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THE VISUAL DECISION MAKING PROCESS AS A  
TECHNIQUE FOR REDISTRIBUTING OUTDOOR  
RECREATION USE

by

Martha Gail Hahn

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

of

MASTER OF SCIENCE

in

Outdoor Recreation

UTAH STATE UNIVERSITY  
Logan, Utah

1982

## ACKNOWLEDGMENTS

When I sit and ponder the mysticism of an ancient rock art panel, I half expect the figures to begin dancing off the sandstone to tell me of the joy and hardship the "ancient ones" endured in their adaptation to an environment so teaching. Acknowledged upon the rocks are the great leaders and respected ones for their contribution to their people's culture.

Much like the ancient ones, I too would like to leave a picture, acknowledging those who have relentlessly pushed me to expand my horizons in the effort of accomplishing this study. One of the first figures to appear would be that of my major professor, Dr. Richard M. Schreyer. From the start his critical comments have helped structure my loose ideas and interest, stimulating and giving form to my thoughts. My gratitude extends even further by knowing the appreciation Rich has towards photography and the canyon country of southeastern Utah.

As a "respected warrior," Dan Williams contributed an infinite amount of his valuable time to the preparation and implementation of this study. Without him, my questionnaires would still be blowing across the San Rafael Swell, observations overlooked, and my "how" questions never answered. A special thanks goes out to a very good friend.

On the committee list, two individuals are to be recognized. Dr. Doug Bock laid the ground work for my understanding of statistics and research methods. He also served as a "medicine man," seeing to it that

many miles were put to the pavement to keep the mind and body fit. Dr. Kent Downing stepped in, midstream, and brought with him a spirit of enthusiasm and commitment.

Besides my graduate committee, I owe thanks to several more individuals. A special person, Tom Parker, graciously heard all my different ideas and wild schemes. He performed the service of a "great thinker," listening with intent and reproducing my disjointed notions into flowing and logical concepts. Sometimes photography and flat tires don't mix, but Craig Law never let it bother him. He taught me that to photograph takes a lot of slowing down and a lot of patience. It takes time and light and life. Another job that takes time is typing. Thanks to Ann Lambertsen and her ability to meet three deadlines at once, the most critical time was met. Finally, it is to Sam Rowley I would like to extend special thanks and personal gratitude. Without his professional willingness, personal interest, and continued caring, the accomplishment forth coming would not have occurred. He has given me the opportunity to "discover" a very magical place, the San Rafael Swell, and that experience will be permanently etched in my memory.

This study was implemented through a Cooperative Education Program between the Bureau of Land Management and Utah State University. A portion of the funding for the research was provided through the McIntire-Stennis funds.

Martha G. Hahn

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## ABSTRACT

The Visual Decision Making Process  
as a Technique for Redistributing  
Outdoor Recreation Use

by

Martha Gail Hahn, Master of Science

Utah State University, 1982

Major Professor: Dr. Richard M. Schreyer  
Department: Forestry and Outdoor Recreation

The demand for recreation on public lands has been growing steadily, resulting in undesirable impacts on certain resources as well as recreation experiences. The problem addressed by this research is the uneven distribution of recreational use that causes a concentration of impacts. This thesis describes the development and testing of a method to reduce the uneven/concentrated recreation use occurring on the public lands.

The basic objectives of the study were to determine the effectiveness of redistributing recreationists by the use of photographs and a decisional process using photographic information and to identify its potential as a tool in meeting management objectives.

The experimental treatment device was the Visual Decision Making Process consisting of color photographs, a map and a selection matrix used in the decision-tree to match people to places that would best suit their needs.

Recreationists were surveyed on three different weekends during the spring season of 1980 in the San Rafael Swell of southeastern Utah. People who had been contacted during that time were randomly assigned to treatment or no-treatment control groups. A home interview was conducted prior to the 1981 spring recreation season. After the season, both the treatment and no-treatment control groups were contacted for posttest questioning. Data were collected from the contact questioning, observation, and posttest questionnaires.

The results indicated that recreation use was influenced by the Visual Decision Making Process, but only a small percentage of people who went through the process went to an area they chose. While the major influence of the process was not significantly proven, there seemed to be a trend in change behavior. This small percentage of change may be an adequate amount to meet management objectives of lessening impacts.

It was also found that persons driving four-wheel drive vehicles and larger groups were significantly more influenced to redistribute than car/pickup drivers and smaller groups.

Recommendations are made for management practices to reduce uneven/concentrated recreation use and suggestions for further research are offered.

(111 pages)

## CHAPTER I

### REDISTRIBUTING USE: A PROVISION FOR THE DIVERSITY OF OUTDOOR RECREATION OPPORTUNITIES

#### Introduction

With an increasing demand for recreation on public lands, managers and land-use planners are acknowledging the importance of supplying a diversity of outdoor recreation opportunities. A complicating factor is that recreation use is very unevenly distributed. Managers regard this as undesirable because it results in "trouble spots" with high physical, biological and social impacts (Roggenback and Berrier 1980). The combination of increasing use, uneven distribution of that use, and need for supplying a diversity of opportunities is increasingly evident on lands administered by the Bureau of Land Management (B.L.M.).

Uneven use of an area can evolve because of elements such as proximity of a setting to urban populations, access, and the lack of knowledge users may have about existing opportunities. Uneven use can occur in both space and time (Krumpe 1979), especially in environments where use is contingent upon weather. The warm spring months in the desert (Easter through Memorial holidays), for example, are more conducive to recreation participation than the hot months of the summer. Thus, use is highest in these environments during the spring.

While providing a diversity of outdoor recreation settings is a major objective for recreation management in the B.L.M., the agency is primarily concerned with management of public lands on a multiple use

sustained yield basis for optimum production of various products and services. Management for outdoor recreation opportunities is one part of the complex resource production responsibility including resource conservation and development of minerals, protection of wildlife, public land surveys, forest management and range management (Brockman and Merriam 1973).

If conflict arises between and among resource activities, mitigating measures must be established in order to maintain the multiple use sustained yield objective. In the case of uneven/concentrated outdoor recreation use, environmental impacts are more likely to occur, causing possible conflict with other resource uses. As has been observed in some cases, mitigating measures established to resolve conflicts most often result in the restriction of recreation use. Consequently, rather than the meeting of management objectives for opportunity diversity, a narrowing of recreation opportunities takes place.

#### The Dismal Cycle in Recreation Management

The problems described above represent a "dismal cycle" (see figure 1). As an illustrative example, the manager has perceived the problem of uneven concentrated recreation use as causing environmental impacts. From the manager's position, the problem is defined as one of resource protection from recreation rather than pursuing objectives of dispersing recreationists to facilitate experience diversity and maximizing utilization of the available recreation resource. Therefore, the manager's reaction is to restrict recreation use. This action

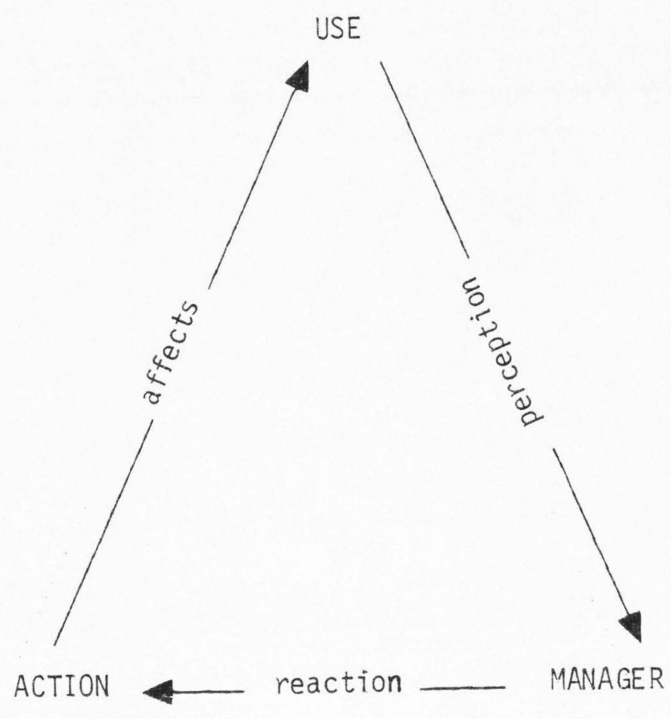


Figure 1. The dismal cycle

subsequently changes the character of the use by narrowing the opportunities available for recreation. Thus, the manager must react to this problem by taking further steps to meet the objective of supplying a diversity of opportunities.

Often it is the manager, not the recreationist, who perceives problems in public use of the environment (Peterson 1974). Actions taken to resolve the problems are not understood by the user and looked upon as restrictive, or authoritarian in nature. The requirement of use permits, limits on activities allowed in an area, and even closure of the area are the types of authoritarian actions taken in response to uneven/concentrated use, and ones against which users respond most strongly. In a period of high sensitivity over the amount of federal control on lands in the West, these actions can abet general feelings of animosity toward federal resource management.

While such regulations may reduce impacts at one place and time, the dismal cycle suggests that aggregate impacts may not change. Moreover, managers are still faced with meeting their objective of providing a diversity of recreation opportunity settings. Because of the recurring loop encountered in the "dismal cycle" of authoritarian control, a more subtle and less obtrusively manifested strategy of nonauthoritarian control would seem preferable for managing visitor behavior in recreation areas exhibiting these characteristics. Fundamentally, nonauthoritarian controls can influence the user to make choices consistent with those desired by management objectives (Lime 1977). Direct regulation of use-intensity or distribution can be

eliminated by controlling factors considered by a user when s/he makes a decision on where to go and how long to stay (Gilbert et al. 1972).

One important nonauthoritarian control method involves influencing user redistribution through information dissemination (Krumpe 1979). Such information could supply the recreationists with a greater range of choices, increasing their behavioral ability to travel to new settings and to do so on their own. This approach is of course based on the assumption that areas of high recreational use concentration in wildland settings may be the result of a lack of awareness of other existing opportunities on the part of recreationists.

#### Study Objectives

The purpose of this thesis is to evaluate a new technique for information dissemination based on photographic imagery of differing experience opportunities. This approach centers on the complexity and effectiveness of such a technique in conveying information to a population of heterogenous educational ability. Because of the diversity of recreation opportunities available on the public lands, a broader range of individuals with varying levels of educational ability are present. Thus, unlike more homogenous wilderness users who tend to have a high educational background (Lucas 1981), general recreationists differ along an educational continuum, where the ability to use and understand information is variable.

The San Rafael Swell, a resource area managed by the B.L.M. in southeastern Utah, is one such place where uneven/concentrated general



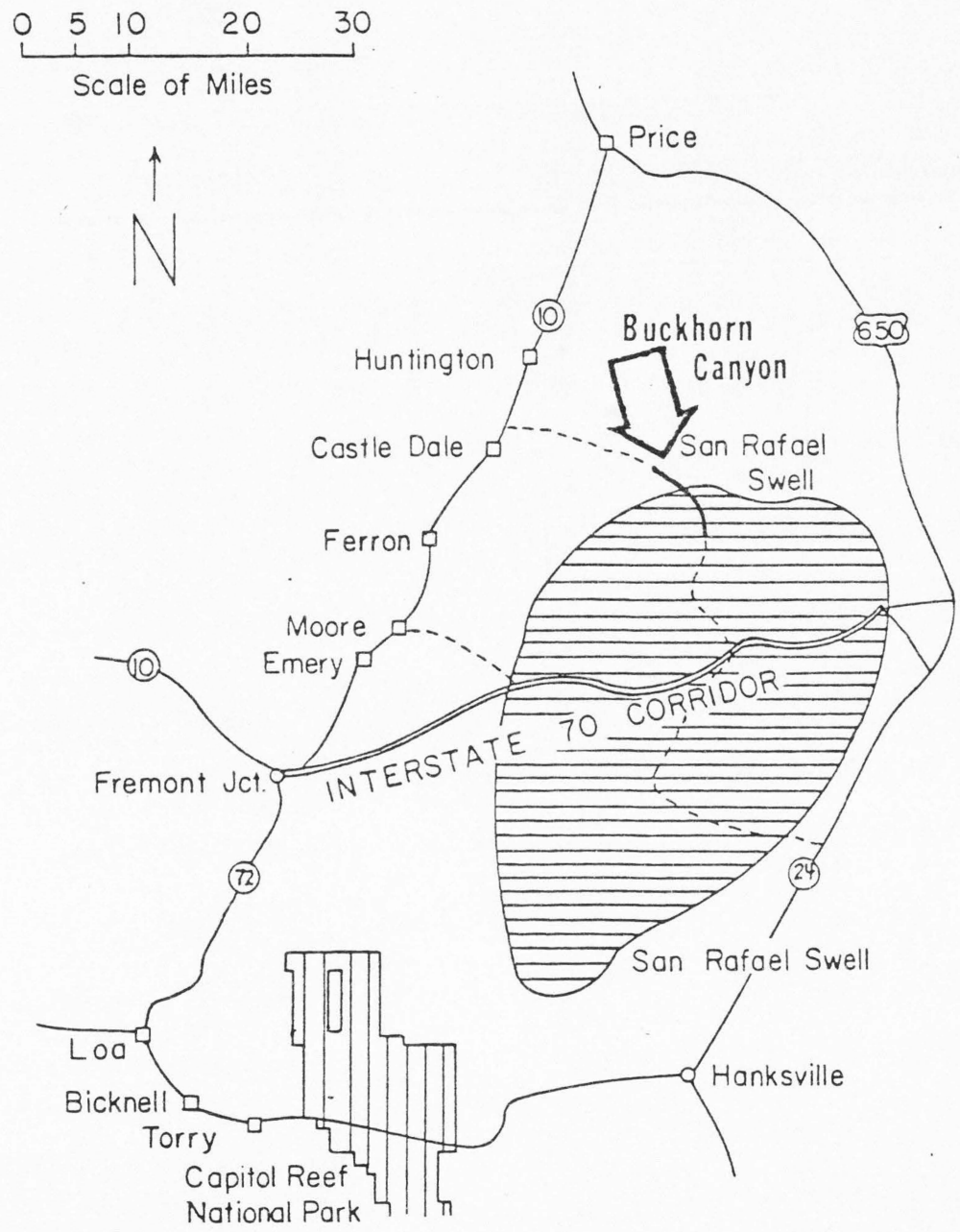


Figure 2. San Rafael Swell map

recreation use takes place and poses a problem for management personnel. One portion of the Swell, Buckhorn Draw (see figure 2), has been identified by managers as a problem area needing use restriction due to a high concentration of visitors, particularly on specific weekends during the spring. The intent of the present study is to aid the manager in avoiding the "dismal cycle" of narrowing recreation settings. By supplying recreationists with information on the area's existing recreation settings, an attempt at redistributing uneven/concentrated use can be initiated in a nonauthoritarian manner.

Therefore, the objectives of this study are:

1. To develop a management tool using photographic imagery to facilitate user decisions that improve the fit between preferences and opportunities.
2. To disperse users from an area of uneven/concentrated recreation use to less impacted settings.
3. To evaluate the effectiveness of such a tool as a nonauthoritarian approach in meeting management objectives.
4. To expand the user's range of perceived opportunity settings closer to the existing settings.
5. To make users aware of and motivated to seek out additional opportunity settings that satisfy their needs and preferences.

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

Information plays an important role in an outdoor recreationist's planning process. Decisions are made about where to go, what to do, how to get there and how long to stay using available information. Information can therefore be used as a behavior influencing tool by those providing a service or opportunity setting; such as a commercial outfitter advertising river expeditions, or the B.L.M. answering questions on the public lands. There are many media sources that can be used to convey information. Their effectiveness, however, may be limited to specific situations. Written material, for example, may be too difficult for those less proficient with reading skills. By adding an illustration to the process, the less-skilled individual may be able to gather more meaning from the information.

This study is concerned with the effectiveness of a photographic medium as an information source in the recreation decision process, and as a tool for land use planning. The first part of this literature review will briefly explain the outdoor recreationist's choice and behavioral decision process. The second section will examine previous research that has used information dissemination as a nonauthoritarian management strategy. The third portion will describe the use of photography as an informative medium in an outdoor recreation context.

## Choice and the Behavioral Decision Process

The decision process of an outdoor recreationist can be very complex; many variables influence an individual's choice. A complete synopsis of the subject matter is beyond the scope of this study. The following section is rather a brief overview of the connection between information, decision making and behavior of the recreationist.

### Consumer Behavior

One area that relates to decision making and behavior is consumer behavior. Marketing experts have found advertising to be a key factor in changing behavior. They are concerned with consumer behavior that involves all of the purchase related activities, thoughts and influences which occur before, during and after a purchase process itself as performed by buyers and consumers of products and services (Williams 1980).

Kennedy (1970) used the "consumer research" orientation while looking at the personal aspects of recreation behavior. By doing so, recreationists were seen as decision makers selecting areas for recreation, evaluating their choices, and eventually deciding to return or search for new recreation areas. The decision process, according to Kennedy, is seen as the user's choice and evaluation of recreational areas. The recreationists' state of satisfaction, expectations and levels of aspiration are brought together to understand behavior. The changing of behavior will vary with individuals and the environment. Returning to old, familiar areas is the easiest decision for recreationists. Kennedy explained that, "Disregarding motivation by excitement

for change or by impulse, recreationists would tend to return unless (1) they are forced to change, or (2) alternative areas present greater rewards (at acceptable cost)" (Kennedy 1970:44-45).

When a consumer makes a purchasing decision, the choice has revolved around many alternatives with many attributes. For instance, if an individual has decided to buy a new car, that person must examine an array of brands possessing different levels of quality items characterizing each brand. On the same line, Krumpal (1979) feels that the recreation decision process is clearly multi-attribute and multi-alternative in nature. It is multi-alternative in that people must select an activity or combination of activities from many alternatives. Furthermore, the decision involves alternatives that possess attributes, which are the perceived characteristics or qualities of the alternative. The recreationist must, therefore, consider not only the activity alternatives available, but also the desired bundle of attributes and outcomes associated with each.

In Krumpal's research he presented several decision models for both multi-attribute and multi-alternative behavior. He categorized these models into compensatory and noncompensatory, identifying their implications for influencing wilderness recreation choice decision. He chose the decision net theory as being the most appropriate to show how people process situational attribute information to reach a decision.

#### Steps in the Decision Process

In consumer behavior, marketing experts define the decision process in four steps. Problem perception, the first step, deals with the

desired state of the individual or consumer needs. The second, deliberation, evokes five processes: There is a search; information is acquired and organized; information is processed; alternatives are reorganized; criteria for judgement are developed and; the alternatives are weighed. For the third step a decision is made that involves the selection of an alternative. Following the decision comes "buyer's remorse," or more specifically, post-cognitive dissonance.

Similar to the consumer decision process, Lucas (1981) identified four major elements involved in recreational location choices. His first element deals with the characteristics of the person choosing the location. These characteristics include personality, experience, personal preferences, knowledge and commitment to the type of recreation. The second component involves the choice process, where a decision is made to take a specific type of trip with a certain time limit. The importance of the particular trip is considered following the decision. In the third element credibility of the source, types of information, lead time in receiving the information, relative location of the choice and the influence of companions are combined as influences related to a location choice. Lastly, alternative potential locations with varying characteristics (familiar, new; known, unknown) are considered.

From these elements Lucas developed several assumptions and postulates relating information, the choice decision of the recreationist and their behavioral outcome. He summarized his speculations by stating (1981:19):

" . . . we view recreationists as having some ideas about what they are looking

for, which can vary greatly among people; using a crude benefit-cost analysis to determine how much effort they will put into picking a place to go; being only fairly good information processors, with a streak of mental laziness; and becoming somewhat stubborn about changing their minds after they have chosen a place."

Much like marketing experts, recreation planners and managers should be concerned about the recreationists' choice processes and how information can play a big role in influencing choice behavior. The next portion of this review will look at information dissemination and how it has been used in several management situations involved in changing behavior of the recreationist.

#### Information Dissemination: A Nonauthoritarian Management Strategy

Lime and Lucas (1977:20) noted that "Information seems to be a highly desirable visitor-management technique. It is nonauthoritarian and serves the visitor's desires rather than restricting and regulating him." One may then ask, can information supplied to visitors effectively serve as a technique for redistributing general outdoor recreational use? It is not surprising that little research has been done in this area, since the need for redistribution of uneven use has increased only in recent years. Further, very little research has been conducted on the redistribution of the heterogeneous outdoor recreationist. Most of the focus has been primarily on wilderness use and the manager's problem of "providing" and "protecting" simultaneously.

### Lack of Information

Even though the research is limited, positive results have been identified. For instance, Brown and Hunt (1969:79) recognized "the lack of information as the primary factor" accounting for the overflow of visitors in recreation sites. They found that information signs at roadside rest and viewing areas could redirect use substantially, eliminating congested parking problems. Additionally, they found that information signs stimulated greater use of a previously unsigned roadside rest area.

### Type and Timing

Evidence from wilderness research has shown the kind of information and when it is received are also major components influencing visitor behavior. Oxenfeldt (1966) indicated that behavior is most efficiently altered when the consumer is given advertising (information) that s/he is seeking. This may be one reason why an attempt to redistribute campers away from specific areas in the Great Gulf Wilderness in New Hampshire failed (Canon, Alder and Leonard 1979). Information attached to permits relied more on rules rather than the area.

Schomaker (1975) tested a map showing heavily used areas in Colorado's Rawah Wilderness. He found it had no effect on the visitor's choice of travel routes for those who received the map just before they began their trip (at the trail head). Schomaker concluded that "the information probably came too late in the planning stage" (1975:68). Further, it focused mainly on solitude which might not have been the most important reason influencing decisions concerning visits to the Rawah Wilderness.



Lime and Lucas (1977) took into account both the problem of utility and timing in their attempt to reduce congestion and crowding in the Boundary Waters Canoe Area (BWCA). A portion of the visitors who entered at the most heavily used entry points in 1974 were sent copies of a brochure in the spring of 1975. The packet included use pattern information (noting heavily used places and times), information on wildlife, fishing and places where black bear depredation on camps were most common. Rules, regulations and nonmotorized zones were also included. About one-third of the sampled respondents who visited the area in 1975 were influenced in their choice of entry point, route or time of subsequent visits. Three-fourths of the respondents felt the information was useful and those who had less previous experience in the area were most often influenced. The authors felt the effort was particularly worth evaluating "because the information was sent to visitors well in advance of the use season and in plenty of time for visitors to study it prior to visiting the area." They concluded that "if properly designed and packaged so as not to destroy a visitor's sense of exploration and discovery, information supplied to visitors can be a very useful and effective tool for redistributing wilderness use" (Lime and Lucas 1977:20).

#### The Proper Information Package

Rather than just giving people information on the amount of crowding that can be expected in specific areas, Krumpe (1979:16) proposed that "even more effective distribution of use could result from giving

people information pertinent to the behavioral aspects of their desired wilderness recreation experience." Krumpe developed and distributed a "Backcountry Trail Selector" (BTS) which included a map and brochure with a description of a number of lightly used trails. The descriptions were arranged in a decision-tree form, where visitors were asked a series of questions dealing with their preferences for backcountry experiences. Depending on their answers to such questions as length of trip, difficulty of route and more detailed features of the setting, the decision-tree guided them to suggested routes. Other applicants for permits did not get the BTS and were used as a comparison control group. As a result, only 14 percent of the control group chose one of the routes characterized in the BTS, compared to 37 percent who received the treatment. The study also showed that those less familiar with the area more often chose one of the suggested trails.

Krumpe's information package was presented in a novel format (decision-tree). It was attractive, fun to use and of immediate relevance to those securing a backcountry camping permit. His respondents listed the BTS as the second most influential source of information for selecting a trail; their first being the park ranger. Krumpé suggested that by combining the two sources, effectiveness of the BTS in redistributing backcountry users could be achieved.

#### Multiple Information Sources

An effort to modify choices of campsites by means of both a brochure and brochure with a personal message was tested in the Shining Rock

Wilderness of North Carolina (Roggenbuck and Berrier 1980). The approaches showed significant dispersal of campers to alternative sites. Even though the two sources of information differed little in their effectiveness, visitor response to the brochure with personal contact was much more positive. Roggenbuck and Berrier concluded (1980:12),

"In areas where use is very concentrated in one area, one person may be very effective in dispersing use. In areas where agency employees are already stationed in the backcountry, distribution of brochures with a verbal message at places and times of concentrated use could easily be added to their duties and should prove worthwhile."

Roggenbuck and Berrier recorded positive results in dispersing users when information was supplied at both the trail head or in camping areas. A similar study conducted by Lucas (1981) over a 2-year period did not shift overall use patterns towards lightly used trailheads. Lucas found that a majority of the users in the Selway-Bitterroot Wilderness of Montana never saw the brochure that was distributed in 1974. He also found that only about one-fourth of the visitors had the brochure before they reached the trailhead and about one-fourth of those said they used it to choose a trailhead (most often a lightly used one). Lucas felt the brochure's focus was too narrow because response indicated information on crowding was not a main influential factor in trailhead choice. He did observe, however, that the study suggested "information programs, which are attractive, nonauthoritarian indirect techniques, can redistribute use substantially if information about a variety of area conditions is presented to visitors early enough in the location choice process" (1981:2-3).

### The Use of Information as a Management Tool

Previous studies have shown positive implications toward the use of information as a management tool. Information, however, must be used in particular ways to be an effective implement in management (Lucas 1981). Lucas addressed eight considerations important in making such a tool useful. They are:

1. Information campaigns should be geared to management objectives; objectives need to guide the design and conduct the information campaign.
2. A large proportion of the visitors should receive the information.
3. The information should be delivered early enough in the choice process.
4. Because of differences in visitor objectives and information processing, information provided should cover a variety of attributes of the environment, use and managerial setting.
5. Detail is needed to compete with previous knowledge and advice of friends. Detail may also improve credibility of the information.
6. An information campaign cannot rely entirely on written material. Face to face and oral communication seems to be a more important channel of communication.
7. False information can never be used, but ethical guidelines are less clear on issues on selectivity, completeness and emphasis.

8. Too much detailed information may take away the sense of exploration and discovery.

The structure of the information given to visitors and the timing of its availability are two of the most important factors influencing several of the studies discussed in this review. Lucas and Krumpe specifically mentioned the possibility of using types of information, other than brochures, to enhance effectiveness. The third part of this review will look at photography as an informative medium and will identify its possibility as an information dissemination tool.

### Pictures As An Informative Medium

#### Pictures and Their Influence

It was nine of William Jackson's best photographs, given to each member of the House and Senate, that provided the impetus for passage of a bill signed by President Grant on March 1, 1872. The bill turned an area of 3,578 square miles of Wyoming into the country's first national park - Yellowstone (Pollack 1969). Today a variety of experiments (Shepard 1967; Kreimer 1977; Peterson and Neumann 1969; Samuels 1970) have shown empirical evidence that the use of visual imagery (pictures) does have significant results in relation to learning, recognition and behavior.

Kennedy (1974:4) stated that "Picturing is a means for informing people about visible things." This is a particularly important consideration in nature, where visual aspects play a very important role in recreation. Kennedy feels that a picture is used for every possible

reason: "to propagandize, identify, give pleasure, comfort and remind. Pictures are amusing, puzzling and informative" (1974:47). A book, for example, contains pictures to attract the reader's attention, to inform the reader about the content, to give them an efficient way to recall the content and to evoke a background of association with it.

O'Connor and Hermelin (1961) discovered that neither advanced age, schooling, nor a specially high level of intelligence seems to be necessary for picture perception to be successful. They tested 72 subjects with a mean I.Q. of less than 50 (under 50 being the bottom 1 percent of the population). The subjects were given different tasks, like picking out from a list of spoken words the names for the outlined pictures they had just seen. The majority of the subjects were able to perform accurately at the various tasks.

Picture perception is an important aspect in the effectiveness of communication for the general outdoor recreationist. Lucas (1981) has recognized wilderness visitors as showing very high educational levels, indicating an ability to understand and use fairly complex information. Contrary to the wilderness user, the general outdoor recreationist shows greater variation in educational attainment, and the ability to use and understand information is varied. Gombrich (1969) contends, however, that comprehension of pictorial representations is a function of experience. He feels that it is necessary for one to learn to read pictorial images, but that the learning is rapid. Carrying the thought further, Paivio (1971) found that "picturable" material is generally easier to learn and remember than less "picturable" material. Specifically,

pictures are generally more memorable than words and concrete high-imagery words are more memorable than abstract low-imagery words.

Paivio concluded that at all levels, memorability is directly linked to the picturability of the image-arousing value of the material being viewed.

Thus, the use of pictorial material as an informative tool seems promising. The next portion of this review will look at the use of photographs in the management of outdoor recreation. It will identify the different aspects of the use of photographs in relation to the recreationists' aesthetic preferences.

#### The Use of Photographs in Outdoor Recreation Management

Recreation management has been one of the most common areas for the use of photography. There have been many studies conducted using photographs as an aesthetic measure of preferences if change were to occur to an outdoor recreation area. For instance, Shafer and Richards (1974) used a color slide projection to determine reactions to an actual scene. They found that if a photograph of an outdoor scene adequately depicts most of the variety in a scene, respondents have similar reactions (in terms of the adjectives they use) to describe both the photograph and the scene. At the same time, if only a portion of the scene's total variation is shown, usually only a portion of the variation in verbal reactions of the entire scene is accounted for. Thus, they concluded that "a photograph that shows only part of a scene can change not only one's word description of the scene, but may also change one's

reaction to resource or landscape-management procedures involving the total environment where the photograph was taken" (1974:1).

Similar studies have been done with photographs using a landscape-preference model. The model, developed by Shafer and others (1969), is used to help evaluate and compare quantitatively the aesthetic quality of different landscapes. By knowing that quantitative features in the photo of a landscape affect its aesthetic appeal, the authors felt "resource managers and planners can begin to have a factual basis for decisions about wildland aesthetics" (1969:16).

The preference measurement tends to be lacking in weight when combined with physical and economical measurement. For example, when alterations in the environment are to occur, psychological changes are often overlooked and the physical and economic become the beneficial measurement. The reasoning for this disregard is that psychological reactions to the environment are not easy to measure.

An environmental assessment can be determined in two ways (Calvin, Dearing, Curtin, 1972) and involves the use of physical or psychological measures. Physical measures gauge objects and spaces in an actual environment (or photograph of an environment), such as an observation of characteristics. Psychological measures assess the characteristics of a physical environment by human observers with the means of a scale or verbal statement. Calvin et al. combined the two measures (using photographs and a semantic differential technique) to obtain natural environmental preferences. They found two major dimensions which people use in their subjective assessments of natural scenery: natural scenic beauty and natural force - natural tranquility.



Personal preferences, such as those evaluated above, play an important role in one's choice for outdoor recreation opportunities. Krumpe (1979) noted, ". . . people do not merely demand a recreation activity (a good), but rather, they demand opportunities to experience desired situational attributes that characterize preferred recreation environments which in turn lead to satisfying psychological outcomes and longer term benefits (utilities)" (1979:28-29).

## CHAPTER III

A CONCEPTUAL MODEL OF EXISTING AND PERCEIVED RECREATIONAL  
OPPORTUNITY SETTINGS IN THE SAN RAFAEL SWELLIntroduction

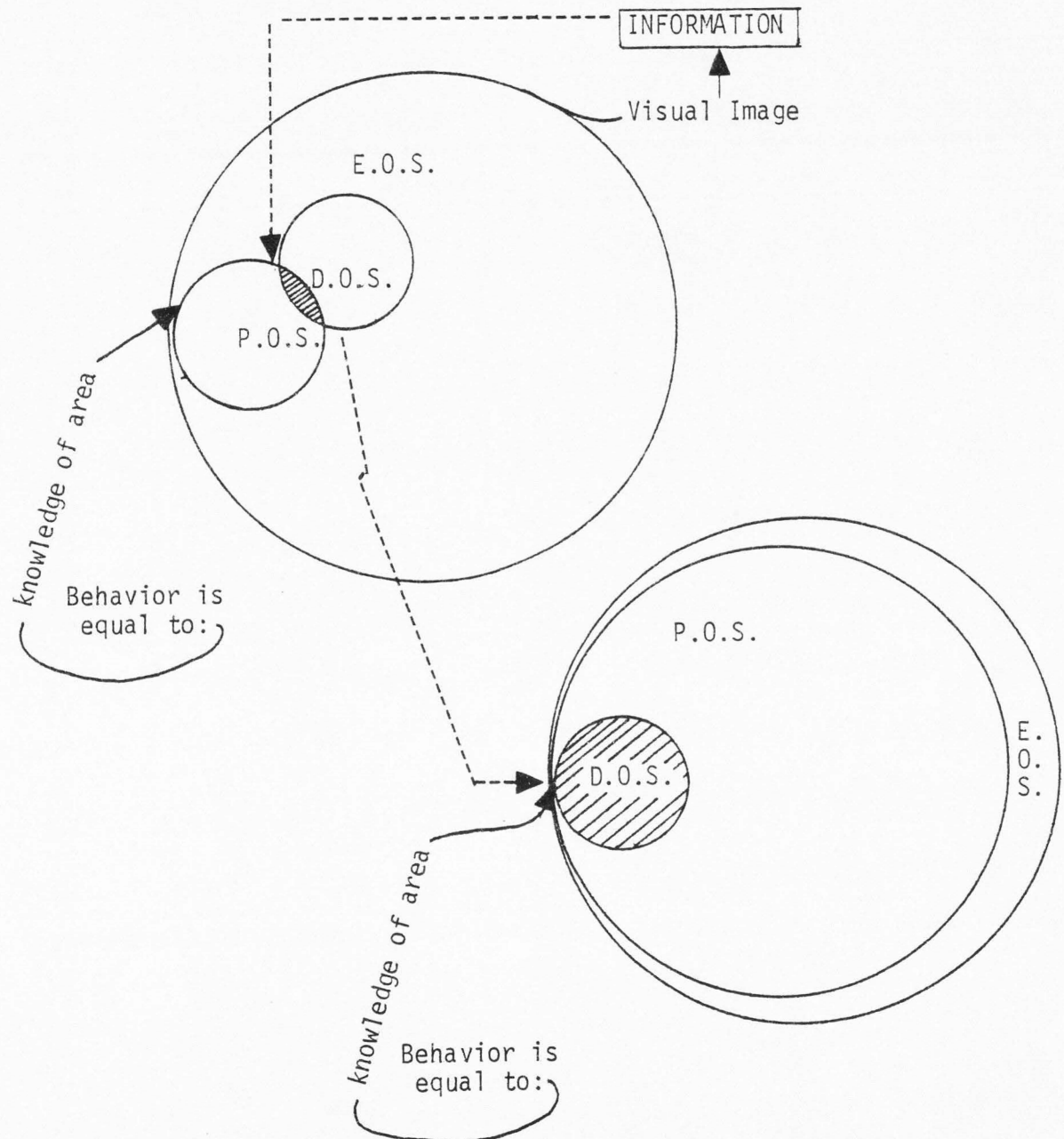
In order to understand the idea of expanding a user's range of perceived opportunity settings closer to existing settings (one of the study objectives), a conceptual model has been developed (see figure 3). An explanation of the model follows.

Existing Opportunity Settings (E.O.S.)

For the recreationist, existing opportunity settings are all the areas available in a specific region that offer particular characteristics that match the needs of the user.

For instance, the San Rafael Resource Area, almost 1.5 million acres in size, possesses a wide spectrum of recreational opportunity settings. Activities such as river floating, off-road vehicle (ORV) exploration, hiking, backpacking, rock collecting, horseback riding, winter sports, photography, cultural resource viewing and scenic sight-seeing are among the many opportunities available to visitors.

The San Rafael Swell provides a wide range of varied topography, many different types of access routes, and - perhaps most important in the long run - it holds a variety of recreation opportunities identified as compatible with other resource management goals. The variety of recreational activities, combined with geographic characteristics make up the existing opportunity settings of that particular region.



E.O.S. = Existing Opportunity Setting  
 P.O.S. = Perceived Opportunity Setting  
 D.O.S. = Desired Opportunity Setting

Figure 3. Perceptual opportunity expansion model

### Perceived Opportunity Settings (P.O.S.)

"Perception itself depends on the skill and experience of the perceiver -- on what he knows in advance," explained Ulric Neisser in his book "Cognition and Reality" (Neisser 1976:13). He feels that perception of an individual is developed over time and it depends upon preexisting structures called "schemata". Schemata direct perceptual activity and are modified as it occurs.

In one sense, a schema is like a format in a computer programming language. Information received in a particular format will be accepted, whereas other information will be ignored. A schema also functions as a plan for finding out about objects and events, for obtaining more information to fill in the format. The schema is not only the plan, but the executor of the plan. This plan/format has also been referred to, according to Neisser, as a Cognitive Map.

Cognitive maps are often looked at as mental pictures of the environment that could be examined at leisure by the mind's eye while the mind's owner is settled back in the easy chair. "Cognitive maps accept information and direct action" (Neisser 1976:11).

For the recreationist, cognitive maps of special recreation sites can be considered as their perceived opportunity setting. A person gains initial information of an area for recreation. S/he then samples the environment. As a result of the sampling, (physically participating) that information on how to get there, what can be done once there, and how the area met certain expectations is formed into a type of schema of the experience. Recall of that information is in the form of a cognitive map, which will then direct further action. In many cases, if no

further information (or correct information) is available, the probability of the individual repeating that behavioral action is very likely.

People tend to develop very traditional patterns of behavior, whether it be because of the comfort of knowing what to expect, they like it and don't tire of it, or just because it's what everyone else is doing. Many people park in the same parking stall, walk home from school the same route, and even return to McDonalds for a hamburger when in an unfamiliar town. Only when pertinent and acceptable information is available does an individual make the decision to change.

#### Desired Opportunity Settings (D.O.S.)

People develop, through previous association, knowledge, and experience, desirable settings for their recreation opportunities. Many times those desired settings are available to the user. However, because the user lacks the proper information to get them to the setting, returning to a well known area is common.

One may wonder why people don't initiate search behavior of their own accord, even when their current setting doesn't meet their desired setting. One reason may be that search behavior can come at a high cost when a person doesn't have much information available. This may be most true when that cost is just not worth it, given the marginal value of the participation.

#### Information

If information, in the correct format, is introduced into the cycle of sampling, and an individual uses it instead of repeating the behavior

consistent to existing knowledge, then the structure of that person's cognitive map will change; along with their behavioral pattern. Expansion of their cognitive map allows for greater choice in behavior.

For the recreationist, behavioral choice can be expanded, allowing the individual's perceived opportunity settings to come closer to the region's existing opportunity settings, and hopefully their desired setting. Thus, the recreationists' choice on where to go for a particular experience is greater, increasing the probability of them not returning to the same place.

#### Function of the Model

The role this model plays in redistribution of recreationists is very important, particularly in the case of Buckhorn Canyon, where approximately 80 percent (BLM User Statistics 1981) of the recreation use for the San Rafael Swell region takes place. An expansion of perceived settings (Buckhorn) to existing and desired settings (1.5 million acres) would help in the dispersion of overcrowded/concentrated use. The type of information, again, will be an imposing factor for the development of cognitive maps and matching of needs to places. As discussed in Chapter II, information and the recreationists' choice process are very important factors for influencing choice behavior. Recreationists tend to be lazy when processing information, and in the case of this study they vary greatly in educational ability. It was also mentioned that information in the form of pictures was generally easier to learn and remember than information in another form. Thus, an

active choice process by the individual, and the use of visual information are most helpful when linking the schema to actual behavior.

### Relationships Within the Model

Although this study is largely exploratory and based on a small sample size, some hypotheses can be stated. The advantage in doing this is to provide feedback for model building. The purpose of this study is not to rigorously test the model. Rather it is to examine the implications of a visual decision making process and develop the recreation knowledge behavior model as the two ideas relate. To do this, the following null hypotheses have been presented:

Hypothesis 1. People exposed to the Visual Decision Making Process (VDMP) will not be significantly more likely to go to the San Rafael Swell for their spring vacation than those not exposed.

Hypothesis 2. People exposed to the VDMP will not be significantly more likely to go to a new area in the Swell for their spring vacation than those not exposed.

Hypothesis 3. A significant number of people in the experiment group will not go to the area they chose from the VDMP.

Several hypotheses were developed to explore the potential influence of the method on different types of persons. The variables chosen were group type, vehicle type, frequency of visit, number in group, activity types, tradition, and centrality of vehicle to experience.

The differences in background variables used in these hypotheses are justified by differing responses to: (1) willingness to accept new

information (lack of overlap between desired and perceived opportunity settings), and (2) utility of the photographic approach ("image" based information being the most relevant in choice behavior of opportunity settings). The following null hypotheses represent the background variables identified:

Hypothesis 4. Group type will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 5. Vehicle type will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 6. The frequency of visits during the year will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 7. The number of people in a group will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 8. The type of activities a group engages in will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 9. The number of years a person has been returning to the same area will make no significant difference in the likelihood of choosing a new area in the Swell.

Hypothesis 10. The centrality of the vehicle to the experience will make no significant difference in the likelihood of choosing a new area in the Swell.



## CHAPTER IV

### METHODOLOGY

#### Introduction

The research project was designed as a field experiment in which an experimental treatment (visual decision making process) was administered at recreationists' homes throughout Carbon and Emery Counties and along the Wasatch front. Subjects (San Rafael Swell visitors who were recreating from Easter through Memorial Weekend) were randomly assigned to either treatment or nontreatment control groups.

The research instruments for this study included (1) the contact sheet and observation, (2) the Visual Decision Making Process (VDMP) pictures and map, (3) the posttest questionnaire for the treatment group, and (4) the posttest questionnaire for the control group.

The purpose of this chapter is to describe the methodology involved in the experimental design, the structure and implementation of the research instruments, and the analytic procedures applied to the data to evaluate the project objectives.

#### Research Design

##### Sampling Procedure

The target population was all recreationists in the San Rafael Swell during Easter weekend, two weekends following Easter, and Memorial weekend in 1980. The sample population was all individuals interested

in gaining more information on recreation opportunities in the San Rafael Swell.

The sampling period, Easter through Memorial weekend, can be considered representative for purposes of the study because uneven/concentrated distribution of recreation use is at its peak in the San Rafael Swell during this time span.

Three sampling periods were chosen, consisting of nine sample days: Friday, Saturday, and Sunday for each period. This selection of sample days assured that the experiment would be representative of the Swell's heavy recreation use period. The selection however, can only be considered to this specific situation and not generalized beyond the San Rafael study region. Persons visiting the area during light use periods were not sampled because the intention of the test was to disperse users in an uneven/concentrated situation. This situation does not exist beyond the spring months. Therefore, light use visitors were not sampled.

A randomized selection and assignment of subjects to treatment and no treatment control groups occurred after collection of 121 names of interested people. Individual information cards were developed and then shuffled and divided into stacks of fours. From the stacks, 70 cards were chosen for the treatment group and 51 for the no treatment control group.

### Experimental Design

The experimental design chosen for this study was the Pretest - Posttest Control Group Design (Campbell and Stanley 1963). This design can be visualized as follows:

(Treatment Group)	R	$O_1$	X	$O_2$
(Control Group)	R	$O_3$		$O_4$

where R represents random assignment of subjects to groups; X represents the application of the experimental treatment;  $O_1$  and  $O_3$  represent the pretest measurements, and;  $O_2$  and  $O_4$  identify the posttest measurement.

The Pretest - Posttest Control Group Design is one of the most strongly recommended true experimental designs. It controls for internal validity, including history, maturation, testing, instrumentation, regression, and selection (Campbell and Stanley 1963). These factors can be described as main effects, and as such have been controlled by the design.

External validity, on the other hand, can be termed as interaction effects, involving X and some other variable. They represent the potential specificity of the effects of X to some limited set of conditions. For example, the effects of X observed may be specific to groups warmed up by the pretest. For the purpose of this study, an extended time period (1 year) between the pretest and posttest was established to help control for any sensitization.

Two more factors may influence external validity. They are the Interaction of selection and X, and the Reactive arrangements. For example, the unique population from which the experimental and control

groups were selected may have some effect on X. Also, the knowledge of participating in an experiment may influence a person's behavior, thus making the effect of X less clear.

The population from which the test group was chosen represented those individuals that expressed interest in receiving new information on recreation areas. Thus, the interaction of selection and X could affect the generalization of the results. The sample group may represent the type of individuals likely to change their behavior because of their willingness to accept new information, and it excludes those not wanting information and a change.

To avoid Reactive arrangements in the study, a cover story was used to disguise the experiment. Participants were told that the purpose of the study was to see what type of information would be best for recreationists. During the treatment phase, participants were told that they were chosen to try out a new form of recreation information. This, however, still might have sensitized them to the knowledge that they were in an experiment.

#### Sample Site

The pretest questioning (in the form of a contact sheet and observation, see Appendix A) was conducted at each subject's campsite. Every individual sampled was subject to the same questioning and observation.

After the pretesting, 121 individuals volunteered to receive further information on the recreation of the area. Seventy of those subjects were contacted prior to the 1981 spring recreation season for the home experimental treatment.

Posttest questioning was conducted following the 1981 Easter and Memorial weekends. During this period all subjects (experiment and control) were contacted by telephone. The experiment group responded to a questionnaire different from the control group questionnaire (see Appendix B).

### Design of the Research Instruments

Five different research instruments were used in the study. One was the experimental treatment device called the Visual Decision Making Process (VDMP). The other four were used to collect data. These were the pretest questioning, observation sheet, the posttest questionnaire for the control group, and the posttest questionnaire for the experimental group. These instruments are briefly described below.

#### The Visual Decision Making Process

The VDMP consisted of a series of photographs (5 X 7 and 8 X 10 in size; see Appendix C), a site selection matrix, and a map. The process was designed as a decision tree to help people in choosing a new area for recreation other than Buckhorn. Their choice would be based on the type of experience they desired and a place that matched their needs. The use of photographs was incorporated to expand the person's visual idea of the area's characteristics, matching them closer to their desired needs. At the same time, individuals with a wider range of educational ability could easily understand and use the information generated in the process. A few additional comments are needed to describe how the concept was developed and applied.

Pilot test. To develop an effective and efficient visual decision making process, a pilot test was conducted. University students were evaluated in a choice process of recreational places through the use of black and white photographs. The main purpose of the test was to analyze the ease of the steps involved in the choice process. Elements such as the order of pictures and factors shown were found to be of great importance in representing a person's actual behavior as compared to a desired feeling. For instance, when individuals chose the type of transportation they would most likely use first, they did not relate this factor with the type of activity they chose later. As a result, a person using a bicycle never considered that type of transportation when picking canoeing as an activity.

Changes were made in the process as a result of the pilot test and incorporated into the development of the San Rafael VDMP.

Development of opportunity settings. Opportunity settings were identified through coordination with the San Rafael Resource Area Manager, Sam Rowley. With his help, the range of recreation activities that normally take place in the San Rafael Swell were recognized. Next, specific areas were chosen that would be consistent with the types of activities mentioned. These areas were photographed and labeled as opportunity settings in the VDMP.

Need factors. In the VDMP three factors were used to represent the needs of recreationists. The factors related to opportunity settings and were chosen to help in matching the experiences users desire with available opportunities. The three need factors are: activities,

access, and density. The factors were operationally defined as follows: (1) Activities -- those recreation opportunities that can occur in the environments identified, such as four-wheel driving, water sports, water play, all terrain/ORV/motorcycles, cultural history, prehistoric culture, scenic, solitude/wilderness, sports (in general), horseback riding, rock scrambling, ecological exploration, tent camping, trailer camping, backpacking, photography; (2) Access -- the degree of difficulty for travel to a camping area, such as easy, moderate, and difficult; (3) Density -- the amount of people in a camping area that can be tolerated, such as low, moderate, high.

To eliminate bias in the choice of photographs representing each factor, two separate groups of individuals (approximately 40 total) rated 15 pictures as either easy, moderate, or difficult access. The same was done for density, rating the pictures as low, medium, or high. From the rating, pictures that attained a concensus of agreement were identified for each category. As a result of this test, one picture each was chosen to represent easy and difficult access and low and high density. Because of a tie, two pictures were chosen to represent moderate access and density.

Activities. The activity photographs were established from an on-site observance of recreational opportunities people participate in throughout the San Rafael Swell. Activities represented in the pictures were judged to be unambiguous.

Matrix. A matrix (see Appendix D) was designed to facilitate the recreationists' decision on needs with a matched opportunity setting.

Each setting was examined and identified with an X as to its capacity to support a specific activity. Access to the setting and density of people normally using the area were also rated. Travel time to each setting was noted.

### Contact Questionnaire

In order to obtain a sample of individuals for the test, a contact questioning was conducted. The following information was collected from the contact sheet (see Appendix A):

- . use during the year
- . return date
- . place to return
- . willingness to participate in study to receive recreation information
- . name
- . address
- . phone number

The contact questionnaire was answered by all 121 subjects used in the study.

### User Classification Observation

During the contact questioning, an observational analysis was conducted for each group. The following information was observed and collected (see Appendix A):

- . type of use (day or night)
- . number in group
- . group type - reunion, association, work, church, beer drinkers, all male, all female, other
- . Activities - cards, toy vehicle use, water sports, sports, vehicle use, horses, shooting, camping, other
- . vehicle types - none, auto, small pickup, standard pickup, 4X4 pickup, van, motorbike, dunebuggy or rail, jeep, transport 4X4
- . vehicle rating - old/functional, stock, fancy
- . centrality rating - activity to vehicle



### Posttest Questionnaire for Control Group

A posttest questionnaire was administered during the summer of 1981 to the control group only. Fifty-one persons were contacted by telephone and the following information was collected (see Appendix B):

- . use of Swell (number of years)
- . places used
- . changes in environment
- . changes in people
- . changes in management
- . effects of changes on enjoyment
- . recreation in Swell since 1980
- . outside use other than Buckhorn Draw during spring of 1981
- . where
- . why

### Posttest Questionnaire for Experiment Group

A posttest questionnaire was initiated during the summer of 1981 to the experiment group only. Seventy persons were contacted by telephone and the following information was collected (see Appendix B):

- . use of Swell (number of years)
- . changes in environment
- . changes in people
- . changes in management
- . effects of changes on enjoyment
- . Swell use since experiment
- . where
- . new locations chosen
- . new locations
- . feelings about picture process

### Map

For the purpose of locating an individual's choice setting, a Utah Travel Council series map, Number 2, was used and given to each treatment participant (see Appendix E).

### Reliability and Validity Testing of the VDMP

Two tests were conducted to determine the reliability and validity of the measuring instrument in the data manipulation of the Visual Decision Making Process. Fifty-three pairs of scores from a University Communication Speech class were used.

For the reliability testing, a test-retest method was employed over a 1-week period. The Pearson formula was used to obtain a correlation coefficient, and a T-test was implemented. The criterion for adequate reliability was identified as significant at the .05 level. The expected relationship that there will be significant correlation between test administration 1 and test administration 2, at the .05 level of significance was indicated. The test-retest of the visual decision making process showed significant reliability at .001.

Scores from the reliability study were also used to test the validity of the process. A Factor analysis was implemented in order to obtain independent and logical categories for the photograph choices in the VDMP. Four major factors for the variables of Activities were identified. Independence was established at .50 and .40, except in cases where items would load .40 or greater on a single factor and less than .13 on all others. The four major factors were identified as motorcycling, unique opportunities, macho motive, and adventuresome. Three other factors for each of the variables Access and Density were identified and showed that each of the photographs loaded independently of each other. The factor analysis showed logic in the representiveness of the photos, indicating a stable and strong measurement device.

### Survey Distribution and Response

Of the 121 subjects from the sample, 70 were contacted by telephone for the purpose of setting up a home visit (that included the treatment phase of the study), and for contact following the 1981 spring recreation season. Out of the 70 persons, 53 completed the testing procedures (pretest, treatment, posttest). Fifty-one subjects were placed in the no treatment control group and were contacted by telephone following the 1981 spring recreation season. Of the 51, 35 completed the testing procedures (pretest, posttest). Thus a response rate of 72 percent was achieved for the testing procedure.

### Coding and Analysis

Many of the analyses involved testing for statistically significant differences between different groups for responses on selected variables. When the variables being compared were of categorical data, the Chi square test of independence (Siegel 1956) was used. When tests between samples involved interval or ratio level data, the T-test (Siegel 1956) was employed to compare sample means.

Throughout the analysis, the .05 level of significance was used to accept or reject the null hypothesis of no significant differences for each test. This allows one to conclude with 95 percent probability that the difference is not due to chance alone. For each test the result is reported as either significant (S) at the .05 level or not significant (NS) at the .05 level.

## CHAPTER V

## RESULTS

The results of the experiment were obtained by analysis of the data collected from the contact sheet, observations, and posttest questionnaires. To aid in their interpretation, the results are organized and reported as they relate to each hypothesis generated for the research.

Group profile comparisons will be discussed first, followed by test of the specific hypotheses described in Chapter III. The results will be reported as either significant (S) or nonsignificant (NS) at the .05 level.

Group Characteristics

Eighty-eight, or 72 percent of the 121 original subjects completed the entire testing procedures. During the 1981 spring recreation season, 58 percent of the subjects returned to the San Rafael Swell for their vacation. Of those who returned, 31 percent were from the no-treatment control group and 69 percent were from the experiment group. Forty-one percent of the San Rafael visitors went to a new area within the Swell. Of those visitors who went to a new area, 51 percent had been exposed to the Visual Decision Making Process and 8 percent were not. Twenty percent of the experiment group that returned to the Swell in 1981 went to a place chosen in the VDMP (see Table 1).

The control and experiment groups were compared for their degree of similarity. Strong differences in background characteristics likely to

Table 1. Group characteristics.

Response Rate:	Original subjects	Completed testing	Percent	
	121	88	72%	
Rate of return to the Swell:	N Yes	Percent	N No	Percent
	51	58%	37	42%
Return rate; Control vs Exp.:	N Control	Percent	N Experiment	Percent
	16	31%	35	68%
Went to new area:	N Yes	percent	N No	percent
	21	41%	30	59%
Went to new area; Control vs Exp.:	N Control	Percent of control group	N Experiment	Percent of exp. group
	3	8%	18	51%
Rate of experiment group that went to <u>choice</u> area:	N Yes	Percent	N No	Percent
	7	20%	28	80%

influence response to experimental variables could potentially bias the tests of the hypotheses. Therefore, both groups were analyzed in terms of basic characteristics, such as use, number in group, group type, activities, vehicle type, centrality of vehicle to experience, vehicle rating, frequency of visits during the year, and tradition of use. The categories analyzed for each characteristic were established for the observational testing. In cases where several factors were combined, not enough values existed for a proper analysis. For instance, vehicle rating included "old/functional", "stock", and "fancy". Old/functional and stock variables had to be combined in order to compare them with fancy.

Of the nine different analyses, only one showed a significant difference between the control and experiment group. This difference related to the types of activities each group was observed participating in. For example, the experiment group was observed participating in general sporting type activities more than the control group (see Table 2). The remaining eight analysis showed no significant differences between the two groups. Given that only one difference was noted, it was felt that the two groups were representative of the total sample.

#### The Influence of the VDMP on the Experiment

##### Group VS the Control Group

In testing the hypotheses, control variable categories were again combined in cases where not enough variables existed for a proper analysis. Original factors for each category can be found in Appendix A; User Classification Observation.

Table 2. The degree of similarity between the experiment and control groups on background characteristics.

Characteristics	Category	Control		Experiment		Total		Statistical Analysis
		N	%	N	%	N	%	
Type of visit	Day	2	5%	10	20%	12	14%	df=1
	Overnight	32	95%	42	80%	74	86%	$\chi^2=3.12$ ;NS
Number in group	1-9	14	42%	27	52%	41	48%	df=1
	10+	19	58%	25	48%	44	52%	$\chi^2=.7$ ;NS
Group type	Family reunion	24	73%	45	85%	69	80%	df=1
	Other	9	27%	8	15%	17	20%	$\chi^2=1.93$ ;NS
Activities	Camping	13	39%	14	28%	27	32%	df=2
	Sports	4	12%	19	37%	23	27%	$\chi^2=6.2$ ;S
	Vehicle play	16	49%	18	35%	34	41%	
Vehicle type	Car/pickup	16	48%	27	51%	43	50%	df=1
	4x4	17	52%	26	49%	43	50%	$\chi^2=1.9$ ;NS
Centrality	Access	26	79%	47	89%	73	85%	df=1
	4x4/park & show	7	21%	6	11%	13	15%	$\chi^2=1.53$ ;NS
Vehicle rating	Funct/stock	28	90%	50	96%	78	94%	df=1
	Fancy	3	10%	2	4%	5	6%	$\chi^2=1.08$ ;NS
Frequency during the year:	Average for experiment = 9 visits control = 5.6 visits	<u>T-test</u>		t-stat = .55 df = 86 distribution = .32;NS				
Tradition of use:	Average number of years for experiment = 15 control = 11	<u>T-test</u>		t-stat = 1.49 df = 86 distribution = .93;NS				

### Hypothesis 1

Hypothesis 1 dealt with return of visitors to the San Rafael Swell during the 1981 spring recreation season. The null hypothesis, stated as:

People exposed to the Visual Decision Making Process will not be significantly more likely to go to the San Rafael Swell for their spring vacation than those not exposed,

was supported. Those individuals participating in the experiment did not differ significantly in their return to the Swell (see Table 3).

### Hypothesis 2

Hypothesis 2 more specifically related to the recreationists going to a new area within the Swell. The null hypothesis, stated as:

People exposed to the Visual Decision Making Process will not be significantly more likely to go to a new area in the Swell for their spring vacation than those not exposed,

was not supported. There was a significant difference between the control group and experiment group, where more of those exposed to the VDMP did go to a new area than those not exposed (see Table 4). Therefore, the null hypothesis is rejected.

### Hypothesis 3

The third hypothesis allowed the closest analysis of the Visual Decision Making Process and its effect on choice behavior. The null hypothesis, stated as:

A significant number of persons in the experiment group will not go to an area they chose in the Visual Decision Making Process,



Table 3. Return of visitors to the San Rafael Swell.

	Went to new area	Control		Experiment		Total		Statistical Analysis
		N	%	N	%	N	%	
Did respondent go to the Swell?	Yes	16	46%	35	66%	51	58%	df=1 $\chi^2=3.52$ ;NS
	No	19	54%	18	34%	37	42%	

Table 4. Redistribution of visitors to new areas in the San Rafael Swell.

	Went to new area	Control		Experiment		Total		Statistical Analysis
		N	%	N	%	N	%	
Did respondent visit new area in the Swell?	Yes	3	9%	18	34%	21	24%	df=1 $\chi^2=7.62$ ;S ( $p < .01$ )
	No	32	91%	35	66%	67	76%	

was supported. Only 20 percent of the experiment group went to a place they chose in the VDMP (see Table 5).

### Experiment Group Characteristics and Behavioral Outcomes

#### Hypothesis 4

Several hypothesis analyzed the potential influence of certain background characteristics on the likelihood of responding to the VDMP. For instance, null hypothesis 4, stated as:

Group type will make no significant difference in the likelihood of choosing a new area in the Swell,

examined two specific group types. One was the family/reunion, and the other included other types beyond the family/reunion. The results showed no significant difference between the two groups in choosing a new area in the Swell for recreation. Thus, the null hypothesis was supported (see Table 6).

#### Hypothesis 5

Vehicle type was the next specific trait to be considered. Two categories of vehicle types were chosen: car/pickup and 4x4. The null hypothesis, stated as:

Vehicle type will make no significant difference in the likelihood of choosing a new area in the Swell,

was not supported. There resulted a significant difference between the two categorical traits. An examination of the distribution suggests that 4x4 drivers were more likely to go to a new area in the Swell

Table 5. Redistribution of experiment group to areas chosen from the VDMP.

Did a significant number of experiment group go to a place chosen in the VDMP?	Criterion of acceptance = 35%	
	Total that went to a chosen place = 7 20%	Total that did not go to a chosen place = 28 80%

Table 6. The influence of group type on choosing a new area in the San Rafael Swell.

	Went to new area	Family/reunion		Other		Total		Statistical Analysis
		N	%	N	%	N	%	
Does group type have an influence on choosing a new area in the Swell?	Yes	29	64%	8	80%	37	67%	df=1 $\chi^2=.9$ ;NS
	No	16	36%	2	20%	18	33%	

compared to car/pickup drivers (see Table 7). Therefore, the null hypothesis is rejected.

#### Hypothesis 6

Hypothesis 6 dealt with the frequency of visits people said they would make during the year. Two categories of return visits were established: 1 to 3 times and 4 to 10 times. The null hypothesis, stated as:

The frequency of visits during the year will make no significant difference in the likelihood of choosing a new area in the Swell,

was supported. There was no significant difference between the people returning 1 to 3 times during the year and the people returning 4 to 10 times (see Table 8).

#### Hypothesis 7

The size of a group made up the next characteristic analysis. Two categories were developed using group sizes of 1 to 9 and 10 or more people. The null hypothesis, stated as:

The number of people in a group will make no significant difference in the likelihood of choosing a new area in the Swell,

was not supported. An examination of the distribution suggested that the larger the group, the more likely they would chose a new area in the Swell for recreation (see Table 9).

#### Hypothesis 8

Hypothesis 8 considered the type of activities a group engaged in while recreating. Three specific categories were developed, placing

Table 7. The influence of vehicle type on choosing a new area in the San Rafael Swell.

	Went to new area	Car/pickup		4x4		Total		Statistical Analysis
		N	%	N	%	N	%	
Does vehicle type have an influence on choosing a new area in the Swell?	Yes	13	48%	22	85%	35	66%	df=1
	No	14	52%	4	15%	18	34%	$\chi^2=7.79$ ; S ( $p < .01$ )

Table 8. The influence of the frequency of visits on choosing a new area in the San Rafael Swell.

	Went to new area	1-3 visits		4-10 visits		Total		Stat. Analysis
		N	%	N	%	N	%	
Does the frequency of visits during the year have an influence on choosing a new area in the Swell?	Yes	27	66%	12	80%	39	70%	df=1
	No	14	34%	3	20%	17	30%	$\chi^2=1.09$ ; NS

Table 9. The influence of group size on choosing a new area in the San Rafael Swell.

	Went to new area	1-9 people		10+ people		Total		Statistical Analysis
		N	%	N	%	N	%	
Does the group size have an influence on choosing a new area in the Swell?	Yes	13	48%	22	88%	35	67%	df=1
	No	14	52%	3	12%	17	33%	$\chi^2=9.4$ ; S ( $p < .01$ )

camping activities in one; sports in the second, and; vehicle play in the third. The null hypothesis stated:

The type of activities a group engages in will make no significant difference in the likelihood of choosing a new area in the Swell.

The null hypothesis was supported and there was no significant difference found between the three categorical groups (see Table 10).

#### Hypothesis 9

Hypothesis 9 examined the relation of years a person had been returning to the same area with the likelihood of changing behavior. The number of years was divided into three specific groups; 1 to 5 years, 6 to 19 years, and 20 or greater years. The null hypothesis stated:

The number of years a person has been returning to the same area will make no significant difference in the likelihood of choosing a new area in the Swell.

The null hypothesis was supported and resulted in no significant difference between the three groups (see Table 11).

#### Hypothesis 10

In the final hypothesis, a centrality rating of the vehicle to the recreation experience was analyzed. Two categories were constructed, showing "vehicles used primarily for access" as the rating furthest from the experience, and "4x4/park and shows (vehicle appearance more important than function)" rating closest to the experience. The null hypothesis was stated as:

The centrality of the vehicle to the experience will make no significant difference in the likelihood of choosing a new area in the Swell.

Table 10. The influence of the type of activities a group engages in on choosing a new area in the San Rafael Swell.

	Went to new area	Camping		Sports		Veh. Play		Total		Stat. Analysis
		N	%	N	%	N	%	N	%	
Does the type of activities a group engages in have an influence on choosing a new area in the Swell?	Yes	7	47%	12	63%	16	84%	35	66%	df=2 $\chi^2=5.43$ ; NS
	No	8	53%	7	37%	3	16%	18	34%	

Table 11. The influence of tradition on choosing a new area in the San Rafael Swell.

	Went to new area	1-5 yrs.		6-19 yrs.		20+ yrs.		Total		Stat. Analysis
		N	%	N	%	N	%	N	%	
Does tradition have an influ- ence on choosing a new area in the Swell?	Yes	7	50%	13	72%	14	70%	34	65%	df=2 $\chi^2=2.01$ ; NS
	No	7	50%	5	28%	6	30%	18	35%	

No significant difference resulted between the vehicle centralities. Therefore, the null hypothesis was supported (see Table 12).



Table 12. The influence of vehicle centrality or choosing a new area in the San Rafael Swell.

	Went to new area	Access		4x4/Park & Show		Total		Stat.
		N	%	N	%	N	%	
Does vehicle centrality have an influence on choosing a new area in the Swell?	Yes	29	83%	17	95%	46	87%	df=1
	No	6	17%	1	5%	7	13%	$\chi^2=1.22$ ;NS

## CHAPTER VI

## DISCUSSION AND CONCLUSION

Introduction

The purpose of this chapter is to (1) discuss the meaning and significance of the findings; (2) draw some conclusions from the study; (3) report the limitations inherent in the methodology; and (4) identify recommendations to management and future research.

Summary of Findings

The primary hypothesis, that those individuals exposed to the Visual Decision Making Process would be more likely to go to a new place chosen in the process, was not supported. Fifty-one percent of the subjects, however, were influenced to go to another place in the Swell besides Buckhorn Canyon. This was a significant difference as compared to the no treatment control group.

While the VDMP's major influence was not significantly proven, there seemed to be a trend that those going through the process were influenced to change. All comparisons in the study were set at the .05 level of significance. This level tends to be restrictive for field studies where extraneous variables influence behavioral outcomes. For example, three situational reasons for people not recreating at all were expressed during the post questioning. These reasons were (1) financial positions, (2) expecting mothers, and (3) adverse weather conditions.

Approximately 85 percent of the individuals in the experiment group, however, indicated they would be returning to the Swell for vacation and planned to visit one of their choices from the VDMP.

Several characteristics were also analyzed in relation to behavioral outcomes. Two of the seven traits showed a difference in change behavior. The first trait was vehicle type, where 4x4 drivers were more likely to go to a new place in the Swell as compared to car and pickup drivers. The second was group size, indicating the larger the group, the more likely they were to change and go to a new place.

For many recreationists, travel to a site is an important part of the experience. Four wheel drivers may emphasize the experience with their vehicles, thus making the trip more fun and the adventure of a new route very enjoyable. Also, having the security of knowing a four-wheel drive vehicle can go more places than a two-wheel drive may influence a person in trying out a new place. Even though the VDMP gave people a visual idea of the roads, the added insurance of a 4x4 vehicle might have helped in their actual behavior.

When a discrepancy or inconsistency exists between one person's position and that of others, the individual often moves toward the normative position. Normative influence is critical in group processes. Also, active participation during group interaction may exert a powerful impact on one's self image. Adhering to a position taken during group interaction is critical to group acceptance. Normative influence, active participation and commitment to a choice during group interaction may have influenced the change behavior of larger groups to go to a new

place. For example, those individuals involved in the contact questioning tended to be group leaders. The leader is usually thought of highly within the group and if s/he can be influenced on a decision, the group is most likely to move towards that person's decision. Also, when a commitment is made during the group participation, obligating those individuals to the group's choice, each group member may feel compelled to stick to their choice so as not to look indecisive. This behavior is termed by social psychologists as Group Dynamics, or interpersonal trusting (Zimbardo, Ebbesen, and Maslach 1977).

A final factor that may have been influential in the redistribution of use is the effects of the person giving the information. Credibility of the source is an important aspect in attitude change. Communication becomes more effective if attributed to a credible source rather than a noncredible one. In the study, the experiment group interacted with an interviewer. If the subject found the interviewer to be credible on the information, they might be more likely to accept the information.

### Conclusions

Conclusion 1. A major conclusion of this study is that a management tool using photographic imagery to facilitate user decisions that improve the fit between preferences and opportunities can be developed and implemented to influence redistribution of heterogeneous recreation use.

Previous studies have shown that the homogeneous wilderness user, given a more complex structure of information, was effectively redistributed. The present project demonstrated that information in the visual

form, aided with simple verbal points, can be presented so that a varied educational level of people can make a selection based on the type of experience they desire. Presenting the information as a decision tree can be like the process by which people normally treat information to reach a decision. Visual information can emphasize that process, making the VDMP easy to understand and use.

Conclusion 2. The Visual Decision Making Process did seem to influence the redistribution of use by making users aware of and motivated to seek out additional opportunity settings that satisfied their needs and preferences.

Although only 20 percent of the subjects in the test went to a choice area and 51 percent were redistributed, this may be an adequate amount to meet management objectives of lessening impacts. The cost effectiveness of the process, however, should be considered in determining such a factor. The VDMP, in the short run, may be as/or more costly than an alternative method that could prove to be more effective. It is also recognized that to completely redistribute use would be neither possible nor desirable. One major concern of the manager, in fact, was that redistribution could spread the Buckhorn problem to the sites to which use was directed.

Such concentration and overuse did not result from implementing the VDMP. The fear that implementing a redistribution device will "spread the cancer" should be restrained by the finding that the VDMP made only a slight influence on the Buckhorn users to change their behavior. At the same time, that change may be an indication that some of the Buckhorn

users are wanting to try some place new for recreation. Their reasons may vary from the need of something different to the unhappiness of the overcrowded/concentrated conditions in Buckhorn Canyon. Whatever the reason, the manager should be concerned as to the movement of these recreationists. The VDMP could influence the choice of a new setting and hopefully match the recreationist to places identified by management goals. Without any directed information, recreationists will eventually move on their own and possibly relocate in an area not consistent to the recreation activity use.

Conclusion 3. The project identified additional factors that could help in targeting communications.

The first factor relates to the type of vehicle a person may use. In general, 49 percent of the experiment group drove four-wheel drive vehicles. Eighty-six percent of the four-wheel drivers were influenced to go to a new place, whereas only 48 percent of those who drove a car or pickup went to a new place. This is important because the VDMP was more effective with people who had the ability to travel to more difficult and unknown areas than those who couldn't.

Another finding having relevance for redistributing Buckhorn use is that groups having a larger number of members are more likely to relocate than those in a smaller group. This suggests to managers that focusing on the larger groups for change may be more effective than the smaller ones. Larger groups, for example, could be easier to find and contact. Also, group leaders and active participation are important considerations in relation to group dynamics and interpersonal trusting.

### Limitations

Because of the small sample size and even smaller number of tested individuals, the full potential of the study cannot be realized. Chi square was used in the analysis; however, a Chi square analysis has a sampling distribution that approximates the true distribution only when N is large. If N is not large enough, probabilities that are too large may occur, possibly leading to the conclusion the null hypothesis should not be supported when actually it should.

For these reasons mentioned above, generalization of the study results should not be made beyond the San Rafael Swell study area.

### Recommendations

#### Management

Based on current trends, it is likely that concentrated/uneven use in Buckhorn Canyon will continue to increase and may even begin to spillover into other areas of the Swell. Therefore, it is imperative that the manager stay abreast of and, if possible, anticipate the future direction of this trend if the "dismal cycle" is to be avoided.

An information approach to the problem may be one of the least controversial ways to meet management objectives. The process, however, may become expensive compared to its total effectiveness. There are several approaches that could be implemented to ease this problem. For instance, a combination of information types and sources could be used to reach the wide range of visitor interests. When possible, information should be focused towards the large group and four-wheel drivers.

The VDMP could also be combined with other types of information packages and used as a campaign method prior to the heavy use season. Credibility of the source can be a major influence for information acceptance. Thus, if the BLM or agency distributing the information doesn't have a favorable image in the eyes of the receivers, allowing a more acceptable source to carry the information may prove to be more successful. Volunteer groups, or community organizations that use the area may be the best types to help carry the message.

The effects of the redistribution of recreationists should be monitored carefully. If certain settings become popular, emphasis should be placed on the goals for that area. Actions and planning can be carried out by the manager in a timely and consistent manner.

#### Future Research

The present study briefly addressed the possibilities of decision making, photography, and the implications of these to recreation management. Yet by touching on a few key concepts, the study opened the way for future research. For instance, a visual decision making process should be explored in more detail and possibly over a longer period of time to help control some of the extraneous factors having an effect on behavioral outcomes. Secondly, the VDMP should be tested against other forms of information processes, to examine its potential in use redistribution. Finally, studies similar to the present one, but covering a different problem area and diversity of visitors, would increase the ability to generalize the outcomes of the VDMP over a greater population.



## LITERATURE CITED

- BLM User Statistics. 1981. Provided by the San Rafael Resource Area Recreation Planner, Price Area Office, Utah.
- Brockman, Frank C. and Merriam, L. C. 1973. Recreational use of wild-lands. McGraw and Hill, Inc., New York.
- Brown, Perry J. and Hunt, John D. 1969. The influence of signs on visitor distribution and use. *Journal of Leisure Research* 1(1):79-81.
- Calvin, James S.; Dearing, J. A.; and Curtin, Mary E. 1972. An attempt at assessing preferences for natural landscapes. *Environment and Behavior* 4(4):447-470.
- Campbell, Donald T. and Stanley, J. C. 1963. *Experimental and quasi-experimental design for research*. Houghton Mufflin Company, Boston.
- Canon, Lance K.; Alder, S.; and Leonard, R. E. 1979. Factors affecting dispersion of backcountry campers. USDA Forest Service Resource Note NE-276. Northeastern Forest and Range Experimentation Station, U. S. Forest Service, Broomall, PA. 6 p.
- Gilbert, G. C.; Peterson, G. L.; and Lime, David W. 1972. Toward a model of travel behavior in the Boundary Waters Canoe Area. *Environment and Behavior* 4(2):131-157.
- Gombrich, E. H. 1969. *Art and illusion: A study in the psychology of pictorial representation*. Bollingen Series XXXV. 5, Princeton, New Jersey: Princeton University Press.
- Kennedy, James J., III. 1970. A consumer analysis approach to recreational decisions: deer hunters as a case study. Ph.D. Thesis in Forest Economics. Virginia Polytechnic Institute and State University, Blackburg.
- Kennedy, John M. 1974. *A psychology of picture perception*. Jossey-Bass Publishers.
- Kreimer, Alcira. 1977. Environmental Preferences: A critical analysis of some research methodologies. *Journal of Leisure Research* 9(2):88-97.
- Krumpe, Edwin E. 1979. Redistributing backcountry use by a behaviorally based communications device. Unpublished Ph.D. Dissertation, Colorado State University, Ft. Collins, CO.

- Lime, David W. 1977. Principles of recreation carrying capacity. Pp. 122-134 in proceedings of the Southern State Recreation Research Applications Workshop, Asheville, North Carolina, September 16-18, 1975. General Technical Report SE-9.
- Lime, David W. and Lucas, Robert C. 1977. Good information improves the wilderness experience. *Naturalist* 28:18-21.
- Lucas, Robert C. 1981. Redistributing wilderness use through informations supplied to visitors. USDA Forest Research Paper. Northwestern Experimentation Station, Missoula, Montana. 10p.
- Neisser, Ulric. 1976. *Cognition and reality*. W. H. Freeman and Company, San Francisco.
- O'Connor, N. and Hermelin, B. 1961. Like and cross-modality recognition in subnormal children. *Quarterly Journal of Experimental Psychology* 11:48-52.
- Oxenfeldt, Alfred R. 1966. *Executive action in marketing*. Belmont, California: Wadsworth Publishing Company, Inc.
- Paivio, A. 1971. *Imagery and verbal processes*. New York: Holt.
- Peterson, George L. 1974. A comparison of sentiments and perceptions of wilderness managers and canoeists in the Boundary Waters Canoe Area. *Journal of Leisure Research* 6 (summer):194-206.
- Peterson, George L. and Neumann, Edward S. 1969. Modeling and predicting human response to the visual recreation environment. *Journal of Leisure Research* 1(3):219-237.
- Pollack, Peter. 1969. *The picture history of photography*. New York: Harry N. Abrams, Inc., Publishers.
- Roggenbuck, Joseph W. and Berrier, Deborah L. 1980. The effectiveness of information on dispersing wilderness campers. *Journal of Forestry* 79:(In press).
- Shafer, Elwood L., Jr.; Hamilton, John F., Jr.; and Schmidt, Elizabeth. 1969. Natural Landscape Preferences: a predictive model. *Journal of Leisure Research* 1(1):1-19.
- Shafer, Elwood L. and Richards, Thomas A. 1974. A comparison of viewer reactions to outdoor scenes and photographs of those scenes. USDA Forest Service Research Paper NE-302. Northeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture. p. 26.

- Samuels, Jay S. 1970. Effects of pictures on learning to read, comprehension and attitudes. *Review of Educational Research* 40(3):397-407.
- Schomaker, John H. 1975. Effect of selected information on dispersal of wilderness recreationists. Ph.D. Dissertation, Colorado State University, Fort Collins, CO.
- Shepard, Roger N. 1967. Recognition memory for words, sentences, and pictures. *Journal of Verbal Learning and Verbal Behavior* 6:156-163.
- Siegel, Sidney. 1956. *Nonparametric Statistics for the behavioral Sciences*. McGraw-Hill Book Company, Inc., New York.
- Williams, Terrell G. 1980. *Consumer Behavior: a strategic orientation*. West Publishing Company, St. Paul.
- Zimbardo, P. G.; Ebbesen, E. B.; and Maslach, C. 1977. *Influencing attitudes and changing behavior*. Second Edition. Addison-Wesley Publishing Company, Reading, Massachusetts.

APPENDICES

Appendix A

Contact and Observation Sheet

## Contact Sheet

1. How often during the year do you come to the San Rafael Swell area?
2. When do you plan to return?
3. Where do you plan to go?
4. Would you be willing to participate in a study and gain visual information on the recreational opportunities of the San Rafael Swell this June?

If yes . . .

5. Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone \_\_\_\_\_

## User Classification

## Observation

1. USE - day or overnight
2. NUMBER in group
3. Group type:  
 Reunion - family and friends      Work      Church  
 Associations--clubs: car, 4x4, envir., scho. Beer drinkers - younger  
 all Male      all Female      Other
4. Activities:  
 Board - cards      Sports      Vehicle use - 4x4, rail, motorcycle  
 Toy vehicle use - bicycle, tricycle      Horses      Shooting  
 Water sports and play - floating and sunbathing  
 Camping - environ. freaks      Other

5. Vehicle types:

None	Motorbike
Auto	Dunebuggy or rail
Small pickup	Jeep
Standard pickup	Transport 4x
4x pickup	Van

6. Vehicle rating:

O/F old/functional

Stock

Fancy

## 7. Centrality rating - activity to vehicle

Appendix B  
Posttest Questionnaires



POST TEST DESIGN

## \* Control Group

1. How long have you been going to the San Rafael Swell?

\_\_\_\_\_

2. Where do you usually go? \_\_\_\_\_

3. What changes have you noticed in the environment?

\_\_\_\_\_

What changes have you noticed in people?

\_\_\_\_\_

What changes have you noticed in management?

\_\_\_\_\_

4. Have any of these changes affected your enjoyment? \_\_\_\_\_

How? \_\_\_\_\_

\_\_\_\_\_

5. Since the spring of 1980, have you been to the San Rafael Swell for outdoor recreation? \_\_\_\_\_

1 = Yes

0 = No

6. During the spring of 1981, did you camp in any other place outside of the Buckhorn Draw vicinity? \_\_\_\_\_

1 = Yes : Where? \_\_\_\_\_ Why? \_\_\_\_\_

0 = No : Why? \_\_\_\_\_

\_\_\_\_\_

POST TEST DESIGN

## \* Experimental Group

1. Have you been to the San Rafael Swell since the picture session?

1 = Yes : Where? \_\_\_\_\_

0 = No

2. Did you go to any of the new locations you chose from the picture session?

1 = Yes

0 = No : Why? \_\_\_\_\_

3. As a result of the picture session, did you go to a new place for outdoor recreation (regardless if you chose it or not)?

1 = Yes : Where? \_\_\_\_\_

0 = No : Why? \_\_\_\_\_

Would you have gone? \_\_\_\_\_

4. How did you feel about the picture process? \_\_\_\_\_

5. What changes in the environment have you noticed? \_\_\_\_\_

6. What changes in the people have you noticed? \_\_\_\_\_

7. What changes in the management have you noticed? \_\_\_\_\_

8. Have these changes affected your enjoyment? How? \_\_\_\_\_

Appendix C

VDMP Photograph Series

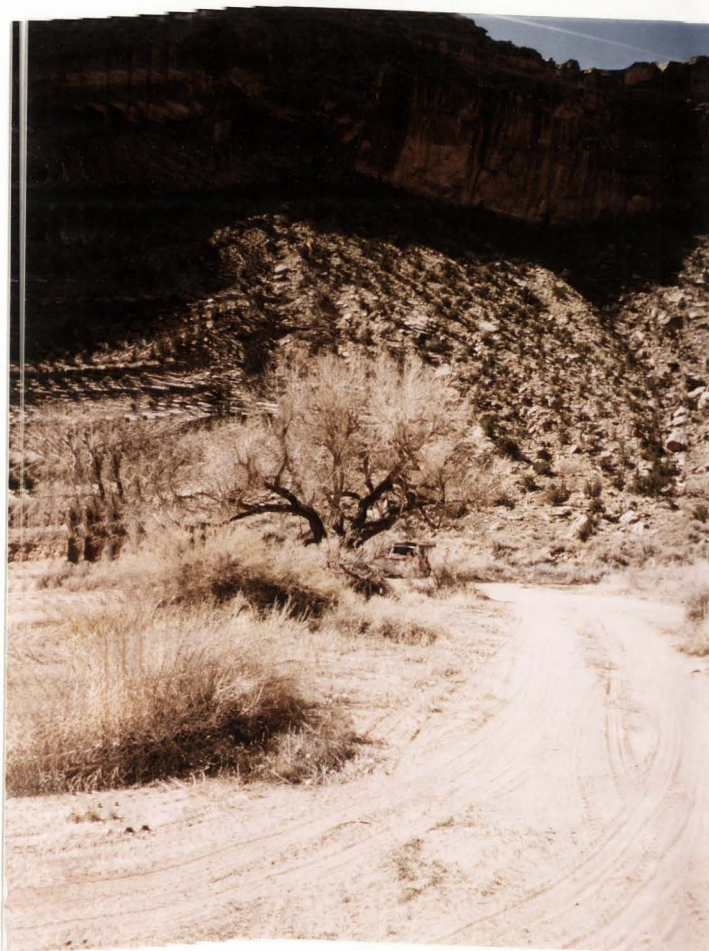
ACCESS



Easy



Moderate



Moderate



Difficult

DENSITY



Low



Medium



Medium



High



ACTIVITY



Sports



Trailer Camping



Family ORV



Motorcycle Trails



ORV Play



Horseback Riding



Canoeing



Waterplay



Backpacking



Tent Camping



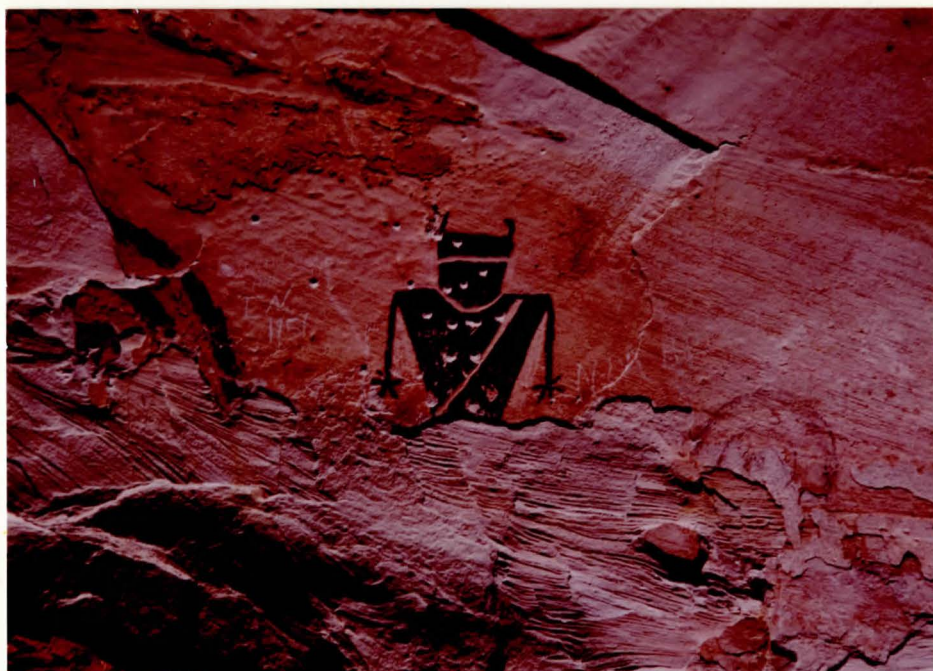
Cultural



Mining Exploration



Prehistoric



Damaged Prehistoric



Waterfall

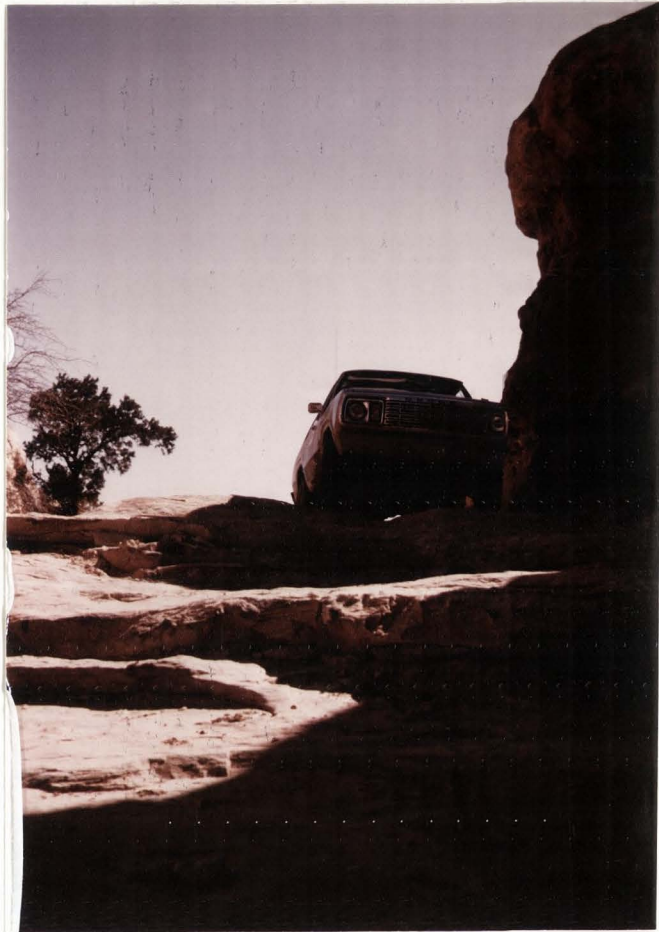


Photography

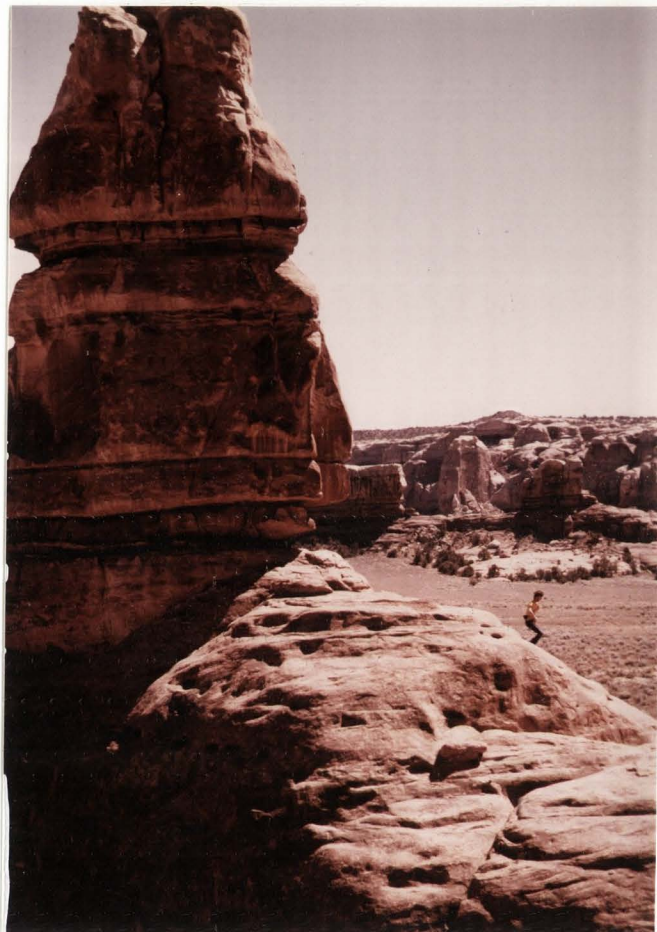




Solitude



ORV Challenge



Rocksrambling



Scenic

PLACES



Wildhorse Butte



San Rafael Desert



San Rafael Reef



North San Rafael Reef



Temple Mountain



Dog Valley



Mussentuchit



Cedar Mountain





Mussentuchit Dunes



Mussentuchit Dunes



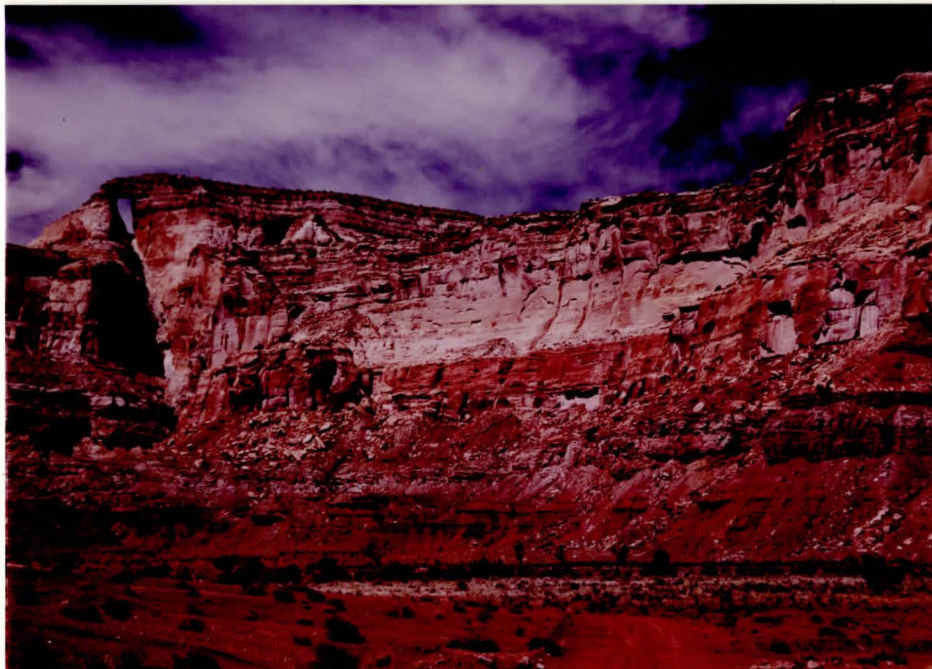
Lone Tree



Muddy River at Tomsic



Tomsic Butte



Hondu Arch



Kessel Country



Inner San Rafael Reef



Hidden Splendor



Tomsic Mine



Black Dragon



Black Dragon



Head of Sinbad



Ghost Rocks



Red Cliffs



Salt Wash





Wedge



Limestone Bench



Jackass Flats



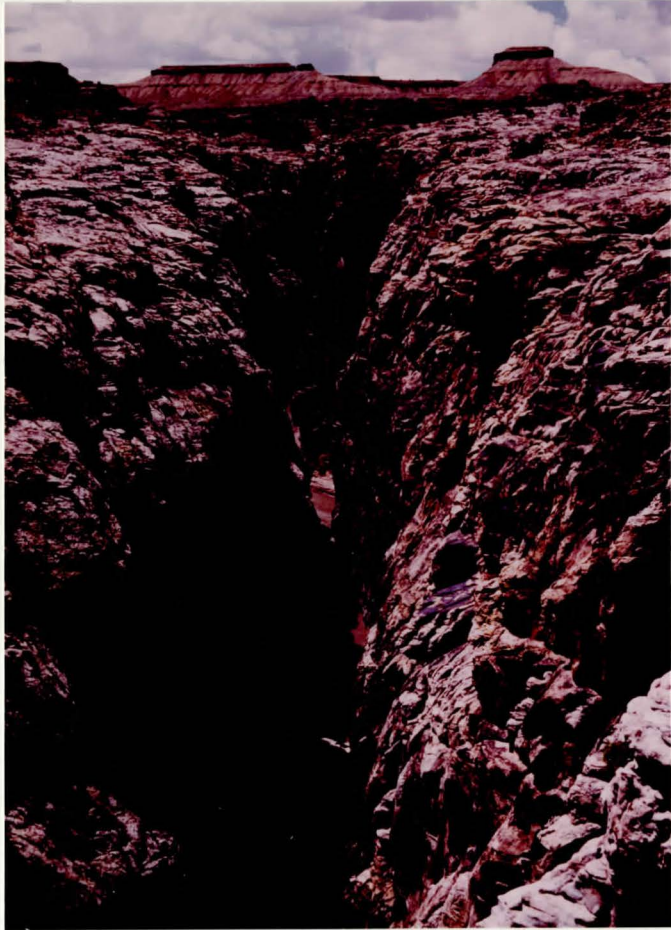
Last Chance



Windowblind Overview



Black Box



Black Box

Appendix D  
Decision Matrix

Place	Time		Density																			
	Road	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	E	1:45	H																			
	Wildhorse Butte			X	X	X	X	X		X												
	M	1:45	L																			
	San Rafael Desert			X	X	X	X	X	X													
	M	1:00	L																			
	San Rafael Reef					X						X	X	X						X	X	X
	E	1:45	H																			
	Temple Mountain					X						X	X	X						X	X	X
	M	1:30	L																			
	Dog Valley			X	X	X	X	X	X			X					X	X	X			X
	E	2:00	L																			
	Mussentuchit			X	X	X	X	X	X													
	E	2:40	M																			
	Mussentuchit Dunes			X	X	X	X	X	X													
	E	2:40	L																			
	Cedar Mountain			X	X	X	X	X														
	M	2:00	L																			
	Lone Tree			X	X	X	X			X	X	X								X		X
	E	2:00	L																			
	Muddy @ Tomsic			X	X	X				X	X	X	X	X	X	X	X		X			X
	E	2:00	L																			
	Hondu Arch			X	X	X				X	X	X	X	X	X	X				X		X
	D	2:30	L																			
	Kessel Country									X		X	X	X						X	X	X
	M	2:30	L																			
	Hidden Splendor				X	X			X	X		X	X	X			X					X
	M	1:15	M																			
	Black Dragon				X	X			X	X		X	X	X						X		X
	M	1:30	M																			
	Head of Sinbad											X	X	X	X	X	X		X		X	

Place	Time		Density																				
	Road	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	M	1:30	H																				
	Ghost Rocks			X	X	X			X	X			X	X	X	X	X	X		X			X
	E	1:30	H																				
	Red Cliffs			X	X	X	X	X	X	X													X
	E	1:00	L																				
	Salt Wash			X	X	X	X	X	X	X													X
	E	1:00	L																				
	Wedge			X	X	X						X									X	X	
	E-M	1:00	L																				
	Jackass Flats			X	X	X						X									X	X	
	M	1:30	L																				
	Black Box											X	X	X						X	X	X	
	E	1:30	L-M																				
	Window Blind			X	X	X				X							X			X			X

---

<u>Road</u>	<u>Density</u>																					
Activity		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Place																						

---



Appendix E  
Opportunity Setting Map

