VISITOR ATTITUDES TOWARD GRIZZLY BEARS IN GLACIER NATIONAL PARK, MONTANA

Thesis for the Degree of M. S. MICHIGAN STATE UNIVERSITY DAVID ANTHONY MIHALIC 1974

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ABSTRACT

VISITOR ATTITUDES TOWARD GRIZZLY BEARS IN GLACIER NATIONAL PARK, MONTANA

By

David Anthony Mihalic

The grizzly bear (<u>Ursus arctos horribilis</u>) is probably among the world's most dangerous animals, yet there are surprisingly few human deaths caused by bears, especially in national parks. The publicity generated by each gives the illusion that bear incidents are a relatively common occurrence. A total of six persons have been killed in North American national parks since 1872. However, there are advocates to remove bears from national parks for safety reasons. The dilemma faced by park managers is one of grizzly bear/human coexistence, or how to allow visitor use while at the same time preserving natural animal populations.

Most studies of the grizzly bear/human coexistence problem have been ethological in nature. These studies, and the few dealing with the human portion of the problem, suggest that an answer lies in the study of human attitudes. Interviews were administered to 158 visitors to Glacier National Park, Montana to discover their attitudes toward grizzly bears, how their attitudes are formed, and what effect attitudes have on visitor behavior in hypothetical bear-encounter situations. It was hypothesized that a causal sequence existed where past experiences (behavior) of visitors influenced formation of their attitudes which, in turn, influenced future behavior. Such variables as past outdoor experiences, membership in environmental organizations, bear knowledge, and the like were selected as indicators of visitors' past behavior. A set of semantic differential scales was administered to measure visitor attitudes toward grizzly bears. Semantic differential scores were factor analyzed to determine the various attitude dimensions. Future behavior was measured by visitor choices of alternative courses of action to take in hypothetical bear-encounter situations. It was also hypothesized that certain general variables such as age, sex, education, and visitor origin (during the formative years) would intervene and have an effect on the formation of visitor attitudes.

Approximately 65 percent of all respondents had positive attitudes toward grizzly bears. Slightly more than 20 percent had neutral attitudes with the remainder (15 percent) having negative attitudes. Past behavior seemed to have little causal effect in attitude formation except when controlled by the intervening variables. Of these, visitor origin intervened in the most number of incidences, age was the next most powerful, while sex and education each intervened in only one instance.

Attitude intensity did not show a relationship to potential visitor behavior. In most instances, "correct" courses of action were chosen in hypothetical encounter situations by most respondents, regardless of the intensity of their attitude. Conventional attitude theory as reported in the literature has indicated that behavior is probably governed by more than any one attitude. The results here seem to bear this out.

VISITOR ATTITUDES TOWARD GRIZZLY BEARS

IN GLACIER NATIONAL PARK, MONTANA

By

David Anthony Mihalic

A THESIS

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Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

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For Judi, whose behavior in grizzly country caused a change in attitude

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PREFACE

The subject of grizzly bears, although long one of a passing interest, did not really capture my complete attention until I learned of my assignment as a seasonal Park Ranger to Glacier's Lake McDonald Ranger Station, which figures so prominently in Jack Olsen's Night of the Grizzlies. My initial reaction, and that of my wife, caused me to look deeper into the events surrounding that tragic summer day in 1967 when it seemed that the grizzly bears had decided to go on a rampage. As interesting as the biological implications seemed to be, it was the attitudes and behavior of present visitors to the ranger station that became more puzzling. They seemed to fall into three categories: those who came with dog-eared copies of Olsen's account in hand and gazed with awe about the station (almost as if they expected to see bloodstains on the walls); the cocky, "experienced" backpackers with their cheap equipment who were afraid of nothing ("Grizzlies? Aw . . . they can't hurt you . . .), and who were potential "drag-outs" for the ranger staff; and those who were earnestly interested in seeing the park, but were slightly apprehensive, and sought valid information ("We've done some camping [or hiking, or backpacking] before . . . but we were wondering about the bears"

These kinds of reactions led me to believe that the grizzly bears were only part of the problem . . . that there was something else, a catalyst of some sort that caused a chance bear encounter to end in

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tragedy. Although the answer may not lie solely in the attitudes and behavior of the park visitor, certainly they must influence the equation which (according to its variables) yields results that can be either of great satisfaction, or great sorrow for the visitor who chances upon the grizzly bear.

Research in this area is new. Although a few studies have been recently accomplished, the problem has yet to be solved. Park managers need information upon which to make management and policy decisions; scientists need to know more of basic relationships in order to study the problem more effectively. To this end, this study has been designed to give managers more information about humans and bears, and to enable scientists to pick up the kernels and discard the chaff so that further useful knowledge may be gained.

If this effort has been successful, it has been due mainly to the help and guidance I have received from many people. First and foremost, I am indebted to Judi, my wife and colleague, who not only gave me love, inspiration, support, and encouragement, but who persevered in making long trips to Logan Pass to help with interviewing.

Second, I must thank my committee for their help and guidance: Dr. Lewis W. Moncrief, my major professor; Dr. M. Rupert Cutler, my minor professor in the Department of Resource Development; and Professor Louis F. Twardzik, Mr. Ronald Hodgson, and Dr. Stephen L. Smith. The park staff of Glacier National Park has been most helpful in their support of the project. I am particularly indebted to Bill Briggle, Cliff Martinka, Bob Burns, Jack Fewlass, and Doug Erskine for their cooperation and helpful suggestions. Without them the study would not

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have been possible. Dr. Stephen Herrero of the University of Calgary was most helpful in reviewing the initial study plan. His comments and suggestions were valuable in determining the direction of the study, and enabled me to discover the work of other researchers. Thanks is also due Professor Rorke Bryan of The University of Alberta, who rendered valuable assistance with respect to research about dangerous wild animals. I especially thank Dr. E. H. (Bud) Pfuhl of Arizona State University, a fellow Ranger, who gave not only valuable time, support, and guidance in the study's development and interviewing stages, but more importantly, gave his friendship. And, of course, I cannot forget thanks for the 158 respondents who, innocently and unknowingly, stopped at Logan Pass to leave on hikes, smell the wild flowers, and gaze at the spectacular scenery of Glacier Park, and instead were accosted by eager interviewers. It was they who gave the most valuable time to the study. My friends and colleagues, Paul Myers, Dan Stynes, Jay Thatcher, Margot Freeman and other fellow graduate students lent support throughout my graduate program. I thank A special note must also go to Mrs. Lilah Hicks, who typed the them. final manuscript in the face of deadlines and last minute additions.

Finally, I wish to thank The Society of Sigma Xi who, along with McIntire-Stennis funds, supported the study financially. But most of all, I owe a great debt of thanks to my parents, who gave me the desire to learn, guided my progress, and enabled me to reach my goals.

While I must accept final responsibility for the content of the thesis, if it is useful and valuable, it is due mainly to the help and efforts of those above. Any error, of course, is mine.

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INTRODUCTION

Glacier National Park: 1967

On the night of August 13, 1967, in Glacier National Park, Montana, two young female concessioner employees were attacked by two grizzly bears while camping in the park's back country. Both were killed by the bears. What was significant about this event, however, was that the two maulings were separate incidents--separated by almost 15 miles--and were perpetrated by two separate bears. These two deaths were the first recorded in the park as a consequence of molestation of visitors by bears since the park was established in 1910. As a result of these two incidents, and the national publicity they received, there arose a wave of criticism of the National Park Service and even exhortations to do away with the grizzly and to leave the parks for the people.¹

Man and the Grizzly Bear

Man has lived and evolved with the grizzly bear (<u>Ursus arctos</u>) ever since Neanderthal times. Then, however, the grizzly bear was a dominant species over man. Only modern weapons have changed this

^IGairdner B. Moment, "Bears and Conservation: Realities and Recommendations," <u>BioScience</u>, Vol. 19, No. 11 (November, 1969), 1019.

relationship. Today, the grizzly exists in Europe, Asia (including Japan), and North America. Although some problems occur between conflicting interests of men and bears throughout most of this range, the problems are perhaps focused more upon the North American species than any other. In most foreign countries the bear generally exists in wild, relatively unsettled areas. Those areas existing in the United States and Canada, however, are subject to increasing numbers of tourists and visitors seeking outdoor recreational experiences.¹ As a result, there have been increasing reports of bear/man conflicts, some of which have resulted in injury or death to the victims.

It is difficult to speculate about how these reports are received by the public. Despite the objections to the bears' presence in park areas by some biological scientists as well as lay people, there are those who feel the bear is an uncontrolled living embodiment of "Wilderness."² Others believe that the public has an "amazing interest" in bears that "goes back to childhood days "³ It is certainly true that bears have had their own television shows (<u>Gentle</u> <u>Ben; Yogi Bear</u>), have been the subject of fables (<u>Goldilocks; Uncle</u> <u>Remus</u>), are the symbols of commercial campgrounds (Jellystone Camp-

¹I. McTaggart Cowan, "The Status and Conservation of Bears (<u>Ursidae</u>) of The World--1970," in <u>Bears--Their Biology and Management</u>, ed. by Stephen Herrero (Morges, Switzerland: International Union for Conservation of Nature and Natural Resources, 1972), pp. 347-50.

²Stephen Herrero, "Man and the Grizzly Bear (present, past, but future?)," <u>BioScience</u>, Vol. 20, No. 21 (November 1, 1970), 1148.

³Horace M. Albright and Frank J. Taylor, <u>Oh, Ranger</u>! (Centennial Edition; Riverside, Connecticut: The Chatham Press, Inc., 1972), p. 49.

Parks), and have been the object of songwriters:

How do you say hello to a grizzly bear What if he doesn't like me because of my long hair . . . Hello, good-bye, so-long, leave me alone--Mr. Grizzly Bear . . .*

Despite these kinds of anthropormorphic portrayals, the fact is the grizzly bear is probably among the world's most dangerous animals. Attemps to prove otherwise would be almost criminal.¹ The question arises as to how these bears are perceived by the public, and what effect public attitudes will have on the bears' future?

One cannot say which factor, that of monarch of the wilds, or killers of young girls will prevail, thus deciding the bears' future. However, until a final choice is made, two facts remain crucial: (1) bears exist in national parks, and (2) people are coming to these parks in increasing numbers, many of whom desire to see bears. Therefore, resource managers must be concerned with the potential for bear/man conflicts, and must learn how to prevent their occurrence.

It is important that more must be learned of the bear/man relationship to determine methods for preventive action to reduce conflict. Although substantial research has been conducted in the study of bears and bear behavior, little has been accomplished with respect to human behavior and its role in this relationship.

How Do You Say Hello To A Grizzly Bear," by John Denver. © Copyright 1973 Cherry Lane Music Co. Used by permission. All rights reserved.

¹"News and Commentary," <u>National Parks Magazine</u>, December, 1969, p. 22.

One means of exploring this segment of the relationship between grizzly bears and human beings is through the study of human attitudes toward bears. This study proposes to examine this relationship by (1) drawing on the findings of the few previous studies in the area, and (2) determining attitudes of park visitors toward grizzly bears. From these activities, relationships will be inferred that will enable resource managers to better manage both bear and human populations. The ultimate objective of this study, obtainable only after possible application of the findings, is to reduce or prevent human injury and death resulting from bear/man conflict.

CHAPTER I

THE PROBLEM: HUMAN/GRIZZLY COEXISTENCE

Early Encounters

In his study of human injury from grizzly bears, Herrero states:

Two primary factors make coexistence difficult. First the bear is shy of human beings and . . . needs large wilderness areas, little disturbed by man, to maintain a population. Second, within his habitat, the grizzly occasionally reacts violently toward people.¹

Although the grizzly is probably among the world's most dangerous animals, there are surprisingly few deaths, especially in national parks, caused by bears. The publicity generated by each incident gives the illusion that bear incidents are a relatively common occurrence. Russell believes that the media contributes to this illusion with distortion and sensationalism.² What, then, is the actual rate of bear/ human conflict in national parks and what are their consequences?

Herrero recounts that the first recorded attack in a national park on a visitor by a grizzly took place about 1907 when a male tourist chased a young grizzly cub up a tree near one of the early hotels in Yellowstone National Park. The cub's enraged mother attacked the man

¹Stephen Herrero, "Human Injury Inflicted by Grizzly Bears," <u>Science</u>, Vol. 170 (Nov. 6, 1970), 594.

²Andy Russell, "The People versus The Grizzlies," <u>Field and</u> <u>Stream</u>, (March, 1968), 119.

and "ripped out [the tourist's] breastbone and one lung." The man died five days later.¹

Since that first incident, grizzly bears have killed few other persons in National Parks. Herrero, who has done the only exhaustive study on bear-caused human injuries, reports a total of five persons killed in the period of 1872-1969 (see Table 1).²

Table 1. Grizzly bear incidents and injuries in North American National Parks, 1872-1969.

National Park		Incidents (No.)	People Injured
United States			
Glacier Grand Teton Mount McKinley Yellowstone		10 0 2 45a	14 0 2 45a
<u>Canada</u>			
Banff Glacier Jasper Kootenay Mount Revelstoke Waterton Yoho		2 1 4 0 0 0 2	4 1 8 0 0 0 0 3
	TOTAL	66	77

^aNot included are 18 possible incidents which resulted in injury to 18 persons.

Source: Herrero, Stephen, "Human Injury Inflicted by Grizzly Bears," <u>Science</u>, Vol. 170 (November 6, 1970), 594.

¹Herrero, "Man and the Grizzly Bear," p. 1148.

²Herrero, "Human Injury," p. 594.

Since Herrero's study, however, Walker has reported a grizzlycaused death in Yellowstone National Park in 1972.¹ Thus, a total of six persons have been killed by grizzly bears in the first century of the existence of National Parks.

National Park Service Management Philosophy

In speaking of human injury by bears (particularly grizzlies), Moment--perhaps the most vocal of the advocates for removal of bears-has said:

The conclusion I draw from all of [these attacks] is that grizzlies and people really do not mix . . . grizzly bears should be removed from parks such as Yellowstone and Glacier which are unsurpassed in eminence as part of our heritage of natural wonders . . .²

This raises a question that is fundamental to the removal of bears from national parks: What is the mandated purpose of the national parks? Congress, in 1916, established the National Park Service and charged it with the management of those lands set aside as national parks since 1872, when Yellowstone became the first national park. In the enabling legislation, Congress gave this mandate:

To conserve the scenery and the natural historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.³

²Moment, "Bears and Conservation," p. 1019-20.

¹Bryce S. Walker, <u>The Great Divide</u>, The American Wilderness Series (New York: Time-Life Books, 1973), p. 137.

³William C. Everhart, <u>The National Park Service</u> (New York: Praeger Publishers, 1972), p. 21.

The dilemma faced by the park service is how to use, or "provide for the enjoyment" of these areas while at the same time trying to preserve them "unimpaired for the enjoyment of future generations." In this instance, the park service is charged to conserve and protect the wildlife in Glacier, including grizzly bears, while allowing use of the park by the public. The problem of visitor protection has been increasingly questioned with respect to where the responsibility for protection lies, particularly with respect to wildlife. As Everhart puts it, ". . . the question has been raised whether it is better to protect the animals from the people or the people from the animals, in particular, the grizzly bear."¹ The problem becomes more critical as greater numbers of people visit parks with bear populations. Yet national parks offer one of the few large land areas where these animals are able to remain relatively free from these pressures of human density, as well as from hunters and trappers.²

The National Park Service philosophy of wildlife protection is grounded in historical tradition. When the first parks were established (after 1872), early administrators felt visitors would need to subsist on fish and game in the parks. Consequently, wildlife was only prevented from the "wanton destruction" caused by poachers. Although early regulations allowed recreational hunting by park visitors, poaching of park animals became such a problem that units of U.S. Cavalry were

¹<u>Ibid</u>., p. 106.

²Eivind T. Scoyen, "National Park Wilderness," in <u>Voices for the</u> <u>Wilderness</u>, ed. by William Schwartz (New York: Ballantine Books, 1969), p. 27.

enlisted to protect dwindling game species.¹ A scientific expedition to the West in 1886 located only 540 buffalo (mostly in Yellowstone). Growing public sentiment for the animals brought congressional passage in 1894 of the Lacey Bill, an "Act to Protect the Birds and Animals in Yellowstone National Park" This became the model for subsequent park legislation for wildlife protection.²

Visitors and Safety

Everhart believes the problem of bears and people is mainly one of visitor safety, and interpretation of the degree of safety that is needed. In this instance, it is a question, he asserts, of safety as an attitude of the visitor as well as management.

If the function of a national park is, as the Wildlife Management Advisory Board concluded, to preserve a 'vignette of primitive America,' then certain potentially dangerous situations--rivers, hotsprings, mountains, wildlife--must exist. The canyon rims in Zion, Bryce, and Grand Canyon, as well as the trails that wind down into the canyons, are potential hazards. Whether they should be lined with chain link fence is another matter.³

Caras agrees, and in a discussion of park deaths from boating, swimming, climbing, automobiles, and plane crashes, states ". . . bear watching in an area administered by our National Park Service is one of the safest things a person can possibly find to do on a vacation."⁴ However, reacting to these kinds of arguments, Moment states, "Why do we

¹Everhart, <u>National Park Service</u>, p. 102.
²<u>Ibid</u>., p. 103.
³<u>Ibid</u>., p. 109.
⁴Roger Caras, "In Defence of the Grizzly," Audubon Magazine,

May, 1969, pp. 53-54.

have to wait until the problem of safe highways . . . is solved before any effective action respecting bears can be taken?"¹ Burton and Kates, speaking of the problem of complete control over a hazard, state, " . . . few hazards are completely preventable."² The question remaining, then, seems to be a definition of what constitutes "effective action" (as stated above by Moment) in protection of visitors and control of bears.

Bear Management in Glacier National Park

Management of bears, as practiced in Glacier National Park, stems from the park's philosophy of resource and wildlife management. Recognition is made of both variables in the interaction of wildlife and visitors. The master plan states, "Management of the wildlife resource will emphasize natural population control and eliminate the human-use factor, which creates undue [wildlife] population stress or contributes to undue visitor risk."³

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Prior to 1968, bear management centered mainly on transplanting of troublesome bears and elimination of some (but not all) unnatural food sources (garbage).⁴ The park's management objective is now to

³National Park Service, <u>Master Plan (Draft)</u>, (West Glacier, Montana: U.S. Department of the Interior, National Park Service, Glacier National Park, March, 1972), p. 36.

¹Moment, "Bears and Conservation," p. 1020.

²Ian Burton and Robert W. Kates, "The Perception of Natural Hazards in Resource Management," <u>Natural Resources Journal</u>, Vol. 3, No. 3 (January, 1964), 413.

⁴C. J. Martinka, "Preserving the Natural Status of Grizzly Bears in Glacier National Park, Montana" (paper presented to the International Assoc. of State Game and Fish Commissioners Committee on Grizzly Bear Management, Yellowstone National Park, Wyoming, Sept., 1972), p. 7.

". . . protect and maintain the natural habitat and status of black and grizzly bears in the park ecosystem while insuring, through reasonable procedures and management, the safety of park visitors."¹ Since 1968 the park has instituted programs to eliminate in-park garbage disposal. install "bear-proof" garbage cans throughout the park, insure strict compliance with the "pack in--pack out" (garbage) policy for backpackers, and expand public information/education programs.² This latter program seeks to identify areas frequented by grizzlies and provide information on grizzly ecology and proper trail travel procedures. The newest aspect of the program is ecological evaluation of present and proposed trails, backcountry campsites, and other developments to determine in what areas human use will contribute to potential bear conflicts. 3 All park employees, both permanent and seasonal, are informed of management policies with respect to bears.⁴ Reports of all bear sightings (both grizzly and black bears) are verified and marked on park maps. This provides the basis for initiating a combination of both bear and visitor management actions. In certain instances, visitor restrictions may be imposed merely on the basis of frequency of bear sightings in a particular area. If these actions are not successful in inducing a return to natural activity patterns of the bear involved, then the offending bear

²Martinka, "Preserving the Natural Status," p. 7.

¹Glacier National Park, "Bear Management Plan," West Glacier, Montana, February 22, 1971, p. 1. (Mimeographed.)

³C. J. Martinka, "Grizzly Bears in National Parks," <u>Pacific</u> <u>Search</u>, May, 1972, p. 7.

⁴Glacier National Park, "Office Order No. 26, Bear Management Responsibilities," West Glacier, Montana, July 13, 1971, p. 1.

(or any bear deemed by park managers as "dangerous") may be either relocated or destroyed. In certain instances of immediate visitor danger, the option of visitor restriction is bypassed and the bear is immediately relocated or destroyed.¹ A summary of bear management actions since 1968 is presented in Table 2.

Year	Vis F	itor Travel Restriction	Capture and Transplant	Destroyed
1968		6	0	2
19 6 9 1970		5 1	0	За О Ь
1971		7	į	Ő
1972	TOTAL	8		<u>_0d</u>
	TUTAL	27	3	5
	Mean	5.4	0.6	1.0

Table 2. Summary of grizzly bear management activities, Glacier National Park, 1968-1972.

a. One death resulted from equipment malfunction.

b. One grizzly killed by automobile not included.

- c. Female with two cubs.
- d. Family group (see note c) travelled 83 miles outside of park; female killed by rancher; not reported.
- Source: Martinka, C. J., "Preserving the National Status of Grizzly Bears in Glacier National Park, Montana." A paper presented to the International Association of State Game and Fish Commissioners Committee on Grizzly Bear Management, Yellowstone National Park, September 19, 1972, p. 13.

Eight of these actions were to remove grizzly bears for visitor safety reasons in or near developed areas. The mean destruction rate of 1.0 grizzly bears per year is comparable to the period of 1946 thru 1970.²

> ¹Martinka, "Preserving the Natural Status," p. 6. ²Ibid.

Future bear management proposals include, in addition to present activities, the proper elimination of sewage and garbage from proposed backcountry trail shelters, relocation of campsites in high bearactivity areas and permitting the deterioration of trails that lead into or through prime grizzly habitat.¹

Human Injury

During the period 1872-1969 in seven of the eleven parks having grizzly populations, there were a total of 77 persons injured in 66 separate incidents. In most cases, only one person was injured in each incident, but in three incidents two persons were injured, and in four cases three persons were injured. Of the seven cases in which more than one person was injured, a grizzly sow with cubs was involved in six of the cases. It should be pointed out that a single grizzly bear was responsible for all the injuries in each incident. As Herrero puts it, "Grizzly bears do not attack in groups."²

Herrero has identified three categories of human activity that preceded 98 percent of all grizzly-caused injuries to human beings in national parks.³ These are hiking, camping (both in developed and backcountry areas) and provocation on the part of the injured person.

¹National Park Service, "Draft Environmental Impact Statement: Proposed Wilderness Plan, Glacier National Park, Montana," West Glacier, Montana, July 23, 1973, pp. 31-37. (Mimeographed.)

²Herrero, "Human Injury," p. 594.

³For further discussion of this study, see Chapter II, <u>Related Research</u>.

Hiking accounted for 24 incidents (31 percent); camping preceded 47 incidents (61 percent); and provoking the bear preceded 5 incidents (6 percent).¹

Provocation accounted for injuries to 5 persons in 5 separate incidents in which attempts were made to chase cubs or photograph bears at close range.² While many experienced naturalists have agreed that bears do not attack except when provoked, the problem seems to be a definition of what constitutes "provocation."³ Russell states, ". . . men and bears have never been able to get together and work out what constitutes an attack on the part of the bear."⁴ Stebler has suggested that provocation "can take several forms, namely, startling, crowding, wounding, or getting close to a grizzly's food."⁵ Russell further suggests that human density can be "provocation" to a bear, and that, "like men, individual bears react differently to intrusion upon their privacy."⁶ Herrero has found that monthly distribution patterns of personal injury show that injuries occur during periods of highest visitor density.⁷

⁵Stebler, "Man and the Grizzly."

⁶Russell, Grizzly Country, p. 63.

⁷Herrero, "Man and the Grizzly Bear," p. 1149.

¹Herrero, "Human Injury," p. 595. ²<u>Ibid</u>., p. 597.

³A. M. Stebler, "Man and the Grizzly--Coexistence?" <u>BioScience</u>, Vol. 20, No. 21 (November 1, 1970), 1141.

⁴Andy Russell, <u>Grizzly Country</u> (New York: Alfred A. Knopf, 1967), p. 62.

that visitor density, not some seasonal variation in bear behavior is an important variable in determination of the number of bear/human encounters. Herrero's study of human injury found that in most attacks in which the victim was hiking, neither the victim, nor the offending bear were aware of each other's presence until they were separated by less than 100 yards. "Grizzly bears each maintain an 'individual distance,' [a] minumum spacing between themselves and conspecifics [other bears] or human beings."¹ This suggests that many so-called "unprovoked" attacks may be, in reality, unintentional provocation of the bear's individual distance by the victim. Herrero states:

Sows with one or more cubs often actively enforce a large individual distance of up to several hundred yards, especially with respect to [other] grizzly bears or human beings. A grizzly suddenly discovering an intruder within its individual distance is apt to charge, almost reflexely.²

Stebler adds, however, that experienced naturalists also agree that association without serious incident between humans and grizzlies is possible, and that "the low rate of attack by these bears may be taken as a support for this view."³ Support for the study of human behavior with respect to interaction with grizzly bears is given by most naturalists who believe "visits into grizzly's domain . . . must be on its terms [with] avoidance of doing anything likely to arouse provocation."⁴

> ¹Herrero, "Human Injury," pp. 595-96. ²<u>Ibid</u>. ³Stebler, "Man and the Grizzly." ⁴<u>Ibid</u>.

The Problem of Garbage

Reed, in speaking of current man/bear problems, stated that garbage and the carelessness of people are the causes of adverse encounters.¹ This problem of bears and garbage has been a recurring one for park service managers, who look upon the garbage-bear relationship as another form of pollution. 2 Craighead and Craighead state that it is not eating "unnatural" versus "natural" foods that alters bear behavior. but rather the association that develops between garbage with its man-smell, and human beings.³ The bears soon learn to lose their fear of man and his scent. The Craigheads have found that these garbage-conditioned bears will, sooner or later, defy interference at food sources (such as a campsite which was the case in the 1972 Yellowstone death), are startled at close range, or just may completely disregard humans in attempts to get food.⁴ Yellowstone National Park has a greater problem with bears and garbage than the other parks which causes bear intrustions into campgrounds.⁵ Glacier National Park, which instituted better garbage disposal measures in 1963, does not share this

¹U.S. Congress, Senate, <u>Daily Digest (S 16845-6)</u>, Senator Mansfield speaking for preserving grizzly bears, Sept. 19, 1973.

²Everhart, <u>National Park Service</u>, p. 108.

³John J. Craighead and Frank C. Craighead, Jr., "Grizzly Bear--Man Relationships in Yellowstone National Park," <u>BioScience</u>, Vol. 21, No. 16 (August 15, 1971), 847.

⁴<u>Ibid</u>., p. 848.

⁵Glen F. Cole, "Preservation and Management of Grizzly Bears in Yellowstone National Park," <u>BioScience</u>, Vol. 21, No. 16 (August 15, 1971), 860.

problem.¹ Glacier seems to have an ecologically natural population of grizzlies while the Yellowstone bears travel long distances to dumps for food and seem to have abnormal distribution patterns as a consequence.² From their studies of Yellowstone's grizzly population, Craighead and Craighead believe that, except for the nature of the food (garbage), the garbage dumps are the ecological equivalents "of the spawning salmon runs that attract and concentrate Alaskan brown bears (<u>Ursus arctos</u> middendorffi) during the summer months."³

Association of food with human beings by bears may pose a greater potential problem than most people think. Cahn reports that of all bear injuries (91) during 1967 in national parks (including black bears, who were involved in most of these cases), 61 occurred in Yellowstone and most occurred along highways as a result of visitors feeding the bears.⁴ This can also lead to potential increased incidences of injuries, in a way that is not readily apparent. As A. Starker Leopold has stated, "[Just as] familiarity with people seems to lead to a diminution of fear and to an attitude of aggression on the part of the bears . . . similarly through their bear-feeding experience, people seem to lose their fear of the ambling and seemingly harmless bear."⁵

²Cole, "Preservation," p. 859.

³Craighead and Craighead, "Bear--Man Relationships," p. 846.

¹C. J. Martinka, "Status and Management of Grizzly Bears In Glacier National Park, Montana," <u>Transactions of the Thirty-Sixth North</u> <u>American Wildlife and Natural Resources Conference</u> (Washington, D.C.: The Wildlife Management Institute, March, 1971), p. 318.

⁴Robert Cahn, "Will Success Spoil the National Parks," a <u>Chris-</u> <u>tian Science Monitor</u> reprint (Boston: The Christian Science Publishing Society, 1968), p. 21.

⁵A. Starker Leopold, "Weaning Grizzly Bears," <u>Natural History</u>, January, 1970, p. 96.

The Grizzly Bear: Some Facts

The grizzly bear is the largest and potentially the most dangerous terrestrial carnivore native to North America. It has fascinated and terrified man since primitive times. If modern man is discounted, the grizzly is at the top of the North American food pyramid. The American Indian regarded the grizzly as a sacred animal, and even early pioneers regarded the grizzly with awe. This fascination still exists todav. Holzworth states there is no other animal over which there are so many conflicting opinions. 2 Primal man and the North American Indian coexisted with the grizzly but in a spacious environment. The grizzly, like all bears and other carnivores, competes with man for space and resources, today more than ever. As the number of humans and their need for resources has increased, so has the number of bears, and especially the grizzly, declined. The bear is now found only in the wilderness areas and national parks of the West. However, growing human population in these regions as well as increasing demands on park and wild lands for leisure pursuits have brought increased pressure on bear populations.³ Jonkel has stated that man's capacity to destroy competing species, not only by the gun but through mere density of human population, has made it impossible for animals such as the grizzly to survive unprotected.⁴ The growing use of helicopters and oversnow vehicles as well

¹Herrero, "Man and the Grizzly Bear," pp. 1150-51.

²John M. Holzworth, <u>The Wild Grizzlies of Alaska</u> (New York: G. P. Putnam's Sons, 1930), p. IX.

³A. S. Leopold, "Weaning Grizzly Bears," p. 95. ⁴Jonkel, "Captured Bears," p. 1145.

as the growing popularity of hiking and cross-country skiing has extended man's range and activities to the farthest reaches of wilderness in all seasons. The result is the question of continued coexistence between man and the grizzly bear, especially in national parks, which is their last sanctuary in the contiguous United States.

Nomenclature

The grizzly bear (<u>Ursus arctos horribilis</u>) belongs to the genus <u>Ursus</u>, or the bears. The <u>horribilis</u> was given the bear by George Ord, a naturalist who described and named the bear from information furnished by Brackenridge in the journals of Lewis and Clark. It was from these journals, and the accounts of encounters with the bear and its display of ferocity that prompted Ord to call the bear <u>horribilis</u> rather than name it after Brackenridge, which is customary when a new species is discovered. Ord's name for the grizzly, as reported in the Second (American) edition of <u>Guthrie's Geography</u>, became then, <u>Ursus horribilis</u>.¹

The term <u>arctos</u> originally referred exclusively to the European brown bear. Although 75 species of grizzly have been identified and described, their difference in scientific names is due mainly to the area in which they are found and slight variations in size and skeletal (mainly the skull) structure. They are all thought now to be of the same species (<u>U. arctos</u>).² An example of the confusion resulting from these

¹John M. Holzworth, <u>The Wild Grizzlies of Alaska</u> (New York: G. P. Putnam's Sons, 1930), p. 221.

²Roger A. Caras, <u>Dangerous to Man: Wild Animals: A Definitive</u> <u>Study of Their Reputed Dangers to Man</u> (New York: Chilton Books, 1964), p. 42.

many species is the confusion over the grizzly and the Alaskan brown bear. In order to distinguish between the two for trophy hunters, the Boone and Crockett Club (which registers big-game trophy records) has drawn an arbitrary line through Alaska; thus a brown bear on one side of the line magically becomes a grizzly bear when it crosses to the other side.¹

Observation shows an increasing use, when speaking of grizzly bears, of the scientific name <u>Ursus arctos</u> rather than <u>Ursus horribilis</u>, or the compromise: <u>Ursus arctos horribilis</u>. Whether this trend is based on new biological data, or on the emotional overtones of <u>horribilis</u>, is purely speculative. For the purposes of this thesis, and the fact that this particular bear, subspecies or not, is native to the northern Rocky Mountains, <u>Ursus arctos horribilis</u> will be used.

Turning to the common name, Lewis and Clark used the term "grizzle" to describe the appearance of the bear's fur. Olsen reports the early explorers thought the white tipped, silvery appearance of the fur looked like the grey in an old man's hair, hence, "grizzly."² However, Holzworth says the name actually derived from two words: "grizzle" and "grisly." Grizzle comes from the old French "grisel," and the Old High German "gris," meaning hoary or grey, and refers to the color of the tips of the guard-hairs (and accounts for another popular name: "silver-

¹Bud Branham and Pat Smith, "The Most Savage Animal on Earth," <u>Sports Afield</u>, June, 1973, p. 86.

²Jack Olsen, <u>Night of the Grizzlies</u> (New York: G. P. Putnam's Sons, 1969), p. 18.

tipped"). Grisly comes from Old English, "grisan," or "to shudder," and means horror-inspiring, terrible, or terror-provoking.¹

Biological Facts

Craighead and Craighead state the grizzly bear is an extremely efficient omnivore but a relatively inefficient carnivore. Although the bear does prey occasionally on big game and livestock, it exists mainly on grasses, sedges, tubers, berries, nuts, rodents, and carrion. In certain parts of its range it is also dependent on garbage and modern packaged foods.² In the Glacier National Park ecosystem, study results have shown that the grizzly functions as an omnivore, rather than a carnivore.³

The bears' use of various habitats is partly related to food availability. During the spring, grizzlies are frequently found in lowland valleys grazing, except for short forays to snowfields and avalanche chutes where they feed on winter-killed animals (mostly ungulates) that are exposed by thaws. The bears move to higher elevations (mostly alpine meadows) as summer progresses, looking for tubers and following ripening berry crops. Wildfire plays an important part in this berry production in Glacier National Park, with bears frequenting burned areas

¹Holzworth, <u>Wild Grizzlies</u>, p. 220.

²See Craighead and Craighead, "Bear--Man Relationships," pp. 846-57, for further discussion of this relationship; see also Cole, "Preservation," pp. 859-64, who documents the same bear/garbage relationship, but with different conclusions.

³C. J. Martinka, "Habitat Relationships of Grizzly Bears in Glacier National Park, Montana," <u>National Park Service Progress Report</u>, 1972, West Glacier, Montana, March 1, 1972, p. 9. (Mimeographed.) during this season. They continue this use of high elevations into the autumn, when they move back to lower elevations following frosts and early snows. The grizzly is generally inactive in the winter, but occasional sightings of individual bears or tracks have occurred in December and March.¹

Martinka, in his study of Glacier's grizzly populations, reports that denning usually occurs in coniferous forests or higher elevation shrub types.² However, the bear is not a true hibernator but rather enters into a deep winter sleep within the den. Hibernation is considered to be a torpid state in which the animal at least partially loses its sensibility, or power of motion, and can be aroused only with difficulty. Bears are actually dormant rather than torpid, easily aroused, and capable of moving rapidly upon arousal.³ In fact it is during this winter sleep that the cubs are born. Weighing less than a pound at birth, the cubs are active and suckle throughout the last months of the sleep period and emerge from the den weighing as much as 25 pounds.⁴

The female, or sow, although capable of breeding at five years, may not do so until six or seven years of age.⁵ The male grizzly, or

³Frank C. Craighead, Jr., and John J. Craighead, "Data on Grizzly Bear Denning Activities and Behavior Obtained by Using Wildlife Telemetry," in <u>Bears--Their Biology and Management</u>, ed. by Stephen Herrero (Morges, Switzerland: International Union for Conservation of Nature and Natural Resources, 1972), p. 85.

⁴Olsen, <u>Night</u>, p. 23.

⁵Allan W. Stokes, "An Ethologist's Views on Managing Grizzly Bears," <u>BioScience</u>, Vol. 20, No. 21 (November 1, 1970), 1155.

¹Ibid., pp. 6-7.

²Ibid., p. 7.

boar, does not remain with the female after breeding. However, the sow/cub family will remain together through the cubs' second year, with dissolution of this family unit occurring prior to the sow breeding again the third summer.¹ Ordinarily, sightings of single bears are either boars or sub-adult male and female grizzlies.

Social Habits

Although grizzly bears usually have a specific range, they are not territorial and wander widely in search of food, breeding mates, or shelter. In many cases, including Martinka's observations, there are indications that home ranges of individual bears will overlap.² This suggests that the grizzly is a tolerant animal. However, bears attempt to avoid one another. Even when two or more bears meet in the same area, a hierarchy exists among them. This hierarchy is a result of threats and attacks among the bears and may often lead to serious injury and death.³

This "social intolerance" may account for the grizzly's relationship (both good and bad) with human beings. The grizzly bear is regarded as a highly intelligent animal that needs large expanses of uninhabitated land in which to survive.⁴ This is also due to intolerance among bears. Many popular writers (Olsen, Russell, and others)

¹Martinka, "Population Characteristics," p. 9. ²<u>Ibid</u>., p. 11. ³Stokes, "An Ethologist's Views."

⁴A. S. Leopold, "Weaning Grizzly Bears," p. 94.
as well as wildlife biologists (Jonkel, Herrero, Martinka, and others), repeatedly recount that the grizzly bear is normally shy and avoids contact with man or places of human habitation. Caras quotes the renowned naturalist William T. Hornaday who said the grizzly disposition is "naturally . . . rather peaceful [with respect to man] and good natured . . . " Hornady went on to add that the temper of the grizzly was ". . . defensive not aggressive"¹ Jonkel suggests that it is not hunting that has decimated the grizzly's numbers but competition with man for range and resources (leading to their development for human use). He further suggests that, because of the hierarchial social order with other bears who share their range, man unknowingly, may also be included in this hierarchy, and "the avoidance of conflict is largely to the credit of the bears."²

Man/Bear Historical Relationships

Early European man not only hunted the now-extinct cave bears (<u>Ursus spelaeus</u>), but started a form of animal worship known as the Cult of the Bear which lasted until the late Paleolithic. Evidence of this relationship has been found in ancient collections of bear skulls and in cave paintings. Herrero states that primitive societies in Asia, Europe and North America had bear cults and that usually the subject was <u>Ursus arctos</u> rather than other species. Herrero cites further the conclusion of Hallowell's (1926) study of bear ceremonialism in North America, in which he states:

¹Caras, <u>Dangerous to Man</u>, p. 41.

²Jonkel, "Captured Bears," pp. 1145-46.

. . . no other animal was found to attain such universal prominence as the bear, nor to have associated with it over such a wide geographical area, such a large series of customs.¹

The American Indians attached great powers, both supernatural and physical, to the grizzly bear. The killing of one was the subject of great pride among most tribes.² McCracken refers to the belief by some western tribes that they were physical descendents of the grizzly bear.³ These same types of beliefs are reflected in many of the old Indian legends.⁴

Perhaps the first grizzly/white man encounter took place in 1690. Henry Kelsey, a Canadian trapper and explorer, wrote the following account in September of that year, and indirectly mentions the bear's relationship with humans:

. . . Another is an outgrown Bear wch [sic] is good meat His skin to gett [sic] I have used all ye ways I can He is mans [sic] food & he makes food of man 5

The next reference to the grizzly bear is in the journals of Lewis and Clark, where two grizzlies were killed on April 29, 1805 after one of them charged Captain Lewis. This was the first time the party had encountered bears.⁶ Lewis later wrote, "the wonderful powers

¹Herrero, "Man and the Grizzly Bear," p. 1150.

²<u>Ibid</u>.

³Harold McCracken, <u>The Beast That Walks Like Man</u> (Garden City, New York: Hanover House, 1955), p. 45.

⁴Stith Thompson, <u>Tales of the North American Indians</u> (Bloomington: Indiana University Press, 1971), p. 164.

⁵McCracken, <u>Beast That Walks</u>, p. 70.

⁶Gerald S. Snyder, <u>In the Footsteps of Lewis and Clark</u> (Washington, D.C.: National Geographic Society, 1970), p. 114. of life which these animals possess renders them dreadful . . . we had rather encounter two Indians than meet a single bear."¹

With the introduction of firearms, and man's relentless push westward, the grizzly range began to shrink. Most authors believe the grizzly originally extended from the western coast to the Mississippi River, and from Mexico north to the Artic Circle.² However, Stebler, in a review of historical accounts, believes that, within the contiguous United States, the range extended only eastward to the Red River region of North Dakota, and southward to the Moreau in present South Dakota. The prairies to the south do not appear to have been grizzly habitat. Historical records placing grizzly bears in Kansas and Minnesota should be considered aberrant occurrences.³

Homesteading, farming, and cattle ranching were instrumental in literally crowding the grizzly out of his habitat.⁴ These factors certainly were instrumental in the killing of the last California golden grizzly (<u>Ursus magister</u>) in 1922.⁵ Soon other western states reported killings of the "last grizzly," and today it is believed that fewer than 1000 individuals remain in the 48 contiguous states. A few years ago

¹National Park Service, <u>Master Plan</u>, p. 5.

²Herrero, "Human Injury," p. 593.

³A. M. Stebler, "Conservation of the Grizzly--Ecological and Cultural Considerations," in <u>Bears--Their Biology and Management</u>, ed. by Stephen Herrero (Morges, Switzerland: International Union For Conservation of Nature and Natural Resources, 1972), p. 299.

⁴Dale A. Burk, "Let's Give the Bears a Break," <u>American Forests</u>, November, 1972, p. 16.

⁵Olsen, <u>Night</u>, p. 27.

only the states of Washington, Idaho, Montana, Wyoming and Colorado were able to claim the grizzly within their boundaries. Today Colorado has none and it is doubtful if any grizzlies remain in Washington. The largest numbers of grizzly bears are now found in a north-south corridor extending from Glacier National Park to Yellowstone and Grand Teton National Parks, and the national forests in between.¹ The greatest concentrations are in the "Yellowstone ecosystem" which includes the bordering national forest lands. The only other concentration of grizzly bears is found in Glacier National Park.²

Present Status of Grizzly Populations in Glacier National Park

The most reliable estimates of the present status of Glacier's grizzly population are presented in the studied performed by the park's Office of Natural Science Studies. At present Martinka estimates between 175 to 220 grizzlies inhabit the park, with an average of 200 grizzlies present at any one time. Martinka surveyed over a period of 4 years a 290 square mile sample area of the north-central region of the park in order to obtain population and density estimates.³ As a result of these studies, it is estimated that there is one grizzly for approximately each 8 square miles of park backcountry. These figures

²<u>Ibid</u>.
³Martinka, "Population Characteristics," pp. 4-6.
⁴Martinka, "Status and Management," p. 314.

¹Michael Frome, "Do Grizzlies Face a Grisly Future?" <u>Field and</u> <u>Stream</u>, January, 1974, p. 38.

compare favorably to Yellowstone National Park estimates of 220 grizzly bears with a density of one bear per 15 square miles.¹ While Yellowstone National Park currently has problems and public controversy over its bear management activities with respect to garbage, Glacier does not share in these same problems.² Martinka reports that the natural status of the grizzly population has not been significantly altered by management activities, and further states that the principal procedures of "bear management" (removal of unnatural foods, removal of problem bears) that took place prior to 1968 have since been supplanted by "people" management procedures (temporary travel restrictions; pack in-pack out garbage policy) which has greatly reduced the opportunity for human encounters with grizzly bears.³ This suggests that perhaps the answer to bear/human problems lies in the study of the human visitor to grizzly country, rather than traditional avenues in wildlife behavior.

Purpose of the Research

In the case of the grizzly bear, the whole bear/man relationship and its impact on behavior and management must be understood to prevent reoccurrence of injury.⁴ Burghardt and Burghardt believe that study of the bears themselves, both in the wild and in captivity, will

¹Cole, "Preservation," p. 858.

²Editorial, Hungry Horse News, Dec. 14, 1973, p. 2.

³Martinka, "Preserving the Natural Status," p. 1.

⁴John S. Marsh, "Bears and Man in Glacier National Park, British Columbia, 1880-1980," in <u>Bears--Their Biology and Management</u>, ed. by Stephen Herrero (Morges, Switzerland: International Union for Conservation of Nature and Natural Resources, 1972), p. 289.

not only answer broader implications of bear behavior, but reduce the number of incidents that result in human injury.¹ Study of the bear/man relationship by definition also includes human attitudes and behavior.

Henning has stated that natural resource managers "are basically concerned with management of people's behavior toward natural resources, rather than natural resources per se." Henning concludes that in making sound resource management decisions (such as those concerning bears), managers must include people and their values.² Bowman feels that the grizzly bear "problem" is "largely one of human attitudes." Public attitudes, Bowman believes, are the most important factor in decisions about bears and their place in national parks.³ Caras states that solutions to the problems of bear/human interaction will be found by changing man's attitudes rather than attempting to "kill off the bears."⁴ Golant and Burton believe that improved understanding and prediction of human behavior when confronted with hazard situations is necessary, and that more research is needed to explore "preconceived . . . feelings held by individuals concerning potential hazards."⁵

¹Burghardt and Burghardt, "Notes," p. 219.

⁴Caras, "In Defence," p. 55.

⁵Stephen Golant and Ian Burton, "A Semantic Differential Experiment in the Interpretation and Grouping of Environmental Hazards," <u>Geo-</u> <u>graphical Analysis</u>, Vol. 2, No. 2 (April, 1970), 120.

²Daniel H. Henning, "Comments on an Interdisciplinary Social Science Approach for Conservation Administration," <u>BioScience</u>, Vol. 20, No. 1 (January 1, 1970), p. 11.

³Eldon G. Bowman, "The Grizzly Bear in the National Parks, Part I," <u>American Forests</u>, July, 1969, pp. 17-18.

To many, the solution to problematic bear/man encounters is removal of the bears. Moment, who has advocated removal of bears from parks in the lower United States, believes that it is a controversial issue between the general public and wildlife managers.¹ A. Starker Leopold, on the other hand, believes that solutions are dependent upon the unpredictable behavior of both bears and man, and that "in most cases, bear 'incidents' could have been prevented with a little human forethought."²

Contemporary human attitudes toward grizzlies seem to run the gamut from pure horror almost to deification. At each end of the spectrum is a <u>reality</u> to the person who believes certain things about bears. The visitor who watches a grizzly sliding playfully down a snowbank has one concept of grizzly bear reality; the victim who lies underneath the biting jaws of the bear has another. Yet both are correct in their beliefs of reality because a grizzly bear is both of these things.

Adequate research, then, is needed in more than just the area of animal behavior. We can assume that current natural resource management philosophy as expressed by managing agencies is to maintain a natural population of grizzly bears while minimizing the chances of potentially harmful man/bear encounters. Although a study, such as this one, of attitudes alone will not predict overt human behavior, behavior and the conditions under which it occurs form one of the major foundations

¹Gairdner B. Moment, "Bears: The Need for a New Sanity in Wildlife Conservation," <u>BioScience</u>, Vol. 18, No. 12 (December, 1968), 1105.

²A. S. Leopold, "Weaning Grizzly Bears," p. 100.

of an individual's attitudes.¹ Because changes in behavior can affect attitudes, and vice versa, human attitude studies may shed light on potential solutions to bear/human conflicts. We can assume that human behavior has shared a large portion of the responsibility for damages and injuries sustained from bears. An understanding of bear biology can show that bears have a flight distance, that a sow will protect her cubs if she feels they are threatened, that garbage can break down the bears' natural fear of man. This understanding cannot show us why, in one instance, an encounter may end with the bear fleeing, while under like circumstances, the encounter may end in human injury or death.

To maintain a natural bear population in a park heavily frequented by visitors is a complex objective. It can only be achieved by an understanding of human, as well as bear, behavior. Managers of natural resources are confronted today with many more problems of user behavior than they are of actual physical resource management. Although scientists can easily legitimize the presence of natural grizzly populations on the basis of ecological values, there is also the value of these animals to the people who use the resource.² The viability of Moment's proposition of bear removal seems questionable without further knowledge. The usual answer to it is Leopold's oft-quoted statement:

Daryl J. Bem, <u>Beliefs, Attitudes and Human Affairs</u> (Belmont, California: Brooks/Cole Publishing Co., 1970), p. 66.

²C. J. Martinka, "Population Characteristics of Grizzly Bears in Glacier National Park, Montana," (paper presented at the American Association for the Advancement of Science Symposium on Research in the National Parks, Philadelphia, Pennsylvania, December 29, 1971), p. 14.

. . . there seems to be a tacit assumption that if grizzlies survive in Canada and Alaska, that is good enough. It is not good enough for me. Relegating grizzlies to Alaska is about like relegating happiness to heaven; one may never get there.¹

It will be the public who (through public choice) will determine the value of bears and their future in national parks. But this is the broad issue. Arguments by Moment and Leopold do little to solve the present problem facing park managers: to reduce the chance for visitor injury from grizzly bears.

Problem Statement

The study of visitor attitudes is of value not only for the future of bears, but more importantly in its application to the basic question of managing visitor behavior with respect to grizzly bears. Effective management will only be possible after we understand the bear/ man relationship at its basic levels. What are visitor attitudes toward grizzly bears in national parks? How do these attitudes affect visitor behavior? Is there a link between visitor attitudes and potentially dangerous behavior toward bears?

If these questions can be answered, then resource managers will be better able to apply them to future visitor management decisions. Study of bear behavior has led to more effective bear management procedures. If the same can be accomplished in terms of visitor management, then the primary management goal of reducing and controlling the situations in which visitors can be injured will be met.

¹Aldo Leopold, <u>A Sand County Almanac</u> (New York: Ballantine Books, 1970), p. 277.

Goals and Objectives

In addressing the problem, this study will:

1. Measure attitudes toward grizzly bears of a randomly selected population of visitors to Glacier National Park.

2. Study these attitudes in relation to other visitor variables to determine how the attitudes are formed.

3. Suggest ways attitudes may affect future visitor behavior toward bears,

4. Discover to what extent attitudes may affect the role of the visitor in the man/bear relationship,

5. Discover patterns and groupings of attitudes to enable possible prediction of future behavior, and

6. Through replication of some aspects of past research, to build on previous theory and suggest avenues of approach to future research.

If these objectives are met, this study will contribute new theory to the study of the bear/man relationship and provide additional basis for future grizzly bear and park visitor management decisions.

CHAPTER II

RELATED RESEARCH

Only a very few studies have attempted to study man's relationship with bears. The preponderance of work has taken place in ethological and wildlife management studies of bears. When man is considered in these studies, it is usually only in a peripheral manner. As a consequence, this chapter is organized in an attempt to show the reader the development of theory from these very broad, peripheral studies dealing primarily with bears to those studies specifically dealing with human attitudes toward bears. Correspondingly, some areas are dealt with in a general way, while others are quite specific.

As one will note, little research has been done solely with respect to the general problem of the human/bear relationship. What has been accomplished has been mainly of a tangential nature with respect to the study of bear behavior. Although ethological researchers have observed the character of the relationship, few attempts have been made to explain it except that portion that can be attributed to bear behavior. An exhaustive review of the literature has discovered only four studies of the human side of this relationship, three of which are reported below. The fourth is referred to in the review of the Burghardt, <u>et al</u>. article. No information was found to indicate that any other formal studies are underway, save those associated with the present project.

Research in Natural Hazards

Most of the general research accomplished in the perception of natural hazards has been that of Burton and Kates. Their main emphasis has been in environmental hazards such as tornadoes, floods, pestilence, earthquakes and so on.¹ How persons perceive these phenomena, as well as other elements of natural environments, is of great importance to planners and managers of natural and recreational resources.² To date, the study of aesthetics has been popular, yet natural hazards are perhaps as important as aesthetics to planning agents concerned with everyday management activities.

Burton and Kates define a "natural hazard" as "those elements in the physical environment, harmful to man and caused by forces extraneous to him."³ They include such specific items as infestations of phreatophytes in water (although the principal causal agent may have been man's alteration of a natural watercourse, creating the environment that allows the infestation); erosion (which may be the result of improper agricultural practices); and venomous animal bites (which may be caused because of intrusion into the animal's habitat). Burton and Kates readily concede that certain hazards (usually biological) can be prevented while others (geographical hazards) cannot be prevented, but may be controlled.⁴ Whether or not they would include grizzly bears in

¹Burton and Kates, "Perceptions of Hazards."

³Burton and Kates, "Perception of Hazards," p. 413. ⁴<u>Ibid</u>., p. 416.

²Elwood L. Shafer, Jr., "Perception of Natural Environments," <u>Environment and Behavior</u>, June, 1969, p. 71.

the same class as venomous animal bites can only be speculated, but it does seem conceivable.

Data from these studies suggest that there is a considerable difference in the social acceptance of personal injury depending on the kind of hazard that was the causal agent. An example would be the emotionalism surrounding a grizzly mauling, with the opposite effect concerning automobile accidents. This is explained by the possibility of a difference in <u>acceptance</u> of a particular hazard as being either inevitable (an automobile accident) or preventable (a bear mauling).

The authors suggest that this variation may be explained in resource users' attitudes toward <u>uncertainty</u>, and that they behave in ways that suggest "an individual effort to dispel uncertainty."¹ Various strategies for coping with uncertainty (i.e., a chance or freak occurrence; or a fatalistic attitude) may be the reason for visitor behavior with respect to their reasoning when deciding to enter grizzly habitat.

Burton and Kates thus hypothesize that perception of a hazard is dependent on attitudes toward uncertainty, preferences for certain risks, and <u>affect</u>, or emotional feelings of users toward the objects of resource management.² If this hypothesis is correct, there may well be a hiatus between attitudes towards grizzly bears as an <u>object</u> and attitudes toward the uncertainty, or relative hazard of a <u>situation</u> (such as hiking in grizzly country) in which one might encounter a bear.³

³Milton Rokeach, <u>Beliefs, Attitudes and Values</u> (San Francisco: Jossey-Bass, Inc., 1970), p. 128. Essentially Rokeach argues that behavior cannot be predicted by attitude toward the object alone. He believes at least one additional measure is needed, that of attitude toward the situation in which the object is encountered.

¹Ibid., p. 434.

²<u>Ibid.</u>, p. 438.

Further study of the interaction of situational variables has been made by Golant and Burton.¹ An attempt was made to explain variation in attitudes by exploring preconceived ideas and feelings of individuals toward potential hazards and hazard situations. Unfortunately, no attempt was made to learn how these attitudes were acquired, nor if they were predictors of behavior. Rather, the authors were concerned mainly with the meaning attached to the particular hazards by the subjects.

Ethological Studies

Research into the relationship between grizzly bears and man has its foundation in those studies of bears and their behavior that tangentially considered man. Perhaps the best known students of grizzlies are John and Frank Craighead, who studied grizzly ecology in Yellowstone National Park.²

Craighead and Craighead have confined their study of bear/man interaction largely to the relationship between grizzlies and garbage. Through their radio monitoring techniques the Craigheads believe it is probably the association of food with the presence of humans, whether by the roadside, in campgrounds, or in garbage dumps, that causes the bears to become conditioned to man and lose their fear of man and human scent:

¹Stephen Golant and Ian Burton, "A Semantic Differential Experiment in the Interpretation and Grouping of Environmental Hazards," <u>Geographical Analysis</u>, Vol. 2, No. 2 (April, 1970), pp. 120-34.

²Craighead and Craighead, "Bear--Man Relationships," p. 845.

Such animals may co-exist with people for extended periods of time, but sooner or later, these man-conditioned animals are startled by humans at close range, defy interference at a food source or completely disregard humans in their attempt to get food. This may occur in a campground, on a trail or in the backcountry. The result may be a bear-man encounter ending in human injury or death.

Through monitoring, they have discovered that bears which frequent the backcountry, having few encounters with developed areas (e.g., a more "natural" population), retain their fear and shyness of man. However, feeding on trash left by visitors to the backcountry or on handouts also lessens the bear's fear of humans. Aligned with these studies is the research of Cole, a National Park Service biologist stationed at Yellowstone National Park. Cole's studies have relied heavily on the research of the Craigheads and others, as well as his own observations. To date his research has been essentially an evaluation of management actions and their resultant behavioral effect on the bear population.² These studies have lately centered on a new park management policy to move garbage disposal areas from within the park. The result has been problems with bears entering developed areas to search for food. The ultimate purpose of this policy will be to encourage the bear to return to natural forage habits.³

Perhaps the best integration of human and grizzly bear behavior are the extensive studies of Martinka in Glacier National Park. Martinka's research has concentrated on grizzly bear population status

¹<u>Ibid</u>., p. 848.

²Cole, "Preservation," p. 863.

³<u>Ibid</u>., pp. 863-64. See also Craighead and Craighead, "Bear--Man Relationships," p. 856; and A. S. Leopold, "Weaning Grizzly Bears," p. 98.

and management, bear habitat relationships and characteristics, and preservation and bear/man relationships. Control of garbage and removal of problem bears were the principal management measures prior to 1968 to prevent bear/human conflict. Recently, a bear monitoring system has greatly reduced bear/man conflicts. In the period 1946-1970, 10 confrontations-attacks between bears and visitors resulted in 12 injuries and two fatalities. Contrary to the Yellowstone studies, most encounters in Glacier were in undeveloped areas, with 78 percent of the encounters between 1968-1971 taking place in the backcountry, and the remainder in or near developments. 1 Martinka reports that this rate is comparable to a distribution of bear/man encounters prior to 1968. The rates of injury in the backcountry were approximately 5.3 per 100,000 backcountry visitors. Contrary to other studies which cite an injury rate based on total park visitation, Martinka's figures are based on 5 percent of the total park visitation, or that number believed to enter these areas for either day-hiking or overnight trips.²

Martinka's studies have focused on two main areas: biological research and bear/visitor management. Glacier's management program is unique in that it is an integration of bear management control measures and visitor travel/use techniques. However, little theoretical base has been developed in the area of visitor behavior with respect to grizzly bears.

¹Martinka, "Preserving the Natural Status," p. 5.

²Ibid.; for examples of other injury citations see Herrero, "Man and the Grizzly Bear," p. 1148.

Other reports have inferred generalization of results obtained in the study of captured animals to humans, but these have mainly been in the area of management, philosophy, or anthropomorphism. Burghardt and Burghardt, in their study of black bear cubs, cite the importance of study because of anthropormorphic implications of the bipedal habit; the similarity between ursine and primate brain features, especially with respect to behavior and memory; and the hierarchical rankings in the communities in which they are found.¹ Research of this kind is most likely applicable in identifying various bear postures (social play, communication, ambivalent threat positions) and their possible implication to human response during an actual encounter threat.

Jonkel also has worked with captured bears, including the grizzly, black bear, and polar bear (<u>Ursus maritimus Phipps</u>).² These studies have done much to integrate and relate findings of the three species with respect to bear behavior and their response to man (while in a captured state). Jonkel's study mainly relates to aggressiveness, as measured by charges and behavior while in captivity.

Stebler has studied the ecological, historical and cultural considerations of the grizzly bear/human relationship.³ Although he recognizes that grizzly activities are in certain instances inimical to man's, he uses the bear/man relationship as a rhetorical question to

³Stebler, "Conservation of the Grizzly," pp. 297-303.

¹Burghardt and Burghardt, "Notes," pp. 207-20.

²Charles Jonkel, "The Behavior of Captured North American Bears," <u>BioScience</u>, Vol. 20, No. 21 (November 1, 1970), pp. 1145-47.

generalize to other aspects of man's relationship with the natural environment, pollution and wildlife preservation. The level of abstraction is mainly philosophical and questioning; it adds little to the development of theory.

Curry-Lindahl is concerned mainly with population studies of the European brown bear (U. arctos) and its present status. Although it does not prey on domestic stock, there is some evidence that the bear does graze on the same range, in some cases at the same time, as stock, with no apparent concern on the part of the stock, or the human tenders.¹ Perhaps the greatest contribution of Curry-Lindahl's research is the implication that perhaps the European bear is further evolved and advanced than is the North American species, with respect to the bears' relationship with man and mans' attitudes toward the bears. More importantly, however, is the further implication that perhaps the European bear offers a window to the future of what is also possible with respect to human attitudes toward, and relationships with, the North American grizzly.

Human Injury

Although the literature cites statistics of human injury caused by grizzly bears (Cole, Craighead and Craighead, Martinka, and others), there has only been one study to date that seriously addresses this

¹Kai Curry-Lindahl, "The Brown Bear (<u>Ursus arctos</u>) in Europe: decline, present distribution, biology, and ecology," in <u>Bears--Their</u> <u>Biology and Management</u>, ed. by Stephen Herrero (Morges, Switzerland: International Union for Conservation of Nature and Natural Resources, 1972), pp. 74-80.

topic. Herrero has made a comprehensive study of grizzly bear/human conflict with respect to injuries sustained in North American national parks. The data does not include encounters outside national park areas (i.e., national forests, wilderness areas, provincial parks) and especially those in connection with hunting accidents.¹

In most attacks preceded by hiking, the individual distance (or "flight distance") of the bear was violated by <u>unintentional</u> provocation by the victim, such as startling or suddenly confronting the bear.² Martinka classifies these attacks as a "defense reaction" on the part of the bear to an intruder, which may occur (when the bear is surprised) almost reflexively.³ Most of these instances (71 percent) involved a grizzly sow with cubs.

Camping victims were attacked mainly in developed areas and also predominantly (38 of 43 injuries) in Yellowstone National Park. In the Canadian parks only one incident involving campers has occurred, resulting in three injuries. Herrero attributes this and other incidences in Canadian parks to bears that have been known to feed at garbage dumps.⁴

Defense implications are apparent in analysis of the behavior of the person attacked. Herrero points out that extent of injury is apparently related to this behavior. The data are not statistically

²<u>Ibid</u>.
³Martinka, "Status and Management," p. 316.
⁴Herrero, "Human Injury," p. 596.

¹Herrero, "Man and the Grizzly Bear," pp. 1148-53; Herrero, "Human Injury," pp. 593-98.

significant, but suggests that "playing dead" minimizes injury. In at least 10 instances, the attack was stopped or lessened when resistance stopped or the victim "played dead." In two other instances, however, resistance by victims because of intense pain caused the attacks to continue resulting in minor wounds in one case, and death in the other. Herrero suggests this method (playing dead) is especially effective when the individual distance of a bear has been inadvertently violated (through surprise). This is especially true when the bear is a sow with cubs. Apparently the "inferred aim of the bear was to stop a disturbance."¹ He points out that bear motivation is probably different (aggressive rather than reactive) under other circumstances (i.e., "camp robbing"). These studies indicate that research is needed in two main areas: visitor attitudes and behavior, and experimental investigation into value of alternative reactions (behavior) when under attack, such as playing dead. The operationalization of the last will indeed be difficult.

Herrero's greatest contribution to theory is the inference he draws between the attack and associated human behavior, and his further inference that the attack, or at least its intensity, may be minimized by some "correct behavior."² What this correct behavior must consist of will be dependent on the attitude of the human actor in an interactive situation. We cannot depend on the predictive value of bear behavior. As with many natural hazards, <u>prevention</u> is difficult.

¹<u>Ibid.</u>, p. 597.

²Ibid., p. 598.

If we seek to <u>control</u> the situation, however, we must learn how and why humans respond in the manner that has, in the past, led to injury and death.

Human Attitudes and Bears

Burghardt, Hietala, and Pelton conducted a study of visitor attitudes and black bear knowledge in 1970 in The Great Smoky Mountains National Park. This study was based on a brief, unpublished questionnaire study by Blakeney the previous summer in the same park.¹ Burghardt, et al., used a 42 item questionnaire to test knowledge of bears and visitor attitudes as well as demographic information. A total of 700 interviews were taken at 7 different locations (100 at each) in the park, of which 500 were used in analysis. Differences based on interview site were not reported. The interviewers were volunteers who had one brief training period where "the niceties of survey taking were explained "² Interviewers picked one person (apparently not randomly) from each group chosen (also not randomly) for interview at each site. Fifty interviews were made from each sex in an attempt to choose a representative age spread. The interviews were conducted during the period of July 2 through September 19, however, no mention is made whether interviewing was continuous (daily), or intermittent (weekends and holidays). Because of the nonrandom sampling techniques and the

¹W. Carlyle Blakeney, Jr., "A preliminary survey of tourist's knowledge of black bears (<u>Ursus Americanus</u>) in The Great Smoky Mountains National Park," Department of Forestry, The University of Tennessee, 1969. (Xeroxed.)

²Burghardt, Hietala, and Pelton, "Knowledge and Attitudes," p. 256.

interviewing procedures, it is questionable as to how representative the sample is of the park population, despite the large volume of subjects. Consequently, this point should be kept in mind in attempts to generalize the results.

Approximately 67 to 69 percent of the respondents were knowledgeable about bear food habits, running speed, and the fact that Great Smoky Mountain bears were able to recognize park rangers. More than 77 percent, despite the anthropormorphic nature allegedly attached to bears (teddy bears, "Smokey the Bear," "Gentle Ben") did not feel bears would make good pets. Although almost all respondents (97.6 percent) knew that bear young were called cubs, less than 10 percent knew the adult nomenclature (boar/sow). Far fewer respondents knew other biological facts. For example, over 55 percent believed that bears weighed over 400 pounds with some believing bears weighed as much as 2000 pounds.

Ten questions concerning bear knowledge were formed into an index with a high-low knowledge score assigned to each respondent. This was then compared to other variables. Males scored higher than females on the index and hunters were more knowledgeable than were non-hunters. Age was not related to the scores, but amount of education was directly related to the index. An interesting note is that both "extremely rural" and "urban" populations scored high, while those in between the two categories scored relatively low in bear knowledge. Most of the respondents' information (51.6 percent) sources were from park literature, roadsigns (presumably interpretive displays), and various printed matter (books, magazines, newspapers, etc.); while the least mentioned

sources (8 percent) included naturalist programs and park rangers (only zoos and museums scored lower).

The attitude portion of the study was mainly a solicitation of opinions toward various concepts.¹ Open-ended questions attempted to elicit responses to such concepts as:

- a. types of animals that should be in the park
- b. what bear behavior is troublesome
- c. what should be done with troublesome bears
- d. why injuries occur
- e. reasons bears are fed by people
- f. opinions of regulations concerning bears
- g. responses to bear confrontation.

Sex was found to be a factor in types of animals that should be allowed in the park with 85 percent of females desiring "all types" as compared to 94 percent of males. It was not a factor in determining what was considered to be (by the visitors) problem bear behavior. Surprisingly, human injury, biting and killing were mentioned by only 2.6 percent of the respondents. These kinds of problems are apparently not associated with bears by visitors to Eastern mational parks.

¹J. B. Cooper and J. L. McGaugh, "Attitude and Related Concepts," in <u>Attitudes</u>, ed. by Marie Jahoda and Neil Warren (Harmondsworth, Middlesex, England: Penguin Books, Ltd., 1966), p. 29. Cooper and McGaugh indicate that an opinion "is tentative perceptual set toward points of view . . . [and] is often used . . . synonymously with the generic term 'attitude.'" Further, an attitude when used in a generic sense, is used psychologically to designate a psychological set, of which an opinion only may be a part.

Although overall findings of the Burghardt, <u>et al</u>. study are valuable, because they are not based on a random sample, one must be careful in generalizing to the universe of Great Smoky Mountains National Park visitors. Based on such a large number of respondents, a more reasoned, scientific approach (especially in the data collection) would have yielded far greater results.

Marsh's study of the grizzly/human relationship was conducted as part of a larger study on the influence of man on the Glacier National Park (British Columbia) ecosystem.¹ The study is somewhat of an historical account but uses survey techniques to assess more recent developments with respect to park visitors, park residents, and park management policy.

Early visitors apparently regarded the grizzly with a mixture of fear on one hand, and its value as a hunting trophy on the other. These visitors carried firearms and hunting was promoted until the early part of the Twentieth Century. As in United States parks, garbage was (and still is) a problem in bear management.

A survey by Marsh to assess current visitor attitudes showed generally favorable public acceptance of bears in the park, with less than 20 percent indicating bears deterred them from some activities. Only 2 percent favored removal of bears from the park. This is comparable to Cahn's (1968) newspaper survey of national park policies in which 2.9 percent of those responding favored elimination of the grizzly from national parks.² Marsh concludes that a change has occurred

¹Marsh, "Bears and Man," p. 289.

²Cahn, "Success."

in visitor attitudes with current visitor populations finding an appreciation and interest in the bears that results in a high tolerance of them despite occasional injury.¹

Bryan and Jansson conducted a survey in 1969 and 1970 in selected towns in Alberta, Canada designed to measure perception of hazardous wildlife in western Canadian national parks.² This included the grizzly bear as well as other dangerous animals. By comparing results with general socioeconomic and demographic variables, the authors found that accuracy of perception seemed to be a function of frequency of contact with the animals or their habitat. For example, hunters and residents in and near parks were comparable in their perception of wildlife danger. One major finding was that 30.4 percent of those respondents who did <u>not</u> visit national parks perceived wildlife (including bears) as very hazardous, indicating the possibility that some of these persons may be deterred from visiting parks for that reason.

The survey has indicated a wide existence of substantial inaccuracies in the perception of wildlife. Familiarity, or frequency of contact seemed to influence the accuracy of perception and knowledge. For this reason, the authors are concerned that management policies may be adversely affected (in their opinion) by more urban residents (who do not visit parks) in a way not conducive to wildlife protection.

¹Marsh, "Bears and Man," pp. 293-94.

²Rorke B. Bryan and Michael C. Jansson, "Perception of Wildlife Hazard in National Park Use," presented to the North American Wildlife Conference, Washington, D.C., March, 1973, pp. 1-15. (Mimeographed.)

The results of this study are valuable and evokes cause for thought concerning future studies. There was no overwhelmingly positive attitude as in the Cahn (1968) or Burghardt, <u>et al</u>. (1972) studies. This seems to indicate that study results derived from park users (not the case in the Bryan and Jansson study) cannot be generalized to the universe of people from which park visitors come.

Summary

All of the attitude studies reported above are somewhat exploratory, drawing on judgment and logic information of their hypotheses. The ethological and natural hazard studies are somewhat more general, and although they form a very basic foundation, they do not shed light on visitor attitudes toward bears. Attitudes are more than just opinions. They are more than merely "liking" or "disliking" bears; and they are more than bear knowledge. If attitudes are related to behavior (and thus in the realm of management), one must know more about the attitude-behavior relationship of the park visitor. One may "like" bears but still not hike in bear country. One may think bears are magnificent animals, at the same time believing they belong in zoos. One may have a high knowledge of bear biology, yet still make the wrong move in a bear encounter. The attitude-behavior relationship is a complex one, as shall be shown in the next chapter. Yet its complexity must not inhibit its study. We can assume the relationship exists; that much has been shown empirically. Yet we do not know how it affects the bear/man relationship. But to address the problem of maintaining bear populations in parks while minimizing visitor danger, we must study attitudes and behavior, and their relationship. Attitudes cannot be managed; behavior can.

The present study attempts to draw on the theory and inferences resulting from the studies already accomplished in this area. In this manner, the present study should move beyond them to add theory or strengthen past observations. Many of the variables tested by the researchers above have been retained in this study. Examples are past and potential behavior, inclusion of hunters, socioeconomic data, and the like. An attempt has been made to improve on previously used methodology through use of random sampling techniques, in-depth interviewing, and the use of standard psychometric measures of attitude. In the latter regard, it is believed that standard attitude measures will not only yield more valid results in terms of visitor attitudes, but their reliability has been shown by numerous former studies. Consequently, the relationship between visitor attitudes and possible behavior during a bear encounter should prove more useful in inferring actual management applications of the results.

Although the Bryan-Jansson approach in comparison of park visitors and nonvisitors is excellent, and certainly needed, it was felt that, initially, a more complete understanding of visitor attitudes is needed. Studies of nonvisitors, without a complete understanding of park visitors, lie in the realm of future research. To this end, a major objective of this study is to contribute theory in order that these broader studies may transpire.

CHAPTER III

BACKGROUND THEORY AND METHODOLOGY

A Discussion of Attitude Theory

The growth of interest in the area of attitude theory has been only in the last half century, beginning with Thurstone's work in the 1920's. Attitude theory is important in that it forms the foundation for the study of social psychology. The term "attitude" is used in a psychological sense to designate a psychological set, while in a sociological sense, the set is a representation of societal and cultural influence.¹ The complexity of the psychological set, and its importance to the individual and society, has been argued repeatedly and despite the amount of research undertaken, confusion and vagueness regarding attitudes still remains.

Thurstone defined an attitude as a simple, unidemensional concept: ". . . the amount of affect for or against a psychological object."² Bem has defined attitudes in even simpler terms: "Attitudes are likes and dislikes."³ Allport, however, takes into account the

³Bem, <u>Human Affairs</u>, p. 14.

¹Rokeach, <u>Beliefs</u>, p. 110.

²L. L. Thurstone, "The Measurement of Social Attitudes," in <u>Read-ings in Attitude Theory and Measurement</u>, ed. by Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 20.

psychological complexity of attitudes in describing them as "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related."¹ Allport's ideas are expressed more concisely by Deese who states, "attitudes are general dispositions which stand behind our evaluations and emotional feelings."² Deese does not attempt, however, to devalue the complexity of the term by his definition.

Hoult agrees in the <u>generality</u> of attitudes and states further that they are also <u>learned</u> and <u>relatively enduring</u>.³ Rokeach states also that attitudes are relatively enduring. He argues that attitudes represent a "cluster or syndrome of two or more interrelated elements" that, in fact, are underlying <u>beliefs</u> (not expressed opinion).⁴ Other schools of thought indicate these elements are past experiences. However, to Rokeach, these underlying elements are organized "around an object or situation predisposing one to respond in some preferential manner."⁵ The views of Rokeach are not entirely in conflict with those who believe attitudes represent past experiences. This will be

³Thomas F. Hoult, <u>Dictionary of Modern Sociology</u> (Totowa, New Jersey: Littlefield, Adams and Co., 1969), p. 30. ⁴Rokeach, Beliefs, p. 112.

⁵Ibid.

¹Gordon W. Allport, "Attitudes," in <u>Readings in Attitude Theory</u> <u>and Measurement</u>, ed. by Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 8.

²James Deese, <u>General Psychology</u> (Boston: Allyn and Bacon, Inc., 1967), p. 492.

discussed in greater detail in the formation of the hypotheses of this study.

This relationship of belief to attitude is an important one, if for no other reason than the confusion that exists concerning their difference. Beliefs are not attitudes, but rather are specific propositions with which we can agree or disagree. Hoult adds two other distinctions between beliefs and attitudes:

- beliefs do not imply anything about tendencies to act (attitudes do), and
- 2. they do not include the positive-negative type of evaluation that is the basis for attitudes.¹

Further, the attitude may be composed of many beliefs (any or all of which may be interrelated) which form a <u>belief system</u>. Belief has been defined as the probability dimension of a concept while attitudes reflect the evaluative dimension.² In addition, one must distinguish between belief <u>about</u> and belief <u>in</u> a concept. Changes in <u>attitude</u> towards a particular concept in reality are changes in <u>belief about</u> the concept.³ Individuals may associate many concepts with a particular attitude object. These concepts, or beliefs, form the belief system.

³<u>Ibid</u>., p. 189.

¹Hoult, <u>Dictionary</u>.

²Martin Fishbein and Bertram H. Raven, "The AB Scales: An Operational Definition of Belief and Attitude," in <u>Readings in Attitude</u> <u>Theory and Measurement</u>, ed. by Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 188.

Rokeach believes that this system is fundamental in the individual formation of attitudes.¹

The "predisposition to respond" is the most common element of all definitions of attitude. Allport states that this relationship (although existing) is very weak, while Rokeach argues that the relationship is relatively strong. In order to understand the strength of the relationship, however, one must digress slightly to gain a greater understanding of the components of an attitude.

The literature indicates that most researchers agree on three components of attitude: 1) the <u>affective</u>, 2) the <u>cognitive</u>, and 3) the <u>behavioral</u> dimensions.² The <u>intensity</u> of an attitude refers to the affective component. The <u>specificity</u> (or generality) of the attitude, as well as the degree of differentiation of the beliefs, refers to the cognitive component. The third component, although not clearly understood, is <u>action</u> or a predisposition to overt behavior.³ Rokeach argues these components are, in actuality, applicable to the underlying belief structure of attitudes.⁴ A belief must lead to some action (behavior) when it is activated, the kind of action being dictated by the content (what Katz would call <u>intensity</u>) of the belief. The confusion surrounding the attitude/behavior relationship is a result of a general

¹Rokeach, <u>Beliefs</u>.

²Milton J. Rosenberg, <u>et al</u>., <u>Attitude Organization and Change</u> (New Haven: Yale University Press, 1960), p. 3.

³Daniel Katz, "The Functional Approach to the Study of Attitudes," <u>Public Opinion Quarterly</u>, Vol. 24, No. 2 (Summer, 1960), 168.

⁴Rokeach, <u>Beliefs</u>, pp. 112-14.

assumption that attitudes should serve as an aid in the prediction of behavior. Kliejunas infers that the resultant confusion is because of the relatively few studies attempting to predict overt behavior from a knowledge of "verbally expressed" attitudes.¹ These studies have found little or no relationship. Most studies of attitudes measure the affective component with <u>affect</u> usually being defined as the <u>feeling</u> of some emotional response (love, hate, fear, etc.). Heberlein reports that these measures of affect are usually sets of items presented to the respondent and are associated with the attitude object. The subject is then asked whether he likes or dislikes each of them. Summation of these items measures a person's "liking-disliking" of the object and is interpreted as positive or negative "affect" toward it. Heberlein states this sort of methodology measures more of the subject's "cognition" than his emotion or affect.²

Fishbein indicates that what little evidence exists supporting a relationship between attitude and behavior tends to show that respondents bring their behavior into line with their attitudes.³ However, he later proposes that two separate attitudes, one toward the object and the other toward the behavioral act, influence the outcome of

Peter T. Kliejunas, "Attitude Toward Object and Attitude Toward Situation As Predictors of Behavior" (unpublished M.A. thesis, Michigan State University, 1969), p. 5.

²Thomas A. Heberlein, "Social Psychological Assumptions of User Attitude Surveys: The Case of the Wildernism Scale," <u>Journal of Leisure</u> <u>Research</u>, Vol. 5, No. 3 (Summer, 1973), 22.

³Martin Fishbein, "Attitudes and the Prediction of Behavior," in <u>Readings in Attitude Theory and Measurement</u>, ed. by Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 477.

behavior:

Instead of assuming some underlying relationship between an individual's attitude toward a given object and his behavior with respect to that object, [this] theory recognizes the importance of situational variables . . . as factors influencing behavior.

Kliejunas cites numerous examples of studies in which situational variables are most often pointed to as factors other than attitudes which influence behavior. Kliejunas' studies support the thesis advanced by Rokeach, who says that behavior is influenced by at least two, and probably more, attitudes (the two least of which are attitudes toward an object and attitudes toward a situation; there may be many others in addition to these).² Further, one cannot split attitudes toward objects and situations in predicting behavior because "an attitude object is always encountered within some situation, about which we also have an organized attitude."³ This is the reason that attempts to predict behavior accurately on the basis of a single attitude toward an object often results in conclusions that inconsistencies exist between attitudes and behavior. If it is discovered in this present study that inconsistencies exist between attitudes toward grizzly bears and visitor behavior (both prior and future behavior, as reported by the respondents), there may be some higher, more influential, and as yet undiscovered attitude(s) that determine visitor behavior (i.e., attitudes toward encountering grizzly bears, rather than bears as objects).

¹<u>Ibid</u>., p. 490.

²Kliejunas, "Attitude Toward Object," p. 9.
³Rokeach, <u>Beliefs</u>, p. 119.

Measurement of Attitudes

Fishbein accounts for the number of different attitude measures as a desire to arrive at a single score that will represent how favorable or unfavorable the respondent is to the attitude object in question.¹ Attitudes can be measured by considering beliefs, past behavior, behavioral intentions, or by measuring the dimensions of attitude. Cook and Selltiz report the most common measures ask the subject to reveal his beliefs, feelings, or behavior with respect to an attitude object.² They qualify this, however, by saying that these kinds of self-reporting procedures are subject to error and distortion. This supports Heberlein's argument that these supposed measures of affect (self-reported liking and disliking) are actually measures of cognition or behavior. They believe behavior can be inferred by measurement of the motivation of the individual toward the object and characteristics of the situation (i.e., its prescriptions as to appropriate behavior, the expectations of others in the situation, the consequences of various behavior, etc.). They add that attitudes may be inferred from the respondent's behavior, whether actual or reported.³ Therefore, behavior of visitors with respect to grizzly bears may be inferred by their actual behavior (whether or not they choose to backpack in grizzly country), or by their reported behavior (whether they have backpacked in other parks, but choose not to do

¹Fishbein, "Prediction of Behavior," p. 477.

²Stuart W. Cook and Claire Selltiz, "A Multiple-Indicator Approach to Attitude Measurement," in <u>Readings in Attitude Theory and Measurement</u>, ed. by Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 223.

³<u>Ibid</u>., p. 220.

so in Glacier). Consequently, this behavior should correspond to their measured attitude towards bears. Thus measurements of a visitor's attitude toward an object (grizzly bears) and his behavior (actual or self-reported) in past situations, as well as potential behavior, should contribute to a greater understanding of the relationship between man and bears in national parks.

Dawes states that the differing definitions of attitude are not critical to measurement. Agreement as to a "correct" definition (among social psychologists) is not necessary, since all that can be measured are specific properties of the attitude. Dawes explains this comment by the argument that measurement can only describe some property, not provide a complete description of the whole complex of attitude.¹ Consequently, while some properties of visitor attitudes toward bears may be described, it is beyond the scope of this study to attempt a complete understanding of the whole complex relationship between visitor attitudes toward bears and resultant visitor behavior.

Allport acknowledges that the simplest measure of an attitude is by tabulation of self-reported answers to a questionnaire. However, he indicates that what is, in fact, measured is an opinion, not the attitude. Although this method may measure the range and distribution of opinion, it does not measure <u>intensity</u>.² Fortunately, measures have been developed that determine the range and distribution, as well as the intensity, of not just opinions, but also attitudes.

¹Robert M. Dawes, <u>Fundamentals of Attitude Measurement</u> (New York: John Wiley and Sons, Inc., 1972), pp. 11-16.

²Allport, "Attitudes," p. 9.

The Semantic Differential

The semantic differential is a standard psychometric technique that uses linguistic encoding as an index of meaning. Through a combination of association and scaling procedures, the semantic differential measures the psychological meanings of attitude concepts. Dawes states the purpose of this measure is "to assess the semantic connotations of the concept being rated."¹

The semantic differential consists of a series, or a <u>set</u> of bipolar (opposite-in-meaning) scales at each end of a continuum. The subject is asked to rate the concept being measured by checking the point on this continuum (which is divided into seven intervals) that best reflects his feelings of where the concept lies (with respect to the opposites at each end of the scale). A series of these continuums or scales, comprises the set; the set is not a scale in itself. The purpose of these scales is "so that the subject can indicate both the <u>direction</u> and the <u>intensity</u> of each judgment."² Although the intervals of each scale are equal-appearing, Triandis reports that of the three common methods (paired comparisons, attitude scaling, and equal-appearing or successive intervals) in attitude measurement, only equalappearing (or successive) intervals does not result in interval data.³

¹Dawes, "Fundamentals," p. 97.

²Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, <u>The Measurement of Meaning</u> (Urbana: The University of Illinois Press, 1957), p. 20.

³Harry C. Triandis, <u>Attitude and Attitude Change</u> (New York: John Wiley and Sons, Inc., 1971), p. 38.
Because a set of scales is used, rather than one individual scale to infer attitude, the semantic differential is assumed to yield interval data.¹

The semantic differential itself does not place subjects on some underlying scale or dimension of attitudes. Rather,

. . . it simply provides a method of measuring the similarity or difference between [the subject's] concepts of a given object. However, the responses to subgroups of the scales can be summated to yield scores that are interpreted as indicating the individual's position on . . . underlying dimensions of attitude toward the object being rated.²

The set can be made quite specific through choice of terms with respect to the object being rated. The more relevant these terms are the more relevant is the information for the problem being analyzed. It is this flexibility, or the fact that the semantic differential need not be standardized for each different attitude, that is a major advantage in its use.³

Through the use of factor analysis of the semantic scales, Osgood, Suci, and Tannenbaum discovered three independent factors, or dimensions, of attitude. The first, and strongest factor (in accounting for variance), is the <u>evaluative</u> dimension; the second, <u>potency</u> is slightly higher, or about equal to the third factor, <u>activity</u>, in variance. The evaluative factor is represented by such items as good-bad, fair-unfair, beautiful-ugly, etc. In the potency factor the attitude

¹Osgood, <u>et al</u>., <u>Measurement</u>, p. 78.

²Claire Selltiz, <u>et al.</u>, <u>Research Methods in Social Relations</u> (revised; New York: Holt, Rinehart and Winston, 1959), p. 381.

³Triandis, <u>Attitude Change</u>, p. 49.

object is strong-weak, big-small, deadly-harmless, and so on, while the activity factor has connotations such as active-passive, fast-slow, and alive-dead. Osgood, <u>et al</u>. suggest the ideal scale would represent each dimension of the semantic "space" of an individual, and therefore, the meaning connoted by that space toward attitude objects.¹ The scale would then be perfectly aligned with (and factorally loaded on) the particular dimension it represents and thus, perfectly reliable. Unfortunately, they are not this way in practice. However, by using three or four closely related scales representing each dimension, it is possible to measure the <u>affect</u> of the subject's attitude toward the object. Thus a short set of nine or twelve scales can measure all three factors of the affective dimension scales, it is assumed that the subject's average is both more representative and more reliable than individual scale scores.²

Osgood has concluded that measurement of the <u>evaluative factor</u> (the first of the three dimensions) with the semantic differential meets all the criteria for a measure of attitude. He cautions those who may assume that "attitude" is simply a projection of the evaluative factor in the total meaning (or semantic) space. Through empirical research, Osgood has found the semantic differential to be as reliable as, and an equal measure to, the Thurstone scales for measuring attitudes. Another indication of reliability is that the scales are not grossly affected

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¹Osgood, <u>et al</u>., <u>Measurement</u>, pp. 72-78. ²<u>Ibid</u>.

by either the object or subject being measured.¹ Osgood also found this technique compares favorably with Guttman scaling techniques.² Validity and reliability studies support the proposition that measurement of the evaluative factor <u>alone</u> is an index of attitude.³

Forming The Hypothesis

Rosenberg observed that attitudes can be inferred by reaction to stimuli and the various types of response. They proposed that attitudes were intervening variables between stimuli and response to that stimuli.⁴ This is in agreement with early attitude theory which formed the foundation for the belief that people often betray their attitudes by their behavior. The literature indicates attitudes are formed by a series of experiences over time and individuals will react to these past experiences affectively and by behavioral intentions. These intentions will emerge under certain situations as behavior. This does not imply that an individual can always identify these past experiences and behavior that form his attitudes. In fact, individuals may not necessarily be able to verbalize the basis of their attitudes. Empirical work has shown attitudes are dependent variables that are a function of

¹Selltiz, <u>et al.</u>, <u>Research Methods</u>, p. 382.

²Osgood, et al., Measurement, pp. 192-95.

³Cross-cultural studies (over twenty-six different cultures) have shown that the three factors discussed above are the most important in measuring attitudes with semantic connotation. Test-retest data has shown the measure to be highly reliable with coefficients ranging from .87 to .93 with a mean (computed by two transformations) of .91.

⁴Rosenberg, <u>et al</u>., <u>Attitude Organization</u>, p. 1.

antecedent behavior. Inferring this behavior as a cause of attitudes, however, is difficult if self-reporting measures are used.¹ There is a causal link between antecedent attitudes and behavior, but results of these studies indicate the link is weak.

The literature suggests that the causal chain in the attitude/ behavior relationship is that behavior (among other stimuli) causes attitudes which, in turn, manifest themselves in further behavior. This sequence is alluded to by Bem and others, but it does not infer how behavior affects attitudes (the various cognitive balance, consistency, and dissonance theories). Rather, it merely suggests the presence of a relationship in which attitude is an intervening variable between past and future behavior. Bem's proposal seems to integrate the two schools of attitude theory: that is (1) attitudes cause behavior, and (2) behavior causes attitudes.

> <u>Theoretical Hypothesis</u>: Attitudes are a function of past behavior and experiences and, in turn, cause a predisposition to respond with some future behavior.

Observation in Forming Operational Hypotheses

Visitors to Glacier National Park have been observed by the author (and others) in the following ways:

1. Many visitors to the park report a great desire to see bears. Of those surveyed in connection with this research, 77.8 percent reported a desire to see a bear, with 32.3 percent (of all visitors) specifying sight of a grizzly bear as first choice.

¹Bem, <u>Human Affairs</u>, p. 201.

2. Common questions asked of park personnel by campers, dayhikers and backpackers are concerned with the danger of bears and the appropriate behavior to follow to avoid conflict or suggestions about what to do if a bear is encountered.

3. Backcountry campsites have designated carrying capacities, and are allotted on a reservation basis. During the peak visitor season when these sites are normally full (according to reservation data) backcountry patrol rangers, in many instances, observe that these sites are, in fact, not full. This suggests that certain visitors, for some reason, decide not to camp in these areas.

4. Olsen's account of the death of two girls in 1967 is readily available in and around the park, and is considered a "best seller."²

5. Female visitors (especially those backpacking) express fear of bears in general. In particular, they fear reports of bears molesting female visitors who are in their menstrual period (although there is no basis in fact for this fear).

Many of these observations are of visitor behavior, or stimuli to be-

havior. In light of these observations, and the theoretical hypothesis

above, the following empirical hypothesis is formed:

Visitor attitudes toward grizzly bears in Glacier National Park are a function of the visitors' past experiences; these attitudes, in turn, will predispose some future behavior as reported by the visitors.

Operationalization of the Concepts

For the purposes of this study, <u>visitors</u> will be considered as those persons over the age of sixteen who visit the park, but are not

²Olsen, <u>Night</u>.

¹This is not to imply that fear of bears is the sole, or even a predominant reason for failure to camp in these sites after they are reserved. Visitors may have to cut their trips short for a variety of reasons, perhaps the least of which is fear of bears. In at least one instance, however, visitors have decided to forego their trip, once they learned of the possible danger of bears (personal observation).

employed in any capacity by the park or its concessioners, and do not live within the park as inholders. <u>Attitudes toward grizzly bears</u> will be determined by the evaluative dimension of the affective component of visitor attitudes as measured by the semantic differential. This particular dimension is identified by Osgood, <u>et al</u>. as being the factor most susceptible as a function of the concept being rated. Ordinarily the other dimensions serve to substantiate or intensify the meaning accorded by the evaluative dimension. The concept of <u>past experiences</u> is defined as those variables that may contribute to the formation of visitor attitudes. These variables are identified in Figure 1. The final concept of <u>predisposition of future behavior</u> is operationalized as selfreported visitor reaction (behavior) toward bears in some hypothetical situation. Because of the limits of the study, actual observation of visitor behavior was not only impractical, but, due to the low incidence of bear/human contact, virtually impossible.

Design of the Instrument

The interview method of gathering data was chosen over alternative methods for a variety of reasons. Due to the somewhat exploratory nature of this study, the interview method was believed to be most effective in eliciting honest, open responses from visitors while they were in a situation (which could introduce bias) which was directly related to the attitude object being studied. Questioning respondents after the park experience was ended would require reliance on the recall ability of the subjects. Although bias may have been introduced with this method (with respect to the exposure of the visitors to bear

acked fore unter 1. Age re 2. Sex 3. Education park 4. Behavior: Saw bear bear on trail 1 group 7. Behavior: Saw bear 6. Behavior: Attacked 7. Behavior: Attacked	pendent iables	ı	11	ıtervening /ariables	Dependent/Independent Variables		Dependent Variables
Image 1. Age 1. Age e 2. Sex 2. Overnight accommoda- tions in park e 3. Education 3. Behavior: Saw bear ge 3. Education 4. Behavior: Encountered park 4. Rural-urban 5. Behavior: Attacked	Licked Fore						Dlan to hacknack
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<pre>ge 3. Education 1. Evaluation] 3. Behavior: Saw bear ge 3. Education 4. Behavior: Encountered park 4. Rural-urban 4. Behavior: Encountered n group] group</pre>	ъ		2.	Sex		2.	Overnight accommoda- tions in park
park 4. Behavior: Encountered hear on trail bear on trail n 5. Behavior: Attacked by bear bear	ge	<u>↑</u>	ຕໍ	Education	→ 1. Evaluation —>	Э	Behavior: Saw bear while driving
n 1 group by bear	park	J	4	Rural-urban 		4.	Behavior: Encountered bear on trail
	n 1 group						Behavior: Attacked by bear

Schematic conception of theoretical hypothesis (with respect to variables chosen for study). Figure l.

information literature, naturalist talks, etc.), the park experience itself may have had an <u>affect</u> on the attitudes of the visitors (if the visitors were questioned later). This last point was considered to be of major importance in choosing to interview on-site.

A 28-item instrument was designed to measure visitor characteristics and demographic data, past experiences with bears, situations in which bears might be encountered, sources of information about park wildlife, membership in outdoor or environmental organizations, and socioeconomic data. In addition, certain questions were included to elicit responses as to behavior in hypothetical bear/human encounters. Every attempt was made through question construction and interviewer probing to <u>not</u> introduce bias by alluding to a request for a <u>correct</u> answer, but merely to ask what the respondent felt was the best action to take in the situation. Several questions were added to measure visitor reaction to National Park Service bear management actions as well as regulations governing visitor behavior with respect to bears.

Attached to the instrument were three scales which the visitors were asked to complete when the formal portion of the interview ended. These were a set of semantic differential scales, a scale designed to measure desire for physical contact with bears, and a "distance" scale to measure visitors' feelings about association with grizzly bears. This latter scale was modeled after Bogardus's <u>Social Distance Scale</u>. The instrument and the scales are attached to this thesis as an Appendix.

Following the field pre-test, certain changes, additions and deletions in questions were made based on pre-test results and park

management suggestions subsequent to their final review of the instrument. The final product, however, remained essentially the same as that reported above.

The Study Area

Glacier National Park is located in the northern Rocky Mountains in northwestern Montana and straddles the continental divide. It has a common border on the north with Canada's Waterton Lakes National Park and together they form the Waterton-Glacier International Peace Park. The topography is characterized by precipitous peaks and lesser ridges that include glaciers, cirques, moraines and glacial lakes. The headwaters of three major drainage systems--the Saskatchewan, the Missouri, and the Columbia--are found within the park. Elevations vary from 3,100 to 10,500 feet, while vegetation is characterized by Pacific forest types on the western slope and coniferous-bunch grass types on the east. This diversity of biotic types and geographic formations combines to form a major attraction for vacationers, and especially for hikers and backcountry enthusiasts. Park visitation has risen from 4,000 visitors in the first year of operation in 1911¹ to almost 1.4 million in 1973.²

The Interview Site

As this study was originally conceived, there was a desire to choose a representative sample from all park visitors. Glacier National

¹Olsen, <u>Night</u>, p. 31.

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²Hungry Horse News, December 28, 1973, p. 12.

Park has two major entrance/exit stations, connected by the only transpark road, the Going-to-the-Sun Road. Initial plans were made to sample visitors at both these areas, as conversations with park personnel indicated that almost all visitors entered or exited at least once during their stay in the park at these stations. However, it became apparent that, because of budget, time, and personnel restraints as well as the safety problems encountered in flagging motorists, a more central location should be chosen. As a consequence, the Logan Pass Visitor Center, located midway between these two stations on the Going-tothe-Sun Road, was chosen as the interview site. Preliminary observation by the researchers confirmed that a large percentage of those entering the visitor center parking lot from the road made their way to the visitor center.

The physical layout of the entryway to the center provided excellent sampling control. Visitors were funneled (through design of walkways to the single entrance) to the center on either side of a flagpole court. Visitors had to merge onto a ramp (walkway) from this court. It was at this point that interviewing took place (see Figure 2).

Gathering the Data

A total of 158 respondents were included in the sample. Interviewing was conducted by two female research assistants, who were identified to the visitor only by name-tags; no uniform of any type was worn because of the possible bias that may have occurred with an "official" study. Initially, a 6-week data gathering period was decided





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upon. However, the first two weeks were used for field pre-testing of the schedule, training, and determination of the best procedures to follow in actual interviewing. Ultimately, interviews were conducted between July 25 and August 25, 1973. This corresponded to the period of highest visitor density in the park.¹

Interviewing times were between 9:30 a.m. and 1:00 to 2:00 p.m. It was discovered early in the data gathering period that refusals were rare before noon. However, they increased substantially after noon, approaching almost 100 percent after 2:00 p.m. On the basis of reasons given for refusals, it is suspected that visitors after this time were in a hurry to gain overnight accommodations (especially those who were camping). Park campgrounds during this period were almost completely filled by early afternoon with some of the more popular areas filling as early as 10:00 a.m. The next most frequently mentioned refusal response was to join the rest of the family on scheduled naturalistconducted walks that began from the visitor center. This was a variable unforseen when the choice of the interview site was made.

Sampling

The interviewers alternated in choosing respondents from the two sides of the flagpole court. When interviewing began, the interviewers randomly chose a number in a random number table. The interviewer would then let the visitors pass by until the random number was reached. The interviewer would then stop the potential respondent,

¹Martinka, "Preserving the Natural Status," p. 4.

explain why the person was stopped, and then request that the person serve as a subject. Guarantee of anonymity was made at this time.¹ The purpose and specific goals of the interview were not explained to the subject until the interview was completed. This avoided the introduction of bias into the responses from the respondent's knowledge of the specific purpose and goals of the study. Upon conclusion of the interview, any questions that were asked by the respondents were fully explained by the interviewer.

The actual interview itself lasted from 10 to 20 minutes, depending on the time spent by the respondent on the self-administered attitude scales after formal questioning ceased. Care was made by the interviewers not to introduce bias into these scale responses. Questions concerning the scales were answered with reference only to the scale instructions, not the scales themselves. Only in a very few instances were the instructions insufficient in explaining what was required of the respondents. In this same manner, questions put to the interviewer during the administration of the instrument were held until the interview was completed. Upon conclusion of the interview, the interviewer selected the <u>next</u> number from the random number table, beginning the interview process once again.

An attempt was made to interview each day during the sampling period. The two interviewers staggered their lieu days which resulted in one or the other interviewer being absent three or more days each

¹No purpose was served in knowing the respondent's name; it was never asked. This was one of the items considered in the granting of approval of the interview schedule by the Committee on Human Subjects at Michigan State University.

week. Due to individual circumstances, there were of necessity a few days during the interview period in which no data was gathered. There is no reason to suspect, however, that this in any way biased the results. On days when both interviewers were present, an attempt was made to also stagger breaks and lunch periods, in order to maintain as continuous an interviewing period as possible.

In retrospect, further studies of this type should employ a team of interviewers. In this manner, many of the problems, even though they were in many instances insignificant, would automatically be eliminated. Had more interviewers been available, the number of respondents gained for this study could have been substantially increased. Additional interviewers would also enable multiple collection points, in order to test generality of the findings to the park population as a whole. In this instance, with the small sample size (158) gained, generality is limited to only those visitors who choose to stop at a visitor center, for whatever the reason.

CHAPTER IV

ANALYSIS OF THE DATA

General Findings

Since there are few actual human attitude studies of the bear/ man relationship, it will be difficult to infer the reliability of this data on the basis of comparison with past research efforts. In an attempt to overcome this problem, as well as that of validity, measures of attitude were drawn from general (and relatively reliable) attitude theory. Even if we assume, however, that the measures used here are reliable, there remains the problem of small sample size relative to the universe from which the sample is drawn. Unofficial park service estimates indicate that "most" first-time visitors to Glacier National Park stop at the Logan Pass Visitor Center at one time or another during their stay in the park. This is most likely due to its central location on the Going-to-the-Sun Road. However, if this information is indeed correct, the universe from which the sample of 158 respondents was drawn may approach one million visitors. Consequently, any generality of the findings must keep this point in mind.

It is the purpose of this section to compare and contrast visitor attitudes with the visitor's general social and behavioral characteristics in order to infer possible causal relationships between past behavior, attitudes, and future (or potential) behavior.

Female visitors comprised a substantial portion of the sample (54 individuals, or 34.1 percent). Past studies concerned with recreational user patterns have relied upon analysis of the "head of the household." Because of the two female deaths by grizzly bears in 1967, as well as the observations of female backpackers in the park, it was felt that female attitudes were important in accomplishing the research objectives.

The age distribution is given in Table 3. The mean age is approximately 35 years. The largest group represented are those under 25 years, comprising about 27.9 percent of the respondents.

Groupings	Number	Percent
16-25	44	27.85
26-35	41	25.95
36-45	29	18.35
46-55	25	15.82
56-65	14	8.86
66 and older	5	3.17
TOTAL	158	100.00

Table 3. Age distribution.

One explanation for the few number of older persons is that a number of refusals came from this age group. This is easily explained by the fact that most of these people stay in concessioner facilities and tour the park on concessioner buses. These vehicles make only a

short rest stop at the Logan Pass Visitor Center. Consequently, many of these persons were anxious to utilize their time at the center in seeing its exhibits, rather than agreeing to an interview. One should note that these categories were collapsed into "under 35" and "over 35" for analysis purposes.

Education

The range of education is presented in Table 4. The largest groups, each almost equally represented, are high school and college graduates as well as a substantial number with 18 years or more of formal education.

Number	Percent
4	2.54
5	3.16
39	24.68
8	5.06
17	10.76
7	4.43
35	22.15
10	6.33
33	20.89
158	100.00
	Number 4 5 39 8 17 7 35 10 33 158

Table 4. Years of education.

As with age, this category was also collapsed for data analysis purposes. Four categories were formed: (1) High school or less, (2) Some college, (3) College graduates, and (4) Post graduates. It is interesting to note the unexplainable high proportion of respondents with at least 18 or more years of post-graduate education. The collapsed category of all post-graduate work past the bachelors level comprises 27.21 percent of the total population.

Rural/Urban Scale

Visitors were shown renderings of various areas of population concentration ranging from a log cabin to the central city and asked to choose the one most like where they lived prior to the age of 15. Past studies have indicated that visitor origin or residence has a relationship to attitudes toward bears. The range and distribution is shown in Table 5.

Groupings	Number	Percent
Extreme rural	12	7.60
Rural farm	27	17.10
Rural town	32	20.25
Open suburban	36	22.80
Dense suburban	29	18.35
Urban spacious	12	7.60
Urban compact	9	5.70
TOTAL	157	99.40

Table 5. Rural/urban scale.

The first three categories were collapsed into a "rural" classification for data analysis. The same was also done with the two suburban categories and the two urban classes, to form a three category index. Although the general population in this country is located in or very near to cities, the mean in this instance was located in the "open suburban" category. This may be reflective of an even greater migration of persons to outlying areas, or may just be the area from which the majority of visitors to national parks come.

General Visitor Characteristics

Respondents for the most part were in family groups and comprised almost half (48 percent) of the sample. Couples (male/female) were represented in one third (33.5 percent) of the sample while the remainder was comprised of individuals. The respondents spent an average of 3.5 days in the park. This is significantly different from unofficial park estimates of an average of 22 hours. One must conclude that the number of day-trips included in the park service estimate probably account for this difference.

Most visitors arrived by automobile (52.5 percent). However, modes of transportation ranged from cross-country bicycle riders to those who arrived at the park on trains. This wide range was also noticed in the number of states from which the visitors traveled. Thirtysix of the fifty states were represented. Most visitors came from the Pacific coastal region,¹ with over half (53 percent) coming from that

¹Based on standard U.S. census regions. See Figure 3.



region including the Mountain and East North Central region (which included Michigan).

Testing the Hypotheses

Operational hypotheses were formed in order to convert the theoretical and empirical hypotheses into those capable of being measured. The operational hypotheses that follow are in some cases subdivided in order to more easily test them. For clarity, conciseness, and easier readability, the general outline of this section will be to discuss the analysis and findings, as well as the specific research methods used, with each hypothesis or sub-hypothesis as it is presented.

Attitudes

<u>Hypothesis 1</u>.--Park visitor attitudes toward grizzly bears will correspond with Osgood's three factorial dimensions: i.e., (1) Evaluation, (2) Potency, (3) Activity. In addition, a fourth dimension (Aesthetic) will equal or surpass the power (in terms of explained variance) of Osgood's Evaluation dimension.

Hypothesis 1A: Semantic scales reflecting Osgood's attitude dimensions will factorally load on those dimensions (i.e., "goodbad" on the Evaluative dimension; "strong-weak" on the Potency dimension; "active-passive" on the Active dimension, etc.).

Hypothesis 1B: Since the literature describes grizzly bears as "monarchs," "beautiful," etc., visitors will rate bears highly on an Aesthetic factor. The semantic scales will include adjectives to reflect this factor. Analysis of this hypothesis is based essentially on Osgood, Suci, and Tannebaum's (1957) study of meaning by using the semantic differential. It is divided into two parts, represented by hypothesis 1A and 1B. Twenty-four scales were chosen (from an original selection of 33) that might best measure visitor's attitudes toward grizzly bears. The variables (in the word and numeric order presented to the subjects) are illustrated in Table 6 (they are also attached to the Appendix). They were placed in random order, then randomized again with respect to the ordering of the bipolar adjectives (i.e., badgood, good-bad). This was done to minimize the bias a response on one scale might have on those that follow. A brief summary of the analytical technique follows.¹

Essentially, factor analysis enables one to explain observed relations among numerous variables in terms of simpler relations. The idea is that the score on any scale item, along with other scores in the set, represents the contribution of some underlying factor, or factors. Each of the scales may contribute to all of the factors, but are weighted according to the amount they contribute to each factor. Thus, scores can be derived for individual respondents depending on his score and the weights of the items marked.

An initial factor analysis produced six factors of attitude. This particular number was arrived at by setting the eigenvalue threshold equal to one, an arbitrary action of the factor analysis program

¹Raymond B. Cattell, "Factor Analysis: An Introduction to Essentials: I. The Purpose and Underlying Models," <u>Biometrics</u>, Vol. 21, No. 1 (March, 1965), pp. 190-213.

Order	Scale	Assigned Value ¹
1.	bad tempered/pleasant	Evaluation
2.	violent/peaceful	Potency
3.	savage/meek	Potency
4.	clean/dirty	Evaluation
5.	threatening/docile	Potency
6.	tender/brutal	unassigned
7.	bad/good	Evaluation
8.	timid/aggressive	Potency
9.	predictable/unpredictable	unassigned
10.	gentle/vicious	Evaluation
11.	grotesque/pretty	Aesthetic
12.	beautiful/ugly	Aesthetic
13.	graceful/clumsy	Aesthetic
14.	kind/cruel	Evaluation
15.	deadly/harmless	Potency
16.	wild/tame	Active
17.	active/passive	Active
18.	weak/powerful	Potency
19.	safe/dangerous	Evaluation
20.	beneficial/harmful	Evaluation
21.	frightful/delightful	unassigned
22.	ordinary/splendid	Aesthetic
23.	homely/handsome	Aesthetic
24.	slow/fast	Active

Table 6. Semantic differential bipolar adjective scales.

¹Values assigned on the basis of Osgood's studies. Those rated "unassigned" either did not fit into a specific category, or fit into more than one category. "Aesthetic" values were assigned to those adjectives that would reflect an aesthetic feeling toward grizzly bears.

itself. Four of the variables (numbers 9, 14, 15 and 21) were then dropped from the set because they did not load significantly among the factors. The twenty remaining variables were then re-factored, using 16 iterations to reach convergence (of the communalities), and producing five factors.¹ Four of these five factors were accepted and are shown together with the factor loadings in Table 7.² The fifth factor was not accepted because its highest loaded variable (clean/dirty) had a loading of only .59385 and thus did not meet criteria for retention.

Factor 1, on the basis of the variables loaded highly upon it, is actually a mixture of Osgood's first two factors: evaluation and potency. Potency of an attitude is what Katz, as described earlier, would call "intensity." Thus, we name this factor <u>Evaluation/Potency</u>. This is not necessarily unusual that these variables should mix. Osgood indicates that this happens often because of the nearness of the two concepts in meaning. Perhaps what is unusual here, is that the potency variables have loaded higher than the evaluative variables.³

Regardless of which should be first or second, the fact remains that inclusion of potency does make this a relatively strong factor in

³Osgood, <u>et al.</u>, <u>Measurement</u>, p. 38.

¹Orthogonal rotations were by the Varimax method utilizing Kaiser normalization. See Cattell, "Factor Analysis," pp. 204-08 for further discussion.

²Factors are described on the basis of those variables loading the highest on the factor. An arbitrary cutoff point of .60000 was made for analysis purposes (in computation of factor scores) which is quite conservative. A cutoff point of .50000 is often used. This does not imply that other variables did not load on one of the five factors. All variables load on all factors, only one of which, however, has the highest loading.

Factor 4	beneficial-harmful (.60771)	q			
Factor 3	homely-handsome (.68820)	ordinary-splendi (.65968)	beautiful-ugly (.61897)		
Factor 2	wild-tame (.73947)	weak-powerful (.71508)	slow-fast (.68167)	active-passive (.61324)	
Factor 1	Savage-meek (.79330)	violent-peaceful (.72537)	threatening-docile (.68782)	bad-tempered-pleasant (.64133)	gentle-vicious (.61011)
Variable (loadings)					

Table 7. Factors with highest-loading variables.

measurement of attitudes. The evaluation/potency factor accounts for 35.2 percent of the common variance in all twenty scales; and accounts for 62.8 percent of the variance of the five factors produced.

The second factor is characterized by "activity" variables. This is logical according to the theory in that it follows evaluation and potency. This factor accounts for only 11.3 percent of the common variance. The fourth factor (the third factor is discussed below) has only one scale loading highly on it. As a result, it cannot be considered either valid or reliable. Perhaps it is an indication that <u>value</u> is a segment of attitudes (with respect to grizzly bears) which this study has neglected to address. It would seem, however, based on the review of attitude theory in Chapter IV, that <u>attitude</u> should be a part of value, rather than the reverse.

Hypothesis 1A can be accepted in part, in that the dimensions of attitude were formed. However, their formation differs slightly from Osgood, who indicates that these differences are not major ones. Hypothesis 1B proposes the (1) formation of an aesthetic dimension, and (2) that dimension would be as powerful as Osgood's three factors. The first part of the hypothesis is accepted: the dimension of aesthetics did in fact form. However, the second part of the hypothesis must be rejected. The aesthetic dimension explains only 7.0 percent of the common variance. Therefore, there are too many other factors or variables that might account for the remainder. That an aesthetic dimension can be created, the answer must be yes; indeed any dimension can be created by merely inserting a number of scales reflecting it. The reliability as a measure of meaning, however, must be closely

scrutinized. In this instance, rejection of the hypothesis is simple: the factor simply does not explain enough of the variance to even infer that it is reliable.

Consequently, these latter factors are useless unless used in some manner with the first factor. Although this is possible, it is beyond the scope and purpose of this project. The initial, or Evaluation/Potency (E/P) factor explains enough of the variance for it to be used as a valid measure of attitude.

The value of these factors for management application does not lie in knowledge of the factors themselves, but rather their meaning with respect to consequences of management decisions. At this point we cannot say that attitudes toward grizzly bears are positive for this person, or negative for that one. As the literature has shown, the attitudes are meaningful only when applied to other variables. An example is the attitudes of females, of Easterners, of hunters, and so These will be discussed in more detail later. What is important on. is that the manager can assume that attitudes toward grizzly bears will be very strong, one way or another. Reference is made to the variables on Factor 1 (the E/P dimension) in Table 7. The very high loadings and the adjectives that load most highly indicate that most people will not be ambivalent toward grizzly bears. Visitors will feel strongly that a grizzly bear is savage, or pleasant, or violent. Thus, in management decisions with respect to grizzly bears, managers may expect some decisions to be controversial. Just as a decision to remove bears from the park will be strongly opposed by some, it may be strongly supported by others. Visitors generally have more positive attitudes overall,

however. But one must remember that it is very possible for an individual to have a highly positive attitude toward grizzlies from an aesthetic viewpoint, but they likely will not want to be molested by one. Therefore, they may at the same time have an extremely negative attitude in terms of evaluation. Although the bear may be beautiful, it may also be savage. For this reason, the E/P factor (having the highest variance) is the more valid one to use in measuring attitudes with respect to other visitor variables.

Attitude Formation

<u>Hypothesis 2</u>.--The <u>intensity</u> of the Evaluative dimension (positive or negative affect) of visitor attitudes is significantly dependent on past experiences.

Hypothesis 2A: Significant differences in <u>affect</u> will be found among visitors who have, or have not had, experiences in outdoor oriented situations (camping, hunting, etc.). Those visitors who partake of these kinds of experiences will manifest the greatest amount of positive affect; those visitors who do not have an interest in outdoor experiences will manifest a negative affect in their attitude towards grizzly bears.¹

A slight digression is made here in order that the reader have a clearer understanding of how this section (and subsequent ones) has been statistically tested. Originally, the data was tested using the analysis of variance method to measure the variance between derived

¹A significance level of .05 is specified for these, and all further analysis in the study. The statistic is chi-square.

factor scores for individuals. Using this method produced no statistically significant results. Factor scores of respondents were determined by calculating the mean score for each factor listed in Table 7 above. Factor scores for each individual can be determined through computation of the factor score correlation matrix, the means, and the standard deviations of each variable. However, these scores are normalized; that is, a zero is calculated at the mean for each factor. Since the zero on the actual scale (given to the respondents) is at the neutral or middle choice (4 in this instance: see Appendix), the normalized zero may be either positive or negative from the actual score, giving positive or negative values to respondents who may actually have checked a value that was the opposite, thus making the normalized scores invalid. Consequently, factor scores are computed by the Dawes method of using averages for the highly loaded variables within that factor.¹ Accordingly, the slightly less powerful statistical test of chi-square was used because of this development.

As is stated above, only the E/P factor is used as a measure of the dependent variable, attitude. As an indicator of past outdoor experiences, visitor responses to the question, "Have you ever hiked, backpacked, or camped before," are tabulated in Table 8.

Table 8 shows that prior outdoors experience does have an effect on attitude scores. Actual cell counts (not tabulated) show that both those with and without prior experience tend to respond positively. Controlling for age, sex, education, and origin (the hypothesized

¹Dawes, <u>Fundamentals</u>, p. 97.

intervening variables) showed no significance at all. Although statistically significant, prior outdoor experience does not seem to be a variable that would determine whether one has a positive or negative attitude. If anything, the trend is slightly negative. Managers should not assume that persons who use their resource will necessarily be more favorable to retaining bears in park areas. In fact, a greater percentage of those with positive attitudes had not hiked, camped or backpacked in the past. It may well be that these persons may feel safer in their activities if bears were removed from park areas.

	Hiked, Ba	ackpacked, o	r Camped Before	
Evaluation/ Potency	No (%)	Yes (%)	No Response (%)	Total
Negative	8.7	91.3	0	23 14.6
Neutral	9.4	84.4	6.3	32 20.3
Positive	22.3	77.7	0	103 65.2

Table 8. Prior outdoor recreational experiences.

Chi-square = 11.9121, 4 D.F., Significance = .018

Before rejecting the hypothesis, we must look at one more variable: hunting. Previous studies have found a relationship to this variable. Results are tabulated in Table 9.

The relationship in Table 9 is not significant within our defined parameters. However, even if it were, it merely shows that scores for both groups, as in Table 8, tend to be positive. Actual cell counts (not tabulated) indicate that both groups are equally distributed in the cells in terms of column (rather than <u>row</u> as shown) percentages. Control of intervening variables only developed a relationship with sex. Control with <u>males</u> is in Table 10. Although no significance is found in control for females (there were only 4 female hunters), all 4 female hunters register a positive attitude. The reverse would have been expected based on sex alone. Therefore it is possible that control of hunting by sex shows a positive relationship.

Evaluation/ Potency	Non-Hunter (%)	Hunter (%)	Total	
Negative	91.3	8.7	23 14.6	
Neutral	84.4	15.6	32 20.3	
Positive	70.9	29.1	103 65.2	

Table 9. E/P in hunters and non-hunters.

Chi-square = 5.7348, 2 D.F., Significance = .056

Male non-hunters tend to have negative attitudes with respect to male hunters, for which the reverse is true. This leads one to infer, especially when one considers the cell count for female hunters, that <u>hunting</u> acts as a significant intervening variable with respect to positive attitudes toward grizzly bears.

In terms of management application, resource managers can expect support in positive bear management actions. One likely

explanation could be the "trophy" status the grizzly bear has among hunters. Another is the fact that many hunters realize that bears are not confined to park areas. If the bear is to wander across park boundaries it then becomes a huntable animal. For those hunters who desire to hunt bears, this can be an important factor. As a matter of fact, many guide services exist around the boundaries of Yellowstone and Glacier parks, hoping to capitalize on this possible movement of bears to non-park areas.

Evaluation/ Potency	Non-Hunters (%)	Hunters (%)	Total	
Negative	89.5	10.5	19 18.3	-
Neutral	78.3	21.7	23 22.1	
Positive	58.1	41.9	62 59.6	

Table 10. E/P in male hunters and non-hunters.

Chi-square = 7.9842, 2 D.F., Significance = .018

Hypothesis 2B: Significant differences will exist among visitors with respect to their exposure to various kinds of media concerned with nature or animals. Visitors with a high exposure to these kinds of media will have positive attitudes toward bears; visitors with a lesser exposure will have negative attitudes.

This hypothesis was the result of several suggestions by previous researchers that anthropomorphic perceptions of animals will logically result in a positive attitude toward them. An index was created from three questions concerning exposure to media that dealt with nature or wildlife. The questions specifically referred to the frequency with which respondents read articles or stories about camping, hiking, etc.; how often they read the outdoor column in their local newspaper; and if the respondents regularly watched television programs concerning the outdoors, animal stories, or nature. Three coding categories were given to each question to reflect this frequency: (1) regularly, (2) sometimes, and (3) rarely.

In construction of the index, respondents with two or more answers in the same category were placed in that category. Respondents with one answer in each category were placed in the middle category ("sometimes"). Respondents with one or more missing values for the questions were placed in the highest (most frequent) category they specified. The exception to this latter standard were those who may have had one <u>low</u> answer ("rarely") and one <u>high</u> answer ("regularly"): these individuals were placed in the middle category.

The data analysis showed no significant differences among categories. As a result, the data is not presented in tabular form. From examination of the cell counts, however, a trend was noticed that tends to support the hypothesis. Proportions of the sample population increased as one moved from the "rarely" by "negative attitude" cell (4.4 percent of the total sample) to the "regularly" by "positive attitude" cell (34.2 percent). However, this trend was not significant within the set statistical parameters.

The same distribution was found in all control variables except one: those respondents from <u>urban</u> backgrounds that "regularly" were exposed to these kinds of media had significantly more positive attitudes than all others (significance = .03). However, one cannot generalize from this occurrence because of the small number (22) of respondents who met the urban criteria. As a result, many cells have no values while others have only one or two. Only by an increase in total sample size can this relationship be studied further. Although this data is significant, caution should be made in applying inferences from it.

If this trend is supported by further research, it would mean that programs or literature expounding the positive values of bears may cause more positive visitor attitudes among those exposed to various media forms. The trend noted in this index is surprising concerning the usual sensationalism surrounding bear maulings alluded to by the literature. Perhaps natural history media presentations may well be an excellent "lobbying" source for park managers to generate support for their decision to maintain bear populations in national parks.

Hypothesis 2C: Significant differences will exist among those who are able to distinguish between bear species (an indicator of bear knowledge). Visitors who are able to distinguish between bear species will have more positive attitudes than those who cannot.

Bear knowledge was not significant in its association with visitor attitudes toward bears, as is shown in Table 11.

Controls for age, education, and sex indicated similar cell sizes with no apparent positive relationship. An exception was the tendency of those respondents who were unable to distinguish between bears

Evaluation/ Potency	Unable to Distinguish (%)	Able to Distinguish (%)	Total
Negative	43.5	56.5	23 14.6
Neutral	50.0	50.0	32 20.3
Positive	62.1	37.9	103 65.2

Table 11. Ability to distinguish between bear species.

Chi-square = 3.4631, 2 D.F., Significance = .18

to be more positive than negative. The relationship is significant, however, for rural respondents (Table 12).

Table 12. Proportion of rural populations in ability to distinguish between bears.

Evaluation/ Potency	Unable to Distinguish (%)	Able to Distinguish (%)	Total
Negative	40.0	60.0	10 14.1
Neutral	38.5	61.5	13 18.3
Positive	70.8	29.2	48 67.6

Chi-square = 6.5489, 2 D.F., Significance = .03

The hypothesis, as it relates to rural populations, must be rejected. The inverse of the hypothesis is significant in its projection of the tendency noted in Table 11. This leads one to believe that knowledge of bears interacts inversely with visitor attitudes. As bear knowledge increases, attitude becomes more negative. This suggests the possibility that innocence as to the potential danger of bears may play an important role in attitude formation. This supposition is somewhat supported in that the significance appears in rural populations, or those who would logically be more aware of the danger of animals. Further support is generated in control for suburban populations (lying between rural and urban) where cell proportions vary only one or two points and Chi-Square approaches unity. Whereas, in urban populations, the trend is the opposite of that observed in rural areas (although it is not statistically significant). These controls suggest that further study must be made of the relationship of innocence and sophistication (with respect to wild animals) to attitude formation about bears.

There is a disparity, however, between this data and that for the trend noted for media exposure. It may well be that distinction between species is not an indicator of bear knowledge. What is more likely, however, is that knowledge of biological facts is not a valid indicator of positive or negative attitudes. Interpretive displays that focus on bear biology may not do anything to generate support for park service management goals. What may be inferred from this data, and that from the media exposure index, is that park interpretive programs should emphasize the more cultural or social aspects of the grizzly bear, rather than biological facts alone. Examples could be the social
relationships between mother and cubs, the intelligence of bears, the past man/bear historical relationships, and so on. This is not to say that negative aspects should be discounted. Rather, instead of relying on biological data to counteract sensationalistic journalism, visitors should be made aware of the values of bears while at the same time learning to respect them.

Hypothesis 2D: Significant differences will exist among those visitors who have actually seen a bear in the park. Those visitors who have had this experience will have more positive attitudes than those who have not.

Visitors who saw bears in the park were almost equally distributed among the attitude categories. Those who had not seen a bear in the park had a tendency to rate more positive on the attitude scale. This relationship was not significant, however.

Of the intervening variables, only in controlling for education was a relationship significant. The point that is significant, however, is that those persons who had not seen bears, and had some college or were college graduates, were <u>either</u> positive or negative in their attitudes, but not neutral. The inverse was the case for those who had seen bears: attitudes were almost exclusively neutral. Care must be taken however, in inferring too much from these control groups. As one can see from examining Table 13 and 14, small cell size was again a problem.

An increase in the sample may change these relationships drastically. Although they are significant, generalizations should not be made, if for no other reason than addition of one or two individuals

Evaluation/ Potency	Have not seen bear (%)	Have seen bear (%)	Total
Negative	80.0	20.0	5 15.6
Neutral	25.0	75.0	4 12.5
Positive	82.6	17.4	23 71.9

Table 13. Visitors with "some college" and bear observation.

Chi-square = 6.1101, 2 D.F., Significance = .05

Table 14. College graduates and bear observation.

Evaluation/ Potency	Have not seen bear (%)	Have seen bear (%)	Total
Negative	100.0	0.0	2 5.7
Neutral	57.1	42.9	7 20.0
Positive	92.3	7.7	26 74.3

Chi-square = 5.9231, 2 D.F., Significance = .05

could change proportions significantly. If we were to assume, however, that in an increased sample this relationship held constant, we still could not make judgments based on it. In both Table 13 and 14 the majority of the respondents had positive attitudes. But one cannot infer that more education necessarily will affect attitudes either positively or negatively. What may be inferred, however, is that seeing a bear does affect attitudes either positively or negatively. From the trend noted above among all visitors, those who had not seen a bear rated more positive attitudes than those who had observed bears in the park. The neutral category is significant here. The immediate question is why do those who have seen bears tend to be neutral in their attitudes? Perhaps the sight of a bear tends to make people uneasy (for some unexplained reason) about their preconceived attitude (be it positive or negative). Another likely possibility, because the question referred to observation of bears in Glacier and therefore probably a recent experience for the respondents, is that this neutral category may reflect attitudes of visitors that are undergoing change. Further research will be needed to discover in which direction this change is going.

One more unknown factor enters this relationship which prevents making management conclusions at this time. That is, the circumstances under which the bear was observed by the respondents is not known. If the bear was seen in a campground the respondent may be changing his attitude negatively. If the bear was observed in the wild state, perhaps the change is positive. Additional research can shed light on this topic.

Hypothesis 2E: Significant differences will exist among visitors who are, or are not, members of various environmental or ecological groups. Visitors who are members of these groups will have more positive attitudes than those who are not members.

The hypothesis is not supported by the data. Respondents of both classes are equally distributed among the respective cell categories. Nonmembers account for approximately 65.0 to 75.0 percent of the proportions in each attitude category versus 25.0 to 35.0 percent for members of environmental groups. This corresponds to the percent each group (72.8 percent for nonmembers; 27.2 percent for members) represents in the total sample.

In controlling for intervening variables, however, significant differences are found with respect to age (Table 15) and origin (Tables 16-18).

Evaluation/ Potency	Nonmembers (%)	Members (%)	Total
Negative	33.3	66.7	6 8.2
Neutral	58.3	23.8	12 16,4
Positive	78.2	21.8	55 75.3

Table 15. Attitudes of visitors over 35 years by environmental groups.

Chi-square = 6.4762, 2 D.F., Significance = .039

The hypothesis is rejected in part. Table 15 presents data that shows an inverse relationship to that hypothesized. Data from those members under 35 years shows the opposite relationship than that shown in Table 15 (as was hypothesized), however, it is not significant. This infers that age may be a stronger, and therefore an intervening variable between membership in environmental groups and attitudes toward bears. If this supposition is accepted, then as a person increases in age, his attitude toward bears moves toward the negative. If one assumes that as age increases, conservatism increases, then this may explain the trend noted above. Younger persons may be willing to take a chance hiking and camping in the same area inhibited by bears. Older persons, however, may be more conservative in their risk-taking, and may prefer to hike and camp in areas that are more safe in terms of possible bear encounters.

Evaluation/ Potency	Nonmembers (%)	Members (%)	Total
Negative	50.0	50.0	10 14.0
Neutral	69.2	30.8	13 18.3
Positive	93.8	6.3	48 67.6

Table 16. Attitudes of rural visitors by environmental groups.

Chi-square = 13.4576, 2 D.F., Significance = .001

Although Tables 17 and 18 are not significant, it is interesting to view them in sequence as the relationship between attitudes and group members changes from the negative (Table 16), through Table 17 where it is neither positive or negative, to Table 18. The relationship has now changed to reflect the positive attitude. This is similar to the relationship change between rural-urban populations and bear knowledge (Table 12, above).

Evaluation/ Potency	Nonmembers (%)	Members (%)	Total
Negative	66.7	33.3	9 13.8
Neutral	77.8	22.2	18 27.7
Positive	63.2	36.8	38 58.5

Table 17. Attitudes of suburban visitors by environmental groups.

Chi-square = 1.1988, 2 D.F., Significance = .549

Evaluation/ Potency	Nonmembers (%)	Members (%)	Total
Negative	100.0	0.0	4 18.2
Neutral	100.0	0.0	1 4.5
Positive	41.2	58.8	17 77.3

Table 18. Attitudes of urban visitors by environmental groups.

Chi-square = 5.3922, 2 D.F., Significance = .067

This attitude change suggests that upbringing in rural or urban areas may significantly affect visitor attitudes toward bears. If this is indeed the case, rural-urban variables will be extremely important in attempting to establish causal sequences between past behavior and attitudes. Therefore, Hypothesis 2E must be rejected in part, in that membership in itself does not determine attitudes. However, significant differences do exist, especially when controlled by intervening variables which also contribute to the formation of attitudes.

It is curious to note these findings do not correspond with what logically might be assumed from the general positive stance of environmental groups toward endangered species. If we assume those respondents belonging to environmental and conservation groups support this organizational stance, then there is a dichotomy between individual attitude and behavior (i.e., support of organizational stands). This tends to support the attitude theory literature which states that attitudes are not related directly to behavior. If this is not true, we may infer that some other, more powerful attitude may cause those members with negative attitudes toward bears to support their organization's positive stand on endangered species.

Hypothesis 2F: Variables such as age, sex, education level attained, and visitor origin will act as <u>intervening</u> variables between all classes of past behavior or experience and attitudes toward bears.

The analysis presented in the discussion of Hypothesis 2A through 2E partially supports the hypothesis. In Hypothesis 2A, sex acted as an intervening variable between male hunters and non-hunters. The same relationship was true with females, although it was not significant. In Hypothesis 2B, no significant relationship was found with respect to media exposure and the E/P attitude dimension. A significant

relationship was found, however, in controlling for origin, where urbanites with a high media exposure also expressed a positive attitude, lending support to the hypothesis.

In Hypothesis 2C, bear knowledge was also found to be insignificant in inferring a causal sequence to attitudes. When controlled for origin, rural visitors expressed an inverse relationship to attitude with respect to that which was hypothesized. Rural visitors also expressed an inverse relationship to attitude with respect to that which was hypothesized. Rural visitors also expressed a significant inverse relationship to Hypothesis 2E, which stated members of environmental groups would have a positive attitude as reflected on the E/P scale. Rural visitors, however, exhibited negative attitudes, thus rejecting the hypothesis.

Education intervened in a curious, but significant way in the relationship between bear observations and bear attitudes. Those persons who had not seen a bear and had some college, or were college graduates, had <u>either</u> a positive or negative, but not neutral, attitude. Those persons with the same educational background who had seen bears had neutral attitudes.

Each of the independent variables hypothesized to be significant in the formation of attitudes as measured by the E/P factor (except for hunters), in fact did not show a relationship until controlled by one of the four hypothesized intervening variables. Each affected the independent variables in at least one instance. However, the strongest of these intervening variables was visitor origin (during the formative years) as measured by the rural-urban scale. It intervened

in three instances: (1) with media exposure (urban), (2) with bear knowledge (rural), and (3) with membership in environmental groups. Of the remaining control variables, age was the next most powerful, with sex and education the least powerful. Nevertheless, all were significant in different instances.

This supports Hypothesis 2F and suggests that, although past experiences and behavior may act in the formation of attitudes, the intervening variables above are more powerful in their influence in attitude formation.

Attitudes and Future Behavior

<u>Hypothesis 3</u>.--Visitor attitudes will have an affect on selfreported responses toward grizzly bears in potential situational encounters. Visitors with a positive attitude will report positive (in terms of what scientists view as correct) behavioral reactions toward hypothetical encounters with grizzly bears. Visitors with negative attitudes will report negative behavioral reactions.

This hypothesis is not supported. There are no significant differences among any of the attitude groups with respect to the three categories in the E/P factor.

Significance was noted with respect to the Activity factor (the second in terms of explanation of variance; not to be confused with the E/P factor) and behavior responses toward seeing a bear while driving (Table 19).

Although the proportions in Table 19 are significant, they do not differ with respect to intensity of the attitude. The significance is mainly in relation to the same kinds of behavioral choice by respondents; not their attitude intensity.

Activity factor	Drive by (%)	Stop in car (%)	Take picture (%)	Slow down (%)	Close windows (%)	Leave alone (%)	Total
Negative	20.0	60.0	0.0	0.0	0.0	20.0	5 3.2
Neutral	22.2	66.7	11.1	0.0	0.0	0.0	9 5.8
Positive	22.0	67.4	6.4	.7	3.5	0.0	141 91.0

Table 19. Behavioral responses toward seeing a bear while driving.

Chi-square = 31.2707, 10 D.F., Significance = .0005

The same is true of the Aesthetic factor as well. There are one or two instances in all dimensions where the data is "significant," but it is only with respect to proportions within the table, as is shown in Table 19. Most respondents chose the same alternatives, no matter what their positive or negative feelings on any of the attitude dimensions. Although behavioral responses are similar, they are not explained by the intensity of feeling on the factor scales.

An examination of the data shows that most choices were "correct," with only a few respondents choosing categories that may result in injury in a real situation. Table 19 is an example. This implies that most respondents are aware of the correct action to take in a bear encounter. However, this does not infer that these choices may actually be made in an actual situation. Responding to a hypothetical situation is not the same as actual confrontation with a bear.

What can be inferred, however, is that park managers are apparently doing an effective job in informing the public of correct choices and courses of action to take with respect to bears. Had the data shown a relationship as hypothesized, it would be an indication that not all persons were receiving this information, or that only those with positive attitudes were heeding it. Such a relationship would indicate a serious communication breakdown between park management and visitors, for information is not distributed on the basis of visitor attitudes toward bears. Since the killings in Glacier National Park in 1967, the park has given high priority to visitor information about bears. The results of this emphasis may be inferred from the decreasing number of grizzly bear incidents since that date, and is substantially supported by the rejection of the third hypothesis.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The data presented here is one portion of the first phase of a larger, two-year study of the relationship between man and dangerous wild animals. This thesis has attempted to determine the attitudes of Glacier National Park visitors toward grizzly bears, how these attitudes are formed, and what effect they may have on behavior. Few actual studies have been attempted to study the man/bear relationship and even fewer have focused on the man element alone. Consequently, this study has been, of necessity, somewhat exploratory in nature. Its immediate value will not be found in exposing new, heretofore unknown, management procedures. Rather it is more valuable in that it serves to point the direction for future management oriented research so that avenues that conceal dead ends are not chosen when there are others that will yield far more profitable results. This is not to imply that results presented here have no immediate management application. On the contrary, the data does yield some interesting insights that have immediate application.

It is necessary to reiterate the assumption that management will work to obtain its stated goal: that is, to maintain natural populations of grizzly bears in Glacier National Park while, at the same time, minimizing the danger of injury and loss of life to the visitor. With this in mind we can explore the implications of this initial study.

Attitudes exist among the visiting public about grizzly bears in Glacier National Park. Contrary to earlier studies which infer highly positive attitudes from overwhelming public desires to retain bears in the park, approximately two-thirds of Glacier Park visitors have positive attitudes toward bears. The remainder are about equally divided between neutral and negative attitudes based on the Evaluation/ Potency factor of the attitude scale. Those visitors with the most positive attitudes toward bears (over 90 percent on each factor) were found in the Activity and Aesthetic factors. It is therefore possible that a visitor may have a positive aesthetic value for bears while, at the same time, scoring negatively on the evaluative dimension of attitude. In terms of support for park service bear policy, based on past studies it would seem that the aesthetic dimension is more powerful in that the vast majority of people do not want bears removed from the park. As shown by the evaluative factor, however, this does not mean that visitors necessarily have overall positive attitudes toward bears. Consequently, park managers probably should not be unduly concerned by the one-third of the sample population which may not have a positive bear attitude.

One cannot predict from this data whether or not a positive attitude toward bears has a direct relationship toward resource use. The findings tend to support the attitude theory (advanced by Rokeach and others) that indicates behavior is governed by many attitudes, the least of which is attitude towards an object (grizzly bears) and attitude towards a situation (resource use).¹ Prediction of resource use

¹Rokeach, <u>Beliefs</u>, p. 111.

will have to rely on further study of other visitor attitudes (such as toward camping in bear country or toward the purpose of national parks) in addition to those toward bears, and the relation between these attitudes in their effect on behavior.

Resource managers cannot assume that past experiences necessarily reflect themselves in visitor attitudes. While hikers and campers (in general, not just those who hike or camp in bear habitat) did not necessarily have positive attitudes, hunters did. This is perhaps explained by the possibility that hikers and campers may have an attachment to the physical resource (the land) itself, while hunters have more of an affinity for the animals that inhabitat that resource. The same is true with the exposure of visitors to media dealing with nature and natural resources. However, a trend (not statistically significant) was noted that indicated as exposure increased, attitudes became more positive. When coupled with the finding that biological bear knowledge seemed to have no effect on attitude in and of itself, however, an immediate management implication becomes apparent. Interpretation of resources has long been an important part of national park management. Yet the data showed that interpretive activities ranked far down on the list of sources from which park visitors got their information about wildlife.

While interpretation has an educational function in terms of presenting facts on bear biology, perhaps more than just biology is needed. In this instance interpretive programs should stress the values of bears, their social relationships with other animals and each other, their effect on the land, and their relationship with man. Observation of bears in "feeding pits" (garbage dumps) and along roadsides used to be a major activity in national parks. This has been discontinued for safety reasons. Moreover, the data showed that bear observation had an effect on both positive and negative attitudes, with a large number of respondents having a neutral attitude. Interpretive activities can be used not only to educate or entertain, but to counter the negative image given grizzly bears by the more popular media forms. In this sense, a clientele group can be built that is not only educated about bears in a biological sense, but is shown the bears' role on earth as well as instilled with the respect that is needed for a potentially dangerous wild animal. This is an opportunity to influence the visitor positively with respect to support of a particular management direction chosen.

The fact that the data shows a disparity between individual attitudes and membership in environmental or conservation groups should not be of immediate concern to park managers. The data does not imply that these individual attitudes will necessarily manifest themselves in negative behavior with respect to support of bear management policies. Environmental groups, for the most part, support the park service desire to maintain bear populations. Members of these groups who have negative or neutral attitudes toward bears by their membership in these groups most likely will continue to support the respective stances of both the group and the park service. This may be an indicator of a change of environmental organizational support if those individuals with negative attitudes were to increase in the future. However, the prospect seems unlikely.

Rather than past experiences, the more general intervening variables seem to be more powerful in their attitudinal effect. Visitor origin (during formative years) seemed to have the most effect on attitude formation. This supports the findings of the Bryan and Jansson study reviewed earlier. However, their findings showed urban populations to be somewhat negative with respect to rural, while the opposite is true in this case. This difference may be explained in that this study did not define visitor origin as where the visitor resided now, but where the visitor grew-up. Age seemed to be the next most powerful intervening variable while sex and education seemed to be the weakest intervening variables. Perhaps the most surprising finding was among female hunters, where all had positive attitudes toward bears. On the basis of the exposure given to the killings of two girls in 1967 by grizzlies, the opposite was expected. Nevertheless, all the general variables significantly intervened in at least one instance.

From this data we can conclude that many past experiences probably do contribute in some way to the formation of attitudes. However, there are intervening variables that are more powerful, with respect to their contribution in attitude formation. Thus, establishment of causal sequences between various intensities of attitude and specified types of past behavior is difficult, mainly because of the intervention of such variables as age, sex, education and origin. There are perhaps other variables also which intervene in this relationship. Certainly the relationship between past behavior and attitude intensity is a complex one. So far as relating attitude intensity to potential visitor behavior, it appears that it cannot be done at this level of abstraction. The literature has indicated that the relationship is very complex and that more than one attitude is usually involved. The results here seem to bear this out. Prediction of behavior cannot be made on the basis of any one attitude indicator alone. From our experience with attitudes and past behavior, it follows that one should not rule out the impact that intervening variables might have on future behavior.

In terms of future research, the most logical next step would be to refine the semantic differential scale so that individual scale items are chosen that contribute most to the overall factors. Also, the scale should be more flexible so that it can be applied to more than one attitude object or situation. In addition to grizzly bears themselves, attitudes toward camping, wilderness, wildlife, death, other people, and many others probably all interact to form visitor behavioral responses in certain situations. Once this is accomplished, the ideal course of action would be to develop an exhaustive list of control or intervening variables that may also enter relationships between attitudes and behavior.

In terms of actual topic areas, the following hypotheses are proposed. From the data regarding bear knowledge, we must find out what effect various kinds of bear knowledge (biological, social, ecological) have on visitor attitudes and behavior. Is bear knowledge in any form a factor at all? What kinds of knowledge affect visitor attitudes? Visitor behavior? In what way are they affected? The relationship between bear knowledge and exposure to various kinds of media

must be examined. Is there a relationship between the two? How does such a relationship (if it exists) affect attitudes and behavior? Can these variables be used as management tools to effect change?

In like manner, the data showed an inverse relationship to that hypothesized among rural and urban visitors with respect to attitude and bear knowledge. This suggests that perhaps innocence (lack of knowledge) or sophistication (in terms of rural-urban lifestyles and their influence) may have some effect on attitudes toward grizzly bears. Does such a relationship exist? The same is true of the relationship between attitudes and bear observation. Does observation of a bear change (or reinforce) preconceived attitudes toward bears? If so, under what circumstances (situation) does this occur? Is there a difference?

But perhaps the most important question is the relationship between attitudes and future behavior. The data shows none in hypothetical situations. Is this correct? Do attitudes not have an effect on future behavior? Or is more than one attitude involved?

Perhaps there is no relationship. But it is as important to find out if no relationship exists as it is to find if one does exist. More importantly, we are not just dealing with psychological constructs or philosophical arguments as to the purpose of national parks. Most importantly, we are dealing with questions that may affect human lives, not just the extinction of a species of wildlife. If this research has advanced man's knowledge only enough that it may one day help to prevent the loss of a human life, or the extinction of a species, then it has served its purpose.

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INTERVIEW INSTRUMENT

APPENDIX





INTERVIEW

Have you ever visited Glacier National Park before? 1. NO YES [] How many times have you previously visited the park? Did you hike, backpack, or camp on any of [] NO b. these trips? [] YES How many days have you spent in the park this visit, including today? 2. 3. How many days in total do you plan to stay in the park this visit? Where are you spending your nights during your visit to Glacier National Park? 4. IF NOT CLEAR, ASK IF INSIDE OR OUTSIDE PARK. [] Lodge/Hotel/Motel Outside Park [] Auto Compgrounds in Park [] Campgrounds Outside Park [] Backcountry Camping in Park [] Lodge/Hotel/Motel in Park [] Backcountry Camping Outside Park [] Other5. Have you ever hiked, backpacked, or camped before? YES [] NO Which do you consider yourself, a hiker, backpacker, a. [] or camper? [] Hiker Backpacker [] [] Camper ь. In what state have you hiked/backpacked/ camped the most? ſ c. How many years have you hiked/backpacked/camped? [] d. When you hike/backpack/camp, do you ordinarily go by yourself, go with family or close friends, or with other groups or clubs? [] self [] family/friends [] groups/clubs е. When you camp in a partially filled campground, do you prefer to choose a site as far from others as possible, near other campers but not too close. or as close to other campers as possible? [] Far from others [] Near, but not close [] Close as possible

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15.	Do you like to read animal stories or watch them on television or in the movies, such as Flipper, Lassie, Gentle Ben, My Friend Flicka, etc.? [] No [] Yes [] Sometimes
16.	Do you watch outdoor or nature-oriented shows on television? [] Regularly [] Sometimes [] Rarely, or never
17.	How often do you go to nature-oriented movies? [] Regularly [] Sometimes [] Rarely, or never
18.	Do you belong to any camping, hiking, or backpacking clubs?
19.	Do you belong to any organizations considered to be "conservation" or "environmental" organizations? [] NO a. Have you served on any of the organization's committees or written letters, etc., to indicate your opinions concerning costro- versial issues? [] NO [] YES
20.	<pre>Would you consider yourself an environmentalist, a preservationist, a conservationist, or none of these? [] Conservationist [] Enviromentalist [] Preservationist [] None of these</pre>
21.	<pre>What do you feel the park should do about bears who are camp-robbers? INTERVIEWER: OPEN-ENDED [] Nothing [] Transplant, or take some other management action. [] Kill the bears [] Other</pre>
22.	How would you rank in priority the following: () protect the park from the people, () protect people from other people, () protect people from the park? [] First priority [] Second priority [] Third priority
23.	<pre>If, while driving in the park, you saw bear, would you drive on by without stopping; stop to see the bear but stay in the car; step out of the car to take pictures; approach the bear for a better look; try to pet or feed the bear if you thought it was safe? [] Drive by [] Stop in car [] Step out [] Approach bear [] Try to pet or feed</pre>

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24.	If, while hiking a trail, you saw a bear walking towards you on the same trail, what would you do? INTERVIEWER: OPEN ENDED																		
-																			
25.	If you were attacked by a bear, what would you do?																		
26.	How many years of education have you completed? [] Less than 8 [] 15																		
	[] 9 - 11 [] 16 [] 12 [] 17																		
	[] 13 [] 18 or more [] 14																		
27.	What is your occupation? INTERVIEWER: PROBE																		
-																			
28.	SHOW RESPONDENT RURAL/URBAN DRAWINGS																		
	Please choose the drawing that is most like where you lived between 5 and 15 years of age. If you lived in more than one place, choose the one you think had the most impression on you.																		
	[] Extreme rural [] Dense suburban . [] Farm [] Urban spacious [] Rural town [] Urban compact [] Open suburban .																		
INT	ERVIEWER:																		
	"I will now ask you to fill out these scales. They are self explanatory. If you have a																		
quest	an "																		
,00 0	TAKE SCALES WHEN COMPLETED STAPLE TO INTERVIEW SCHEDULE.																		
	"I want to thank you for your cooperation. Is there any comment or complaint you might have																		
about	the park or any of the facilities?"																		
about	the park or any of the facilities?"																		
about TERMI	the park or any of the facilities?"																		
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4.	clean	_	-	-			-	_	-	-		[]		_	-	ب	Γ	dirty	
5.	threatening		Ē	-	[]		_	_	-	-				ш	_	_	_	docile	
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8.	timid	_	-				-	_		ſ				-	-	<u>_</u>	_	aggres	sive
.6	predictable	-	-	-			-	-	-	٦				-	-	-	_	unpred	ictable
10.	gentle	-	-	-				-		-				_	-	-		viciou	ທຸ
11.	grotesque]	-	-			_	-		-				L	_	÷	_	pretty	
12.	beautiful	_	-	_			_	_		-					_	<u>ب</u>	-	ugly	

Here are some pairs of words that might describe how you feel about grizzly bears. Please mark a square between each pair of words that best describes these feelings. Mark one square for each pair

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		Vei	Υ	somev	what a	li	ttle	nen	tral	a li	ttle	somew	hat	very		
13.	graceful	<u> </u>		-	[_	_	<u>ب</u>	[_	_	_	_	[]	ច	lumsy
14.	kind		-	<u> </u>	[-	[<u> </u>	-	<u>ب</u>	-	<u> </u>	-		5	ruel
15.	deadly	_	-	_]	-	_	<u> </u>	_	_	_	_	-	[]	hā	armless
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20.	beneficial	ب]		_		Γ	-	_	-	[_	-		hé	ırmful
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23.	homely	-	-	-	-	_	Γ	_	-	ب	-	_	_	[]	hé	andsome
24.	slow		-	-	-	_		<u>-</u>	-	ب	-	-	-		Ę	ast

The following 13 phrases will each fit into this sentence:

I WOULD LIKE TO A GRIZZLY BEAR.

If you were talking about yourself, which words would you use to fill in the blank? Mark <u>YES</u> for words you would use. Mark <u>NO</u> for words you would not use.

1.	pet	YES []	<u>NO</u>	8.	see from the trail	YES	<u>NO</u>
2.	touch	[]	[]	9.	never see	[]	[]
3.	photograph	[]	[]	10.	hug	[]	[]
4.	see in cages	[]	[]	11.	see from car	[]	[]
5.	see in campground	[]	[]	12.	feed from my hand	[]	[]
6.	throw food to	[]	[]	13.	ride on	[]	[]
7.	play with	[]	[]				

Below you will find a sentence with six different endings. Read each sentence carefully.

Then mark <u>AGREE</u> for each ending that describes how you would complete the sentence. Mark <u>DISAGREE</u> for each ending that you would not use to complete the sentence.

IT IS ALL RIGHT FOR GRIZZLY BEARS TO ROAM FREE . . .

AGREE	DISAGREE		
[]	[]	1.	around campgrounds and lodges in the park.
[]	[]	2.	along roads and highways in the park.
[]	[]	3.	in all of the backcountry of the park.
[]	[]	4.	in that portion of the backcountry of the park not used by many hikers.
[]	[]	5.	in wilderness areas outside the park.
[]	[]	6.	in remote area of northern Canada and Alaska.

