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Attitudes toward limiting overnight use of the Chilkoot Trail National Historic Site

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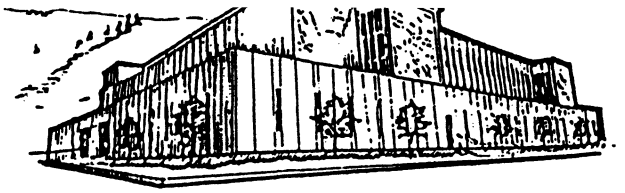

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ATTITUDES TOWARD LIMITING OVERNIGHT USE

OF

CHILKOOT TRAIL NATIONAL HISTORIC SITE

by

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Attitudes Towards Limiting Overnight Use of Chilkoot Trail National Historic Park (122 pp.)

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Park mandates, laws, and policies often dictate recreation management actions that are not popular. Canadian and United States managers of the Chilkoot Trail are considering use of a potentially unpopular action; a use limit program, to fulfil their mandate to protect the trail's natural and cultural resources and provide quality recreational experiences. A random sample of visitors hiking the Chilkoot Trail during the summer of 1993 were surveyed to determine their attitudes toward limiting overnight use of Chilkoot Trail National Historic Site (CTNHS).

A 35-question self-response questionnaire was used to determine hikers' visitor and trip characteristics, desired experiences, perceptions of impact problems, and the affect of and support for limiting use of the trail. Hikers were found to have a bundle of seven experience expectations. In contrast to park managers and staff, hikers displayed an indifference to impact problems occurring along the Trail. Their desired experiences and perception of setting conditions were such that they did not support limiting use of the trail at this point in time. However, support for limiting use was found if the park's natural and cultural resources or visitor resources were threatened, or in light of the pending Gold Rush Centennial. Support for limiting use of the trail also increased with university education, hiking experience, the perception of impact problems in the trails social, resource and managerial settings, and with the perception that limiting use would add to a visitor's hiking experience.

This study alerts managers of CTNHS to the need for an education and information program that explains the rationale for limiting overnight use of the trail. Study findings are utilized to identify actions park managers can take to convince hikers that limiting use is necessary.

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INTRODUCTION

Park mandates, laws, and policies often dictate management actions that are not popular. Information about visitor attitudes can alert managers to the need for programs that explain the rationale for their actions (Stankey and Schreyer 1987). This study investigates visitor attitudes toward limiting overnight use of Chilkoot Trail National Historic Site.

Background Information

The Chilkoot Trail was a main access route used by stampeders to reach the Klondike gold fields during the 1897/98 gold rush. Today the trail is recognized as an international historic park managed jointly by the Canadian and United States parks services. The 15.5 square mile United States section of the park is called Klondike Gold Rush National Historical Park (KGRNHP). The 50 square mile Canadian section of the trail is named Chilkoot Trail National Historic Site (CTNHS). CTNHS is unique among current Canadian National Historic Sites because of its large size and combination of natural, cultural and recreational resources.

Each summer, hikers come from all over the world to retrace the steps of the Klondike stampeders between the historic gold rush towns of Dyea, Alaska and Bennett City, British Columbia. They encounter a variety of vegetation, weather, terrain and historic features during their three to five day trip over the trail. Near tidewater, they pass

through Alaska's Pacific Northwest coastal rain forest. Inland, they climb above treeline into alpine tundra near the 3280-foot summit of the Chilkoot Pass. They then follow the trail downwards into the Boreal forest of British Columbia.

The Chilkoot Trail's proximity to the Inside Passage results in a wet maritime climate. This climate produces strenuous hiking conditions that include blowing rain, sleet, hail, thunderstorms and sometimes snow. Trail conditions include wet muddy sections, steep loose boulder fields, and snow covered sections that exist all year long.

The Chilkoot Trail is located on or next to several historically significant sites. These sites have a variety of sensitive and significant artifacts and cultural features in and around their area. As a result, CTNHS is like an outdoor museum and hikers encounter thousands of artifacts remaining from the gold rush era.

Problem Definition

CTNHS is managed by Parks Canada, an entity of the federal government. The general mandate of Parks Canada is:

> *"To fulfil national and international responsibilities in assigned areas of heritage recognition and conservation; and to commemorate, protect and present, both directly and indirectly, places which are significant examples of Canada's cultural and natural heritage in ways that encourage public understanding, appreciation and enjoyment of this heritage in a sustainable manner."* (Environment Canada Parks Service 1990)

As a National Historic Site, management of CTNHS is further guided by a specific Historic Site objective to:

> *"Protect and present commemorated resources of national historic significance administered by the Canadian Parks Service for the benefit, education and enjoyment of this and future generations, in a manner that respects the significant and irreplaceable legacy represented by those resources."* (Environment Canada Parks Service 1990)

The Chilkoot's *preservation with use* objective has presented CTNHS managers with one of their major challenges to date, that of ensuring the protection of CTNHS's natural and cultural resources while providing enjoyable park experiences in light of increasing visitation.

In recent years, summer use of CTNHS has risen dramatically above the eighteen hundred visitors per season projected by the site's 1988 Park Management Plan. Park planners did not anticipate hiker levels would reach the eighteen hundred mark until the 1997/98 Centennial of the Klondike Gold Rush. However, use of CTNHS has already increased from 1570 hikers in 1987 to 2972 hikers in 1993; an average annual increase of 14.9 percent. This increase compares to the 1950's and 1960's when backcounty and wilderness use growth often exceeded 10 percent a year (Roggenbuck and Watson 1989). The Chilkoot's current growth rate projects to a visitation level of in excess of five thousand by 1997. The five thousand hiker level is probably realistic given the various events being planned and organized for the Gold Rush Centennial.

Hiker use is concentrated along the CTNHS's narrow trail corridor and to the ten designated campgrounds within that corridor. These campgrounds have no designated campsites but past use has delineated many tent sites as evident through trampling, removal of ground vegetation and disturbance of historic resources. On peak use days, some campgrounds are filled beyond their physical capacity. The most notable of these is "Sheep Camp" on the U.S. side of the trail. Tent spacing on peak use days (40+ hikers per night) is reminiscent (on a small scale) to the gold rush era as hikers compete for tent space. When space is limited, hikers seek out new and previously undisturbed tent sites.

Chilkoot managers initiated a variety of management actions over the last four years, in response to their concerns regarding protection of the trail's resources and provision of quality visitor experiences. These actions included increasing the number of camp-sites, increasing site resiliency to resource impacts, educating hikers on wilderness travel and camping ethics, providing information on campground crowding, and requesting groups to voluntarily limit their size to 12. Campsites located on or near sensitive cultural resources were relocated to less sensitive, more resilient sites. Heavily impacted sites were closed and rehabilitated where possible. Managers are concerned that these visitor behavior and facility modifications will not accommodate the increase in hikers, particularly with the pending gold rush centennial celebrations. As a result, they are considering a use limit program for the Chilkoot Trail.

In 1992, CTNHS initiated a research project to determine the carrying capacity of the Chilkoot Trail. Once the short comings of the carrying capacity concept were discovered, the proposal was modified. CTNHS managers adopted the Limits of Acceptable Change (LAC) approach for addressing their resource protection and visitor experience concerns. LAC focusses on the management of conditions rather than the number of users. LAC manages the impacts of use, not necessarily use itself (Stankey and McCool 1984). The LAC process directs managers to identify and monitor the resource and social conditions defined as acceptable and appropriate under site specific management objectives. Corrective actions are undertaken if and when standards are exceeded or close to being exceeded. The type of corrective action depends on the nature of the impact standard exceeded and the activity causing the impact (Washburne 1982; Stankey and McCool 1984; Brown et al. 1987).

The LAC process shifts management attention away from the number of users toward management for desired social and ecological conditions (Stankey et al. 1985). It has four major components: i) specification of acceptable and achievable resource and social conditions, defined by a series of measurable parameters; ii) analysis of existing conditions and those judged acceptable; iii) identification of management actions judged best to achieve desired conditions; and iv) monitoring and evaluation of management program effectiveness (Stankey et al. 1985).

The LAC process can be used as a management tool to determine if use limits are necessary, and if they are, to determine an approximate use level capacity. When monitoring has shown that conditions have reached or are close to minimally acceptable standards and that previous management actions have been tried and failed, setting a use limit may be a manager's only remaining alternative. The area's numerical capacity would be near the current level of use occurring when standards were exceeded (Washburne 1982; Stankey et al. 1990). This capacity is once again a value judgement, but by using the LAC process an explicit justification for the set capacity is provided.

An LAC workshop was held in Whitehorse, Yukon in March 1993 to provide the Canadian and United States managers of the Chilkoot Trail an understanding of the LAC process. The workshop identified four areas for the modified research proposal to address:

1. identification of visitor motivations for hiking the Chilkoot trail;
2. identification of hiker attitudes towards existing visitation levels, group size limits, level of development, staff presence and various management techniques such as education, making the trail more difficult, campground development, law enforcement etc.;
3. identification of hiker attitudes towards developing a use limit program for the Chilkoot Trail; and
4. collection of hiker input to help with the identification of potential LAC indicators.

Addressing these areas will assist Chilkoot managers to carry out the LAC process, respond to concerns for protecting CTNHS's resources, and provide quality visitor experiences. This approach recognizes the variety of management techniques already planned and underway along the Chilkoot Trail. It also recognizes the fact that it will take one to two years to carry out the LAC process leaving little if any time to develop a use limit program before the Gold Rush Centennial celebrations begin in 1996. This approach also acknowledges park managers' experience and intuitive judgements that a use limit will ultimately be required on the trail, if only for the Gold Rush Centennial years 1996 through 1998.

Problem Statement

Use limitation strategies began in the late 1950's and continued into the 60's and early 70's when permits and/or advance reservations were required in order to visit several popular Forest Service and National Park Service wilderness areas (Utter 1979; Hennessy 1991). They started at a time when wilderness managers were developing ways to respond to the rapid growth of backcountry recreation. Restricting use was a management strategy aimed at protecting the quality of an area's recreational experiences and natural resource conditions (Shelby 1991).

Use limits are used at about 25 wildernesses in the United States (Watson and Niccolucci in prep). They are an essential part of a wilderness manager's repertoire of tools to protect and restore an area's recreational opportunities and resources (Brown et

al. 1987; Stankey and McCool 1991). Use limits are most effective in recreational settings confronted by rapidly increasing use as they prevent irreversible impacts and provide managers some "breathing room" to examine other less restrictive techniques (Stankey and McCool 1991). Limiting backcountry use at Great Smoky Mountains National Park succeeded in reducing crowding and physical impacts (Burde and Curran 1986).

Limiting use appears to be a valid management technique considering the Chilkoot Trail's rapidly increasing visitation levels. Utter (1979) however, cautions that the establishment of a use limit program can have far reaching consequences and raise management questions that are as difficult to deal with as, or perhaps more difficult, than the use limit itself. Some of these questions are introduced below.

Use limits are a potentially intrusive management technique that determine access to highly valued and unique recreational resources (McCool and Lime 1989). Restricting entry into wilderness areas is, in many ways, seen as an anathema. The very idea of wilderness recreation suggests freedom, spontaneity and lack of controls. Restricting that freedom through implementation of use limits "strikes at the very heart of what wilderness is all about" (Stankey and Schreyer 1987).

A 1986 visitor survey by the Canadian Park Service (1989) found that the majority (71 percent) of Chilkoot visitors were hiking the trail "to experience both the historic and

the wilderness/backcountry attributes of the trail." Do today's hikers have these same experience expectations? How important is freedom, spontaneity and unconfinement to Chilkoot hikers? What experiences do Chilkoot hikers desire today? Will these experiences play some role in hikers' support for limiting overnight use of CTNHS?

Research in a variety of recreational settings has consistently found that visitors will accept a use limit program. Their acceptance however, is generally contingent on a clearly defined need to protect wilderness resources and visitor experiences (Brown et al. 1987). CTNHS park managers perceive this need, but do Chilkoot hikers perceive it? Several authors have noted that park managers and visitors often see things differently (Hendee and Pyle 1971; Downing and Clark 1979; Martin et al. 1989). Do Chilkoot hikers see the resource impact and campground crowding problems along the trail the same way as Canadian and United States park managers? Will Chilkoot hikers support a use limit program to protect the resources and visitor experiences at CTNHS?

Previous research has indicated mixed support for limiting use at CTNHS. Womble et al. (1976) found divided opinion for limiting use of the Chilkoot Trail. Their research indicated that 37.4 percent of the hikers agreed and 38.4 percent disagreed that the number of hikers on the Trail should be limited at any given time. The Canadian Park Service (1986) found that support for limiting use had decreased to 29.6 percent, while opposition towards limiting use had increased to 48.6 percent despite the fact that

visitation had risen over 7 percent. Visitation statistics for 1993 reveal that overnight use of the Chilkoot Trail has doubled since 1976, and risen over 86 percent since 1986. Will visitors attitudes have changed as well? Will Chilkoot hikers now support limiting overnight use of the Chilkoot Trail?

This study will attempt to answer the many questions raised above. More specifically, it will address the following research question: ***are hikers' desired experiences and perceptions of setting conditions on the Chilkoot Trail such that they will support limiting overnight use of CTNHS?***

Objectives

The basic goal of this study is to provide Chilkoot managers an indication of the support they can expect for implementation of a use limitation program at CTNHS. The study objectives are:

1. identify the experience expectations (or psychological outcomes) of Chilkoot hikers;
2. determine visitor perceptions of impacts on the Chilkoot Trail;
3. determine if Chilkoot hikers see conditions on the trail the same way as Chilkoot managers and staff;
4. determine the support for a use limit program on the Chilkoot Trail;
5. determine how implementation of a use limit program would affect the quality of visitor's overall hiking experience; and

6. make recommendations regarding potential LAC indicators that will help explain the rationale for a use limit program.

Chapter 2

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Experience-Based Setting Management

"The basic purpose of outdoor recreation resource management is to provide opportunities for quality recreation experiences while protecting the users from harm and the resources from unacceptable change." (Driver and Rosenthal 1982) This statement closely parallels Park Canada's preservation with use mandate for CTNHS. Canadian and United States managers of the Chilkoot Trail foresee their development of a use limit program as enabling them to fulfil their mandate to protect the trail's natural and cultural resources while providing quality recreational experiences.

Driver and Rosenthal (1982) infer that preservation with use type mandates can be fulfilled through an approach known as experience-based setting management. In experience-based setting management, managers attempt to gain an understanding of the relationships between the valued psychological outcomes of a recreational activity and the types of settings that facilitate those outcomes (Manfredo et al. 1983). This information can help managers increase the probability that park users will realize their desired experiences by ensuring that the physical, social and managerial settings that help facilitate users desired outcomes are available. Experience-based setting management enhances a park manager's ability to specify management objectives and techniques that will protect an area's natural and cultural resources in a way that provides for quality recreational experiences.

Experience-based setting management evolved from research efforts to evaluate the benefits accruing to different types of recreationists from different types of activities and settings. These efforts were led by Bev Driver, a research scientist with the U.S. Forest Service. Driver wanted to know why people were participating in outdoor recreation, what satisfactions were being received and how the quality of recreational experiences could be enhanced. Beginning in the late 1960's, Driver and several of his associates began conducting research into why recreationists selected particular activities and environments. The goal of his research was to develop a data base that would allow strong inferences to be made about how particular leisure activities and settings benefited different types of recreationists (Driver et al. 1991).

Driver's research lead to a goal directed behavioral approach to outdoor recreation in which people participated in leisure activities to gratify needs not satisfied by their non-leisure activities (Driver 1976; Driver et al. 1991). Driver's research was heavily influenced by developments in psychology's expectancy valence theory (Manfredo et al. 1983; Manning 1985) and guided by the works of Lawler (1973) in industrial psychology (Driver et al. 1991). The expectancy theory suggests that people engage in activities in specific settings to realize a group of psychological outcomes that are known, expected, and valued (Manning 1985). Lawler (1973) proposed that one's motivations to engage in a behavior were a function of the expectation that one's efforts would lead to certain performances and the expectation that these same performances would lead to positively valued outcomes (Manfredo et al. 1983). He

indicated that some of the outcomes produced were ends in themselves, while others might be intermediate in achieving other outcomes. Lawler also suggested that the attractiveness of an outcome was determined by the extent to which it satisfies a human need, with needs being defined as those outcomes people seek as ends (Driver et al. 1991). For example, a person might feel the need to go running. Running can result in the outcome of exercise but this exercise can also lead to other outcomes such as better health, self-esteem and improved work productivity.

In adapting the expectancy valance conceptual framework to recreation, Driver and his associates proposed that the motivation to engage in a given recreation opportunity was a function of the expectation that one's efforts to recreate would lead to performance (participation in certain activities in a specific setting) and that the performance would lead to desired experiences (Manfredo et al. 1983). In Driver's model, activities are recreational behaviors such as hiking, wildlife-watching and fishing. Settings are the places where the recreational activities take place. Settings are made up of three components; the managerial, social and physical settings. The managerial setting is comprised of movable structures, on-site presence of management personnel, educational and informational services, rules and regulations and the managerial use of equipment, e.g. chainsaws, boats, helicopters etc. The social setting is comprised of users and their behaviors, equipment and pets. The physical setting is made up by the area's biophysical and cultural resources and the relatively permanent man made structures such as roads and operational facilities (Driver et al. 1987). Experiences

are defined as a package of specific psychological outcomes (e.g. observe scenic beauty, experience solitude) both desired and expected from recreational engagement (Manfredo et al. 1983). Because these experiences are expected, they are also called experience expectations. Finally, psychological outcomes are viewed as being synonymous with desired satisfactions (Driver and Brown 1978; Driver and Rosenthal 1982).

Driver and Brown (1978) use a four level demand hierarchy to illustrate this behavioral approach to recreation. Their model helps demonstrate the theoretical relationships between the activities people seek, the setting where activities take place and the outcomes/benefits resulting from recreation. Driver and Brown separate recreation into four associated components defined in terms of the specific types of recreational opportunities demanded. The four demand levels are 1) activities, 2) settings, 3) outcomes and 4) benefits (Clark and Stankey 1979). The demand levels are hierarchical because it becomes harder to define or measure the demand as you move from the first level to the last. *Activities* cover the spectrum of recreational events and include everything from auto sightseeing to wilderness backcountry hiking. *Settings* are characterized by their physical, social and managerial components as described above. These three setting components collectively comprise the preferred environmental setting for a specific level 1 activity i.e., hiking. *Outcomes* are the specific highly valued psychological outcomes desired and expected from an activity and it's associated preferred environmental setting. Driver and Brown call the "bundle" of most highly valued or preferred outcomes the overall "experience opportunity." *Benefits* flow from

satisfying recreational experiences and are defined "as the enhanced (or improved) subsequent performance or effective functioning realized after having participated" (Driver and Brown 1978). *Benefits* are the most difficult to measure and generally accrue off site i.e. enhanced family solidarity, enhanced work performance etc.

Experience-based setting management is founded on the notion that people recreate to engage in certain activities in specific settings to achieve desired and expected experiences (or psychological outcomes). It assumes an inherent relationship between recreationists and the activities, settings and experience outcomes they are seeking. Managers are concerned with activities and the conditions of the recreational setting, but their interest in these is to facilitate the desired experiences people are seeking. The Recreation Opportunity Spectrum (ROS) and LAC processes used throughout North America are based on the concept of experienced-based setting management (Driver et al. 1987; McCool and Lime 1988).

Driver's 1977 Recreation Experience Preference (REP) scales are the driving force behind experience-based setting management. Forty-three (43) scales are used to identify and measure the importance of the various experiences (or psychological outcomes) desired and expected from leisure activities. These scales are empirically grouped in 19 more general REP "domains" such as escape, independence and enjoying nature (Driver et al. 1991). Each domain generally consists of one or more scales. Each scale measures a sub-dimension of a particular domain and is closely

associated with other scales comprising the same domain. Driver's scales were developed and refined through dozens of empirical studies, generating in excess of 20,000 questionnaires (Manning 1985). They are used extensively in recreation research today. Testing of the REP scales has confirmed their validity and reliability (Rosenthal et al. 1982; Driver et al. 1991).

Limitations of Experience-Based Setting Management

Considerable research has gone into the development of experience-based setting management (Driver and Brown 1978; McCool and Lime 1988). Limited support for this concept was found in Manfredo et al.'s 1983 study of the concepts inherent in experience-based setting management. The results of this study suggested that wilderness recreationists could be segmented into experience groups and that these groups would differ on the activities and attributes of the settings they preferred. However, the authors cautioned that they found only limited support for the experience-based setting management model and that further research was needed. Other authors (Driver et al. 1987; McCool and Lime 1988; Virden and Knopf 1989) have also identified limited support for the relationships between activities, experiences and settings, and recommend further study and refinement as well.

Experience-based setting management is a very reductionistic model. It assumes people participate in outdoor recreation simply because they are seeking the activities, settings and experiences it offers. The model does not consider the role or influences

that other people may have had in an individual's recreation participation (as per Fishbein and Ajzen's theory of planned behavior: Fishbein and Ajzen 1975; Ajzen and Fishbein 1980; Ajzen 1985). Experienced-based setting management also assumes a rational choice process among people in their selection of activities and settings, or in their identification and evaluation of motivational factors for recreation participation (Driver et al. 1987). Schreyer et al. (1985), suggest the REP scales used to measure the importance of psychological outcomes may not be an accurate predictor of recreational behavior. This is because "relative" importance is not accounted for i.e. the scales do not allow for a direct connection to be made to the particular setting in question where upon a REP scale such as "solitude" could be just as easily achieved in a city park as on the Chilkoot Trail. Kuentzel (1989) presents a similar argument suggesting Driver's REP scales are too general to be of much use. Kuentzel argues that while REP scales can indicate differences in value and preference, these differences are not exclusive and "do not extricate substantial differences between experiences encountered at different settings and among different activities" i.e. while challenge can be associated with climbing in Alaska, it may be equally challenging to spend the night out in a canvas family tent for the first time. Kuentzel also has difficulty with the conceptual generality of Driver's model that makes no distinction between experience preferences as an expectation, a benefit, a satisfaction, or an experience.

Given these limitations, it is important to realize that the experience-based setting management model is probablistic rather than deterministic. It was not meant to

predict that certain combinations of settings and activities would guarantee that visitors would achieve their desired outcomes. Experience-based setting management is simply meant to enhance the probability that visitors would realize their desired outcomes. Therefore, relationships between activities, settings and experiences are viewed probabilistically (Driver et al. 1991).

Application of Experience-Based Setting Management

Understanding the relationship between psychological outcomes, activities and settings is a fundamental aspect of recreation management because managers cannot provide a visitor's experience directly. Managers can and do however, manipulate an area's physical, social and managerial settings. The setting is where recreationists come, where they carry out their activities, where they impact the natural/cultural resources, and where in association with their activity, they derive their experience (Schreyer et al. 1985). The setting is the interface between the psychological outcomes visitors seek, the activities performed and the experiences derived from those outcomes and activities. The setting is therefore a key component with respect to recreation management.

Clark and Stankey (1986) define setting attributes as the characteristics or qualities of a site that can either be positive or negative depending on one's point of view. Setting attributes play an important role in a person's decision to participate in a particular recreational setting as they can facilitate or hinder the fulfillment of a recreationist's

desired experiences (Stankey and Schreyer 1987). Setting attributes have been found to either enhance or detract from a visitor's experience (Merigliano 1989) and can be used to indicate the quality of the recreational experience (McCool 1983).

Recognizing the physical, social, and managerial setting components as described earlier, Clark and Stankey (1986) characterize setting attributes as facilitating or constraining. Facilitating attributes such as scenery, activity opportunities (i.e. hiking, fishing etc.), facilities and trails, allow or attract use and increase visitor satisfaction. Constraining attributes make recreational settings difficult to use or undesirable and unlikely to meet visitors' desired recreational experiences. Litter, resource damage, visitor regulation and crowds are examples of constraining attributes. It should be noted that facilitating and constraining setting attributes are not necessarily mutually exclusive. For example, a constraining attribute such as regulation, can provide for fewer encounters per day which in turn can facilitate a visitor's desired solitude experience.

The concept of saliency plays an important role in Clark and Stankey's setting attribute model. Stankey and McCool (1984), define saliency as the importance of a given outcome or setting attribute in the recreational engagement. If outcome importance is high, a close correlation between the extent the outcome is satisfied or achieved and the actual setting conditions that facilitate its realization would be expected (Stankey and Schreyer 1987). For example, if setting conditions are acceptable, desired experi-

ences are achieved. Conversely, if setting conditions are unacceptable, desired experiences are not achieved. If outcome importance is low, there should be a weaker relationship between attribute conditions and the extent desired experiences are achieved.

In experience-based setting management, managers manipulate the setting in a way that protects resources and enhances the probability that recreationists achieve their desired recreational experiences. Whether visitors achieve their desired recreational experiences will depend in large part on how managers manipulate the recreational setting and whether these actions produce a setting that enhances or constrains the desired recreational outcomes. In a study of visitors to Glacier National Park during the annual bald eagle migration, Frost (1985) found that visitors who desired to interact with the natural setting (one of Driver's REP scales) were more likely to perceive park management regimentation as "goal facilitation," and thus were more likely to feel restrictions were necessary and an enhancement to their experience. In this case the setting was manipulated through restrictions on visitor behavior. These restrictions protected the eagles and enhanced the visitor's recreational experience.

Application of a use limit program at CTNHS represents manipulation of the managerial setting to protect visitor experiences and attributes of the park's physical and social settings. Whether a use limit program will provide for desired recreational experiences will depend in large part on if visitors see this program as enhancing or detracting

from their experience. The concepts and findings above suggest that if a use limit program adds to a hiker's experience, it will be supported. Conversely, if the use limit program detracts from a hiker's experience it will not be supported. It is therefore hypothesized that a positive correlation will exist between support for limiting overnight use of CTNHS and hikers' perceived affect of a use limit program on their experience. It is also proposed that hikers' desired experiences will play some role in determining their support for limiting overnight use of CTNHS.

Types of Management Techniques

Managers have a variety of techniques they can use to manipulate the recreational setting to protect resources and provide quality recreational experiences. These tools are generally described as direct and indirect management actions based on the degree to which visitor behavior and freedom is modified (Peterson and Lime 1979; Brown et al. 1987; Lucas 1990; McCool and Christensen 1993). Indirect management techniques emphasize modification of human behavior and park facilities so that individuals are allowed to retain freedom and control of their actions. Educating users about low impact techniques, building more campsites, and making backcountry travel more difficult are examples of indirect management techniques. Direct management techniques emphasize the regulation of human behavior. Managers maintain a high level of control in direct management, such that an individual's freedom of choice is restricted (Lucas 1990). Use limits, limiting groups size, or restricting certain types of activities (i.e. campfires) are examples of direct management actions.

Support for Direct Management Techniques

Indirect techniques are generally preferred over direct management techniques by researchers and visitors alike as they help maintain a visitor's freedom and spontaneity (Lucas 1983; Wuerthner 1985; McCool and Lime 1989; Lucas 1990). There are times however, when more direct regulatory controls are both needed and accepted. Lucas (1990) suggests direct management techniques be used when indirect techniques have failed to meet management objectives. He also proposes that regulations may be necessary if they avoid Harden's (1968) "tragedy of the commons" - the loss to all caused by the natural tendency to overuse a resource owned by all. Harden (1968) proposes that the infringement of a minorities' freedoms may be necessary and acceptable if this ensures freedom for the majority. Lucas (1983) supports Harden's notion when he states "eliminating some freedoms can create other perhaps more valuable freedoms" or positive benefits such as resource protection, removal of undesirable behaviors etc. Parks Canada's 1990 policy is also based on this notion i.e. "protect . . . for the benefit . . . of this and future generations." The positive benefits of regulation serve to enhance at least some visitors' recreational experiences.

Anderson and Manfredo (1986) found that direct management actions were preferred when overuse was a problem. Frost and McCool (1988) found that visitors to Glacier National Park during the annual bald eagle migration accepted a variety of restrictions as the benefits and rationale for the restrictions were readily apparent. The restrictions protected eagles, minimized disturbance and controlled abusive visitor behavior.

Shindler and Shelby (1993) found general user support for direct regulation of users (i.e. limiting use, limit group size, site closures etc.) at three Oregon wilderness areas with substantially impacted sites.

Support for Use Limit Programs

When dealing specifically with use limit programs, research has consistently shown that visitors will accept a use limit program if there is a clearly defined need to protect the wilderness resource or experience (Brown et al. 1987). In a study of use rationing at the San Gorgonio and San Jacinto wildernesses, Stankey (1979) found that 82 percent of the respondents felt rationing was needed due to crowding and resource damage. Lucas (1980), found strong support for limiting use in nine wilderness and other roadless areas when an area is used beyond its capacity. He found that 90 percent of the Desolation Wilderness users and about 75 percent of the other study participants indicated rationing use was desirable. A 1990 study of visitors to the Desolation Wilderness revealed that 95 percent of the campers with permits felt restricting visitor numbers was desirable if an area is used beyond capacity (Watson 1993). A recent study by Watson and Niccolucci (in prep) investigated visitor support for use restrictions at three Oregon wildernesses. They found that support for limiting use was best predicted by crowding measures for day users and a combination of crowding and physical environment impact for overnight users.

The previously cited research suggests that acceptance of direct management techniques is contingent on whether social or environmental impact problems are evident, or if a clear benefit or rationale accompanies the restriction. These findings are supported elsewhere in the literature by Lucas (1983), Brown et al. (1987), Stankey and Schreyer (1987), McCool and Lime (1988), and Lucas (1990). The implications of this with respect to CTNHS is that visitors to the trail will likely accept a use limit program if they see it being necessary to protect the trail's natural/cultural resources or visitor experiences. These findings lead to the hypothesis that a positive correlation will exist between hikers' perceptions of impact problems and their support for the proposed use limit program. It is also proposed that hikers' perceptions of impact problems will be useful in predicting support for limiting overnight use of CTNHS.

Perceptions of Impact and Benefits

Chilkoot managers perceive impact problems on the trail and foresee the benefits of carrying out a use limit program. It remains to be seen if Chilkoot hikers perceive these same impacts and benefits. Research has consistently shown that managers and visitors see things differently (Hendee and Pyle 1971; Downing and Clark 1979; Martin et al. 1989; Shindler and Shelby 1993). Marion and Lime (1986) credit resource managers with greater sensitivity, broader awareness and more responsibility for ecological impacts than visitors because of their formal training and extensive experience.

Studies by Hendee and Pyle (1971) and Shelby et al. (1988) indicate user indifference to impacts at campsites. Hammit and Cole (1987) suggest most recreationists do not even recognize ecological impacts. Downing and Clark (1979) found that managers consistently rated their perceptions or recreational impacts as more serious than visitors did. Using artistic representations of campsite impacts, Martin et al. (1989) found that managers were more sensitive to the presence of bare ground than visitors and that visitors found tree damage and fire rings more objectionable than managers. Similarly, but using site inspections and actual photographs, Shelby et al. (1988) found that while managers were less likely than visitors to prefer a site with an established area of bare ground, they were more likely to find fire rings more acceptable than visitors. These findings lead to the hypothesis that managers and visitors will differ in their perceptions of impact problems at CTNHS.

On an individual level, recreationists respond to and evaluate setting attribute impacts differently. Martin (1987) suggests that hikers' personal norms and attribute saliency contribute to the differences in impact perceptions. Personal norms are influenced by visitor characteristics such as motivations for recreating, past experience, age, sex, and place of residence. In terms of saliency, if an attribute is not important, a person is less likely to perceive it at all, or will perceive it in a limited or perceptually distorted manner (Martin 1987). This later point was illustrated by Lucas in unpublished data from a study of visitors to the Bob Marshall Wilderness Area. Lucas found that visitors who valued solitude highly were more likely to report they met "too many"

people, than visitors who placed low importance on solitude (Stankey and McCool 1984). These insights suggest that hikers' perceptions of impact problems at CTNHS will be influenced by personal visitor characteristics and attribute saliency (as indicated by desired experiences). It is therefor hypothesized that i) the perception of impact problems will be related to visitor characteristics, and ii) the perception of impact problems will be positively correlated with hikers' desired experiences.

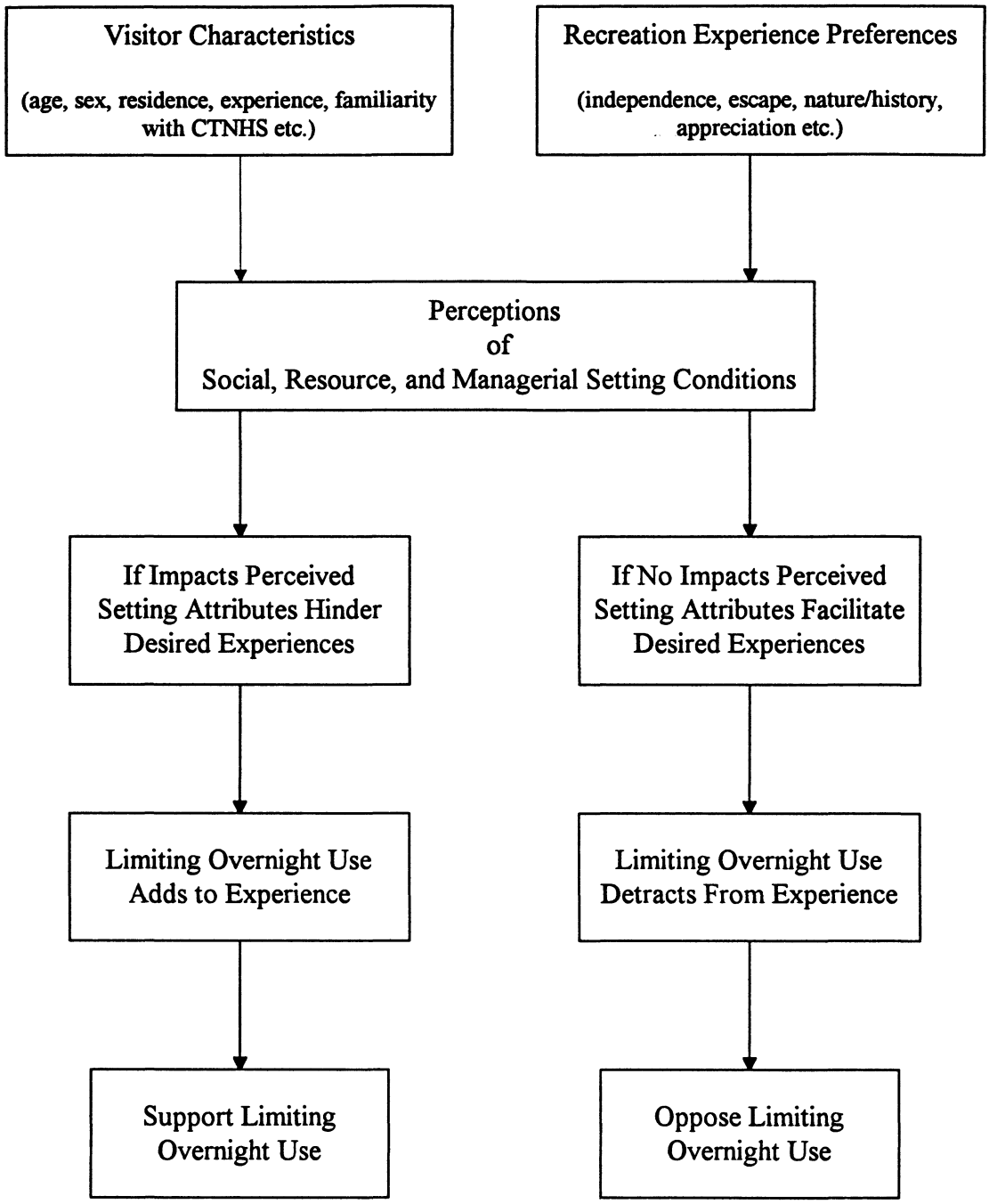
If hikers display an indifference to impact problems along the Chilkoot Trail, limiting overnight use of CTNHS will likely be seen as an undesirable management action that detracts from recreational experiences. If so, it will be necessary for managers to implement an information and education program to explain the rational for limiting overnight use of CTNHS. Use of information and education to explain management rationale is advocated throughout the literature on recreation management (Stankey 1979; Lucas 1983; Brown et al. 1987; Stankey and Schreyer 1987; McCool and Lime 1988; and Lucas 1990).

Proposed Conceptual Framework

The following model (Figure 1) has been developed as the conceptual framework for this study. It recognizes three major points brought out in the literature review:

1. People recreate to engage in certain activities in specific settings to achieve desired experiences (or psychological outcomes).

Figure 1. Proposed Conceptual Framework



2. Setting attributes can facilitate or hinder the fulfillment of a recreationist's desired recreational experiences.
3. Most visitors will accept a use limit program if there is a clearly defined need to protect the wilderness resources or experience.

The proposed model also recognizes the role that visitor characteristics play in the recreation process as per previous models of recreation behavior by Driver 1976; Frost 1985; and Driver et al. 1991.

The conceptual framework illustrates anticipated relationships between visitor characteristics, desired experiences, setting conditions, the affect of, and support for a use limit program at CTNHS[1]. The model begins with the realization that Chilkoot hikers will differ in terms of their visitor characteristics (i.e. social-demographic characteristics, hiking experience, and familiarity with CTNHS) and recreation experience preferences. During their trip, hikers will encounter various attributes of the trail's managerial, resource and social setting. These attributes will either enhance or detract from hikers' experiences depending on their visitor characteristics, desired experiences and perceptions of impact problems in the various settings. These relationships in turn, influence whether hikers see the proposed use limit program as adding to or detracting from their experience. If limiting overnight use of CTNHS is perceived as adding to a hiker's experience, it is anticipated that support for this action will result.

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[1]The activity of hiking is constant for all visitors travelling the Chilkoot Trail.

If limiting overnight use of CTNHS is seen as detracting from a hiker's experience it is anticipated that this action will be opposed.

The following examples help illustrate the proposed model (Figure 1). Assume some Chilkoot visitors are hiking the trail to observe historic features and artifacts in a natural outdoor setting as indicated by the 1986 visitor survey. These hikers are experienced local hikers who have hiked the trail several times over the last ten years. They would likely put importance on items in Driver's nature - history type REP domains. Their experiences would be negatively affected if they found historic features, artifacts, or the natural setting impacted or damaged. These people would be expected to see limiting overnight use of CTNHS as adding to their experience since it would provide protection to the resources they were coming to see. Correspondingly, these hikers should support limiting overnight use of CTNHS as it would enhance their desired experience.

Similarly, if visitors were hiking the trail to experience solitude, they would be expected to place higher importance on the escape REP domain. If these hikers encountered too many people along the trail they would be expected to support limiting overnight use of the CTNHS as this would restore the social setting conditions to levels where their experience is enhanced. These two scenarios reflect the left-hand side of the conceptual model.

The two preceding examples assume that hikers will detect impact problems along the trail much as Chilkoot managers have. However, the literature suggests that Chilkoot hikers will perceive things differently than the managers of the trail. If hikers do not perceive impact problems on the trail, it is unlikely they will see the need for, or support limiting overnight use of the CTNHS. This situation is reflected by the right-hand side of the conceptual model. This scenario would probably be best displayed by visitors who have experience expectations for independence. If these hikers do not perceive impacts to the trail's resource or social settings, they would be expected to oppose limiting overnight use of CTNHS since it would detract from the achievement of their desired experiences.

The proposed conceptual model has one exception that may occur with hikers who place high importance in the REP independence domain. If this group of hikers perceives problems with the managerial setting (i.e., too many rules and regulations, staff and facilities etc.) they would be expected to see limiting overnight use of the trail as making the existing situation worse. In this case, limiting overnight use would detract, rather than add to experiences as the model suggests.

Research Hypotheses

The following hypotheses are derived from the preceding literature review and the proposed conceptual framework. Hypothesis one states that park managers and staff will perceive impacts differently than visitors to CTNHS (reference page 19).

Hypothesis two suggests that the perception of impact problems on the trail will be dependent on hikers' visitor characteristics (reference page 19). Hypotheses three proposes that the perception of impact problems on the trail will be positively correlated with hikers' desired experiences (reference page 19). Hypothesis four states that support for limiting overnight use of CTNHS will be positively correlated to hikers' perceptions of impact problems along the Chilkoot Trail (reference page 18). Hypothesis five recognizes the proposed relationship between hiker support for a use limit program and the affect of such a management action on hikers experiences. It proposes that hiker support for limiting overnight use of CTNHS will be positively correlated with their perception of the affect this program (reference page 16). Hypothesis six builds on hypotheses two through five. It hypothesizes that hiker support for limiting overnight use of CTNHS will be a function of visitor characteristics, desired experiences, perceptions of impact problems and the perceived affect of a use limit program. Hypothesis six essentially tests the proposed conceptual framework.

Hypothesis One: Chilkoot hikers perceive impact problems on the trail differently than managers and staff.

Hypothesis Two: The perception of impact problems on the trail will be related to hikers' visitor characteristics (i.e. age, sex, hiking experience, place of residence, familiarity with CTNHS etc).

Hypothesis Three: Hikers' perceptions of impact problems at CTNHS are positively correlated with their desired experiences.

Hypothesis Four: Hikers' support for limiting overnight use of CTNHS is positively correlated with their perception of impact problems along the Chilkoot Trail.

Hypothesis Five: A positive correlation exists between hikers' support for limiting overnight use of CTNHS and their perceived affect of a use limit program on their experience.

Hypothesis Six: Hiker support for limiting overnight use of CTNHS is a function of visitor characteristics, desired experiences, perception of impact problems and the perceived affect of a use limit program on hikers' experience.

Chapter 3

METHODS

Population

The population for this study consists of those visitors to CTNHS, 16 years and older, hiking Chilkoot Trail between July 1 and August 17, 1993. Parks Canada visitation records reported 1,890 hikers walked the trail during this time.

Sampling Procedures

The sampling objective was to survey a sample of Chilkoot hikers representative of the above population. A systematic random sampling approach was used to obtain a representative sample of the Chilkoot hiker population. Hikers were surveyed along the trail at the Bare Loon Lake campground. This site was selected because of its strategic location four miles from the north end of the trail. Traditionally, over 90 percent of the visitors to CTNHS hike the trail from south to north enabling most hikers to be surveyed just prior to completion of their trip. Regardless of trip direction, almost all visitors hiking the trail must pass through the Bare Loon campground (the exception being those flown or boated out for medical reasons).

Sampling took place during four day blocks; Thursday through Sunday alternating with Saturday through Tuesday. Sampling days was divided into three four-hour blocks: 8 AM to 12 PM; 12 PM to 4 PM; and 4 PM to 8 PM. One four-hour block was sampled each day. The initial four-day and four-hour sampling blocks were

selected using a random number table. After the first sampling cycle: July 2 to 11, 1993; the sampling day was divided into two six hours blocks: 8 AM to 2 PM and 2 PM to 8 PM. This divided the slow 12 PM to 4 PM time slot between the two other busier periods. This was done to ensure the desired sample size of 500 participant was reached. A copy of the sampling schedule can be found in Appendix A.

During each sample period, hikers were approached as they entered Bare Loon Lake campground. They were informed of the survey's purpose and asked to participate. Visitors who agreed to participate, were asked to fill out a questionnaire on site. Survey registration forms (Appendix B) were filled out for each group participating in the study. These forms recorded the date, individual names and addresses of party members, party size, sex of each member and questionnaire number.

Participants who did not have the time to complete the questionnaire on site, or who were hiking the trail from north to south, were given a survey packet consisting of a questionnaire, pencil and postage paid return envelope. A modified Dillman (1978) procedure was utilized with these participants. They were asked to fill out the questionnaire and to drop it in the mail as soon as possible after their trip. The questionnaire identification number corresponding to an individual name and address on the visitor registration form enabled the mailing of a reminder postcard (Appendix C). This postcard requested hikers to return their completed questionnaires. The reminder postcards were mailed from one to two weeks after the questionnaire was

initially distributed, when the study coordinator finished the ten day sampling shift and had returned to Whitehorse. Approximately two to four weeks after the reminder postcard was sent, a replacement questionnaire and covering letter (Appendix D) was sent to those participants who had not yet responded. An additional (second) replacement questionnaire and covering letter was sent approximately two to fours weeks after the first replacement package if necessary.

The goal of the sampling plan was to achieve a sample size of approximately 500 participants and a response rate of 80 percent to provide survey results that were accurate to within 5 percent at the 95 percent level of confidence.

All Canadian and United States managers of CTNHS and staff of the trail were asked to complete the section of the questionnaire dealing with perceptions of setting conditions (Question 12).

Research Instrument

A self-response 35 question questionnaire (Appendix E) was utilized to conduct the CTNHS visitor survey. The questionnaire was designed to solicit visitor information concerning eight general areas of interest:

1. social-demographics (age, sex, origin etc.)
2. trip characteristics (trip length, places camped etc.)
3. desired experiences

4. trip satisfaction and dissatisfaction
5. perceptions of natural/cultural resource, social and managerial conditions
6. experienced, expected and preferred levels of group contact
7. support for various management techniques used to protect resources and visitor experiences
8. affect of and support for implementation of a use limit program for CTNHS
9. preferences for proposed use limit program

Research Variables

The visitor characteristics utilized in this study included age, sex, education, place of residence, familiarity with CTNHS, and hiking experience. Education was divided into two categories: university/college graduates and non university/college graduates. Two measures of residency were utilized in this study: i) Regional residents (Yukoners and Alaskans) or non-regional visitors and ii) geographical groupings i.e. North American (Canadian and U.S.A. residents), European, and Pacific residents (Japan, Australia and New Zealand). Familiarity with the CTNHS was measured in two ways: the number of nights spent on trail (Question 3), and the number of times the trail had been hiked (Question 7).

Hiking experience was determined by asking hikers if they had hiked further than 33 miles on any one trip (question 33); and if they had been on longer hikes in terms of days out on trail (question 34). Experienced hikers were classified as those people

who had been on previous hiking trips longer in length and duration (number of days) than their present trip on the Chilkoot Trail. Novice hikers included those people who had not previously been on hiking trips longer in length or duration than their present trip on the Chilkoot Trail. Intermediate experience level hikers were those participants who had been on trips longer in length or longer in duration (but not both) than their present Chilkoot Trail hike.

Driver's 1977 REP scales were used to determine visitors' desired experience expectations for hiking the Chilkoot Trail. Hikers were asked to indicate the importance of each of the 26 scale items selected for this study (Question 11). Importance was measured on a four point interval scale ranging from "not at all important" at one end to "very important" at the other. REP scales thought to be of most importance to this study (i.e. observe historic features and artifacts) were represented two or three times. The scales used were representative of 11 of Driver's 19 recreation experience preference domains i.e. independence, nature appreciation, escape, achievement etc. The 26 scale items were subjected to principal-component analysis (PCA[1]) with iteration and varimax orthogonal rotation to determine the desired experience domains of Chilkoot hikers. This procedure resulted in the seven REP domains which were used as independent desired experience research variables.

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[1]PCA will be discussed in more detail in the data coding and analysis section to follow.

Hikers' perceptions of impact problems was determined by asking visitors to indicate how much of a problem they found each of 20 setting condition indicators to be during their trip to CTNHS (Question 12). Impact problem level was measured using a 5 point interval scale ranging from "not a problem" at one end to "very serious problem" at the other. Indicators of setting conditions were selected from lists of potential LAC indicators found in Lime (1991), Watson and Cole (1992) and Roggenbuck et al. (1993). Indicators were selected to represent conditions in CTNHS's resource, social and managerial settings. Similar to above, the 20 indicators were subjected to principal-component analysis with iteration and orthogonal rotation to determine the underlying dimensions for the various impact indicators. This procedure produced four underlying impact dimensions, of which three were used as both dependent and independent research variables.

Question 25 assessed hikers' support for implementation of a use limit program. Support was inferred by asking hikers how much they agreed or disagreed with a series of statements. A measure of conditional support was obtained by asking hikers if they "would support a (use limit) permit system that protects the site's natural and cultural resources, and visitor experiences, even if it means being denied a permit." Separate statements asked if hikers thought "overnight use of CTNHS should be limited now" and whether "overnight use of CTNHS should be limited during the Gold Rush Centennial." A five point Likert scale was utilized to assess support for limiting

use. Support for limiting overnight use of CTNHS now was the primary dependent research variable utilized in this study.

Affect of a use limit program was measured by asking hikers "how would implementation of a use limit program at CTNHS affect the quality of your hiking experience" (Question 27). A five point semantic differential scale (Babbie 1991) was utilized to measure this variable. The scale ranged from "strongly add to experience" at one end, to "strongly detract from experience" at the other, with "neither add or detract from experience" in the center. Affect was utilized as an independent research variable.

Data Coding and Analysis

Returned questionnaires were coded and entered into a Lotus 123 database on a pc-compatible microcomputer. The database was subsequently transferred into SPSS/PC+ Advanced Statistics 5.0 program for windows (Norusis/SPSS Inc. 1988) for analysis. Analysis was conducted at the individual hiker level. Frequency tables, Spearman's and Kendall's tau correlations, principle-component analysis, independent sample t-tests, Wilcoxon and Kruskal-Wallis tests of independent mean ranks and multiple regression were used as data analysis procedures. Specific hypothesis testing techniques will be discussed in the results section to follow. A significance level of .05 was utilized as the cut off point for determining statistical significance.

PCA was utilized to determine the experience expectation and perception of setting condition impact variables used in this study. PCA is a method of transforming a large set of variables (i.e. the 26 Driver REP items) into a new smaller set of composite variables (or principal components) that are orthogonal (uncorrelated) to each other (Nie et al. 1975). It accomplishes this by identifying groups of items that co-vary with one another and appear to define meaningful underlying latent variables (Devellis 1991). PCA condenses the original variable list in a manner that enables the variation within the original list of variables to be accounted for by the new set of composite variables. The new composite variable or factor, can be thought of as an underlying construct or label that characterizes responses to related groups of variables (Norusis 1992). In PCA, no assumptions about the underlying structure (i.e. normality) of the variables is required (Nie et al. 1975). Principal component factoring with iteration was selected because this is a widely accepted factoring method and is recommended for researchers with limited experience with factor analysis (Nie et al. 1975).

PCA consists of four steps: (1) preparation of a correlation matrix, (2) factor extraction, and (3) factor rotation to a terminal solution, and (4) calculation of factor scores (Norusis 1992). The correlation matrix is used for factor extraction. Principal component analysis with iteration makes use of the inferred factor factoring technique. It replaces the main diagonal elements in the correlation matrix with communality estimates (i.e. the r^2 estimates). Factor extraction is based on this reduced correlation matrix. The inferred factor technique assumes that variance within a variable consists

of common and unique variance. Common variance is the variance the variable shares with all the other variables in the matrix. Unique variance is the variance component that is not common (i.e. uncorrelated) to the other variables. The process of iteration is used to ensure that the factors removed are based on this notion of common variance (Nie et al. 1975).

Factor extraction is the process of identifying the hypothetical latent variables (factors or principal components) that mathematically account for the patterns of variation in the data set. Factors are mathematically derived linear combinations of the original variables. They are produced sequentially, such that the first factor consists of the particular combination of variables that accounts for more of the variance in the data as a whole than any subsequently produced linear combination of variables. The second factor extracted is orthogonal to the first and represents the second best linear combination variables and accounts for the most residual variance following the removal of the first factor. This process continues until all the of variance in the data have been accounted for (Nie et al. 1975; Devellis 1991).

The number of factors to be extracted is based on Kaiser's eigenvalues greater than one rule (Nunnally 1978). Eigenvalues represent the variance accounted for by an individual PCA factor. Eigenvalues are calculated by adding the squares of the factor loadings[1] for each variable in the factor. Kaiser's rule is based on the notion of

[1]Factor loadings can be interpreted as the correlation of the variables with each factor.

retaining only factors that explain more variance than the average amount explained by one of the original variables. Since the original variables are normalized in PCA, their individual variance is equal to one. Therefor, for any consolidation of the original data set to occur, the worst PCA factor must have an eigenvalue greater than one (Nie et al. 1975; Devellis 1991).

The third step of PCA is factor rotation. Rotation transforms the initial factor matrix into one that is easier to interpret (Norusis 1992). Its goal is to find a set of factors that provides the clearest conceptual picture of the relationships among the variables by approximating simple structure (Devellis 1991). Simple structure is said to be achieved when, for each factor, the factor loadings for most variables are near zero and the remaining factor loadings are relatively large. When simple structure occurs, the factor is conceived as describing the variation shared in common by the subset of variables highly related (loaded) to it and not describing the variation in other variables (Kleinbaum et al. 1987). With simple structure, a subset of the original variables would be exclusively associated with Factor one, another subset would be exclusively with Factor two, and so on according to the number of factors extracted (Devellis 1991).

In this study, varimax orthogonal rotation was used to approximate the simple structure achieved during PCA. In orthogonal rotation the factor axes are rotated perpendicularly. This produces factors that are statistically uncorrelated or indepen-

dent. The varimax method of orthogonal rotation is the most widely used. This computer algorithm centers on simplifying the columns of the factor matrix by maximizing the variance of the squared loadings in each column (Nie et al. 1975, Kleinbaum et al. 1987; Devellis 1991).

Following PCA, the variables that comprise each factor were reviewed. By referring to their content, one can discern the nature of the latent variable that each factor represents (Devellis 1991). Factors are named according to this underlying context. Subsequently, Chronbach alpha reliability coefficients are computed for each of the factor scales. The coefficients depict the reliability with which each scale measures the factor's underlying latent dimension. Alpha is an indication of the proportion of the variance in the factor scale that is attributable to the true score (Devellis 1991).

Devellis (1991) suggests the following comfort ranges for research scales: below .60 unacceptable; between .60 and .65, undesirable; between .65 and .70, minimally acceptable[1]; between .70 and .80, respectable; between .80 and .90, very good; much above .90, and one should consider shortening scale. On occasion, it is necessary to remove an item from the factor scale in order to improve the scale's reliability. Once the researchers are satisfied with the factor's reliability rating, they proceed to the last step of PCA where new factor variables are created by computing an overall factor score. Several methods exist to determine factor scores (Nie et al. 1975; Gorsuch

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[1]Nunnally (1978) suggests a value of .70 as a lower acceptable bound for alpha.

1983; Norusis 1992). In this study a subjectively derived factor score (Watson and Niccolucci 1992) was utilized. Factor scores were calculated by totaling the sum of the reported values for each item in a principal component factor and then dividing this sum by the number of items comprising each factor. This procedure resulted in a factor score comparable to the original variable item scale with the exception that the new scale was continuous.

Chapter 4

VISITOR AND TRIP CHARACTERISTICS

Sample Response

Sampling procedures resulted in 503 visitors participating in this study with an overall response rate of 95.0 percent (478 completed surveys). The majority of the surveys (410) were completed and returned on site. This high rate of on site response was attributed to the survey location being at a site were most hikers stopped for a rest or to camp overnight. Only 92 of the survey participants took the surveys with them. Mail back procedures produced a mail response rate of 73.9 percent with this group. Since the overall response rate exceeded 80%, no check for potential non-response bias was conducted.

Surveys were completed by 15 Canadian and United States park managers and staff. These people consisted of five park wardens/rangers, two archaeologists, four park managers (Superintendent, Chief Park Warden, Chief Park Ranger, Project Manager) and four trail crew maintenance persons.

Visitor Characteristics

Chilkoot hikers ranged in age from 16 (the minimum age threshold) to 68, with a mean age of 33.8 years old. Males comprised 58.2 percent of the hikers, while females made up 41.8 percent. Table 1 illustrates that Chilkoot hikers are well educated with more than 50 percent having university/college or post graduate degrees.

This was reflected in the large proportion (37.8 percent) of survey respondents having professional or technical occupations. Students (21.8 percent), craft persons (7.6 percent), service workers (7.1 percent), managers and administrators (6.5 percent) also comprised sizeable proportions of hiker occupations.

Table 1. Highest education level completed among Chilkoot hikers, in percent

Schooling Level	Percent
Grade School	6.7
High School	14.4
Vocational School	7.7
Some College or University	19.7
College or University Graduate	36.3
Post Graduate Degree	15.2

As during the Klondike stampede, Chilkoot hikers came from all over the world (Table 2). Sixteen different countries were represented but the vast majority (78.1 percent) came from Canada and the United States. European countries accounted for 18.8 percent of all hikers with Germany (11.0 percent) and Switzerland (4.4 percent) being leading the way. Japan, Australia and New Zealand accounted for the remaining (3.0 percent) of the hikers.

Table 2. Country of residence among Chilkoot hikers, in percent

Country	Percent
Canada	41.1
United States	36.9
Germany	11.0
Switzerland	4.4
New Zealand	1.5
Australia	1.3
England	0.8
Austria	0.8
Ireland	0.6
Sweden	0.2
Norway	0.2
Denmark	0.2
Czechoslovakia	0.2
Turkey	0.2
Italy	0.2
Japan	0.2

Yukoners comprised the largest proportion of Canadian hikers followed by those from British Columbia, Ontario and Alberta (Table 3). American hikers came from 25 states with the majority from Alaska, Michigan, Washington and California (Table 4). Local regional residents (Yukoners and Alaskans) comprised 27.8 percent of all survey respondents.

Table 3. Residence of Canadian hikers (N = 195)

Province or Territory	Frequency	Percent
Yukon	73	37.4
British columbia	37	19.0
Ontario	34	17.4
Alberta	33	16.9
Quebec	6	3.1
Nova scotia	4	2.1
Manitoba	3	1.5
NWT	3	1.5
Newfoundland	1	0.5
Saskatchewan	1	0.5

Table 4. Residence of American hikers (N=175)

State	Frequency	Percent
Alaska	60	34.3
Michigan	27	15.4
Washington	14	8.0
California	13	7.4
Other Western States	5	2.9
North Central States	23	13.1
South Central States	7	4.0
Northeastern States	20	11.4
Southeastern States	6	3.4

This was the first trip over the Chilkoot Trail for 85.8 percent of the hikers. This is probably indicative of the large distances most people must travel to hike the trail. Just over 14 percent of respondents had hiked the trail more than once. Most repeat hikers were on their second or third trip, although one visitor claimed to have hike the trail ten times (Table 5).

Table 5. Number of times visitor had hiked Chilkoot Trail

Number of Times	Frequency	Percent
1	406	85.8
2	40	8.5
3	14	3.0
4	7	1.5
5	2	0.4
6	1	0.2
8	1	0.2
9	1	0.2
10	1	0.2

Chilkoot hikers travelled the trail in a variety of groups (Table 6). The most common group consisted of "friends only" and accounted for 46 percent of all survey respondents. "Family only" groups accounted for the next largest proportion of Chilkoot hikers at 21 percent. "Family and friends" and "organized groups" (i.e. scouts, military etc.) each comprised close to 12 percent of all Chilkoot hikers. Almost seven percent of all hikers travelled "alone." The remaining hikers (1.7 percent) travelled as "commercially guided" groups.

Table 6. Chilkoot hikers' type of travelling group

Group name	Percent
Alone	6.9
Family only	21.0
Friends only	46.0
Family and Friends	12.0
Club or organized group	12.4
Commercial guide group	1.7

A large proportion (44.3 percent) of Chilkoot hikers had been on hiking trips longer in length and duration than the Chilkoot Trail. A slightly smaller proportion (39.7 percent) of visitors had not been on trips longer in length and duration than the Chilkoot Trail. Much smaller proportions (7 to 8.9 percent) of hikers had either been on longer trips in terms of length but not duration or in duration but not length. Table 7 shows survey respondents' hiking experience.

Table 7. Hiking experience in relation to the Chilkoot Trail

	Percent
Had been on longer trips in terms of length and days out	44.3
Had been on longer trips in terms of length only	7.0
Had been on longer trips in terms of days out only	8.9
Had not been on longer trips in terms of length or days out	39.7

Trip Characteristics

As expected, the vast majority (94.4 percent) of Chilkoot hikers began their trip at Dyea, Alaska and hiked the trail in the traditional south to north direction. An additional 2.1 percent of the hikers walked the trail in the same direction but came in through "the Notch" a side valley adjacent the Chilkoot Pass along the Canadian side of the trail. The remaining hikers (3.5 percent) walked the trail in a north to south direction, beginning their trip at Bennett City (2.7 percent) or Log Cabin (0.8 percent).

Hikers' trip length ranged from zero to six nights on the trail with a mean length of 3.2 nights. Most hikers (57.8 percent) spent between two and four nights on the trail (Table 8).

Table 8. Number of nights hikers spent on the Chilkoot Trail

# of Nights	Percent
0	0.4
1	3.8
2	27.8
3	30.1
4	23.6
5	11.7
6	2.5

With ten designated campgrounds to choose from and the wide range of trip lengths, it is not surprising that hikers collectively reported 77 different trip profiles. The most frequently reported trip profile made by 9.5 percent of survey respondents had hikers spending two nights on the trail at the Sheep Camp and Deep Lake campgrounds. The next most popular trip profile was reported by 8.8 percent of the study participants who had camped at Sheep Camp and Lindeman City campgrounds. Five point one (5.1) percent of Chilkoot hikers spent three nights along the trail at the Dyea, Sheep Camp and Deep Lake campgrounds.

Instead of reporting the remaining 74 trip profiles, it more useful to simply report the frequency of campgrounds usage. Over 80 percent of all hikers stayed at the Sheep Camp. The second most popular campground was Happy Camp; utilized by 48.2

percent of the hikers, followed by Lindeman City; 35.1 percent, Deep Lake; 32.6 percent and Canyon City; 29.0 percent. Table 9 reveals the campground usage by study participants.

Table 9. Where hikers camped along the Chilkoot Trail

Campground	Percent
Dyea	24.4
Finnegan's	18.4
Canyon City	29.0
Pleasant Camp	12.1
Sheep Camp	80.2
Happy Camp	48.2
Deep Lake	32.6
Lindeman City	35.1
Bare Loon Lake	23.2
Bennett City	5.6

Hikers' group size ranged from one to fifteen with a mean of 4.2. Two people was the most common group size reported by 33.3 percent of the hikers, followed by groups of four at 12.6 percent and groups of three at 10.5 percent. Only six hikers (1.3 percent) reported a group size larger than the voluntarily limit of 12. Table 10 illustrates the group sizes reported by survey participants.

Table 10. Group size reported by Chilkoot hikers

Group size	Percent
1	6.5
2	35.3
3	10.5
4	8.0
5	8.0
6	7.8
7	2.1
8	2.1
9	1.7
10	1.5
11	2.3
12	2.5
15	1.3

Hikers' Desired Experience Expectations

Principal component analysis (PCA) reduced the list of 26 motivational items down to 7 desired experience domains (Table 11). The following experience expectation dimensions underlie Chilkoot visitor's motivations for hiking the trail: stress release/escape, history appreciation, nature appreciation, challenge/improvement, learning about natives/nature, sharing similar values, and doing something with my family. These experiences are statistically different from each other, with the exception of the history appreciation - challenge/improvement domains. These domains have statistically equal mean importance levels. Devellis's 1991 reliability criteria suggests most of these experience dimension are reasonably reliable, although both the "learning" and "sharing values" dimensions fall within his minimally acceptable alpha range.

Two motivation items: "to meet new people," and "to retrace the steps of a gold rush relative" were excluded from the experience domains because their removal improved

Table 11. Chilkoot hiker experience domains, items, factor loadings, mean importance and Chronbach's alpha (N = 411)

Experience domains and items[2]	Factor loading	Mean importance[1] (overall factor) and items	Chronbach's alpha
1. Nature Appreciation		3.48 a[3]	0.73
To enjoy the sights and smell of nature	0.797	3.63	
To observe the scenic beauty	0.751	3.80	
To experience peace and tranquility	0.523	3.40	
To view wildlife in its natural setting	0.499	3.07	
2. History Appreciation		3.04 b	0.85
To relive stampeders trek	0.853	3.08	
To observe historic features and artifacts	0.836	3.04	
To learn about gold rush history	0.811	3.00	
3. Challenge/Improvement		3.03 b	0.71
Because of its challenge	0.859	3.30	
For the adventure	0.725	3.48	
To be able to say I hiked the Chilkoot Trail	0.630	2.69	
To develop my skill and abilities	0.476	2.83	
To improve my health	0.425	2.85	
4. Share Similar Values		2.89 c	0.67
To be with friends	0.818	2.82	
To be with others who enjoy the same things I do	0.754	2.96	
5. Learning		2.72 d	0.65
To learn more about native history/culture	0.656	2.64	
To learn more about nature	0.583	2.82	
6. Stress Release/Escape		2.49 e	0.82
So my mind can move at a slower pace	0.765	2.28	
To release tension	0.704	2.44	
To be unconfined by rules and regulations	0.669	2.26	
To escape noise	0.665	2.85	
To be somewhere where I can make my own decisions	0.578	2.05	
To experience solitude	0.547	2.71	
To get away from crowds of people	0.490	2.84	
7 Do Something With My Family	0.811	2.07 f	

[1]Possible response categories: 1 = not at all import; 2 = slightly important; 3 = moderately important; 4 = very important

[2]Factor analysis was principal factoring with iteration and orthogonal varimax rotation and eigenvalues greater than 1. Variance explained by these seven factors = 62.6 percent.

[3]Domains with different letters are statistically different from each other at $P = 0.05$ (paired t test).

the overall reliability of the experience scale. Removal of the "meet new people" item from the "learning" dimension increased alpha from .60 to .64. Removal of the "to retrace the steps of a gold rush relative" item increased the history appreciation alpha from .77 to .85.

The history, nature, and challenge/improvement experience domains had mean importance ratings between moderate and very important. The other experience domains had mean importance ratings somewhat lower, ranging between slightly and moderately important. Nature appreciation had the highest mean importance rating at 3.48, while doing something with my family had the lowest mean importance rating at 2.07. Item wise, observing the trail's scenic beauty, enjoying the sights and sounds of nature, and for the adventure had the highest mean importance ratings. Being somewhere, where I can make my own decisions, doing something with my family, and being unconfined by rules and regulations had the lowest mean importance ratings.

It was anticipated that PCA would factor out an independence/autonomy dimension, but scale items "to be unconfined by rules and regulation" and "to be somewhere I can make my own decisions" both loaded onto the stress release/escape experience domain. This is indicative that Chilkoot visitors do not differentiate these autonomy type items from the other stress release/escape scale items i.e. "so my mind can move at a slower pace, to escape noise, to release tension" etc.

Hikers' Perceptions of Impact Problems

Principal component analysis (PCA) reduced the original list of setting condition indicators from 20 to 4 (Table 12). Interestingly, most of the items factored into dimensions reflecting the three generally accepted (Clark and Stankey 1986) recreation opportunity settings: social, resource, and managerial. A fourth dimension factored out was a two item amenity type factor that included high quality campsites and safe drinking water. The four dimensions had statistically different mean problems levels. Devellis's reliability criteria suggests the resource and social setting factors are reliable to very good, the managerial setting dimension is undesirable, and the water/campsite amenity dimension is unacceptable.

Generally speaking, the public did not perceive much if any problem with CTNHS's setting conditions. Mean problem ratings for the five setting factors ranged between 1 - not a problem, and 2 - a slight problem. The highest mean problem rating occurred with the water/campsite amenity dimension at 1.83. The managerial setting factor had the lowest mean problem rating of 1.18. Individually, safe drinking water (2.01), number of groups seen at campsites (1.85), and number of groups within site and sound (1.84), had the highest mean problem ratings. Too many park staff (1.08), noise associated with park management activities (1.17), and too many facilities and developments (1.22) had the lowest mean problem ratings.

Table 12. CTNHS setting condition factor names, items, loadings, mean problem rating and Chronbach's alpha (N = 438)

Factor and item[2]	Factor loading	Mean problem level[1] (overall factor) and items	Chronbach's alpha
1. Water/Campsite Amenities		1.83 a[3]	0.46
Safe drinking water	0.710	2.01	
High quality campsites	0.708	1.66	
2. Social Conditions		1.64 b	0.91
Number of groups seen at campsites	0.879	1.85	
Total number of hikers using campsites	0.830	1.77	
Number of groups within sight/sound of campsite	0.811	1.84	
Number of groups seen along trail	0.754	1.49	
Size of groups	0.699	1.58	
Time spent finding an unoccupied campsite	0.684	1.47	
Total number of hikers using trail	0.633	1.62	
Noise associated with other hikers	0.589	1.49	
Crowded shelters	0.557	1.69	
3. Resource Conditions		1.56 c	0.75
Damage to trees around campsites	0.784	1.54	
Vegetation loss and bare ground at camps	0.746	1.76	
Damage to historic artifacts & features	0.678	1.64	
Litter	0.618	1.46	
Human body waste along trail and campsites	0.447	1.41	
4. Managerial Conditions		1.18 d	0.62
Too many park staff	0.790	1.08	
Too many facilities and developments	0.674	1.22	
Noise associated with park management activities	0.667	1.17	
Too many rules and regulations	0.428	1.25	

[1]Possible response categories: 1 = not a problem; 2 = slight problem; 3 = moderate problem; 4 = serious problem; 5 = very serious problem.

[2]Factor analysis was principal factoring with iteration and orthogonal varimax rotation and eigenvalues greater than 1. Variance explained by these five factors = 57.7 percent.

[3]Domains with different letters are statistically different from each other at $P = 0.05$ (paired t test).

Support for Limiting Use of CTNHS

It appears that support for limiting use is conditional upon protecting resources and visitor experiences or perhaps a perceived threat to resources or visitor experiences. Almost 75 percent of the hikers questioned either agreed (49.8 percent) or strongly agreed (25 percent) they would support a (use limit) permit systems that protects the sites' natural and cultural resources and visitor experiences even if it meant being denied a permit. There is not, however, much support for limiting use now. Just 22.2 percent of the Chilkoot hikers agreed or strongly agreed that overnight use of CTNHS should be limited now, while 38.7 percent disagreed or strongly disagreed. A large number (39.1 percent) of hikers remained neutral on this issue. Support for limiting use strengthens in light of the pending Gold Rush Centennial. Almost sixty percent of the survey respondents indicated that overnight use of CTNHS should be limited during the Gold Rush Centennial. Tables 13, 14 and 15 provide a detailed breakdown of hiker support for limiting use at CTNHS.

Table 13. Hikers' attitudes toward limiting use of CTNHS to protect natural/cultural resources and visitor experiences

Opinion Category	Percent
Strongly Disagree	1.9
Disagree	6.7
Neutral	16.6
Agree	49.8
Strongly Agree	25.0

Table 14. Hikers' attitudes towards limiting overnight use of CTNHS now

Opinion Category	Percent
Strongly Disagree	12.8
Disagree	25.9
Neutral	39.1
Agree	17.4
Strongly Agree	4.8

Table 15. Hikers' attitudes towards limiting overnight use of CTNHS during the Gold Rush Centennial

Opinion Category	Percent
Strongly Disagree	6.9
Disagree	9.1
Neutral	25.5
Agree	34.8
Strongly Agree	23.6

Affect of Implementing a Use Limit Program

Most (54.4 percent) Chilkoot hikers indicated that implementation of a use limit program at CTNHS would neither add or detract from their hiking experience. About three times as many hikers (34.7 percent) thought a use limit program would add or strongly add to their experience than those who indicated a use limit program would detract or strongly detract from their experience (10.9 percent). Table 15 illustrates the detailed breakdown for this question.

Table 16. Hikers' perceptions of how a use limit program would affect the quality of their hiking experience

Response Category	Percent
Strongly Detract	2.8
Detract	8.1
Neither add or detract	54.4
Add	30.6
Strongly add	4.1

Chapter 5

TEST OF HYPOTHESES

Hypothesis One: Chilkoot hikers perceive impact problems on the trail differently than managers and staff.

The Wilcoxon two sample test, sometimes called the Wilcoxon rank sum test (Noether 1990) was used to test this hypothesis. This nonparametric method was selected because it makes no assumptions about homogeneity of variance or normal distributions of the sample data. The Wilcoxon method compares the rank sums of hikers' perception of setting conditions with the rank sums of managers'/staffs' perceptions. This test was undertaken on the original list of 20 attribute items and the underlying social, resource and managerial dimensions derived from the PCA. Table 17 lists the mean ranks and their associated P values. Mean problem levels are also listed to give an indication of the difference between hikers and managers assessments of setting conditions.

Table 17 clearly demonstrates that managers consistently rated impact problems higher than hikers across all 20 setting attributes and the 3 underlying setting dimensions. With the exception of the resource setting attributes, managers generally had mean problem levels 0.6 to 0.8 higher than hikers. Managers rated the attributes in the resource setting dimension approximately twice as high as hikers. Managers' highest rated problems were vegetation loss and bare ground at campsites (3.87), damage to

Table 17. Hikers' vs manager/staffs' perceptions of setting conditions at CTNHS

	Hikers		Manager/Staff		
	Mean Rank[1]	Mean Problem Level[2]	Mean Rank	Mean Problem Level	P Value[3]
1. Social Conditions	234.82	1.64	328.59	2.41	.0232
Number of groups seen at campsites	241.30	1.85	317.57	2.50	.0311
Total number of hikers using campsites	241.85	1.77	316.54	2.42	.0329
# of groups in sight/sound of campsite	239.84	1.84	331.89	2.64	.0093
Number of groups seen along trail	241.23	1.49	214.93	2.07	.0164
Size of groups	240.39	1.58	357.60	2.60	.0002
Time spent finding unoccupied campsite	242.73	1.47	271.35	1.77	.3812
Total number of hikers using trail	241.30	1.62	317.54	2.36	.0202
Noise associated with other hikers	241.10	1.49	335.37	2.20	.0027
Crowded shelters	240.65	1.69	309.54	2.31	.0496
2. Resource Conditions	241.46	1.56	307.67	3.12	.0000
Damage to trees around campsites	238.08	1.54	413.53	3.00	.0000
Veget'n loss and bare ground at camps	233.80	1.76	448.23	3.87	.0000
Damage to historic artifacts & features	235.99	1.64	429.53	3.60	.0000
Litter	239.66	1.46	364.13	2.46	.0001
Human waste along trail and campsites	239.12	1.41	397.43	2.73	.0000
3. Managerial Conditions	241.46	1.18	307.67	1.52	.0284
Too many park staff	243.87	1.08	264.27	1.33	1712
Too many facilities and developments	243.10	1.22	288.57	1.53	.0523
Noise assoc. with park mgt. activities	241.83	1.17	296.00	1.53	.0095
Too many rules and regulations	243.65	1.25	287 73	1.67	.0725
4. Water/Campsite Amenities					
High quality campsites	238.77	1.66	359.23	2.80	.0002
Safe drinking water	239.30	2.01	350.00	2.93	.0019

[1]Calculated using Wilcoxon Rank Sum W Test

[2]Possible response categories: 1 = not a problem; 2 = slight problem; 3 = moderate problem; 4 = serious problem; 5 = very serious problem.

[3]Two sided P Value

artifacts and features (3.60) and damage to trees around campsites (3.00). Their lowest rated problems were the same as hikers, that is too many park staff (1.33), too many facilities and developments (1.53) and noise associated with park management activities.

The Wilcoxon two sample test results indicated the rank sum differences between Chilkoot hikers and managers were statistically significant for all but time spent finding an unoccupied campsite, too many facilities and developments, and too many rules and regulation items. These results strongly support the research hypothesis that Chilkoot hikers perceive impact problems on the trail differently than managers and staff.

Hypothesis Two: The perception of impact problems on the trail will be related to hikers' visitor characteristics (i.e. age, sex, hiking experience, place of residence, and familiarity with CTNHS).

Once again, nonparametric procedures were utilized to test this hypothesis. Spearman correlations were used to test the relationship between perception of impact problems and hikers' age and familiarity with CTNHS (the number of times hiked trail and nights spent on the trail). Spearman correlation coefficients are calculated based on the ranks of the data, rather than their actual numerical values. Spearman correlations provide a measure of the association between two variables, an indication of the strength of this association, and the statistical significance of this association. The

Wilcoxon rank sum test was utilized to test the dependency of impact perceptions on the binomial visitor characteristic of sex (male, female), regional residency (regional or non regional resident) and education level (university or non university degree). The Kruskal-Wallis test (an extension of the Wilcoxon rank sum test to more than two categories) was utilized to test antecedent visitor characteristics of: hiking experience (least, in between and most experienced hikers) and geographical residency (North America, Europe and Pacific). Spearman correlation results are reported in Table 18 and Wilcoxon and Kruskal-Wallis results are reported in Table 19.

The results of the nonparametric tests revealed that the perception of social, resource and managerial setting impacts were not related to a hiker's regional residency, number of nights spent on the trail or the number times they had hiked the trail.

Table 18. Spearman correlations between Chilkoot hiker impact perceptions and visitor characteristics

Setting Dimension	Age		# of Times Hiked		Nights on Trail	
	Correlation	P Value	Correlation	P Value	Correlation	P Value
Social Setting Impacts	-.1464	.002*	-.0042	.928	-.0377	.420
Resource Setting Impacts	-.0858	.069	.0432	.360	-.0086	.855
Managerial Setting Impacts	-.1743	.000*	.0524	.259	.0194	.675

* denotes statistically significant correlation at *alpha = .05*

Statistically significant relationships were found among the remaining visitor characteristics. Statistically significant negative correlations were found between hikers' age and reported impact problem levels in the social and managerial setting dimensions.

The younger the hiker was, the more likely they were to report higher impact problem levels. Conversely, the older a hiker was, the smaller their reported impact problem levels. The strength of these correlations were weak (maximum $r^2 = .03$).

Hiking experience (Table 19) appears to play an important role in the perception of impact problems. Test results indicate that the more experienced a hiker was, the higher they rated the impacts within the social, resource and managerial setting dimensions. University educated hikers reported higher impact levels in the social and resource settings than their non university educated counter parts. Europeans recorded higher impact problem levels in the managerial setting than North American or Pacific hikers. Males rated impact problems in the social and managerial setting dimensions higher than females.

The male/female relationship with impact perceptions was surprising. Crosstabs were run between sex and education, and sex and experience to investigate if a hikers' education or experience level might have been contributing to the male/female differences. The crosstab check revealed no relationship between gender and education, but a relationship between gender and hiker experience was found. Males were more likely to fall in the most experienced hiker category, while females were more likely to fall into the least experienced hiker group. A hikers' experience level is probably causing the male/female difference in perception of impact problems.

Table 19. Results of the Wilcoxon and Kruskal-Wallis tests for hypothesis two

Visitor Characteristics	Social Setting Mean Rank	Social Setting Mean Problem Level	Social Setting P Value	Resource Setting Mean Rank	Resource Setting Mean Problem Level	Resource Setting P Value	Managerial Setting Mean Rank	Managerial Setting Mean Problem Level	Managerial Setting P Value
Sex									
male	241.92	1.69	.0165*	233.20	1.59	.1577	247.12	1.21	.0024*
female	212.13	1.57		215.83	1.52		215.86	1.13	
Residency									
non regional	233.52	1.66	.2897	224.78	1.54	.7481	234.21	1.18	.5877
regional	219.14	1.60		229.11	1.62		229.12	1.17	
Education									
non university	207.48	1.55	.0025*	203.20	1.49	.0015*	227.71	1.17	.5940
university	244.38	1.73		241.34	1.63		233.08	1.19	
Experience									
least	203.27	1.49	.0037*	201.25	1.45	.0053*	212.23	1.11	.0011*
intermediate	245.15	1.73		232.06	1.54		229.33	1.13	
most	245.09	1.74		243.48	1.67		252.78	1.25	
Geographical Residency									
North American	230.85	1.63	.9059	221.45	1.54	.3031	228.78	1.16	.0032*
European	225.21	1.68		240.80	1.64		264.68	1.29	
Pacific	220.18	1.62		260.29	1.68		177.29	1.02	

* denotes statistically significant difference at *alpha* = .05

Collectively, the results of the various nonparametric tests provide some support for hypothesis two. The perception of impact problems were related to some visitor characteristics (i.e. hiking experience, education, age, geographical residency), but not to others (i.e. local residency, familiarity with trail, nights on trail). It is important to note that in those instances where statistically significant relationships were found, the practicality of the relationships was of little use. Correlations were very weak and the differences in problems levels reported were negligible (largest mean problem level

difference found was .27). Hypothesis two is partially supported, but has little if any practical significance.

Hypothesis Three: Hikers' perceptions of impact problems at CTNHS are positively correlated with their desired experiences.

Spearman correlations were used to test the relationship between perception of impact problems and hikers' desired experiences. The results of the correlation tests are listed in Table 20. This table indicates few statistically significant correlations were found between impact perceptions and desired experiences. Statistically significant correlations were found between impacts in the managerial setting and the stress release/escape, history appreciation, challenge/improvement, and do things with my family experience dimensions. Statistically significant correlations were also found between impacts in the social and resource settings and the challenge/improvement experience dimension. All but the stress release/escape - managerial impact correlations were negative. The strength of the correlations found were all quite weak. The strongest correlation (r = .1481) between resource impacts and the challenge/improvement experience expectation had a coefficient of determination (r^2) of .022 percent. This meant only 2.2 percent of the variability in resource impact perceptions was explained by the challenge/improvement experience dimension. These results reveal that hypothesis three is not supported. Hikers' perceptions of impact problems at CTNHS were for the most part uncorrelated with their desired experiences. Of the six statistically significant correlations found, all were relatively weak, and only one was positive.

Table 20. Spearman correlations between Chilkoot hiker impact perceptions and desired experiences

	Setting Dimensions					
	Social Impacts		Resource Impacts		Managerial Impacts	
Desired Experiences	Correlation	P Value	Correlation	P Value	Correlation	P Value
Stress release/escape	.0772	.053	.0439	.182	.1329	.003*
History appreciation	.0081	.431	-.0225	.317	-.0878	.030*
Nature appreciation	-.0378	.211	-.0179	.353	.0016	.487
Challenge/improvement	-.1018	.015*	-.1481	.001*	-.1385	.001*
Learning	-.0329	.241	.0234	.310	.0051	.456
Share similar values	-.0692	.069	-.0383	.208	.0297	.261
Do things with family	-.0677	.076	-.0037	.469	-.0946	.021*

* denotes statistically significant correlation at *alpha = .05*

Before accepting the failure of hypothesis three, a final set of Spearman correlations were run between desired experiences, and the perception of impact problems on the individual items comprising the social, resource, and managerial settings domains. It was thought that the subjectively derived factor scores might have obscured the relationships between desired experiences and impact perceptions. The results of this test were consistent with those found above. A small number of weak ($r < .20$) statistically significant and mostly negative correlations were found, therefor hypothesis three was not supported.

Because hikers commonly share a package of desired experiences, a K-Means cluster analysis of cases (Norusis 1992) was performed to organize hikers into groups of shared desired experiences. Hikers were clustered into five different groups and subjected to Kruskal-Wallis tests to determine if the five cluster groups differed in their perception of the social, resource and managerial setting impacts. The results of

this test indicated that the perception of impacts did not vary by a hiker's desired experience cluster membership. It appears that desired experiences play little if any role in impact perception at CTNHS.

Hypothesis Four: Hikers' support for limiting overnight use limit of CTNHS is positively correlated with their perception of impact problems along the Chilkoot Trail.

Spearman correlations were also used to test hypothesis four. The correlation results supported this hypothesis. Support for limiting overnight use of CTNHS was positively correlated with impact problems in the social, resource and managerial settings along the Chilkoot Trail. All three correlations had P values less than .0005. The positive correlations mean that support for limiting overnight use of CTNHS increased as the perception of social, resource, and managerial impact problems increased. Similarly, support for limiting use decreased as the perception of impacts decreased.

While hypothesis four was supported, the strength of the correlations were not that strong. Correlations ranged from .2875 for social impacts, .1953 for resource impacts, to .1610 for managerial impacts. Social impacts account for 8.3 percent of the variability in support for limiting overnight use of CTNHS, while resource impacts and managerial impacts account for 3.8 and 2.6 percent respectively. It appears that other factors may also be accounting for the variability in hiker support for limiting overnight use of CTNHS.

Hypothesis Five: A positive correlation exists between hikers' support for limiting overnight use of CTNHS and their perceived affect of a use limit program on their experience.

This hypothesis was tested using the nonparametric Kendall's tau rank correlation coefficients. Kendall's tau was chosen over Spearman correlations because it provides more meaningful coefficients when the data contain a large number of tied ranks (Nie et al. 1975). Similar to Spearman correlations, Kendall's tau correlation coefficients are calculated based on the ranks of the data, rather than their actual numerical values.

The results of the Kendall's tau correlation test produced a positive correlation coefficient (r) of .2853 with an associated P-value of less than 0.001. This indicates that hiker support for a use limit program increased as their perception that a use limit program would add to their experience. Similarly hiker support decreased with the perception that a use limit program would detract from their experience. This results supports hypothesis five, that a positive correlation exists between hikers' support for limiting overnight use of CTNHS and the anticipated affect of a use limit program on their experience. It should be noted that while this association was found to be statistically significant, the relationship was also rather weak i.e. $r = .2853$. Affect of the use limit program explains only eight percent of the variation in hikers' support for the use limit program i.e. coefficient of determination (r^2) = .08. Perhaps affect of the use limit program will combine with other factors (i.e. impact perception, desired experi-

ences, visitor characteristics) to determine hikers' support for limiting use. This possibility will be explored under hypothesis six.

Hypothesis Six: Hiker support for limiting overnight use of CTNHS is a function of antecedent visitor characteristics, desired experiences, perception of impact problems and the perceived affect of a use limit program on hikers' experience.

A combination of methods were used to test hypothesis six. Wilcoxon and Kruskal-Wallis rank sum tests were used to test the relationship between hiker support for limiting overnight use and the nominal visitor characteristics of sex, geographical and regional residency, education and hiking experience. Stepwise multiple regression analysis was utilized to determine if a linear relationship existed between the support for limiting overnight use and ratio or interval level visitor characteristics (age, nights on trail, number of times trail had been hiked), desired experiences (the seven PCA experience dimensions), perception of impact problem (the three PCA impact problem dimensions), and the affect of a use limit program.

The results of the Wilcoxon and Kruskal-Wallis tests (Table 21) indicate the visitor characteristics of education and hiking experience play a statistically significant role in hikers' support for limiting overnight use of CTNHS while sex and national and regional residency do not. University educated hikers had higher support rankings than non university educated hikers. Visitors with more hiking experience also demonstrated higher support rankings. Mean support levels are also reported in Table 21 and provide an indication of the difference between hikers' education and experi-

ence levels. The difference in mean support levels are not that large (.25 for education and .08 - .34 for hiking experience). While support for limiting use is higher with more education and hiking experience, the increase in support is not that important in a practical sense.

Table 21. Results of the Wilcoxon and Kruskal-Wallis tests for hypothesis six

Visitor Characteristics	Support for Limiting Overnight Use of CTNHS		
	Mean Rank	Mean Support Level	P Value
Sex			
male	233.63	2.79	.3552
female	222.55	2.71	
Residency			
non regional	231.73	2.78	.5515
regional	223.94	2.71	
Geographical Residency			
North American	228.14	2.75	1707
European	226.09	2.73	
Pacific	300.23	3.27	
Education			
non university	213.24	2.64	.0243*
university	239.76	2.88	
Hiking Experience			
least	208.31	2.60	.0040*
intermediate	220.01	2.68	
most	250.44	2.94	

* denotes statistically significant difference at *alpha = .05*

The results of the stepwise regression test (Table 22) revealed that support for limiting overnight use of CTNHS could be predicted as a function of social impacts, the

perceived affect of a use limit program and the "do things with my family" desired experience dimension. The regression equation:

$$Y_{support} = .45_{affect} + .35_{social\ impacts} - .07_{family} + .87$$

accounts for 20.8 percent of the variability in hikers' support for limiting overnight use of CTNHS. The equation builds on the results of hypothesis four and five where it was found that support for limiting use was positively associated with the perception of social impacts and the affect of a use limit program on hiking experiences. The equation also indicates that support is negatively correlated with the do things with my family desired experience (i.e support decreases as family importance increases).

The stepwise regression analysis was repeated using the individual attribute items comprising the social impact dimension to determine which social impact attribute(s) were playing an individual role in predicting support for limiting use. This analysis produced the following regression equation:

$$Y_{support} = .44_{affect} + .31_{hikers} + .85$$

which explained 21.4 percent of the variability in hikers' support for limiting overnight use of CTNHS. Under this equation, support was a function of the affect of a use limit program and problems associated with the total number of hikers using the trail. The total number of hikers using campsites and the number of groups at campsites

Table 22. Stepwise multiple regression results for predicting support for limiting overnight use of CTNHS

Multiple R	.45023
R Square	.20270
Adjusted R Square	.19631
Standard Error	.93495

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	83.11720	27.70573
Residual	379	326.92777	.87414

F = 31.69490 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	Tolerance	VIF	T	Sig T
AFFECT	.452046	.061889	.340809	.979188	1.021	7.304	.0000
SOCIMP	.351030	.071208	.230000	.979333	1.021	4.930	.0000
FAMDIM	-.073691	.037349	-.091169	.998445	1.002	-1.973	.0492
(Constant)	.872131	.239205				3.646	.0003

---------- Variables not in the Equation ----------

Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
NIGHTS	-.051015	-.056983	.994759	1.005	.977596	-1.102	.2710
TIMEHIKE	.054477	.060807	.993341	1.007	.973249	1.177	.2401
AGE	-.006695	-.007031	.879587	1.137	.879587	-.136	.8920
ESCDIM	-.010982	-.012272	.995763	1.004	.975213	-.237	.8128
HISTDIM	.026953	.029696	.967847	1.033	.954295	.574	.5665
NATDIM	-.019052	-.021150	.982543	1.018	.973038	-.409	.6831
CHALLDIM	-.020274	-.022497	.981706	1.019	.971440	-.435	.6641
LEARNDIM	-.003062	-.003361	.960348	1.041	.960348	-.065	.9483
PEOPDIM	.036948	.041304	.996371	1.004	.977318	.798	.4252
RESIMP	.036156	.037820	.872366	1.146	.860192	731	.4653
MGTIMP	.069038	.071239	.848950	1.178	.831414	1.379	.1686

were also included in the initial stepwise regression analysis, but were removed because of multicollinearity problems (high correlations between these independent variables).

Taken together the results of the Wilcoxon - Kruskal-Wallis and the multiple regression analysis provides support for hypothesis six, although not every visitor characteristic, desired experience or perceived impact plays an individual role in hikers' support for limiting overnight use of CTNHS. Overall, hikers support for limiting overnight use of CTNHS increases with university education, hiking experience, the perception of social impact problem and affect of a use limit program while it decreases with the do things with my family desired experience. The total number of hikers using the trail is the major social impact problem influencing support for limiting use.

Summary of Hypothesis Testing

Weak and/or partial support was found for five of the six hypotheses tested. A summary of the hypothesis test results are presented Table 23

Table 23. Summary of Hypothesis Testing

Hypothesis	Support
One: Hikers perceive impact problems differently than managers.	Strongly supported: Managers consistently rated impact problems higher than hikers across social, resource and managerial settings.
Two: Perception of impact problems related to hikers' visitor characteristics. (i.e. age, sex, hiking experience, place of residence, familiarity with CTNHS etc).	Partial weak support: Impact problems were related to some visitor characteristics (i.e. hiking experience, education, age, national residency), but not to others (i.e. local residency, familiarity with trail, nights on trail). In those cases where statistically significant relationships were found, the relationships were weak and/or there was little practical relevance.
Three: Impact problems positively correlated with desired experiences.	Not supported: Impact problems at CTNHS were for the most part uncorrelated with desired experiences. Of the six statistically significant correlations found, all were relatively weak and only one was positive.
Four: Support for limiting overnight use positively correlated with impact problems.	Weakly Supported: Support for limiting use was positively correlated with impact problems in the social, resource and managerial settings, but the strength of the correlations were not that strong.

Table 23 (Cont.)

Hypothesis	Support
Five: Support for limiting overnight use positively correlated with affect of use limit program on experience.	Weakly Supported: Support for limiting overnight use positively correlated with affect of use limit program on experience, but the strength of the correlation is somewhat weak (r = .2853).
Six: Support for limiting overnight use is a function of visitor characteristics, desired experiences, impact problems and affect of use limit program on experience.	Weakly to moderately supported, although not every visitor characteristic, desired experience or impact problem plays an individual role in support for limiting overnight use. Support for limiting use was found to increase with university education, hiking experience, the perception of social impact problems and the affect of a use limit program. Support decreased with the do things with my family desired experience. Total number of hikers using the trail was the major social impact problem influencing support.

Chapter 6

DISCUSSION

The basic goal of this study was to provide Chilkoot managers with an indication of the support they could expect for implementation of a use limit program at CTNHS. It investigated whether hikers' desired experiences and perception of setting conditions on the Chilkoot Trail were such that they would support limiting overnight use of the trail. This section of the study discusses the results of this project in terms of the questions raised in chapter one, the proposed conceptual framework, management implications, and future research.

Desired Experiences

Previous research by the Canadian Parks Service (1989), indicated that experiencing "both the historic and wilderness attributes of the trail" was the primary reason people were hiking the trail. These are still important motivations for Chilkoot hikers as seen by the bundle of seven experiences desired. Nature and history appreciation were two of the most important experiences desired by park visitors. On the other hand, being unconfined by rules and regulations, or being somewhere where hikers could make their own decisions, were not of major importance to Chilkoot hikers. These items had mean importance ratings lower than almost all of the other individual motivational items measured in this study (Table 11). In addition, these items did not factor out into a separate or orthogonal independence/autonomy experience domain. This suggests that the concepts of freedom, spontaneity and unconfinement are not critical

factors to Chilkoot hikers. Chilkoot hikers have other more important reasons for hiking the trail than this i.e. nature and history appreciation, and challenge/improvement.

Perception of Impact Problems

By and large, Chilkoot hikers did not perceive major problems with CTNHS's social, resource and managerial settings. Of the 20 setting attributes measured, their highest mean problem rating, safe drinking water, ranked only as a slight problem. Generally speaking, hikers' mean problem ratings for the various setting conditions ranged between the not a problem and a slight problem categories. In contrast, managers' mean problem ratings were anywhere from 25 to 120 percent higher than those of hikers. The fact that managers and hikers differed in their perception of setting conditions is consistent with past research by Downing and Clark (1979) and Marion and Lime (1986).

The largest difference between managers' and hikers' perceptions occurred within the resource setting. Managers rated resource impact problems on such items as damage to artifacts or bare ground at campgrounds, almost twice as high as Chilkoot hikers. The reason for this discrepancy is probably as Hendee and Pyle (1971), Shelby et al. (1988), Marion and Lime (1986), and Hammit and Cole (1987)) suggest, that recreationists tend to be indifferent to or lack the sensitivity or knowledge to recognize resource impacts. Marion and Lime (1986) note that recreationists generally have

limited perceptions of the normal wear and tear impacts that occur at recreation sites and do not find such impacts particularly disturbing. They also credit managers' formal training and extensive experience as accounting for their greater awareness and sensitivity of ecological impacts.

Applicability and Usefulness of Conceptual Framework

The proposed conceptual model suggested that hikers' visitor characteristics and desired experiences would play a role in their perception of setting conditions and impact problems. These relationships were tested through hypothesis two and three. The conceptual model proposed that if visitors perceived impact problems along the trail, these conditions would hinder attainment of their desired experiences. The model suggested that these visitors would perceive limiting overnight use as adding to their experience, as this would provide protection to the setting attributes they were coming to see. As a result these visitors would support limiting use of CTNHS. The conceptual model had a parallel view to this which suggested if impact problems were not perceived, limiting overnight use would detract from a hikers experience since this would be perceived as an unnecessary restriction on a hiker's freedom and spontaneity. These ideas suggested hypothesis four; that support for limiting overnight use would be positively correlated with the perception of impact problems along the trail, and hypothesis five; that support for limiting overnight use would be positively correlated with the affect of a use limit program on hikers' experience. Hypothesis six combined all the elements of the conceptual framework to investigate support for limiting

overnight use of CTNHS as a function of visitor characteristics, desired experiences, perception of impacts and the affect of a use limit program.

Hypothesis two found that the perception of impacts were related to a variety of visitor characteristics including age, hiking experience, education, and geographical residency. While these relationships were statistically significant, they were found to have little practical meaning. The correlations between age and impact perceptions were very weak (maximum *r* of .17) and mean impact problem levels varied very little with different levels of hiking experience, education, and residency.

Hypothesis three found that desired experiences play little if any role in the perception of impact problems. The conceptual model and literature review suggested the more important an attribute was in terms of a hikers' desired experience, the more likely they would perceive impacts on the settings contributing to that experience. In particular, positive correlations were expected between the nature and history appreciation domains and perception of impact problems in the resource setting domain, where problems such as vegetation loss/bare ground and damage to historic artifacts/features were found. A positive correlation was also expected between the stress release/escape experience dimension and impact problems in the social setting. These anticipated relationships did not occur. While relationships were found, they were all very weak (maximum *r* of .1481) and only one was positively correlated. Correlations between desired experiences and the individual items comprising the social, resource,

and managerial domains revealed similar findings. In addition, different groups of hikers sharing similar packages of desired experiences did not differ in their perception of setting conditions. Desired experiences were found to play a minor role in the perception of impact problems at CTNHS.

Hypothesis four, five and six all provided support, albeit somewhat weak, for the proposed conceptual model. Support for limiting use of the trail was found to increase with the perception of impact problems (hypothesis four) and the perception that a use limit program would add to a visitor's hiking experience (hypothesis five). Increased support levels (although not particularly strong) were also found in hikers with university educations and having more hiking experience (hypothesis six). It was found that support for limiting overnight use of CTNHS could be predicted as a function of social impacts, affect of a use limit program and the "do things with my family desired experience" (hypothesis six). Support increased with the affect of a use limit program on visitors' hiking experience, and the perception of social impact problems (in particular the total number of hikers' using the trail). Support was found to decrease with an increase in importance of "the do things with my family" desired experience expectation (hypothesis six). These three factors were useful in explaining 20.8 percent of the variability in hikers' support for limiting use.

A recent study of three wildernesses in Oregon by Watson and Niccolucci (in prep), provides backing to this study's finding and the conceptual model notion that support

for limiting use is related to the perception of impact problems. Watson and Niccolucci found that general feelings of being crowded and perceptions of impacts along trails and at campsites were the best predictors of whether campers would support use limits to reduce use or would not support use limits at all.

The relationships found in this study were notably weak. This might have been because of hikers' demonstrated indifference to impact problems along the trail or because visitors felt that other management actions were more effective in protecting resources and visitor experiences. Future research could investigate these hypotheses. The conceptual framework could be tested in areas where visitors are more aware of impact problems to see if stronger relationships can be found. The conceptual framework could also be adapted and utilized to test the relationships with other management actions (i.e. education, information, facility modification etc.).

The failure to find the anticipated relationships with desired experiences was somewhat of a surprise although research in other National Parks in the United States and Canada have encountered similar difficulties when using Driver's REP scales and domains. Frost's 1985 bald eagle study at Glacier National Park failed to find anticipated relationships between desired experiences and perceptions of management restrictions, or found that the relationships were also very weak (r^2 = .01 and .013 respectively). A 1991 study at Nahanni National Park Reserve in the NWT clustered visitors into seven different groupings based on Driver's REP scales. The study found

that while visitors sought very different experiences from their trip to Nahanni, they did not differ significantly with respect to several characteristics analyzed, including site visitation behavior and trip satisfaction (Smale 1992). Smale (1992) attributed this finding to the nature of the unique Nahanni experience, an experience that could only be found on the Nahanni River.

Despite its noted shortcomings, the conceptual model provided a useful framework for analyzing support for limiting overnight use of CTNHS. The results of the hypothesis testing provided backing for the model's proposed relationships between visitor characteristics, perception of setting conditions, and the affect of and support for limiting use. Relationships with desired experiences were found, but they were either very weak or in the opposite direction anticipated.

Management Implications

Much as in other studies, Chilkoot hikers strongly supported use limits (75 percent agreement) if they were necessary to the protect natural and cultural resources or visitor experiences along the trail. However, the conditional type of framework in which this question was asked, makes it hard for visitors to disagree with (Lucas 1985). Support for limiting use of the trail dropped off considerably when the question was asked without the conditional "protect resources and experiences" framework. When compared to previous studies by Womble et al. (1978) and the Canadian Parks Service (1989), support for limiting use of CTNHS is ironically at it

lowest point ever, despite having the highest visitation level on record. Only 22.2 percent of Chilkoot hikers agreed that overnight use of CTNHS should be limited now, down from 29.6 percent in 1986 and 37.4 percent in 1976. Fortunately, opposition to limiting use has not increased; 38.7 percent of Chilkoot hikers disagreed that overnight use of the trail should be limited now. This is down from 48.6 percent in 1986 and almost identical to the opposition level of 1976. The number of undecided hikers is at the highest level ever, with 39.1 percent remaining neutral on this issue (up from 24.2 percent in 1976 and 11.8 percent in 1986).

The lack of support for limiting use is likely attributable to hikers demonstrated indifference to impact problems occurring along the Chilkoot Trail. In addition, more than 85 percent of the visitors were hiking the trail for the first time. These hikers were probably unaware of the management actions already being used on the trail, or the extent to which visitation has increased over the last several years. These lack of insights makes it difficult for hikers to support use limits at this point in time. If managers were to implement a use limit program now, they will have to convince hikers that this is right action to take.

Past research indicates that visitors with more knowledge about the recreational setting are more likely to perceive restrictions on their behavior as enhancing their experience. Frost (1985) found that visitors to Glacier National Park during the bald eagle migration who were aware of the bald eagle concentration prior to their arrival, who

were aware of the bald eagle research program, and who encountered a naturalist, were more likely to perceive restrictions as adding to their experience. He also found that almost 90 percent of the visitors who had a awareness of the restrictions, perceived them as necessary. This information suggests CTNHS managers work towards increasing hiker knowledge of the recreational setting. This knowledge will help hikers understand the need for and benefits of limiting use of the trail.

The affect of a use limit program and social impacts (in particular the total number of hikers using the trail) were useful in predicting support for limiting overnight use of the trail. Managers should focus their education and information efforts on these aspects. They should document the impact problems associated with the number of hikers using the trail and emphasize how limiting use would address these problems and add to a visitor's hiking experience. These efforts will be most useful in explaining management's rationale for limiting use.

Park managers can use the LAC process to document the changing setting conditions and impact problems at CTNHS. To do this they must first identify LAC indicators. LAC indicators are specific elements of the resource, social and managerial settings selected to represent conditions deemed as appropriate and acceptable (Stankey and McCool 1992). The selection of indicators is one of the most critical and difficult steps in the LAC process (Watson and Cole 1992). LAC indicators should be specific, measurable, sensitive to change, integrate well with several impacts, and be

responsive to alternative management actions. Indicators should also be able to detect significant impacts caused by human use, which if they occurred, would result in serious consequences (Stankey et al. 1985; Merigliano 1987; Watson and Cole 1992; Whittaker 1992).

The selection of LAC indicators as discussed by Lime (1991), Whittaker (1992), Whittaker and Shelby (1992) and Roggenbuck et al. (1993) reflect two general approaches to indicator selection. One approach emphasizes the protection side of a *preservation with use* mandate. Whittaker and Shelby (1992) suggest the most important criteria for indicator selection is that they should represent significant impacts. Expanding on this line of thought, Whittaker (1992) proposes that the severity of impact problems can be used to help select LAC indicators. Lime (1991) utilized this method to identify potential LAC indicators for the Boundary Waters Canoe Area Wilderness (BWCAW). He asked hikers to indicate the severity of impact problems they encountered during their trip in the BWCAW. He recommended a number of potential LAC indicators based on hikers' impact problem ratings. A second approach to indicator selection emphasizes the experiential side of *preservation with use* mandates. Roggenbuck et al. (1993) identified potential LAC indicators based on influential 19 attributes were in defining the quality of visitors' wilderness experience. A combination of these two approaches would likely work best for as Whittaker and Shelby (1992) suggest, the significance of impacts to a recreationists experiences can make indicator selection more successful (Whittaker and Shelby 1992). Ideal LAC

indicators would be those that represent significant impacts in terms of agency mandate and park management objectives, and would also be influential in defining the quality of a visitor's recreational experience.

This study focused on identifying the severity of impact problems occurring along the Chilkoot Trail. Unfortunately, it did not ask how important these impacts problems were to defining the quality of a hiker's recreational experience. This is information which can only be collected through additional research. Despite these shortcomings, a few potential LAC indicators are identified below. They are based on the mandate of CTNHS, hikers' desired experiences, the perception of impact problems, and the criteria listed previously that indicators be specific, measurable, sensitive to change etc. Managers' perceptions were used for resource impact problems and hiker's perceptions were used for social impact problems.

The Historic Sites and Monuments Board of Canada recommended the establishment of CTNHS as an international historic park because of the national historic significance of the Chilkoot Trail in the context of the Klondike Gold Rush as a social phenomenon (Environment Canada 1988). CTNHS has a mandate that directs it to "protect and present" its resources of national historic significance. History appreciation was the second most important experience desired by Chilkoot hikers. Almost 75 percent of the survey respondents indicated that observing historic features and artifacts were moderate to very important reasons for hiking the Chilkoot Trail.

Damage to these features was rated by managers as the most serious impact problem occurring along the trail (tied with vegetation loss and bare ground at camps). It is very clear that hiker damage to artifacts and historic features found along the trail should be utilized as LAC indicator.

Nature appreciation was the most important experience desired by Chilkoot hikers. Over 82 percent of the hikers indicated that observing the scenic beauty of the trail was very important, and almost 71 percent reported enjoying the sites and sounds of nature as very important. As indicated above, managers rated vegetation loss and bare ground at camps as the most severe impact problem occurring along the trail. This attribute is another good candidate for an LAC indicator.

The selection of a potential social setting LAC indicator is not as obvious as above. The stress release/escape dimension is the desired experience most closely related to the social setting. While this dimension did not include a specific social setting attribute, it included indirect items such as experiencing solitude, escaping crowds, and escaping noise. The stress release/escape experience dimension had a mean importance rating between slightly and moderately important for Chilkoot hikers, yet they rated social conditions as the second most severe problem they encountered along the trail. Social impact problems, in particular the total number of hikers using the trail, were useful in predicting support for limiting use of the trail. The number of groups seen at campsites, total number of hikers using campsites, and the number of groups

within site and sound of campsites all loaded highly on the social condition setting dimension. These attributes were also among the highest mean problem levels reported by Chilkoot hikers. Any one of these items could be used as an LAC indicator.

While support for limiting use of the trail now is relatively weak, it strengthens in light of the Gold Rush Centennial. Almost 60 percent of the hikers agreed and just 16 percent disagreed that use should be limited during this time. This level of support can probably be attributed to hikers perception that use levels will be much higher during this time period. Managers should be able to strengthen this support even more by using the LAC process. By documenting change to the trail's social and resource settings, managers will have explicit information to support implementation of a use limit program. This documentation will be most useful if use levels do not decline after the Gold Rush Centennial.

Future Research

The applicability of the proposed conceptual framework should be further investigated. Future research could investigate whether higher impact perceptions or alternative management techniques strengthen the models proposed relationships between desired experiences, impact perceptions, affect of, and support for alternative management techniques utilized in recreation settings. Will relationships be stronger if hikers are

made more aware of the impact problems occurring along the trail? Will relationships be stronger when other management alternatives are considered?

Schreyer et al. (1985) and Kuentzel (1989) both suggest Driver's REP scales are too general to be much use to recreation managers. Perhaps this is what accounted for the study's failure to find strong relationships between the Driver based desired experiences and impact perceptions or support for limiting overnight use of CTNHS. Impact problem ratings were also based on broad as opposed to unique site specific attributes. Kuentzel's (1989) phenomenological approach to recreation looks at motivation from a micro level viewpoint, i.e., the particular set of artifacts/historic features, white water rapids, vegetation habitat type, viewpoint etc., that makes one setting unique from another. Investigating support for limiting use on a micro level might have resulted in surprising different findings. Future research could apply Kuentzel's micro level approach to defining desired experiences and impact problems. Support for limiting use could then be assessed against these findings. Broadly based experience expectations and impact problem levels should not be ignored. These measures can provide valuable insights into the overall experiences desired. They also provide an overall rating of the impact problem levels within a recreational area.

On a site specific level, more research is needed at CTNHS to determine which impacts are most influential in defining the quality of a hiker's experience. This information can then be combined with managers' perceptions of impact problems to

determine LAC indicators which reflect both the preservation and experiential side of the park's mandate.

Closing Remarks

Managers see the implementation of a use limit program as being necessary to protect the Chilkoot Trail's natural and cultural resources and provide quality recreational experiences in light of the increasing use levels. Unfortunately, hikers' experience expectations and perceptions of setting conditions along the Chilkoot Trail are such that there is little support for limiting overnight use of the trail at this time. In comparison to park managers, hikers appear indifferent to impact problems occurring at CTNHS. This indifference and a lack of awareness of the management alternatives already being implemented along the Chilkoot Trail, are likely contributing to the lack of support for use limits. Support for limiting use increases in light of the Gold Rush Centennial. This support should strengthen if the park service initiates an education and information program that explains the rationale for implementing a use limit program. This program should emphasize how a use limit program would enhance hiking experiences and address the impact problems associated with the number of hikers using the trail. The LAC process provides park managers with a means to accomplish these goals. It will help managers document the change in setting conditions and impact problems occurring along the trail. Potential LAC indicators for documenting this change include damage to historic artifacts and features, vegetation

loss and bare ground at campsites, number of groups seen at campsite, total number of hikers using campsites, and the number of groups within site and sound of campsites.

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APPENDIX A

Sampling Schedule: Chilkoot Trail National Historic Site

Visitor Survey

July 2 - August 17, 1993

1993 Chilkoot Trail Visitor Survey Sampling Schedule

Date	Starting Time
First Shift July 2 - 11	
3	4 PM
4	8 AM
5	12 PM
6	4 PM
8	8 AM
9	12 PM
10	4 PM
11	8 AM
Second Shift July 16 - 25	
17	2 PM
18	8 AM
19	2 PM
20	8 AM
22	2 PM
23	8 AM
24	2 PM
25	8 AM
Third Shift July 30 - August 8	
31	2 PM
1	8 AM
2	2 PM
3	8 AM
5	2 PM
6	8 AM
7	2 PM
8	8 AM
Fourth Shift August 13 - 22	
14	2 PM
15	8 AM
16	2 PM
17	8 AM
19	2 PM
20	8 AM
21	2 PM
22	8 AM

APPENDIX B

Visitor Survey Registration Form

Chilkoot Trail National Historic Site
Visitor Survey Registration Form

Date: _____ Registration Number: _____

Number in Party: _____

Please circle EACH of the campgrounds you camped at during your trip:

Dyea Finnegan's Pt. Canyon City Pleasant Camp
Sheep Camp Happy Camp Deep Lake Lindeman City Bennett City
Log Cabin Other (please name

	Name	Address & Postal/Zip Code	Age	Sex	Questionnaire ID #
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					

APPENDIX C

Reminder Post Card

Dear Chilkoot Hiker:

Several days ago, you received a questionnaire asking your opinions about use and management of Chilkoot Trail National Historic Site. Your completed questionnaire will assist the Canadian Parks Service manage the Chilkoot Trail into the next century. Only a small number of hikers were selected to participate in this study. The success of the study is dependent upon your response. If you have not yet done so, please take a few minutes to fill out the questionnaire and drop it in the mail.

Thank you

Tom Elliot.

Tom Elliot
Survey Coordinator

APPENDIX D

Replacement Questionnaire Covering Letter

Our file Notre reference

Your file Votre reference

Yukon National Historic Sites
205 - 300 Main Street
Whitehorse, Yukon
Y1A 2B5

Dear Chilkoot Hiker

Several weeks ago we sought your cooperation in a study of Chilkoot Trail National Historic Site hikers. The study involves identifying how visitors feel about the current management of this area and their preferences for various management actions. You are one of a small number of hikers who have been randomly selected for participation in this study, so your responses are important for the study's success. We certainly appreciate your cooperation.

Enclosed is a questionnaire which will take approximately 15-20 minutes to complete. Your responses will not only help us in our work, but will also be very useful in guiding our decisions concerning management of the park. Please be assured that your responses will be tabulated in such a manner that no one individual can be identified. After you have completed the questionnaire, enclose it in the self-addressed stamped envelope and drop it in any convenient mailbox.

If you have any questions concerning this study, please contact us.

Sincerely,

Tom Elliot
Study Coordinator

APPENDIX E

Chilkoot Trail National Historic Site

1993 Visitor Survey

Chilkoot Trail National Historic Site

1993 Visitor Survey

Questionnaire Number: _____

Chilkoot Trail National Historic Site

1993 Visitor Survey

Dear Chilkoot Hiker,

I hope you have enjoyed your visit to Chilkoot Trail National Historic Site (CTNHS).

I am an employee of CTNHS on education leave to pursue a Masters degree in Recreation Resource Management at the University of Montana. I am conducting this study as part of my thesis with the permission and support of the Canadian Parks Service. The purpose of the study is to learn more about the opinions and management preferences of visitors to CTNHS. The information gathered will assist CTNHS staff improve services and management policies for the Chilkoot Trail.

Completion of this questionnaire is voluntary. If you chose to respond your answers will be kept strictly confidential.

Only a few hikers have been randomly chosen to receive this survey. It is important that **your** questionnaire be answered and returned. The survey will take just a few minutes to fill out. I encourage you to answer **each** question carefully and completely. Put your completed questionnaire in the enclosed reply envelope (postage is pre-paid) and drop it in the mail.

I appreciate your participation in this study.

Yours truly

Tom Elliot

Tom Elliot
Survey Coordinator

1. Where did you start your hike? ☐ Dyea ☐ Bennett City
☐ Other (specify) _____

2. What date did you climb the Chilkoot Pass? _____

3. How many **nights** did you spend on the trail?

☐ 1 night ☐ 2 nights ☐ 3 nights ☐ 4 nights ☐ 5 nights ☐ 5+ nights

4. Please indicate the campsites you stayed at overnight while hiking the Chilkoot Trail. Refer to map on back if neccessaary. *(Check all that apply. Underline those sites you stayed at for more than one night.)*

☐ Dyea ☐ Pleasant Camp ☐ Deep Lake ☐ Bennett City
☐ Finnegan's ☐ Sheep Camp ☐ Lindeman City ☐ Log Cabin
☐ Canyon City ☐ Happy Camp ☐ Bare Loon Lake
☐ Other *(please specify where)* _____

5. What type of group were you travelling with on the Chilkoot Trail? *(Check one)*

☐ Alone
☐ Family only
☐ Friends only
☐ Family and Friends
☐ Club or organized group (scouts, school, etc.)
☐ Commercially guided group

If applicable, specify the name of your club, organized group, or commercial outfitter/guide. _____

6. How many people were in your group including yourself? _____

7. How many times have you hiked the trail? (Indicate number) _____

8. How far in advance did you plan your trip on the Chilkoot Trail?

☐ Less than a month
☐ One to three months
☐ Four to six months
☐ Seven months to a year
☐ Over a year

9. How satisfied were you with your trip to CTNHS? Give us an appropriate grade.

☐ A. very good ☐ B. good ☐ C. fair ☐ D. poor ☐ F. very poor

What was most satisfying about your trip? (high points) _____

_____

_____

What was most dissatisfying? (low points) _____

_____

_____

10. How well do each of the following statements describe your feelings about your hike on the Chilkoot Trail? (Circle one number for each statement.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Applicable
This trip was so good I would like to do it again.	1	2	3	4	5	6
This trip was better than any of my previous trips on the Chilkoot Trail.	1	2	3	4	5	6
This trip was better than any other hiking experience I remember.	1	2	3	4	5	6

11. Each visitor has many reasons for hiking the Chilkoot Trail. Please indicate how important each of the following reasons were for your trip. (*Circle one response for each item.*)

I hiked the Chilkoot Trail to:	Very Important	Moderately Important	Slightly Important	Not at all Important
observe its scenic beauty	V	M	S	N
get away from crowds	V	M	S	N
enjoy the sights/smells of nature	V	M	S	N
re-live the stampeders hike of the trail	V	M	S	N
observe historic features and artifacts	V	M	S	N
meet new people	V	M	S	N
be somewhere where I can make my own decisions	V	M	S	N
experience the peace and tranquility	V	M	S	N
be able to say "I hiked the Chilkoot Trail"	V	M	S	N
be with friends	V	M	S	N
learn about the history of the gold rush	V	M	S	N
develop my skills/abilities	V	M	S	N
do something with my family	V	M	S	N
for the adventure	V	M	S	N
improve my physical health	V	M	S	N
because of its challenge	V	M	S	N
learn more about nature	V	M	S	N
release tension	V	M	S	N
retrace the steps of a gold rush era relative	V	M	S	N
so my mind could move at a slower pace	V	M	S	N
view wildlife in its natural habitat	V	M	S	N
be with others who enjoy the same things I do	V	M	S	N
experience solitude	V	M	S	N
learn about native history and culture	V	M	S	N
be unconfined by rules and regulations	V	M	S	N
escape noise	V	M	S	N
be considered a true Yukoner or Alaskan	V	M	S	N

12. Please indicate how much of a problem you found **each** of the following to be on your trip to CTNHS. (*Circle one response for each item.*)

	Not a Problem	Slight Problem	Moderate Problem	Serious Problem	Very Serious Problem
litter	1	2	3	4	5
damage to trees around campsites	1	2	3	4	5
vegetation loss/bare ground around campsites	1	2	3	4	5
damage to historic artifacts/features	1	2	3	4	5
safe drinking water	1	2	3	4	5
high quality campsites	1	2	3	4	5
human body waste along trail or at campsites	1	2	3	4	5
noise associated with other hikers	1	2	3	4	5
number of groups within sight or sound of campsite	1	2	3	4	5
size of groups	1	2	3	4	5
time spent finding an unoccupied campsite	1	2	3	4	5
number of groups seen along trail	1	2	3	4	5
number of groups at campsites	1	2	3	4	5
aircraft flying overhead	1	2	3	4	5
too many rules and regulations	1	2	3	4	5
too many park staff	1	2	3	4	5
too many facilities and developments	1	2	3	4	5
total number of hikers using trail	1	2	3	4	5
noise associated with park management activities	1	2	3	4	5
total number of hikers using campsites	1	2	3	4	5
crowded shelters	1	2	3	4	5

Other problems (please specify) _____

_____

_____

13. About how many other **groups per day** did you expect to see during your CTNHS visit *once you got away from the trailhead area*? (check the appropriate box.)

☐ None ☐ Six to ten ☐ More than twenty
☐ One to two ☐ Eleven to twenty ☐ No expectation
☐ Three to five

14. About how many other **groups per day** did you actually see? (*check the appropriate box.*)

☐ None ☐ Six to ten ☐ More than twenty
☐ One to two ☐ Eleven to twenty ☐ I don't remember
☐ Three to five

15. How did you feel about the number of other **groups** you saw **per day**? (*check the appropriate box.)*

☐ Saw too few ☐ Saw too many ☐ I don't remember
☐ About right ☐ Didn't matter to me .....if number of other groups doesn't matter to you, go to question 18.

16. About how many other **groups** would you **prefer** to see **per day** when hiking the Chilkoot Trail? (*check the appropriate box.*)

☐ None ☐ Six to ten ☐ More than twenty
☐ One to two ☐ Eleven to twenty ☐ No expectation
☐ Three to five

17. What is the maximum number of other **groups** you could **accept** seeing **per day** before those hikers begin to detract from your enjoyment? (*check the appropriate box.*)

☐ None ☐ Six to ten ☐ More than twenty
☐ One to two ☐ Eleven to twenty ☐ No preference
☐ Three to five

18. At what **size** (number of hikers per group) do other groups of hikers become too large and begin to detract from your hiking experience? (*check the appropriate box.*)

☐ Two to four ☐ Eleven to twelve ☐ More than twenty
☐ Five to seven ☐ Thirteen to Fifteen ☐ Doesn't matter
☐ Eight to ten ☐ Sixteen to twenty

19. What is the maximum number of **hikers per group** you would prefer? (*check the appropriate box.*)

☐ Two to four ☐ Eleven to twelve ☐ More than twenty
☐ Five to seven ☐ Thirteen to Fifteen ☐ Doesn't matter
☐ Eight to ten ☐ Sixteen to twenty

20. Did you expect to see fewer hikers in some areas of CTNHS than others?

☐ No ☐ Yes (where? _____)

21. If visitation increases to the point where natural and cultural resources or visitor experiences are threatened, a number of management actions could be considered. Please indicate how you would feel about **each** of the following management actions. (*Circle the number that shows how much you would support or oppose each action*).

	Strongly Oppose	Oppose	Neutral	Support	Strongly Support
make hiking the trail more difficult by removing bridges and warming shelters	1	2	3	4	5
charge an entry fee for using the trail	1	2	3	4	5
limit the number of people per group	1	2	3	4	5
put more emphasis on educating users about minimum impact use	1	2	3	4	5
limit the number of non-profit organized hiking trips (e.g. scout, church, nature, military trips etc.)	1	2	3	4	5
provide more patrols to enforce regulations	1	2	3	4	5
limit the number of commercially guided hiking trips	1	2	3	4	5
begin some type of permit system to limit overnight use of CTNHS	1	2	3	4	5
limit the number of private hiking trips	1	2	3	4	5
build more campsites at designated campgrounds	1	2	3	4	5
limit the maximum length of stay per trip	1	2	3	4	5
limit the activities of special interest groups (runners, centennial events etc.)	1	2	3	4	5

22. In your opinion, visitor use levels in CTNHS: (*check the appropriate box.)*

- ☐ Should be lowered significantly
- ☐ Should be lowered slightly
- ☐ Should be kept at the present level
- ☐ Should be allowed to increase slightly
- ☐ Should be allowed to increase significantly
- ☐ I don't know enough about the area to say one way or the other

The Canadian and U. S. Parks Services are considering implementation of a use limit program in the event that resource and visitor conditions deem it necessary. Under this program, overnight use of CTNHS would be restricted to permit holders only. A limited number of permits would be available each day. Planning a permit system requires a great deal of public input. Your opinions are a crucial part of this process. The following questions pertain to developing a use limit program for CTNHS.

23. In allocating permits certain groups are often recognized. Please indicate how much you agree or disagree with each of the following allocation options. (*Circle the appropriate number.*)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) A percentage of permits should be set aside for commercially guided hiking trips.	1	2	3	4	5
b) A percentage of permits should be set aside for non-profit organized hiking trips (scouts, military, nature groups, schools etc.)	1	2	3	4	5
c) A percentage of permits should be set aside aside for local BC, Yukon, and Alaskan residents.	1	2	3	4	5
d) A percentage of permits should be set aside for visitors who have never hiked the trail before.	1	2	3	4	5
e) Treat everyone the same. No one group receives special recognition or preference for permits.	1	2	3	4	5
f) Other allocation method (please specify).	1	2	3	4	5

Which allocation option would you prefer? (*Indicate option letter.*) _____

24. Several methods exist for rationing permits to potential hikers. The most popular methods are listed below. Please indicate how much you agree or disagree with each of the following rationing mechanisms. (*Circle the appropriate number.*)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) Lottery - names randomly selected from applicants.	1	2	3	4	5
b) Advance reservations by phone or mail with early requests favoured over later requests.	1	2	3	4	5
c) Ration permits on a daily first come first served basis. Those in front of line get permits.	1	2	3	4	5

24. continued

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
d) Combine a lottery method with a first come first served method e.g. 50 % of daily permits by lottery, 50% by first come first served.	1	2	3	4	5
e) Combine an advance reservation method with a first come first served method e.g. 50% advance reservation and 50% first come first served.	1	2	3	4	5
f) Other rationing method (please specify).	1	2	3	4	5

_____

_____

Which rationing mechanism would you prefer? (*Indicate rationing letter.*) ____

25. Please indicate how much you agree or disagree with each of the following statements. (*Circle the appropriate number.*)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The permit system should designate where hikers must camp.	1	2	3	4	5
The permit system should only restrict access to the trailhead. Once on the trail, hikers should be free to select the campsite of their choice.	1	2	3	4	5
I would support a permit system that protects the site's natural and cultural resources and visitor experiences, even if it means being denied a permit.	1	2	3	4	5
Fewer permits should be issued for June and September to reflect the lower use these months traditionally receive, and enable a hiking trip with chances for fewer encounters with other parties.	1	2	3	4	5
The permit system should also apply to day users of CTNHS.	1	2	3	4	5
Overnight use of CTNHS should be limited now.	1	2	3	4	5
Overnight use of CTNHS should be limited during the Gold Rush Centennial.	1	2	3	4	5

26. How much time would you prefer to have between the date permits are issued and the start of the hiking season (June 1). (*Check the appropriate box*).

☐ Less than a month ☐ Four to six months ☐ Over a year
☐ One to three months ☐ Seven months to a year

27. How would implementation of a use limit program at CTNHS affect the quality of your hiking experience? It would: (*Check the appropriate box*)

☐ Strongly add to my experience
☐ Add to my experience
☐ Neither add or detract from my experience
☐ Detract from my experience
☐ Strongly detract from my experience

The following questions seek basic information about you personally. All responses will be held in the strictest confidence.

28. What is your age? _____

29. Are you: Male ☐ Female ☐

30. What is the highest education level you have completed so far? (*Circle one number.*)

1 Grade School
2 High School
3 Vocational /Technical School
4 Some College/University
5 College/University Graduate
6 Post Graduate Degree

31. Please indicate the country and province or state you are from.

Country _____

Province, Territory or State _____

32. What is your occupation? (*Please indicate what kind of work you do, not for whom you work. If you are a homemaker, student, retired, or unemployed, please indicate so.*) _____

33. Before hiking the Chilkoot Trail, had you hiked further than 53 kilometers (33 miles) on any one trip?

☐ No ☐ Yes

34. Before hiking the Chilkoot Trail, had you been on a longer hike in terms of days out on the trail?

☐ No ☐ Yes

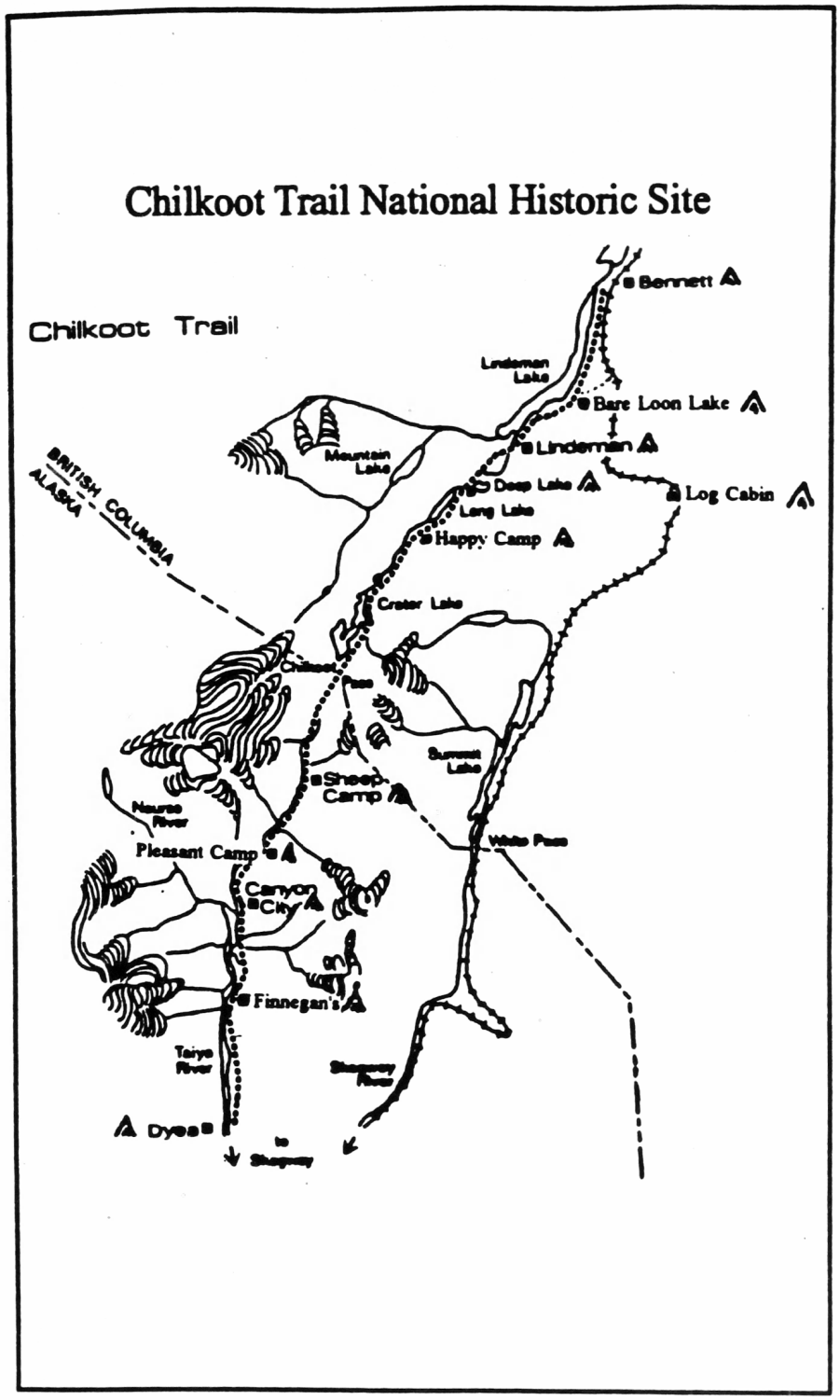
35. In which of Canada's official languages do you prefer to be addressed?

☐ French ☐ English

36. If you have any additional comments or suggestions on how to improve the management of CTNHS, please write them in the space provided below.

Please place your completed questionnaire in the pre-paid pre-addressed envelope provided and drop it in any convenient mailbox.

Thank You.


Chilkoot Trail National Historic Site
Chilkoot Trail
Bennett
Lindeman Lake
Bare Loon Lake
Lindeman
Mountain Lake
BRITISH COLUMBIA
ALASKA
Deep Lake
Log Cabin
Long Lake
Happy Camp
Crater Lake
Chilkoot Pass
Summit Lake
Sheep Camp
Nares River
Pleasant Camp
White Pass
Canyon City
Finnegan's
Tarya River
Dyea
to Skagway