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PERCEPTIONS AND USE: A SURVEY OF VISITORS IN THE LAKES MANAGEMENT AREA, KAMAS RANGER DISTRICT, WASATCH-CACHE NATIONAL FOREST, UTAH

by

Ronald E. Vance

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF LANDSCAPE ARCHITECTURE

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1998

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ABSTRACT

Perceptions and Use: A Survey of Visitors in the Lakes Management Area, Kamas Ranger District, Wasatch-Cache National Forest, Utah

by

Ronald E. Vance, Master of Landscape Architecture

Utah State university, 1998

Major Professor: John C. Ellsworth
Department: Landscape Architecture and Environmental Planning

New planning and management paradigms for the USDA Forest Service suggest that future Forest Plans incorporate the best available science and the public's values into Forest Plan revisions. Revised plans should focus on the ecological capabilities of the land and how to sustain them. The means to manage the land for these outcomes should be developed with considerable and ongoing public involvement. One outcome of this public involvement can be the development of a "desired future condition" for the area being managed and the needed regulations to maintain and monitor the desired conditions.

In order to provide preliminary information on backcountry recreation in a particular setting, a survey was conducted in the Lakes Management Area (LMA) of the Kamas Ranger District in northeastern Utah. The purpose of the survey was to provide scientifically gathered baseline information (who the typical visitor

was, perceptions of and preferences for social and biophysical conditions in the LMA, how the area was being used) and to investigate the variability of visitor desires within the LMA.

Results indicate that visitors to the LMA are mostly from the nearby urban Wasatch Front. Visitors come to the LMA to relax and find solitude while hiking and camping. They report being highly satisfied with their visit, with social and biophysical conditions found during the visit surveyed largely meeting expectations or being less than expected.

The variability of visitor desires was measured by creating groupings of visitors based on characteristics of the visitor or visit considered relevant to managers. Eight groupings were developed. Subgroupings within these groups were then analyzed, using ANOVA, to determine the extent of variability within the groupings of visitors and their perceptions of and preferences for selected social and biophysical factors as well as site attributes and management options. Significant variability was found within certain groupings, particularly groupings based on the type of organization the visitor was a member of, how many previous trips to the LMA the visitor has made, and whether the visit was day use or overnight.

(198 pages)

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Ronald E. Vance

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CHAPTER I

INTRODUCTION

United States Forest Service (USFS) planning and management practices are currently in a state of flux. Decreases in money appropriated by Congress are forcing reductions in numbers of staff. The organization has been reduced from nine to eight regional offices. Individuals' expertise is being shared among district, supervisor, and regional offices. Although only an act of Congress can change forest boundaries, many forests are jointly managing lands that have common ecological characteristics.

These efforts are being undertaken to respond to fiscal realities and to facilitate the agency's ability to accommodate the new management paradigm, Ecosystem Management (EM). As described by former USFS Chief Dr. Jack Ward Thomas (1994), EM is a holistic approach to resource management which looks at the forest landscape within the context of the larger environment. This view looks at integrating human, biological, and physical factors to achieve sustainability of all resources.

In order to move forward with this new management paradigm, changes need to occur in both the focus and process of forest planning (USDA FS 1995). New operating practices must evolve from an understanding of past management. Decisions must be made using the best available science. Collaboration will be required as managers seek to establish desired outcomes for difficult social and ecological problems. Finally, the decision process must be flexible enough to adapt the desired outcome based on monitoring of the

results of the decisions (Thomas 1994).

With this need in mind, the USFS has proposed a new planning rule (Federal Register 4/13/95). This proposed rule takes into account the need to satisfy existing legal frameworks while allowing flexibility to adapt plans to EM principles. The rule will focus on managing ecosystems for sustainable production of multiple benefits such as healthy forests, clean water, and quality recreation experiences. These benefits will be defined by the needs and desires of the public.

To understand peoples' needs and implement resource plans, it is critical that concerned individuals participate in the planning process. Public expectations now include the desire to have the best information available and a meaningful way to respond to and influence public policy and management decisions (Boyers 1994). This is an issue Dr. Thomas (1994, p. 13) recognized when he said, "We will rely on the best science and technology available and we will reflect a broad spectrum of viewpoints gained from our employees and from up-front public participation in the decision making process."

Statement of the Problem

The Wasatch-Cache National Forest Land and Resource Management Plan, 1985 (Forest Plan) is scheduled to be revised. Forest Plans are intended to be revised every 10 years, but not later than 15 years. This plan was one of the first implemented since management plans were mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), later amended by the National Forest Management Act of 1976 (NFMA). Concepts related to EM were not

considered when the initial plan was developed, but revisions should incorporate these concepts. The shift to EM contains two important elements for Forest Service planning and management personnel: a renewed interest in public involvement in the planning process to better represent peoples' needs and desires, and a shift from focusing on resource output targets to managing for desired future conditions of resources and visitor experiences.

Public Involvement. Evident in the new policy's evolution is that social values need to be considered and integrated into the USFS planning process when defining management goals and objectives (Cortner and Shannon 1993, Lime 1996). As stated by Dr. Thomas (1994, p. 11), "The desired outcome of this process will be to create an organization that has a stronger customer orientation, based on a better understanding of their expectations." This is an exceedingly difficult task. Social values are constantly changing. One schism currently creating conflict is the issue of consumptive versus nonconsumptive uses of forest resources (Kennedy 1985). While this is one of the more visible value changes, there are many larger scale social value changes occurring.

As discussed by Backiel (1992), changing demographics, societal composition, and the way we view and are able to interact with our world are affecting people and their expectations of how their natural resources should be managed. It is imperative for resource managers to be aware of and sensitive to these changes.

However, bureaucracies are not known for their ability to respond quickly to change. Formal, rigid processes and personal

biases are often obstacles which slow or nullify progress within agencies. As the public has become better informed and less trusting of government, conflict over how to manage our natural resources has escalated. People have lost trust in public institutions and often feel their interests have been usurped by the wants and needs of special interest groups (Culhane 1981). Dr. Thomas (1995, p. 157) addressed these concerns when he stated:

> The Forest Service will gain trust through our competence as we streamline and improve operations, eliminate inefficiencies, and develop and use new knowledge and technology. Scientific information used will include social as well as biological and physical sciences.

As demonstrated in Knowlton (1972), not responding to existing social values and the resultant loss of trust can have long-term impacts on an agency's ability to successfully implement policies and programs. The problem with not involving the public is well demonstrated by Blahna and Yonts-Shepard (1989) where it is noted that of 123 Forest plans to be completed by 1985, only 27 had reached the point of implementation by 1987. This was due in part to a large amount of public controversy, lack of conflict management, and resulting litigation.

Conflicts resulting from lack of public involvement and consent can have impacts economically and temporally when proposed plans are litigated, blocking implementation. Using cost estimates provided in Gericke, Sullivan, and Wellman (1992), formal public participation costs are estimated to be about $512,000 per forest plan. Plans averaged 8.4 appeals each, requiring an additional $10,700 per plan to address. How to deal with these conflicts has become a major

issue for public agencies and resource managers (Kennedy 1985).

Determining plan goals will not be an easy task. While EM is envisioned to "become a set of management processes and practices that focus on producing conditions and outcomes desired by the American people" (Thomas 1994, p. 12), common goals or desired conditions have been difficult to define.

According to Muth and Fairey (1995), social conflicts over recreation opportunities will accelerate in the future. This is largely due to an increase in conflicting individual and social values leading to a greater diversity of special interest groups, each advocating opportunities which suit their own needs. Competition for allocations of recreation opportunities often results in conflicts where desired activities are not compatible (Blahna, Smith, and Anderson 1995).

Desired Future Conditions. The concept of managing for desired future conditions (DFC) is a refinement of the former strategy of establishing a carrying capacity (Stankey et al. 1985, Manning et al. 1996). The focus of the carrying capacity concept is setting thresholds beyond which use was anticipated to have undesirable effects on biological and physical resources or visitor experiences. It is often associated with establishing appropriate resource output levels, or how much can be extracted without creating unacceptable damage. However, nature and public desires are not static; therefore, thresholds change.

The difficulty in establishing a carrying capacity for specific areas is greatly complicated by the EM paradigm which suggests that

the ecosystem be looked at as a whole and at multiple scales of time and space. Defining carrying capacity supposes that we understand the composition and processes of these systems on multiple levels. As stated by Dr. Thomas (1994, p. 6), "These systems are incredibly complex and we will never understand ecosystems completely." Accepting that we do not have all of the information necessary to establish firm thresholds for resource use, a better solution may be to establish a description of the dynamic conditions acceptable for a particular resource, area, and use type or level (Blahna, Smith, and Anderson 1995).

One existing tool to establish a description of acceptable conditions is the Limits of Acceptable Change System (LAC) (Stankey et al. 1985). The LAC is a process which evolved from previous recreation research and management experiences to determine the relationships between recreation use and its impact on the biophysical environment and recreation experiences (Watson and Williams 1995). It has been used to develop a DFC for a resource, area, or visitor experience. Through a series of interrelated steps described in more detail in Chapter 2, management and customer concerns are identified, indicators of resource quality are defined, standards for maintenance of acceptable conditions are established, and management actions to maintain acceptable conditions are proposed.

Public involvement is considered an important aspect for implementation of LAC results if changes in management goals or objectives are proposed.

> Two of the keys to successful implementation of the LAC method are the compilation of adequate baseline inventory conditions and continuous monitoring of changing conditions. Only when such information is available can wilderness managers know when established standards are being exceeded and have a basis upon which to undertake corrective actions to ensure high-quality wilderness recreation opportunities or appropriate resource protection measures. (US GAO 1989, p. 19)

The need to monitor the results of management actions is dictated by our inability to completely understand how ecosystems function and to stay aware of peoples' changing needs and desires. Monitoring social and biophysical conditions over time can help in evaluating management actions and their ability to meet the DFC. Knowledge about the results of actions on resource conditions can be shared, and actions adapted to meet the changing needs of the resource or the users who define the resource values.

Due to the complex dynamic nature of ecosystems and social values or desires, plans and the planning process must be adaptable so that they efficiently respond to new information. The proposed planning rule recognizes this need and suggests strengthening the role of monitoring and evaluation.

> The agency believes an expanded and strengthened role for monitoring and evaluation is a cornerstone for implementing the proposed rule and making adaptive resource management a reality for National Forest System lands. (USDA FS 1995, p. 18910)

The proposed rule requires a documented monitoring and evaluation strategy, separate from the forest plan, be developed in conjunction with forest plan revisions. This document "would provide guidance to make sure that projects are being implemented in accordance with the project decision document, and that progress is being made toward achieving plan goals" (USDA FS 1995, p. 18911).

Background

The existing Forest Plan for the Wasatch-Cache National Forest is scheduled to be revised by the year 2000. This Forest Plan was one of the first implemented since management plans were mandated. The Forest Plan: "guides all natural resource activities and establishes standards and guidelines... describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management" (USDA FS 1985, p. I-1).

The Forest Plan guides by first identifying goals and objectives. "Goals are broad definitions of what will be achieved, while objectives are aimed at achieving those goals" (USDA FS 1985, p. IV-1). Direction is also provided giving specific details concerning how objectives will be met.

A DFC was established for the Forest, containing numerous specific directives and quantitative suggestions for specific actions. A DFC was also individually prescribed for each functional unit the Forest classifies: recreation, wilderness, wildlife and fish, range, timber, water and soil, minerals, lands, facilities, as well as scenic resources and law enforcement. EM is moving away from functional classes of resource conditions to a more integrated view of resource management where sustainability of a healthy, productive, diverse environment is desired.

Study Area

In order to facilitate implementation of the initial Forest Plan, the Wasatch-Cache National Forest was divided into 14

management areas. These are typically contiguous land units with similar physical and resource use characteristics. The areas are managed according to forestwide standards and guidelines as well as those specifically developed for the unique resources or attributes of individual management areas.

Physical Setting. The Lakes Management Area (LMA) is one of those management areas. It is located on the Kamas Ranger District (KRD), which is part of the Wasatch-Cache National Forest. The LMA is located on the western end of the Uinta Mountains. On the eastern boundary of the LMA is the Mirror Lake Scenic Highway, which separates it from the popular High Uinta Wilderness. With a range in elevation of between 8,000' and 12,000', the 57,222-acre LMA is composed mainly of alpine and subalpine habitat types. It is characterized by numerous glacial cut valleys interspersed with high elevation lakes; spruce, fir, and aspen forests; grass or sedge meadows; and rock or talus slopes. The substantial snowpack of the area provides the headwaters for the Provo and Weber Rivers.

Social Setting. Because the LMA is within a one-hour drive of Salt Lake City, Utah, and the large Wasatch Front metropolitan area, it can be considered an urban-proximate forest. The major use value is backcountry recreation, with additional values gained by water storage and diversions, and a few existing grazing allotments.

Recreation pressure is already considered high. Hot summer temperatures along the Wasatch Front push visitors up into the LMA to enjoy the cooler temperatures and fresh air. These visitors are thought to make up the majority of visitors to the LMA. With the

current growth patterns in the Utah population, these trends are likely to continue.

As of 1990 urban residents made up 87 percent of the total state population. This represents an increase of 21.6 percent in urban residents between 1980 and 1990 with a corresponding 1.8 percent decrease in the statewide rural population (BEBR 1996). Population projections for 1995 indicate that approximately 63 percent of the Utah population will live in the Wasatch Front. Between 1980 and 1990 this area increased its urban population by 18.8 percent while the rural componant decreased by 16.8 percent (BEBR 1996). As of 1990, 97 percent of the Wasatch Front population was considered urban (areas with more than 2,500 residents).

Forest Service projections indicate at least a 60 percent increase in recreation visits to the LMA over the next 25 years (USDA FS 1995a). On the national level, recreation visits to national forests are projected to increase 64 percent by the year 2045 (USDA FS 1995b). In the existing Forest Plan it is estimated that dispersed recreation capacity will exceed opportunities on the Wasatch-Cache National Forest by the year 2010 (USDA FS 1985). These figures indicate significant growth in recreation pressure and the potential for increased conflicts in the LMA.

Managerial Setting: Existing Recreation Framework. Recreation values for the LMA are described in terms of the variety of opportunities present. For planning and management purposes the variety of opportunities has been delineated by using a continuum called the Recreation Opportunity Spectrum (ROS) (USDA FS 1982).

Recreation opportunity is defined as "the availability of a real choice for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired" (USDA FS 1982, p. 4). It is the goal of recreation managers to provide a diversity of quality recreation opportunities to match visitors' desired experiences.

The ROS continuum, which is divided into six classes, recognizes a range of opportunities classified from primitive to urban. Each class is defined by a combination of three key components for recreation opportunity: the activity, the setting, and the experience.

Recreation activities for the different classes are described in general terms only and need to be developed on an area-specific basis. One general activity type addressed in ROS classifications is whether motorized or nonmotorized use can occur in an area. For recreation management, the LMA is classified as a semiprimitive, nonmotorized area.

Generally managers concern themselves with the setting. Settings can be defined as "the combination of physical, biological, social, and managerial conditions that give value to a place" (Clark 1979, p. 1). In the LMA, the setting

> ...is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted. (USDA FS 1982, p. 7)

Along the ROS continuum from primitive to urban, experience opportunities "range from a very high probability of solitude, self

reliance, challenge, and risk to a very social experience where self reliance, challenge, and risk are relatively unimportant" (USDA FS 1986, p. II-1).

> The LMA is managed to provide experiences where there is high, but not extremely high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. (USDA FS 1982, p. 8)

Classifying recreation management objectives along a continuum recognizes the need to provide for a variety of experiences. The quality of the experience is influenced by customer expectations and perceptions and may be analyzed in terms of satisfaction derived by the experience. "Quality is not judged by the presence or absence of some factor (facilities, naturalness, or other visitors), but as the extent to which a given setting satisfies the desires of a particular recreationist" (Clark and Stankey 1979, p. 5). By understanding what visitor expectations are, their perceptions of existing conditions, and measuring visitor satisfaction, managers may develop plans to match visitor desires and provide quality experiences.

Purpose of the Study

One of the changes implicit in EM is that sociological as well as ecological factors be taken into consideration in the planning process. Based on conversations with recreation managers in the LMA, very little was known about how management direction was meeting the needs and desires of visitors to the area. The existing Forest Plan management direction calls for a limitation on the size of groups, if

needed. In order to determine the level of need, an ecological and sociological carrying capacity was to be established. To establish a social carrying capacity, managers in the LMA needed to know more about social conditions of backcountry recreation visitors and their concerns so they can incorporate visitors' values into the forest plan revision process.

This study involved the development, implementation, and analysis of a survey of recreation visitors using the Lakes Management Area. The study provides selected visitor information such as who they are, how and where they traveled, what they did, and how the area met their needs. It reports visitor perceptions of social and biophysical resource conditions as well as their preferences for selected setting attributes and possible management options.

The study also provides visitor feedback on topics of concern identified by Kamas Ranger District (KRD) recreation personnel. Analysis of the results describe not only the "typical" desires of the individuals sampled, but also the diversity of desires represented by groupings of individuals sampled. This form of up-front public involvement helps refine concerns identified by area managers. The survey also identified individuals who would like to be incorporated into the planning process.

This survey also provides baseline data from which to measure perceived changes in setting conditions. As described by Freimund, Anderson, and Pitt (1996, p. 114),

> A baseline inventory is imperative for accurate assessment and comparison of proposed management alternatives, because some

> management actions can result in subtle degradation of the resource over time. The extent to which various alternatives enhance or degrade the resource will not be evident unless they are measured from the common baseline an inventory provides.

This also follows US GAO (1989, p. 64) recommendations to the Secretary of Agriculture which propose the Forest Service "develop baseline inventory information on the condition of each designated wilderness and monitor changes in the condition and extent of use in wilderness areas" and "consider the applicability of the LAC method or other methods to assess changes in wilderness conditions." Although the LMA is not a designated wilderness, the same ROS classification found in the LMA is also found in Wilderness areas.

Information from this study can be used as the initial step in the LAC process. This step is to identify issues and concerns for an area. A scientifically designed survey is a good means to collect representative information about a topic, while avoiding biases associated with less scientific methods. According to Blahna and Yonts-Shepard (1990, p. 162), "The objective identification of public issues and stakeholders is the first, and perhaps most critical, step for dealing successfully with the many preservation-versus-use conflicts facing resource agencies." This initial information can be used to focus follow-up public scoping, required by the National Environmental Policy Act of 1969 (NEPA 1969), and identify concerned individuals who may participate throughout the LAC and forest planning process to jointly produce a DFC for the LMA.

The LAC process focuses on recreation experiences or impacts and has mainly been applied to planning in wilderness areas. However, this process can apply to any management area, especially

those with recreation as their major resource impact, like the LMA.

Study Objectives

The goal of this study is to provide information concerning how the LMA is meeting social conditions as expressed by the needs and desires of its visitors, and its ROS designation. It provides, through survey research, scientifically collected data regarding recreation visitors and their activities, perceptions, and preferences at a backcountry recreation setting. This baseline information identifies selected conditions by which change in the LMA can be monitored.

This can be used as initial public input into the LAC planning process and to help define the existing social conditions. From this baseline and topics of concern refined through the survey process, further collaboration with interested members of the public can focus on developing a DFC for inclusion in the revised Forest Plan. Study goals are achieved through the following objectives.

1. Determine visitor characteristics in the LMA. Visitor characteristics deal with attributes of the individuals responding to survey and include such information as: age, gender, level of education, where they are from, type of area they grew up in, if they have visited before, and types of organizations they are affiliated with. These questions deal with who the individual visitors are.

2. Determine visit characteristics in the LMA. These attributes deal with how visitors experienced the LMA on this visit and do not necessarily relate to characteristics of the individual. Questions were asked regarding: composition of groups, number of

people in the groups, how people travel, how far they travel, where they travel, why they visited this area, and if they stayed overnight.

3. Determine how visitors perceive the social conditions in the LMA. Questions addressed topics such as: if, and how crowded visitors felt; were they satisfied with the visit; and how the visit met their expectations.

4. Determine how visitors of the LMA perceive the biophysical resource conditions of the area. Information was gathered on perceptions of selected impacts to the natural environment.

5. Determine initial visitor responses to topics of concern identified by Kamas Ranger District personnel.

6. Investigate intragroup diversity for selected visitor groups and visit characteristics regarding perceptions of social and biophysical resource conditions in the LMA.

7. Investigate intragroup diversity for selected visitor groups and visit characteristics regarding preferences for setting attributes and management options in the LMA.

CHAPTER II

LITERATURE REVIEW

This chapter provides more in-depth discussion of literature regarding selected aspects of USFS recreation management in the natural environment. First a brief discussion of the development of recreation management in the USFS is provided. Then the Recreation Opportunity Spectrum (ROS) is examined. This is followed by a description of the Limits of Acceptable Change (LAC) process for developing a Desired Future Condition (DFC) for recreation in a specific backcountry management area. The final section examines survey research in wildland recreation and its application to natural areas recreation management.

USFS Recreation Management

The following discussion about USFS recreation management prior to World War II is based on information provided by Tweed (n.d.). In its early years the Forest Service was not concerned with recreation and considered it an incidental use of Forest System lands. The initial recognition of people's need to recreate on Forest System lands was satisfied by allotments for summer residences and privately run resorts. As roads and trails were developed for administrative use, recreation pressures increased. To provide resource protection, particularly regarding fire hazard and sanitation, the Forest Service began to provide minimum facilities to meet the growing recreation demand. In 1916 the first campground with modern facilities was developed at Eagle Creek in the then Oregon National Forest. In

1917, responding to a realization that professional skill may be needed to aide in the development of facilities to satisfy the growing recreation demand, a study was commissioned to look at recreation uses on Forest System lands. Landscape architects were considered to have the skills required to conduct this study. The study identified a need for technically experienced personnel to oversee the development of facilities and plans to provide for the increasing recreation demand. In 1919 Arthur Carhart was hired as the first Landscape Engineer to aide in the planning and development of recreation resources.

During the following years many public/private ventures were completed to provide picnic and camping facilities for recreationists. It was not until 1922 that Congress authorized funding to help pay for recreation improvements. These improvements were limited to facilities to reduce the hazards of fire and improve sanitary conditions in heavily used recreation areas. In 1933, with the advent of the Civilian Conservation Corps (CCC), facility development not funded through Forest Service appropriations began to blossom.

This boom in development forced a realization that the Forest Service needed some means to coordinate the increasing development. In 1935 a Recreation and Lands division in the Washington D.C. office was created. This was a major step towards recognition of recreation as a legitimate forest system lands use competing for funding with the more traditional uses such as timber and grazing. This development phase lasted until 1942 when World War II ended the CCC

program and recreation development slowed considerably.

The post-World War II era saw gains in prosperity, leisure time, and the desire for outdoor recreation opportunities. This increase in demand was paralleled by an increase in outdoor recreation research. Initial research focused on the ecological impacts of recreation. As recreation pressure increased, the effects of crowding also became a concern.

In the 1960's, recreation research on social conditions focused on descriptions of activities, demographic visitor characteristics, and preferences. Concerns about crowding led to calls for use limitations and the establishment of social as well as ecological carrying capacities. These capacities were tied to appropriate user densities in given areas and were justified to maintain user satisfactions (Becker 1978). However, densities were found to be incomplete explanations of crowding impacts to visitor experiences. Attempts to provide social carrying capacities were confounded by the lack of a clear relationship between use densities, a descriptive factor, and its impact on the quality of the recreation experience, an evaluative factor (Manning 1994).

By the 1970's, recreation research had identified that more than just descriptions of opportunities and activities should be considered and that the experience should also be considered. As stated by Driver and Brown (1978, p. 25), "The concept of activity is inadequate for the formation of meaningful management objectives or for quantifying the products of recreation management systems."

A behavioral approach to recreation research was pursued which

focused more on the motives, preferences, and experiences than the activities. The psychological basis of this approach was that human behavior is goal-directed and aimed at providing a satisfactory experience. According to Manning (1986, p. 88), "Empirical tests, then, have generally supported a behavioral approach to recreation. People participate in recreation activities to fulfill a variety of motivations, and these motivations are identifiable empirically."

Not only do these levels of demand exist, but they are linked together in complex ways. "The relationships of concern are those that recreators perceive - based in their preferences - that help guide their recreation choices and behaviors" however "perceptions of preferred activities might not be constant; they can change with the type of group one is with, the time available, life cycle, and other factors that influence activity choice" (Driver et al. 1987, p. 208).

As more became known about visitors and the complexity of their desires, it became apparent that a variety of opportunities were necessary to provide for the diverse demands of the recreating public. Elements of this concept were found earlier in the writings of Frederick Law Olmstead Sr., Arthur Carhart, Aldo Leopold, and Robert Marshall (Driver et al. 1987).

In a 1978 paper, Driver and Brown proposed four levels of recreation opportunities which are demanded by recreationists:

1. opportunities for desired activities
2. appropriate settings in which to pursue activities
3. opportunities to realize desired experiences or psychological outcomes

4. opportunities to realize the benefits of the experiences.

These levels of demand were proposed to be hierarchical in order of difficulty to measure and achieve. These pursuits in recreation research led to the development of a new planning system for allocating recreation opportunities (Driver et al. 1987). It was called the Recreation Opportunity Spectrum.

Recreation Opportunity Spectrum

As described in Chapter I, the recreation opportunity spectrum (ROS) was conceived as a continuum of opportunities for different, quality recreation experiences. Recreation opportunities were defined as "the availability of a real choice for a user to participate in a preferred activity within a preferred setting in order to realize those satisfying experiences which are desired" (USDA FS 1982, p. 4). By providing a variety of recreation opportunities, it was assumed that people would choose an activity in a particular setting to obtain a preferred experience (Virden and Knopf 1989).

As shown in Figure 1, there are six class descriptions associated with the ROS continuum, anchored by "primitive" on one end and "urban" on the other. Each of these six classes is further characterized by the activity opportunity, setting opportunity, and experience opportunity one would expect to encounter in that class. By providing these classifications, it was supposed that recreation managers would be able to better apportion and assure a variety of opportunities for desired experiences. In concept, the apportionment of the classes was developed for a particular area based on the

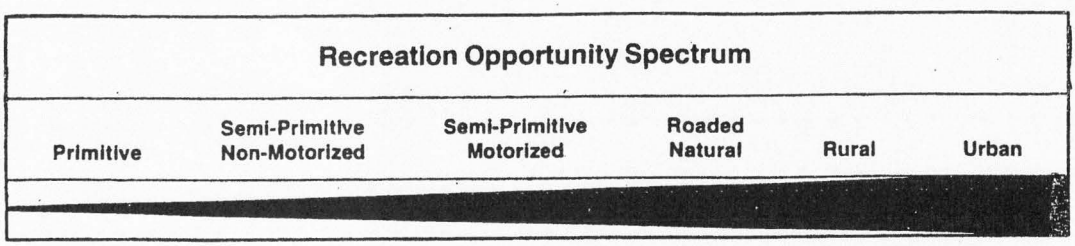

Figure 1. The ROS continuum classes. These classes may be considered to vary based on the level of perceived human influence to the three opportunity factors.

land's ecological capabilities and other integrated resource needs (USDA FS 1982).

Most pertinent for the recreation manager is the setting as this is the opportunity they can most readily influence (Driver et al. 1987). It is what visitors seek out for their activities and what managers manipulate and allocate (McCool, Stankey, and Clark 1984).

Within the ROS framework, the setting opportunity has been further divided into three principal components: the (bio)physical, social, and managerial, which affect activity opportunities and resulting experiences (Driver et al. 1987). They affect choices where preferred activities are appropriate and provide opportunities for a variety of experiences and benefits. Past research illustrates these components are useful for delineating the diversity of the classes along the primitive to urban continuum.

For purposes of inventory and allocation, criteria were established to further define each of these three setting components. These criteria were developed based on previous research regarding

recreationists' preferences, management experience, and researchers' judgments (Clark and Stankey 1979). They are described in the ROS Users Guide (USDA FS 1982) and further defined in the ROS Primer and Field Guide (USDA FS 1990).

The physical setting is defined by the size of the area, the remoteness of the area, and evidence of humans. The size of the area relates to the area's ability to provide an experience of self-sufficiency. To be classified as semiprimitive and nonmotorized, areas such as the LMA need to generally be a minimum of 2,500 acres. The remoteness of the area provides the opportunity to remove oneself from the sights and sounds of other human activities, particularly motorized activities. In the LMA this means the area is at least one half mile from motorized access. Evidence of humans concerns the perception of visitor impacts to the natural environment. This factor is important for developing the amount of change due to visitor use acceptable in a given area. To meet this criteria in semiprimitive and nonmotorized areas, there should be little noticeable modification to the natural environment. This means evidence of previous motorized use and structures should be rare and isolated.

The social setting is defined by the amount and nature of contacts with other individuals or groups. Along the continuum it relates to the degree of solitude or social interaction available. This criterion has evolved from a measure of user densities in a particular area to look at the number of social encounters and where they occur. This relates to the perception of crowding and its

impact on the perception of solitude and visitor satisfaction. As described earlier, these are difficult relationships to manage. In the LMA, the criteria call for six to fifteen visitors met per day and six or less visible from camp.

The managerial setting is defined by the type and amount of regulations placed on visitors' actions. Visitor management also includes the level of information and services provided to visitors and level of development in the area. Increased regulations, information, and facilities or site modifications can impact visitors' experiences of self-reliance, sense of challenge, and security. Based on its ROS designation as semiprimitive and nonmotorized, management in the LMA would provide subtle on-site regulation and limited information. On-site development would be rustic with facilities and site modifications restricted to acts to protect the natural environment or visitor safety and not for added comfort or convenience.

From the beginning, the ROS was conceived as a general classification and planning framework. It was also conceived as an adaptable framework whose authors recognized that "as our knowledge of the linkages among settings, activities, experiences, and satisfactions improves, our ability to fine-tune the supply sector to most efficiently meet demands of visitors will grow" (Clark and Stankey 1979, p. 7).

ROS Linkages. Since its integration into management planning in the Forest Service and the Bureau of Land Management (BLM), the ROS system has been the subject of considerable study and debate.

Studies of the relationships among activities, settings, and experiences have shown linkages in some settings, with some activities, creating varied experiences. The following studies helped investigate these relationships.

Manfredo, Driver, and Brown (1983) tested concepts of the ROS continuum regarding the relationships among activities, settings, and desired experiences. Using cluster analysis, they grouped wilderness visitors into three groups based on stated experience preferences. Experience preferences were clusters of psychological outcomes realized by the recreation experience. The assumption was that the goals of recreation management could be met by understanding the relationship between the desired psychological experience and type of setting which provides for the experience. Hence the name experience-based recreation setting management.

Their review of previous research found that groupings of visitors based on their activities were inadequate to explain the variety of experience outcomes. Activity groupings can be further defined by their preferred experiences and those experiences are also related to setting preferences. Results of their study showed support for the hypothesis that different experience preference groups vary based on preferred setting attributes.

The underlying assumption of the ROS is that people chose an activity in a particular setting to achieve a preferred experience (Virden and Knopf 1989). Virden and Knopf's literature review regarding these relationships led them to conclude that "there exists an inadequate conceptual and empirical base for speculating about the

structure of the model and the nature of the relationships which may exist" (Virden and Knopf 1989, p. 162).

In their study to explore the extent of the relationship among outdoor activities, preferred settings, and desired experiences, they concluded that "some desired experiences are more activity-dependent, while others are more setting dependent" and that "desired experiences for a given activity might be independent of environmental setting, while for other activities those same desired experiences might be setting-dependent" (Virden and Knopf 1989, p. 175). The authors cautioned that their results were likely specific to the area and activities analyzed and results could be different in other areas or circumstances.

In a further test of the ROS continuum concept, Yuan and McEwen (1989) looked at how experience preferences varied among campground settings in different ROS classifications. They concluded that some experience variables are more setting-dependent than others and may be predictors of an ROS class differentiation, but that opportunity class designation may not apply to all recreation activities and settings. They also recognized the limitations of their study which looked at campgrounds where only contiguous ROS classes in the center of the spectrum were found. Results may have varied more if ROS classifications at the ends of the continuum had been included.

As evidenced by these studies, the linkages among activities, settings, psychological outcomes, and the benefits of recreation experiences are highly complex and variable among visitors, either as individuals or in social situations. These linkages are also further

complicated by their unknown transferability across space and time. This study accepts that linkages exist between motives, actions, outcomes, and probably different areas with similar use patterns. Due to a limited number of longitudinal studies, generalizations about the affects of time on the above linkages are poorly understood.

The ROS system was developed to provide a systematic approach to recreation resource allocation on a regional or landscape scale (Driver et al. 1987). It was intially applied by the Forest Service at the forest planning level. When viewed as a zoning tool, the ROS is considered a "useful concept for assuring that a range of recreational opportunities are offered to the public" (Graefe, Kuss, and Vaske 1990, p. 89).

While the ROS designation of the LMA as a semiprimitive and nonmotorized area provides the framework within which further management prescriptions could be developed, it does not provide the finer details for how to manage the area. It also does not provide a means to deal with area specific issues as they arise. Smaller scale recreation resource allocations, or subzones for different often conflicting uses, and means to address recreation quality issues in the LMA might be better served through a newer planning process called the Limits of Acceptable Change.

Limits of Acceptable Change

As described earlier, the limits of acceptable change (LAC) process can be used to develop a desired future condition (DFC) for a particular resource area or user experience. In the words of its

authors, the LAC is "a framework for establishing acceptable and appropriate resource and social conditions in recreation settings" (Stankey et al. 1985, summary). These desirable conditions are defined by measurable objectives where

> ...the amount of change to be allowed is defined explicitly by means of quantitative standards, the appropriate management actions needed to prevent further change are identified, and procedures for monitoring and evaluating management performance are established. (Stankey et al. 1985, p. 3)

Although the LAC process defines nine specific steps, it was conceived as a dynamic, conceptual approach to planning that is ongoing. This process relies heavily on monitoring of selected indicators which provide feedback to whether management objectives are being met. The authors also recognized that the "process takes place in a political environment in which different interests with different views and values seek to achieve the goals important to them" (Stankey et al. 1985, p. 21). For this reason, and those discussed earlier, it remains important to "involve the public, both as a way of developing support for and understanding of the process" (Stankey et al. 1985, p. 21).

For practical application the process consists of four major components. The following is based on the description in Stankey et al. (1985, p. 3).

1. Specification of acceptable and achievable resource and social conditions

2. Analysis of the gap between existing and acceptable conditions

3. Identification of management actions to achieve a DFC

4. Monitoring and evaluation of management effectiveness

To aid in understanding and implementation of the process, nine interrelated steps were provided. These steps are shown in Figure 2 and should be considered general guidelines.

1. Identify Area Issues and Concerns. Issues and concerns can be developed based on existing management direction. This step helps develop management objectives based on concerns of the responsible management agency and interested publics. Management objectives are one of the keys to providing quality recreation experiences. They

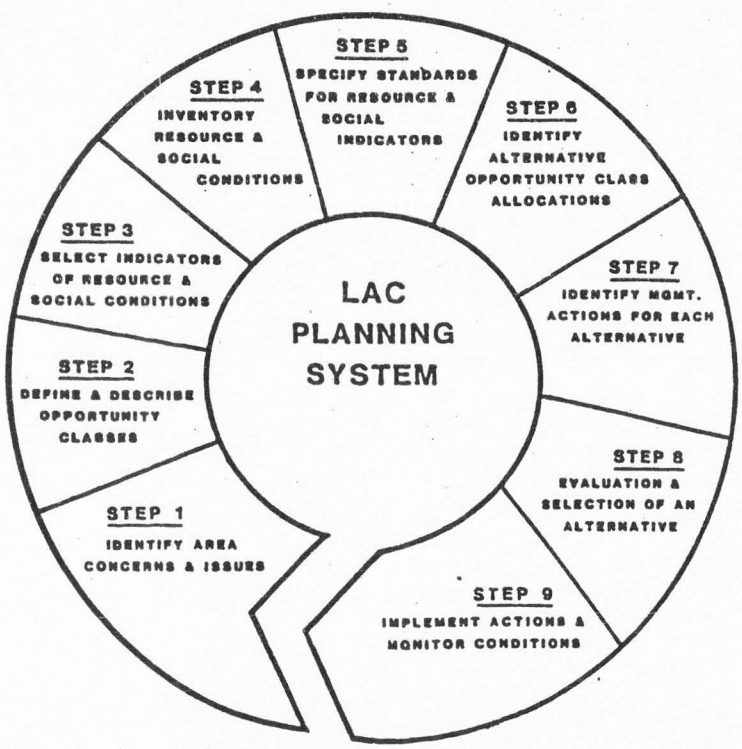

Figure 2. The LAC process. The circular configuration implies an ongoing iterative process which does not have to be implemented in a linear fashion.

typically "define the physical, biological and social conditions within an area that management seeks to create" (Marion, Cole, and Reynolds 1985, p. 10). A set of mutually agreed upon objectives are one outcome of the LAC process.

2. Define and Describe Opportunity Classes. Opportunity classes provide a range of physical, social, and managerial conditions which may be desirable in parts or all of the management area. They can be thought of as subzones of a given area which are constrained by the larger scale ROS classification. As with the larger scale ROS, these subzones can provide a diversity of experience opportunities within a single management area.

3. Select Indicators of Resource and Social Conditions. These respond to the issues and concerns, or factors, identified in step one. Indicators are the "specific elements of the ... setting that change in response to human activities" (Reed and Merigliano 1990, p. 103). They are one of the most critical steps in the LAC process. Research is still evolving to propose appropriate LAC indicators of social and biophysical conditions. Indicators should be quantifiable and provide measurable evidence of how they meet user and management concerns and objectives. To be effective they must also be within the ability of management to control or implement.

4. Inventory Existing Resource and Social Conditions. This step is driven by the previous factors identified and the indicators chosen to monitor the factors. "To be of value to managers, the inventory must be conducted in an objective and systematic fashion.

If not the data will be of limited value" (Stankey et al. 1985, p. 11).

5. Specify Standards for Resource and Social Indicators for Each Opportunity Class. Standards are established to "specify the amount of change we are willing to accept" (Reed and Merigliano 1990, p. 104). They define the "limits" of change and often prescribe management actions should those limits be exceeded. Limits are based on value judgements and it is therefore critical to have public involvement in their development. Standards should not just reflect existing conditions, but should be related to achievable management objectives.

6. Identify Alternative Opportunity Class Allocations Reflecting Area Issues and Concerns and Existing Resource and Social Conditions. This step combines the information gathered in steps 1, 2, and 4 to identify potential subzones and provide alternatives, as required by NEPA, to represent different uses and capabilities within different parts of the management area.

7. Identify Management Actions for Each Alternative. This step identifies the gap between existing conditions in step 4 and the alternatives developed in step 6 and describes what needs to be done to close the gap.

8. Evaluation and Selection of a Preferred Alternative. This step is taken by management. The decision should be made based on public input, the relative costs, and ability to implement the alternatives developed in step 7.

9. Implement Actions and Monitor Conditions. If the previous steps have been done conscientiously, with sufficient public involvement, this step should be the logical conclusion. Feedback from monitoring of the specified indicators will alert management personnel to how well standards are being met.

Validation of this process and its conceptual basis may be inferred from the development of parallel planning frameworks implemented by other recreation management entities in the United States and other countries. These concepts share a reliance on defining desirable conditions by setting management objectives, measurable indicators of how objectives are being met, and standards beyond which impacts are unacceptable (Graefe, Kuss, and Vaske 1990; Hof et al. 1994; Manning, Lime, and Hof 1996).

While the LAC process has been applied to natural area planning efforts, problems still exist. According to Roggenbuck et al. (1993, p. 188):

> Major problems in implementing the LAC process currently include the lack of knowledge about the level of concern wilderness visitors have for various aspects of the resource and social setting that potentially affect experiences (to aid in selecting indicators), and what visitors consider to be acceptable levels or standards for experience indicators.

What these authors further proposed is "to study intensively a few areas with great diversity in use and user characteristics, in order to cover the typically high range in visitor opinions about acceptable conditions" (Roggenbuck, Williams, and Watson 1993, p. 196).

As stated earlier, the search for appropriate indicators of a quality experience has been difficult and indicators may be unique to

a specific area or user type. Even more difficult to establish are standards by which indicators can be monitored. Williams et al. (1992), when considering variability of user-based social impact standards, found that while standards may be generalizable across wilderness areas, they vary depending on the context of the encounter and are highly variable among respondents.

The high variability among respondents led them to speculate that "any consistency across occasions or areas is a result of widely varying opinions among respondents converging at the same central tendency. Social condition standards appear to be more idiosyncratic than shared or normative" (Williams et al. 1992, p. 754).

So while reported arithmetic means show similar standards for indicator variables across different areas, these means mask the variability of the respondent's desires within the subject areas.

These authors state that efforts to identify subgroups with diverse desires or standards for social conditions have not been successful. Further research into the question of the diversity of respondents within areas should look at such explanatory variables as "length of stay, mode of travel, activities, location of travel within areas, and group size and composition" (Williams et al. 1992, p. 755). Survey research is one means to provide clues to what people seek in their pursuit of recreation experiences and their response to different management objectives (Stankey 1977).

Survey Research in Recreation Planning

In discussing priority research needs for further implementing the LAC process, Lucas and Stankey (1985) identified four critical

research needs. Two of these identified needs involve determining visitor perceptions of the relative importance of selected aspects of the resource and social setting, and understanding visitor evaluations of various degrees of resource impacts. The answers to these questions involve management and visitor value judgments.

The first step in the LAC process is particularly in need of objective answers to questions such as what about the area is important to visitors, how is the area being used, and what problems do visitors feel are most in need of solutions. Answers to these questions help identify what issues are critical to deal with during the rest of the planning process and the degree of concern these issues represent. Based on these factors, DFC's of the setting can be developed which respond to visitor preference for social, biophysical, and managerial conditions. Better knowledge of visitor preferences, and including them in the planning process, can lead to greater acceptability of established goals, objectives and standards when implemented (Manning 1994; Marsh 1994).

As discussed earlier, outdoor recreation policy makers need objective information if programs are to provide what visitors desire. Numerous studies indicate that managers perceptions and visitor perceptions are not always the same (Stankey 1977; Brown and Haas 1980; Manning 1986; Zube and Simcox 1987; Martin, McCool, and Lucas 1989; Anderson and Blahna 1996). This factor increases the need for objective, quantifiable data on visitor activities, perceptions, and preferences. Survey research, when developed and administered appropriately, is an instrument which can provide the

type of data needed by the planner or environmental designer.

According to Marans (1987), survey research has four characteristics: it involves the systematic collection of information, the information relates to a population and environment, the information is collected from the entire population or a sample of the population, and it is generally collected by interviews or self administered questionnaires. In addition survey research provides a formal means to collect information which is as free as possible from bias, values and predispositions of the initiator. The information gathered can be quantitative in nature, can be replicated at a later date (to provide longitudinal data for measuring trends), and should be generalizable to the population being studied.

This information can be particularly valuable during the initial planning stages as the results can sensitize planners to factors important to visitors representing an area's user groups and their reported reactions to management options. On-site surveys in particular can provide information about the visitor and data regarding their activities, perceptions, and preferences relative to the setting of interest.

Heberlein (1976) evaluated three methods for including public involvement in natural resource project and policy decisions. Survey research was determined to be a good method for obtaining *representative* views of a sample of a population. However, there are drawbacks. Surveys can be difficult to develop, expensive to implement and the knowledge of the respondent about the particular topic of concern is not known. While public hearings afford the

opportunity for two-way communication, they can be dominated by vocal minorities only representing special interests.

While these difficulties with survey research are real, they were not limiting factors for this study. Because of the applied nature of the data collection, the desire for a representative baseline sample of visitors, and the acknowledgement that this is only the start of the public involvement process, it was decided that an exit survey of visitors to the Lakes Management Area was needed. Costs were minimized by collaboration with a university. Methodologies were reviewed by expert staff, and prior knowledge of the subject was not a factor as people were asked about information concerning their recently completed trip.

Summary

Recreation research in the Forest Service has, through its recent history, developed a framework for allocating land uses (ROS) and a process (LAC) by which appropriate levels of recreation use and its resultant impacts can be identified and managed. In a study focusing on Forest Service managers' awareness and use of recreation research, the ROS and LAC were found to be the top-rated innovations in the past 20 years to manage for a diversity of recreation opportunities (Anderson and Schneider 1993).

This diversity is largely managed through allocations of a spectrum of settings which vary according to their biophysical, social, and managerial conditions. These settings provide choices to participate in a range of activities which hopefully produce satisfying experiences and multiple positive benefits. For

recreation managers to know if they are doing this, they need to understand who they are managing for and what that market wants. The difficulty is one size does not fit all and we still are not sure how many sizes there are.

While recreation managers are providing a diversity of settings, visitors to these settings may bring an even greater diversity of desires for different, possibly conflicting, experiences. The linkages between what managers provide for a setting and how visitors enjoy and benefit from that setting are only partially understood. The challenge for managers is to find meaningful limits within this diversity of demands which provide both resource protection and satisfying experiences. Establishing these limits is best accomplished by working with communities of interested publics to coproduce a desired future condition and the standards by which to measure and maintain it.

This study used a survey to develop baseline data on visitors to a previously unstudied backcountry recreation area. These data focus on attributes relevant to the existing ROS designation. The information gathered provides visitor feedback on topics of concern identified by managers of the LMA for input into step one of the LAC process.

The study not only looked at who the typical visitors were and their level of concern about social, biophysical, and managerial aspects of the LMA setting, but also the diversity within groupings of visitors and their opinions of present and preferences for future conditions. This information helps identify the need for additional

opportunity classes in the LMA, step two in the LAC process.

Analysis of the data also provides input to step three in the LAC process to select indicators which respond to levels of concern developed in step one. This study provides information on visitor perceptions of setting conditions. These can be combined with a manager's perceptions for the final selection of appropriate indicators. The baseline inventory of conditions, as called for in step four of the LAC process, provides a starting point from which to analyze different management alternatives and monitor the effectiveness of a chosen action.

Finally, with this background information, managers can begin a focused public involvement process and include individuals and issues identified by the survey. Together they can work toward defining a DFC for a place they value.

CHAPTER III

RESEARCH METHODS

This study was designed to provide information regarding visitors' desired use and perceptions of setting conditions in the LMA. The methods were developed to provide scientifically representative data which could be duplicated at a later date. Analyses focused on variables relevant to recreation management in the LMA.

This section begins with a description of the study design, the setting for the study, and how respondents were selected. These items are followed by discussion of questionnaire development and data analysis. The section concludes with information on limitations regarding study development, process, and application of the results.

Study Design

Kamas Ranger District recreation management personnel expressed a need to develop a DFC for backcountry recreation in the Lakes Management Area. Management direction in the Forest Plan (1985 p. IV-170) calls for group size limits if needed and that the ecological and social carrying capacity for the area be established. Based on existing management direction and a recreation team meeting, it was determined that baseline information was needed about recreation visitors to the LMA. This information focused on how the LMA setting was meeting existing ROS classification direction, what were the current social conditions, and perceptions of and preferences for selected setting conditions and management options.

There were also topics of concern about which managers of the LMA wanted to know how visitors to the area felt. These concerns related to the desirability of providing commercial services in the LMA, how visitors felt about fish stocking in the area, and if different zones of the LMA were providing differing or conflicting opportunities. The baseline data and information on topics of concern could be used to work with interested publics and help develop a DFC for the LMA.

In addition to knowing the desires of the typical visitors to the LMA, it is also important to know the diversity of desired conditions. If visitors to the LMA have a diversity of needs, then a variety of opportunity classes within the existing ROS designation may be required. Schomaker and Glassford (1982) proposed that the variability among backcountry visitors was similar to that of wilderness visitors. Therefore, a questionnaire was developed with content and analysis of the results based mostly on previous work with wilderness visitors (e.g. Lucas, Roggenbuck, Stankey, Watson).

The questionnaire (Appendix A) was distributed at LMA trailheads during randomly selected times. Visitors exiting the trailheads were asked to fill out and return the questionnaire on-site. In their analysis of ecological impacts to recreation sites, Shelby and Harris (1985) found that on-site methods of data collection work best when trying to determine overall desirability ratings because evaluations concerning setting attributes are developed in the contextual framework within which they occur. For the purposes of this study, ratings of the postexperience perceptions

and preferences were desired. This study was looking for ratings of perceptions and preferences provided at this setting during the visit in which the sample subjects received the questionnaire.

Setting and Sample Selection

The study setting is the Lakes Management Area (LMA) of the Kamas Ranger District (KRD) in northeastern Utah (Figure 3). This area is heavily used for nonmotorized backcountry recreation. As indicated on the map in Figure 4, there are nine main access points or trailheads used by visitors to the LMA. These access points range in elevation from 8,000 to 10,000 feet. Due to the high elevation of the study site, the majority of use is limited to a June through September season.

Most of the visitation to the LMA occurs through the Crystal Lake Trailhead (CLT). This trailhead is typically snowed-in until mid June or as late as July. Snows can also close access to this trailhead as early as September, but typically use tapers off after Labor Day while the trailhead is still accessible anyway. Winter access to the CLT is limited as the Mirror Lake Scenic Highway (MLSH) is closed by snow in October or November about 20 miles west of the trailhead. The snowpack is typically too light to support snowmobile or ski activities. Due to low use numbers and budget constraints, winter visitation information was not collected. Impacts to the LMA mainly result from the heavy summer use. Therefore a sampling period of June 19, 1994 to September 11, 1994 was selected. This period includes the heaviest use times as well as periods of lighter use prior to and after the busy midsummer season.

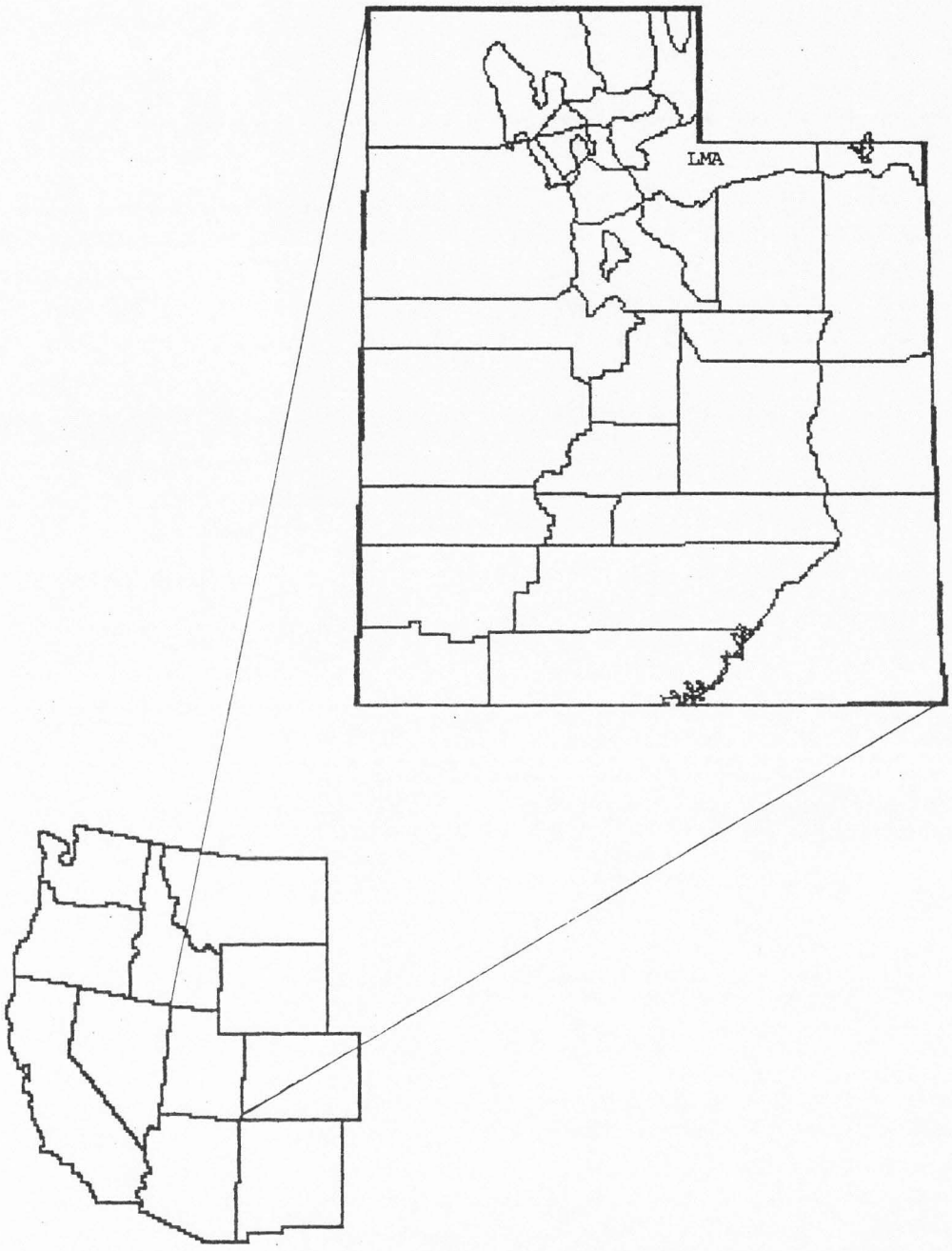

Figure 3. Regional locator map of the study area.

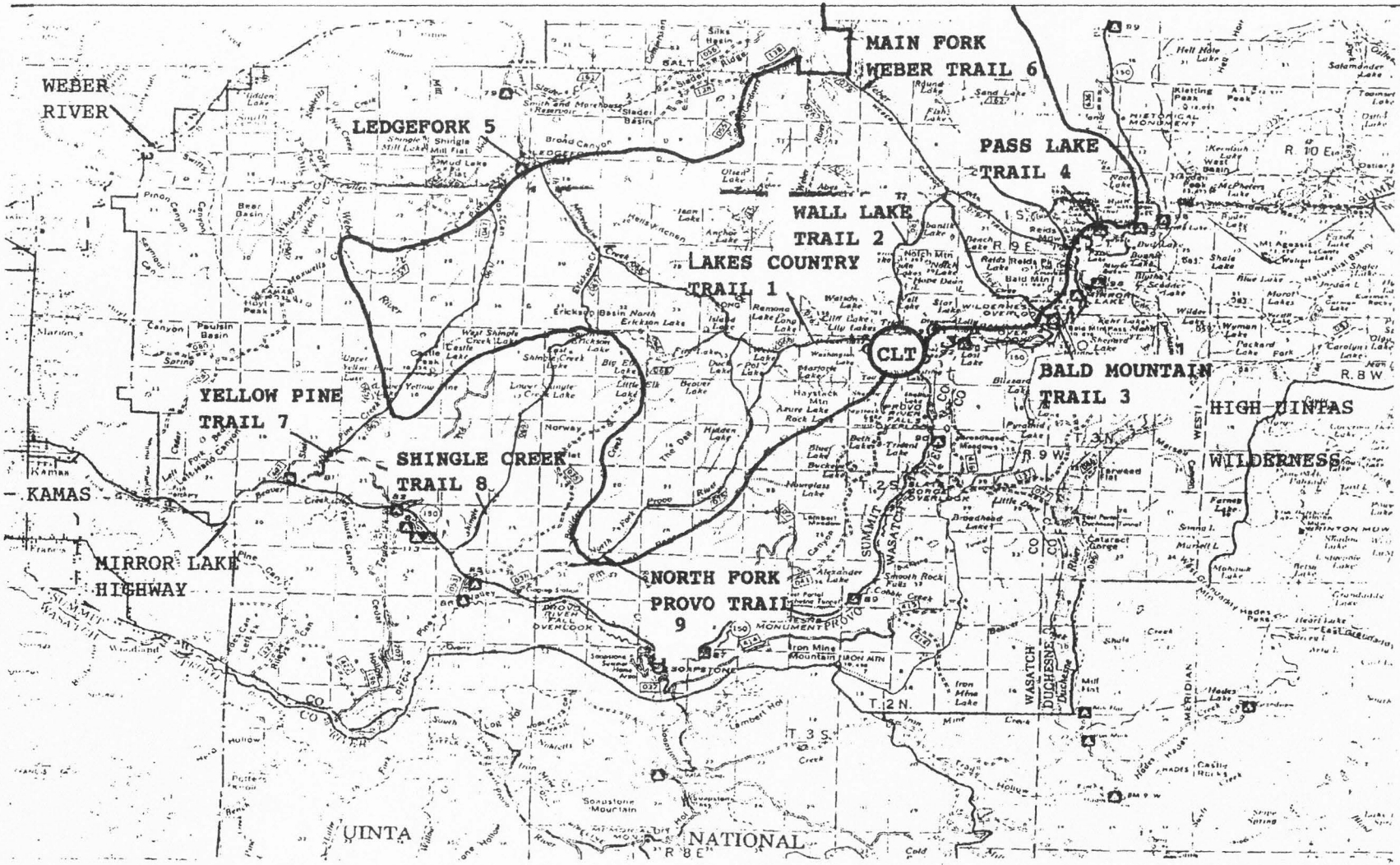

Figure 4. The LMA area boundary and nine access points and trails.

Sample Frame. One concern for recreation managers is providing for a diversity of recreation experiences to meet varied visitor desires. One aspect of this study is to investigate whether different areas of the LMA are characterized by different visitors or desired experiences. Therefore, the sample frame selected was based on the trailheads or access points where visitors enter the LMA.

The CLT (Figure 4) provides access to either the high elevation Lakes Country trail (1) or the Wall Lake trail (2). The Bald Mountain trail (3) and the Pass Lake trail (4) access higher elevation areas of the northeast portion of the LMA. The Ledgefork trail (5) and the Main Fork of the Weber River trail (6) provide lower elevation access into the more remote northern portion of the LMA. These two access points are located in the Weber River drainage. The Shingle Creek trail (7), the North Fork of the Provo River trail (8), and the Yellow Pine trail (9) access the lower elevation southeastern sections of the LMA. These access points are along the MLSH.

While exact numbers of visitors to the LMA are not known, discussion with KRD personnel indicated that the majority (80 percent) enter at the CLT. An additional 10 percent of visitors enter at the Pass Lake or Bald Mountain trailhead. The remaining 10 percent of use was considered to be equally distributed among the other five trailheads. Sampling periods at trailheads were weighted according to best estimates of the percent of use at each trailhead.

Trailheads were further clustered into three geographic areas based on the survey implementor's ability to travel efficiently

between access points. Trailheads 1 through 4 are all located at higher elevations along the Mirror Lake Scenic Highway (MLSH), so these formed one geographic unit for data collection. Trailheads 5 and 6 are located in the Weber River drainage on the north side of the LMA. This is the most remote geographic unit (about an hour and a half drive from the other sample sites). Trailheads 7 through 9 are located at the lower elevations along the MLSH and are about a half hour drive from the CLT.

Each of the three clusters of geographically defined trailheads was randomly assigned to an AM or PM sampling time frame. AM sampling periods ranged from 6 o'clock in the morning to noon; PM sampling periods ranged from noon to 6 o'clock in the evening. Within these sampling periods, three one-hour time blocks were randomly assigned to the trailheads in that geographic area.

Discussion with KRD personnel also indicated that approximately 70 percent of total use occurred on weekends or holidays. Therefore, sampling was also weighted to include all weekend and holiday periods.

Sampling Procedure. A stratified, random sampling schedule was prepared by Dave Turner, statistician at the Intermountain Research Station of the U.S. Forest Service (Appendix B). While sample locations and time frames were first clustered and then individual elements within the clusters were randomly selected, all groups of visitors exiting the access points were asked to complete a questionnaire. The person over 16 years old with the most recent birthday was asked to independently fill out the questionnaire on-

site and return it to the research assistant.

Personnel administering the questionnaire were given a standardized approach to use with potential survey participants. This was done to minimize bias due to implementation methods while maximizing respondent participation. Survey administrators were also responsible for keeping track of general numbers of visitors using the trailhead (in and out). They also kept track of the number of people refusing to participate in the survey.

Questionnaire Development

The majority of questions were taken from an Office of Management and Budget (OMB)-approved question pool provided by Dr. Alan Watson, research social scientist with the Aldo Leopold Wilderness Research Institute. Using questions from this database allows comparisons with similar studies in other areas and adds to the diversity of the database.

Additional questions were provided by Beth Ludvigson (1994), from her study at Utah State University on social and environmental aspects of dispersed recreation at Lost Valley Reservoir. Some questions were also developed in cooperation with KRD personnel so that topics of concern specific to the LMA were addressed.

Visitor Characteristics. Questions 2, 3, 23, 24, 25, 26, 27, 28, and 29 were included to provide sociodemographic data on visitor characteristics. Questions within this grouping deal with visitors' level of experience and familiarity with the LMA (2, 3); organization affiliation (23); and demographic information such as the kind of place where the visitor grew up (24), highest education level (25),

age and gender (26), current residence (27), employment status (28), and occupation (29).

To measure the variability of visitors' opinions in the LMA, selected visitor characteristics were recoded to provide independent variables for analyses looking at dependent variables representing various setting attributes and management options. These independent variables were developed based on their relevance to management of the LMA and are described later under Management Relevant Groups.

Visit Characteristics. Visit characteristics deal mainly with when, where, and how the visit occurred. Characteristics of *groups* rather than individuals are reported here. This information relies on visitor reports of their behavior on this specific trip to the LMA.

Questions 1, 4, 5, 6, 7, 8, 9, 11, 12, 16, 31, 32, and 33 provide data about visits to the LMA. Questions in this grouping deal with where, how far, and method of travel in the LMA (1, 6, 7); type and composition of groups (4, 5); was the visit day use or overnight (8); activities participated in (9); estimates of various social density factors (11, 12, 16); and type of day (31); time of day (32); and trailhead entered (33).

These characteristics were also further recoded to provide independent variables to test the diversity of desires within management relevant groups. This diversity could provide a range of differing desires for selected setting opportunities.

Visitor Perceptions. For the purposes of this study, perception relates to the evaluations recorded by visitors filling

out the questionnaire. How they evaluate the setting conditions is influenced by numerous factors. Some factors are brought by the individual visitor, some may be formed by group interaction, and some may be reactions to external factors.

In this study, perceptions of *setting* conditions were measured in different ways. Perceptions of *social conditions* were defined by the level of satisfaction (10), how crowded the visitor felt (13), and how social conditions met their expectations (20). These were measured on a five-point Likert-type interval scale.

Perceptions of how *biophysical conditions* met visitor expectations were also measured on a five-point Likert scale. In addition, visitors were asked if they noticed selected resource impacts. If impacts were noticed, they were rated on a three-point scale to determine what degree the noticed impacts detracted from the visit (17).

Results of visitor perceptions are presented based on whether they reflect perceptions of social or biophysical setting conditions. Perceptions of social and biophysical conditions were also used as dependent variables to test the degree of diversity in evaluations based on management relevant groups described later in this chapter.

Factors which may affect reports of perception include visitor characteristics such as use history, type of organization one is a member of, and proximity to urban areas. Visit characteristics such as the size of the group one is traveling with, the type of group, and whether one is day hiking or staying overnight may also influence perceptions. Measurement of perceptions can also be affected by the

kind and organization of the survey instrument as well as the timing of when it is administered.

Visitor Preferences. In this study, preferences refer to visitors' expressed desire for selected setting conditions or management options. These conditions focused on social and managerial factors of the setting.

As described earlier, managers and visitor perceptions and preferences are not always similar. In a study of preference differences between landscape architects and the public, it was concluded that "substantial gains can be made in matching planning with the public's expectations by simply asking members of the relevant public what they do and do not like about landscapes" (Buhyoff et al. 1978, p. 261). Information on the desirability of selected setting conditions has been collected with this in mind.

Questions 14, 15, 18, 19, 21, and 22 relate to preferences for selected setting conditions in the LMA. Preferences deal with desired conditions for social attributes (15, 22), setting attributes (18) and management options (14, 19, 21). Responses to these questions were also used to provide the dependent variable for further analysis of the diversity of opinions within management relevant groupings.

Data Analysis

After questionnaire development, a codebook was created assigning numeric values to question responses. The numeric values of the responses were entered into SPSS Inc. (1994) software for analysis. Frequency distributions and descriptive statistics were

generated on the raw data. Mistakes made during data entry were identified and corrected. The cleaned data were then used for the reported results.

Three levels of data values are presented: categorical, ordered, and numeric. Different summary reports and statistical tests were required for the different data levels (Siegel and Morgan 1995).

Categorical (nominal) data are represented by numbers, but these numbers are labels only. Results of analysis of these data are reported as frequencies or percentages. Ordered (ordinal) data have an implied relationship between the order of the numbers, but numbers still represent labels and do not have scaled relationships between them. These data are described by frequencies or percentages and a median or mode to represent central tendency. Interval data have distinct numerical relationships between their numbers. This allows calculation of a mean or average as well as percentages and medians. Where results are influenced by extreme values (outliers), medians are also reported.

Analysis of the results of the survey is directed toward providing applicable, objective information with a focus on setting conditions relevant for planning and management. Baseline information was developed using the appropriate descriptive statistics depending on the data level. Inferential statistics were used to evaluate differences between subgroups of visitors sampled and to make inferences regarding the entire population of LMA visitors for the summer of 1994.

The analysis of relationships focused on topics of concern and intragroup variability. When the dependent variable was categorical data, relationships were analyzed using crosstabulation with subgroup independence measured using the chi-square test.

When the dependent variable was interval data and the independent variable contained only two categories, the independent t-test was used. Relationships were considered significant when p=.05 or less.

One-way analysis of variance (ANOVA) was used where the dependent variable was interval data and there were more than two categories of independent variables. When significant relationships were found, the Student-Newman-Keuls post hoc multiple comparison test was used to determine which variables were significantly different.

Development of the dependent and independent variables was based on the needs expressed by recreation managers and researchers. Topics of concern to the district were analyzed from the perspective of the typical visitor or visit and subsets of groupings of respondents based on visitor or visit characteristics. Relationships are considered significant only when the probability is 0.05 or less.

Topics of Concern

According to Blahna and Yonts-Shepard (1989), the objective identification of public issues is a critical step in the initial phase of planning. It is also step one in the LAC process. In this study, initial concerns were developed from management direction in the Forest Plan and discussions with KRD recreation management

personnel. These concerns were incorporated into survey design. They were first analyzed to determine baseline perceptions and preferences of the typical visitor to the LMA. Further analysis used these topics as dependent variables to determine the diversity of responses based on management relevant groupings of visitors.

Social Conditions. The Forest Plan calls for the establishment of an ecological and social carrying capacity in the LMA. As described earlier, carrying capacity has been difficult to determine and present management looks toward a description of the desired conditions rather than thresholds described by numbers of users. The focus of this study is the social conditions in the LMA. Ecological issues are analyzed according to visitors' perception of biophysical conditions. The issue of social carrying capacity is analyzed by looking at social conditions related to ROS defined factors and previous research.

Based on the original ROS designations, social conditions were measured by user densities in a particular area. Ideal densities were specified for each of the six ROS designated classes. Studies have since shown that density is an incomplete measure for social conditions. More recent ROS descriptions look at social encounters as being descriptive of social conditions. Continuing research is still searching for meaningful ways to define social conditions and how they relate to quality recreation experiences.

Visitor satisfaction has been one of the components used to measure the outcome or quality of the recreation experience (Becker 1978, More and Buhyoff 1979). As described by More and Buhyoff, in

general, the amount of satisfaction relates to the degree with which visitors' expectations matched their perception of the actual experience. According to Manning (1986, p. 7) "Satisfaction may depend on visitors and their perceptions of an area as much as, or more than, on the characteristics of the area itself". This is one point where the views of managers and visitors may diverge. If managers are to provide a diversity of quality recreation experiences, it is the perception of the visitors which must be responded to and linked to managers' knowledge of the resource base.

Feeling crowded is one element usually considered an impact to ratings of satisfaction. As contrasted with use densities, crowding is a value judgment concerning when the density of others negatively impacts one's experience. The perception of being crowded is affected by individual and situational factors (Manning 1986). This variable is influenced by numerous factors, such as location of the encounter (trails, trailheads, or campsites), past use experience, type of group one is with, method of travel, size of group, intragroup relationships, whether the visit is for day use or overnight, and the experience one is seeking. It can also be influenced by physical variables such as topography of the area and evidence of previous use or misuse (Becker 1978; Schreyer and Roggenbuck 1978; Bultena et al. 1981; Gramann 1982; Shelby et al. 1983; Graefe, Vaske, and Kuss 1984; Stankey and McCool 1984; Manning 1986).

In a review of research on crowding, Gramann concluded that "the existence of multiple goals and satisfactions, each with

different degrees of density tolerance, makes the relationship between density and overall satisfaction extremely complex" (1982, p. 116). Absher and Lee in their study on social density and the variables which affect perceived crowding concluded, "Crowding responses are more sensitive to the differences in motives than to intensity of use itself" (1981, p. 242).

Bultena et al. (1981) tried to isolate some of the factors important to crowding. Their study found that respondents most often felt crowded when the expected number of contacts for their experience was exceeded. They also found that preferences for number of contacts had an effect on reported crowding. These effects were greater than those for reported frequencies of backcountry contacts. They also reported essentially no relationship between degree of crowding and level of satisfaction. The importance of expectations and preferred numbers of contacts to perceived crowding were also found in an analysis of a compilation of studies reviewed by Shelby et al. (1983).

What is considered an "acceptable" number of encounters is a moving target. Longitudinal studies related to crowding have found that perceived crowding decreased in an area where use levels had actually increased (Shelby, Vaske, and Heberlein 1989). One possible explanation for this finding is that as new visitors come to an area they have limited concepts of what use levels to expect and may be willing to accept densities they find as normal. Therefore, what is rated normal can change constantly. As described in Manning (1986, p. 64), this has been termed the "floating baseline" concept where

"first time users tend to accept what they find as normal, whereas repeat visitors evaluate what they find against past experience."

Kuentzel and Heberlein (1992) looked at how visitors adapt to increases in social encounters within the same setting. Their study suggests that visitors may be more likely to change their behaviors to cope with feeling crowded than to change their ratings of how crowded they felt. Visitors who felt most crowded coped by moving to areas they perceived as being less crowded. In this case, there were not differences in perceived crowding based on past experience alone.

Regardless of the complexity in measuring social carrying capacity and the complication of measuring both the descriptive and evaluative attributes of crowding, Shelby and Heberlein (1986) developed a scale which provides useful preliminary data on the perception of being crowded. As described in Shelby, Vaske, and Heberlein (1989), this scale is a unidimensional measure of the perception of being crowded. They used a nine-point Likert-type scale anchored by "not at all crowded" at one end and "extremely crowded" at the other. Their comparative analysis of this scale indicated that it was sensitive to differences within and across settings.

They further proposed that analysis of responses to the scale can be used to establish a preliminary carrying capacity. If fewer than 35 percent of visitors report feeling crowded, then there are not problems and crowding perceptions are low. If ratings are in the 35 percent to 50 percent range, crowding perceptions are about normal. Ratings of being crowded by 50 to 65 percent of visitors

indicate that the setting may be nearing its capacity. Ratings above 65 percent indicate an existing problem.

For this study, social conditions were measured based on visitors' perceptions and preferences. First, visitors were asked to give a rating of how satisfied they felt. This was done with a five-point scale anchored by "very unsatisfied" to "very satisfied."

Visitors were also asked how the numbers of people, large groups, or livestock seen met their expectations. Ratings were on a five-point scale anchored by "less than expected" to "more than expected."

Crowding was measured in two parts. First, visitors were asked if they felt crowded or not. If they felt crowded, they were given a five-point interval scale to rate how crowded they felt. This scale was anchored by "slightly crowded" to "extremely crowded." While this scale does not exactly match the one proposed by Shelby and Heberlein, it has the same components.

Crosstabulation then was used to investigate relationships between the ratings of perceived satisfaction, crowding, visitor expectations, and preferences for the number of people they would like to meet in the future. Satisfaction ratings were recoded into two new categories. Respondents with a rating of three or less were recoded as being "unsatisfied." Respondents with a rating of four or greater were recoded as "satisfied."

Ratings of how selected aspects of the visit met respondent expectations were recoded into three new categories. Ratings of less than three were recoded as "saw less than expected." Ratings of three

were recoded as "saw about the expected number." Ratings greater than three were recoded as "saw more than expected."

Feeling crowded was recoded based on whether the respondent answered no to feeling crowded, "not crowded," or rated the perception of crowding as a three or less, "slightly crowded." Finally, ratings of greater than three were recoded to "extremely crowded."

Preferences for social conditions were measured by asking visitors, based on this visit and the current use level, to rate on a five-point scale how many people they would like to meet. The scale was anchored by "many more people" to "a lot less people." For further analysis this scale was also recoded. Response ratings of less than three were recoded as "meet more people." Ratings of three were recoded as "meet the same number of people." Ratings above three were recoded as "meet less people." These recoded categories were then crosstabulated to look for relationships between preferences for use levels and the sense of being crowded or satisfied.

Commercial Services. Legal uses of National Forest System lands for commercial purposes require a special use permit. Outfitter and guide (O&G) groups often participate with land management agencies to provide these services. Forest Plan criteria require that before outfitter and guide permits are issued, there should be a demonstrated public need for the service.

Kamas Ranger district personnel wanted to determine if there was a need for O&G services based on the desires of current visitors to the LMA. Visitor preference for six different types of commercial

services were measured on a five-point scale. This scale ranged from a rating of "not at all important" to "very important."

Preferences were first determined by calculations of mean values for the typical visitors. They were also used as dependent variables to investigate the diversity of opinions on desirability of these services by management relevant grouping of visitors.

Fish Stocking. Ecosystem management focuses on the sustainabilty of all forest resources. Concerns have been raised that the stocking of fish damages the integrity of natural systems. Some studies show that stocking causes changes in the diversity and abundance of other aquatic species (Luecke 1990; Rinne and Janisch 1995). This has been a particular concern in Wilderness where natural processes are supposed to dominate (Carter 1997).

The stocking of fish can also change recreation patterns by drawing increased numbers of visitors to stocked lakes. This has the potential to increase biophysical impacts at those areas and may increase conflicts between visitors.

However, the stocking of lakes is not under the authority of federal land management agencies, but is held by state wildlife management agencies. These agencies often have a different mission than federal land management agencies whose responsibility in these matters lies with managing the land base.

Three questions related to fish stocking were included with questions about setting attributes relating to management options. Visitors were asked to rate the desirability of a natural fishery where there is no stocking and fishless lakes are left fishless,

stocking with native fish, or stocking with nonnative fish. Responses were rated on a five-point scale anchored by "very undesirable" and "very desirable."

Zones or Opportunity Classes. While the ROS was conceived as a means to provide different zones or areas for different or a variety of opportunities, it was developed to plan at a large scale. As recreation use increases, a greater diversity for desired opportunities also increases. Sometimes these varied desires conflict, possibly decreasing some groups' perception about the quality of their experience. Kamas Ranger district personnel were interest in finding out how the existing setting is meeting the desires of current visitors and if different areas are providing different opportunities.

Step 2 in the LAC process is to determine, based on identified issues or concerns, if different zones of an area require different opportunities based on desired biophysical, social, or managerial conditions. This study looked at the acceptability and need for a variety of opportunity classes in two ways.

First a 26-item list of site attributes and potential management options was provided. Respondents to the survey rated their preference for these attributes on a five-point scale anchored by "very undesirable" to "very desirable." This provides information on the "typical" visitor.

In addition, as described earlier, the sample frame focused on different trailheads that access the LMA. These trailheads were recoded to a new independent variable to represent zones with the

potential for different opportunities. This variable is described in the next section about management relevant groups.

Further analysis used selected social, biophysical, and managerial conditions, and what are called management relevant groups to look for a diversity of perceptions and preferences beyond those of the "typical" visitor or visit. Patterns based on this analysis may indicate different setting needs for different subgroups of visitors. These varied needs could be addressed by providing different opportunity classes within the LMA.

Management Relevant Groups

The focus of the baseline portion of this study was the typical visitor and visit. Management relevant groups were created to further investigate the variability in perceptions of or preferences for setting attributes and management options in the LMA. These groupings of respondents are important variables as they may represent visitors with divergent desires and levels of concern for setting conditions. Williams et al. (1992) suggested that a major issue for future research is investigating the high variability between subgroups of visitors. They noted that research to this point has not been successful in defining subgroups.

Groupings of visitor and visit characteristics were selected based on those used in previous research. Categories within the groups were created to provide sufficient responses in each category and be able to compare these subgroups to other relevant studies. Important variables to study for management purposes include activities, amount and timing of use, method of travel, zones of

travel, group size and composition, length of stay, and urban residence (Roggenbuck and Lucas 1987; Watson 1989; Kuss, Graefe, and Vaske 1990; Williams et al. 1992; Ewert and Hood 1995).

The following discussion provides a brief description of the selected variable subcategories, why they were chosen, and how they were developed. Three commonly studied visitor characteristics and five visit characteristics were further analyzed past use experience, the type of organization the visitor was affiliated with, current area of residence, area of travel, group size, group type, day or overnight use, and weekday or weekend travel.

Past-Use Experience. Past-use experience has been considered an important element in studying visitor perceptions and experiences in recreation settings. The number of previous visits has been one element in most constructs developed to measure past-use experience. Relationships between number of previous visits and perception of and preferences for selected setting attributes have been established. According to Schreyer and Bealieu (1986, p. 237) "Research has shown amount of previous experience to be linked to differences across visitors participating in the same activity in the same environment."

Schreyer and Lime (1984) looked at how different types as well as amounts of previous experience influenced visitors perceptions and behaviors. They noted that past-use experience levels were a complex construct where the number of previous visits did not fully represent the underlying differences between visitors, but that experience in other settings was also a factor. They found that persons with experience in certain activities, but no previous experience in a

particular setting, were more like persons in that setting who had previous experience.

To get at the underlying differences, a more complex measure of use history was proposed (Schreyer, Lime, and Williams 1984). Experience use history (EUH) combined variables which represent the amount, type, and diversity of information a recreation pursuit involves. This information provides insight into the cognitive state of the individual which is proposed to influence the behavior, perceptions, and psychological rewards or benefits within the given activity or setting. Using this measure, significant differences in their behaviors, preferences, perceptions, and attitudes toward management strategies were found between visitors with different EUHs in the same setting.

Questions have been raised about the appropriateness of combining different variables into a unidimensional measure of use experience (Watson and Niccolucci 1992). When combined in this manner, the relevance of individual variables is lost. For the purposes of this analysis, only one dimension of past use was analyzed, the number of previous visits.

The number of previous visits was combined into four subgroups: respondents with no (0) previous visits, "1-2" previous visits, "3-5" previous visits, and six or more (6+) previous visits. These subgroups were chosen to represent different levels of information or cognitive awareness within the sample set and to match subgroups chosen in other related studies.

Why do we care about past experience? Persons with different

levels of experience may have different needs and desires. First-time users rely more on information provided to them about the chosen setting, or where to choose a setting for their desired activity. Long-time users may have increased perceptions of social and biophysical impacts and be better able to recognize and report changes over time (Watson and Cronn 1994). By their choice to recreate in a given setting, they may be telling us that the setting is satisfying a need or desire. If a setting is dominated by first-time or less experienced users, it may mean the setting no longer meets the needs of more experienced visitors, who may be displaced.

Organization Affiliation. Previous studies have identified differences in frequencies of memberships to selected types of groups. Generally, between 20 to 35 percent of visitors to natural areas are members of conservation groups, with about 33 to 50 percent of these group members belonging to environmental organizations (Roggenbuck and Watson 1988). In their study on trends in wilderness use, Cole, Watson, and Roggenbuck (1995) found that overnight visitors were more likely to be members of some organized group than day users and that membership in organizations had declined since 1972.

Question 23 had respondents identify if they belonged to an organized group and if so what type of group. Original selections were "do not belong," "wilderness/environmental," "sportsman/fishing," "youth organizations," "other recreation," and "other conservation." Respondents were allowed to choose all that apply.

Selections were recoded to form four categories of group affiliation: nonmembers, environmental groups, sportsperson groups, and youth organizations. Those who checked "do not belong" were left in that category. The "environmental" group was created by combining respondents who selected "environmental" *and* those who selected both "environmental" and "other recreation" or "other conservation." The "sportsperson" group was created by including respondents who selected "sportsman/fishing" *and* those who selected both "sportsman/fishing" and either "other recreation" or "other conservation." "Youth organizations" was created similar to "environmental" and "sportsperson." Respondents who selected only "other recreation" or "other conservation" and did not specify on the questionnaire a name of the organization were eliminated from the analysis. Information about if and what types of organizations individuals belong to can help focus where or to whom managers need to provide educational materials.

Area of Current Residence. Demographic studies have noted certain trends related to place of residence and whether the visitor was from an urban or rural area (Roggenbuck and Watson 1988). Ewert and Hood (1995) suggested that there are differences between urban and rural residents regarding their desired activities. They also suggested, when looking at the effect of an area being close to or far from wilderness areas, that further research was needed to explain the effect of place of residence and group size.

Three categories of place of residence were developed for further study. Respondents were regrouped, based on reported zip

codes, as currently residing in either the Wasatch Front area (n=172), Other Utah residents (n=36), or Other US residents (n=22).

"Wasatch Front" residents were those living in one of the five counties that make up the most urban areas of Utah. "Other Utah" respondents were all other visitors from Utah, and generally would represent more rural respondents. "Other US" were not from Utah.

This grouping was used as the independent variable to look for differences in perceptions and preferences. These categories help inform managers, in general, where their visitors are coming from and where they may want to concentrate dispersal of educational and other information. This information also helps further define whether the LMA should be considered or looked at as an urban-proximate area. Researchers have speculated that visitors to urban-proximate areas will have different characteristics, needs and desires, and impacts to the resource (Ewert 1989, 1995).

Wilderness area users have been characterized as largely residing in the state the wilderness is in. Urban residents use of wilderness areas occurs in roughly the same proportions as they occur in the region's population, 74 percent in their report (Roggenbuck and Lucas 1987). In their review of other wilderness studies, Desolation Wilderness had the highest urban visitor rating for year-round users at 93 percent. In 1990, Utah's population was 85 percent urban (BEBR 1996).

Finally, the identification of the LMA as an urban-proximate natural area may improve the comparability of study results with other areas having a close, urban influence. Cole, Watson, and

Roggenbuck (1995) have suggested that trends in wilderness uses may be similar for heavily used mountainous areas close to large urban areas with universities.

Area of Travel. While the LMA has one classification under the ROS system, people who chose this setting may be seeking a variety of experiences. Where these desires are incompatible with other users, conflict may arise. The choice of which part of the LMA to visit may reflect different perceived opportunities in those settings.

Use patterns typically vary within wilderness areas. Popular entry points, particularly those near urban populations, can account for a disproportionate amount of the use to an area. Special attractions such as lakes can also concentrate use (Roggenbuck and Lucas 1987). Zones are often differentiated by the kind and intensity of management present. These levels of management intensity are often in response to a diversity of social or biophysical conditions in an area (Hass et al. 1987).

Respondents from each of the nine trailheads surveyed have been recombined into four different geographic areas or zones for further analysis (Figure 5). Each category represents a different zone of travel. These were combined based on considerations of the locations of the trailheads, the topographic separation from other locations, and the need for an adequate number of responses in each category. The four zones are the Lakes Country (n=96), Wall Lake (n=84), Bald Mountain (n=38) and Weber/N. Fork (n=12).

The "Lakes Country" zone starts from the CLT and travels west. There are numerous small lakes within this backcountry area.

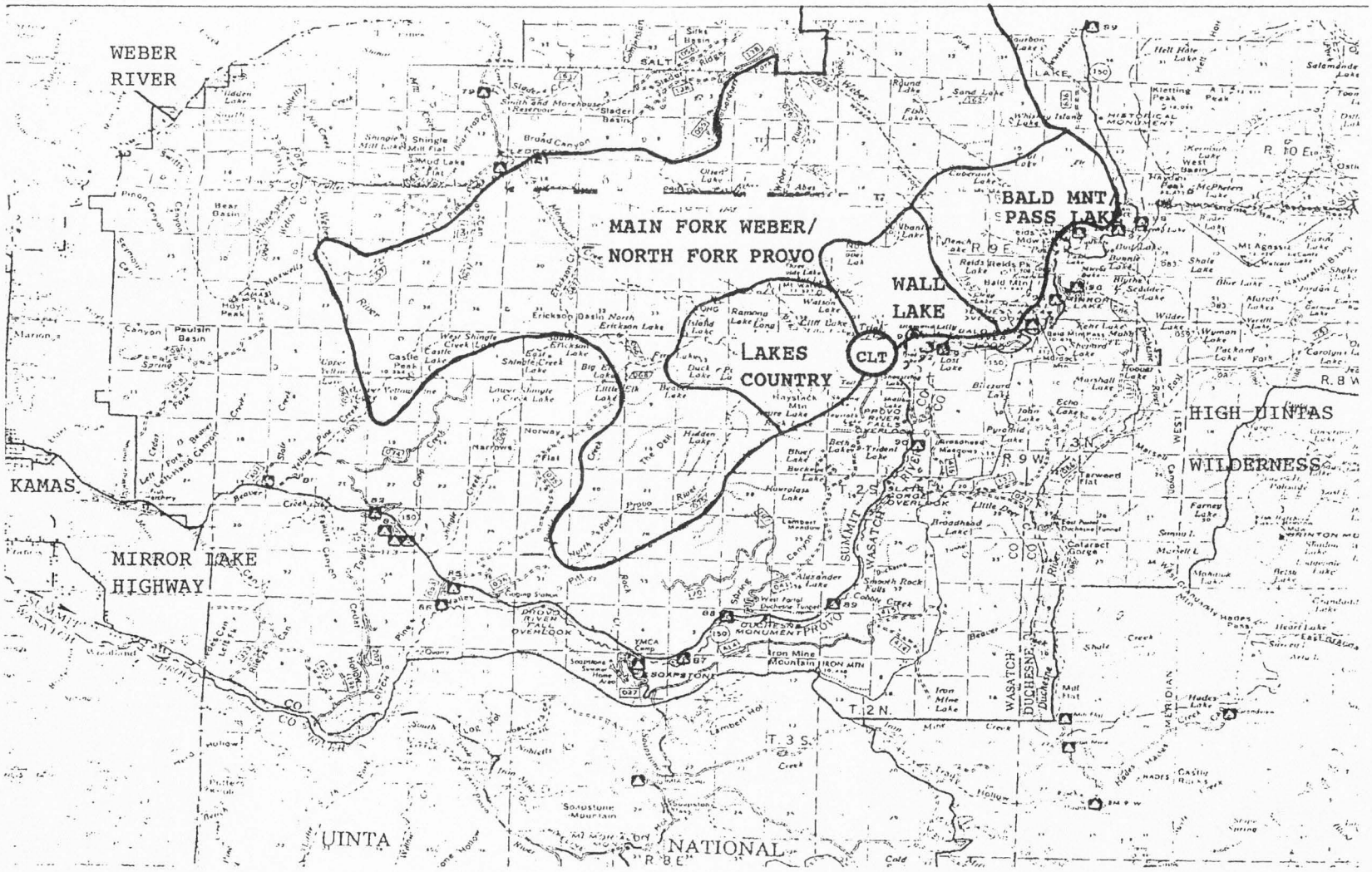

Figure 5. The LMA area boundary and the four geographic areas of travel.

Principal destinations are within three miles of the trailhead. Gains in elevation are minimal as the trailhead starts at the 10,000 foot elevation.

"Wall Lake" also starts at the CLT. From there, visitors generally travel north approximately 0.75 miles to Wall Lake.

"Bald Mountain" includes visitors from the Bald Mountain and Pass Lake trailheads. In elevation, Bald Mountain is the highest trailhead. This trailhead is popular with bus tours which stop here to allow passengers to take the short but strenuous hike up Bald Mountain. Pass Lake trailhead is further east along the Mirror Lake Highway from Bald Mountain. Visitors here access the more remote areas of the LMA. There is a boy scout camp located near this trailhead.

The "Weber/N. Fork" zone is a combination of five trailheads. These are all located at lower elevations and require relatively strenuous travel to access the LMA. Two of the trailheads are located on the northern part of the LMA and are accessed from the Weber River drainage. The other three trailheads are along the Mirror Lake Scenic Highway at least a half hour drive west of the CLT.

Group Size. The number of people in a group has implications for both impacts to the social and biophysical environment. People in smaller groups may be more sensitive to crowding than those in large groups (Graefe, Kuss, and Vaske 1990). Large groups, particularly when camping, impact a larger area of the chosen site. What constitutes a "large" group is hard to specify. Is it six

people or seven or 25? How do animals factor into the equation?

Group size limits have been a popular management tool when areas are overused or there is a perception of a threat to solitude. These limitations have been used to protect values in wilderness areas. The Forest Plan calls for group size limits in the LMA, if needed.

However, groups sizes have been declining. Groups of wilderness visitors average about four to five people, with groups of two to four people making up 50 to 75 percent of all visitors. Groups with two people are the most common. Lone individuals make up less than 10 percent of visitors as do groups of 10 or more (Roggenbuck and Lucas 1987).

The number of people in a group was recoded into four subgroups for this study. The new variable is called group size. People traveling alone (1), people in pairs (2), groups of three-six (3-6), and groups with more than six people (6+) are the subgroups making up this variable. These groupings provide a relatively normal statistical distribution and are used as independent variables to investigate differences between subgroups in perceptions and preferences related to topics of concern.

Group Type. This variable has typically be described based on relationships between individuals in the group. Groups of families or families and friends make up a majority of visitors to wilderness areas, with groups of families often accounting for 40 percent of all groups. This is typically followed by groups of friends, members of organized clubs (10 percent), and lone individuals (10 percent)

(Roggenbuck and Lucas 1987).

The type of group one was traveling with was recoded into a new variable, group type, by creating new categories of respondents. These new categories are family, friends, friends and family, alone, and with a club.

The original question in the survey did not have a category for family and friends. However, respondents were allowed to choose more than one category. This variable was created by combining respondents who checked both the friends category and the family category as friends and family. Respondents who checked only friends or only family were left in those same categories. Visitors choosing "other" (n=4) were omitted. The recoding was done to be more compatible with previous studies.

Type of Use. Use patterns, desired experience, and other factors may differ for day users versus overnight users. They certainly bring with them different setting needs for their activities. In their study of longitudinal trends in three wilderness areas, Cole, Watson, and Roggenbuck (1995) concluded that day users are often different than overnight visitors and that day use is increasing. Based on studies in Wilderness areas, campers are more likely to be horse users, and travel in larger groups (Roggenbuck and Lucas 1987).

Managers judge day users to be a larger part of current management problems than overnight visitors, yet they are rarely targeted for management actions (Manning et al. 1996). Managers need to be aware of the differential impact regulations may have.

Type of Day. Based on use estimates developed by LMA management staff during establishment of the sampling frame, more visitors were expected on weekends and holidays than during weekdays. This pattern is typical of Wilderness visits, particularly areas close to urban centers (Roggenbuck and Lucas 1987). In his earlier study, Lucas (1980) found that somewhere between 66 and 75 percent of all visits occur on weekends and holidays.

How does this affect the visitors based on their reported perceptions and preferences? This factor gives a temporal element to the analysis.

These management relevant groups provide the independent variable for additional bivariate analyses of setting opportunities. Selected social and biophysical factors, setting attributes, and management options provide the dependent variables. Differences in means between categories within each subgroup were calculated using ANOVA or independent t-tests depending on the number of independent variables.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to provide the Kamas Ranger District with selected information on visitors to the LMA. This section presents the results of analysis focused on visitors and, based on a recently concluded visit, their concerns about present and future conditions there.

Baseline conditions are provided regarding visitor and visit characteristics, perceptions, and preferences. The discussion focuses on relationships between results of this study and other similar studies. Implications of these baseline conditions to topics of concern for the LMA are also discussed. Results of the within-group variability regarding topics of concern are presented. The results of this information can aid in developing a desired future condition for backcountry recreation.

Description of the Data Set

This data set represents a stratified random sample of visitors to the LMA. Actual population numbers for the areas are not known, but were estimated to be about 4,000 visitors during the sample period. The data set is assumed to be a representative sample of the population of spring, summer, and fall recreation visitors to the LMA. Application of the results of this survey to other high elevation, backcountry recreation areas and visitors should be done with caution.

Of the total 298 visitors approached, 240 returned usable

surveys, for a response rate of 81%. There were 261 questionnaires handed out and 240 returned. During early implementation of the survey there was concern about refusals due to visitors being in a hurry to get home. To minimize refusals, visitors who were in a hurry were allowed to take the questionnaire with them and either fill it out and drop it off at the KRD District office on their way home or mail it in. Of the 31 questionnaires handed out in this manner, 10 were either dropped off or mailed in (32 percent response rate). Review of trailhead logs also indicate there were 37 refusals with no surveys handed out. Reasons recorded for these refusals range from too big of a hurry, language barrier, or the questionnaire was too long or technical.

Visitor Characteristics

Visitor characteristic items provide demographic information about the individual filling out the questionnaire. This baseline information identifies who the visitors to the LMA are. It can be used to track trends or changes in recreation visitors as demographics on the larger scale change. This section presents the baseline data collected.

Age and Gender. The ages of survey respondents in the LMA ranged from 14 to 73 years old. The average age for visitors was 37.6 years with the most frequent age being 41 years old. This is similar to the mean age of 38 years described for 1990 visitors to Desolation Wilderness (Cole, Watson, and Roggenbuck 1995). Women accounted for 28 percent of the visitors (N=230). Figure 6 illustrates the distribution of age categories by gender.

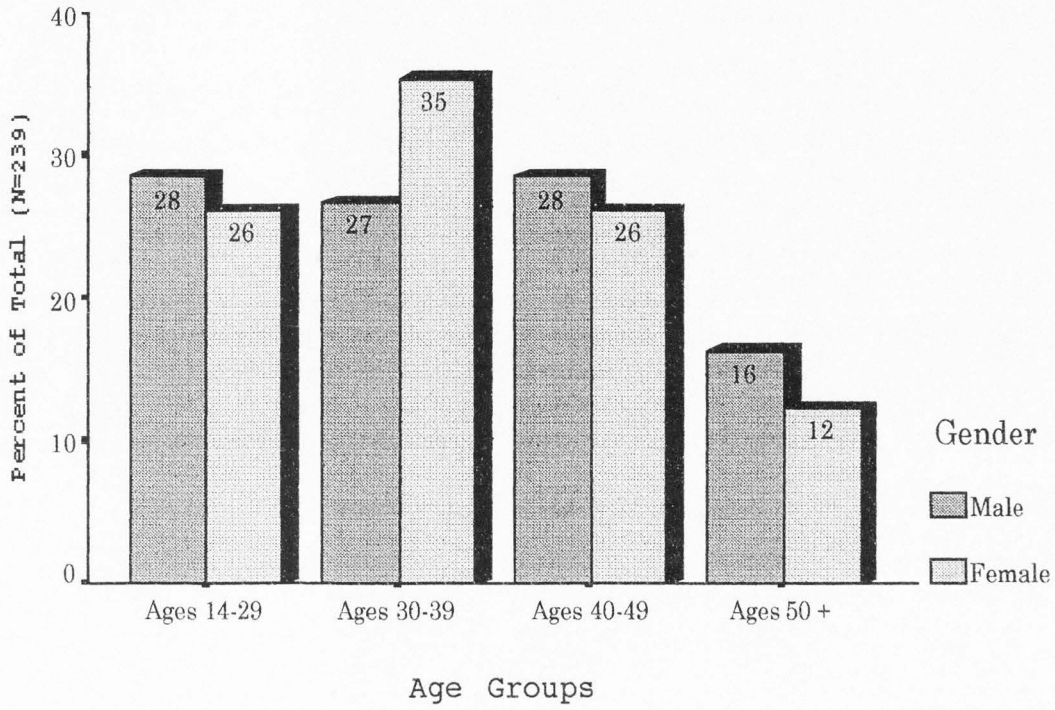

Figure 6. Percentage distribution of males and females by age group.

Education Levels. Approximately 89 percent of respondents (n=233) were college graduates and 34 percent have done some level of postgraduate work. Compared to information in Watson and Niccolucci (1992), this is a high education level. Previous studies of Wilderness visitors have reported percentages of college graduates in the 40 percent to 50 percent range. Cole, Watson, and Niccolucci (1995) reported an approximately 50 percent rate of postgraduate work for 1990 visitors to the Desolation Wilderness and an approximately

67 percent college graduate rate.

The high education level of the visitors to the LMA indicates that visitors should be able to understand complex interpretation and management rationales. This has positive implications for managers both to provide information about what opportunities are available and to further inform these individuals about complex management issues. With two-way communication established, visitors and Forest Service personnel would have an opportunity to learn what is important to each other about the LMA. Information and education strategies may be prefered to modify behaivor or enhance expectations rather than regulations.

Organization Affiliation. Groups were delineated based on the following categories: do not belong, wilderness/environmental, sportsman/recreation, and youth organizations. Fifty-six percent of the respondents (n=240) reported not belonging to any groups. This was followed by 22.8 percent in environmental groups, 10.8 percent from youth organizations, and 10.4 percent in sportsperson groups.

Group affiliation (44 percent) is higher than described by Hendee, Stankey, and Lucas (1990), who summarized results of previously studied wilderness areas (20 to 30 percent). It is also higher than percent of membership in conservation groups (38 percent) reported by Cole, Watson, and Niccolucci (1995) for 1990 visitors to Desolation Wilderness. Differences between these studies in regard to question wording or how groups were categorized could affect these relationships.

Use History. Visitors were asked to indicate their number of

previous visits to the LMA and the nearby High Uintas Wilderness (HUW). About 18 percent of visitors had never been to the LMA before (Table 1). This was the most frequent response category. The next most frequent was for one previous visit (13 percent).

TABLE 1.
Past-Use History as Measured by the Number of Previous Visits. Numbers Include Both the LMA and the High Uintas Wilderness

	Area Visited			
	LMA		HUW	
Number of previous visits	Frequency Response	Cumulative Percent	Frequency Response	Cumulative Percent
0	41	18.4	22	10.1
1	32	32.7	23	20.6
2	25	43.9	31	34.9
3	16	51.1	20	44.0
4	11	56.1	14	50.0
5	14	62.3	15	57.3
6	7	65.5	6	60.1
7	0		3	61.5
8	5	67.7	5	63.8
9	1	68.2	1	64.2
10	20	77.1	19	72.9
11	0		1	73.4
12	8	80.7	4	75.2
15	6	83.4	3	76.6
18	0		1	77.1
19	1	83.9	0	
20	15	90.6	14	83.2
24	1	91.0	2	84.4
25	0		6	87.2
30	2	91.9	8	90.8
40	2	92.8	3	92.2
50	5	95.1	5	94.5
75	0		1	95.0
80	0		1	95.4
96	1	95.5	0	
100	6	98.2	7	98.6
150	2	99.1	1	99.1
200	1	99.6	2	100.0
1000	1	100.0	0	

For further study, groups were recoded into the following categories: "0" previous visits (18.4 percent), "1-2" previous visits (25.5 percent), "3-5" previous visits (18.4 percent), and "6+" previous visits (37.3 percent).

As described in Roggenbuck and Lucas (1987) approximately 10 percent to 30 percent of visitors to western Wilderness areas had not visited that specific area before, while 20 percent to 30 percent had made 6 visits or more. When compared to the present area of study, 1972 figures for Desolation Wilderness, an area with similar characteristics as the LMA (high elevation mountain setting, close proximity to urban areas, characterized by small lakes, and similar size), show differences in the number of previous visits: "0" previous visits = 30 percent, "1-2" previous visits = 23 percent, "3-5" previous visits = 17 percent, "6+" previous visits = 30 percent.

The most pronounced differences are that the LMA had fewer first-time visitors and more repeat visitors. This relationship could well be a factor of the past increase in recreation participation and the length of the time since that study. A longitudinal study by Cole et al. (1995) in the Desolation Wilderness showed a trend towards fewer first-time visitors.

Current and Past Residence. Approximatly 75 percent of sampled visitors (n=231) live along the Wasatch Front. The next categories were "other Utah" (15 percent) and "outside Utah" (10 percent).

There is a fairly normal distribution of responses (n=229) when asked where LMA visitors grew up (Table 2). Most reported growing up in a large town or suburb with a population between 5,000

TABLE 2.
Percentages Showing the Type of Area Where Respondents Grew Up

Past Residence (n=229)	Percent
Farm or Ranch	6.1
Rural or Small town (>5,000 population)	15.7
Large Town or Suburb (5,001-50,000)	31.0
Small City or Suburb (50,001-200,000)	22.3
Medium City (200,001-1,000,000)	15.7
Major Metropolitan Area (>1,000,000)	9.2

and 50,000 people and the fewest coming from a farm or ranch.

Employment Status and Occupation. Of the people who responded to this question (n=231), 75 percent work full time outside of the home. The next largest categories are: work part time outside the home (8.7 percent), students (5.6 percent), retired (4.6 percent), unemployed (2.9 percent), full time homemaker (2.5 percent), and temporarily laid off (0.4 percent).

The modal occupation category (n=194) was professional/ technical (49.5 percent). Manager/official/proprietor was the next highest category (22.2 percent), followed by laborer (8.8 percent), clerical sales (8.2 percent), service worker (7.7 percent), craftsmen (3.1 percent), and operators (0.5 percent).

Wilderness study data, mostly from the early 1970s, also reported a majority of visitors in professional technical positions (30-40 percent), which was then four to five times the proportion in the population (Roggenbuck and Lucas 1987). Students had the second highest frequency then, but rank third here, behind service workers.

A declining trend for students was noted in the 1987 study.

Visit Characteristics

Visit characteristics do not deal with attributes of the individual respondent, but consider the logistics of their trip, types of activities, and types of groups respondents are traveling with. This baseline information provides managers with knowledge about use and use patterns in the LMA.

Visit Location and Timing. Results described here need to be considered within the constraint of the established sampling framework. Sampling was weighted based on an estimate that 80 percent of use would occur at the Crystal Lake Trailhead (Lakes Country and Wall Lake trails). It was also weighted by estimating that approximately 70 percent of the use occurred on weekends. Sampling was equally distributed between AM and PM schedules.

Location. With the above in mind, the vast majority of visitors to the LMA (n=233, 78.1 percent) use the Crystal Lake Trailhead. From here visitors access either the Lakes Country trail (42.1 percent) or the Wall Lake trail (36.1 percent). Bald Mountain (8.6 percent) and Pass Lake (8.2 percent) are the next highest use trailheads. Lower elevation trailheads at Ledgefork (3.9 percent), North Fork (0.9 percent), and Shingle Creek (0.4 percent) had lower use levels than estimated. No visitors were contacted at the Mainfork of the Weber River trailhead or Yellow Pine trailhead.

Timing. Of visitors sampled, 56.4 percent (n=234) were surveyed on weekends, 35.9 percent visited on weekdays, and 7.7 percent of the samples were taken on holiday weekends. Of visitors

sampled (n=203), 70 percent exited the study area in the afternoon.

Due to limitations of the sampling schedule, relationships to the larger population are difficult to ascertain. For management purposes, to reach a majority of visitors, trailhead host services could concentrate on weekend afternoons.

Length of Stay and Method of Travel. Visitors to the LMA (n=239) were divided into overnight (55.2 percent) and day visitors (44.8 percent). Overnight visitors averaged 1.9 nights camping, but most visits were for one night (43.5 percent). Combined with visitors staying two nights (38.2 percent) or three nights (10.7 percent), they accounted for 92.4 percent of all overnight visits sampled.

Most visitors (n=237, 96 percent) hiked carrying their own equipment. In addition to these visitors, there were only 10 bike riders, eight visitors with horses, and one hiking with a llama.

The number of horse groups was expected to be much higher. Actual use numbers by horse groups are hard to determine as the visitors often do not sign in at trailhead registration boxes which are frequently used to estimate numbers of visitors. Based on the sampling plan for this survey, travel with horses accounts for a small segment of the user population.

Visitors' most reported travel distance was about 2 miles. The median travel distance was 5 miles with a mean distance of 13.98. This high mean value could be attributed to a small portion of the sample which reported very high (100-150 mile) travel distances. Eighty-five percent of visitors reported traveling 12 miles or less.

Most visitors reported a travel time of about 2 hours on this visit. They reported a median travel time of 3 hours with a mean travel time of about 5 hours. Ninety percent of the visits were for 8 hours or less.

Means were also calculated to differentiate between miles of travel and hours of travel for day and overnight visitors. Day only visitors had a mean travel distance of 9.48 miles and mean times of 3.18 hours. Overnight visitors had almost double mean trip travel miles (17.70) and hours (6.73).

This information, along with area of travel, can have important planning implications if separation of these different user groups is desired. Zones of travel could be delineated based on where visits start and how far visitors travel. Managers could also design and designate different areas to separate day use from overnight visitors based on their different travel patterns. In order to accomplish this, a more detailed survey of visitor travel patterns would be required.

Group Size and Composition. Group size was described by the number of people in the group. Composition refers to the gender of individuals in the group, relationships between individuals, and number of dogs.

Group size. Of the number of people responding to this question (n=239) reported group sizes ranged from lone individuals to one group of 150 girls. There was a mean of 5 people per group and median of 3. The most frequent size group had 2 people (Table 3). Groups of 25 or less accounted for all of the groups surveyed except

TABLE 3.
Group Size as Measured by the Number of People in the Group.
Most Groups Are Small and Trending Smaller

Number of People in the Group	Frequency Response	Cumulative Percent
1	30	12.6
2	69	41.4
3	34	55.7
4	28	67.4
5	15	73.6
6	14	79.5
7	8	82.9
8	10	87.0
9	6	89.5
10	5	91.6
11	6	94.1
12	3	95.4
13	1	95.8
14	1	96.2
15	1	96.7
16	1	97.1
17	1	97.5
20	4	99.2
25	1	99.6
150	1	100

for the group of 150 girls.

Eighty percent of the groups surveyed had 6 or fewer people and 41 percent of the groups had only 1 or 2 people traveling together. Large groups are often perceived as a problem for recreation managers. Yet the point at which a group becomes "large" has not yet been determined. In the LMA, groups with more than 12 visitors made up only about 4 percent of this sample. If desired, contact with these groups would not require much time relative to the number of

people managers could reach with educational messages.

Group sizes in the LMA are similar to those reported by Lucas (1980) in a study of nine wilderness or roadless areas. That study reported mean group size from 3.8 to 5.6 people. Nine of the 10 areas studied had less than 10 percent of groups with more than 10 people, compared to 8.4 percent for this study. Looking at the group size for Desolation Wilderness from Lucas' study shows that 71 percent of the groups sampled had five or fewer people compared to 74 percent of groups with five or fewer in the current study. In both studies the most common size group had two people.

Group composition. Based on the reported number of people in groups, a total of 1,213 people are represented and 55 percent of total group members were male. On average there were 2.8 males per group. The median number of males per group was 2, with a mode of 1 male per group. Of the total number of visitors' groups represented (n=239), only approximately 6 percent had no males.

The majority of respondents were not traveling with dogs (n=130, 71 percent). Groups average 0.5 dogs per group, with a range of between zero and five dogs per group reported.

In a summary of several studies, Roggenbuck and Lucas (1987) reported 70 to 85 percent of wilderness users as being males. Lucas (1990) in a recent compilation of wilderness information suggested the trend is toward more female visitors. The recent study of trends in the Desolation Wilderness between 1972 and 1990 (Cole, Watson, and Roggenbuuck 1995) also found a trend towards more females. Their research indicated the percent of females increased significantly in

1990 both for day hikers (34 percent, p<.01) and overnight visitors (20 percent, p<.001). These numbers are still lower than the 45 percent for women in the LMA.

Group Type. Of the people who responded to this question (n=238), the majority reported traveling with family (57.1 percent). Traveling with friends (32.3 percent) was next most popular followed by traveling alone (11.3 percent), with an organized club (10.9 percent), and other (1.6 percent). Percentages total more than 100 because respondents were allowed to chose more than one response.

Group type was also recoded into a new variable by creating new categories of respondents. These new categories are family (46.6 percent), friends (21.4 percent), friends and family (11.5 percent), alone (10.3 percent), and with a club (10.3 percent). All but one respondent traveling with an organized group stayed overnight.

These percentages are similar to information reported for other wilderness areas. Roggenbuck and Lucas (1987) report that families account for around 40 percent of visitors. Groups of friends are the second most popular group types. Organized clubs typically make up 10 percent or less of groups and people traveling alone are also less than 10 percent of total groups. The analysis of trends in Desolation Wilderness (Cole, Watson, and Roggenbuck 1995) reported no significant changes in group types between 1972 and 1990.

Although trends for these characteristics seem stable, significant differences do exist between some group types and day versus overnight visitors (n=233, chi-square=26.869, p=.00002, d.f.=4) (Figure 7). Visitors traveling alone in the LMA (n=24) are 3

Figure 7. Percent distribution of group types by day use or overnight visit.

times more likely to day hike than stay out overnight (Figure 7). For respondents visiting as members of organized groups (n=24), all but 1 stayed overnight and groups of family and friends traveling together are twice as likely to camp than to visit for the day.

This has important applications for management. While respondents who were members of a club or organization make up only 11 percent of visitors sampled, their group members represent 36.6 percent of members of all groups sampled (n=1,213). Furthermore, 80.8 percent of the groups they represent travel as large groups.

Educating members of these groups about low impact camping and backcountry travel techniques may reduce or stabilize future impacts to the LMA. Given the small proportion of the population they represent, educational lectures may be very efficient and effective in adapting behaviors to meet managment objectives. These could be provided in combination with required permits for larger groups.

Activities. Visitors were asked to report whether or not they participated in selected activities. Provided responses were 1) did not participate; 2) participated, but not a major reason for the trip; and 3) activity was a major reason for the trip. Where respondents only coded major activities, unanswered categories were coded "did not participate." Activities marked as "participated" in and those marked as a "major reason for the trip" were combined to determine participation rates in individual activities.

The top five reported activities participated in and which were listed as major reason for the visit were the same, but their rank order differed (Table 4). The major reason to visit the LMA was for relaxing. This was closely followed by hiking on trails, camping, seeking solitude, and hiking with friends.

The top five activities participated in, listed from highest to lowest frequency, were hiking on trails, relaxing, seeking solitude, hiking with friends, and camping (Table 4). Family gatherings were also highly participated in (57.5 percent) although they were only a major reason to visit for 21.7 percent of the respondents.

Possible differences between response categories make comparisons with other studies difficult. Lucas (1980) noted that

TABLE 4.
Activities Which Were a Major Reason for the Visit and Those Participated In. Ranked by Major Reason for the Visit

Reason for Visit	Major Reason		Participated In	
	N	Percent	N	Percent
Relaxing	143	59.6	193	80.4
Hiking on trails	136	56.7	203	84.6
Camping	118	49.2	145	60.4
Seeking Solitude	103	42.9	157	65.4
Hiking with Friends	95	39.6	150	62.5
Fishing	84	35.0	119	49.6
Picnicking	56	23.3	113	47.1
Taking Pictures	56	23.3	113	47.1
Family Gathering	52	21.7	138	57.5
Hiking Off Trails	40	16.7	122	50.8
Nature Study	30	12.5	124	51.7
Mountain Biking	11	4.6	20	8.3
Horseback Riding	8	3.3	8	3.3
Training/Certification	8	3.3	20	8.3
Hunting	5	2.1	6	2.5
Checking Places to Hunt	4	1.7	12	5.0
Other	0	0.0	0	0.0

hiking was the main activity reported in seven of the nine areas studied, with horse use being higher in two areas. He also noted three patterns of activity which differed among wilderness areas. Desolation Wilderness was at one end of the spectrum and was high on hiking, swimming and nature study, while the Bob Marshall Wilderness was at the other end of the spectrum with hunting high and hiking low. Other areas were intermediate in activities. The LMA most closely resembles Desolation Wilderness in terms of activities.

Activities at different areas studied seem to be stable over time and may be trending away from consumptive activities (Roggenbuck and Lucas 1985). Cole, Watson, and Roggenbuck (1995) noted that some activity patterns in Desolation Wilderness changed, but this trend was significant only for decreases in overnight visitors who hunted or fished. The relatively stable activity patterns provide management opportunities to meet current demand and anticipate that the same or similar types of uses will occur in the future.

Visitor Perceptions

The following baseline information provides ratings of how visitors to the LMA feel about the area. These initial results represent the typical respondents' opinion.

Satisfaction. Reported satisfaction (n=237) was measured using a five-point scale ranging from 1, "very unsatisfied" to 5, "very satisfied." Similar to findings in other studies, satisfaction was rated as very high. The mean satisfaction rating was 4.25, with a median of 5 and most people (51.5 percent) feeling "very satisfied." Only 17.3 percent of the respondents reported either feeling neutral

(10.5 percent) or unsatisfied (6.8 percent) with this trip.

Crowded. Perceived crowding was measured in two parts. Participants were first asked if they felt crowded. Of the people responding to this question (n=218), only 31.7 percent reported that they felt crowded. As described earlier by Shelby, Vaske, and Heberlein (1989), when less than 35 percent of visitors report feeling crowded, crowding perceptions are low and the area may be offering a unique experience. Given the difference in measurement scales, crowding in the LMA could be considered to be about normal.

People who perceived crowding as a problem were asked to rate, on a scale of 1, "slightly crowded" to 5, "extremely crowded," how crowded they felt. Respondents to this question (n=76) gave a mean "crowded" rating of 2.75, with a median and mode of 3.

Expectations. Question 20 (Table 5) presented five different items for respondents to rate depending on how the items met their expectations on this visit to the LMA. A 5-point scale was used with responses ranging from 1, "saw less than expected," to 3, "about what I expected," to 5, "saw more than expected."

In general, for approximately 80 percent of the people surveyed, selected impacts found during this trip were as expected or less than expected. This may help account for the high number of satisfied visitors (83 percent).

Biophysical Impacts. Question 17 asked respondents if they noticed any of eight selected biophysical resource impacts during this visit (Table 6). Items were scaled as 1, "did not notice" and 2, "noticed." Responses to this question are listed from most to

TABLE 5.
Percentages for Each Response Category Rating How Aspects of This Visit Met Visitor Expectations.

How did the following meet your expectations?	N	Saw less than expected	Expected	Saw more than expected
Number of people seen	235	30	42	28
Number of livestock seen	233	57	23	20
Number of large groups seen	232	51	33	16
Human caused resource impacts	231	34	45	21
Livestock caused resource impacts	233	53	35	12

least noticed impacts. If they noticed these impacts they were to rate how much it detracted from this visit (Table 7). Responses for how much the noticed impacts detracted from this visit were scaled 3, "not at all," 4, "a little," and 5, "a lot."

As evidenced by a comparison of the two tables, the impacts most noticed did not necessarily detract most from the visit. The most notable of these differences are litter and improper disposal of human waste, which were only the sixth and seventh most noticed impacts, but were the two impacts calculated to detracted most from this visit.

TABLE 6.
Ranking by Frequency of Impacts Which Were Reported Noticed

Selected Impact	Frequency Noticed	Percent Total
Trails Worn from Heavy Use	169	72.84
Many Side Trails Off Primary Route	167	71.67
Campsites Which Have Lost Vegetation	163	69.96
Trees Damaged/Cut Down by Humans	160	69.69
Roads/Trails > than 4' Wide	121	52.16
Amount of Litter Seen	89	38.03
Disposal of Human Waste	89	38.03
Trees Damaged by Livestock	65	28.01

TABLE 7.
Ranking by Mean of How Much Noticed Impacts Detracted from This Visit.

				Percent This Detracted		
Noticed Impacts	Mean	S.D.	N	Did Not	A Little	A Lot
Litter seen	4.23	0.67	164	13.4	50.0	36.6
Disposal of human waste	4.08	0.78	83	26.5	38.6	34.9
Trees damaged/cut down	3.99	0.77	148	30.4	40.5	29.1
Campsites lost vegetation	3.93	0.70	144	27.8	51.4	20.8
Trees damaged by livestock	3.75	0.78	55	45.5	34.5	20
Side trails	3.73	0.62	148	36.5	54.1	9.5
Trails worn from heavy use	3.69	0.68	147	43.5	44.2	12.2
Roads/trails > than 4'wide	3.55	0.59	105	51.4	43.8	4.8

3 = Did not detract, 4 = Detracted a little, 5 = Detracted a lot

The top two impacts which detracted the most from this visit relate to inappropriate human behavior. The next three categories of impacts which detracted from the visit focus on biophysical resource impacts more than social factors. Managers need to balance indicators to measure impacts which are both noticed and detract.

Visitor Preferences

In this study, preferences referred to the visitors' reported desirability for selected LMA setting conditions. These conditions are described based on three ROS relevant categories: social, biophysical, and managerial.

Social Conditions. Questions 15 and 22 were used to measure preferences for social conditions. Question 15 was an open-ended question which asked respondents to provide a count for the maximum number of people acceptable to see without feeling crowded. Responses ranged from 0 to 200 people acceptable to be seen per day. The mean value was approximately 24 people seen, with a median value of 15 and a dual mode with 33 people, indicating either 10 or 20 people seen as acceptable. Fifty-three percent of those surveyed felt 15 people was the maximum, while approximately 78 percent felt that 25 was the maximum number of people acceptable to see.

The wide variation in responses (standard deviation 30.54) indicates how little agreement there is for reported preferences for an acceptable number of people seen. There was also a low response rate to this question (n=184), which may be partially caused by the difficulty in making this type of judgment. This could lead one to conclude this is not a good indicator of social conditions.

Question 22 asked people to rate which of five categories describes their preference for future social conditions. The scale ranges from 1, "meet many more people," to 3, "meet about the same number of people," to 5, "meet a lot less people." Approximately 94 percent of the 232 respondents would like to see the same number (46 percent), a few less (36 percent), or a lot less people (12 percent). Only about 6 percent of respondents would like to see a few more people with no one wanting to see many more people.

Given the fact that use in the LMA is likely to increase in the future, some areas may need to be protected from growth in use numbers. Other areas may be able to handle more visitors and remain within acceptable limits for the number of people seen. Use could be concentrate in these areas, while protecting the lower use areas.

These desires indicate a potential management problem. As recreation use continues to increase, how can this desired condition be met and at what point does the increase in people affect the rated satisfaction of the experience. For the manager, the dilemma is to either restrict use to current levels or provide access for more people and monitor the effect on reported satisfaction and crowding.

Biophysical Conditions. Question 21 was used to measure desirable conditions for biophysical resources. A four-item response set was used to determine visitors' preferred level of development. Responses ranged from 1, "become much more natural," to 4, "should be developed to provide more facilities." Ninety-four percent of respondents (n=230) preferred that the area stay the same or become more natural. Only about 6 percent of respondents wanted more

facilities developed in the LMA.

Coupled with the results of the responses to social conditions it would appear that a majority of visitors to the LMA would prefer no changes be made which increase the number of people who use the LMA or affect the natural appearance of the area.

Managerial Conditions. Questions 14, 18, and 19 were used to determine what attributes of the LMA, which management can influence, would visitors prefer. We have a general idea of what social and biophysical conditions visitors would like. This section analyzes what visitors find desirable for site attributes and management options in the LMA.

Question 14 investigates the desirability of implementing group size limits in the LMA. A four-item response scale was used to indicate desirability. Responses ranged from 1, "no controls now or in the future," 2, "no controls now, but ok in the future," 3, "hold to current level," and 4 "lower the current use level."

Seventy-nine percent of respondents (n=230) felt that controls were ok, while 39 percent of total respondents felt controls were needed either to hold use to the current level (23 percent) or lower use (16 percent). The most frequent response (40 percent) was "no controls now, but ok in the future if overuse occurs."

Responses to this question may be complicated by the unanswered implication of whether overuse is occurring. While responses indicate acceptance of controls to limit visitor numbers, a fairly large number of respondents (21 percent) will not accept any controls. They would be negatively impacted if groups size limits

are implemented in the LMA.

Question 18 provided visitors with 26 items related to setting attributes relevant to management. Fourteen items related to the desirability of specific site attributes (Table 8). Twelve items (Table 9) asked about the desirability of potential management options for additional regulation of use in the LMA. Respondents were asked to rate the desirability of these attributes on a five-point scale ranging from 1 = "very undesirable," to, 3 = "neutral," to, 5 = "very desirable."

The most desirable site attribute for visitors in the LMA is to be able "to be isolated from the sights and sounds of other people." Visitors find primitive forests highly desirable, but would like them to have signs at trail destinations. In general, visitors prefer few developed conveniences. Fire rings, high standard trails, lakes behind dams, and pit toilets were all rated as slightly undesirable by the typical visitor.

The most desirable management option was having the area stocked with native fish, while stocking with nonnative fish was rated as somewhat undesirable. Some restrictions on use were rated desirable, particularly when they pertained to horse use. However, requiring permits or designated campsites were rated as slightly undesirable.

A natural fishery with no stocking and commercial outfitter and guide services were the lowest rated attributes. Had the lakes in the LMA not been previously stocked, they would likely have been fishless.

Table 8.
Site Attributes as Listed by Mean from Most to Least Desirable.

Site Attributes	Mean	S.D.	N
To be isolated from the sights and sound of other people	4.11	0.79	236
Signs at trail destinations	4.00	0.81	235
Leaving some areas with no trails	3.91	1.11	235
Forests and wildlife much the same as before the pioneers	3.89	0.88	236
Absence of man-made features,except trails	3.85	0.89	235
Signs along the trail	3.77	1.02	236
Connecting or loop trails of varying lengths	3.73	0.90	235
Low standard trails (narrow, somewhat like game trails)	3.69	0.86	235
Seeing rangers or patrol people in the backcountry	3.43	0.93	234
Bridges over creeks where hikers would otherwise get their feet wet	3.29	1.07	237
Small, loose rock fire rings	2.95	1.09	233
High standard trails (wide, steady grades, fairly straight)	2.81	1.08	237
Lakes behind small man-made dams	2.80	0.99	235
Pit toilets in the backcountry	2.75	1.15	236

Table 9.
Management Options as Listed by Mean from Most to Least Desirable

Management Options	Mean	S.D.	N
Stocking the area with native fish	3.94	0.95	235
Restricting the number of visitors if an area is being overused	3.94	1.03	236
Prohibiting wood fires where dead wood is scarce	3.89	1.09	236
Relocating trails out of environmentally sensitive areas	3.88	1.03	235
Closing some areas to use by horse groups	3.80	1.10	236
Different parts of the LMA favoring different users	3.61	0.89	235
Eliminating grazing by visitors' horses (requiring carrying horse feed)	3.55	1.08	235
Requiring camping in designated sites	2.90	1.25	236
Stocking the area with non-native fish	2.69	1.18	236
Requiring all visitors to obtain a permit to enter the backcountry	2.57	1.17	237
Natural fishery, no stocking, fishless lakes left fishless	2.43	1.09	235
Commercial outfitter or guide services	2.17	0.97	236

Topics of Concern

Four items have been previously selected for further analysis. These items were considered to be of concern to managers of the LMA. The topics relate to visitors' perception and or preferences for selected setting attributes. The topics are how social conditions in the LMA are meeting visitor desires, the desirability of providing commercial services, fish stocking, and whether different zones or opportunity classes are needed.

Social Conditions. How well the setting is meeting visitor needs is an important concern to managers. Social conditions were looked at based on visitors' perceptions or preferences.

Social factors were all rated highly. Fifty percent of the respondents were "very satisfied" with this visit. Less than seven percent were either "unsatisfied" or "very unsatisfied." Sixty-eight percent of the visitors surveyed did not feel crowded at all. However when asked about their preference for future conditions no one wanted to "meet many more people" and less than five percent wanted to "meet a few more people."

Social factors are difficult to measure and interpret. Scaled responses to questions of how satisfied or crowded visitors feel, by themselves, are not considered reliable indicators of setting conditions. Based on ROS defined measures, the LMA is providing opportunities within the densities proposed for a semiprimitive, nonmotorized area. Yet, there are unsatisfied visitors who feel crowded. The relationship between satisfaction, how crowded the visitor felt, how visitor expectations were meet, and the amount of

people respondents would like to meet was investigated.

A chi-square analysis was performed to determine which of the above factors had a significant influence on visitors' satisfaction ratings. There was no significant relationship between how visitors rated their perception of being crowded and their rating of satisfaction. There was also no significant relationship between visitors' preference for how many people they would like to meet and their satisfaction rating. There were significant relationships between ratings of satisfaction and how certain aspects of the trip met visitor expectations.

Most significantly the perception of human-caused resource damage affected the rating of satisfaction (n=228, chi-square=6.50, p=.04, d.f.=2). In addition, the expected number of large groups seen (n=229, chi-square=6.20, p=.04, d.f.=2) and the expected number of other people seen (n=232, chi-square=5.81, p=.05, d.f.=2) had an impact on satisfaction ratings.

In this study, recreation quality, as measured by rated satisfaction, is influenced by how actual densities and encounters met visitors' expectations. Preferences for numbers of other people and ratings of how crowded one felt were not as great an influence.

Given the connection between matching expectations with satisfaction, it is possible that ratings of satisfaction may be improved. If visitors can be informed about how many other people, large groups, and biophysical impacts to expect in a given setting, they may find conditions more acceptable.

Commercial Services. How important is providing commercial

outfitter and guide (O&G) services in the LMA? This was the lowest rated item of the 26 site attributes and management options surveyed. Question 19 expanded on the desirability of specific commercial services in the LMA. Six potential commercial services were listed and respondents were asked to rate each service relative to its importance in the LMA (Table 10). A 5-point scale was used rating services from; 1 "not at all important" to 5 "very important."

There is no perceived desire for commercial services within the LMA. Between 78 percent and 86 percent of respondents determined commercial services were not important. Only between four and nine percent indicated these services were important or very important.

TABLE 10.
Mean Ratings for Importance of Commercial Services

Commercial Services	Mean*	SD	N
Guided camping trips on Horseback	1.50	0.91	234
Guided camping trips on foot	1.67	1.05	235
Horses packing in equipment	1.58	0.97	233
Llamas packing in equipment	1.58	0.99	233
Guided mountain bike trips	1.62	1.04	236
Guided fishing trips	1.68	1.09	235

*Scale: 1 = not at all important to, 5 = very important

Fish Stocking. The desirability of stocking backcountry lakes with fish is a concern for recreation managers. Numerous small lakes in the study area are stocked with a variety of fish species. Fishing was the sixth most important activity (Table 3, p. 83) and was a major reason for the visit for 35 percent of the respondents. It was also the ninth most participated in activity. Although this activity was not a major reason for most people visiting the LMA, the stocking of native fish was the most desirable (mean=3.96) of the management options rated. However, the stocking of nonnative fish (mean=2.67) and having a natural fishery with no fishing and possibly no fish (mean=2.42) were among the lowest rated of management options tested. It would appear that visitors, even though most are not fishing, would like the opportunity for that activity, but mainly if stocked with native fish.

Zones or Opportunity Classes. To insure a variety of opportunities, management areas can be subzoned to provide different areas for possibly conflicting activities. These subzones could be managed with different standards or may provide different levels of development if desired.

One of the management options rated the desirability of "different parts of the LMA favoring different users." This item received a positive rating (mean=3.62), suggesting that visitors moderately agree on the zoning concept.

To explore this concept, data were coded to represent travel in different areas or zones of the LMA. This allows analysis based on the different areas of travel. The need or desire for separation of

uses was also explored by looking at the variability of responses within selected management relevant groups of visitors. Variability in their responses may indicate different or divergent needs.

CHAPTER V

MANAGEMENT RELEVANT SUBGROUPS

Management relevant groups were used as the independent variable to look for divergent desired experiences or site attributes in the LMA. Subgroupings were constructed to investigate the variability of desired opportunities among visitors there. This variability could indicate a need for different zones of use. Subgroups were created based on past research so results could be comparable.

ANOVA and chi-square tests were performed to look for statistically significant differences among respondents. Dependent variables were chosen which address the topics of concern previously identified and selected site attributes and management options which could provide for diverse opportunities in the LMA.

Past-Use Experience

Past-use experience was measured by the unidimensional rating of how many previous visits the respondent had made to the LMA. Categories ("0," "1-2," "3-5," and "6+") were selected which were comparable to previous research in natural areas management.

Social Conditions. For this set of groupings based on the number of the respondents' previous visits (Table 11), results indicate that there were no significant differences. Ratings of satisfaction, crowding, or how use levels met visitor expectations were similar. There was, however, a significant difference in the preference for amount of people one would *like* to meet. Visitors

with "6+" previous visits wanted to meet significantly fewer people than visitors with "3-5" previous visits.

Biophysical Conditions. Respondents with "6+" previous visits saw slightly more human caused resource damage than those with "3-5" previous visits (Table 11). Livestock caused resource damage was below expectations for all groups, but those with "6+" visits saw significantly more damage than those with either "1-2" or "3-5" previous visits. When asked to rate the preferred level of development, no significant differences were found between subgroups.

Managerial Conditions. No significant differences were found between experience subgroups and a desire for group size limits. Approximately 39 percent of the respondents would like to have limits that either hold the number of people at current levels, or decrease numbers.

There were also no significant differences regarding 14 site attributes between visitors with different levels of experience (Table 12), but there were five significant differences regarding the desirability of 12 selected management options (Table 13). Visitors with "6+" or more previous visits were significantly more interested in impact management than visitors with "3-5" previous visits. They supported relocating trails out of environmentally fragile areas, prohibitions on wood fires, and restricting visitors if an area is being overused more than visitors with "3-5" previous visits.

Visitors with "3-5" previous visits were more oriented to hunting and fishing opportunities. They rated stocking with nonnative fish as slightly desirable, while all other subgroups gave

TABLE 11.
ANOVA for Social and Biophysical Conditions by Number of Previous Visits

Social Factors (n=)	Grand Mean (SD)	Number of Previous Visits 0 Mean (SD)	1to2 Mean (SD)	3to5 Mean (SD)	6+ Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (221)	4.260 0.954	4.24 0.83	4.44 0.90	4.10 1.07	4.22 0.99	1.062
How crowded did you feel?[2] (71)	2.780 1.256	2.71 1.27	2.83 1.54	2.70 1.16	2.90 1.15	0.362
How did the following meet your expectations?[3]						
Number of people seen (218)	2.960 1.300	2.82 1.32	2.89 1.32	2.80 1.24	3.14 1.31	0.959
Number of livestock seen (216)	2.125 1.160	2.44 1.35	1.96 1.06	1.89 0.88	2.19 1.22	1.914
Number of large groups seen (215)	2.400 1.190	2.33 1.13	2.32 1.28	2.36 1.22	2.51 1.16	0.369
Human caused resource damage (214)	2.750 1.147	2.79 1.03	2.55 1.14	2.50 1.11	2.96 1.19	2.248 *
Livestock caused resource damage (216)	2.310 1.087	2.23 1.01	2.13[b] 1.03	2.03[b] 0.97	2.61[a] 1.15	3.711 **
Based on current use, what is your preference for future management?[4]						
Amount of people you would like to meet (215)	3.520 0.760	3.53 0.76	3.45 0.71	3.26[a] 0.11	3.70[b] 0.78	3.292 **

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = Less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b]Means with different superscripts are significantly different at the 0.05 level or less.

Table 12.
ANOVA for Site Attributes by Number of Previous Visits

Site Attributes (n=)	Grand Mean (SD)	Number of Previous Visits 0 Mean (SD)	1to2 Mean (SD)	3to5 Mean (SD)	6+ Mean (SD)	F (Prob)
High standard trails (wide, grades fairly straight) (220)	2.836 1.081	2.75 1.08	2.96 1.06	2.90 1.16	2.76 1.07	0.535
Low standard trails (like animal trails) (219)	3.694 0.863	3.75 0.93	3.75 0.94	3.66 0.85	3.65 0.74	0.238
Leaving some areas with no trails (219)	3.932 1.075	4.28 0.88	3.84 1.06	3.73 1.06	3.93 1.16	2.012
Bridges over creeks where otherwise get wet feet (220)	3.277 1.081	3.05 1.11	3.32 1.10	3.44 1.03	3.28 1.09	0.925
Connecting or loop trails (218)	3.750 0.866	3.62 0.88	3.75 0.95	3.78 0.69	3.81 0.89	0.449
Pit toilets in the backcountry (219)	2.753 1.163	2.53 1.20	2.80 1.26	2.73 1.07	2.84 1.13	0.708
Small, loose rock fire rings (216)	2.954 1.103	2.70 1.11	2.98 1.05	3.20 0.88	2.94 1.22	1.395
Signs along the trail (219)	3.790 1.005	3.68 0.97	3.77 0.98	4.03 1.05	3.74 1.02	0.782
Signs at trail destinations (218)	3.991 0.815	3.98 0.83	4.07 0.78	4.03 0.89	3.93 0.80	0.377
Seeing rangers in the backcountry (217)	3.442 0.922	3.41 0.88	3.45 0.93	3.33 1.01	3.51 0.90	0.327
Lakes behind small man-made dams (218)	2.802 0.990	2.60 1.06	2.79 1.06	2.95 0.96	2.84 0.92	0.901
Absence of man-made features, except trails (218)	3.858 0.892	3.95 0.89	3.91 1.05	3.68 0.73	3.87 0.85	0.761
Forest and wildlife much the same as before pioneers (219)	3.895 0.879	3.93 0.80	4.11 0.88	3.73 0.88	3.82 0.91	1.826
To be isolated from sights and sounds of other people (219)	4.110 0.805	4.05 0.88	4.16 0.83	3.95 0.75	4.18 0.78	0.886

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 13.
ANOVA for Management Options by Number of Previous Visits

Management Options (n=)	Grand Mean (SD)	Number of Previous Visits 0 Mean (SD)	1to2 Mean (SD)	3to5 Mean (SD)	6+ Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (218)	3.889 1.028	3.73 1.30	4.01[b] 0.97	3.40[a] 1.02	4.12[b] 0.75	5.352 ***
Eliminating grazing by visitors' horses (218)	3.518 1.096	3.46 1.14	3.50 0.99	3.33 1.07	3.65 1.15	0.857
Closing some areas to use by horse groups (219)	3.776 1.121	3.75 1.24	3.73 1.02	3.48 1.13	3.96 1.111	1.793
Prohibiting wood fires where dead wood is scarce (219)	3.909 1.084	3.78 1.29	3.93 1.06	3.55[a] 1.11	4.13[b] 0.93	2.924 **
Commercial outfitter or guide services (219)	2.164 0.977	2.20[b] 1.14	2.21[b] 0.93	2.70[a] 0.99	1.86[b] 0.80	7.448 ****
Restricting visitors if an area is being overused (219)	3.964 1.018	4.13 0.98	3.95 1.06	3.58[a] 1.15	4.08[b] 0.90	2.744 **
Requiring a permit to enter the backcountry (220)	2.559 1.163	2.70 1.11	2.46 1.02	2.63 1.29	2.53 1.22	0.401
Natural fishery, no stocking fishless lakes left fishless (219)	2.431 1.081	2.53 1.04	2.56 1.08	2.15 1.03	2.43 1.12	1.251
Stocking the area with native fish (218)	3.908 0.956	3.74 0.99	3.86 0.94	4.23 0.77	3.87 1.01	1.981
Stocking the area with non-native fish (219)	2.662 1.171	2.40[b] 1.06	2.82 1.25	3.10[a] 1.17	2.47[b] 1.11	3.760 **
Different parts of the LMA favoring different users (218)	3.615 0.895	3.62 0.99	3.73 0.94	3.45 0.78	3.61 0.87	0.771
Requiring camping in designated sites (219)	2.868 1.262	3.05 1.36	2.95 1.33	2.83 1.26	2,75 1.18	0.616

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

this a negative rating. They also rated the desirability of O&G service significantly higher than any other experience subgroup, but this was still rated negatively by all subgroups.

When asked about the desirability of specific commercial services, respondents with "6+" previous visits found some services significantly less desirable than the others (Table 14). These more experienced visitors gave the lowest rating in every category, particularly where horse use was concerned.

TABLE 14.
ANOVA for Commercial Services by Number of Previous Visits

		Number of Previous Visits				
Commercial Services (n=)	Grand Mean (SD)	0 Mean (SD)	1to2 Mean (SD)	3to5 Mean (SD)	6+ Mean (SD)	F (Prob)
Guided camping trips on horseback (217)	1.521 0.933	1.78[b] 1.19	1.55 1.01	1.74[b] 0.94	1.27[a] 0.65	3.905 ***
Guided camping trips on foot (218)	1.697 1.073	1.85 1.17	1.68 1.11	1.88 1.04	1.56 1.01	1.167
Horses packing in equipment (217)	1.599 0.996	1.70 1.07	1.57 0.99	1.92[a] 1.09	1.41[b] 0.89	2.518 **
Llamas packing in equipment (216)	1.601 1.001	1.64 1.14	1.64 1.10	1.79 0.98	1.46 0.88	1.047
Guided mountain bike trips (219)	1.612 1.032	1.73 1.15	1.70 1.16	1.83 1.00	1.40 0.76	2.079
Guided fishing trips (218)	1.679 1.106	1.75 1.21	1.55 1.06	2.08 1.15	1.54 0.99	2.508 *

Scale: 1 = not at all important to, 5 = very important
Probability * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Organization Affiliation

Approximately 60 percent of visitors to the LMA were not members of any conservation or other outdoor recreation groups. More differences between subgroups of this category were found than for any other visitor groups tested.

Social Conditions. Subgroups based on the types of organizations visitors belong to were high in their ratings of satisfaction and low for how crowded they felt, except for members of sporting groups (Table 15). Members of sports groups who responded to this question (n=4) felt significantly more crowded than non-group members or youth group members. However, there was a very small number of responses and it may be assumed that most sports group members did not report feeling crowded and therefore did not indicate a rating for how crowded they felt. Those few who did respond generally felt extremely crowded. There was also a low rate of response from youth groups (n=4) who may have also mostly not felt crowded.

Subgroups based on organization affiliation all saw about the number of people expected, but fewer livestock and large groups. Conservation group members wanted to meet significantly fewer people than either people who do not belong to organizations or people who belong to youth organizations, but all groups wanted to meet fewer people.

Biophysical Conditions. The amount of resource damage noticed was less than expected, both for human-caused and livestock-caused, with no significant differences between subgroups (Table 15).

There were, however, significant differences between subgroups and their preferred level of development (n=213, chi-square=26.72, p=.001, d.f.=9). Conservation group members tended to prefer the area become more natural while 50 percent of non-group members thought it should stay about the same.

Managerial Conditions. There were significant differences when asked if there should be a limit to group size (n=208, chi-square 27.43, p=.001, d.f.=9); no conservation group members supported "no controls ever," while 24 percent of non-group members did.

There were also significant differences between organization member subgroups on eight of 16 site attributes (Table 16). In general, members of conservation groups desired a more natural setting with few conveniences, while persons who were members of youth groups or non-group members were most likely to desire manipulation of the natural environment to facilitate activities and accessibility. Conservationists differed from all other groups in the strength of their desire for an absence of man-made features.

Youth groups were most closely aligned with non-group members while sportsmen tended to agree with conservationists. All subgroups gave a high rating to low standard trails, loop trails, signs along the trail and at destinations, and seeing rangers in the backcountry. They all gave a low rating to having pit toilets in the backcountry.

There were significant differences on nine of 12 management options (Table 17). Conservation group members were generally more supportive of regulation than youth groups and sometimes non-group members. Conservation group members and sportspersons also supported

TABLE 15.
ANOVA for Social and Biophysical Conditions by Organization Affiliation

Social Factors (n=)	Grand Mean (SD)	Type of Organization: Not Member Mean (SD)	Youth Mean (SD)	Consrv Mean (SD)	Sport Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (214)	4.252 0.994	4.22 1.00	4.16 0.99	4.48 0.88	4.00 1.28	1.136
How crowded did you feel?[2] (72)	2.764 1.239	2.56[b] 1.20	2.75[b] 0.50	2.86 1.28	4.50[a] 0.58	3.357 **
How did the following meet your expectations?[3]						
Number of people seen (217)	2.996 1.286	2.96 1.28	2.80 1.15	3.07 1.23	3.46 1.71	0.836
Number of livestock seen (216)	2.176 1.188	2.1 1.18	2.36 1.11	2.27 1.25	2.23 1.24	0.465
Number of large groups seen (215)	2.447 1.190	2.36 1.15	2.36 1.04	2.56 1.23	3.15 1.57	1.930
Human caused resource damage (214)	2.813 1.132	2.7 1.15	2.76 1.09	3.15 1.02	2.97 1.18	1.681
Livestock caused resource damage (216)	2.348 1.058	2.32 1.08	2.19 1.03	2.49 1.07	2.44 0.98	0.467
Based on current use, what is your preference for future management?[4]						
Amount of people you would like to meet (215)	3.553 0.771	3.46[b] 0.75	3.28[b] 0.74	3.91[a] 0.68	3.92 0.86	6.209 ****

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 16.
ANOVA for Site Attributes by Organization Affiliation

Site Attributes (n=)	Grand Mean (SD)	Type of Organization: Not Mean (SD)	Youth Mean (SD)	Consrv Mean (SD)	Sport Mean (SD)	F (Prob)
High standard trails (wide, grades fairly straight) (216)	2.847 1.070	3.04[b] 1.05	2.76 1.01	2.46[a] 1.04	2.31 0.95	4.913 ***
Low standard trails (like animal trails) (214)	3.687 0.85	3.67 0.79	3.56 1.12	3.86 0.82	3.92 0.95	1.367
Leaving some areas with no trails (214)	3.930 1.079	3.8[b] 1.10	3.72[b] 1.17	4.41[a] 0.79	4.08 1.19	4.148 ***
Bridges over creeks where otherwise get wet feet (216)	3.260 1.069	3.40[b] 0.99	3.28 1.17	2.82[a] 1.04	3.23 1.42	3.426 **
Connecting or loop trails (214)	3.706 0.890	3.78 0.84	3.50 0.98	3.57 1.02	3.77 0.93	1.102
Pit toilets in the backcountry (215)	2.767 1.165	2.86 1.13	2.76 1.20	2.55 1.21	2.62 1.33	0.868
Small, loose rock fire rings (212)	2.995 1.073	3.15[b] 1.00	3.32[b] 1.11	2.43[a] 1.09	2.62 1.04	6.635 ****
Signs along the trail (216)	3.764 1.018	3.86 0.91	3.76 1.01	3.51 1.22	3.62 1.33	1.374
Signs at trail destinations (215)	4.005 0.800	4.04 0.79	3.92 0.64	3.98 0.80	3.85 1.14	0.390
Seeing rangers in the backcountry (215)	3.414 0.943	3.36 0.96	3.48 1.08	3.45 0.79	3.69 0.95	0.583
Lakes behind small man-made dams (215)	2.809 0.989	2.83[b] 0.96	3.04 1.02	2.49[a] 0.94	3.23 1.17	2.840 **
Absence of man-made features, except trails (216)	3.857 0.906	3.78[b] 0.86	3.56[b] 0.77	4.34[a] 0.86	3.54[b] 0.77	6.347 ****
Forest and wildlife much the same as before pioneers (216)	3.880 0.892	3.77[b] 0.88	3.68[b] 0.85	4.27[a] 0.87	4.08 0.86	4.370 ***
To be isolated from sights and sounds of other people (216)	4.116 0.802	4.02[b] 0.80	3.76[b] 0.88	4.57[a] 0.55	4.23 0.83	7.663 ****

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 17.
ANOVA for Management Options by Oganization Affiliation

Management Options (n=)	Grand Mean (SD)	Type of Organization: Not Mean (SD)	Youth Mean (SD)	Consrv Mean (SD)	Sport Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (215)	3.888 1.035	3.75[b] 1.01	3.68[b] 1.03	4.43[a] 0.79	3.85 1.46	5.482 ****
Eliminating grazing by visitors' horses (215)	3.554 1.083	3.51[a] 1.05	3.00[b] 0.98	3.93[a] 1.09	3.77 1.17	4.322 ***
Closing some areas to use by horse groups (216)	3.791 1.090	3.69[bc] 1.03	3.20[a] 1.22	4.27[bd] 1.00	4.31[b] 0.95	7.212 ****
Prohibiting wood fires where dead wood is scarce (216)	3.875 1.090	3.73[b] 1.12	3.48[b] 1.23	4.39[a] 0.78	4.38[a] 0.65	6.505 ****
Commercial outfitter or guide services (216)	2.157 0.980	2.22 0.95	2.16 0.99	1.89 0.97	2.38 1.19	1.572
Restricting visitors if an area is being overused (217)	3.949 1.033	3.83[b] 1.03	3.68[b] 1.18	4.48[a] 0.66	3.92 1.26	5.305 ***
Requiring a permit to enter the backcountry (217)	2.571 1.181	2.44[b] 1.13	2.48 1.12	3.00[a] 1.18	2.69 1.55	2.671 **
Natural fishery, no stocking fishless lakes left fishless (215)	2.428 1.112	2.40[b] 1.08	1.92[b] 1.06	2.86[a] 0.95	2.23 1.54	4.308 ***
Stocking the area with native fish (216)	3.958 0.956	4.06[b] 0.90	4.28[b] 0.61	3.48[a] 0.95	3.92 1.50	5.485 ***
Stocking the area with non-native fish (216)	2.685 1.194	2.72 1.15	3.16[b] 1.14	2.34[a] 1.10	2.54 1.71	2.712 **
Different parts of the LMA favoring different users (216)	3.583 0.901	3.54 0.86	3.64 0.91	3.70 0.98	3.46 1.13	0.456
Requiring camping in designated sites (216)	2.889 1.264	2.88 1.18	2.68 1.31	2.91 1.36	3.08 1.70	0.706

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

restricting firewood more than youth group members or non-group members, but generally, sportsperson ratings were between conservation group members and youth groups or non-group members. All of the groups agreed that zoning was a positive concept and that they did not want any commercial services or camping in designated spots. There were no significant differences measured by a variety of services either (Table 18).

Fish stocking was a divisive issue with diversity on all three options. Conservationists were more supportive of natural

TABLE 18.
ANOVA for Commercial Services by Organization Affiliation

		Type of Organization				
Commercial Services (n=)	Grand Mean (SD)	Not Mean (SD)	Youth Mean (SD)	Conserv Mean (SD)	Sport Mean (SD)	F (Prob)
Guided camping trips on horseback (215)	1.479 0.876	1.51 0.85	1.44 0.96	1.29 0.67	1.85 1.41	1.537
Guided camping trips on foot (216)	1.653 1.045	1.61 0.95	1.60 1.08	1.70 1.21	2.08 1.32	0.844
Horses packing in equipment (215)	1.572 0.973	1.64 1.01	1.56 1.04	1.29 0.71	1.77 1.09	1.656
Llamas packing in equipment (215)	1.605 1.003	1.64 1.01	1.44 0.96	1.56 1.04	1.80 0.93	0.430
Guided mountain bike trips (217)	1.631 1.042	1.70 1.08	1.68 1.11	1.36 0.87	1.69 1.03	1.222
Guided fishing trips (216)	1.653 1.093	1.67 1.09	1.60 1.15	1.53 1.03	2.00 1.29	0.627

Scale: 1 = not at all important to, 5 = very important
Probability * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

fisheries and less supportive of stocking with either native or nonnative species. Sportspersons were the only group without any significantly different responses from other subgroups. Youth group members were the only subgroup to give a positive rating to stocking with nonnative fish.

Area of Current Residence

This variable was based on where the visitor lived at the time of the visit. It was recoded into the groups of respondents from the Wasatch Front, "other Utah" and "outside Utah."

Social Conditions. No significant differences were found among social factors based on current area of residence (Table 19). They all reported being well satisfied with their visit; did not feel crowded; and saw fewer people, livestock, and large groups than expected. They would like to meet about the same number of people.

Biophysical Conditions. No significant differences were found here either (Table 19). Resource damage, human caused and livestock caused, were as expected or less than expected. All groups preferred that the area become a little more natural in appearance.

Managerial Conditions. There were no significant differences concerning group size limits. Few significant differences were found between these subgroups regarding site attributes (Table 20). Generally, visitors from the Wasatch Front seemed to want more convenient site attributes, but these differences were minor.

Management options had two significant items (Table 21). Wasatch Front visitors rated eliminating horse grazing much lower

TABLE 19.
ANOVA for Social and Biophysical Conditions by Current Residence

Social Factors (n=)	Grand Mean (SD)	Current Residence: Other Utah Mean (SD)	Current Residence: Wasatch Front Mean (SD)	Current Residence: Outside Utah Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (228)	4.263 0.971	4.14 1.17	4.25 0.94	4.59 0.80	1.578
How crowded did you feel?[2] (75)	2.720 1.203	3.10 0.99	2.68 1.23	2.50 1.31	0.652
How did the following meet your expectations?[3]					
Number of people seen (231)	2.952 1.276	2.94 1.51	2.98 1.25	2.78 1.08	0.234
Number of livestock seen (229)	2.153 1.18	1.97 1.07	2.19 1.20	2.17 1.15	0.490
Number of large groups seen (228)	2.412 1.200	2.21 1.27	2.46 1.17	2.39 1.27	0.622
Human caused resource damage (227)	2.775 1.147	2.71 1.00	2.82 1.20	2.57 0.90	0.561
Livestock caused resource damage (229)	2.328 1.081	2.11 0.90	2.39 1.13	2.22 0.95	1.051
Based on current use, what is your preference for future managment?[4]					
Amount of people you would like to meet (228)	3.548 0.775	3.63 0.94	3.54 0.75	3.52 0.73	0.223

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

TABLE 20.
ANOVA for Site Attributes by Current Residence

Site Attributes (n=)	Grand Mean (SD)	Current Residence: Other Utah Mean (SD)	Current Residence: Wasatch Front Mean (SD)	Current Residence: Outside Utah Mean (SD)	F (Prob)
High standard trails (wide, grades fairly straight) (230)	2.826 1.068	2.77 1.14	2.85 1.06	2.77 1.02	0.258
Low standard trails (like animal trails) (228)	3.684 0.853	4.00[a] 0.68	3.60[b] 0.87	3.82 0.85	3.647 **
Leaving some areas with no trails (228)	3.916 1.089	4.11 1.14	3.85 1.11	4.10 0.77	1.142
Bridges over creeks where otherwise get wet feet (230)	3.291 1.072	3.08 1.20	3.36 1.04	3.14 1.13	1.208
Connecting or loop trails (228)	3.730 0.898	3.67 1.15	3.76 0.85	3.59 0.80	0.438
Pit toilets in the backcountry (229)	2.734 1.160	2.72 1.00	2.74 1.18	2.73 1.32	0.003
Small, loose rock fire rings (226)	2.943 1.100	2.67 1.15	3.06 1.09	2.50 0.86	3.995 **
Signs along the trail (230)	3.770 1.021	3.72 0.95	3.80 1.03	3.61 1.08	0.404
Signs at trail destinations (229)	4.004 0.803	3.94 0.72	4.02 0.83	4.00 0.76	0.123
Seeing rangers in the backcountry (228)	3.434 0.915	3.56 0.97	3.40 0.92	3.50 0.80	0.49
Lakes behind small man-made dams (229)	2.790 0.982	2.72 0.88	2.84 0.98	2.50 1.14	1.288
Absence of man-made features, except trails (230)	3.857 0.892	3.89 0.79	3.87 0.90	3.72 1.03	0.263
Forest and wildlife much the same as before pioneers (230)	3.904 0.881	3.83 0.94	3.93 0.88	3.82 0.85	0.294
To be isolated from sights and sounds of other people (230)	4.113 0.796	4.25 0.73	4.10 0.81	4.00 0.76	0.781

Scale: 1 = very undesirable to 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 21.
ANOVA for Management Options by Current Residence

Managment Options (n=)	Grand Mean (SD)	Current Residence: Other Utah Mean (SD)	Current Residence: Wasatch Front Mean (SD)	Current Residence: Outside Utah Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (229)	3.891 1.031	4.14 0.93	3.86 1.01	3.73 1.32	1.402
Eliminating grazing by visitors' horses (229)	3.550 1.086	3.92[a] 1.03	3.46[b] 1.09	3.59 1.01	3.451 **
Closing some areas to use by horse groups (230)	3.804 1.102	3.92 1.18	3.78 1.09	3.83 1.07	0.239
Prohibiting wood fires where dead wood is scarce (230)	3.904 1.090	4.03 1.06	3.87 1.10	4.00 1.11	0.419
Commercial outfitter or guide services (230)	2.170 0.972	2.03 0.91	2.19 0.99	2.09 0.97	0.477
Restricting visitors if an area is being overused (231)	3.957 1.033	3.92 1.11	3.92 1.05	4.26 0.69	1.109
Requiring a permit to enter the backcountry (231)	2.576 1.173	2.67 1.37	2.60 1.14	2.48 1.22	0.189
Natural fishery, no stocking fishless lakes left fishless (229)	2.432 1.093	2.61 1.25	2.37 1.07	2.64 0.95	1.600
Stocking the area with native fish (230)	3.944 0.949	3.89 1.01	4.01[a] 0.90	3.50[b] 1.14	2.954 **
Stocking the area with non-native fish (230)	2.678 1.175	2.39 1.18	2.77 1.20	2.45 0.91	2.003
Different parts of the LMA favoring different users (229)	3.611 0.895	3.50 0.85	3.61 0.90	3.77 0.92	0.636
Requiring camping in designated sites (230)	2.887 1.256	2.78 1.31	2.87 1.26	3.23 1.15	0.967

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

than did visitors from other parts of Utah. Visitors from outside of Utah rated stocking with native fish lower than visitors from the front, but again, the differences were minor. The importance of specific commercial services (Table 22) were all rated uniformly low.

Area of Travel

As described in Chapter III (Research Methods), four different areas of travel were analyzed. Differences found by this grouping could relate to a need or desire for a variety of setting conditions.

TABLE 22.
ANOVA for Commercial Services by Area of Current Residence

		Current Residence			
Commercial Services (n=)	Grand Mean (SD)	Other Utah Mean (SD)	Wasatch Front Mean (SD)	Outside Utah Mean (SD)	F (Prob)
Guided camping trips on horseback (229)	1.489 0.892	1.31 0.67	1.52 0.91	1.57 1.08	0.933
Guided camping trips on foot (230)	1.665 1.052	1.33 0.72	1.74 1.10	1.65 1.07	2.215
Horses packing in equipment (229)	1.559 0.956	1.33 0.72	1.61 1.00	1.57 0.95	1.210
Llamas packing in equipment (229)	1.590 0.994	1.50 0.94	1.59 0.97	1.74 1.25	0.400
Guided mountain bike trips (231)	1.610 1.024	1.56 1.00	1.62 1.02	1.65 1.11	0.073
Guided fishing trips (230)	1.665 1.088	1.33 0.72	1.74 1.14	1.65 1.11	2.065

Scale: 1 = not at all important to, 5 = very important
Probability * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Social Conditions. A significant difference was found for only one social factor (Table 23). While visitors to most areas reported seeing about the number of people they expected, the number of people seen was significantly *less* than expected for those traveling in the Weber/N. Fork zone.

Biophysical Conditions. Similar to social factors, only one zone differed significantly regarding resource factors (Table 23). Livestock-caused resource damage was significantly *less* than expected for those traveling in the Weber/N. Fork zone than in the other three zones.

Managerial Conditions. The area in which they traveled did not have an effect on visitors' feelings about group size limits. There were no significant differences related to site attributes, but visitors to the Weber/N. Fork area slightly favored connecting or loop trails (Table 24). If provided, these trails would generally have to cross steep drainages. This type of change could also impact the current visitors by changing the types and numbers of other people using the area. Another strategy might be to provide loop trail opportunities in the higher use areas near the upper elevations of the LMA where trail grades would be less steep.

Managment options had two items with significant differences (Table 25). Lakes area visitors found it more desirable to close some areas to use by horse groups than did those visiting Wall Lake. This could be a response to the relatively light use by horse groups at Wall Lake and the heavier use by horse camps in the Lakes. There was also a difference between visitors to the Weber/N. Fork area who

TABLE 23.
ANOVA for Social and Biophysical Conditions by Area of Travel

Social Factors (n=)	Grand Mean (SD)	Area of Travel: Lakes Mean (SD)	Wall Mean (SD)	Bald/ Pass Mean (SD)	Weber/ N.Fork Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (230)	4.248 0.973	4.24 0.90	4.31 0.99	4.24 1.00	3.92 1.31	0.576
How crowded did you feel?[2] (73)	2.753 1.245	2.74 1.33	2.96 1.16	2.57 1.16	1.00 0.00	0.980
How did the following meet your expectations?[3]						
Number of people seen (228)	2.969 1.271	2.99[b] 1.24	3.07[b] 1.33	3.08[b] 1.12	1.75[a] 0.97	4.128 ***
Number of livestock seen (226)	2.164 1.179	2.30 1.23	2.17 1.16	1.89 1.01	1.92 1.31	1.245
Number of large groups seen (225)	2.431 1.182	2.52 1.16	2.41 1.20	2.50 1.22	1.67 0.89	1.932
Human caused resource damage (224)	2.804 1.135	2.82 1.17	2.83 1.14	2.84 1.13	2.42 0.90	0.492
Livestock caused resource damage (226)	2.348 1.058	2.32 1.08	2.19 1.03	2.49 1.07	2.44 0.98	0.467
Based on current use, what is your preference for future management?[4]						
Amount of people you would like to meet (225)	3.542 0.779	3.55 0.82	3.59 0.78	3.50 0.73	3.25 0.62	0.711

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 24.
ANOVA for Site Attributes by Area of Travel

Site Attributes (n=)	Grand Mean (SD)	Area of Travel: Lakes Mean (SD)	Wall Mean (SD)	Bald/ Pass Mean (SD)	Weber/ N.Fork Mean (SD)	F (Prob)
High standard trails (wide, grades fairly straight) (231)	2.840 1.070	2.74 1.03	3.00 1.11	2.68 0.99	3.00 1.28	1.259
Low standard trails (like animal trails) (229)	3.677 0.859	3.74 0.83	3.75 0.80	3.47 1.01	3.33 0.89	1.724
Leaving some areas with no trails (229)	3.891 1.097	3.81 1.16	4.01 1.06	3.76 1.08	4.08 0.79	0.794
Bridges over creeks where otherwise get wet feet (231)	3.307 1.074	3.16 1.19	3.49 0.99	3.31 1.02	3.17 0.72	1.440
Connecting or loop trails (229)	3.742 0.888	3.56 0.94	3.87 0.85	3.82 0.87	4.09 0.54	2.587 *
Pit toilets in the backcountry (230)	2.756 1.157	2.84 1.19	2.82 1.14	2.53 1.16	2.33 0.89	1.313
Small, loose rock fire rings (227)	2.956 1.076	3.04 1.05	3.06 1.15	2.55 0.89	2.83 1.11	2.337 *
Signs along the trail (229)	3,777 1.012	3.88 1.11	3.68 1.01	3.71 0.87	3.83 0.58	0.684
Signs at trail destinations (229)	4.013 0.803	3.96 0.93	4.05 0.07	4.05 0.66	4.08 0.79	0.260
Seeing rangers in the backcountry (228)	3.430 0.929	3.36 0.91	3.56 0.90	3.24 1.10	3.67 0.49	1.520
Lakes behind small man-made dams (229)	2.83 0.974	2.86 0.97	2.95 0.99	2.50 0.83	2.75 1.14	1.985
Absence of man-made features, except trails (229)	3.834 0.893	3.82 0.90	3.75 0.98	3.97 0.91	4.08 0.79	0.875
Forest and wildlife much the same as before pioneers (230)	3.883 0.886	3.85 0.92	3.85 0.92	4.00 0.74	4.00 0.85	0.370
To be isolated from sights and sounds of other people (230)	4.104 0.797	4.00 0.88	4.20 0.71	4.21 0.74	3.92 0.79	1.426

Scale: 1 = very undesirable to, 5 = very desirable
Probabilty: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Table 25.
ANOVA for Management Options by Area of Travel

Management Options (n=)	Grand Mean (SD)	Area of Travel: Lakes Mean (SD)	Wall Mean (SD)	Bald/ Pass Mean (SD)	Weber/ N.Fork Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (229)	3.878 1.032	3.92 0.97	3.87 1.15	3.82 0.98	3.83 0.83	0.097
Eliminating grazing by visitors' horses (229)	3.546 1.082	3.63 0.97	3.52 1.19	3.58 1.13	2.92 0.90	1.588
Closing some areas to use by horse groups (229)	3.790 1.100	3.94[a] 0.99	3.60[b] 1.20	4.00 1.04	3.27 1.10	2.789 **
Prohibiting wood fires where dead wood is scarce (230)	3.883 1.090	4.07 0.93	3.74 1.24	3.84 1.03	3.50 1.17	2.006
Commercial outfitter or guide services (230)	2.187 0.978	2.17 0.97	2.23 1.01	2.08 0.94	2.42 1.00	0.431
Restricting visitors if an area is being overused (229)	3.943 1.022	4.05 0.90	3.85 1.10	3.82 1.18	4.17 0.72	1.008
Requiring a permit to enter the backcountry (230)	2.574 1.171	2.59 1.18	2.55 1.20	2.50 1.18	2.83 1.03	0.267
Natural fishery, no stocking fishless lakes left fishless (229)	2.437 1.085	2.47 1.15	2.33 1.01	2.51 0.93	3.00 0.74	1.404
Stocking the area with native fish (229)	3.930 0.939	4.03 0.88	4.01 0.92	3.66 1.10	3.42 0.67	2.917 **
Stocking the area with non-native fish (230)	2.691 1.173	2.74 1.21	2.65 1.20	2.71 1.14	2.50 0.91	0.189
Different parts of the LMA favoring different users (229)	3.616 0.884	3.55 0.93	3.63 0.92	3.80 0.77	3.83 0.58	0.485
Requiring camping in designated sites (230)	2.913 1.254	2.90 1.20	2.93[b] 1.25	2.66[b] 1.40	3.75[a] 0.97	2.357 *

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

rated stocking with native fish less desirable than visitors to the Lakes Country or Wall Lake zones.

While no differences were noted between sugroups and the desirabilty of commercial services (Table 25), differences were noted in preferences for specific commercial services (Table 26). A significant difference was found between the importance of guided mountain bike trips. Visitors to the Weber/N. Fork area found them more important than visitors to Wall Lake. Visitors to the Wall Lake

TABLE 26.
ANOVA for Commercial Services by Area of Travel

		Area of Travel				
Commercial Services (n=)	Grand Mean (SD)	Lakes Mean (SD)	Wall Mean (SD)	Bald/ Pass Mean (SD)	Weber/ N.Fork Mean (SD)	F (Prob)
Guided camping trips on horseback (227)	1.511 0.923	1.59 1.02	1.33 0.65	1.61 1.03	1.91 1.30	2.195 *
Guided camping trips on foot (228)	1.689 1.064	1.73 1.06	1.49 0.93	1.84 1.13	2.25 1.54	2.387 *
Horses packing in equipment (227)	1.573 0.972	1.59 0.96	1.43 0.87	1.68 1.09	2.09 1.22	1.803
Llamas packing in equipment (226)	1.602 0.998	1.63 0.99	1.45 0.94	1.74 1.03	2.09 1.22	1.829
Guided mountain bike trips (229)	1.633 1.045	1.74[a] 1.12	1.37[b] 0.79	1.79 1.10	2.08 1.56	3.150 **
Guided fishing trips (228)	1.697 1.103	1.79 1.14	1.48 0.94	1.76 1.08	2.25 1.66	2.368 *

Scale: 1 = not at all important to, 5 = very important
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

area rated guided foot or horseback travel camping trips or fishing trips lower than visitors to the Weber/N. Fork area. These differences may be explained by the more remote setting and harder travel conditions in the Weber/N. Fork areas than Wall Lake in particular.

Group Size

This variable was created by combining the reported groups sizes into four categories: respondents traveling alone, in pairs, in groups of three to six people ("3-6"), and groups with seven or more people ("7+").

Social Conditions. All subgroups within these categories were equally satisfied with their trips and did not report feeling more than a "little crowded" (Table 27). There were differences among certain expectations.

People traveling in pairs were more sensitive to the conditions they experienced in the LMA. In general, they rated conditions closer to meeting their expectations than all other subgroups. The number of livestock seen was rated significantly higher than for other subgroups, but still less than expected. Pairs were the only subgroup for whom the number of people seen exceeded their expectations.

Groups size was not a factor in differences concerning the amount of people visitors might want to meet based on current use. All subgroups would like to meet about the same number or slightly fewer people.

Biophysical Conditions. Along with seeing more people than expected, pairs saw slightly more human caused resource damage than expected (Table 27). They also reported seeing significantly more resource damage caused by livestock than did groups of "3-6" or "7+," but these ratings were still in the "less than expected" to "expected" (3) range.

Managerial Conditions. There were no significant differences concerning the need for group size limits, there are three site attributes where subgroups have significant differences (Table 28). Large groups rated fire rings and lakes behind small dams more desirable than the other groups. In fact, they gave the only positive ratings to these two site attributes. Pairs rated leaving some areas without trails more desirable than groups of "3-6" people.

There were also three managment options (Table 29) with significant differences. Large groups gave a lower rating to closing some areas to horse use than pairs. Having a natural fishery with no stocking was rated much lower by groups of "7+" than by people traveling alone. Groups of "3-6" and "7+" gave a higher rating to stocking with native fish than the other two groups.

Commercial services were not rated significantly different by any subgroups. Large groups were generally more in favor of the specific commercial services listed (Table 30), but still rated them not important.

Group Type

This variable was recoded into five subgroups alone, organized club or group, family and friends, friends, and family. The

TABLE 27.
ANOVA for Social and Biophysical Conditions by Group Size

Social Factors (n=)	Grand Mean (SD)	Number of People in Group 1 Mean (SD)	2 Mean (SD)	3to6 Mean (SD)	7+ Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (235)	4.247 0.969	4.43 0.77	4.33 0.83	4.14 1.11	4.20 0.98	0.192
How crowded did you feel?[2] (76)	2.750 1.223	2.78 1.64	2.88 1.19	2.64 1.16	2.73 1.22	0.152
How did the following meet your expectations?[3]						
Number of people seen (233)	2.957 1.279	2.57 1.28	3.26 1.19	2.96 1.21	2.76 1.46	2.660 *
Number of livestock seen (231)	2.143 1.169	1.80[b] 0.89	2.57[a] 1.27	1.99[b] 1.08	2.04[b] 1.21	4.634 ***
Number of large groups seen (230)	2.413 1.200	2.10 1.29	2.61 1.17	2.36 1.16	2.42 1.23	1.331
Human caused resource damage (230)	2.778 1.140	2.86 1.87	3.03 1.13	2.69 1.08	2.53 1.20	2.057 *
Livestock caused resource damage (231)	2.329 1.082	2.23 1.04	2.67[a] 1.15	2.26[b] 1.01	2.02[b] 1.06	3.786 ***
Based on current use, what is your preference for future management?[4]						
Amount of people you would like to meet (230)	3.539 0.774	3.57 0.90	3.72 0.78	3.43 0.76	3.47 0.73	2.046

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 28.
ANOVA for Site Attributes by Group Size

Site Attributes (n=)	Grand Mean (SD)	Number of People in Group: 1 Mean (SD)	2 Mean (SD)	3to6 Mean (SD)	7+ Mean (SD)	F (Prob)
High standard trails (wide, grades fairly straight) (235)	2.826 1.078	2.93 1.01	2.71 1.04	2.76 1.06	3.04 1.20	1.121
Low standard trails (like animal trails) (233)	3.619 0.860	3.62 0.73	3.63 0.84	3.76 0.96	3.69 0.78	0.363
Leaving some areas with no trails (233)	3.906 1.095	4.13 1.17	4.13[a] 0.98	3.62[b] 1.20	3.98 0.87	3.648 ***
Bridges over creeks where otherwise get wet feet (235)	3.298 1.065	3.20 1.16	3.19 1.01	3.22 1.08	3.65 1.00	2.195 *
Connecting or loop trails (233)	3.730 0.900	3.90 0.76	3.70 1.03	3.68 0.88	3.77 0.84	0.505
Pit toilets in the backcountry (234)	2.744 1.155	2.45 0.87	2.78 1.13	2.71 1.25	2.94 1.14	1.136
Small, loose rock fire rings (231)	2.957 1.093	2.59[b] 0.95	2.78[b] 1.16	3.00 1.08	3.35[a] 1.00	4.039 ***
Signs along the trail (235)	3.779 1.014	3.73 1.01	3.68 1.06	3.83 1.04	3.85 0.92	0.416
Signs at trail destinations (234)	4.017 0.797	4.13 0.68	3.91 0.82	4.06 0.86	4.02 0.70	0.679
Seeing rangers in the backcountry (232)	3.431 0.928	3.31 0.89	3.37 0.90	3.51 0.91	3.46 1.03	0.468
Lakes behind small man-made dams (234)	2.803 0.987	2.40[a] 0.86	2.74 0.92	2.83 1.01	3.10[b] 1.04	3.386 **
Absence of man-made features, except trails (233)	3.841 0.888	3.90 0.96	3.76 0.85	3.92 0.93	3.77 0.84	0.554
Forest and wildlife much the same as before pioneers (234)	3.889 0.882	3.90 0.84	3.89 0.82	3.92 0.96	3.83 0.86	0.103
To be isolated from sights and sounds of other people (234)	4.111 0.795	4.00 0.83	4.25 0.76	4.11 0.81	3.98 0.79	1.335

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.1, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 29.
ANOVA for Management Options by Group Size

Management Options (n=)	Grand Mean (SD)	Number of People in Group: 1 Mean (SD)	2 Mean (SD)	3to6 Mean (SD)	7+ Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (233)	3.871 1.034	3.70 1.21	4.04 0.96	3.84 1.09	3.79 0.90	1.023
Eliminating grazing by visitors' horses (233)	3.537 1.083	3.43 1.10	3.69 1.08	3.53 1.09	3.38 1.05	0.867
Closing some areas to use by horse groups (234)	3.791 1.102	3.80 1.10	4.06[a] 0.99	3.74 1.11	3.50[b] 1.19	2.575 **
Prohibiting wood fires where dead wood is scarce (234)	3.885 1.092	4.13 1.07	4.04 0.97	3.77 1.23	3.71 0.97	1.744
Commercial outfitter or guide services (234)	2.175 0.971	2.33 0.88	2.01 1.04	2.16 0.98	2.33 0.88	1.322
Restricting visitors if an area is being overused (234)	3.936 1.032	3.80 1.03	4.09 0.99	3.85 1.14	3.96 0.86	0.860
Requiring a permit to enter the backcountry (235)	2.575 1.168	2.63 1.13	2.65 1.23	2.48 1.18	2.60 1.11	0.302
Natural fishery, no stocking, fishless lakes left fishless (233)	2.429 1.093	2.87[a] 1.14	2.54 1.03	2.38 1.07	2.08[b] 1.11	3.636 ***
Stocking the area with native fish (233)	3.949 0.941	3.70[b] 0.99	3.69[bd] 1.00	4.07[c] 0.91	4.26[ac] 0.77	4.754 ***
Stocking the area with non-native fish (234)	2.694 1.179	2.67 1.18	2.5 1.01	2.74 1.26	2.90 1.13	1.132
Different parts of the LMA favoring different users (233)	3.601 0.890	3.76 0.69	3.54 0.85	3.59 0.98	3.60 0.89	0.396
Requiring camping in designated sites (234)	2.901 1.253	3.30 1.24	2.79 1.33	2.78 1.20	3.04 1.22	1.648

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

TABLE 30.
ANOVA for Commercial Services by Group Size

Commercial Services (n=)	Grand Mean (SD)	Number of People in Group 1 Mean (SD)	2 Mean (SD)	3to6 Mean (SD)	7+ Mean (SD)	F (Prob)
Guided camping trips on horseback (233)	1.506 0.915	1.67 0.99	1.44 0.89	1.40 0.78	1.70 1.10	1.564
Guided camping trips on foot (234)	1.675 1.055	1.90 1.13	1.76 1.19	1.51 0.88	1.72 1.10	1.424
Horses packing in equipment (233)	1.579 0.976	1.60 0.86	1.40 0.95	1.50 0.88	1.85 1.20	1.638
Llamas packing in equipment (232)	1.595 0.993	1.67 1.06	1.56 1.08	1.51 0.83	1.76 1.10	0.715
Guided mountain bike trips (234)	1.628 1.041	1.43 0.82	1.57 1.04	1.57 0.93	1.94 1.31	1.888
Guided fishing trips (234)	1.680 1.094	1.67 0.92	1.69 1.15	1.57 1.06	1.87 1.17	0.769

Scale: 1 = not at all important to, 5 = very important
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

club or group, family and friends, friends, and family. The relationships within these groups may vary according to the degree of intimacy sought or provided.

Social Conditions. All subgroups reported high levels of satisfaction, with visitors traveling in groups of friends or alone rating satisfaction the highest (Table 31). Friends, and families and friends saw more people than expected, but they did not differ

from other groups in their rating of how crowded they felt. Groups of friends perceived significantly more other people than visitors traveling alone. There was no difference in preferences for the number of people to see in the future by group type.

Biophysical Conditions. There were no significant differences between subgroups regarding resource factors (Table 31). In general, the perception of damage was less than expected, but respondents still preferred the area become a little more natural.

Managerial Conditions. Group size limits were rated uniformly low by subgroup types, but there were a few differences between subgroups regarding desirability of selected site attributes (Table 32). People traveling with a club or with family and friends preferred a little more development than other subgroups. They rated fire rings and lakes behind small dams more desirable than visitors traveling alone. This could be due to the fact that persons traveling alone rarely camp, and therefore would not need fire rings. Visitors traveling with friends gave the highest rating of all site attributes as being isolated from the sights and sounds of other people. They rated this significantly higher than visitors traveling alone, with an organized group, or with family. This reported desire may explain why groups of friends were more sensitive than other groups to the number of other people seen.

There was only one management option where respondents had a significant difference (Table 33). Visitors with organized groups or clubs rated no stocking and fishless lakes left fishless lower than people traveling alone did.

TABLE 31.
ANOVA for Social and Biophysical Conditions by Group Type

Social Factors (n=)	Grand Mean (SD)	Type of Group: Alone Mean (SD)	Club Mean (SD)	Fam./ Frnds Mean (SD)	Frnds Family Mean (SD)	Family Mean (SD)	F (Prob)
How satisfied were you with this trip?[1] (232)	4.263 0.969	4.417 0.83	4.04 0.95	4.11 1.05	4.42 1.03	4.24 0.95	0.969
How crowded did you feel?[2] (75)	2.720 1.203	2.33 1.21	2.33 1.03	2.38 1.30	2.72 1.18	2.92 1.23	0.716
How did the following meet your expectations?[3]							
Number of people seen (229)	2.952 1.282	2.38[B] 1.01	2.73 1.39	3.22 1.37	3.24[A] 1.28	2.93 1.26	2.394 **
Number of livestock seen (227)	2.145 1.183	1.75 0.94	2.14 1.21	2.22 1.55	2.08 1.29	2.25 1.19	0.920
Number of large groups seen (226)	2.407 1.190	1.83 0.98	2.41 1.30	2.67 1.14	2.54 1.29	2.41 1.15	1.875
Human caused resource damage (227)	2.742 1.140	2.59 1.10	2.55 1.14	2.70 0.99	2.83 1.10	2.78 1.21	0.375
Livestock caused resource damage (227)	2.322 1.080	2.25 1.03	2.05 1.05	2.44 0.97	2.42 1.23	2.32 1.06	0.562
Based on current use, what is your preference for future mangement?[4]							
Amount of people you would like to meet (226)	3.540 0.772	3.50 0.88	3.41 0.80	3.50 0.65	3.73 0.79	3.50 0.76	0.983

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

Table 32.
ANOVA for Site Attributes by Group Type

Site Attributes (n=)	Grand Mean (SD)	Type of Group: Alone Mean (SD)	Club Mean (SD)	Fam./ Frnds Mean (SD)	Frnds Mean (SD)	Family Mean (SD)	F (Prob)
High standard trails (wide, straight) (231)	2.818 1.084	2.88 0.95	3.04 1.33	2.89 1.05	2.67 1.05	2.81 1.09	0.511
Low standard trails (like animal trails) (229)	3.686 0.862	3.57 0.66	3.74 0.81	3.85 0.91	3.59 0.96	3.70 0.86	0.535
Leaving some areas with no trails (229)	3.895 1.095	4.13 1.15	3.64 1.09	3.74 1.23	4.00 1.11	3.89 1.04	0.814
Bridges over creeks where otherwise get feet wet (231)	3.299 1.072	3.29 1.04	3.61 1.12	3.74[a] 1.03	3.02[b] 1.07	3.25 1.05	2.578 **
Connecting or loop trails (229)	3.734 0.905	3.96 0.75	3.78 0.74	3.85 1.08	3.61 1.02	3.70 0.87	0.739
Pit toilets in the backcountry (230)	2.752 1.161	2.39 0.66	2.87 1.18	2.93 1.33	2.63 1.24	2.81 1.16	0.973
Small, loose rock fire rings (227)	2.952 1.098	2.50[a] 0.93	3.43[b] 1.04	3.37[b] 1.04	2.77 1.00	2.92 1.14	3.623 ***
Signs along the trail (230)	3.770 1.021	3.74 0.96	3.83 1.19	4.07 1.00	3.55 1.12	3.79 0.95	1.196
Signs at trail destinations (229)	4.018 0.800	4.17 0.65	4.17 0.65	4.19 0.72	3.80 0.89	4.02 0.82	1.575
Seeing rangers in the backcountry (228)	3.425 0.933	3.22 0.90	3.39 1.03	3.70 0.78	3.18 1.15	3.52 0.82	2.017 *
Lakes behind small man-made dams (229)	2.812 0.984	2.48 0.90	3.13 1.10	3.11 1.25	2.86 0.68	2.72 1.00	2.192 *
Absence of man-made features, except trails (229)	3.847 0.898	4.08 0.78	3.86 0.83	3.78 0.97	4.04 0.87	3.72 0.92	1.584
Forests and wildlife same as before pioneers (230)	3.891 0.887	3.96 0.86	3.87 0.81	3.89 1.09	4.14 0.87	3.77 0.85	1.568
Be isolated from sights and sounds of other people (230)	4.104 0.792	3.96[b] 0.81	3.78[b] 0.85	4.30 0.78	4.47[a] 0.65	3.99[b] 0.78	5.040 ****

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

TABLE 33.
ANOVA for Management Options by Group Type

Managment Options (n=)	Grand Mean (SD)	Type of Group: Alone Mean (SD)	Club Mean (SD)	Fam. Frnds Mean (SD)	Frnds Family Mean (SD)	Family Mean (SD)	F (Prob)
Relocating trails out of sensitive areas (229)	3.852 1.032	3.88 0.95	3.70 0.93	3.74 1.13	4.14 0.96	3.77 1.07	1.347
Eliminating grazing by visitors' horses (229)	3.542 1.090	3.50 1.06	3.27 1.08	3.41 1.31	3.78 1.14	3.53 1.01	1.012
Closing some areas to horse groups (230)	3.778 1.101	3.79 1.14	3.35 1.15	3.59 1.39	3.96 1.02	3.83 1.02	1.477
Prohibiting wood fires where wood is scarce (230)	3.865 1.092	4.08 1.06	3.70 0.93	3.85 1.32	4.04 1.06	3.78 1.08	0.874
Commercial outfitter or guide services (230)	2.187 0.973	2.38 0.88	2.43 0.95	2.22 0.89	2.12 1.01	2.11 1.00	0.815
Restricting visitors if an area is being overused (230)	3.922 1.035	3.71 1.04	4.09 0.92	4.15 1.06	4.14 0.96	3.78 1.06	1.838
Requiring a permit to to enter the backcountry (231)	2.533 1.156	2.42 1.06	2.61 1.20	2.85 1.26	2.59 1.21	2.44 1.12	0.821
Natural fishery, no stocking, fishless lakes left fishless (229)	2.406 1.091	2.88[a] 1.15	1.91[b] 1.04	2.38 1.36	2.59 1.02	2.33 1.01	2.874 **
Stocking area with native fish (229)	3.939 0.953	3.75 0.90	4.14 0.77	4.19 0.92	3.84 0.96	3.93 1.00	1.07
Stocking area with non-native fish (230)	2.704 1.178	2.88 1.15	2.96 1.02	2.63 1.42	2.57 1.08	2.69 1.20	0.571
Different parts of the LMA favoring different types of users (229)	3.594 0.897	3.70 0.64	3.78 0.67	3.67 1.21	3.71 0.91	3.46 0.88	1.214
Requiring camping in designated sites (230)	2.870 1.244	3.08 1.14	2.91 1.38	2.85 1.26	2.65 1.23	2.92 1.24	0.590

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001
[a,b] Means with different superscripts are significantly different at the 0.05 level or less.

No significant differences by group type were found in respondents ratings of the desirabilty of commercial services. There were also no significant differences in the ratings of the importance of specific commercial services (Table 34).

Type of Use

This variable has been conceptualized as a broad scale means to differentiate between two types of activities, people visiting for the day and those staying overnight. Overnight visitors make a

TABLE 34.
ANOVA for Commercial Services by Group Type

Commercial Services (n=)	Grand Mean	Group Type: Alone Mean (SD)	Club Mean (SD)	Fam./ Frnds Mean (SD)	Frnds Mean (SD)	Family Mean (SD)	F (Prob)
Guided camping trips on horseback (228)	1.513 0.922	1.48 0.73	1.83 1.15	1.59 1.01	1.37 0.70	1.50 0.97	1.033
Guided camping trips on foot (229)	1.673 1.061	1.70 0.93	1.83 1.11	1.67 1.00	1.65 1.01	1.65 1.13	0.144
Horses packing in equipment (228)	1.583 0.979	1.52 0.85	1.96 1.19	1.59 1.01	1.43 0.76	1.58 1.03	1.169
Llamas packing in equipment (227)	1.582 0.971	1.48 0.79	1.77 1.11	1.59 1.08	1.53 0.92	1.58 0.98	0.309
Guided mountain bike trips (230)	1.63 1.048	1.42 0.72	1.91 1.31	1.63 1.01	1.65 1.03	1.61 1.07	0.682
Guided fishing trips (229)	1.668 1.09	1.65 0.88	2.04 1.22	1.59 1.01	1.67 1.07	1.61 1.13	0.796

Scale: 1 = not at all important to, 5 = very important
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

different commitment for their visit, because they must prepare and carry enough supplies to camp out.

Social Conditions. No significant differences were found based on social conditions for day versus overnight visitors (Table 35). A slight difference was reported regarding number of large groups seen; day visitors reported seeing slightly fewer large groups than overnight visitors.

Biophysical Conditions. There were no significant differences regarding the perception of resource impacts or desire for different levels of development for day and overnight visitors (Table 35).

Managerial Conditions. There were no differences regarding the need for group size limits. There were some significant differences between day and overnight visitors regarding site attributes, however (Table 36). Day visitors preferred connecting or loop trails more than overnight visitors and also preferred signs at trail destinations. Overnight visitors rated lakes behind small dams more desirable than day visitors, but this was still considered undesirable by both groups

Management options (Table 37) had significant variation with two items: a natural fishery with no stocking was rated significantly more desirable by day visitors than by overnight visitors, while campers rated stocking with native fish slightly more desirable than day visitors. There was also a strong difference between day and overnight visitors related to requiring camping in designated sites; day visitors rated this slightly desirable, while campers found it slightly undesirable.

TABLE 35.
Results of t-Test for Social and Biophysical Conditions by Type of Use

Social Factors (n=)	Type of Use: Day Use Mean	Type of Use: Over Night Mean	Mean Difference	t-value	Prob.
How satisfied were you with this trip?[1] (236)	4.35	4.17	0.1798	1.42	
How crowded did you feel?[2] (76)	2.78	2.73	0.0431	0.15	
How did the following meet your expectations?[3]					
Number of people seen (234)	2.84	3.05	-0.2162	1.29	
Number of livestock seen (232)	2.06	2.22	-0.1666	1.08	
Number of large groups seen (231)	2.25	2.55	-0.2955	1.88	*
Human caused resource impacts (230)	2.68	2.85	-0.1695	1.12	
Livestock caused resource impacts (232)	2.19	2.44	-0.2477	1.75	
Based on current use, what is your preference for future management?[4]					
Amount of people you would like to meet (231)	3.51	3.57	-0.0638	0.62	

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Table 36.
Results of t-Test for Site Attributes by Type of Use

Site Attributes (*n*=)	Type of Use: Day Use Mean	Type of Use: Over Night Mean	Mean Difference	t-value	Prob.
High standard trails (wide, grades fairly straight) (236)	2.77	2.87	-0.0988	0.70	
Low standard trails (like animal trails) (234)	3.63	3.72	-0.0885	0.79	
Leaving some areas with no trails (234)	3.82	3.98	-0.1596	1.11	
Bridges over creeks where otherwise get wet feet (236)	3.35	3.25	0.1005	0.72	
Connecting or loop trails (234)	3.87	3.63	0.2346	2.00	**
Pit toilets in the backcountry (235)	2.71	2.78	-0.0626	0.41	
Small, loose rock fire rings (232)	2.84	3.05	-0.2193	1.52	
Signs along the trail (235)	3.83	3.75	0.0747	0.55	
Signs at trail destinations (234)	4.13	3.92	0.2192	2.09	**
Seeing rangers in the backcountry (234)	3.48	3.39	0.0856	0.70	
Lakes behind small man-made dams (234)	2.64	2.93	-0.2865	2.23	**
Absence of man-made features, except trails (234)	3.88	3.83	0.0467	0.40	
Forest and wildlife much the same as before pioneers (235)	3.86	3.92	-0.0659	0.57	
To be isolated from sights and sounds of other people (235)	4.09	4.14	-0.0527	0.50	

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Table 37.
Results of t-Test for Management Options by Type of Use

Management Options (n=)	Type of Use: Day Use Mean	Type of Use: Over Night Mean	Mean Difference	t-value	Prob.
Relocating trails out of sensitive areas (234)	3.82	3.91	-0.0862	0.63	
Eliminating grazing by visitors' horses (234)	3.49	3.60	-0.11	0.78	
Closing some areas to use by horse groups (235)	3.87	3.74	0.1282	0.89	
Prohibiting wood fires where dead wood is scarce (235)	3.96	3.83	0.1311	0.91	
Commercial outfitter or guide services (235)	2.21	2.15	0.0634	0.50	
Restricting visitors if an area is being overused (235)	3.92	3.96	-0.0461	0.34	
Requiring a permit to enter the backcountry (236)	2.61	2.53	0.0824	0.54	
Natural fishery, no stocking fishless lakes left fishless (235)	2.67	2.22	0.4513	3.24	****
Stocking the area with native fish (234)	3.81	4.05	-0.237	1.91	*
Stocking the area with non-native fish (235)	2.60	2.75	-0.1538	0.99	
Different parts of the LMA favoring different users (234)	3.65	3.57	0.074	0.63	
Requiring camping in designated sites (235)	3.23	2.64	0.5901	3.69	****

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Commercial services were rated about equally undesirable (Table 38). There was one significant difference where overnight visitors rated guided mountain bike trips more important than day visitors, but the overall rating was still "not important."

Type of Day

Knowing when visits are occurring is important to managers. It can help them maximize efforts to educate people in the field and determine when problems may be occurring. Type of day refers to whether the visit was during a weekday, weekend, or holiday.

TABLE 38.
Results of t-Test for Commercial Services by Type of Use

Commercial Services (n=)	Type of Use: Day Use Mean	Type of Use: Over Night Mean	Mean Difference	t-value	Prob.
Guided camping trips on horseback (233)	1.46	1.55	-0.0898	0.74	
Guided camping trips on foot (234)	1.65	1.69	-0.0385	0.28	
Horses packing in equipment (233)	1.48	1.66	-0.1858	1.45	
Llamas packing in equipment (232)	1.52	1.66	-0.1444	1.10	
Guided mountain bike trips (235)	1.48	1.75	-0.2780	1.99	**
Guided fishing trips (234)	1.65	1.70	-0.0462	0.32	

Scale: 1 = not at all important to, 5 = very important
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Social Conditions. The higher use levels during weekends and holidays did have a significant effect on how the visit met expectations. Weekenders saw significantly more people and livestock than expected, but this did not seem to have an effect on their experience. The groups were fairly equally satisfied and reported about the same level of feeling crowded (Table 39). There was also a slight difference between the number of large groups seen and the number of people either group would like to meet. Weekend visitors would prefer to meet fewer people than those visiting during the week, but both groups reported preferring to meet fewer people overall.

The most important information from these data may be the difference in the number of people visitors expected to see. The number seen by weekend visitors was greater than expected while the number seen by weekday visitors was less than expected. If this trend continues, satisfaction may decline for weekend visitors. Management could consider limiting the number of visitors on weekends and holidays. A less intrusive managment practice could be to inform visitors of high and low use times. This information may help match visitor expectations with existing conditions and delay the need for regulations while maintaining high satisfaction ratings.

Biophysical Conditions. No significant differences were found related to the type of day that respondents visited (Table 39). Although there were differences in expectations regarding encounters, perceptions of biophysical impacts were not different.

TABLE 39.
Results of t-Test for Social and Biophysical Conditions by Type of Day

Social Factors (n=)	Type of Day: Weekday Mean	Type of Day: Weekend Holiday Mean	Mean Difference	t-value	Prob.
How satisfied were you with this trip?[1] (231)	4.17	4.29	-0.1190	0.89	
How crowded did you feel?[2] (73)	2.85	2.72	0.133	0.40	
How did the following meet your expectations?[3]					
Number of people seen (229)	2.65	3.14	-0.4832	2.81	***
Number of livestock seen (227)	1.82	2.36	-0.5352	3.38	****
Number of large groups seen (226)	2.25	2.53	-0.2782	1.71	*
Human caused resource impacts (230)	2.68	2.87	-0.1695	1.19	
Livestock caused resource impacts (232)	2.21	2.42	-0.2477	1.39	
Based on current use, what is your preference for future management?[4]					
Amount of people you would like to meet (226)	3.42	3.61	-0.196	1.84	*

[1]Scale: 1 = very unsatisfied to, 5 = very satisfied
[2]Scale: 1 = slightly crowded to, 5 = extremely crowded
[3]Scale: 1 = less than expected to, 5 = more than expected
[4]Scale: 1 = many more to, 5 = a lot less
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Managerial Conditions. The need for group size limits was rated equally low by both groups. There was only one significant difference regarding the desirability of the site attributes (Table 40). Weekend visitors rated an absence of man-made features more desirable than respondents who visited during the week. They also had a slight preference for forests and wildlife to be the same as before pioneers and for signs at trail destinations.

Management options revealed some additional significant differences between these groups (Table 41). Weekend/holiday visitors found prohibiting wood fires significantly more desirable than those visiting during the week. Weekenders were also more willing to accept requiring permits to enter the backcountry.

There were differences regarding the desirability of a natural fishery with no stocking. Weekend visitors found this more desirable than weekday visitors. Neither group had a significant difference regarding the desirability of commercial services. All specific commercial services identified were also rated about equally unimportant (Table 42).

Table 40.
Results of t-Test for Site Attributes by Type of Day

Site Attributes (n=)	Type of Day: Weekday Mean	Type of Day: Weekend Holiday Mean	Mean Difference	t-value	Prob.
High standard trails (wide, grades fairly straight) (232)	2.90	2.79	0.1142	0.78	
Low standard trails (like animal trails) (230)	3.63	3.71	-0.0814	0.69	
Leaving some areas with no trails (230)	3.89	3.90	-0.0064	0.04	
Bridges over creeks where otherwise get wet feet (232)	3.37	3.28	0.0920	0.63	
Connecting or loop trails (230)	3.85	3.68	0.1603	1.32	
Pit toilets in the backcountry (231)	2.82	2.72	0.1003	0.63	
Small, loose rock fire rings (228)	2.85	3.03	-0.1895	1.28	
Signs along the trail (230)	3.76	3.82	-0.0532	0.38	
Signs at trail destinations (230)	4.14	3.95	0.1977	1.80	*
Seeing rangers in the backcountry (229)	3.32	3.50	-0.1795	1.41	
Lakes behind small man-made dams (230)	2.85	2.81	0.0370	0.28	
Absence of man-made features, except trails (230)	3.68	3.93	-0.2529	2.08	**
Forest and wildlife much the same as before pioneers (231)	3.75	3.97	-0.2160	1.79	*
To be isolated from sights and sounds of other people (231)	4.01	4.16	-0.1514	1.39	

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

Table 41.
Results of t-Test for Management Options by Type of Day

Management Options (n=)	Type of Day: Weekday Mean	Type of Day: Weekend Holiday Mean	Mean Difference	t-value	Prob.
Relocating trails out of sensitive areas (230)	3.71	3.98	-0.2687	1.91	*
Eliminating grazing by visitors' horses (230)	3.42	3.63	-0.2042	1.37	
Closing some areas to use by horse groups (230)	3.70	3.85	-0.1469	0.97	
Prohibiting wood fires where dead wood is scarce (231)	3.65	4.02	-0.3656	2.48	***
Commercial outfitter or guide services (231)	2.15	2.20	-0.05	0.37	
Restricting visitors if an area is being overused (230)	3.79	4.04	-0.2554	1.83	*
Requiring a permit to enter the backcountry (231)	2.27	2.76	-0.4813	3.05	***
Natural fishery, no stocking fishless lakes left fishless (231)	2.24	2.55	-0.3129	2.13	**
Stocking the area with native fish (230)	3.96	3.91	0.0533	0.42	
Stocking the area with non-native fish (231)	2.79	2.63	0.1599	0.99	
Different parts of the LMA favoring different users (230)	3.54	3.67	-0.1177	0.97	
Requiring camping in designated sites (231)	2.81	2.96	-0.1497	0.87	

Scale: 1 = very undesirable to, 5 = very desirable
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

TABLE 42.
Results of t-Test for Commercial Services by Type of Day

Commercial Services (n=)	Type of Day: Weekday Mean	Type of Day: Weekend Holiday Mean	Mean Difference	t-value	Prob.
Guided camping trips on horseback (228)	1.51	1.51	-0.0043	0.03	
Guided camping trips on foot (229)	1.68	1.69	-0.0111	0.08	
Horses packing in equipment (228)	1.60	1.55	0.0507	0.38	
Llamas packing in equipment (227)	1.55	1.63	-0.0708	0.51	
Guided mountain bike trips (230)	1.64	1.62	0.0196	0.14	
Guided fishing trips (229)	1.69	1.70	-0.0061	0.04	

Scale: 1 = not at all important to, 5 = very important
Probability: * = 0.10, ** = 0.05, *** = 0.01, **** = 0.001

CHAPTER VI

SUMMARY AND CONCLUSIONS

As the concepts of Ecosystem Management are integrated into Forest Service planning and management, more consideration needs to be given to the social values associated with these efforts. Incorporating social values from the beginning of the planning process will produce a better, more implementable product.

Historically, USFS recreation research has focused on understanding the needs and desires of the public. This research led to the development of the Recreation Opportunity Spectrum, which provides a diversity of settings from which visitors can choose a setting for their desired activities or experiences. This diversity is expressed as points along a continuum with a primitive type of setting and experience on one end of the scale and a relatively urban setting at the opposite end.

These allocations are best developed on a regional or landscape scale, but the management objectives for these settings or management areas are developed at the more localized forest level. At this level, standards and guidelines are developed to meet the needs of the visitors and the valued biophysical resources.

As the time comes to revise existing Forest Plans, social values should be incorporated into the development of the objectives for which the LMA is managed. These objectives can define the desired future condition for the LMA. Standards and guidelines can then be developed to implement the objectives. Finally, indicators that are used to evaluate the progress being made toward achieving

and maintaining the desired future condition can be developed and monitored.

This chapter restates the purpose of the study and the process used. Results relevant to the objectives of the study are summarized, conclusions based on the results are presented, and recommendations for further study or management action are proposed.

Purpose and Process

The purpose of this study was to provide the Kamas Ranger District with baseline information on visitors to the Lakes Management Area. Of particular concern was who the visitors are, how they use the area, what their perceptions of existing conditions are, what attributes of the setting they prefer, and their responses to selected management options. This information was gathered to provide the baseline from which to monitor changing conditions as recreation demands expand and to monitor the effectiveness of new standards and guidelines. The collected data provide some of the information for step four of the LAC process (Figure 2) which is an inventory of social and biophysical conditions.

In addition, the data provide initial feedback on topics of concern to KRD recreation management personnel. This information was used to determine their level of concern to current visitors.

Further analysis investigated the diversity among visitors to the LMA regarding their perceptions of and preferences for existing conditions in the LMA. These concerns could be incorporated into the first step of the LAC process and help focus the public dialogue about the desired future condition for the LMA.

In order to obtain the desired information in a representative and reproducible fashion, an on-site survey was used. A stratified random sampling scheme was developed to acquire information from visitors as they exited the LMA at the conclusion of their visit. The final response rate was 81 percent with 240 completed surveys. The questionnaire was developed using questions from previous visitor studies, mostly in Wilderness areas. Questions focused on visitor characteristics, visit characteristics, and perceptions of, or preferences for, social, biophysical, and managerial conditions.

Topics of concern were developed through discussions with KRD personnel and a review of the current Forest Plan and ROS guidelines. The four topics analyzed were existing social conditions, the importance of providing commercial services, fish stocking, and whether different zones or opportunity classes were desired. Information regarding these topics was analyzed from the perspective of the typical visitor and to look at the variability within management relevant grouping of respondents.

The groupings were based on: past use experience, organization affiliation, area of current residence, area of travel, group size, group type, type of use, and type of day the visit occurred. They provided the independent variables with which to analyze the differences among visitor desires.

Baseline Conditions

Visitor Characteristics. Visitors to the LMA are generally male, middle aged with high education levels, and full-time technical or professional jobs. The majority of visitors have been to the LMA

before, but there are a large number of first-time visitors. Most are from the nearby urban Wasatch Front. As a rule they do not belong to any particular organizations. Major reasons for visiting the LMA are hiking and camping, with relaxing and solitude the most sought after experiences. These experiences are often realized during family gatherings, picnics, nature study, or fishing.

These visitor characteristics are typical of those found in other studies. The most useful characteristic may be the high education level. This attribute can help as complex issues are sorted out and standards and guidelines are developed later in the planning process. It also indicates that additional education and information may help advance management goals.

There were significant differences in preferences for social conditions and perception of biophysical conditions between visitors based on their past use experience. In general, respondents with "6+" previous visits preferred to meet fewer people than those with fewer previous visits and found biophysical conditions closer to their expectations than the other subgroups. Preferences for management options also differed considerably for this grouping. Respondents with "6+" previous visits were generally more in favor of management actions to protect biophysical resources and restrict use. They gave the least favorable ratings to the importance of the selected commercial services.

This higher experienced subgroup provides important information for recreation planners. Long-time visitors are more sensitive about the number of people they would like to meet. This preference may be

site specific and, if definable, may provide an upper limit to when and where there are too many people in certain areas of the LMA.

Organization affiliation was a good indicator of the diversity regarding preferences. Visitors who were members of environmental or conservation organizations were similar to visitors classified as sportspersons but were more protective of the setting. Visitors who are not members of any organizations were open to a greater level of manipulation of the natural environment to meet management objectives and members of youth organizations were even more open to manipulation. Interestingly, there were no significant differences regarding perceptions of social or biophysical conditions based on group membership differences.

Visitors grouped by their current residence did not demonstrate any variability not already predicted by organization affiliation. This analysis did, however, provide valuable data concerning where and what type of area visitors are from, confirming the urban influence on the LMA.

Visit Characteristics. Most trips begin at the Crystal Lake trailhead on weekends or holidays. The vast majority of visitors travel on foot, packing their own equipment. They typically travel about 5 miles in 3 hours. Hikers average about 9 miles in 3 hours, while campers travel an average of 18 miles in 7 hours. About 80 percent of visitors travel in small groups of six or less. More visits are for camping than day hiking with campers generally staying one to two nights per visit. Large groups are almost four times as likely to stay overnight rather than they are to visit for

the day. Visitors traveling with organized groups almost always (96 percent) stayed overnight.

These visit characteristics are also similar to other studies of backcountry recreation. More specifically, they are similar to other studies conducted in areas where hiking is the main mode of travel, camping and solitude are important experiences, and the setting is dominated by the natural environment and is located near a large urban center.

When looking at the diversity of opinions based on visit characteristics, the size of the group was the most important factor for understanding visitor expectations for social and biophysical conditions. While intragroup dynamics are hard to predict, it appears that visitors traveling in pairs were more sensitive to social and biophysical conditions than visitors traveling alone. However, both of these subgroups prefer a more protected, natural environment than visitors traveling in larger groups.

There were only slight differences among groups in different travel zones, but this may still be important information for zoning the LMA. Visitors to the Lakes Country area saw significantly more livestock damage than visitors to other areas and were more favorable to closing the area to horse use. Visitors to the Weber/N. Fork area found social factors well below conditions they expected, with this subgroup seeing significantly fewer other visitors than expected. Visitors to this area also preferred to meet slightly fewer other people. In general, visitors to the Weber/N. Fork desired that the area stay more natural than other groups. This group is most in

favor of management options which limit visitor access to preserve the natural characteristics. Unfortunately, insufficient numbers of responses from some of the low-use trailheads made further analysis based on trailhead use impractical.

Day use visitors differed from overnight visitors in three of the six attributes related to their chosen activity. Day visitors were more likely to prefer trail amenities--such as loop trails and signs at trail destinations, and requiring camping in designated spots--than overnight visitors. Day visitors also showed a stronger preference for a natural fishery with no stocking and found requiring camping in designate sites much more desirable. In general, overnight visitors were most satisfied, but also perceived conditions closest to their expectations with the number of other people seen actually exceeding their expectations. They preferred more natural site conditions

And finally, most visitors travel on weekends and holidays. Day of travel was an especially good indicator of expectations for social conditions in the LMA. Weekenders reported seeing more people than expected. They also tended to find regulations and restrictions more desirable than weekday visitors. It will be important for managers and planners to consider this temporal factor when looking at overuse or imposing restrictions and to consider weekend restrictions or focus education efforts during weekend visits.

Visitor Perceptions. Visitors uniformly perceive a very satisfying environment concerning social conditions, a typical response for this question. Crowding is not perceived as a problem,

but visitors on weekends and holidays tend to see more people, livestock, and large groups than expected. Only about 20 percent of the visitors found that selected social or biophysical impacts exceed their expectations. So while there is a general conclusion that satisfaction is being meet and crowding is not a problem, managers should be aware there are some visitors whose experiences are being impacted by the number of other people they meet.

The most noticed biophysical impacts, such as worn trails and numerous side trails, did not seem to detract much from the visitor experience. While litter and improper disposal of human waste were not highly noticed, they were major reasons for what detracted from the visit. Damaged trees and campsites with loss of vegetation were more noticed than litter and human waste, but were not as much of an impact to the visit. In spite of the impacts visitors noticed that did detract from the visit, ratings of satisfaction with this visit remained high.

When developing standards for the LMA, the impacts that most detracted from the visit should be considered along with those of the greatest ecological concern. Litter and proper disposal of human waste can be managed through educational efforts. Other possible indicators of biophysical conditions such as tree damage, campsite vegetation loss, and trail conditions will require input from resource specialists to determine a biophysical limit to these conditions, while managers work with visitors to educate them to causes and concerns regarding these impacts.

Visitor Preferences. While visitors perceive satisfying social

conditions, their reported preferences also reflect a desire that these conditions stay about the same in the LMA. Visitors would prefer to see about the same number or slightly fewer people than they saw on the visit when they answered this survey.

When asked to predict the maximum number of people acceptable to see without being crowded, responses ranged from 0 to 200 other people. This range of people acceptable to see is much too large to be useful for planning purposes. However, over 50 percent of the visitors felt that 15 people was the maximum while 78 percent thought up to 25 people was the maximum they wanted to see. Visitors with "6+" previous visits preferred to see less than those with "3-5" previous visits while members of conservation and sportsman groups would prefer to meet significantly fewer other people than non-group members or members of youth groups. Managers will have difficulty making decisions based on reports of the maximum number of people to see. Zones within the LMA allowing different levels of use, and setting limits to maintain low use levels in areas such as the Weber/ N. Fork would allow for different opportunities in different zones and could protect the low use areas by limiting use there to existing conditions and providing for increases in visitation in other zones.

While certain impacts to biophysical conditions were noted, visitors reported preferring that the area stay about the same or trend toward more natural conditions. Only the type of organization one is affiliated with showed intragroup variability based on the preferred level of development, with visitors who are members of conservation groups wanting significantly less development than non-

visitors who were non-group members.

There is a general acceptance for managing visitor use levels, with visitors preferring use to stay about the same or decrease slightly. Restricting the number of visitors to an area if it is being overused was one of the highest rated preferences, but it is a separate value judgment as to whether the area is currently being overused or not. Based on this survey, overuse was not perceived to be occurring at the time of this study. The top 10 positively rated site attributes relate to a desire for a natural environment or specific actions for improved travel conditions or convenience (e.g., signs along the trail or at destinations, loop trails, bridges, and seeing rangers).

Topics of Concern and Management Recommendations

These topics were developed based on discussions with the Kamas Ranger District, a review of LMA management direction in the Forest Plan, and a review of current research. Topics were first analyzed from the perspective of the typical visitor. An ANOVA was then used to determine the variability within selected groupings of respondents.

Social Conditions. For about 31 percent of the visitors, crowding was a "slight" problem. This problem was largely temporal with 75 percent of the perceived crowding occurring on weekends. This represents 36 percent of the weekend visitors feeling "slightly" crowded. The most significant visitor subgroup feeling crowded were environmental group members, 51 percent of whom felt crowded.

While currently within an acceptable level (Shelby, Vaske, and Heberlein 1989), if use numbers increase, this problem may increase. Visitors already report use near their expected levels and for some it slightly exceeds expectations on weekends. Managers should be aware that parts of the LMA may be approaching their limit of acceptable social density. As the issue of crowding proceeds through the planning process, it will be important that weekend visitors, members of organized groups, and visitors who travel in small groups or alone be involved in the process. One strategy to provide for future increases in use would be to concentrate use in the existing high use areas such as Wall Lake and the Lakes Country. The manager could provide increased services in these locations, such as environmental education and interpretation, to increase awareness of proper backcountry recreation behavior and how it impacts other visitors' experiences. Low use areas could then be protected with restrictions to maintain the opportunity for that experience also.

Zones of Use. Visitors surveyed for this study rated The concept of different parts of the LMA being managed for different users as desirable. This was one of four site attributes where there was no variability within any of the tested subgroups regarding perceptions and preferences. However, use patterns did differ for some groups.

Sixty-eight percent of visitors to the Lakes Country stayed overnight, while day use was more prevalent in the Weber/N. Fork area. Hikers in this area slightly favored having loop trails to hike. Managers need to be aware of this difference in use patterns.

Based on the results of this survey, the need for different zones of travel or opportunity classes still needs further research. A redirected survey or follow-up later in the planning process may provide more direction on this matter.

Commercial Services. The desirability of having commercial services, particularly outfitters or guides, operating in the LMA ranked the lowest of all site attributes tested. Only the subgroup of people with "3-5" previous visits differed in the desirability of commercial outfitter and guide services. They found it significantly more desirable than people with "6+" previous visits, but still rated it as undesirable (2.70) on a five-point scale.

It is important for managers to remember that this only refers to people currently visiting the LMA. Other people may report a greater desirability for commercial services. It is possible that persons with no knowledge of the area would rate these services as more desirable, although first-time visitors to the LMA did not.

In looking at specific services to offer, there was a slight difference between visitors' responses in different areas of the LMA. Visitors to the Weber/N. Fork areas gave a higher rating to mountain bike trips than visitors to other areas. They were also slightly more in favor of guided horseback, hiking, and fishing trips than visitors to Wall Lake. Although there were differences in preferences, these specific services only rated a maximum mean of 2.25, or still undesirable. Adding commercial services in the LMA would apparently be poorly received by current visitors.

Fish Stocking. Fisheries management was the most divisive

issue of the management options on the survey. Fishing was the sixth ranked "major reason" for coming to the LMA and ranked as the eighth most "participated in" activity. Visitors identified stocking the area with native fish as the most important management option (3.96), with no subgroups giving it a negative rating.

In contrast, "no stocking with fishless lakes left fishless", and "stocking with non-native fish" were negatively rated and were among the four lowest rated options. Youth groups and visitors with "3-5" previous visits were the only subgroups to rate stocking with nonnative fish as desirable. No subgroups rated fishless lakes as desirable.

Managers must realize the diversity of opinions on this issue, while visitors need to be educated on the complexity of the issue. The USFS does not manage fish and wildlife on Forest System lands, those responsibilities belong to the state wildlife agencies. However, the USFS is responsible for managing the habitat.

Information such as what is native and nonnative (as determined by state agencies) needs to be understood by visitors involved in the planning process. More information needs to be brought forward regarding the impacts of fish stocking on social as well as biophysical conditions. Economic impacts are also a consideration. After questions such as these are addressed via two-way communication, an informed choice can be made.

Management Implications for Planning Issues

The knowledge reported here can be used in the first step of

the LAC process to identify issues and concerns. This information also forms the baseline inventory for social conditions measured by objective descriptions of activities, perceptions and preferences as suggested in step 4 of the LAC.

Social Conditions. Based on this analysis, it appears that visitors to the LMA are very satisfied with their visits. This is true for new visitors as well as long-time visitors. The setting is used for numerous activities, most importantly those which provide the visitor opportunities for relaxation and the feeling of isolation from other people. In certain areas, these experiences may currently be threatened by increasing crowding on weekends and holidays. Current visitors desire that the number of people they meet stay about the same or decrease slightly, and most support regulations to provide these conditions.

These factors make it important that standards for measuring social conditions be part of the planning process. This is a difficult issue. At this point in time there are no universal standards regarding crowding and our understanding of the relationship between crowding and satisfaction is still weak. While 51 percent of members of environmental groups felt that crowding was already occurring in the LMA, a few others would still like to meet more people. More specific information on where the crowding occurs and why visitors felt crowded is needed.

Biophysical Conditions. Visitors would like to see the area stay about the same or become a little more natural. They support management actions to protect the environment and the existing

biophysical conditions. Low standard trails are preferred over high standard trails, while leaving some areas with no trails was preferred over either of the above. Visitor behaviors such as littering, improper disposal of human waste, and damage to trees or campsites are the major reported impacts detracting from visitor experiences.

Managerial Conditions. While these are generally the desires of current visitors to the LMA, there is diversity of opinions. There are visitors who are unwilling to accept controls placed on their visits, while others feel that regulations are needed now. While fishing is a major activity, there are visitors who find lakes behind small dams undesirable. Most visitors find stocking with non-native fish acceptable.

Identified topics of concern are complex. While concerns such as fish stocking and areas or zones for different uses were addressed, these are complex issues and are going to require additional agency and visitor education. Visitors gave their highest rating for management options to stocking with native fish; however, no fish are native to these lakes and stocking creates increased social and biophysical impacts. However, given the low rating for fishless lakes, a compromise seems necessary.

Given the variability in visitor desires on some topics, it is important for managers to recognize, seek out, and address the concerns of these diverse groupings of visitors. Individuals not affiliated with any organized groups should be sought out and included in the planning process. Part of this survey provided names

and addresses of individuals who would be willing participants in the LAC planning process. A follow-up scoping letter could be sent to these individuals so their desires are included in the formal scoping process. This could be accomplished with a workbook that provided additional information on these complex issues and then gathered more informed responses.

Further Research

Additional research could focus on two levels. The data in this study could be analyzed for fit with existing recreation research on a regional level and be further analyzed on the local level.

Because it was largely based on previously used questions, results of this study add to the diversity of existing recreation research. Additional study could contrast results of this study with other wilderness and backcountry areas. Further research could look at the urban-proximate influence in a diversity of areas within different regions. Information from this survey could also be added to the growing body of literature on backcountry recreation visitors and how they compare with Wilderness visitors. Research could also investigate how biophysical impacts influence the perception of crowding.

Further research on the local level should include a more focused follow-up study to look at changing trends in the LMA. The Mirror Lake Scenic Highway, which provides access for the majority of visitors to the LMA, is now part of the USFS Recreation Fee Demonstration area. This means that fees are now required to access the LMA, except on the Weber River side. Additional studies could

determine how the collection of the fees changes the characteristics of recreation use and users in the LMA. It could also investigate changes in use or use patterns on the Weber River side of the LMA to see if visitors are displaced due to the fees at the other access points. This would have the effect of increasing use in a lightly used area and possibly changing to characteristics of the visitors who use the area.

To further investigate the zoning concept and the need for a variety of opportunities in different geographical areas within the LMA, a different sampling scheme could be developed and implemented. Sampling could focus on a minimum number of responses per trailhead or zone to improve the capability of employing different statistical tests regarding visitors and zones of use.

To improve the knowledge generated by the existing survey, a more involved measurement of past use experience could be used and contrasted with the current instrument. The crowding scale could also be revised to match the scale developed by Shelby and Heberlein (1986). The map for the existing survey could also be improved to provide additional knowledge of exactly where visitors traveled and camped and where potential conflicts are occurring. This could be added to a Geographic Information System database for additional analysis of the need for subzones within the LMA.

Finally, to improve the public involvement process, a workbook could be developed which focused on the issues identified here and other issues developed by USFS personnel or through the scoping process. The workbook could give background information concerning

the issues to provide more informed public input into the Forest planning process.

Study Limitations

This study provides a cross-sectional glimpse of recreation use patterns in an urban-proximate, semiprimitive, nonmotorized backcountry recreation area in the Intermountain West. As with studies of this type, it is difficult to transfer conclusions and make generalizations about other areas. While the study provides a portrait of visitors to the LMA during 1994, it does not provide accurate data on use levels.

The sampling strategy, due to the proportional stratification, also did not provide adequate responses at some trailheads. The best example was the Main Fork of the Weber River and Yellow Pine trailheads, which had no respondents in 22 and 16 hours of surveying, respectively. Lack of adequate responses in certain categories of respondents limited statistical analysis options. Future studies could set a minimum level of respondents at each trailhead to better search for different use patterns in the identified zones.

Questions about the sampling procedure were also raised due to suspected low numbers of horse users. Horse use levels were thought to be much higher than sampling indicated (eight of 237 respondents). Use could be thought to be higher due to the disproportionate impacts from improper horse use, or the fact that horse trailers take up a larger parking area in often crowded parking lots.

The sample time frame provided data from a limited use period. The study does not provide baseline information on winter recreation

use. As previously explained, this use is considered to be very low. As technology changes, winter use in the LMA for both snowmobiling and skiing may increase.

This study is limited in its application in the recreation planning process. Issues investigated in this survey are complex and more dialogue is needed to develop a greater awareness of the various aspects of the issues. While the data generated provide a baseline for certain conditions, additional public involvement is needed so that two-way communication is established and the more complex issues are understood from agency and visitor viewpoints.

Some management planning is moving to the next step in the recreation opportunity equation, to investigate what benefits a particular area is providing (Stein and Lee 1995; Driver 1996). While benefits are the ultimate outcome from the recreation experience, they may be impossible to manage for because they are interrelated with situations beyond the control of the manager.

And lastly, the sample selected for this study is not intended to represent the views of the general population. Persons in this sample have already enjoyed the experience and are familiar with the area. Some results, particularly those regarding the desirability of outfitter/guides, may be different if the general population were included (Manning 1986).

Summary

In this study, visitors to the LMA were surveyed to determine conditions relevant to how well the area is meeting its ROS designation of semiprimitive, nonmotorized and how well it is

providing the perception of a quality recreation experience. This objective information focused on who the visitors are, how they use the area, their perceptions of social and biophysical conditions, and preferences for selected site attributes and management options. Analysis of the results focused on topics of concern developed by the Kamas Ranger District and how these topics are perceived or affect visitors to the LMA.

These data help define issues and concerns, which is step 1 of the LAC process. They also provide insights into the need for additional opportunity classes within the LMA, step 2 in the LAC process. Finally they provide the objective inventory data, step 4, from which to gauge changes in conditions of the LMA as management prescriptions or visitor desires change.

Results of this study provide the initial input for the LAC process. With these results and further public involvement, KRD personnel can move forward with the LAC process to develop a set of standards and guidelines that define and maintain the desired future condition for the LMA.

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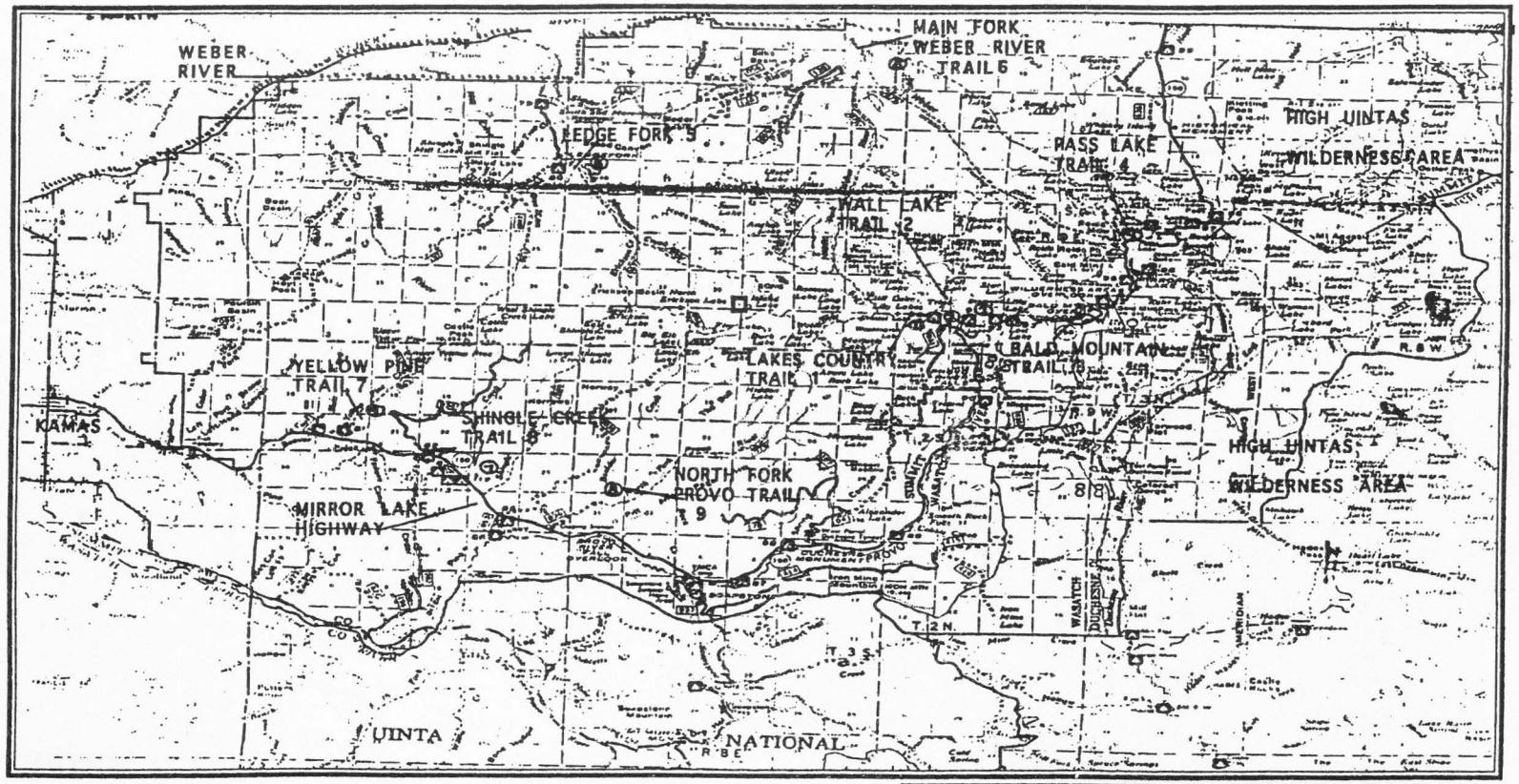
APPENDICES

Appendix A:

Survey Questionnaire

NUMBER _____

LAKES MANAGEMENT AREA



DATE _____ TRAILHEAD _____

BACKCOUNTRY CUSTOMER SURVEY

Participation in this survey is voluntary. While you are not required to respond, your cooperation is needed to make the survey comprehensive and accurate. ALL OF YOUR ANSWERS ARE CONFIDENTIAL. You may be assured that in the analysis and reporting of the results your answers will not be connected with you. The Kamas Ranger District is interested in your feelings concerning the future management of this backcountry area. You have been chosen to represent many customers, therefore it is very important that you fill out the entire questionnaire.

THANK YOU

OMB#0 596-0108 exp 5/31/96

1.) Using the map on the cover, indicate or describe your route of travel and places you camped. Please use arrows to indicate direction of travel.

2.) How many times have you visited the Lakes Management Area before? . . . . . ____

3.) How many times have you visited the High Uintas Wilderness Area? . . . . . ____

4.) How many people were in your group on this trip including yourself? . . . . . ____
How many were male? . . . . . ____
How many animals in your group? . . . . . ____

5.) How would you describe your group? (Check all that apply)

( ) ALONE
( ) FRIENDS
( ) FAMILY
( ) ORGANIZED CLUB OR GROUP
NAME_____
( ) OTHER (Please describe)_____
_____

6.) Please estimate about how far you traveled on this visit to the Lakes Management Area . . . . . _____MILES _____HOURS

7.) How did you travel in the backcountry on this visit?
(Check all that apply, but if more than one, underline the way you traveled the most.)

( ) HIKED, CARRIED OUR EQUIPMENT
( ) HIKED, LEADING HORSES, MULES, OR BURROS
( ) HIKED, LEADING LLAMAS OR GOATS
( ) RODE ON HORSE
( ) RODE ON MOUNTAIN BIKE
( ) OTHER (Please describe) _____

Please use this space to write any comments you may have about the current conditions or your vision of what you would like the Lakes Area to be managed for in the future.

Public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OIRM, Room 404-W, Washington, D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB#0596-0108), Washington, D.C. 20503

OMB#0 596-0108 exp 5/31/96

8.) On this visit did you or your group stay out overnight?
( ) NO (go to question 9)
( ) YES –>Total number nights . . . . . ____

Did you use a gas stove for cooking? . . . . . 1 NO 2 YES
How many times did you have a wood fire? . . . . . ____
How many of these fires were to sit around and enjoy--not for cooking? . . . . . ____

Would you be willing to have fewer wood fires in areas with declining wood supplies if it would mean: (Circle one number for each item)

	YES	PROBABLY YES	PROBABLY NO	NO
A. THERE WOULD BE FIREWOOD FOR CAMPERS IN 20 YEARS	1	2	3	4
B. VISITORS WOULD SEE FEWER CAMPFIRE SCARS	1	2	3	4
C. IT WOULD HELP MAINTAIN TREE AND SOIL RESOURCES	1	2	3	4
D. YOU WOULD SEE FEWER OTHER FIRES AT NIGHT	1	2	3	4

In general, how many nights did you camp near a lake or stream (Underline the letter which represents the distance you prefer to camp)

A. WITHIN 25' OF A LAKE OR STREAM . . . . . ____
B. 25' TO 200' FROM THE LAKE OR STREAM . . . . . ____
C. 200' OR MORE FROM THE LAKE OR STREAM . . . . . ____

For each of the following, would you be willing to camp further from a lake or stream than normal if: (Circle one number for each item)

	YES	PROBABLY YES	PROBABLY NO	NO
A. IT WOULD MEAN SEEING FEWER OTHER PEOPLE	1	2	3	4
B. IT WOULD MEAN NOT SEEING OTHER PEOPLE CAMPING THERE	1	2	3	4
C. IT WOULD MEAN LESS IMPACT TO PLANTS AND SOILS.	1	2	3	4
D. IT WOULD MEAN LESS WATER POLLUTION.	1	2	3	4

E. OTHER (Please describe)_____

8. cont.) In general, how many nights on this visit did you camp near a trail? (Underline the letter which represents the distance you prefer to camp)

A. WITHIN 25' OF A TRAIL . . . . . ____
B. 25' TO 200' FROM A TRAIL . . . . . ____
C. 200' OR MORE FROM A TRAIL . . . . . ____

For each of the following, would you be willing to camp further from a trail than normal if: (Circle one number for each item)

	YES	PROBABLY YES	PROBABLY NO	NO
A. IT WOULD MEAN SEEING FEWER OTHER PEOPLE	1	2	3	4
B. IT WOULD MEAN NOT SEEING OTHER PEOPLE CAMPING THERE	1	2	3	4
C. IT WOULD MEAN LESS IMPACT TO PLANTS AND SOILS	1	2	3	4
D. IT WOULD MEAN LESS WATER POLLUTION	1	2	3	4
E. OTHER (Please describe)_____				

9.) We are interested in knowing what activities you participated in during this visit and how important each was to you. (Circle 1 number for each item)

	DID NOT PARTICIPATE IN THIS ACTIVITY	PARTICIPATED IN BUT NOT A MAJOR REASON FOR THIS TRIP	THIS ACTIVITY WAS A MAJOR REASON FOR THIS TRIP
CHECKING OUT PLACES TO HUNT	1	2	3
HUNTING	1	2	3
NATURE STUDY	1	2	3
FISHING	1	2	3
TAKING PICTURES	1	2	3
HIKING ON TRAILS	1	2	3
HIKING OFF TRAILS	1	2	3
HIKING WITH FRIENDS	1	2	3
CAMPING	1	2	3
PICNICKING	1	2	3
RELAXING	1	2	3
HORSEBACK RIDING	1	2	3
MOUNTAIN BIKING.	1	2	3
FAMILY GATHERING	1	2	3
SEEKING SOLITUDE	1	2	3
TRAINING/CERTIFICATION/OR EARNING MERIT BADGE	1	2	3
OTHER, (Please describe)_____			

The Kamas Ranger District is in the process of initiating resource improvement projects anddeveloping a management plan for semi-primitive, nonmotorized, backcountry areas like the Lakes Management Area. The questionnaire you have just completed is one of the initial steps in the planning process. We would like your further participation in this process. We would like to mail you more detailed information on these projects and management planning efforts. Please give us your name and address so that we might mail you a follow-up questionnaire. Your name and address will not be connected with this questionnaire. Simply fill in the lines below, tear off this page, and hand it in with your completed questionnaire. Your continued participation is critical to the long range planning of these public lands.

NAME:_____

STREET/PO BOX_____

CITY_____

STATE:_____

ZIP CODE:_____

Kamas Ranger District
Wasatch-Cache National Forest
P.O. Box 68
Kamas, UT 84036
(801) 783-4338

Please use this space to write any comments you may have about the current conditions or your vision of what you would like the Lakes Area to be managed for in the future.

10.) How satisfied were you, personally, with this trip?

VERY UNSATISFIED				VERY SATISFIED
1	2	3	4	5

What was it about this trip that made you feel this way?

_____

_____

_____

_____

_____

_____

11.) For each day of your visit up to 5 days (day visitors respond for Day 1), please estimate the number of each of the following:

NOTE: Consider a "group" to be a complete party of one or more people, dogs, or livestock apparently traveling together.

HOW MANY:	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
A. Hiking groups you came within speaking distance of (about 25') while traveling . . .	___	___	___	___	___
B. Large hiking groups (14 or more people) you came with in speaking distance of	___	___	___	___	___
C. Hiking groups you saw, but did not come within speaking distance of	___	___	___	___	___
D. Large hiking groups (14 or more people) you saw, but did not come within speaking distance of	___	___	___	___	___
E. Horseback groups you came within speaking distance of (about 25')	___	___	___	___	___
F. Large horseback groups (any combination of people and livestock totaling 14 or more) you came within speaking distance of	___	___	___	___	___
G. Horseback groups you saw but did not come within speaking distance of	___	___	___	___	___
H. Large horseback groups you saw but did not come within speaking distance of	___	___	___	___	___

12.) If you camped, for each night of your visit up to 5 nights, please estimate the number of each of the following:

	NIGHT 1	NIGHT 2	NIGHT 3	NIGHT 4	NIGHT 5
A. Other camper groups that were camped close enough for you to see and hear them . . .	___	___	___	___	___
B. The number of other camper groups that you could see, but not hear	___	___	___	___	___
C. The number of hiker groups that traveled past your campsite while you were there . . .	___	___	___	___	___
D. The number of horse groups that traveled past your campsite while you were there . . .	___	___	___	___	___

13.) Did you feel crowding was a problem during this visit?

( ) NO
( ) YES - ->How crowded did you feel?

SLIGHTLY CROWDED — EXTREMELY CROWDED

1 2 3 4 5

What in particular made you feel crowded during this visit? _____
_____
_____
_____

14.) Do you feel there should be a limit to the size of groups visiting the Lakes Area? (Please check one)

( ) NO, THERE SHOULD BE NO CONTROLS NOW OR IN THE FUTURE
( ) NO CONTROLS ARE NEEDED NOW, BUT SHOULD BE IMPOSED IN THE FUTURE IF OVERUSE OCCURS
( ) YES, CONTROLS ARE NEEDED TO HOLD USE AT THE CURRENT LEVEL.
( ) YES, CONTROLS ARE NEEDED TO LOWER THE CURRENT USE LEVEL

What is the maximum number of individuals that should be allowed in any one group?

PEOPLE IN HIKING PARTIES . . . . . ___
PEOPLE AND LIVESTOCK IN ANY ONE PARTY . . . . . ___

23.) Do you belong to any organizations that are primarily concerned with conservation or other outdoor recreation? (Check all that apply and list name of organization)

( ) DO NOT BELONG TO ANY ORGANIZATIONS
( ) WILDERNESS/ENVIRONMENTAL _____
( ) SPORTSMAN/FISHING _____
( ) YOUTH ORGANIZATIONS _____
( ) OTHER RECREATION _____
( ) OTHER CONSERVATION _____

24.) In which of the following kinds of places did you spend most time while growing up, to age 18? (Please only mark one answer)

( ) ON A FARM OR RANCH
( ) RURAL OR SMALL TOWN (UNDER 5,000 POPULATION)
( ) LARGE TOWN OR SUBURB (5,001 - 50,000 POPULATION)
( ) SMALL CITY OR SUBURB (50,001 - 200,000 POPULATION)
( ) MEDIUM CITY (200,001- 1,000,000 POPULATION)
( ) IN A MAJOR METROPOLITAN AREA (OVER ONE MILLION POPULATION)

25.) What is the highest level of education you have attained? (Circle one)

ELEMENTARY SCHOOL	HIGH SCHOOL	COLLEGE
LESS THAN 8 8	9 10 11 12	13 14 15 16 MORE

26.) What is your AGE: ___ years and GENDER: ___Male ___Female

27.) Where is your current residence? _____ CITY _____ ZIP CODE

28.) Are you presently:
( ) EMPLOYED OUTSIDE THE HOME——>( ) FULL TIME ( ) PART TIME
( ) UNEMPLOYED
( ) RETIRED
( ) FULL-TIME HOMEMAKER
( ) STUDENT ___FULL TIME ___PART TIME
( ) TEMPORARILY LAID OFF

29.) If you are employed, what is your occupation? (If retired, indicate occupation before retirement.)

JOB TITLE: _____
KIND OF WORK _____
KIND OF COMPANY OR BUSINESS _____

19.) How important is it that any of the following commercial services be offered in the Lakes Management Area?

	NOT AT ALL IMPORTANT				VERY IMPORTANT
A. GUIDED CAMPING TRIPS ON HORSEBACK	1	2	3	4	5
B. GUIDED CAMPING TRIPS ON FOO	1	2	3	4	5
C. HORSES PACKING IN EQUIPMENT	1	2	3	4	5
D. LLAMAS PACKING IN EQUIPMENT	1	2	3	4	5
E. GUIDED MOUNTAIN BIKE TRIPS	1	2	3	4	5
F. GUIDED FISHING TRIPS	1	2	3	4	5

20.) Circle the number below which indicates how much each item met your expectations about this visit to the Lakes Management Area.

	SAW LESS THAN EXPECTED		ABOUT WHAT I EXPECTED		SAW MORE THAN EXPECTED
A. NUMBER OF PEOPLE	1	2	3	4	5
B. NUMBER OF LIVESTOCK	1	2	3	4	5
C. NUMBER OF LARGE GROUPS	1	2	3	4	5
D. HUMAN CAUSED RESOURCE IMPACTS.	1	2	3	4	5
E. LIVESTOCK CAUSED RESOURCE IMPACTS	1	2	3	4	5

21.) What best describes your preference for future management of the Lakes Area? (Check only one item)

( ) SHOULD BECOME MUCH MORE NATURAL
( ) SHOULD BECOME A LITTLE MORE NATURAL
( ) SHOULD STAY ABOUT THE SAME
( ) SHOULD BE DEVELOPED TO PROVIDE MORE FACILITIES (Toilets, signs, trails)
( ) OTHER (Please describe)_____
_____
_____
_____

22.) Based on this visit to the Lakes Area and your perception of the current use level, what best describes your preference for future management? (Check only one item)

( ) WOULD LIKE TO MEET MANY MORE PEOPLE
( ) WOULD LIKE TO MEET A FEW MORE PEOPLE
( ) WOULD LIKE TO MEET ABOUT THE SAME NUMBER OF PEOPLE
( ) WOULD LIKE TO MEET A FEW LESS PEOPLE
( ) WOULD LIKE TO MEET A LOT LESS PEOPLE

15.) For the area of the Lakes you visited, what do you think is the maximum number of people that would be acceptable to see without feeling crowded? . . ___

16.) Did you see any domestic animals, other than your own?

___ NO
___ YES ——>If yes what kinds. (Check all that apply)

( ) COWS . . . . . HOW MANY _____
( ) HORSES, MULES . . . . . HOW MANY _____
( ) SHEEP, GOATS . . . . . HOW MANY _____
( ) LLAMAS . . . . . HOW MANY _____
( ) DOGS . . . . . HOW MANY _____

17.). Please tell us if you noticed any evidence of the impacts listed below and if you noticed them, whether they detracted from your enjoyment of this visit.

	Did Not Notice	Noticed	Detracted From My Enjoyment: Not At All	A Little	A Lot
A. Trails which are worn down from heavy use	1	2——>	3	4	5
B. Many side trails, created by visitors, off the primary travel routes	1	2——>	3	4	5
C. Old roads or trails greater than 4' wide	1	2——>	3	4	5
D. Campsites which have lost vegetation due to human use	1	2——>	3	4	5
E. Trees damaged or cut down	1	2——>	3	4	5
F. Litter left behind by visitors	1	2——>	3	4	5
G. Inappropriate disposal of human waste	1	2——>	3	4	5
H. Trees or shrubs damaged by livestock	1	2——>	3	4	5

18.). Thinking just about the Lakes Management Area, how desirable or undesirable do you think each of the following is? (Circle one number for each question)

		Very Undesirable	Undesirable	Neutral	Desirable	Very Desirable
A.	High Standard trails (wide, steady grades, fairly straight	1	2	3	4	5
B.	Low standard trails (narrow, somewhat like animal trails	1	2	3	4	5
C.	Leaving some areas with no trail	1	2	3	4	5
E.	Bridges over creeks where hikers would otherwise get feet wet	1	2	3	4	5
F.	Connecting or loop trails of varying lengths	1	2	3	4	5
G..	Pit toilets in the backcountry	1	2	3	4	5
H.	Small, loose rock fire rings.	1	2	3	4	5
I.	Relocating trails and campsites out of environmentally fragile areas	1	2	3	4	5
N.	Eliminating grazing by visitors' horses (requiring carrying horse feed).	1	2	3	4	5
J.	Closing some areas to use by horse groups	1	2	3	4	5
K.	Prohibiting wood fires where dead wood is scarce	1	2	3	4	5
L.	Signs along the trail	1	2	3	4	5

		Very Undesirable	Undesirable	Neutral	Desirable	Very Desirable
S.	Signs at trail destinations	1	2	3	4	5
L.	Commercial outfitter or guide services	1	2	3	4	5
M.	Restricting the number of visitors to an area if it is being overused	1	2	3	4	5
O.	Requiring all visitors to obtain a permit to enter the backcountry	1	2	3	4	5
P.	A natural fishery—no stocking, and fishless lakes left fishless	1	2	3	4	5
Q.	Stocking the area with native fish.	1	2	3	4	5
Q.	Stocking the area with non-native fish.	1	2	3	4	5
T.	Seeing Rangers or patrol people in the backcountry	1	2	3	4	5
U.	Lakes behind small human-made dams	1	2	3	4	5
V.	Absence of man-made features, except trail.	1	2	3	4	5
W.	Forests/wildlife much the same as before pioneers	1	2	3	4	5
X.	Different parts of the Lakes Area favoring different types of users	1	2	3	4	5
Y.	To be isolated from the sights and sounds of other people	1	2	3	4	5
Z.	Requiring camping in designated campsites.	1	2	3	4	5

Appendix B:

Survey Sampling Schedule

Kamas Sampling Plan for 1994

1st	2nd	3rd	Date	Time
3	1	2	06/19/94	am
4	2	1	06/19/94	pm
3	1	2	06/20/94	am
8	7	9	06/20/94	pm
1	2	4	06/21/94	am
4	1	2	06/21/94	pm
1	2	3	06/22/94	am
2	4	1	06/22/94	pm
1	2	3	06/23/94	am
1	2	3	06/23/94	pm
8	7	9	06/24/94	am
7	8	9	06/24/94	pm
6	5		06/25/94	am
1	3	2	06/25/94	pm
3	2	1	06/26/94	am
2	1	4	06/26/94	pm
2	4	1	06/27/94	am
1	3	2	06/27/94	pm
2	4	1	06/28/94	am
1	4	2	06/28/94	pm
1	4	2	06/29/94	am
2	4	1	06/29/94	pm
2	4	1	06/30/94	am
2	1	4	06/30/94	pm
3	1	2	07/01/94	am
1	4	2	07/01/94	pm
6	5		07/02/94	am
2	3	1	07/02/94	pm
3	1	2	07/03/94	am
2	4	1	07/03/94	pm
7	8	9	07/04/94	am
1	2	4	07/04/94	pm
3	2	1	07/05/94	am
2	4	1	07/05/94	pm
6	5		07/06/94	am
4	2	1	07/06/94	pm
3	2	1	07/07/94	am
6	5		07/07/94	pm
2	1	3	07/08/94	am
			07/08/94	pm
2	4	1	07/09/94	am
			07/09/94	pm
1	2	3	07/10/94	am
3	1	2	07/10/94	pm
2	3	1	07/11/94	am
5	6		07/11/94	pm
2	1	4	07/12/94	am
4	1	2	07/12/94	pm
1	2	3	07/13/94	am
2	1	3	07/13/94	pm
7	8	9	07/14/94	am
6	5		07/14/94	pm
4	2	1	07/15/94	am
3	1	2	07/15/94	pm
6	5		07/16/94	am
1	2	4	07/16/94	pm
2	3	1	07/17/94	am
2	3	1	07/17/94	pm
			07/18/94	am

1st	2nd	3rd	Date	Time
4	1	2	07/18/94	pm
9	8	7	07/19/94	am
6	5		07/19/94	pm
8	9	7	07/20/94	am
2	1	4	07/20/94	pm
5	6		07/21/94	am
3	1	2	07/21/94	pm
6	5		07/22/94	am
1	3	2	07/22/94	pm
2	1	4	07/23/94	am
			07/23/94	pm
2	3	1	07/24/94	am
3	1	2	07/24/94	pm
2	1	3	07/25/94	am
2	1	4	07/25/94	pm
6	5		07/26/94	am
7	9	8	07/26/94	pm
2	4	1	07/27/94	am
2	3	1	07/27/94	pm
6	5		07/28/94	am
2	1	3	07/28/94	pm
1	2	4	07/29/94	am
1	2	4	07/29/94	pm
			07/30/94	am
3	1	2	07/30/94	pm
9	8	7	07/31/94	am
5	6		07/31/94	pm
			08/01/94	am
2	3	1	08/01/94	pm
3	1	2	08/02/94	am
1	3	2	08/02/94	pm
6	5		08/03/94	am
1	2	3	08/03/94	pm
			08/04/94	am
1	2	3	08/04/94	pm
9	8	7	08/05/94	am
2	3	1	08/05/94	pm
1	3	2	08/06/94	am
9	8	7	08/06/94	pm
2	3	1	08/07/94	am
2	1	4	08/07/94	pm
6	5		08/08/94	am
1	3	2	08/08/94	pm
1	2	3	08/09/94	am
9	7	8	08/09/94	pm
6	5		08/10/94	am
2	3	1	08/10/94	pm
9	8	7	08/11/94	am
1	3	2	08/11/94	pm
3	1	2	08/12/94	am
4	1	2	08/12/94	pm
1	4	2	08/13/94	am
2	4	1	08/13/94	pm
2	1	3	08/14/94	am
4	1	2	08/14/94	pm
1	3	2	08/15/94	am
2	1	3	08/15/94	pm
5	6		08/16/94	am
1	3	2	08/16/94	pm
1	2	4	08/17/94	am
5	6		08/17/94	pm
2	4	1	08/18/94	am

1st	2nd	3rd	Date	Time
4	1	2	08/18/94	pm
2	4	1	08/19/94	am
4	1	2	08/19/94	pm
			08/20/94	am
1	3	2	08/20/94	pm
2	1	4	08/21/94	am
1	3	2	08/21/94	pm
1	2	3	08/22/94	am
1	2	3	08/22/94	pm
3	2	1	08/23/94	am
1	4	2	08/23/94	pm
1	3	2	08/24/94	am
1	2	4	08/24/94	pm
1	2	4	08/25/94	am
1	3	2	08/25/94	pm
1	3	2	08/26/94	am
2	1	3	08/26/94	pm
2	1	3	08/27/94	am
2	3	1	08/27/94	pm
8	9	7	08/28/94	am
1	3	2	08/28/94	pm
2	3	1	08/29/94	am
2	3	1	08/29/94	pm
7	9	8	08/30/94	am
5	6		08/30/94	pm
1	2	4	08/31/94	am
1	2	4	08/31/94	pm
2	4	1	09/01/94	am
1	4	2	09/01/94	pm
6	5		09/02/94	am
2	3	1	09/02/94	pm
8	7	9	09/03/94	am
3	2	1	09/03/94	pm
5	6		09/04/94	am
7	9	8	09/04/94	pm
3	2	1	09/05/94	am
6	5		09/05/94	pm
7	8	9	09/06/94	am
4	1	2	09/06/94	pm
4	1	2	09/07/94	am
4	2	1	09/07/94	pm
1	4	2	09/08/94	am
1	3	2	09/08/94	pm
4	2	1	09/09/94	am
4	2	1	09/09/94	pm
			09/10/94	am
2	4	1	09/10/94	pm
			09/11/94	am
4	2	1	09/11/94	pm

TRAILHEADS

1. LAKES CNTRY
2. WALL LAKE
3. NOTCH LAKE
4. Cuberant
5. Ledge Fork
6. MAIN FORK WEBER
7. Shingle Creek
8. NORTH FORK
9. Yellow Pine