = 0.05$ , on an item by item basis.

Visitors with higher levels of wilderness knowledge tended to oppose restrictions on allowable areas for camping at the UKRW, while those with low knowledge slightly favored such restrictions (Table 94, page 242). High knowledge individuals likely desired to maintain a sense freedom in their choice of a place to camp, an idea echoed in the Wilderness Act of 1964. On the contrary, the low knowledge subgroup opposed the prohibition of horses in the area, while medium and high knowledge visitors hovered between neutrality and slight favor regarding restricting horses from the UKRW. Though horse travel is appropriate in many wilderness areas, it is not allowed along the Ouachita National Recreation Trail corridor in the UKRW. Perhaps the high knowledge visitors were aware of this policy, or they preferred to keep horses out of the area due to the potential impact that they could cause along the trail.

Regarding informational/educational modes of management, visitors with higher levels of wilderness knowledge tended to express greater opposition towards interpretive signs and displays, and more trail and distance markers in the UKRW (Table 94, page 242). Again, these preferences are congruent with the spirit and mandate of the Wilderness Act of 1964, supporting the utility of the wilderness knowledge survey instrument in discerning distinct visitor subgroups.

Though use of wilderness knowledge instruments has not achieved widespread acceptance by the wilderness research

community, some continued support exists for basing wilderness management strategies in part on the preferences and inputs of individuals whose wilderness concept aligns closely with the spirit and intent of the Wilderness Act of 1964 (Vaske et al. 1980, Roggenbuck and Lucas 1987, McDonald 1987). Refinement of the wilderness knowledge scale used in the UKRW visitor survey in further research may yield an effective tool that could assist managers in gauging visitor preferences and planning for optimal wilderness visitor experiences at the UKRW.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

#### Summary of Objectives and Procedures

This study was designed to initiate a visitor-use monitoring scheme at the Upper Kiamichi River Wilderness (UKRW) in southeastern Oklahoma. The study was delimited to the UKRW and to individuals 16 years of age or older who registered their visit at one of four trailhead registers there between April 1, 1991, and March 31, 1992. Registration compliance was observed and used to estimate annual and seasonal visitation levels.

A mail survey was utilized to establish a data base for gaining an understanding of visitor characteristics (including motives for visiting the area, demographics, level of wilderness knowledge, satisfaction levels, management preferences, and perceptions of UKRW wilderness character, use-impact, crowding, and use-conflict), and visitation patterns. All registrants were sent a survey questionnaire, and if necessary, up to two follow-up reminders.

In addition to analyzing data for the visitor population as a whole, seven comparative pairs of visitor

subgroups were analyzed, including hikers and horse-riders, hunters and non-hunters, day-visitors and overnight-visitors, local-visitors and distant-visitors, first-time visitors and repeat visitors, male visitors and female visitors, and solo-visitors and group-visitors (see Glossary of Terminology, page 12, for definitions of visitor subgroups).

In all, 33 research hypotheses were investigated (Table 2, page 53). Statistical procedures utilized included Student t-tests, analysis of variance (ANOVA), least significant difference tests, cross-tabulations, Chi-square analysis, factor analysis, and cluster analysis. All analyses were performed using SPSS (Statistical Package for the Social Sciences) "Release 4". A 5% level of significance was assumed for all tests.

#### Summary of Findings

The survey population included 588 registrants, comprising 154 visitor groups. Registration compliance for the year of the study was 64.8 percent, ranging from a high of 83 percent in the fall and a low of 37 percent in the summer. A ratio estimate of 907 visitors for the year was calculated. Since the UKRW boundary was not monitored beyond the four trailheads (see map inside back cover), this figure represents a conservative estimate.

A total of 185 surveys were returned, for a response rate of 72 percent for the mail survey. ANOVA of selected



data variables for respondents to first, second, and third mailings elicited no differences between them. Comparisons of respondents and nonrespondents, using data from trailhead registration cards yielded no differences between them. A potential source of bias in the representativeness of the data was the lack of knowledge of nonregistrants.

The UKRW visitor population tended to be comprised of middle-aged (averaging 36 years of age), male (77 percent), highly educated (80 percent with college education) individuals, representing mostly professional-technical and service-oriented employment fields with income levels from \$20,000 to \$50,000 per year. Most visitors came from Oklahoma and Texas, though only 20 percent were considered local residents from within a 60-mile radius of the UKRW. Fifty-three percent indicated that they had visited the UKRW before. Most people visited in groups of friends or family, though less than 19 percent of visitor groups included children of less than 16 years of age. Solo individuals accounted for less than 10 percent of visitation. Thirty-nine percent of the visitors belonged to one or more conservation organizations, and 75 percent had previously visited one or more federal wilderness areas. Most visitors first learned about the UKRW from family members or friends, by seeing it on a map, or by virtue of living nearby the area. Visitor demographic data exhibited virtually no seasonal variation.

The spring and fall seasons realized the bulk of visitation at the UKRW (41 and 30 percent, respectively). Use was lowest during the summer (13 percent of visitation). Two-thirds of the visitation occurred on weekends. Overnight-use far exceeded day-use (78 and 22 percent, respectively). The average length of stay for overnight-visitors was 2.2 days, while day-visitors averaged 5.2 hours in the area.

More than 70 percent of the visitors to the UKRW used the Pashubbe Creek or Stateline trailheads to access the area (see map inside back cover). The Horsepen Creek trailhead was used the least, likely due to the lack of an established trail system in the southeastern sector of the UKRW.

Hiking was the dominant travel mode at the UKRW, with only four percent reporting travel in the area by horseback. Backpacking, camping, and day-hiking were the most popular activities pursued. Wildlife observation and photography were popular as well, but only a small proportion of visitors hunted at the UKRW.

Sixty percent of the UKRW visitors made loop trips, as opposed to one-way trips through the area. Most visitors travelled exclusively along established trails and old roads, primarily along the Ouachita National Recreation Trail. The average distance travelled by visitors was 9.0 miles.

As far as could be determined, all visitors who reported that they camped at the UKRW used one of 18 identified, existing sites (see map inside back cover). Most of these sites were discerned by the presence of one or more rock fire rings, litter, loss of vegetation, soil compaction, and marks on trees, and all were situated within 100 feet of a trail. Use of the sites was uneven, and visitors rarely spent more than one night at a given site. Almost two-thirds of visitors who camped used a sole site during their visit.

Patterns of visitor use of the UKRW were not subject to seasonal variation during the course of the study. Some variation by trailhead was evident, however. Hikers and campers favored the Pashubbe Creek and Stateline trailheads, while horse-riders only used the Pashubbe Creek or Horsepen Creek trailheads. Hunters typically avoided the Stateline trailhead and overnight-visitors tended not to use the Horsepen Creek trailhead. The proportions of local-visitors and solo-visitors were higher at Horsepen Creek than at the other three trailheads.

Factor analysis of reported motives for visiting the UKRW delineated nine motive domains. Based on mean importance of scale items within each domain, UKRW visitors were motivated mostly toward escape from social pressures, enjoyment of nature, physical fitness, escape from physical pressures, and learning, as reasons for visiting the area.

Comparisons of motives by visitor subgroup elicited no differences between hikers and horse-riders, and some subtle differences between hunters and non-hunters, and between male and female visitors. Specific motive differences between local-visitors and distant-visitors, and between first-time visitors and repeat visitors, inferred that local and repeat visitors may have developed a sense of place attachment to the UKRW. Overnight-visitors placed a higher value on the motive for autonomy and risk than did day-visitors, while day-visitors indicated higher importance for family togetherness. Group-visitors placed higher importance on motives for family togetherness and experiencing similar people at the UKRW than did solo-visitors, who reported high importance for escaping physical pressures. Cluster analysis was used to partition UKRW visitors into five motive typologies. Some differences between visitors belonging to each motive type were evident.

Factor analysis of visitor responses to items on the wilderness knowledge scale identified five knowledge domains related to human encroachment, management intervention, mechanized noise disruption, setting attributes, and activity attributes. Most UKRW visitors (82 percent) exhibited a "medium" level of wilderness knowledge, while 13 percent had "high" knowledge and only four percent demonstrated a "low" level of wilderness knowledge.

Visitors generally regarded the UKRW as having a relatively high, positive wilderness character, noting that

it is large enough to provide a true wilderness experience, it has a great sense of wildness, it offers a great opportunity for solitude, and it is little impacted by humans. Visitors did not readily discern or report that private inholdings, eroded trails, and external mechanical sounds were evident, though many agreed that past logging activity in the area was still evident. More than 70 percent of the visitors cited natural scenic beauty and primitive conditions as the two most outstanding features of the UKRW. Perceptions of wilderness character of the UKRW did not vary across the seasons, nor did it vary between the three wilderness knowledge subgroups.

UKRW visitors did not perceive the area as crowded during their visits, generally reporting that they saw fewer actual numbers of visitors or groups of visitors than their maximum acceptable numbers of each. Thirty-one percent indicated that they encountered no other people during their visit to the UKRW. Fifty-six percent of the visitors indicated that the number of others they saw at the UKRW was "about the right number." Encounters varied by season, being highest during the fall, the season realizing the second highest level of visitation at the UKRW during the study. There were no differences in crowding perception between the three wilderness knowledge subgroups.

Though visitors were cognizant of the evidence of use by others at the UKRW, they generally did not assess the area as being impacted in a negative way. Responses to the

use-impact items in the survey did not vary across the seasons nor were they different between the three wilderness knowledge subgroups.

Similarly, visitors did not perceive that use-conflicts between hikers and horse-riders nor between hunters and non-hunters occurred on a regular basis at the UKRW. Further, visitors generally agreed that mechanical noises originating within the area, illegal use of all-terrain vehicles, use of vehicles by private inholdees travelling to their lands, and dogs were not problems at the UKRW. Only ten individuals (five percent of the respondents) reported a use-conflict with another visitor or group at the UKRW. There was no variation in perception of use-conflict among visitors across the seasons or between the knowledge subgroups.

UKRW visitors expressed high levels of satisfaction with their visits to the area. The two satisfaction scales used in the study exhibited a relatively high positive correlation ( $r = 0.67$ ). Though visitors who experienced inclement weather were less satisfied with their visits, levels of satisfaction of those who hunted or fished were not affected by whether or not they were successful at bagging game or catching fish. Further, there was no difference in satisfaction between visitors who experienced a conflict with another visitor at the UKRW and those who did not. The "high point" of most visitors' trips at the UKRW related in some way to success in the pursuit of their activities or the ability to experience nature and solitude

in the area. "Low points" typically were associated with concerns related to physical characteristics of the UKRW (i.e. insects, lack of wildlife, etc.), weather problems, social conflicts, evidence of human impact, and problems encountered in the pursuit of activities. Satisfaction levels did not vary from season to season, nor did they vary from wilderness knowledge subgroup to subgroup.

UKRW visitors ranged between neutrality and slight favor regarding their preferences for resource manipulation modes of management of the area, particularly for planting trees on old roads, establishing wildlife food plots and water holes, and building separate trails for hikers and horse-riders. They opposed campsite developments such as picnic tables, fire grates and pit toilets. For behavioral modes of management, visitors again ranged between neutrality and slight favor regarding the siting of camps at least 200 feet away from trails and streams, restriction of the number of people camped in any one area, the prohibition of horse-use, and ranger patrols to reduce illegal activity in the area. They strongly favored a requirement that visitors pack out all trash, but opposed heavy-handed restrictions that would limit camping to specific areas in the UKRW and that would require all visitors to obtain a permit at a ranger station.

Regarding educational and informational modes of management of the UKRW, visitors hovered between neutrality and slight favor for the provision of more information about

the area, more trail and distance markers, the provision of interpretive signs and displays, and regular ranger patrols to provide programs and information.

Visitors essentially supported the idea that some form of direct or indirect management was necessary to sustain the perceived high character of the UKRW and to sustain opportunities for quality wilderness experiences there. Most suggestions for management included the prohibition of activities that are not wilderness-dependent, the prohibition of resource management activities that are perceived to be in occurrence (i.e. logging and minerals exploration), and the encouragement of minimum-impact backcountry practices.

Visitor preferences for management generally did not vary across the seasons, though summer visitors expressed a desire for the provision of drinking water sources. Several differences in responses to the management preference survey items were evident between the three wilderness knowledge subgroups. Visitors with higher levels of wilderness knowledge expressed greater opposition to camp site developments, to the provision of sources of drinking water, to restrictions on allowable areas to camp within the UKRW, to interpretive signs and displays, and to more trail and distance markers. Their preference responses were congruent with the spirit and mandate of the Wilderness Act of 1964, supporting the utility of the knowledge scale in the survey



instrument in discerning distinct wilderness knowledge subgroups.

### Conclusions and Implications for Management of the UKRW

Visitors to the UKRW were in general agreement that the area exhibits a high degree of wilderness character by virtue of its large size, its scenic beauty, its relatively undisturbed natural conditions, the low level of evident deterioration due to human impact, and low visitor-use levels. One tenet of the Eastern Wilderness Act of 1975 was that certain lands previously impacted by human activity could revert to a more wild state by natural processes over time, to once again become wilderness. The area known today as the UKRW has apparently regained an element of wildness that was diminished by earlier settlement and sporadic selective logging.

UKRW visitors expressed high levels of satisfaction with their visits to the area. They exhibited a wide range of motives for journeying to the UKRW, and they concluded that use-impact, use-conflict, and crowding at the UKRW are minimal, causing few concerns. Visitors identified mostly with light-handed preferences for future management of the area, indicating greater acceptance of informational and educational based forms of management over direct behavioral controls and physical resource manipulation.

The typical wilderness visitor has been stereotyped as a young, wealthy, male, eastern urbanite, though Hendee *et al.* (1990) have dispelled this myth for the most part. The data from this study further challenged the stereotype. Despite being predominantly male, the UKRW visitor population was comprised of middle-aged, middle-income, highly-educated individuals originating from outside the local vicinity, mostly coming to the area from Oklahoma and Texas. Most visitors came to the area on weekends in the spring or fall in groups of family or friends, and more than one-half of them had visited the area before. Most visitors hiked in the area, and most spent a night camping at the UKRW.

Visitor use was virtually restricted to trails within the area, predominantly along the Ouachita National Recreation Trail corridor (see map inside back cover). Few visitors left the trail for backcountry travel, and virtually all camping occurred at existing sites along trails. Many of these sites exhibited signs of deterioration from over-use. Based on a continuation of the status quo, the potential is high for further deterioration at existing camp sites, and for further increases in visitor encounter levels and use-conflicts between visitors. These may be perceived or equated by future visitors as indicators of crowding, reductions in the wilderness character of the UKRW, and factors that impede the realization of quality wilderness experiences in the area.

It is critical to recognize that the favorable responses to survey items regarding satisfaction, perceptions, and preferences by UKRW visitors represent just one "slice in time." If and when visitation increases at the UKRW over time, the way visitors think and feel about the area and its management may change, due to displacement of disgruntled visitors by those more tolerant of altered conditions. Possibly, there may be little observable change in visitor satisfaction levels, perceptions and preferences, as various coping behaviors (Hammit and Patterson 1991) are adopted by repeat visitors. Hence, it is important to consider the relevance of follow-up studies to gauge use of the UKRW longitudinally over time.

Future planning and management of the UKRW will likely require the use of some visitor regulations and restrictions. Caution should be exercised in this regard, however. Whereas managers tend to visualize regulations as tools to reach specific goals, visitors often view them as impediments to the experience (Brown *et al.* 1987, Shindler and Shelby 1993). If feasible, voluntary change and adaptation by visitors should be sought first, through educational and informational modes (Halstead *et al.* 1991). As regulations and restrictions are deemed necessary, light-handed and unobtrusive ones should be instituted, to foster and sustain the elements of freedom, choice, and closeness to nature that are integral components of the wilderness experience.

Due to varying conditions of the resource or its use by visitors, various sections of practically every federal wilderness must be managed differently (Green 1983, Haas et al. 1987, Hendee et al. 1990). The UKRW is no exception. It would be logical to consider viewing the UKRW as three distinct managerial zones, including a portal zone adjacent to each of the four trailheads, a trail corridor zone that includes the Ouachita National Recreation Trail and its forks, and a trailless zone. Social conditions, styles of travel, activities pursued, and the evidence of use by others likely would be very different in each zone, as would be the type of wilderness experience opportunity and the consequent need for management of each zone.

It may be prudent to dismantle the existing camp sites within the Ouachita National Recreation Trail corridor, many of which are less than 50 feet from the trail. Fire rings should be scattered and indirect rehabilitation efforts begun at such sites. To accommodate camping along the corridor, new designated sites could be established at least 200 feet from the trail and from streams. The sites should not be developed in any way, but they should be identified by small, unobtrusive signs similar to those utilized in other National Forest wilderness areas. Existing camps in the portal zones probably have a long-standing history of use. The dismantling of these sites would likely lead to their inevitable reappearance. Hence, it would be logical to just leave them alone. At this juncture, no camping

restrictions should be levied upon visitors in the trailless zone.

Many visitors commented that more trails are needed in the area. The construction of new trails in the current trailless zone would likely compromise the high degree of wilderness character there, and also likely lead to higher social density in that zone. Keeping the areas north of the Ouachita National Recreation Trail and in the Horsepen Creek sector devoid of trails should perpetuate opportunities for solitude and for primitive, unconfined wilderness experiences there.

There may be some merit in considering some minor re-routing of the Ouachita National Recreation Trail, however. Tire ruts made in the old road by inholdee vehicles were visible throughout the duration of the study. Many visitors expressed concern over them, and visitor experience quality likely was reduced in some cases. Several visitors also reported an error in mile-markers along the Ouachita National Recreation Trail. The "35" mile marker east of the Pashubbe Creek trailhead should be changed to "36."

Though the dismantling of certain camp sites has been recommended, Cole (1993) cautioned that such a management tactic could be a futile effort without focusing on changing the behavioral patterns of the visitors who typically establish, occupy, or reestablish such sites. Hence, the importance of an informational and education-based mode of management cannot be underestimated. Brown *et al.* (1987)

reported that wilderness visitors characteristically seek out and use a variety of information when making decisions about wilderness recreation opportunities, and that they prefer an optimal amount of information provided outside of wilderness boundaries. Such information can be effective in communicating the kinds of resources and social conditions that visitors could anticipate in different management zones, and it can be effective in distributing visitors within an area. Further, clearly stated and logical information related to minimum-impact backcountry practices can be instrumental in reducing site deterioration and social conflicts in wilderness.

Information could be made available to UKRW visitors at trailheads, at Forest Service ranger stations, at visitor information stations at other developed areas within the Ouachita National Forest, and at nearby state parks. Items to incorporate into visitor information could include the cultural history of the area, the origin and establishment of the UKRW, a general definitional statement of federal wilderness, suggestions for minimum-impact practices in the area, experience expectations for each of the zones within the UKRW, and justifications for distinct management of each zone.

Finally, management planning of the UKRW should include the involvement of regional interest groups, particularly those who have established a history of use of the area (Appendix J). Managers need to know that there is public

support for the many difficult decisions that they make in the interest of wilderness protection and preservation. When conservation leaders, organizations, and interested individuals are part of the wilderness planning process, they are more likely to feel a sense of ownership in the management and protection of that wilderness (Fege 1990), and they are likely to develop a sense of place attachment. Such organizations and individuals will likely foster sustained appropriate use of a wilderness, and they may be recruited to engage in activities such as trailhead, trail, and camp site maintenance at a wilderness. There appears to be a good potential for establishing this type of visitor and interest group involvement at the UKRW.

The ultimate objective for management of wilderness should be to sustain its potential as a refuge from the symmetry and efficiency of our urbanized world, as a haven for our creative instincts, as a source of life-affirming intangibles, and as a sanctuary for the renewal of the human spirit (Kuzmic 1992). It must be remembered that visitors are the producers of their own experiences (Driver and Brown 1983, Hawkes *et al.* 1992), yet managers can facilitate optimal numbers and quality of visitor experiences by pursuing insightful and prudent management of wilderness resources and wilderness recreation opportunities. The future challenge in wilderness management, as echoed in the Wilderness Act of 1964, will be keeping it affected primarily by the forces of nature, while managing it for the

use and enjoyment of the American people as wilderness (Fege 1990).

#### Recommendations for Further Study

Recommendations for further research at the UKRW include:

- 1.) Refine the present study and repeat it periodically at later dates as a longitudinal study to gauge long-term trends and changes, as recommended in the literature (Roggenbuck and Lucas 1987, Hendee and Ewert 1993).
- 2.) Initiate a monitoring program to discern and select visitor-use, social, and site impact indicators to facilitate the management of the UKRW according to the Limits of Acceptable Change management system (Stankey *et al.* 1985).
- 3.) Investigate and evaluate mediums and methods of communicating educational and minimum-impact information to UKRW visitors.
- 4.) Develop minimum-impact educational material tailored for the UKRW and the UKRW visitor, and investigate to what extent the material is assimilated by visitors and put into practice during visits to the area.
- 5.) Investigate the components of the UKRW visitor experience, and analyze changes in visitor



perceptions and levels of satisfaction through different phases of the experience.

- 6.) Investigate the moods and mood swings of visitors across the various components of their wilderness experience, and relate them to simultaneous evaluations of the experience.
- 7.) Investigate the antecedent motives of UKRW visitors and analyze their relationship to benefits realized as a result of wilderness experiences at the UKRW.
- 8.) Quantify and evaluate visitor benefits derived from recreational experiences at the UKRW.
- 9.) Investigate the phenomenon of the predominance of trail-only travel through the UKRW, and investigate the camp site selection process utilized by UKRW visitors.
- 10.) Analyze the visual attributes of the UKRW as compared to other nonwilderness settings in the region, utilizing Scenic Beauty Estimation methodology.

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APPENDIXES

APPENDIX A

WORDING OF TRAILHEAD SIGN



**WILDERNESS VISITORS!****WE NEED YOUR HELP!****PLEASE REGISTER EACH TIME YOU VISIT!**

Fill out one registration card, providing the name and address of all group members who are 16 years or older. Use the back of the card if needed.

To best manage and protect wilderness, we need to know more about you --- the wilderness visitor!

For further information concerning this wilderness study, contact:

Wilderness Study Project  
OSU Forestry Department  
Stillwater, OK 74078  
405-744-5463

For more information about this or other National Forest Areas, contact:

Ouachita National Forest  
Choctaw Ranger District  
HC-64 Box 3467  
Heavener, OK 74937  
918-653-2991

APPENDIX B

TRAILHEAD REGISTRATION CARD

### WILDERNESS TRAIL REGISTRATION

The information provided by you on this card is voluntary. It will be used to plan for the management of the area. Your cooperation and comments are appreciated.

Date of Entry \_\_\_\_\_ Group Size \_\_\_\_\_

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Destination \_\_\_\_\_

Length of Stay \_\_\_\_\_

**PLEASE MARK (X) THE APPROPRIATE ACTIVITIES**

- |  |  |
|--|--|
| <input type="checkbox"/> Hiking                | <input type="checkbox"/> Nature Study  |
| <input type="checkbox"/> Overnight             | <input type="checkbox"/> Bird Watching |
| <input type="checkbox"/> Day Use               | <input type="checkbox"/> Photography   |
| <input type="checkbox"/> Backpacking           | <input type="checkbox"/> Camping       |
| <input type="checkbox"/> Fishing               | <input type="checkbox"/> Hunting       |
| <input type="checkbox"/> Horseback Riding      |  |
| <input type="checkbox"/> Other (Specify) _____ |  |

**PLEASE DEPOSIT IN SLOT. THANK YOU.**

Supervisor's Office • Ouachita National Forest  
P. O. Box 1270 • Hot Springs, AR 71902

**COMMENTS**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

HALL 3212

USE BACK FOR MORE COMMENTS

APPENDIX C

UPPER KIAMICHI RIVER WILDERNESS TRAIL MAP

ABOUT THE UPPER KIAMICHI RIVER  
WILDERNESS STUDY PROJECT:

To best plan for, manage,  
and protect the Upper Kiamichi  
River Wilderness, we need to  
know more about how the  
wilderness is used by its  
visitors.

By registering at the  
trailhead, you will help  
us determine the amount of  
use the wilderness receives.

Some of you will be mailed  
a survey questionnaire, to  
find out more about your  
wilderness interests  
and opinions.

The study is being conducted  
by Oklahoma State University,  
in cooperation with the Forest  
Service, from March 1991  
through March 1992.

Research results will be used  
by the Forest Service in the  
future planning and management  
of the Upper Kiamichi River  
Wilderness.



*Oklahoma State University*

DEPARTMENT OF FORESTRY  
COLLEGE OF AGRICULTURE

If you have any questions or  
comments concerning this study,  
please contact:

Wilderness Study Project  
OSU Forestry Department  
Stillwater, OK 74078  
405-744-5445

Questions or comments about this  
or other National Forest areas  
can be directed to:

Ouachita National Forest  
Choctaw Ranger District  
HC-64, Box 3467  
Heavener, OK 74937  
918-653-2991

**UPPER  
KIAMICHI RIVER  
WILDERNESS**



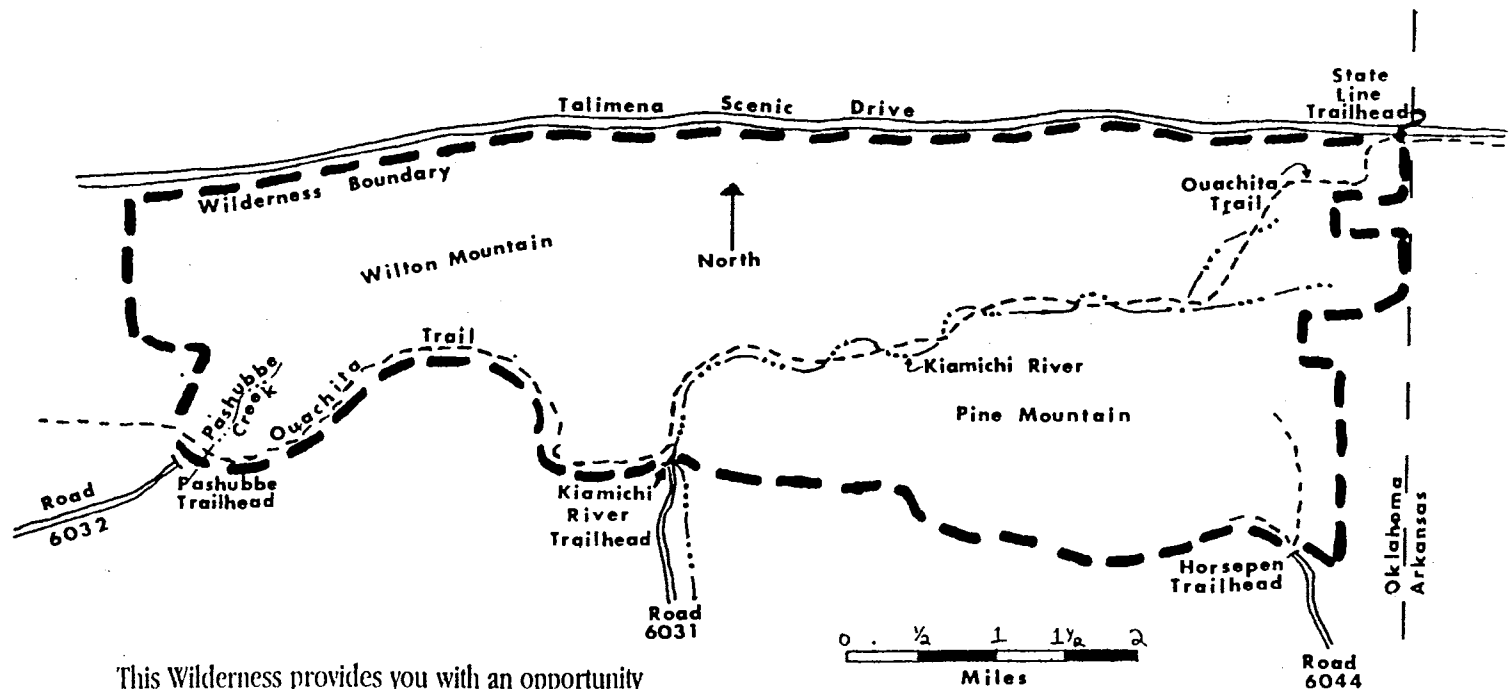
OUACHITA NATIONAL FOREST  
LEFLORE COUNTY, OKLAHOMA



United States  
Department of  
Agriculture      Forest Service  
Southern Region



# UPPER KIAMICHI RIVER WILDERNESS



This Wilderness provides you with an opportunity to experience a natural environment, to have solitude, and to use your outdoor skills.

The Forest Service is maintaining the wildness of this area for you by providing only a few primitive trails, bridges and signs. Your visit may include a degree of challenge and risk.

Please help protect this special place by practicing no-trace camping and traveling skills.

APPENDIX D

REGISTRATION COMPLIANCE TALLY SHEET

## UPPER KIAMICHI RIVER WILDERNESS TRAILHEAD REGISTER COMPLIANCE FORM

### REASON CODES:

- 1 - Did not see the register/sign
- 2 - Did not think it was important
- 3 - Did not want to take the time
- 4 - Registered earlier in the year
- 5 - Regular user/local resident
- 6 - Invasion of privacy/ none of your business'
- 7 - Bad weather/too much trouble
- 8 - Other (indicate)

DATE: \_\_\_\_\_ TRAILHEAD: \_\_\_\_\_ OBSERVER: \_\_\_\_\_

OBS. #	NO. IN GROUP	TRAVEL MODE		HUNTER		VOLUNTARY COMPLIANCE?			RESPONSE OF NON-COMPLIANT WHEN ASKED TO REGISTER		REASON FOR NON-COMPLIANCE (USE CODE)
		FOOT	HORSE	YES	NO	YES	NO	ACCURATE?	REGISTERED	REFUSED	

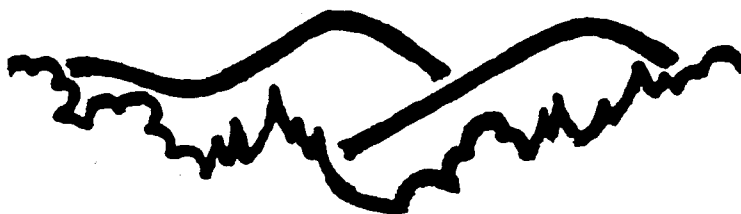
OBSERVER COMMENTS & NOTES:



APPENDIX E

SURVEY INSTRUMENT

# **UPPER KIAMICHI RIVER WILDERNESS**



**RECREATIONAL USE STUDY**

Conducted by the  
**DEPARTMENT OF FORESTRY**  
of  
**OKLAHOMA STATE UNIVERSITY**

in coordination with the  
**OUACHITA NATIONAL FOREST**  
**U. S. FOREST SERVICE**

April 1991 - March 1992

### GREETINGS WILDERNESS VISITOR!

The purpose of this survey is to better understand how you feel about the Upper Kiamichi River Wilderness. We are interested in finding out about your wilderness experience and your preferences for management of the area. Please think back on your recent visit to Upper Kiamichi, and take about 30 minutes to complete the survey. Please write or call if you have any questions. Your help is greatly appreciated!

Wilderness Study Project  
OSU Forestry Department  
Stillwater, OK 74078  
405-744-5445

---

#### PART ONE -- QUESTIONS ABOUT YOUR RECENT VISIT

---

1.) Which activities did you participate in? (check all that apply)

- hiking or walking
- camping
- hunting
- fishing
- picnicking
- photography
- wildlife observation
- observing plants
- horseback riding
- picking berries
- other: \_\_\_\_\_

2.) Which one activity above was the major activity you participated in? \_\_\_\_\_

3.) If you hunted or fished, did you successfully bag any game or catch any fish?

- Yes
- No

4.) Have you visited the Upper Kiamichi River Wilderness before?

Yes List the number of visits per month in the past 12 months:

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| <input type="checkbox"/> January  | <input type="checkbox"/> July      |
| <input type="checkbox"/> February | <input type="checkbox"/> August    |
| <input type="checkbox"/> March    | <input type="checkbox"/> September |
| <input type="checkbox"/> April    | <input type="checkbox"/> October   |
| <input type="checkbox"/> May      | <input type="checkbox"/> November  |
| <input type="checkbox"/> June     | <input type="checkbox"/> December  |

No, this was my first visit to Upper Kiamichi.

5.) How did you first hear about the Upper Kiamichi River Wilderness? (check one)

- I live nearby the area.  
 A family member or friend told me about it.  
 A U. S. Forest Service person told me about it.  
 I read about it in a U. S. Forest Service publication.  
 I saw it indicated on a map.  
 I read about it in a newspaper or magazine.  
 I noticed signs as I passed by the area.  
 I read about it in my organization's newsletter.  
 Other: \_\_\_\_\_

6.) On this trip, what type of people were you with? (check one)

- Family  
 Friend(s)  
 Group of family and friends  
 Organized club or group -- Name of group: \_\_\_\_\_  
 I visited the area alone

7.) If you visited the area with one or more people, list the number in your group that was:

Age 16 years or older \_\_\_\_  
 Under 16 years old \_\_\_\_

8.) Did you camp overnight in the wilderness on this visit?

- Yes      How many nights? \_\_\_\_  
                     Which ones?       Wednesday  
                      Sunday             Thursday  
                      Monday            Friday  
                      Tuesday           Saturday

No, I only visited the wilderness for one day.

Which day of the week? \_\_\_\_\_

How long was your visit in hours? \_\_\_\_

9.) What was your primary mode of travel? (check one)

- Hiking/walking  
 Horse  
 Other: \_\_\_\_\_

10.) How much did you spend for yourself, for travel, food, and supplies related to this visit? \$ \_\_\_\_\_

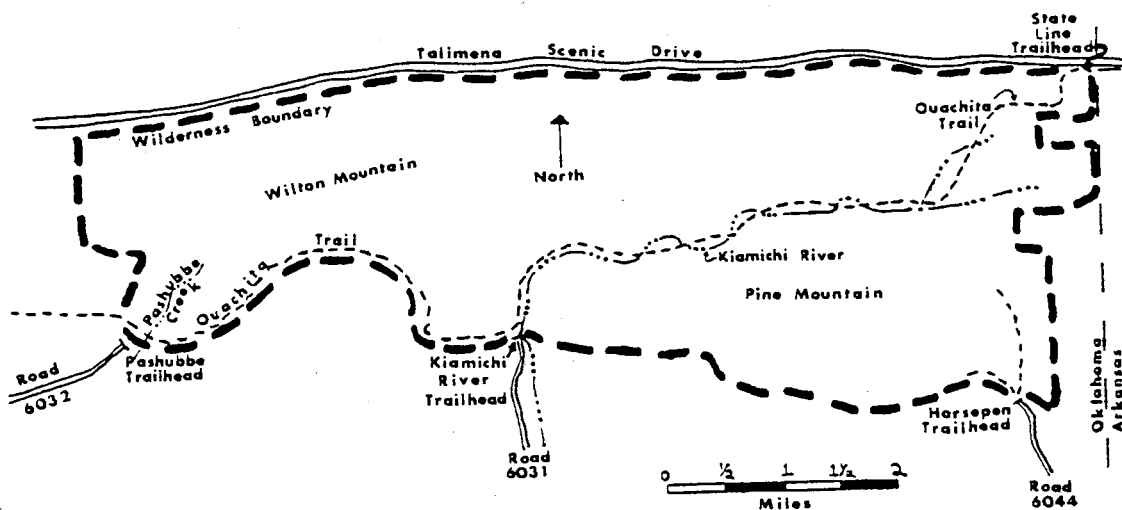
11.) Use the map of the Upper Kiamichi Wilderness below to answer the following about your recent trip:

Indicate where you entered the area by drawing an "E" at that point.

Indicate your route of travel with a solid line (pencil or pen).

Indicate where you left the area by drawing an "X" at that point.

If you camped, indicate your campsite location(s) with the letter "C".  
Next to each "C", indicate the number of nights spent at that site.



12.) Please evaluate your visit to the Upper Kiamichi River Wilderness by checking one response for each statement below:

	Strongly Agree	Mildly Agree	Neutral/Undecided	Mildly Disagree	Strongly Disagree
I thoroughly enjoyed my visit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I cannot imagine a better visit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trip was well worth the money I spent to take it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to visit the area again.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was disappointed with some parts of my visit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not want to visit any more areas like this one.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13.) Overall, how would you rate your visit to the Upper Kiamichi River Wilderness? (check one)

- Poor.  
 Fair; it just didn't work out very well.  
 Good, but I wish a number of things could have been different.  
 Very good, but could have been better.  
 Excellent; only minor concerns.  
 Perfect.

14.) What was the "high point" or best part of your visit? \_\_\_\_\_

15.) What was the "low point" or worst part of your visit? \_\_\_\_\_

#### PART TWO -- REASONS FOR VISITING UPPER KIAMICHI RIVER WILDERNESS

People have many reasons for visiting wilderness areas. Several of the often mentioned reasons are listed below, and we would like you to rate the importance of each of them. Please think back to when you decided to visit the Upper Kiamichi River Wilderness, and then check how important each of the following reasons seemed to you at that time.

Reasons for Visiting Upper Kiamichi:

	Extremely Important	Very Important	Moderately Important	Slightly Unimportant	Not At All Important
1.) To learn more about things there	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.) To be close to nature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.) To feel my independence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.) To do something with the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.) To have a stimulating and exciting experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.) To be at a place where I can make my own decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.) To chance dangerous situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.) To be with friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.) To get to know the lay of the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.) To think about who I am	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.) To get away from the usual demands of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.) To be alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<i>Extremely Important</i>	<i>Very Important</i>	<i>Moderately Important</i>	<i>Slightly Unimportant</i>	<i>Not At All Important</i>
13.) To have a change from my daily routine	[ ]	[ ]	[ ]	[ ]	[ ]
14.) To develop my skills and abilities	[ ]	[ ]	[ ]	[ ]	[ ]
15.) To experience new and different things	[ ]	[ ]	[ ]	[ ]	[ ]
16.) To meet other people in the area	[ ]	[ ]	[ ]	[ ]	[ ]
17.) To get exercise	[ ]	[ ]	[ ]	[ ]	[ ]
18.) To experience solitude	[ ]	[ ]	[ ]	[ ]	[ ]
19.) To help release or reduce some built-up tensions	[ ]	[ ]	[ ]	[ ]	[ ]
20.) To think about my personal values	[ ]	[ ]	[ ]	[ ]	[ ]
21.) To rely on my wits and skills	[ ]	[ ]	[ ]	[ ]	[ ]
22.) To bring my family closer together	[ ]	[ ]	[ ]	[ ]	[ ]
23.) To gain a sense of self-confidence	[ ]	[ ]	[ ]	[ ]	[ ]
24.) To be with others who enjoy the same things that I do	[ ]	[ ]	[ ]	[ ]	[ ]
25.) To take risks	[ ]	[ ]	[ ]	[ ]	[ ]
26.) To view the scenery	[ ]	[ ]	[ ]	[ ]	[ ]
27.) To keep physically fit	[ ]	[ ]	[ ]	[ ]	[ ]
28.) To be in control of things that happen	[ ]	[ ]	[ ]	[ ]	[ ]
29.) To be away from crowds of people	[ ]	[ ]	[ ]	[ ]	[ ]
30.) To be in closer touch with higher spiritual values	[ ]	[ ]	[ ]	[ ]	[ ]
31.) To talk to new and varied people	[ ]	[ ]	[ ]	[ ]	[ ]
32.) To learn more about nature	[ ]	[ ]	[ ]	[ ]	[ ]
33.) To feel good after being physically active	[ ]	[ ]	[ ]	[ ]	[ ]
34.) To be with people having similar values	[ ]	[ ]	[ ]	[ ]	[ ]
35.) To observe other people in the area	[ ]	[ ]	[ ]	[ ]	[ ]
36.) To enjoy the smells and sounds of nature	[ ]	[ ]	[ ]	[ ]	[ ]
37.) To give my mind a rest	[ ]	[ ]	[ ]	[ ]	[ ]
38.) To do something the entire family would like	[ ]	[ ]	[ ]	[ ]	[ ]
39.) To get away from noise back home	[ ]	[ ]	[ ]	[ ]	[ ]
40.) To experience the uncertainty of not knowing what will happen	[ ]	[ ]	[ ]	[ ]	[ ]

---

 PART THREE -- YOUR THOUGHTS ABOUT WILDERNESS IN GENERAL
 

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As you think about the character and essence of *U. S. Forest Service wilderness* as a natural setting and as a place for a "wilderness experience", indicate your opinion about how appropriate or inappropriate each of the following are, by checking one response for each.

	Very Appropriate	Somewhat Appropriate	Neutral/Undecided	Somewhat Inappropriate	Very Inappropriate
1.) Solitude (not seeing others except those in your own group)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.) Gravel roads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.) Privately-owned cabins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.) Covers a large area (5-10 square miles or more)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.) Hearing mechanical noises coming from within the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.) Absence of man-made features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.) Little or no evidence of other visitors before you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.) Use of motorized recreational and all-terrain vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.) Logging or other commercial timber cutting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.) Fishing for native fish within legal limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.) Trash containers along the trail and at popular camping areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.) Use of non-motorized mountain bikes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.) Hunting according to state regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.) Interpretive signs and exhibits along the trail to explain the natural, cultural, and historical features of the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.) Stocking streams with non-native fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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 PART FOUR -- YOUR THOUGHTS ABOUT THE UPPER KIAMICHI RIVER WILDERNESS
 

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Think back on your visit to Upper Kiamichi, and then indicate your feeling or opinion about the following by checking one response for each statement.

	<i>Strongly Agree</i>	<i>Mildly Agree</i>	<i>Neutral/Undecided</i>	<i>Mildly Disagree</i>	<i>Strongly Disagree</i>
1.) Upper Kiamichi provides a great opportunity for solitude	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.) The evidence of use by others is obvious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.) Mechanical noises from within the area are commonly heard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.) Mechanical noises from outside of the area are commonly heard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.) There is evidence of past logging activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.) Upper Kiamichi is large enough to provide a true wilderness experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.) Conflicts regularly occur between hikers and horseback riders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.) Upper Kiamichi is too crowded to have a true wilderness experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.) Private land ownerships within Upper Kiamichi are evident	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.) Trash and litter is a common sight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.) There is little disruption of the natural ecosystem by visitors at Upper Kiamichi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.) Use of vehicles by owners of private land within the area is common	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.) Illegal use of motorized all-terrain vehicles is a problem at Upper Kiamichi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.) The trails are often crowded with visitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.) Very few visitors leave the trails and go into the backcountry at Upper Kiamichi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.) Upper Kiamichi has a high quality wilderness character	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.) Conflicts regularly occur between hunters and non-hunters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Agree	Mildly Agree	Neutral/Undecided	Mildly Disagree	Strongly Disagree
18.) Upper Kiamichi is clean, pure, and little impacted by humans	[]	[]	[]	[]	[]
19.) The campsites of previous visitors are obvious	[]	[]	[]	[]	[]
20.) Horseback riders are commonly encountered	[]	[]	[]	[]	[]
21.) There are too many dogs seen or heard at Upper Kiamichi	[]	[]	[]	[]	[]
22.) Finding a lot of litter is more disturbing than seeing a lot of people at Upper Kiamichi	[]	[]	[]	[]	[]
23.) The trails are of poor quality and badly eroded	[]	[]	[]	[]	[]
24.) Upper Kiamichi provides a high quality wilderness experience	[]	[]	[]	[]	[]
25.) The Upper Kiamichi setting has a great sense of wildness	[]	[]	[]	[]	[]

\* \* \* \* \*

- 26.) About how many other visitors did you see per day during your visit to Upper Kiamichi? \_\_\_\_\_
- 27.) About how many other groups did you see per day during your visit to Upper Kiamichi? \_\_\_\_\_
- 28.) What do you feel is an *acceptable* maximum number of other visitors to see per day at Upper Kiamichi? \_\_\_\_\_
- 29.) What do you feel is an *acceptable* maximum number of other groups to see per day at Upper Kiamichi? \_\_\_\_\_
- 30.) How do you feel about the number of other visitors you saw during your visit to Upper Kiamichi? (check one)
- far too many
  - somewhat too many
  - about the right number
  - somewhat too few
  - far too few
  - no opinion
- 31.) Do you feel that there should be a limit to the size of any one group at Upper Kiamichi?
- Yes      What is the maximum number that should be allowed? \_\_\_\_\_
  - No
- 32.) Do you feel that there is any activity that should be discouraged at Upper Kiamichi?
- Yes      Which one(s): \_\_\_\_\_
  - No

- 33.) Did you encounter a conflict in use or behavior with another visitor or group during your visit to Upper Kiamichi?  
 \_\_\_ Yes Please indicate: \_\_\_\_\_  
 \_\_\_ No
- 34.) Did you encounter bad or unexpected weather that limited your activity or reduced the quality of your visit to Upper Kiamichi?  
 \_\_\_ Yes Please indicate: \_\_\_\_\_  
 \_\_\_ No
- 35.) What do you feel is the most outstanding characteristic or feature about Upper Kiamichi that makes it a quality wilderness area?  
 \_\_\_\_\_

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PART FIVE -- YOUR PREFERENCES FOR MANAGEMENT OF UPPER KIAMICHI

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Listed below are examples of suggestions for the management of recreational use of the Upper Kiamichi River Wilderness. Please indicate your opinions by checking one response for each of the following statements.

	<i>Very Much In Favor</i>	<i>Slightly In Favor</i>	<i>Neutral/Undecided</i>	<i>Slightly Oppose</i>	<i>Very Much Oppose</i>
1.) Provide interpretive signs and displays	[ ]	[ ]	[ ]	[ ]	[ ]
2.) Build more trails	[ ]	[ ]	[ ]	[ ]	[ ]
3.) Allow camping only in certain areas	[ ]	[ ]	[ ]	[ ]	[ ]
4.) Require visitors to pack out all trash	[ ]	[ ]	[ ]	[ ]	[ ]
5.) Plant trees on old roadways	[ ]	[ ]	[ ]	[ ]	[ ]
6.) Require that all campsites be at least 200 feet or more away from the trail	[ ]	[ ]	[ ]	[ ]	[ ]
7.) Require all visitors to obtain a permit at the ranger station in town	[ ]	[ ]	[ ]	[ ]	[ ]
8.) Prohibit the use of horses in the area	[ ]	[ ]	[ ]	[ ]	[ ]
9.) Provide campsites with picnic tables, fire grates and pit toilets	[ ]	[ ]	[ ]	[ ]	[ ]
10.) Have regular ranger visits to provide information and educational programs	[ ]	[ ]	[ ]	[ ]	[ ]

	Very Much In Favor	Slightly In Favor	Neutral/Undecided	Slightly Oppose	Very Much Oppose
11.) Provide sources of drinking water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.) Have special trails for horse use only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.) Limit the amount of people camping at any one site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.) Require that all campsites be at least 200 feet or more away from streams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.) Have frequent ranger patrols to reduce illegal use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.) Put in more trail and distance markers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.) Provide more information about the area and its recreational opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.) Plant food plots and construct water holes to attract more wildlife	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---

**PART SIX -- INFORMATION ABOUT YOURSELF**

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Finally, we ask that you provide us with a little background information about yourself. Please take a few moments to answer the following:

- 1.) What is your age? \_\_\_\_
- 2.) What is your gender?  
 Male                       Female
- 3.) What is the highest level of education that you have completed?  
 (check one)  
 8th grade or less  
 9th to 12th grade  
 some college  
 Bachelors degree  
 some graduate study  
 Masters or Doctorate degree
- 4.) What best describes the place where you live?  
 (check one)  
 Rural or farm  
 Town (population under 5000)  
 Town or city (population of 5000 or more)
- 5.) What is your current occupation? \_\_\_\_\_

6.) What is your annual income?  
(check one)

- under \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$59,999
- \$60,000 to \$69,999
- \$70,000 or more

7.) Do you belong to an outdoors, sporting, or conservation organization or club?

- Yes      Which one(s): \_\_\_\_\_  
\_\_\_\_\_
- No

8.) Have you visited any other federal wilderness areas?

- Yes      Indicate the name and state of the area(s):  
\_\_\_\_\_  
\_\_\_\_\_
- No

\*\*\*\*\*

Any other comments that you have regarding management of the Upper Kiamichi River Wilderness would be greatly appreciated! Please write them here:

THANK YOU FOR YOUR TIME AND CONSIDERATION!

PLEASE PLACE YOUR COMPLETED QUESTIONNAIRE  
IN THE ENCLOSED STAMPED ENVELOPE AND  
MAIL IT TO US AT YOUR EARLIEST CONVENIENCE

APPENDIX F

COVER LETTER FOR SURVEY INSTRUMENT



*Oklahoma State University*

DEPARTMENT OF FORESTRY  
COLLEGE OF AGRICULTURE

STILLWATER, OKLAHOMA 74078-0491  
AGRICULTURAL HALL  
(405) 744-5437 FAX (405) 744-5339

Dear Wilderness Visitor:

As you know from your recent visit to the Upper Kiamichi River Wilderness on the Ouachita National Forest, a study is being conducted by Oklahoma State University regarding recreational use of the wilderness. Our objective is to gain an understanding about how Upper Kiamichi visitors feel about the area and its management. We are interested in finding out how the area is used for recreational purposes, across all seasons of the year.

This study is designed to help the U.S. Forest Service plan for and manage the Upper Kiamichi River Wilderness. To assure a continued opportunity for visitors like yourself to have a high quality wilderness experience at a quality wilderness setting, we need to know your opinions and preferences. You have been selected from the trail registration list to represent the views of Upper Kiamichi visitors. Your input is important, and it will be used to direct the future of the wilderness!

Please take about 30 minutes to complete the enclosed survey questionnaire. Then send it back to us, using the enclosed stamped envelope. Please be assured that your responses will be totally confidential. They will not be linked with you as an individual in any way.

Your time and consideration is appreciated.

Sincerely,

Thomas Kuzmic  
Instructor of Forestry

TK/dn

APPENDIX G

FIRST POSTAL CARD REMINDER  
FOR SURVEY INSTRUMENT



Wilderness Study Project  
Department of Forestry  
Oklahoma State University  
008C Agriculture Hall  
Stillwater, OK 74078  
U.S.A.

0823

Dear Wilderness Visitor,

About two weeks ago, you were sent a survey questionnaire dealing with your recent visit to the upper Kiamichi River Wilderness on the Ouachita National Forest. At this point, several visitors have returned surveys to us, but several have not. If you have not sent yours back yet, please take a little time to fill it out and mail it to us. Your ideas and opinions are important in the future planning and management of the Upper Kiamichi Wilderness.

If you have already mailed your survey, we thank you for your time, assistance and consideration!

Sincerely,

Wilderness Project  
OSU Forestry Department  
Stillwater, OK 74078

P.S. If you need another survey form, please let me know! (405-744-5445)

APPENDIX H

SECOND LETTER OF REMINDER  
FOR SURVEY INSTRUMENT



*Oklahoma State University*

DEPARTMENT OF FORESTRY  
COLLEGE OF AGRICULTURE

STILLWATER, OKLAHOMA 74078-0491  
AGRICULTURAL HALL  
(405) 744-5437 FAX (405) 744-5339

Dear Upper Kiamichi River Wilderness Visitor:

A few weeks ago, I sent a survey questionnaire to you regarding your visit to the Upper Kiamichi River Wilderness of the Ouachita National Forest. As noted then, I am very much interested in learning how wilderness visitors such as yourself feel about Upper Kiamichi and its current and future management. Such information will be very helpful to the U.S. Forest Service in planning for the area and in maintaining Upper Kiamichi as a high quality wilderness. Most of all, the Forest Service and I are concerned with maintaining the opportunity for high quality wilderness experiences by people like you.

Your inputs, ideas and opinions are important! More than 65% of the visitors to Upper Kiamichi have already responded to the survey. We hope that you too will respond. Please take about 20 minutes or so to complete the enclosed survey questionnaire, and then mail it back in the pre-stamped envelope provided. All responses will be considered confidential. Your responses will not be linked with you as an individual in any way.

Thanks for your interest, time, and willingness to be a part of this important effort. Please feel free to write or call, if you have any questions or concerns.

Sincerely,

Thomas Kuzmic  
Wilderness Study Project

Enclosure

:dll

APPENDIX I

TELEPHONE SURVEY INSTRUMENT USED FOR  
MAIL SURVEY NONRESPONDENTS

## UKRW TELEPHONE-SURVEY OF MAIL-SURVEY NON-RESPONDENTS

OBS. NO. \_\_\_\_\_ TELEPHONE NO. \_\_\_\_\_

MESSAGE: "Hi, this is \_\_\_\_\_ calling from Oklahoma State University of Stillwater. I'm working with the wilderness study of the Upper Kiamichi River Wilderness in southeastern Oklahoma. You may recall receiving a survey about your visit back in \_\_\_\_\_. We didn't hear back from you, so we're doing a brief telephone survey. Do you have just a few minutes to answer just a few questions about your visit to Upper Kiamichi?"

RESPONSE: [ If "Yes" ] "Thanks, I appreciate it."  
 [If "No" ] "OK, thanks anyway. Goodbye."

1.) Was that trip your first visit to Upper Kiamichi?  
 \_\_\_First visit                      \_\_\_Repeat visit

2.) On a scale of 1 to 5:  
 5=Strongly Agree            2=Mildly Disagree  
 4=Mildly Agree              1=Strongly Disagree  
 3=Neutral

How do you feel about the following?

- a.) Upper Kiamichi has a high degree of wilderness character \_\_\_\_.
- b.) Use by others at Upper Kiamichi obvious \_\_\_\_.
- c.) There are enough high quality trails at Upper Kiamichi \_\_\_\_.
- d.) Campsites with fire grates, picnic tables, and pit toilets should be provided \_\_\_\_.

3.) On a scale of 1 to 6:  
 1=poor                      4=very good  
 2=fair                      5=excellent  
 3=good                      6=perfect  
 How would you rate your visit to Upper Kiamichi? \_\_\_\_

4.) Age \_\_\_\_\_ Gender:    M    F

5.) Reason for not sending back survey:  
 Never received it \_\_\_\_  
 Not enough time \_\_\_\_  
 Misplaced it \_\_\_\_  
 Lack of interest \_\_\_\_  
 Invasion of privacy \_\_\_\_  
 Other \_\_\_\_

MESSAGE: "Thanks so much for your time and consideration! Your information is definitely valuable and important for the study. We hope you enjoy any future visits to Upper Kiamichi. Goodbye."

APPENDIX J

ORGANIZED GROUPS REGISTERING VISITS TO THE  
UPPER KIAMICHI RIVER WILDERNESS FROM  
APRIL, 1991, THROUGH MARCH, 1992

Boy Scouts of America  
Camp Pioneer  
Route 1  
Hatfield, AR 71945

Boy Scouts of America  
Troop 3  
1810 Harned Drive  
Bartlesville, OK 74006

Boy Scouts of America  
Troop 27  
1201 Campbell  
Commerce, TX 75428

Boy Scouts of America  
Troop 393  
2615 Colleen  
Arlington, TX 76016

Boy Scouts of America  
Troop 743  
531 Summit  
Tahlequah, OK 74464

Boy Scouts of America  
Troop 876  
Carrollton, TX 75006

Boy Scouts of America  
Troop --  
6416 Jones Lane  
Texarkana, TX 75501

Boy Scouts of America  
Troop --  
Route 5, Box 5651  
Athens, TX 75751

Boy Scouts of America  
Troop --  
712 Top Hill Drive  
Tyler, TX 75702

Christian Community of  
God's Delight  
1905 Normandy  
Richardson, TX 75080

Denton Parks & Recreation  
Denton, TX 76201

Girls Adventure Trails  
5147 Miller  
Dallas, TX 75206

Letourneau University  
% Dan Chrouser  
Box 7001  
Longview, TX 75602

Lloyd E. Rader Center  
Route 4, Box 9  
Sand Springs, OK 74063

Mena Mountaineers  
Route 5, Box 333B  
Mena, AR 71953

Outdoor Discipleship Ministry  
2019 Stradivarias  
Carrollton, TX 75007

Pathfinder Club  
Route 3, Box 670  
Wilburton, OK 74578

Pleasant Hill Baptist Church  
Highway 108  
Tyler, TX 75703

Queen Wilhemina State Park  
Mena, AR 71953

Sierra Club of Dallas  
3215 Damascus Way  
Farmers Branch, TX 75234

Sierra Club of Oklahoma City  
6204 Reeves Ct.  
Oklahoma City, OK 73122

Wilderness Encounter Programs  
204 West Nash  
Grapevine, TX 76051

Wolfpack Backpacking Club  
220 Prospect  
Hot Springs, AR 71901



APPENDIX K

COMMENTS PROVIDED BY UPPER KIAMICHI RIVER  
WILDERNESS SURVEY RESPONDENTS

VISIT DATE	OBS #	COMMENTS
04/06/91	002	The current marking of the OK-ARK State line is very inconsistent. Larger # of game animals would be nice.
04/06/91	020	I think that there needs to be something done about the food plots already in the area, such as burn them to get rid of all the briars and shrubs.
04/06/91	021	I am concerned about wildlife management of wilderness areas. Many of the old food plots are jungles now, and in places the underbrush is getting very thick. I enjoy visiting the wilderness areas whether I'm hunting or just looking around and I appreciate the opportunity to fill out this survey.
04/06/91	024	I cannot understand your map on page 11. We entered a road just north of rt 63 off of 259. We entered the trail at a circle (following the blue trail). We went right at a sign Kiamichi River & crossed the river and camped near that river in an established camp with a fire pit. We parked our van somewhere off of 63. Can you give me a better map? I suggest you re-do this map.
04/07/91	005	Please, no more roads and clearcuts. Wilderness is too small an area out of the Ouachita N.F. More should be preserved!
04/08/91	007	Leave it a wilderness area - don't try to make a city park out of it.
04/13/91	008	I think <u>non-motorized</u> bikes should be allowed, if horses are. And keep the river crossing by Pigeon Creek in better shape to allow access to the trailhead. I've gotten (2) turkeys in (10) years of hunting. So please stop removing them to stock other areas.

- 04/14/91 010 I want to thank you for asking. My husband and I plan to go again & with friends. We plan to spend a lot of time there. Thank you for all the effort that goes into keeping the area clean & well marked. It is really wonderful. By the way the last heavy rains that we have had are sort of washing the trail really bad. Down at the river I think some of your markers washed away. My husband stood two back up & tried to brace them up. And you did spell my name right.
- 04/14/91 011 If I can be of any help in preserving the area, please let me know. I'll be visiting the area quite often in the future.
- 04/17/91 016 I have been coming to this area for appx. 6 yrs. & each time, especially the last 3 years, the area has been more & more enjoyable. The controlled/denied vehicle access & absence of timber cutting activities has enabled the wilderness to flourish into just that, a wilderness. I can think of no other place in the state that a person has the ability to literally, "Go where no man has gone before." In this day & age this type of experience is one that is of great importance & that some people in other states are only able to read about in magazines.
- The efforts & continued efforts by the people responsible for such a fine (beautiful) area are to be both commended & encouraged to continue to take the necessary steps to preserve a vanishing part of our world.
- Thank you for your time, consideration & conservation!
- 04/17/91 017 Hunting is a good sport. We have good hunting rules. Men have been hunting for 1,000 years. They say there won't be no hunting one of the years. I hope you keep standing for hunting and help keep it going. I feel you will. Keep up the good work.

- 04/20/91 013 Y'all do a great job - it's a continual pleasure to hike the trail in all its spots - I'd like info re: maps/books of the whole trail and critiques if possible.
- 04/28/91 027 Please do not allow gas well exploration in area as it would ruin the area. The well being drilled just north of this area causes sound pollution that can be heard even at the heart of this wilderness area. I'd like to help preserve this area if I can be of any help.
- 04/29/91 030 The area was very well kept. I was scouting the area for future backcountry trips to the area. The water supply was better than the other areas in the region. I expect to travel more during the winter months, due to the excessive heat and insects! My time in Colo. trained myself well in backcountry and every aspect is always to be considered in any trip. The area reminded me of my Colo. experience.
- 05/11/91 084 I plan to revisit the Upper Kiamichi in October '91.
- I and many others from the Dallas area no longer go to the White Mtns & Pecos Wilderness (of NM) because of the horses destroying the trails. You literally have to wade horse (expletive) above the level of the top of the boots. I went to the Maroon Bells of Co. this summer and one trail was impossible because of this. At lease you could wade the stinking trails of White Mts. & Pecos. Please don't become like this!
- No clear cutting!
- Terrible erosion!
- 05/11/91 085 My experience is limited to one visit in May 1991. I was pleased with all aspects of my trip.

- 05/14/91 047 Part III question #11: Trash containers at camping areas such as those with bathrooms are very appropriate but never, never along trails! The question is difficult to answer. It is too broad. I feel the people who use the trails in the wilderness will be users who respect the area.
- If there is anything at all that I can do to further benefit your study, please feel free to ask. Preserving our forest lands is a top priority to me.
- 05/18/91 057 There were a few times where the trail markings were difficult to find especially when crossing the river.
- 05/18/91 059 The Ouachita Trail is well blazed and easy to follow but much of it is quite rough and rocky. I saw one party of three hikers and one of two horseback riders in three days. Horse droppings were in ??????. The mileage sign at the top of Wilton Mountain needs replacing. Camp sites were spaced at about 1 per mile, which does not seem excessive. If 6031 could be closed or access to it restricted, I think pressure on the Kiamichi River campsites, showed the only significant site degradation, would be lessened. I presume people walk the two miles or less in from 6031 and fewer people would walk in from Pashubbe Road or the State Line. More trails, especially a loop, would make for more interesting hiking. The Wilderness area - at least on the Ouachita Trail - was not large enough to prevent one from hearing chainsaws. The expansion of the wilderness would be nice.
- 05/24/92 062 I did not go there looking for danger we were preparing ourselves for a tougher climb in Pecos. I killed three poisons snakes in 3 days two cottonmouth water moccasins and a timber rattler. All these snakes were right on the trail and in the 5 to 6 foot size range. It bothered me to kill them because they belong there. We are the intruders who come out there to enjoy the wilderness of the place and it is wrong for any of us to destroy the wild animals that live

there. We need to leave them for other visitors to enjoy.

- 05/25/91 060 When we stopped teaching backpacking in Colorado for financial reasons, we found the upper Kiamichi to provide an affordable challenge with a reasonably desirable objective to hike to ("falls" area). Thank you for protected areas such as these!
- 05/25/91 071 More markings on the trail
- 05/25/91 073 I appreciate your efforts very much. I enjoyed my stay and look forward to possible returning sometime in the future.
- 06/02/91 065 You should be commended for your hard work in preserving the forest area. Thank you.
- 06/24/91 078 The trail was basically clean.
- Certain sections especially near the river were not well marked
- Don't build bridges across the river but arrange a few logs or large rocks where one could easily cross.
- 07/13/91 080 Need water on trail
- 07/13/91 081 It was a fun trip, other than the fact that one of our leaders got Rocky Mountain Spotted Fever, but they need more mile markers.
- 08/04/91 098 It was a great experience. I plan to go again.
- 08/09/91 100 I love the Upper Kiamichi just the way it is now. It's wonderful to know that there's a place only five hours away where I can get away from the hustle and bustle of city life and enjoy some real solitude. Please, leave it just as it is now! Thanks.
- 08/11/91 092 Though this was only a short hike to break a trip back to Texas, we have backpacked several times into the Wilderness Area before it was designated so. I view this Upper Kiamichi River

Wilderness as a very unique area which has provided many natural wilderness experiences and look forward to many more provided human impact is held to a minimum.

- 08/11/91 096 Please halt the logging. Thank you.
- 08/17/91 112 My friends & I like the Ouach. Trail - not a lot of people, trail easy, water available, few horses, no bikers, clean, feel safe & the people in both OK & ARK are helpful, friendly and welcoming. TX could use some of this.
- 08/22/91 108 While planning our trip to the area we knew that the trail did not cross the river very many times. Yet, when we questioned the park ranger he assured us that we would have plenty of access to water. We did not. My husband and I had to dig in a dried spring to find water. It was not a pleasant experience.
- 08/23/91 109
- 1) Lack of water sources limits backpacking options (i.e. camp sites, distance, etc.) when considered along with point of entry & transportation. Are 1, 2, & 3-day loop trails possible?
  - 2) Although it has not been a problem, I am concerned with security of vehicle left overnite.
- 08/24/91 111 I was impressed by the parking areas. The O.T. was maintained nicely. I question accessibility along trail during the rainy season, since it hugs the river. Water was adequate in Aug. Several areas could be greatly improved with just a few hours of chainsaw work in cut over areas. Keep up the good work.
- 09/28/91 127 I think the trails are well blazed, though the mileage markers contradict what the sign's mileage provides.
- Also in 16 times backpacking this area, I've never seen black bear, I wonder where do you most find them to view?

- 09/28/91 128 It's a lovely place to be.
- 10/04/91 137 Save the Ouachitas!
- 10/05/91 134 No clear cutting  
No horse  
No mountain bikes
- I am painfully aware of the Ouachita N.F. plans. Basically clear cutting is rape. Thank you for letting me respond.
- 10/05/91 140 Sometimes trail markers hard to follow. Especially on switch backs. Other than that great area.
- 10/08/91 133 Deer Archery
- Over a ten day period sighted 13 deer 4 fawns harvested 2 spike bucks 80 lbs, 74 lbs 7 mature does poor buck doe ratio, no mature bucks. Sighted no turkeys. Protect the bears.
- 10/11/91 149 This is my third backpacking trip to this area and the first time I've ever seen anybody on the trail. My only disappointment is when the fall foliage is most beautiful, hunting season is open producing an element of risk unwelcomed.
- 10/12/91 146 S.E. Oklahoma and S.W. Arkansas are the most fiercely managed timber lands I have ever seen. I don't see how a diversity of wildlife and plants can exist in such a small wilderness area when it is completely surrounded by miles and miles of these fiber farms.
- 10/17/91 154 I would like to see the trail completed as soon as possible all the way around as shown on the map so my horse and I could make a circle instead of an "out and back" on the same trail.
- 10/19/91 177 I have never camped in such seclusion before, and I really enjoyed nature there.
- 10/20/91 156 These trails are great for horses. This is the best riding country I have ever lived in and I'm gonna stay here and ride at Kiamichi till I can't no more.



- 10/24/91 163 Maybe have one other trail that doesn't cross river twelve times. We were concerned about our safety crossing with river rising rapidly and temperature being cool. An alternative winter/rainey trail might help.
- 10/24/91 164 One section of trail eroded. Jet fighters overhead constantly! Well done overall!
- 11/08/91 185 Really nice area. A little trail maintenance would be nice, hand pump water wells along trail would be excellent.
- 11/08/91 237 My friend and I were very disappointed that "people" were allowed to drive in and set up an old fashioned large deer camp!!! I have hunted in the west since 1973 and I never have seen people drive a pick-up into a wilderness area and set up a large camp! Other than that problem we enjoyed our trip very much! And we will return. I wish the state of Okla. would "open" up or close other areas for wilderness. Thank you very much!
- 11/13/91 239 There was much evidence of motorized traffic and several areas where logging was going on. The old roadbeds that the trail utilizes are too open for summer use.
- 11/13/91 240 I oppose development in the wilderness. I am not opposed to development outside the area. One thing not mentioned by the survey was the use of fire and "what is Natural in the Ouachitas?" According to Smith's book Sawmill and several other reference books, fire was an important component to the natural ecosystem. The Forest Service needs to find out - What is Natural?, then - How do we manage for it? The most important value of wilderness areas should be as a natural control area to learn more about the entire forest.
- 11/16/91 186 There is a need for a "high-water" route for the Ouachita N.R. Trail through the Wilderness Area. During periods of heavy rainfall the trail becomes

difficult and when extreme amounts of rainfall occur it is impassable. Backpackers using the trail for extended trips pass thru the Upper Kiamichi and difficulties have occurred in re-routing during unusually wet conditions. An alternate trail needs to be built to provide a more convenient and safer route when the bottomland is flooded. Thus a high/low water route would exist for those traveling the entire trail thru the area to provide access to the hillsides, and possibly vistas. Thanks!

- 11/16/91 190 I had a great time; it was a lot of fun! Need more animals! No snakes, though!
- 11/27/91 207 Continued care for the area's wildlife is my major concern. I love to hunt deer, turkey and coon. I've noticed in the past 4-5 years that the underbrush is really getting thick and the current food plots are grown up in briars.
- 11/28/91 195 Some way to limit the no#. of hunter groups to the area during hunting season.
- 11/28/91 196 The trail was tougher than I had anticipated. Suggest trail indicators to show level of endurance required to make the trek.
- 11/28/91 197 We were originally concerned w/ the prospect of encountering hunters or being awakened by gun shots due to our trip being on Thanksgiving day. Also were a bit concerned about our dogs or ourselves w/ others shooting in the area. We encountered no problems like these & saw only one hunter (from a distance). We did hear gun shots but not anything bothersome. We worked harder than expected on the trails but thoroughly enjoyed the trip!
- 11/28/91 198 You may try to limit # of hunters i.e. give out a set number of permits.
- 11/??/91 235 I would like to have a map of the area owned by the federal government. Thank you.

- 12/07/91 216
1. I visited the area during December after heavy rains, which probably discouraged other visitors and obscures some signs of use. It was one of the nicest areas of the Ouachita Mountains and the Ouachita Trail that I have visited.
  2. Some of the old logging roads could be converted to wheelchair accessible trails--which are needed in Oklahoma. Your group should study this.
  3. We backpacked behind a group of llamas which were being evaluated. I have seen numerous trails and horse type wear--these gentle animals did less damage than our hiking boots--please don't put them in the same category as horses.
- 12/07/91 217
- I encountered a group using llamas as pack animals. I was very impressed that they impacted the trail less than humans. I was convinced that they should be allowed free access of the Wilderness and should be encouraged over horses, which do a significant amount of damage.
- The trail crosses the river many times.
- 12/27/91 210
- I believe this is my tenth trip there. I have been from inside Ark. to the Winding Stair. If the trail from T.S. Drive could be remarked it would give us the other trail to go on. I try to split up the group in order not to leave anything behind us but footprints.
- 12/27/91 211
- Stop the cutting federal and state wilderness areas.
- 12/28/91 204
- Sorry I couldn't be more specific about the Kiamichi as I have only used the N.E. trail area for "day use" and B & W photography. Almost all my real backpacking (up to 8 days on the Escalante River) occurs in Utah.
- My favorite forest areas "near" Dallas are the Ozarks rather than the Ouachitas. Thank you for the opportunity to comment!

- 01/09/92 221 Hope this isn't too late to be used. School has occupied my time so much I haven't been able to breathe! I had a very enjoyable time there. Too bad there were no places to rappel! Oh well, I don't think there is much you can do about that!
- 01/10/92 218 Dear Tom,  
Scott Farrow and I were eating lunch when you came upon us on the trail on Sat., Jan 11, 1992. We enjoyed talking with you. I hope that the management of this area is not considering opening up the area to horseback or motorized vehicle use. We would like to see results of this survey.  
Thanks & Good Luck!  
Richard
- 01/10/92 220 I enjoyed the area very much!
- 01/24/92 224 I think it is good horses are allowed, as well as hunting & fishing. It should not be for a few ultra-conservationists to dictate how others spend/enjoy their outdoor time. I am glad the Nat. For. Serv. is open to diverse uses of their land.
- 02/02/92 225 Roads are well kept
- 02/02/92 226 I'll be back to this beautiful country. Please preserve area.
- 02/02/92 227 Area should be preserved & protected from any commercial or exploitive activities, should stay as is. Thank you.
- 02/02/92 228 If I can be of any help, let me know. I live close by area.
- 02/02/92 229 Thank you for your efforts in taking care of and preserving the area.
- 02/02/92 230 I very much appreciate areas like this being available to everyone. Hopefully, there won't be too much development of the area so it will remain beautiful and peaceful.

- 02/02/92 231 This is a beautiful area. I hope it can always be preserved for my daughter and all the generations to come. I feel it is very important to reforest areas which need it and to take care of the forests we have left.
- [My daughter is only 9 but she helped fill out this survey. (Cathy) She's a girl scout.]
- 02/02/92 232 I think rangers should patrol more during hunting season to stop all the illegal use of ATV's in this area. I believe these vehicles destroy wildlife. And inhibit others from enjoying the area. I realize there is not enough rangers to control everything.
- 02/08/92 251 Eliminate all vehicle traffic. Improve the road (6031).
- 02/08/92 252 Eliminate all vehicle traffic.
- Allow handguns for protection (only for life threatening situations). (No target practice)
- Improve the road (6031)
- 02/23/92 246 Please preserve area as is presently.
- 02/23/92 247 Any kind of gas exploration or commercial activity would seriously ruin the wilderness setting of this beautiful are. Please Protect! Thank you
- 03/07/92 253 Trails & markers were very clear -- easy to follow.
- 03/07/92 267 You sent 4 surveys to one address & also sent the others in the party. At each sign in location each member not living at different addresses filled out a report.
- 03/14/92 274 I really enjoyed my stay. I realize one reason that I didn't encounter others on the trail was because of the season, but that was fine with me. I really would like to see hikers/campers practice low impact hiking. There were a few areas with large fire rings and cleared sites.

But the area is beautiful and I would visit again!

- 03/14/92 275 I enjoyed my stay a lot. Because of the time of year that we went, I am neutral/undecided about some of the questions asked. Most people don't use wilderness areas as much in the colder months. But I would recommend to others that they visit the area. Please keep it a wilderness area
- 03/15/92 276 The trail was in very good shape. There was one place where we crossed the river that there was some confusion as to where the trail went. It looked like the trail had been changed. There is a ? mark on the map at about the place.
- Our trip started Sun. morning, 3-15-92, at Winding Stairs campground. The first night was spent just east of Hwy 259. The second night was spent just past the Kiamichi River Trail Head. We got to the state line about 3:00 p.m. on Tues, 3-17-92, and ended at Queen Wilhemina State Park about 5:30 p.m. on Tues, 3-17-92. The seven boys from our troop are working on the backpacking merit badge. They had a great time.
- 03/15/92 278 The clear cutting in some areas were very disturbing. Logging select trees from an area would be better for the forest and support a larger population of wildlife
- 03/18/92 288 The people in this area appreciate our trails for horseback or hiking. We would like to see more trails in the mountains, in the near future. Thanks.
- 03/18/92 290 We would like to see more horseback and hiking trails, in the near future, so people can enjoy nature. THANKS.
- 03/20/92 295 The old VW van rusting on the south side of the river near the Kiamichi River trailhead should be removed if possible!
- 03/25/92 297 A safer crossing of the Kiamichi - I would even like a footbridge.

03/25/92 298 Some sign was down, should be put back up & also can be read. And last part of the trail in Okla. is not mark by miles - it would help to know.

03/28/92 300 This survey is long. Does it discourage others from completing it?

VITA

Thomas Kuzmic

Candidate for the Degree of  
Doctor of Philosophy

**Thesis:** CHARACTERISTICS OF VISITORS AND RECREATIONAL USE  
OF THE UPPER KIAMICHI RIVER WILDERNESS IN OKLAHOMA

**Major Field:** Environmental Science

**Biographical:**

**Personal Data:** Born in Cleveland, Ohio, March 19,  
1952, the son of John M. and Clara S. Kuzmic.

**Education:** Graduated from St. Joseph High School,  
Cleveland, Ohio, in June, 1970; received  
Bachelor of Science degree in Forestry &  
Wildlife from Virginia Polytechnic Institute &  
State University in May, 1974; received Master  
of Science degree in Forestry from Virginia  
Polytechnic Institute & State University in  
August, 1977; completed requirements for the  
Doctor of Philosophy degree in Environmental  
Science at Oklahoma State University in May,  
1993.

**Professional Experience:** Instructor of Natural Science  
at Southeast Community College, University of  
Kentucky System, Cumberland, Kentucky, August,  
1977, to December, 1979. Instructor of Forestry  
and Director of Summer Camp Program, Department of  
Forestry, Oklahoma State University, Stillwater,  
Oklahoma, December, 1979, to present.

**Professional & Honorary Affiliations:** Society of  
American Foresters; National Recreation and Parks  
Association; Society of Parks and Recreation  
Educators; Xi Sigma Pi; Phi Sigma; Alpha Zeta.

**Awards:** Undergraduate Student Advisor of the Year,  
College of Agricultural Sciences and Natural  
Resources, Oklahoma State University, 1991.

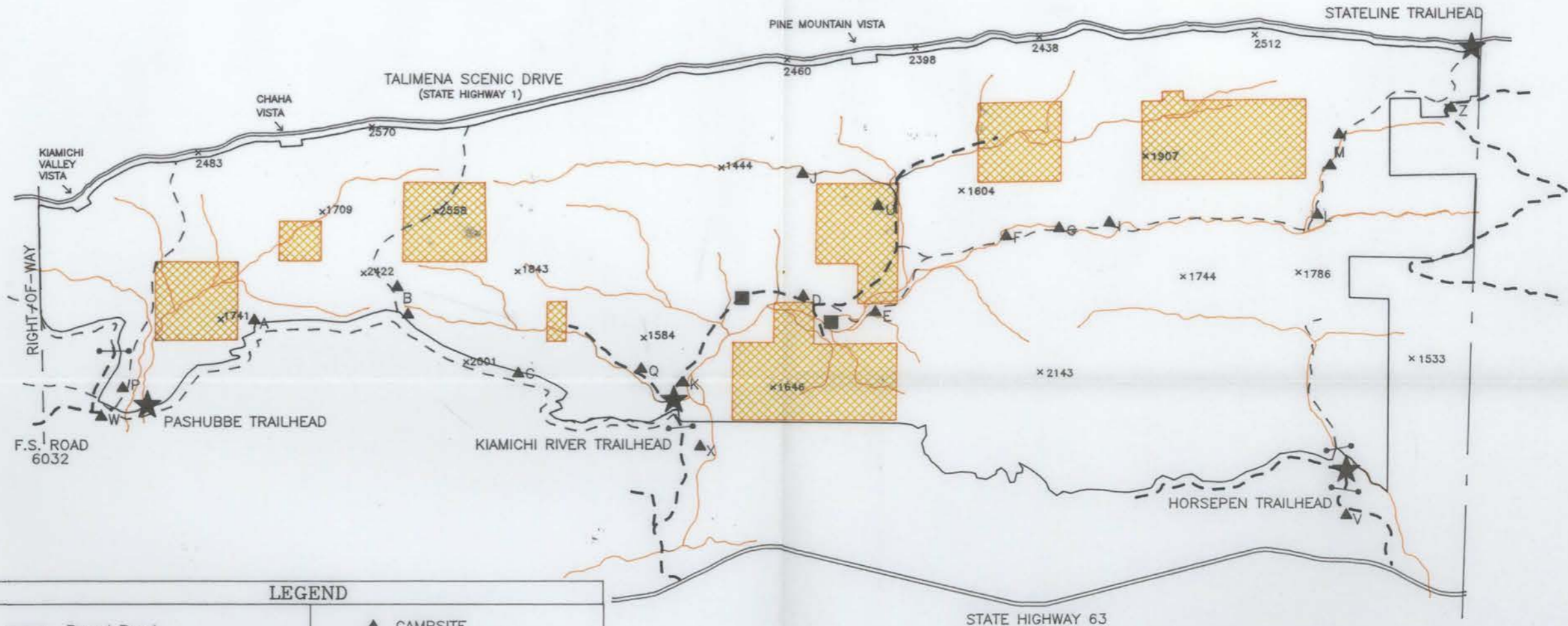


# UPPER KIAMICHI RIVER WILDERNESS

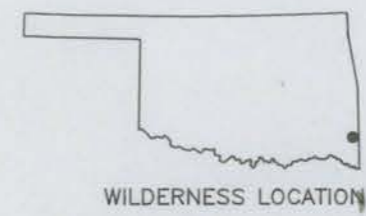
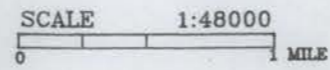
OUACHITA NATIONAL FOREST

OKLAHOMA

1992



LEGEND	
	Paved Road
	Unpaved Road
	Trail
	Stream
	Private Inholding
	Trailhead
	Wildlife Plot
	Elevation
	Earthen Roadblock
<p>The Ouachita National Recreation Trail passes through from Pashubbe Trailhead to Stateline Trailhead. It is the only marked and maintained trail in the wilderness.</p>	
	CAMPSITE
A	Pashubbe Peak Camp
B	Wilton Mountain Camp
C	Mile 38 Camp
D	Riversign Camp
E	Big River Camp
F	Valley Camp
G	Pine Grove Camp
I	Mile 43 Camp
J	North Central Camp
K	Kiamichi Trailhead Camp
L	Lower Beech Grove Camp
M	Upper Beech Grove Camp
P	Pashubbe Trailhead Camp
Q	Old Landing Camp
U	Private Cabin
V	Outside Horsepen Trailhead
W	Outside Pashubbe Trailhead
X	Outside Kiamichi Trailhead
Z	Outside Stateline Trailhead



OKLAHOMA | ARKANSAS