

**THE EFFECTS OF A RESTRICTIVE MANAGEMENT APPROACH  
ON THE CHILKOOT TRAIL VISITOR POPULATION:  
A TWELVE-YEAR TREND STUDY**

by

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## **Abstract**

In 1997, Chilkoot Trail National Historic Site of Canada (CTNHSC) experienced several management changes, including implementation of a quota system and introduction of an overnight user fee. These restrictive management policies achieved the intended management goals: to reduce user volumes and redistribute use, which in turn would limit some impacts of recreational use; and to generate income for park management and operations. However, this study reveals that there is more to the story than this simple measure of success. Implementation of these regulations brought indirect consequences, affecting CTNHSC visitor experiences. It was observed that some visitors were displaced by this use of restrictive management, while others appear to have changed their expectations and reevaluated their experience at CTNHSC to match the current situation through a product shift. Use of a trend study design allowed observing these changes over time.

**Keywords:** multiple data sets, trends, visitor segmentation, stability, change, parks and protected areas.

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# Chapter 1: Introduction

## 1.1. Background information

The Parks Canada Agency is responsible for the management and protection of some of Canada's most valued heritage resources: National Parks and Reserves, Historic Sites, and Marine Conservation Areas of Canada. In the last two decades, Parks Canada has moved away from its dual mandate, which focused on visitor enjoyment and environmental conservation, to concentrating on protecting the ecological and commemorative integrity in Canadian national parks (Dearden and Dempsey, 2004). In order to satisfy its mandate, the agency committed to using both restrictive and non-restrictive management policies (Parks Canada, 1994). Using a restrictive management approach meant that Parks Canada would need to rely on certain regulations of visitor behaviour, while a non-restrictive approach would emphasize education and information (McCool and Christensen, 1996).

Despite its changed mandate, with increasing visitation levels at many of its parks, the agency still faces the challenge of providing opportunities for visitor enjoyment, without compromising the protection of the parks it manages. The *Report of the Panel on the Ecological Integrity of Canada's National Parks* (Parks Canada, 2000) recognized that part of the impact on park ecosystems was associated with the limited research on public use in the parks. The *2002 Parks Canada Science Strategy* was a first step towards

developing a comprehensive social science capacity addressing the urgent need for improved visitor management strategies (Parks Canada, 2004).

## **1.2. Research problem**

At the Chilkoot Trail National Historic Site of Canada (CTNHSC), visitors have experienced an increase in restrictive management policies over the last ten years. Following a steep increase in summer usage of the Chilkoot Trail in the early 1990s, CTNHSC managers were faced with the task of ensuring that recreation would be managed so as not to impair the ecological and commemorative integrity of the park. An average annual increase of 14.9 percent in public use between 1987 and 1993, and an expected 5,000 visitors for the 1998 Klondike Gold Rush Centennial celebrations, led Parks Canada to consider several management options to reduce recreational use impacts (Elliot, 1994). Such increase in visitation would have prevented Parks Canada from fulfilling its mandate of protecting the trail's natural and cultural resources and providing quality recreation experiences. It would have also resulted in other problems associated with the maintenance of facilities, the adequate provision of services to the public, and overworked staff (Elliot).

In an attempt to reduce the impacts of increased visitation levels, CTNHSC managers began by implementing a number of non-restrictive management techniques in the years leading up to the introduction of a use limit. In particular, campgrounds and trails were hardened and redefined more clearly, wet braided areas of trail were restored, more shelters were built to limit the impacts of cooking to specific areas, and pre-trip planning information was updated to reinforce the 'leave no trace' message (i.e. brochure, trip

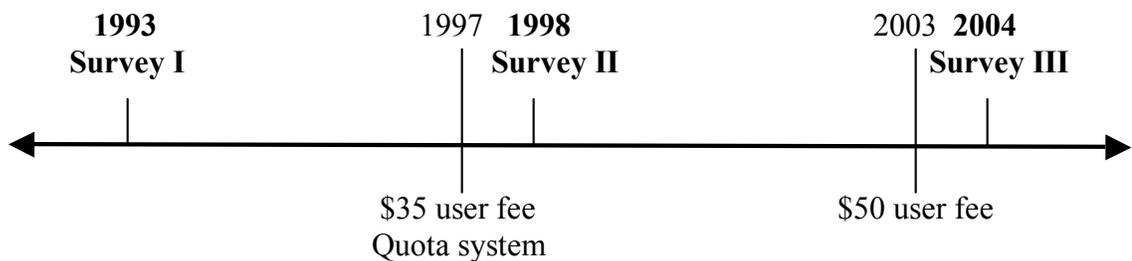
planning package, and video presented at the Skagway Trail Center). Despite their effort to reduce the impacts of increased visitation through a less restrictive management approach, CTNHSC managers realized that they would need to use more restrictive management tools to achieve park objectives.

Following interagency (i.e., Parks Canada and United States National Parks Service) and visitor consultations, a use limit program was introduced at CTNHSC in 1997. It limited the daily number of hikers crossing the Chilkoot Pass to fifty. The limit was originally proposed to be eighty (based on maximum campsite capacity at CTNHSC). That maximum was reduced to seventy to diminish the potential for excess use at certain campsites during periods of poor weather. The year prior to the formal limit of fifty being set, an evaluation by field staff revealed that seventy hikers per day was still too many. This led to the reduction in the number of permits to the implemented fifty hikers limit. Of the fifty permits, forty-two are available for advanced reservation. Eight are kept aside for unreserved walk-ons (i.e., last minute hikers). In addition, a maximum group size of twelve hikers per group and a quota of one large group allowed over the Chilkoot Pass each day were also implemented in 1997.

A \$35 user fee per hiker for overnight visits was also introduced in the summer of 1997. The fee was the result of federal legislation directing Parks Canada to recover the costs of providing services and facilities from those who directly benefit from them (Technos Information Strategies Inc., 1996). The fee increased to \$50 per hiker in the summer of 2003.

The implementation of a quota system and the introduction of user fees in 1997 may have affected the Chilkoot Trail visitor characteristics and use patterns in various ways. In an attempt to develop a better understanding of how the use of a restrictive approach to visitor management affected different types of visitors, this study pursues trend analyses of visitor composition at CTNHSC over a period of twelve years. During the period of this study, Chilkoot Trail summer visitors were surveyed at three different times about their experience on the trail. The intercept surveys occurred toward the end of their hikes and targeted all adult hikers. Figure 1 illustrates the timing of these visitor surveys, and also contains the points in time at which the quota system and various user fees were introduced to the area.

**Figure 1: Timeline of management changes and visitor research at CTNHSC**



### **1.3. Purpose and objectives**

This study is a long term empirical evaluation of change and stability in the CTNHSC visitor population. Its goal is to explore, inform, and improve the understanding of how visitors adjust to changed regulations in recreational settings over time. By fostering a better understanding of the impacts of management changes on the visitor population, it is anticipated that park management decision-making can be enhanced, specifically at CTNHSC, but also in other park settings in general. Such investigation will also

contribute to enhancing the human dimension of ecosystem-based management decisions that are designed to ensure the maintenance of Chilkoot Trail's wilderness character, commemorative integrity, and visitor enjoyment.

From a methodological perspective, this research contributes to the very limited number of longitudinal studies of visitors in parks and protected areas research. A greater understanding of the impacts of management policies on park visitors, based on repeated time ordered observations, may also contribute insights to the management of other protected areas with similar challenges and opportunities to that of CTNHSC.

Based on the overriding purpose of this project, the main research objectives are to:

- identify and evaluate the direction and intensity of change in visitor characteristics and use patterns over a twelve-year period that included several visitor management changes;
- determine if motivation-based segments of visitors can be distinguished in terms of their individual profile;
- relate observed visitor population changes to coincidental management interventions; and
- demonstrate the utility of longitudinal research designs to the enhancement of protected area management decision-making.

#### **1.4. Report organization**

This report is organized in six separate chapters. The first chapter described the context, purpose and goals of this study. Chapter two will describe the study area. The third chapter will provide an extensive review of the literature pertaining to visitor management strategies for protected areas and the specific techniques used at CTNHSC,

in addition to relevant research that has applied a trend study design. Chapter four will provide a description of the research methods and data analysis techniques used in this study. The results of the various analyses will be presented in chapter five. Finally, chapter six will discuss the results as they relate to management interventions at CTNHSC, and the use of a trend study design for recreation research.

## **Chapter 2: Study Area**

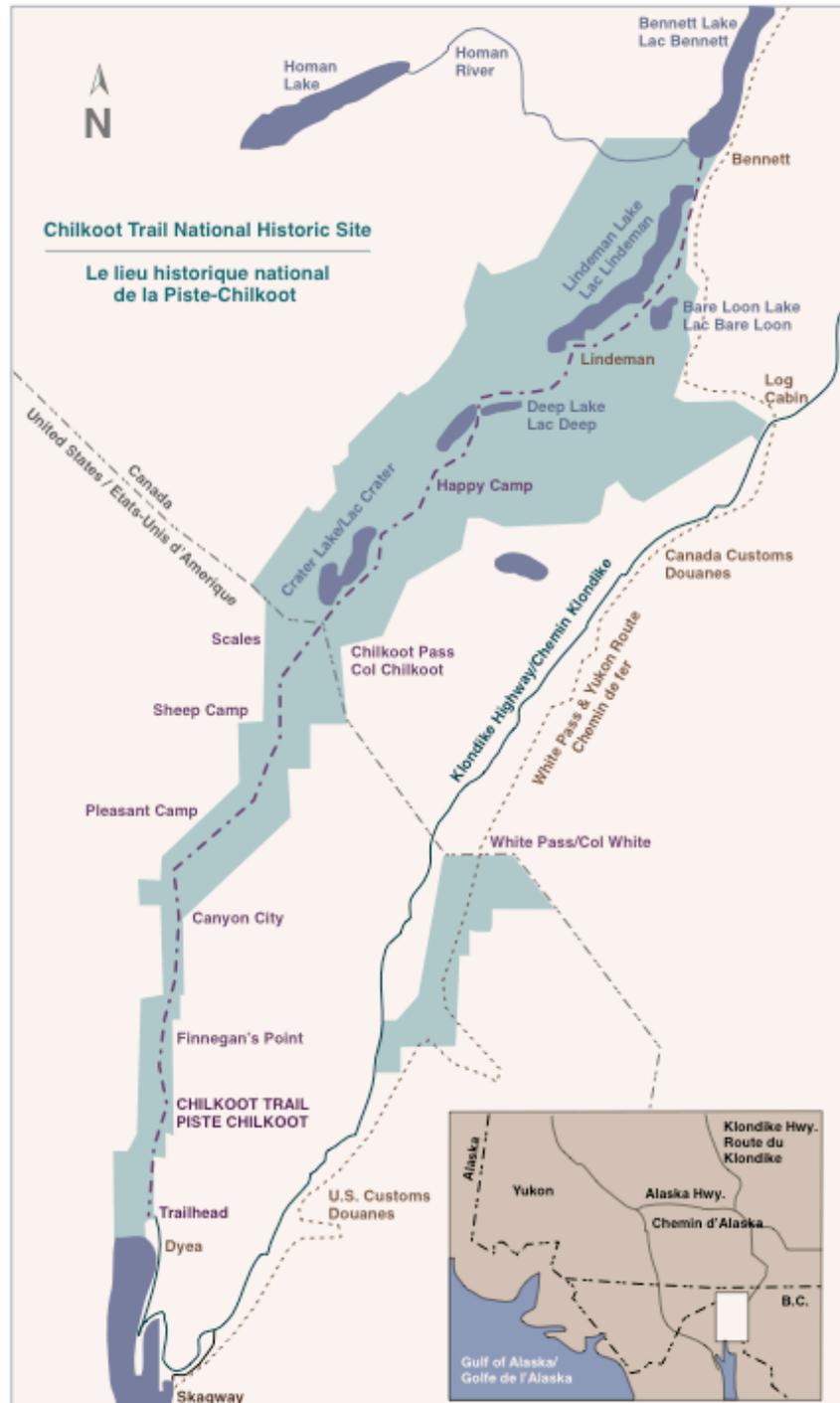
### **2.1. Regional setting of the Chilkoot Trail**

The Chilkoot Trail is a 53 kilometer (33 mile) linear hiking trail that is located between the historic towns of Dyea, Alaska, and Bennett, British Columbia (Figure 2). The Canadian portion of the trail extends for 26.6 kilometers north of the Chilkoot Pass and is part of the Chilkoot Trail National Historic site of Canada (CTNHSC), which encompasses an area of 135 square kilometers. The southern, American portion of the trail is part of the Klondike Gold Rush National Historical Park, and is managed by the United States National Parks Service.

### **2.2. Natural environment**

The Chilkoot Trail is set in a large natural landscape and presents hikers with dramatic views, as well as a diversity of climates, terrains, and vegetations. The trail begins at tidewater level in Dyea, Alaska, reaches its highest point at 1074 meters, where the Chilkoot Pass is located, and returns to approximately 700 meters above sea level in Bennett City, British Columbia. The trail takes hikers into the Pacific Northwest coastal forest of Alaska, above the treeline (around 900 meters above sea level) and into alpine tundra, and finally into the subalpine boreal forest of British Columbia.

Figure 2: Chilkoot Trail National Historic Site map



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The three ecosystems found along the trail differ greatly in terms of wildlife and vegetations. The coastal forest sits in a mild marine climate and consists mainly of hemlock and Sitka spruce. Black and grizzly bears, boreal toads, bald eagles, river otters, pink and chum salmon, and the American dipper all prosper under these conditions. The alpine tundra is mostly devoid of vegetation; only mosses, lichens, heaths, dwarf shrubs, and low-growing willows survive this alpine climate. Arctic ground squirrels, hoarv marmots, pikas, and a few mountain goats can also be observed in this section of the trail. The subalpine boreal forest of British Columbia is a much dryer and less dense forest than the coastal forest from the Alaskan side of the trail. The boreal forest is comprised of subalpine fir, lodgepole pine, willow, and alder. A variety of wildlife can also be observed under these conditions, including moose, black and grizzly bears, wolverine, ruffed grouse, and white throated sparrows.

Most of the forest surrounding the trail is second growth. It is a reminder of the use and abuse of the environment along the trail by thousands of stampedeers during the Klondike Gold Rush. Stampedeers used the wood to build villages and boats on their way to the Klondike.

### **2.3. Cultural environment**

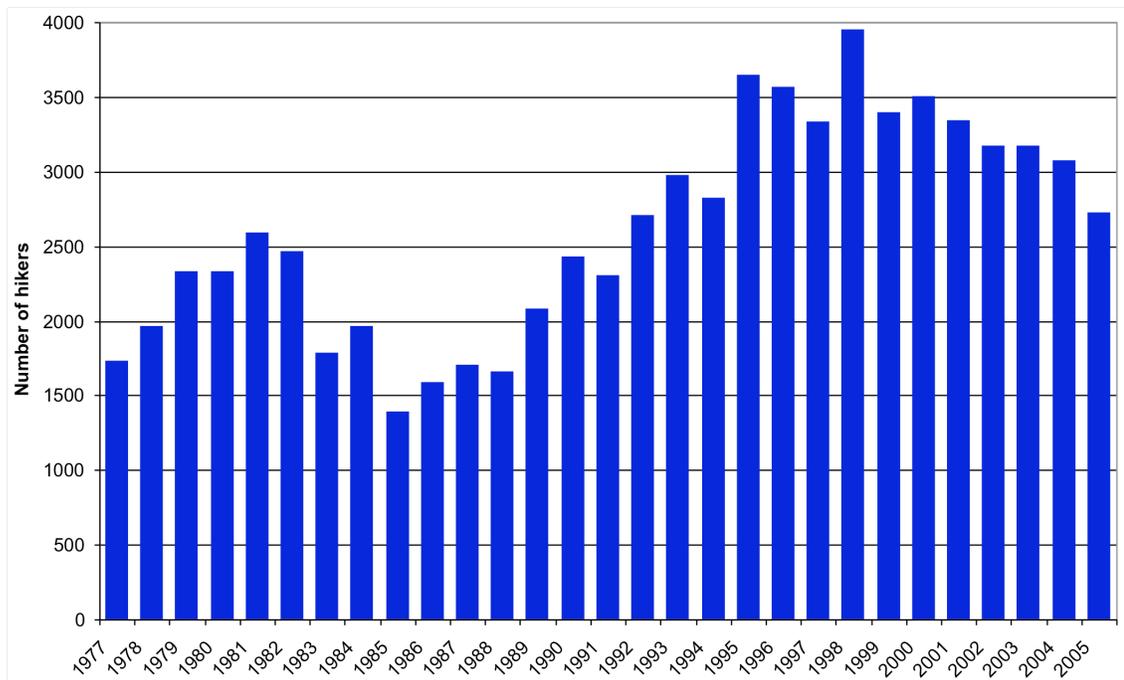
The CTNHSC commemorates the use of the trail by thousands of stampedeers during the Klondike Gold Rush period of 1896-99. Other heritage values of the trail relate to its pre-Gold Rush use by aboriginals and prospectors, and post-Gold Rush backcountry recreational use. The trail is located in Carcross/Tagish and Taku River Tlingit First Nations' traditional territories. Aboriginal subsistence use of this area continues.

## 2.4. Recreational environment

Currently, the Chilkoot Trail is mainly used as a backcountry recreational hiking trail. Its historical resources and wilderness-based setting attract a few thousands of visitors every year. Over the twelve-year of this study (1993-2004), an average of 3,300 hikers have visited CTNHSC every summer. As observed in Figure 3, almost 4,000 hikers visited CTNHSC in 1998. This increase was attributed to that year's Klondike Gold Rush Centennial Celebrations.

During the summer of 2004, a total of 3,080 visitors hiked the Chilkoot Trail. According to data from CTNHSC's registration system, the majority (98%) were overnight hikers. Most (96%) hiked the trail south to north, as Klondike stampeders did historically.

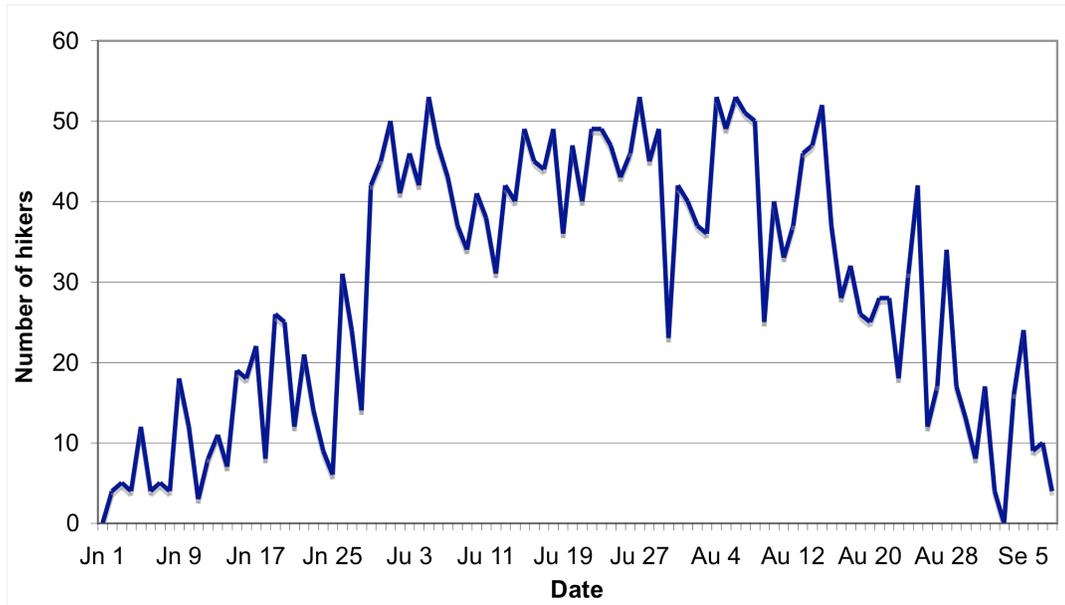
**Figure 3: Total number of hikers<sup>1</sup>, 1977 to 2005**



<sup>1</sup> Sources: 1997 and later – CTNHSC registration system; 1996 and earlier – On-trail data collected by Parks Canada staff

Peak visitation takes place during the months of July and August. In 2004, more than two thousand visitors, or 80 percent of the annual visitation occurred during those two months (Figure 4).

**Figure 4: Daily number of Chilkoot Trail hikers<sup>1</sup>, 2004**



## 2.5. Managerial environment

The management of the Chilkoot Trail falls under two different jurisdictions, Canada and the United States. Parks Canada has authority over the northern portion of the trail while its counterpart, the United States National Parks Service, manages the southern American side of the trail. The Yukon Field Unit is responsible for northwestern Canadian Heritage Sites and has managed CTNHSC, in addition to Kluane National Park and Reserve, S.S. Klondike National Historic Site and other National Historic Sites in Dawson City, including the Dawson Historical Complex, S.S. Keno, and Dredge No.4.

<sup>1</sup> Based on the number of hikers going over the Chilkoot Pass each day

## **Chapter 3: Literature Review**

An extensive amount of literature exists on the topic of recreational use management for protected areas. This section begins by outlining existing literature on the topic of visitor management. It focuses on restrictive management policies for protecting natural and cultural resources at heritage sites, and their potential impact on the visitors and visitor experiences. As such, the costs, benefits, effects, and associated trade-offs of several management policies relevant to the present case study are identified and described.

Another area of interest for this research is the application of the trend study design, and more specifically trend studies involving the use of survey questionnaires as their main research instrument. A review of several trend studies, which included changes at the managerial level in their analyses and the effects of such changes on the recreationists, is provided. Finally, literature relevant to the data analysis techniques used to achieve the objectives of this project is also presented.

### **3.1. Management of park visitors**

Hermer (2002) perceives today's North American parks as "highly sanitized landscape[s], that [are] intensely ordered, that tell people where to go, what to do, and how long to do it" (p. 45). He also sees our national parks as 'regulated wildernesses' that

preserve specimen of nature in an era of ‘environmental toxification’ and warns that “parks remain the most taken for granted and unexamined regulatory [institutional] forms in North American society” (p. 113).

**Figure 5: Restrictions on wilderness visitors**



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As presented in Figure 5, park managers sometimes have to restrict recreational use in order to protect park resources. Although a restrictive approach may sometimes be essential to achieve park objectives, it is important for managers to understand the implications of different alternative management actions in order to make wise decisions that maximize visitor enjoyment while protecting park resources. In an attempt to

understand the implications associated with such management strategy, several approaches to recreational use management are presented below.

Eagles, McCool, and Haynes (2002) describe three general strategies for the management of visitor behaviour in wilderness settings: direct regulations, directive measures, and indirect measures. Direct regulations and directive measures are considered restrictive management approaches because they regulate, conduct, guide, or control visitor behaviour (Eagles et al.). Indirect measures, on the other hand, are non-restrictive because they retain the locus of control within the visitor, by leaving it up to them to make their own choices and decisions (Eagles et al.).

Direct regulations usually rely on the force of law to enforce regulations and control visitor behaviour (McCool and Christensen, 1996). Examples of direct regulations include the introduction of seasonal or temporal limit on use levels, group size limits, or restrictions on group types or activities allowed. The growing occurrence of direct regulations in North American parks points to the implicit assumption that directly regulating visitors is often perceived by park managers as more effective in protecting park resources than less direct techniques (McCool and Christensen).

The second type of restrictive tools consists in directive measures, which conduct and guide visitor behaviour, but in a subtler and gentler way than direct regulations (Eagles et al., 2002). Directive measures typically target the design of a protected area in terms of its accessibility or layout, or they control use through methods such as park zoning and

differential pricing. These techniques allow managers to channel visitor use towards more desirable areas or times, and away from more sensitive or dangerous areas, and busier periods of use.

Finally, a non-restrictive management approach applies indirect measures in an attempt to modify visitor decisions (Eagles et al., 2002). Indirect measures require the transmission of information through interpretation programs, education, and other learning opportunities. A non-restrictive approach to visitor management may be as effective as a restrictive one in mitigating some types of impact, while usually being less obtrusive to visitors. For example, the development of voluntary and self-regulating codes of conduct can influence visitor attitudes and behaviour through the provision of information and persuasion (Johnston, 1997). Although the literature strongly advocates the use of less restrictive techniques, it is important to remember that indirect management does not have the potential to reduce all types of undesirable behaviour (Vorkinn, 1998).

Some restrictive and non-restrictive management policies may be implemented for other purposes than modifying visitor behaviour. In particular, although recreational user fees may be used to control behaviour through geographical or temporal redistribution of use as a means to relieve congestion (Eagles et al., 2002), they are most often introduced to generate revenues for park management. The introduction of a user fee at CTNHSC was not aimed at modifying visitor behaviour, but rather at redirecting some of the operational costs of management to those who directly benefit from their use.

Bixler, Noe, and Hammitt (1992) investigated the relationship of visitors' environmental attitudes, knowledge of park damage, and previous park experience with visitor receptiveness to non-restrictive and restrictive recreational management policies. Although they acknowledge that some visitor impact must be controlled through restrictive policies, they point out that restrictive measures could cause an erosion of public support, further threatening a park's integrity.

Rather than viewing management tools as a dichotomous choice between restrictive and non-restrictive management actions, McCool and Christensen (1996) suggest considering the set of visitor management tools as part of a continuum in terms of their effectiveness and their level of burden on the visitor. In any case, when faced with having to make subjective and value-based decisions, protected area managers should be primarily concerned with providing appropriate experiences to as many people as possible, within the limits of other park management goals such as protecting and preserving ecological and commemorative integrity. By looking at the regional recreational context and using distinctive management strategies for different areas within a region, managers may be able to meet the needs of a wider range of visitors by allowing the provision of a variety of opportunities (Hall and Cole, 2000; Stewart and Cole, 2001; Wagar, 1964). Such regional strategy would allow staying away from the homogenization of recreation settings.

Lucas (1983) warns that recreationists' acceptance of restrictive policies must not be mistaken with preference for them. Although visitors may be willing to accept the use of

restrictive approaches for the management of visitors at protected areas, they may prefer less restrictive ones (McCool and Christensen, 1996). The costs and effectiveness of any management decision must therefore be evaluated carefully before its introduction. When possible, less obtrusive management forms should take precedence over more restrictive ones. If restrictions and regulations are necessary, their purpose should be clearly understood by recreationists if they are to be seen as legitimate. When park visitors understand the rationale for the use of a restrictive approach, they are more likely to abide by the prescribed rules and regulations, thus reducing costs to management through the reduced necessity for enforcement (Bixler et al., 1992). Hermer (2002) outlines the importance of park employees to gain respect and compliance of visitors by using “tact, sensitivity, and knowledge, rather than threats of arrest and court action” (p. 42). By developing a permission-driven compliance system, Hermer proposes that parks will be seen as “a permissive whole that is congruent with the notion of an innocent, unrestrictive, ‘natural’ space” (p. 44).

The cumulative burden of policies should be taken into account when determining what the costs of management actions really are. According to Hammitt and Cole (1998), it is preferable to communicate restrictions during the planning stage of a trip, rather than during a recreational activity. Doing so helps reduce the costs to the visitors. However, recreationists who are intolerant to regulations may still be displaced. On the whole, internal non-restrictive approaches are preferable to external regulatory approaches; when regulations are necessary, an external approach is preferable (Hammitt and Cole).

### **3.2. Recreation regulations**

Park regulations are generally aimed at reducing environmental and personal risks (Hermer, 2002). Personal (or safety) risks relate to the potential for injuries or death to visitors. Regulations that attempt to minimize personal risks may result in costs to some visitors, through the reduction of recreational opportunities, but also in benefits to others, who may gain access to areas as a result of restriction on other activities (e.g., a restriction on powerboats allows for increased swimming areas). Safety risks entail potential financial losses to park agencies, communities, and even host nations, through the logistic disruptions of search-and-rescue operations, and the risks to rescuers (Johnston, 1997). They may also be associated to some environmental costs; for example, an aggressive bear may have to be put down if it is perceived as an excessive threat to visitors (Johnston).

Environmental risks on the other hand relate to the management of resource impacts that are attributable to recreational use of wilderness areas (Hermer, 2002). Managing environmental risks can be tricky because ecosystem functions are highly interrelated, and management actions attempting to minimize some types of environmental impact could result in impacts elsewhere. For example, in an attempt to address the problem of limited terrain available for pit privies and their short life span, CTNHSC managers introduced fly out privies. But, by attempting to solve one set of problems, others were created, including higher maintenance cost and noise pollution.

Hammitt and Cole (1998) warn that some environmental impact is an inevitable consequence of use and therefore, management cannot eliminate all of these effects, unless they are willing to totally prohibit recreational use. Sometimes, a certain amount of environmental impacts may be desirable if it helps mitigate others. An example would be the development of a campsite so that use is concentrated in one area, potentially limiting the impacts of camping to a fixed perimeter. Hammitt and Cole also remind us that ecosystem change is a normal process and thus, managers should not attempt to halt change altogether, but rather halt undesirable change. As an ultimate goal, they propose that finding an optimal balance, where both recreational experiences and natural ecosystems will be compromised to some extent, is key to deal with the conflicting goals of national parks.

A third type of recreation regulations focuses on the right of each individual to enjoy their recreational experience through the reduction of visitor interference. In that sense, regulations may serve to preserve personal freedoms, which many would not otherwise enjoy (McCool and Christensen, 1996). Such regulations may attempt to decrease interference between inherently conflicting activities (e.g., horseback riding and mountain biking), which, if left unmanaged, could result in reduced satisfaction for all parties. Peace and quiet are also often perceived as qualities inherent to nature (Hermer, 2002); policies such as curfews and party size limits may eliminate some visitor freedoms, but result in providing other, more valuable ones (Lucas, 1983).

It would be a major mistake to assume that recreation regulations are likely to affect all park users (or potential users who are displaced by these management decisions) in the same way and at the same level. Restrictive actions will affect the recreational environment in a variety of ways depending on visitors' needs and expectations (Hammitt and Cole, 1998). Vorkinn (1998) found that place attachment may be important in understanding human responses to changes in the recreational environment. Existing users are usually more heavily impacted by management actions than are first-time users.

According to Vorkinn (1998), possible visitor responses to a change in the recreation environment in terms of an increase in rules and regulations can be both cognitive and behavioural. A product shift is a cognitive coping mechanism, which requires visitors to redefine their overall experience toward a more positive evaluation (Vorkinn). In the face of changing recreational environments visitors may also use behavioural coping strategies such as substitution or displacement. Substitution requires a change in the activity in which recreationists engage (Vorkinn), while displacement is "a process in which recreationists are driven away from a preferred place due to changes in conditions resulting from management action or lack thereof" (Hall and Cole, 2000, p. 119).

Hall and Cole's (2000) definition of displacement reformulates the traditional definition, which suggested that displacement was associated with impacts at overly used wilderness areas such as crowding and resource damage. Their new definition takes into account the needs of different visitors who may be more affected by the effects of management actions, for example through costs such as reduced personal freedom, than by the effects

of inaction and the resulting visitor crowding and resource damage (Hall and Cole). Although the study of displacement due to crowding or overly impacted recreation areas has been the subject of multiple wilderness recreation research (Hall and Cole, 2000; Kuentzel and Heberlein, 1992; Kuentzel and Heberlein, 2003; Robertson and Regula, 1994; Shelby, Bregenzer, and Johnson, 1988; Stewart and Cole, 2001), displacement of those sensitive to recreation regulations has not been the subject of as much research (Hall and Cole, 2000; Shelby et al., 1988; Vorkinn, 1998).

The following subsections describe restrictive management policies that have been implemented at CTNHSC during the period of this study. First, the general reasons for using these specific management techniques are presented, followed by some of the potential costs and benefits of each technique on different user groups.

### **3.2.1. Quota system**

Use limits consist in direct restrictions on the number of people that may enter an area at one time (McCool, 2001) and usually serve as visitor distribution systems, helping to redistribute use spatially or temporarily (Hammit and Cole, 1998). Limits are often based on the perceived carrying capacity of an area, which relates to a set volume of recreational use that an area can support before it becomes detrimental to the biophysical/cultural resources, visitor experiences, and management programs (Haas, 1999; McCool, 2001). Numerous researchers have attempted to determine the relationship between use levels, encounters, and perceived crowding, without much conclusive findings, if not for the inconsistency between these variables (Kuentzel and Heberlein, 2003; Stewart and Cole, 2001).

Limits on use level may result in benefits by maintaining use at a predetermined level and, potentially, helping in controlling biophysical and social consequences of rapidly growing use levels (McCool, 2001). However, because such programs restrict access to an area, their largest cost accrue in the reduction of visitor individual freedom; in addition, the administration of a use limit program may be financially costly to management (McCool and Christensen, 1996).

McCool (2001) suggests that instead of solving the problems associated with high recreational use, use limits only shift the burden to other areas, which may see increases in their use as visitors seek areas without the restrictive environment. Stewart and Cole (2001) suggest that in order to provide a few visitors with slightly more benefits, use limits require that access be denied to some visitors who have to forgo all the benefits of recreational engagement. According to these authors, a substantial increase in overall experience quality that exceeds the costs of limiting use to others is necessary to justify the use of such policy (McCool; Stewart and Cole). Hall and Cole (2000) found that although some visitors do adapt to use limits, others do not and are displaced or discouraged from visiting an area.

Visitor preferences and reported acceptability for direct management, such as public use limits, may be influenced by their motives to visit the setting (McCool and Christensen, 1996; Wagar, 1964). For example, when their motivation is solitude, the benefits of a recreation limit (i.e., increased quality experience) may outweigh its costs (i.e., less

recreation) (Wagar). However, empirical research suggests that use limits may in fact not be favouring visitors that are less tolerant to crowding, but instead those who are more tolerant to regulations (Hall and Cole, 2000). In order to favour visitors that are less tolerant to crowding, Hall and Cole suggest that a use limit would have to be set at a considerably low level.

Trip scheduling is another restrictive approach to visitor management, which involves establishing location and timing of individual group use of an area (Eagles et al., 2002). Trip scheduling is used to control and limit congestion, thus providing more opportunities for solitude and reducing competition among visitors for limited space. This tool may also benefit management by facilitating interpretation and ensuring a constant and predictable flow of visitors (Eagles et al.). However, it may also reduce visitors' level of individual freedom, in addition to increased administrative costs to the agency administering the schedule and permit system (Eagles et al.). At CTNHSC, trip scheduling is limited to the designation of specific dates when hikers are allowed to go over the Chilkoot Pass. Although it is necessary for hikers to have a planned itinerary at the time of reservation/purchase of permit, itineraries are not enforced; a more restrictive use of the technique at CTNHSC could include designated campsites, enforced itineraries, or specific dates of departure and arrival at trailheads.

Since their initial implementation in the 1970s, public use limits have generated much controversy around the issue of equity because of their inherent distributional consequences (McCool, 2001). When the demand for recreational opportunities exceeds

supply (as determined by the use limit), rationing or allocation mechanisms are used to distribute permits among potential visitors. In Canadian national parks, the most commonly used mechanisms to allocate permits are the queuing and request systems. The request system requires visitors to reserve in advance, therefore favouring those who are able to plan ahead (Hammitt and Cole, 1998). Queuing on the other hand allocates permits among visitors on a first-come, first-served basis. In contrast to the request approach, this allocation technique favours those with low opportunity costs for their time, as well as those who live nearby (Hammitt and Cole).

Several other allocation mechanisms exist, each with their own costs and benefits to different visitors. Permits may be allocated through a lottery; because it is based on chance, this approach does not benefit a particular group over another (Hammitt and Cole, 1998). Canadian National parks have yet to use this allocation tool, but it has proven to be useful in allocating hunting permits. Pricing is another rationing technique, which excludes those who cannot afford or are not willing to pay for an experience (Harris and Driver, 1987). Finally, a merit system rations use based on visitors' skills and knowledge, favouring those who are able and willing to invest in the training required to meet the requirements that have been set for specific areas or activities by the park agency (Hammitt and Cole).

Group size limits restrict the number of people in one group of recreationists travelling together (Eagles et al., 2002). Studies have shown that negative impacts on the park environment, on other hikers' experiences, and on park facilities may be decreased with

the introduction of group size limits (Hammitt and Cole, 1998). As such, maximum group sizes have usually been established to minimize the impact of very large groups on the resource and visitor experiences. Because relatively few visitors are actually affected by such a restrictive policy (i.e., the majority of hikers travel in small groups), the majority will usually support such an initiative (Monz, Roggenbuck, Cole, Brame, and Yoder, 2000).

Group size limits may interfere with some of the goals of wilderness management through the displacement of large organized groups (McCool and Christensen, 1996); some types of experience such as school outings provide important societal benefits which may be lost with the introduction of limits on the maximum group size allowed in an area. To counter such negative impact, a common practice has been to implement quota on the total number of large parties allowed at certain places or times. At CTNHSC, a limit of one large group (9-12 hikers) per day allowed over the Chilkoot Pass was implemented as part of the quota system.

Although group size limits usually refer to a maximum group size, minimum party size restrictions have also been experimented with in Canada (Tucker, 2001). In addition to reducing personal risks, such policy can benefit certain wildlife species that are more affected by the number of group encounters than by the total number visitors (Tucker). Banff National Park managers introduced a minimum group size of six for the Moraine Lake backcountry area in an attempt to reduce the impacts of recreational use on grizzly

bear. By decreasing the total number of encounters between visitors and the animals, park managers expect the level of recreational use impact to be reduced (Tucker).

### **3.2.2. Recreational user fees**

Recreational user fees can achieve several protected area management objectives. They can offset some or all operating costs of providing recreational services and protecting park environments from use. They can also be used as management tools to decrease visitation levels during peak season or at heavily used areas (Van Sickle and Eagles, 1998). By decreasing or redistributing use, user fees can help reduce congestion and ecological damage in sensitive areas (Eagles et al., 2002). Differential pricing can also achieve some desirable social purposes, such as favouring local or less privileged sectors of society in using protected areas (Eagles et al.).

National Parks require large budgets to manage visitor use and protect park resources. Because government funding is often insufficient, agencies turn to user fees for additional funding (Van Sickle and Eagles, 1998). Proponents of user fees believe that cost recovery and revenue generation are legitimate justifications for charging recreational user fees in national parks, and that user fees allow parks to increase the quality of services and facilities (Harris and Driver, 1987). Opponents believe that it is unfair to charge recreationists twice, once through taxation and again with user fees; they also believe that fee programs discriminate against those who cannot afford to pay (Buckley, 2003; More and Stevens, 2000).

In a 1995 study of CTNHSC visitors' willingness to pay to hike the Chilkoot Trail, it was found that several factors affected visitors' responses to such charges. In particular, responses varied according to the demand for the services, as well as visitors' perception about the value, and more specifically the fair value, of the service. Other factors influencing visitor reactions to recreational user fees included the attitude of front-line staff in communicating information about fees, the availability of different choices relating to the fees, the changes implemented in the services offered to compensate for the introduction/increase of charges, and weather (Techneos Information Strategies Inc., 1996).

### **3.3. Trend studies in the field of leisure and recreation**

Research on recreational use and users of protected areas has mostly used cross-sectional study designs, which provides only 'snapshots' of the current situation (Crompton and Kim, 2004). When management policies are informed by cross-sectional survey research, it is impossible to determine if visitor composition, along with individual characteristics, behaviour, expectations, and experience evaluations, have changed as a result of structural or contextual change (Kuentzel and Heberlein, 2003). Kuentzel and Heberlein claim "the only way to observe the potential for change, either in visitor composition or in the normative standards of visitors, is to measure social conditions and visitor evaluations at a single site over time" (p. 351). Although cross-sectional visitor use research is useful for the provision of current information on the state of a wilderness and its recreational use, it becomes much more valuable if repeated so that both current and trend information can be generated.

Different types of longitudinal study designs have been used for wilderness visitor research. The main feature common to all of them is that they require data to be gathered on the same variables over a period of time, with the objective of measuring and evaluating change (Menard, 2002; Taris, 2000; Wright, Rogers, and Backman, 2001). The trend study design is a type of longitudinal research that combines data from cross-sectional studies in order to analyze ongoing patterns, and allow researchers to track change within some general population (Kuentzel and Heberlein, 1992; Wright et al., 2001).

More than twenty years ago, Lucas (1985) published the first comprehensive wilderness recreational use trend study after realizing that “effective planning for the management of outdoor recreational use requires not only the knowledge of the current situation but also indications of the dynamics of change” (p. 1). At that time, Roggenbuck and Lucas (1987) believed that the shortage of such type of research was due to the lack of a cost-effective, accurate technique.

A few researchers followed Lucas’ (1985) advice to pursue more longitudinal research, but studies that provide thorough evaluations of change and stability in outdoor recreation use patterns and user characteristics are still scarce. A decade after Lucas’ pleads, Jackson and Witt (1994) found that “lack of replication [was still] one of the most serious problems of leisure research” (1994, p. 322). Still in 2001, Hammitt, Backman, and Davis declared that although a Trends Conference in Outdoor Recreation and Tourism was held every five years, an evaluation of the papers that were presented at the conference

revealed that “most of the papers are comparisons of data to previous literature, rather than replication-longitudinal comparisons of data change over time” (2001, p. 290). Yet again, Mowen, Payne, and Scott found in 2005 that “only a few [researchers] have actually examined stability and variation in leisure constraints using exact survey replications” (2005, p. 192).

Longitudinal research evaluating the influence of changing attributes and management actions on recreational experiences has been even scarcer. Mowen et al. (2005) point out that even in longitudinal research, too few researchers discuss how management changes have impacted specific populations. They believe that incorporating managerial and structural changes in longitudinal recreation analyses would increase the relevance of research to agencies’ organizational programs and planning. A few researchers have attempted to evaluate visitor responses to managerial changes at wilderness areas using the trend study design; although there may exist additional unpublished research on this type of time-ordered evaluation of organizational changes, the discussion below comprises all such studies published in the academic literature or in the readily available grey literature (i.e., the web).

In a study of carrying capacity and norms of crowding at the Apostle Islands National Lakeshore, Kuentzel and Heberlein (2003) used both the panel (a 10-year panel of 1975, and a 12-year panel of 1985 visitors) and the trend study designs (i.e., three repeated cross-sectional surveys of the Apostle Islands boater population from 1975, 1985, and 1997). During the period of their study, the area evolved in terms of management and

service infrastructure as it was declared a National Lakeshore in 1970. In addition, a change in the boat ownership structure occurred in the late 1970s. The introduction of a U.S. federal government tax policy allowed people to treat boat ownership as vacation property and permitted them to claim investment tax credits on such good. After the 1986 tax reform, the tax shelter was removed. This led to the 1988 collapse of sailboat sales. Kuentzel and Heberlein questioned the possible impacts of these structural and institutional changes on respondents' perceptions of, and preferences for their recreational experiences at the Apostle Islands.

Between 1975 and 1985, total visitation levels more than doubled at the National Lakeshore, and remained relatively stable between 1985 and 1997 (the total number of overnight visitors increased by 17% during the second time period of their study). Nevertheless, Kuentzel and Heberlein (2003) found that visitor encounter level preferences increased during the first period of their study, and stabilized during the second time period, leaving them perplexed. What caused visitors to feel more crowded in 1975 than they did in 1985, despite the doubling of overnight visitors during that period? Why did 1997 visitors' perceived crowding norms decrease to levels similar to those of 1975, but with twice as many boaters in the area? The authors believe that the Apostle Islands stabilized as the area evolved. In the first period of their study (1975-1985), the area was still 'young' as a national park. During this discovery and development phase, visitors were learning about access to the area, park services facilities, and anchoring options. During that period, visitor preferences and expectations

may not have been established and well delineated. As the system stabilized, normative standards may have also stabilized.

Using the panel and trend study designs, Vorkinn (1998) examined recreationists' cognitive and behavioural responses to the introduction of restrictive regulations at one of Norway's first areas to restrict camping outside of commercial campgrounds. In addition to being restricted with regard to their camping location, visitors also had to pay for the opportunity of camping, which was formerly provided at no cost. Vorkinn investigated changes in user volume, user composition, and existing users' responses to the introduction of the regulations. The results showed a decrease in camper volume and a change in camper composition, possibly due to the displacement of certain visitors.

Vorkinn also observed cognitive changes in terms of area attractiveness and visitor satisfaction among existing campers. However, no substitution was needed, meaning that campers were able to participate in the same activities as before the regulations.

Vorkinn's evaluation of visitor responses to management regulations took place over a four-year period, or two years prior and one year after the implementation of the regulations. The author suggests that the situation may still be unstable for such a short term evaluation of the regulations, and that changes may continue to occur in the longer term. Vorkinn believes that triangulation in the study design (i.e., volume count, repeated cross-sectional surveys, and a panel study of existing users) was necessary to come up with an overall picture of the impact of management regulations on visitor responses.

Hall and Cole (2000) also investigated displacement of visitors that are sensitive to recreation regulations at the Oregon wilderness area. Their study examined visitors to three wilderness areas with high use in 1991 and again in 1997, for displacement due to both crowding and regulations. During the period of their study, one of the three areas implemented a use limit program, while the other two did not. Hall and Cole observed more changes in the visitor profile of users in the area where a use limit program was implemented, than in the other two. In 1991, visitors to the three sites believed that use levels should not be capped or reduced. While this was still true for the two areas that had not implemented public use limits in 1997, most visitors to the area that did implement a use limit supported the program and were also first time users. Hall and Cole concluded that the use limit program had displaced those intolerant to regulations, but had not attracted ‘purists’ as is often the goal when implementing such programs (i.e., providing more opportunities for solitude and less crowding). One of two possible explanations for their findings is that in order to see improvement in crowding levels and attract purists, the restrictive management policies must reduce visitation to very low levels. The other possibility is that restrictive management policies favour a regulation-tolerant clientele rather than purists, displacing both purists and those intolerant to regulations.

In a ten-year trend study (1991 and 2001), Mowen et al. (2005) investigated changes and stability in general park use constraints of Northeast Ohio’s residents (i.e., both park users and non-users). During the period of their study, the Park District made an effort to reduce park use constraints by enhancing the visibility of its ranger corps, continuing its strategy of placing park amenities near higher traffic areas, maintaining the physical

appearance of parks to discourage vandalism and other forms of crime, and increasing informal crime monitoring. Taking into consideration structural changes in terms of park agency efforts to reduce visitation constraints, Mowen et al. examined trends in the relationships between specific sub-populations (defined in terms of socio-demographics), and constraints/constraints negotiation preferences. They suggest that such segmentation of visitors may provide evidence for an organization's progress in reducing constraints toward targeted sub-groups. They found that although park visitation increased, and despite agency efforts to reduce park use constraints, overall and certain sub-populations' perceived visitation constraints remained stable. They believe that factors independent of the park agency control could have influenced respondents' perceived constraints.

### **3.4. Trend data analysis**

The analysis of trend study data requires an evaluation of the level of stability (i.e., similarities) and change (i.e., differences) in the same variables over time, for different samples of the population studied (Menard, 2002). The trend study design allows for aggregate analyses of respondents from the studied population, but contrary to panel studies, does not allow for disaggregate analyses of intra-individual differences (Wright et al., 2001; Menard). Even though trend studies do not allow for intra-individual comparisons, similar patterns of change may be measured by grouping cases in well-defined segments, as long as the cases are comparable at the group level from one cross-section to another (Menard). For example, a panel of visitors allows understanding changes in specific individuals over time, while repeated cross-sections of the same population allow understanding changes at the group level.

One goal of trend studies may be to identify and understand the strength and consistency of trends in visitor and visit characteristics across several trend studies or time periods. For example, Cole, Watson, and Roggenbuck (1995) investigated commonalities and differences among five wilderness use trend studies. The researchers replicated visitor surveys in three American wildernesses: the Boundary waters Canoe Area (1969 & 1991), the Shining Rock Wilderness Area (1978 & 1990), and the Desolation Wilderness Area (1972 & 1990), and were also supplied with data from two additional wilderness trend studies: the Bob Marshall Wilderness Complex in 1970 and 1982 (Lucas, 1985), and the Great Smoky Mountains National Park in 1973 and 1983 (Burde and Curran, 1986).

Cole et al. (1995) began their analysis by examining the trend studies separately, using chi-square tests, and t-tests to evaluate the differences found between mean responses or percentages of respondents in the original studies and their replications. They then classified the results based on two features: 1) whether or not a significant change could be observed, and 2) when a significant change was observed, if the direction of the change was consistent between the case studies. They developed five categories of responses to constitute a framework for the evaluation of strength and consistency in trends observed amongst the different cases (Table 1).

**Table 1: Framework for the evaluation of strength and consistency of trends across three wilderness areas<sup>1</sup>**

<b>Trend Evaluation Framework</b>	
<b>Strong consistent trend</b>	Significant change in the same direction in at least three areas and no opposing trends
<b>Weakly consistent trend</b>	Change in the same direction in all areas but not significant in at least three areas
<b>No change</b>	No significant change in either direction
<b>Strong inconsistent change</b>	Significant change in opposing directions or significant change in one direction and at least two areas with change in opposing directions
<b>Weakly inconsistent change</b>	Significant change in one direction and non-significant change in opposing directions

Although this type of descriptive data analysis (e.g., Cole et al., 1995) is common in trend research, Jackson and Witt (1994) believe that replication is not merely a matter of comparing descriptive findings from one survey to another. It should progress to the comparison of relationships among variables over time. For that purpose, more in-depth analyses are necessary to truly understand change and stability in the studied population.

Principal component analysis (PCA) is a factor analysis technique that has been used in several trend studies (Barich and Bielby, 1996; Cordell, Herbert, and Pandolfi, 1999; Cordell, Tarrant, and Green, 2003; Hammitt et al., 2001). This multivariate statistical technique reduces a large number of variables to a smaller set of factors or latent variables, which explain a sizeable portion of the variance found in the initial set of variables. In trend studies, separate PCAs are usually undertaken for different years (for each cross-section) in order to compare underlying dimensions in the same variables, but for different samples of the same population over time (Taris, 2000). The same method is usually used for panel studies, but instead of comparing different cases (i.e., different

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<sup>1</sup> Source: Cole et al. (1995)

individuals over the years), the PCA is undertaken multiple times for the different measures of the same cases (i.e., same individuals over the years) and variables (Crompton and Kim, 2004; Wicks and Backman, 1994; Wright et al., 2001).

As mentioned earlier, Menard (2002) suggests that grouping trend study survey respondents in well-defined segments allows measuring patterns of change across time in distinctive clusters of visitors. The identification of subgroups to summarize visitor information may help identify differences among them, and potentially assist managers in meeting different groups' needs or identifying which groups of visitor may be most impacted by management actions (McDonald and Hammitt, 1986).

In recreation research, segmentations of visitors based on underlying dimensions generated by PCA are frequently undertaken to develop distinct visitor clusters, which can then be analyzed further among themselves (Moscardo, Morrison, Pearce, Lang, O'Leary, 1995; Pearce and Lee, 2005; Smale, 1992). However, to the best of this author's knowledge, this segmentation method has not reportedly been used to develop comparable clusters of visitors across multiple cross-sections of trend studies. In addition, this technique does not appear to have been used to compare the same visitors among themselves and across time for panel data. Instead, recreation researchers using longitudinal designs have usually relied on segmentations of visitors by socio-demographic or trip characteristic variables to then compare the sub-populations among themselves and across time (Cordell et al., 1999; Cordell et al., 2003; Iwasaki and Smale, 1998; Jackson and Witt, 1994; Mowen et al., 2005). Although this type of segmentation

is still being used, it has now been recognized that this method may result in rather heterogeneous segments because these characteristics are usually not highly related to visitor expectations or behaviour (Smale). Benefit segmentation has emerged as the preferred method for deriving relatively homogenous market segments from a study population (Moscardo et al.; Pearce and Lee; Smale).

Using a cross-sectional study design, Moscardo et al. (1995) and Smale (1992) looked at individual travel motivations in an attempt to understand tourist behaviour, preferences, expectations, and satisfaction. These authors began their analysis by undertaking a PCA of visitors' responses to a list of motives so as to uncover underlying motive dimensions in their samples' motivation patterns. In both studies, the PCA was undertaken in an exploratory way so as to extract components which best summarized the populations' motivations. The researchers then used cluster and discriminant analyses to segment respondents for further comparisons. Using the segments generated by these analyses, they could determine if the uniqueness of each visitor segment, which was based on underlying benefit dimensions, could also be distinguished on the basis of other factors of the visitor profile.

Several of the data analyses techniques presented in this section are used for the present case study. Details on how they are used to achieve this project's objectives are presented in the latter half of Chapter 4, following a detailed description of the methods used in the data collection phase of this study.

## **Chapter 4: Methods – Trend Analysis of Survey Data**

The purpose of this study was to understand how CTNHSC visitors were affected by the introduction of several restrictive management policies. As such, a multiyear analysis of trends in CTNHSC visitor population profile was undertaken. The research methods consist of a multi-step process, using data from three parallel visitor surveys of 1993, 1998, and 2004 summer CTNHSC hiker populations. Data analyses focused on the stability and changes in CTNHSC visitor characteristics and use patterns over a period of twelve years, during which several visitor management policies were introduced.

### **4.1. Data collection**

In order to understand how the introduction of management policies was associated with change or stability in the CTNHSC visitor profile, it was imperative to investigate the visitor population at several points in time. Longitudinal data concerning these profiles of CTNHSC visitors are available from visitor surveys undertaken with Chilkoot Trail users at several points in time since 1976. In 1976, Womble et al. (1978) set out to provide baseline information about the trail's hikers. In 1986, two years prior to the establishment of Chilkoot Trail as a National Historic Site of Canada, another visitor survey was undertaken to document the opinions and concerns of trail users regarding the development and management of the proposed park (Canadian Parks Service, 1989). The

original data from two subsequent studies, undertaken in the summers of 1993 and 1998, were used for this project. An additional set of data was collected from the same hiker population in the summer 2004.

The main data collection instrument for the three studies used for this project consisted of a self-administered, on-site questionnaire. It was comprised mostly of close-ended questions, including likert-scale, numerical, and categorical types of questions. The comparisons of cross-sectional data may be compromised or completely unsuitable for longitudinal analysis if researchers deviate from the original sampling or administration procedures (Martin, 1983). The 2004 summer recreational study therefore replicated 1993 and 1998 instrumentation and survey administration procedures as closely as possible. The 1976 and 1986 studies applied different instrumentations and survey procedures, thereby making comparisons impossible.

The original visitor survey used for this trend study was undertaken in the summer of 1993 (Elliot, 1994), and thus prior to the introduction of restrictive policies in 1997. This baseline survey describes the visitors prior to the management changes and acts as a benchmark to which later surveys can be compared. Respondents were asked about their personal characteristics, their trip, their motivations, preferences, and their opinions concerning several actual or potential problems in the park. Another objective of the 1993 survey was to assist in the design of the use limit program and help set an appropriate fee level for the Chilkoot Trail.

The second survey was undertaken in the summer of 1998 (Jackson, 1998). It was conducted one year after the implementation of the 35\$ user fee for overnight users and the quota system. Again, visitors were asked about their trail use, their motivations, preferences, and opinions on problems in the park. In addition, their opinions on the recently implemented restrictive use policies and their social encounter norms were collected.

Following an increase in user fee to \$50 per visitor for overnight users in 2003, the *2004 CTNHSC Summer Recreational Use Study* (Légaré and Haider, 2005) provided another snapshot of the CTNHSC visitor population. The 2004 survey was practically identical to the 1998 survey, with the exception that an additional question inquired about visitors' perceptions of various types of potential future development for the trail. For the present analysis, sections that were part of all three surveys are investigated further. In some instances, questions that were included in the 1998 and 2004 visitor surveys only are also considered for further analyses.

The field component of the two follow-up studies (i.e., 1998 and 2004) was kept as similar as possible to the initial procedures of 1993. For all three studies, hikers were contacted near the completion of their hike at kilometer 46.7 of the Chilkoot Trail, where the Bare Loon campsite is located (See Figure 2). This location is most appropriate, because the majority of visitors hike the Chilkoot Trail from south to north. It is also the furthest point north before the 'cut off' trail to Log Cabin. Conducting the visitor survey at the Bennett City campsite (i.e., at the northern trailhead) would have omitted hikers

who exit the trail by foot through Log Cabin instead of catching the train from Bennett. A shortcoming of this survey site is that most hikers completed the survey prior to the end of their trip (6.4 km away from the Bennett trailhead) and therefore, prior to visiting that area.

The floating random sampling technique was used to intercept study participants. The researcher selected participants as they walked in the Bare Loon campsite area. After a visitor had agreed to participate in the study and had received a questionnaire, the researcher moved on to the next available individual. This was considered to be the most appropriate selection approach because the flow of hikers passing by the study site was neither constant nor known. Randomness in the sample selection process was ensured by the equal likelihood of each hiker being intercepted during one of the five sampling periods between June and August of each study season. Hikers who agreed to participate in the study could either answer the questionnaire on-site, or return it in a self-addressed, stamped envelope.

In 2004, sampling occurred over four periods of eight consecutive days on a two-week rotation. In addition, an initial four-day sampling period over one week in late June was conducted. Overall, a total of 28 sampling days occurred. Sampling days were split between two different six-hour shifts: 8:00 to 14:00 and 14:00 to 20:00. Sampling activities alternated between morning and afternoon shifts. The target population consisted of all adult hikers who passed by the Bare Loon campsite during one of five pre-determined sampling periods between June 29<sup>th</sup> and August 24<sup>th</sup>. Based on the

CTNHSC registration system, the number of hikers estimated to have passed by this location during the sampling period is 1,261, of which a total of 641 hikers (50.8%) were intercepted. Of those intercepted:

- 571 (96.8%) of the 590 hikers who satisfied the sample selection criteria (i.e., adult hikers passing by the Bare Loon campsite during one of the sampling periods) received a survey questionnaire;
- the overall response rate was 80.4 percent, with a total of 459 surveys completed;
- a majority of respondents (96.1%) completed the questionnaire on-site, but without help from the researcher;
- the on-site response rate was 86.1 percent (434 of 504), while the mail-in response rate was much lower at 37.3 percent (25 of 67).

Similar sampling periods and schedules were used for the 1993 and 1998 studies, and the target populations and sample selection techniques were the same. During the 1998 study, 597 visitors were intercepted, and a total of 505 surveys were completed for an overall response rate of 84.6 percent. In 1993, a total of 480 surveys were completed, out of 503 surveys distributed to hikers. This created a 95 percent response rate. Reminder cards were mailed to hikers who had taken the surveys off-site in 1993 only, resulting in a higher return achieved.

For the longitudinal analysis in this study, the total number of respondents is 1,444, distributed over the three survey years. Approximately 85 percent of respondents were hiking the Chilkoot Trail for the first time in all three years (see Figure 18). Hence it is very unlikely that any one would have answered the survey in other years. Based on these response rates, the margin of error for this study is within 5 percent at the 95 percent confidence level.

## **4.2. Analytical techniques**

This study investigates change (i.e., differences) and stability (i.e., similarities) in the CTNHSC visitor profile over a twelve-year period, by looking at how various dimensions of the profile have changed in three distinct, but highly comparable visitor surveys. The purpose is exploratory rather than explanatory. As such, the study investigates several general aspects of visitor market composition instead of testing narrower hypotheses. A combined database, including all comparable data from three visitor surveys over a period of twelve years, was assembled to facilitate comparisons between respondents.

The complete dataset (1,444 cases) will be analyzed using the *Statistical Package for the Social Sciences* (SPSS 11.0) software. Overall and segment-specific trend analyses will be undertaken on the CTNHSC visitor population. The first step of the data analysis will involve simple descriptive analyses with the aim to summarize the data and detect general trends. The second data analysis phase will entail a segmentation of the visitors using the combined database. Underlying motivational dimensions will be used to determine representative visitor experience segments and investigate specific trends in the visitor profile and composition of park visitor segments.

### **4.2.1. Phase I: Analysis of change in the visitor population**

Associated with the introduction of several management policies in the case study area, there is a possibility that the general composition of the Chilkoot Trail visitor population has changed. If management policies affected user populations, it would be expected that such impacts would be apparent in visitor profiles in succeeding time periods. This study will therefore begin by exploring if variations can be observed in visitor profile

characteristics. When they are apparent, a description of the direction and intensity of those variations will also be presented. Independent samples t-tests and chi-square tests for two-way contingency tables (crosstabulations) will be used to determine if significant changes in mean responses and percentages of respondents are observed for visitor and visit characteristic variables.

The first stage of the data analysis will closely follow Cole et al.'s (1995) approach for the evaluation of the strength and consistency in trends observed. A similar framework to theirs will therefore be used to evaluate trends between the two study periods at CTNHSC (Table 2). Because only two sets of data comparison are available for this study, their framework, which was designed for comparing multiple trend studies (see Table 1), was adapted to the conditions of this study.

**Table 2: Framework for the evaluation of strength and consistency of trends across two time periods**

<b>Trend Evaluation Framework</b>	
<b>Strong consistent trend</b>	Significant change in the same direction for both study periods
<b>Weakly consistent trend</b>	Significant change for one study period and no change in the other
<b>No change</b>	No significant change in either direction
<b>Strong inconsistent change</b>	Significant change in opposing directions

#### **4.2.2. Phase II: Analysis of change in visitor segments**

The CTNHSC experience may have attracted somewhat different types of hikers at various times in this study. Potentially, hikers who were more sensitive to regulations may have been displaced after 1997, when several restrictions were implemented. It is also possible that the benefits of those regulations outweighed their costs, or that their introduction may not have affected hikers' decision to visit the trail. In an attempt to

understand how managerial changes may have affected different types of visitors, the complete dataset will, in this second stage of the analysis, be segmented based on the importance individual hikers attributed to different motivation statements. These segments will then be compared across time, thus allowing the comparison of groups seeking the same type of experiences across the different time periods of this study.

The segmentation will progress through three stages. First, an exploratory principal components analysis (PCA) of the combined database will be undertaken to identify general underlying relationships and patterns between motivation variables. In all three surveys, visitors were asked to rate the same twenty-four motivation items for hiking the Chilkoot Trail on a scale ranging from 1 (very important) to 4 (not important at all). The scores on the 24 motivation items will be subjected to a PCA with Varimax rotation.

Smale (1992) suggests that responses to all motivation items are necessary in order to be considered in a motivation-based segmentation analysis. Hence, incomplete data will be deleted from further analyses.

The second step in the segmentation analysis will classify respondents into separate clusters according to intra-personal motivational trends as observed in their responses to the 24 motivational items. The cluster analysis will be hierarchical, and will use Ward's method and squared Euclidian distances algorithms. A shortcoming of hierarchical clustering methods is that grouping between respondents at each level of the analysis is dependent upon what happened at the previous level (Chakrapani, 2004). A discriminant analysis can rectify such shortcoming (Smale, 1992) and will therefore be undertaken for

the same data. Because the PCA and cluster analysis will be performed on the combined dataset over the three years of observation, it will then be possible to define segments by years, providing the trend perspective.

As a last step, segments will be compared on other visitor profile characteristics in order to determine if these motivation-based clusters differ from each other in terms of demographics, travel patterns, preferences, perceived management issues, etc. One-way analyses of variance, including Bonferroni's test for multiple comparisons, and chi-square tests for two-way contingency tables will be used to determine if significant differences exist in visitor profile variables among the visitor segments. By relating each cluster back to the visitor profile characteristics, it will be possible to observe if change in the visitor segments are related to other visitor profile characteristics.

### **4.3. Limitations**

As with other studies of this type, limitations associated with the data collection and analysis methods used are discussed below.

#### **4.3.1. Data collection methods**

A problem specific to longitudinal visitor surveys is that in order to maintain continuity in the data collection over the period studied, measurement refinements and improved techniques that are developed after the initial study may not be incorporated in later studies. This limits advancement and possibly the quality of the data collection procedures used.

Another potential problem is that visitors' stated preferences do not always represent reality (Cole and Daniels, 2004). As with other survey-based techniques, the use of questionnaires as the main data collection instrument may provide data that do not correctly reflect visitors' actual preferences or responses to management changes.

A potential issue specifically associated with this study relates to the sampling frame chosen. Current CTNHSC visitors may not be representative of the entire CTNHSC visitor population. Potential visitors (i.e., those who inquire about the trail, but never make a reservation/purchase a permit) were not included in the sample of visitors. Their potential discontentment with the trail conditions and regulations were not taken into account in this study.

One further constraint relating to this case study is that both the recreational user fee and the quota system were implemented at CTNHSC at the same time, therefore limiting the possibility of disassociating their specific impact on the visitor population.

Finally, one of the three summers during which sampling occurred was 'irregular.' Unfortunately, the 1998 survey occurred during the summer of the Klondike Gold Rush Centennial celebrations, which may potentially have an effect on visitors' responses.

#### **4.3.2. Data analysis methods**

There are often difficulties in disassociating societal trends and other external factors from case study trends in longitudinal research (Kuentzel and Heberlein, 2003; Mowen et al., 2005). Because this study is not experimental (i.e., does not control for exogenous

variables), it is only possible to infer how societal trends have affected the CTNHSC visitor population. Another limitation in survey data analysis is the possibility of multicollinearity existing between independent variables. Multicollinearity exists when independent variables are correlated or if an independent variable responds in a linear way with the remaining independent variables (Grapentine, 1997). When attempting to relate management actions to changes observed in the case-study population, the limitations associated to this type of empirical studies are taken into account.

## **Chapter 5: Survey Results**

Two complementary data analyses were undertaken to investigate how the CTNHSC visitor population has been impacted by the implementation of restrictive policies. As a first step, trends in the overall data were investigated to understand general patterns of change in the visitor population. The second phase of analysis tested how various motivation-based visitor segments may have been affected by the management changes. The findings derived from these analyses will be presented in this chapter.

### **5.1. Change and stability in the visitor profile**

To determine if, and to understand how, the CTNHSC visitor profile changed at the aggregate level during the twelve years of this study, tests of significance and of direction of change were undertaken for each visitor characteristic and use pattern variable that had been evaluated in all three surveys. First, the direction (increase/decrease) and intensity of change (significance level of  $< 0.05$ ) for each variable and each time period were evaluated. Then, using the framework for the evaluation of trends (see Table 2 for the modified after Cole et al. framework), variables were classified in terms of the strength and the consistency in their direction of change, over the complete period of this study.

### **5.1.1. Direction and intensity of change**

The intensity of change for categorical variables was evaluated using Pearson's chi-square test for crosstabulations. In Table 3, checks (√) are used to indicate statistically significant differences between the distributions. One check (√) denotes a change of alpha a priori of 0.05 and two checks (√√) of 0.01. An X signifies that no significant change was observed for that variable over the time period. For variables showing significant differences in both time periods, visual evaluations of the direction of change were undertaken to determine if it was consistent.

Changes were observed in all categorical variables for at least one of the two study periods (Table 3). During the first time period (1993-1998), visitors' education and backcountry experience, both in terms of trail length and multi-day experiences, changed significantly. No change was observed in these variables for the second time period. On the other hand, visitors' gender and country of origin (residence) distributions changed significantly in the second time period only; almost half of all visitors are now female hikers and more Canadians hike the trail, while less overseas visitors do so than earlier on in this study. Finally, three variables changed significantly and consistently in the same direction in both time periods (i.e., preferred maximum group size, advance planning period, and type of personal party); after 1993, hikers reported a preference for larger maximum group sizes, planned their trips more in advance, and hiked the trail with both friends and family instead of with friends only.

**Table 3: Comparison of distributions for categorical variables**

Categorical variables	Significant difference	Significant difference	Same direction
	1993 – 1998	1998 – 2004	
Gender	X	√	n/a
Education level	√	X	n/a
Residence	X	√√	n/a
Hiking experience – Length	√	X	n/a
Hiking experience – Multi-day	√√	X	n/a
Maximum group size preferred	√√	√	Yes
Advance planning period	√√	√√	Yes
Type of personal party	√√	√√	Yes

Numerical variables, including responses to likert-scale type of questions, were evaluated using independent samples t-tests. Table 4 summarizes the intensity and direction of change for numerical variables of the visitor profile (excluding motivation variables, which are presented in Table 5). One arrow (→) signifies a significant change with an alpha a priori of 0.05 along with the direction of the change (an arrow pointing left indicates a decrease, and right an increase, in mean response), whereas two arrows (→→) refers to a change with an alpha a priori of 0.01. An X signifies that no significant change was observed in mean response for that variable during that time period.

As indicated in Table 4, two numerical visitor profile variables out of four changed significantly in one of the two time periods of this study. Visitors' mean age increased significantly over the first time period (1993-1998), while visitors' mean group size increased over the second time period of the study (1998-2004).

**Table 4: Comparison of mean responses for numerical variables**

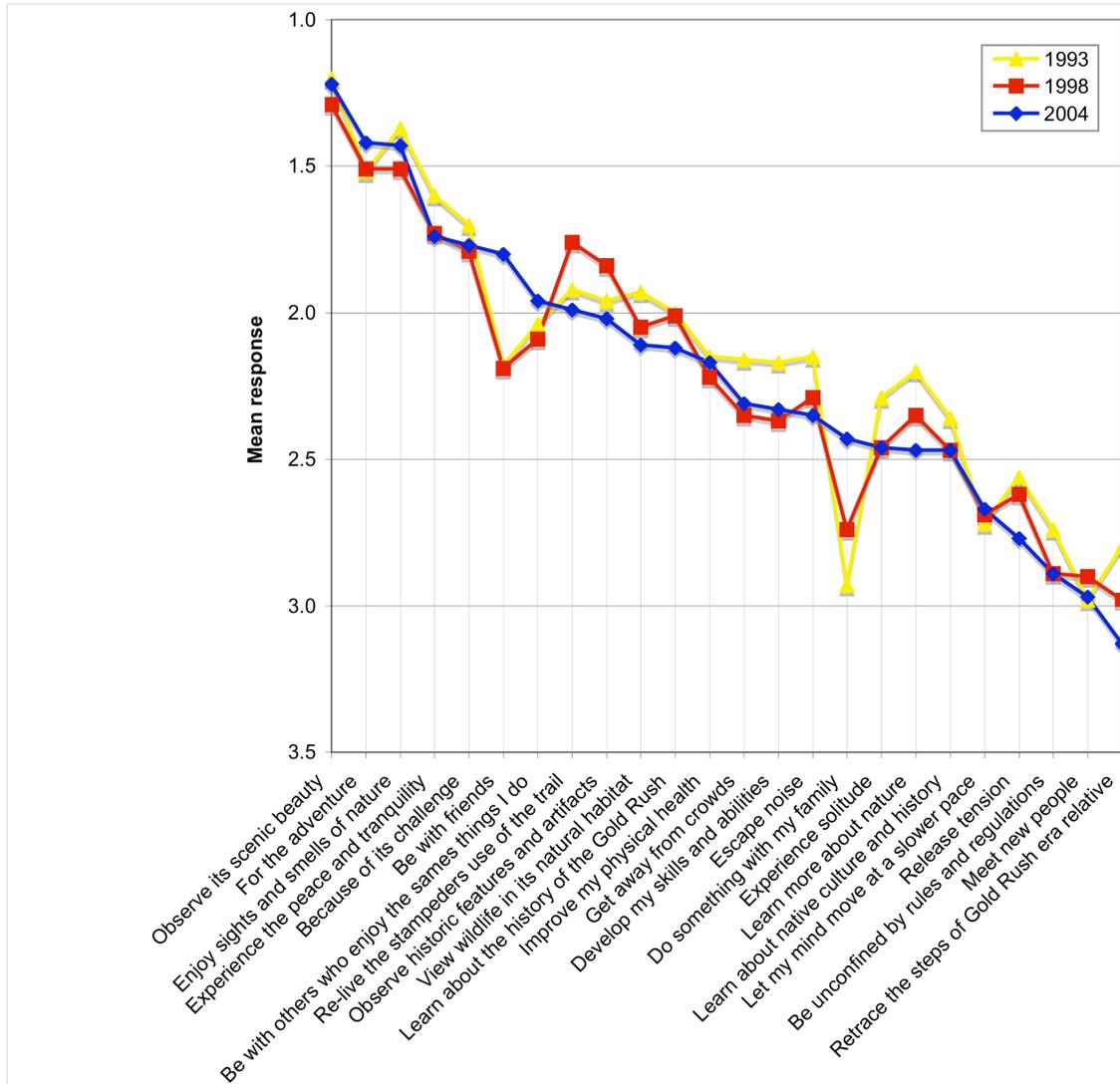
Numerical variables	Mean responses		Significant difference	Mean responses		Significant difference
	1993	1998		1998	2004	
Age	33.82	37.50	→→	37.50	38.68	X
Number of CT hikes	1.27	1.41	X	1.41	1.35	X
Total group size	4.22	4.20	X	4.20	4.88	→→
Number of nights on the trail	3.58	3.83	X	3.83	3.85	X

Overall, the importance of various motivations to visit CTNHSC has remained relatively stable over the years, with some notable exceptions (Figure 6). Generally, the importance of motivations such as peace and solitude has decreased, while the importance of social aspects of trail hiking has increased over the years. Changes in three motivation items have been consistent (have significantly changed in the same direction) over both periods of the study: the mean importance of *doing something with my family* has significantly increased in both time periods, while the mean importance of the items *learning more about nature* and *retracing the steps of a Gold Rush era relative* decreased. Another three variables changed in opposite directions. *Observing the trail's scenic beauty* was significantly less important in 1998, while *re-living the stampede's use of the trail*, and *observing historic features and artifacts* were significantly more important for 1998 respondents only.

Eight motivation factors decreased significantly in importance during the first time period only (i.e., *enjoy sights and smells of nature*, *experience the peace and tranquility*, *view wildlife in its natural habitat*, *get away from crowds*, *develop my skills and ability*, *escape noise*, *experience solitude*, and *be unconfined by rules and regulations*). Interestingly, visitors' reported importance to *be unconfined by rules and regulations* decreased at the

same time as regulations were introduced at CTNHSC. Finally, the importance of *being with friends* and *being with others who enjoy the same things I do* increased significantly during the second period of this study. Figure 6 depicts visitors' mean responses to the 24 motivation items. The motivation items are sorted from most to least important factors as reported by 2004 hikers.

**Figure 6: Mean<sup>1</sup> importance of motivational factors, by year**



<sup>1</sup> Based on a scale ranging from 1 (very important) to 4 (not at all important)

Table 5 summarizes the direction and intensity of change in mean importance over the three years of observation for the 24 motivation items.

**Table 5: Comparison of mean<sup>1</sup> importance of motivations for visiting CTNHSC**

Motivation items	Mean importance		Significant difference	Mean importance		Significant difference
	1993	1998		1998	2004	
Observe its scenic beauty	1.20	1.29	→→	1.29	1.22	←
For the adventure	1.52	1.51	X	1.51	1.42	X
Enjoy sights and smells of nature	1.37	1.51	→→	1.51	1.43	X
Experience the peace and tranquility	1.60	1.73	→	1.73	1.74	X
Because of its challenge	1.70	1.79	X	1.79	1.77	X
Be with friends	2.18	2.19	X	2.19	1.80	←←
Be with others who enjoy the same things I do	2.04	2.09	X	2.09	1.96	←
Re-live the stamperders use of the trail	1.92	1.76	←←	1.76	1.99	→→
Observe historic features and artifacts	1.96	1.84	←	1.84	2.02	→→
View wildlife in its natural habitat	1.93	2.05	→	2.05	2.11	X
Learn about the history of the Gold Rush	2.00	2.01	X	2.01	2.12	X
Improve my physical health	2.15	2.22	X	2.22	2.17	X
Get away from crowds	2.16	2.35	→→	2.35	2.31	X
Develop my skills and abilities	2.17	2.37	→→	2.37	2.33	X
Escape noise	2.15	2.29	→	2.29	2.35	X
Do something with my family	2.93	2.74	←	2.74	2.43	←←
Experience solitude	2.29	2.46	→	2.46	2.46	X
Learn about native culture and history	2.36	2.47	X	2.47	2.47	X
Learn more about nature	2.20	2.35	→	2.35	2.47	→
Let my mind move at a slower pace	2.72	2.69	X	2.69	2.67	X
Release tension	2.56	2.62	X	2.62	2.77	→
Be unconfined by rules and regulations	2.74	2.89	→	2.89	2.89	X
Meet new people	2.98	2.90	X	2.90	2.97	X
Retrace the steps of a Gold Rush era relative	2.80	2.98	→	2.98	3.13	→

### 5.1.2. Strength and consistency of change

Of the thirty-six visitor profile variables evaluated above, twenty-seven showed significant change in at least one study period, with nine of those changing significantly in both time periods (Table 6). Three of these nine variables changed in opposing directions (*strong inconsistent change*), while the other six changed significantly in the

<sup>1</sup> Based on a scale ranging from 1 (very important) to 4 (not important at all)

same direction (*strong consistent trend*). A total of eighteen variables changed in one of the two periods only (*weak consistent trend*); of those, twelve items changed significantly in the 1993-1998 period, whereas only six did between 1998 and 2004. Finally, nine variables did not change over the period studied (*no change*). Table 6 summarizes these findings. Motivation items are followed by a (M) to distinguish them from other visitor profile variables.

**Table 6: Strength and consistency of trends across two time periods for 36 variables**

<b>Trend observed</b>	<b>Visitor or visit characteristics</b>
<b>Strong consistent trend</b>	Maximum group size preferred
	Advance planning period
	Type of personal party
	Do something with my family (M)
	Learn about nature (M)
	Retrace the steps of a Gold Rush era relative (M)
<b>Weakly consistent trend (significant change observed in 1st time period only)</b>	Age
	Education level
	Hiking experience – Length
	Hiking experience – Multi-day
	Enjoy sights and smells of nature (M)
	View wildlife in its natural habitat (M)
	Get away from crowds (M)
	Develop my skills and abilities (M)
	Escape noise (M)
	Experience solitude (M)
	Be unconfined by rules and regulations (M)
<b>Weakly consistent trend (significant change observed in 2nd time period only)</b>	Gender
	Residence
	Total group size
	Be with friends (M)
	Release tension (M)
	Experience the peace and tranquility (M)
	Be with others who enjoy the same things I do (M)

Trend observed	Visitor or visit characteristics
No change	Number of Chilkoot Trail hikes
	Number of nights on the trail
	For the adventure (M)
	Because of its challenge (M)
	Learn about the history of the Gold Rush (M)
	Improve my physical health (M)
	Learn about native culture and history (M)
	Let my mind move at a slower pace (M)
Strong inconsistent change	Meet new people (M)
	Relive the stampeder's use of the trail (M)
	Observe historic features and artifacts (M)
	Observe its scenic beauty (M)

These results provide evidence of an overall change in several aspects of the visitor profile over the twelve years of this study. In the following section, efforts are made to determine if these changes are observed across the whole visitor population or if they are only observed in certain segments of visitors.

## 5.2. Motivational segmentation of visitors

A segmentation of visitors based on an importance rating of motivation items allows organizing the sample in terms of types of recreational experience sought (Smale, 1992). Such analysis divides the population based on underlying motivation dimensions, generating visitor segments that are distinctive on an inter-segment basis, and are internally homogeneous. The total number of cases qualifying for the segmentation analysis (i.e., with responses to all 24 motivation items) was 1,151.

### 5.2.1. Underlying motivation dimensions of park visitors

A PCA of the 24 motivation items was undertaken for the entire database. When retaining all components with an Eigenvalue greater than one, the PCA resulted in six

factors<sup>1</sup>. Because one component could not be interpreted, a five-component solution was eventually retained for further analysis (Table 7), which explain 55.8 percent of the total variance for Eigenvalues greater than 1.273 (Table 8). The five underlying motivation dimensions were labeled as: 1) solitude and nature, 2) heritage significance, 3) challenge and adventure, 4) nature appreciation, and 5) social interaction.

**Table 7: Principal component analysis of motivations for visiting CTNHSC**

Motivations	Varimax rotated factor loadings by factor				
	1	2	3	4	5
<b>Solitude and nature</b>					
Escape noise	0.75	-0.04	0.03	0.24	0.01
Let my mind move at a slower pace	0.75	0.02	0.03	0.04	0.11
Be unconfined by rules and regulations	0.68	0.06	0.10	-0.09	0.05
Experience solitude	0.66	0.01	0.15	0.25	0.02
Release tension	0.66	-0.02	0.22	0.04	0.18
Get away from crowds	0.53	-0.09	0.05	0.42	-0.10
View wildlife in its natural habitat	0.53	0.17	0.08	0.39	0.10
Experience peace and tranquility	0.50	-0.02	0.24	0.46	0.10
Learn more about nature	0.49	0.21	0.32	0.25	0.22
<b>Heritage significance</b>					
Learn about history of the Gold Rush	-0.02	0.84	0.08	0.02	0.10
Observe historic features and artifacts	-0.11	0.83	0.05	0.10	0.07
Re-live the stamperders use of the trail	-0.14	0.82	0.08	0.04	0.01
Learn about native history and culture	0.38	0.56	0.00	0.16	0.16
Retrace steps of Gold Rush relative	0.29	0.52	0.05	-0.25	-0.04
<b>Challenge and adventure</b>					
Because of its challenge	0.05	0.08	0.84	0.05	0.03
For the adventure	0.03	0.10	0.73	0.22	0.06
Improve my physical health	0.35	0.00	0.66	-0.05	0.19
Develop my skills and abilities	0.24	0.04	0.64	-0.04	0.26
<b>Nature appreciation</b>					
Enjoy the sights/smells of nature	0.23	0.04	0.06	0.77	0.12
Observe its scenic beauty	0.13	0.05	0.04	0.76	0.07
<b>Social interactions</b>					
Be with friends	0.07	-0.06	0.09	-0.03	0.81
Be with others who enjoy the same things I do	0.24	0.02	0.12	0.14	0.74
Meet new people	0.20	0.27	0.09	-0.02	0.41
Do something with my family	-0.09	0.11	0.10	0.13	0.33

<sup>1</sup> The sixth component explained 4.29% of the total variance and its Eigenvalue was equal to 1.029

**Table 8: Total variance explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.039	25.164	25.164	6.039	25.164	25.164	4.282	17.843	17.843
2	2.826	11.775	36.94	2.826	11.775	36.94	2.84	11.833	29.676
3	1.864	7.765	44.705	1.864	7.765	44.705	2.431	10.128	39.803
4	1.389	5.789	50.494	1.389	5.789	50.494	2.005	8.352	48.155
5	1.273	5.305	55.798	1.273	5.305	55.798	1.834	7.643	55.798

### 5.2.2. Derivation of visitor segments based on motivation dimensions

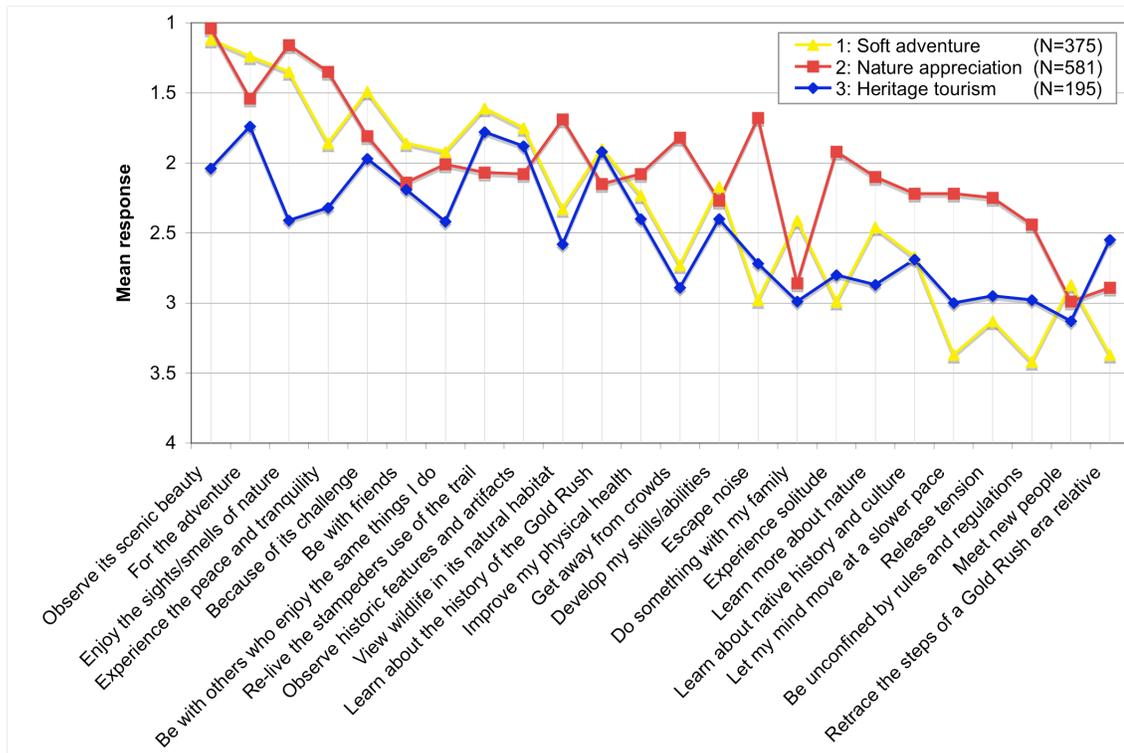
The factor scores produced by the PCA were then used in a cluster analysis. Cluster solutions of 2 to 5 segments were generated and evaluated for their homogeneity. As suggested by Smale (1992), the optimal cluster solution was selected based on a compromise between keeping as few segments as possible, while maintaining as much of the homogeneity within each segment. The three-cluster solution was highly interpretable and was selected as the final cluster solution. Thereafter, a discriminant analysis was undertaken to ensure correct classification of respondents based on their scores on the motivation dimensions (Table 9).

**Table 9: Frequency of cases correctly classified into clusters based on discriminant analysis**

Clusters	Predicted Group for Analysis			Total
	1	2	3	
1	272	35	21	328
2	74	549	22	645
3	11	12	155	178
Total	357	596	198	1151

Figure 7 presents the mean scores on each motivation item for each of the three segments (presented in the same order as in Figure 6).

**Figure 7: Three-cluster solution based on underlying motivation dimensions**



The first visitor segment – the *soft adventure cluster* – contains 32.6 percent of the visitors and represents individuals who are motivated to visit CTNHSC for the adventure and social interaction components. In particular, members of this cluster reported that the motives of *being with friends*, *doing something with my family*, *for the adventure*, *because of the trail's challenge*, and *being with others who enjoy the same things I do* were relatively more important to them than other motive items.

The second segment – the *nature appreciation cluster* – makes up half of all visitors (50.5%). Members of this cluster reported a greater desire to experience solitude, peace and nature. This trend is observed in the importance they attributed to *getting away from crowds*, *experiencing peace and tranquility*, *learning more about nature*, *releasing tension*, *letting their mind move at a slower pace*, *viewing wildlife in its natural habitat*,

*experiencing solitude, learning about native history and culture, being unconfined by rules and regulation, and escaping noise.*

Finally, the third and smallest segment – the *heritage tourism cluster* – consists of only 16.9 percent of all visitors and appears to be highly motivated by the heritage significance of the trail (i.e., Gold Rush history). Respondents in this group rated *learning about the history of the Gold Rush, retracing the steps of a Gold Rush era relative, reliving the stampede's use of the trail, and observing historic features and artifacts* as relatively more important to them than other items.

With these distinct clusters, it was then possible to investigate trends between the three years of study in much more detail.

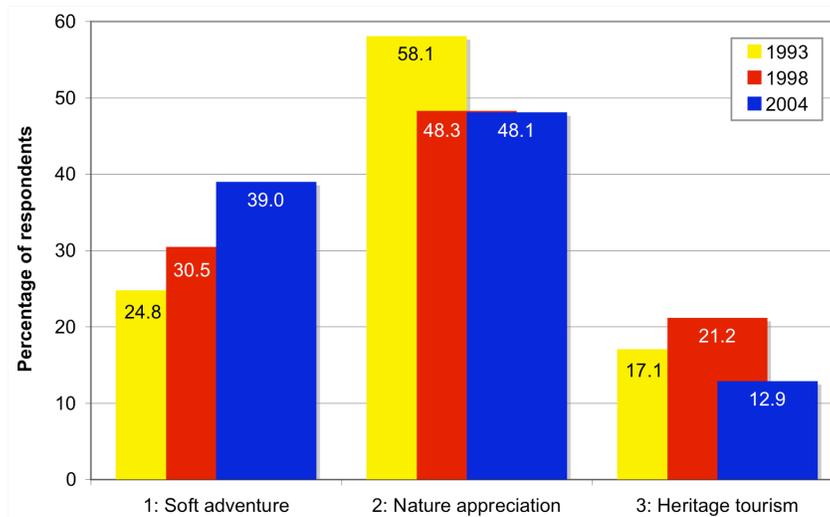
### **5.2.3. Trends in visitor segments**

Figure 8 documents the change in the relative proportion of visitors in each of the segments over the years. The proportion of the soft adventure cluster has steadily increased over the study period. In 1993, 24.8 percent of all hikers were part of this cluster. This increased to 30.5 percent in 1998, and to 39.0 percent in 2004. As mentioned earlier, hikers who are part of this group are highly motivated by the social and challenge aspects of the trail.

At the same time, membership in the nature appreciation cluster, featuring hikers that are motivated by the peace, solitude, and nature aspects of the trail, has drastically dropped after 1993, and remained stable over the second time period (1998-2004). In 1993, 58.1

percent of all visitors were part of this cluster, while this was the case for approximately 48 percent of all respondents in both 1998 and 2004.

**Figure 8: Relative proportion of respondents in each cluster, by year**



The smallest of the three clusters, the heritage tourism cluster, which peaked at 21.2 percent of all visitors in 1998. This group is characterized by the importance of *learning about the history of the Gold Rush* and *retracing the steps of a Gold Rush era relative*.

The relative increase in that cluster’s membership level in 1998 coincides with that year’s Klondike Gold Rush Centennial celebrations.

### **5.3. Patterns of change in use and user characteristics**

In this section, an attempt is made to determine if segments are only distinct from each other in terms of their motivational profile or if they also differ on other variables of the visitor profile. First, the overall trend is presented for each variable (by year) and serves as a baseline for the comparative evaluation of trends observed in each of the visitor segments over time. Thereafter, differences between the respective visitor segments for each of the three years are presented. Because copious amounts of tests of significance

were undertaken throughout this section, only statistically significant changes are mentioned; a complete list of results from the tests of significance is presented in the appendix.

### 5.3.1. Gender distribution

Overall, the gender distribution of respondents has changed significantly between the summers of 1998 and 2004, while no significant change was observed during the previous time period. In particular, the proportion of women hiking the Chilkoot Trail has increased by 6.5 percent between 1998 and 2004 to almost achieve gender parity, with 51 percent of male and 49 percent of female visitors hiking the trail in 2004 (Figure 9).

**Figure 9: Gender distribution, by year**

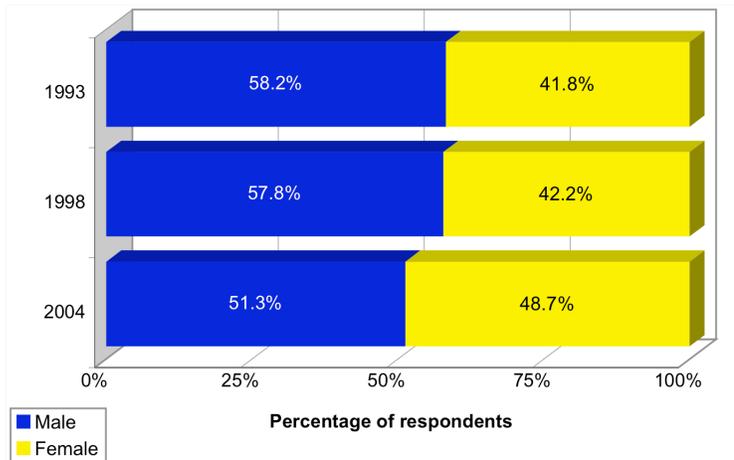
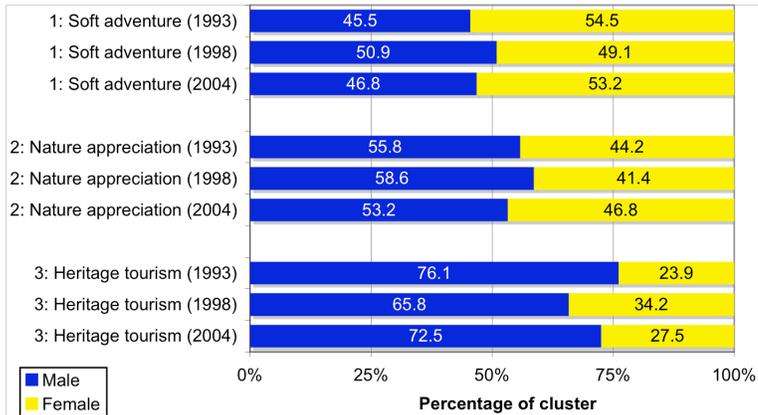


Figure 10 presents the gender distribution of Chilkoot Trail hikers for each cluster by year. The relative proportion of male and female in the soft adventure and nature appreciation clusters is close to the 2004 overall gender pattern. Interestingly, the overall proportion of male hikers in the heritage tourism cluster (71%) is much higher than it is in the other two clusters.

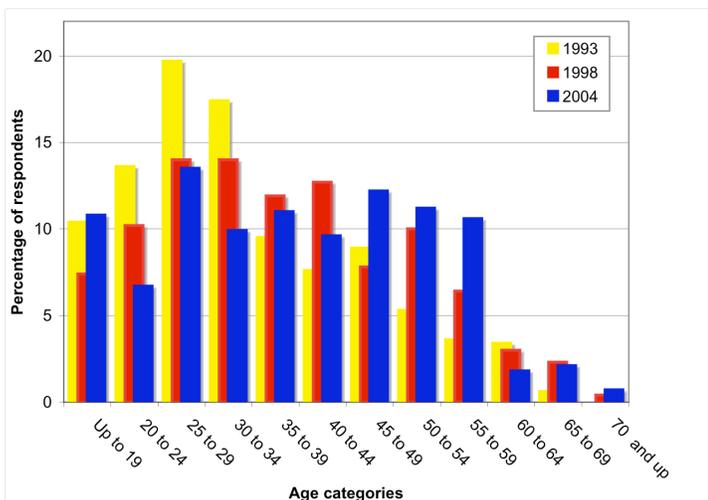
**Figure 10: Gender distribution, by cluster and by year**



### 5.3.2. Age of respondents

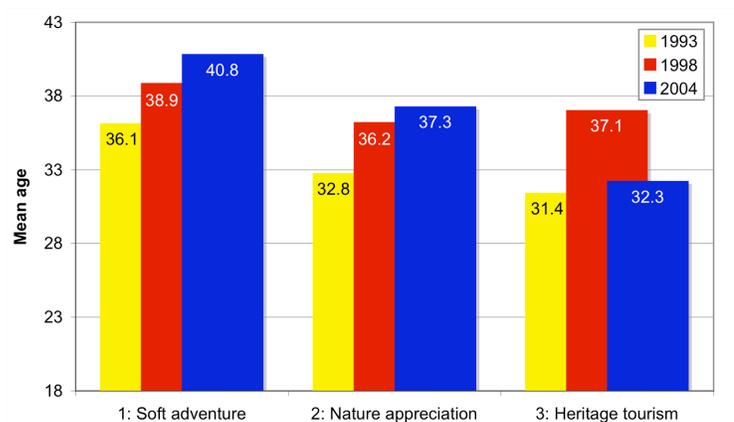
A clear trend, from a younger crowd toward a more even distribution of age groups, can be observed in the data (Figure 11). Of particular interest is a sharp decrease (20%) in the percentage of 20 to 34 year old respondents between 1993 and 2004. Conversely, the percentage of respondents between the ages of 35 and 59 has increased by about the same magnitude, from 34.9 percent of all respondents in 1993, to 48.8 percent in 1998, and to 54.6 percent in 2004. The average age of hikers increased from 33.8 in 1993, to 37.7 in 1998, and further to 38.7 in 2004.

**Figure 11: Age distribution, by year**



Members of the soft adventure cluster are generally older than those of the nature appreciation and heritage tourism clusters, with mean ages of 38.7, 35.1, and 34.0, respectively (Figure 12). While mean ages of hikers in clusters one and two are increasing along with the overall CTNHSC visitor population, hikers in cluster three were generally younger, but with a significant spike in their mean age in 1998 compared to the other two years.

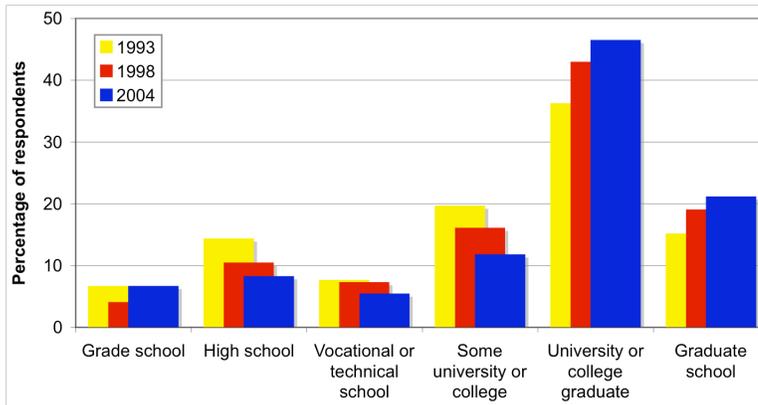
**Figure 12: Mean age of hikers, by cluster and by year**



### 5.3.3. Highest level of education

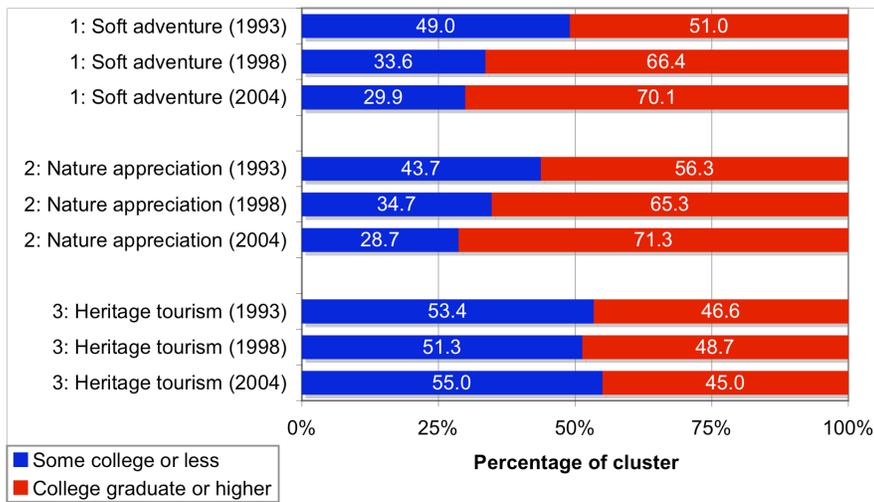
Overall, the highest level of education completed by respondents has slightly increased over the years. More than three quarters of 2004 respondents had completed *college*, *university*, or a *graduate degree* in 2004 (Figure 13). The percentage of respondents with such completed degrees increased by 10.6 percent from 1993 to 1998, and by another 5.6 percent since 1998, but was only statistically significant in the first time period.

**Figure 13: Highest level of education, by year**



A smaller proportion of the heritage tourism cluster has completed a college or university degree, than the other two groups (Figure 14); an average of 47 percent of hikers in that group reported having reached such educational level, compared to 63 percent in the other two. In addition, the education level of hikers in clusters one and two has increased over the years, but such change was not observed for cluster three.

**Figure 14: Highest level of education, by cluster and by year**

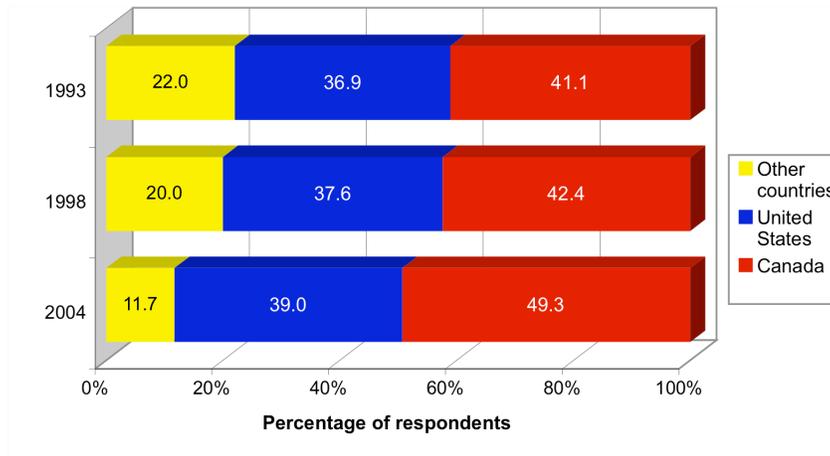


### 5.3.4. Country of origin

The distribution of respondents by country of origin was stable during the first study period, but changed significantly between 1998 and 2004 (Figure 15). During the second

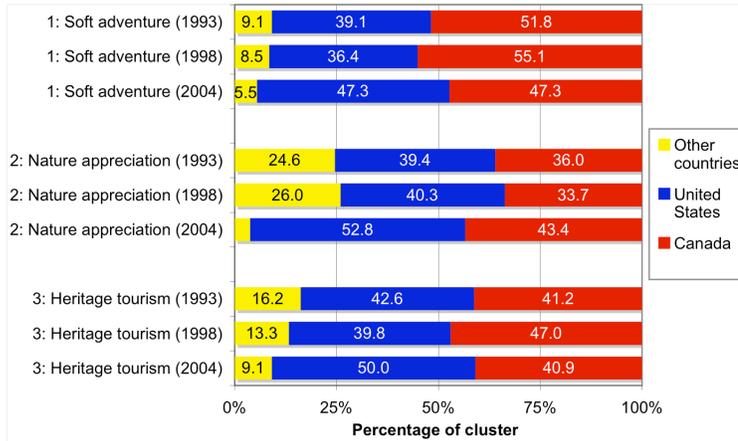
time period, visitors from countries other than Canada and the United States decreased by 8 percent, while Canadian visitors increase by 7 percent.

**Figure 15: Country of origin, by year**



Overall, the relative proportion of hikers from other countries was much higher in the nature appreciation cluster than in the other two clusters, with 19 percent of hikers in this group being foreign visitors, compared to 7 and 13 percent in the soft adventure and heritage tourism groups (Figure 16). Canadian visitors on the other hand have the highest relative representation in cluster one, making up 51 percent of this cluster, compared with 37 and 44 percent of clusters two and three, respectively. Between 1998 and 2004, the proportion of Canadian visitors increased in all three clusters. At the same time, visitors from countries other than Canada and the United States have decreased in all three clusters. However, the most drastic decrease in international visitors is observed in cluster two where, relative to other clusters, overseas visitors contributed one fifth of all hikers until 1998, but decreased to levels below those of other clusters thereafter.

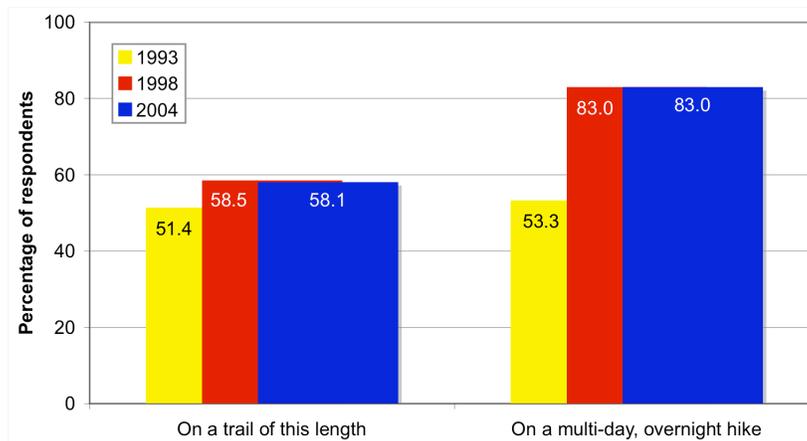
**Figure 16: Country of origin, by cluster and by year**



### 5.3.5. Hiking experience

The proportion of respondents with experience on a trail of this length<sup>1</sup> has increased by approximately 7 percent between 1993 and 1998, while the proportion of respondents with experience on a multi-day, overnight hike<sup>2</sup> increased by 30 percent during the same period (Figure 17). Visitors’ overall hiking experience remained stable between 1998 and 2004.

**Figure 17: Hiking experience, by year**

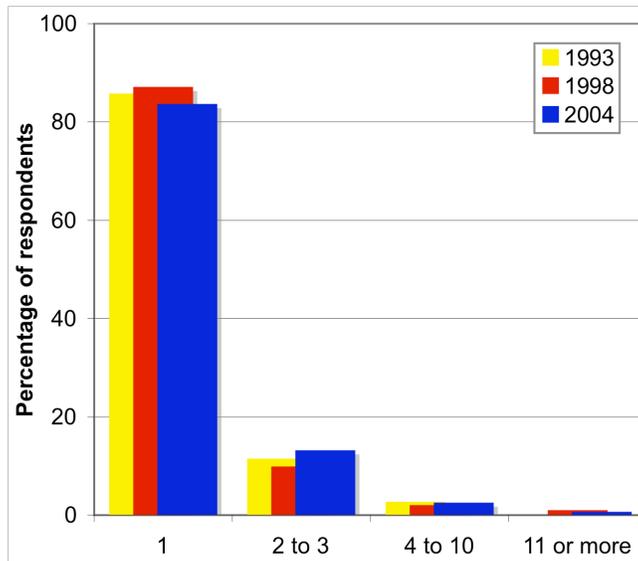


<sup>1</sup> Wording in 1993 was “Before hiking the Chilkoot Trail, had you hiked further than 53km (33mi) on any one trip?” while wording in 1998 and 2004 was “Before hiking the Chilkoot Trail, had you hiked another trail of this length?”

<sup>2</sup> Wording in 1993 was “Before hiking the Chilkoot Trail, had you been on a longer hike in terms of days out on the trail?” while wording in 1998 and 2004 was “Before hiking the Chilkoot Trail, had you been on a multi-day, overnight hike?”

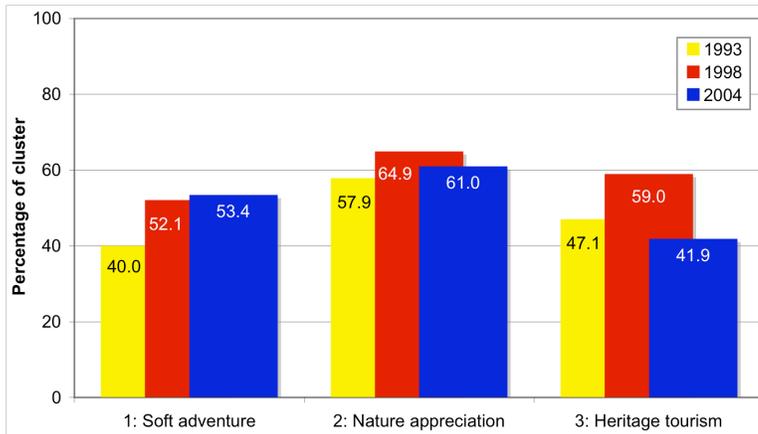
The total number of Chilkoot Trail hikes by respondent was relatively stable over the years (Figure 18). The vast majority of hikers visited CTNHSC only once.

**Figure 18: Mean number of Chilkoot Trail hikes, by year**

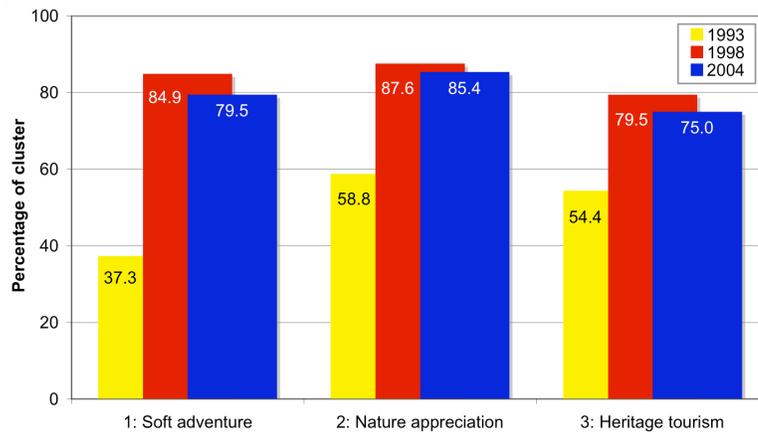


Members of the nature appreciation cluster generally have more backcountry experience than members of the other two groups; these trends are consistent over the years, with hikers in the nature appreciation cluster continually reporting greater backcountry experience levels than hikers in the other two groups (Figure 19 and Figure 20). The only inconsistent trend observed in backcountry experience is a significantly larger proportion of 1998 hikers in the heritage tourism cluster who hiked a trail of this length prior to their Chilkoot Trail hike, compared to hikers in the same cluster in 1993 and 2004 (Figure 19). Conversely, such trend was not observed in that group's hiking experience on multi-day, overnight hikes (Figure 20).

**Figure 19: Hiking experience on a trail of this length, by cluster and by year**

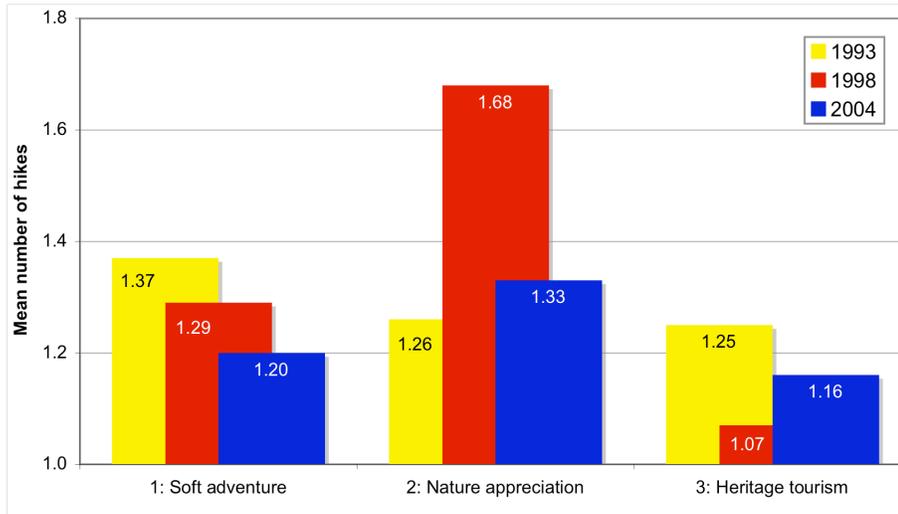


**Figure 20: Hiking experience on a multi-day overnight hike, by cluster and by year**



The overall mean number of Chilkoot Trail hikes for the nature appreciation segment was significantly higher (1.42) than that of the soft adventure (1.28) and the heritage tourism (1.16) clusters. However, when looking at the mean number of Chilkoot Trail hikes by year and by cluster, it was evident that all three clusters had fairly similar Chilkoot Trail experiences. Only in 1998 did hikers in the nature appreciation cluster report larger numbers of Chilkoot Trail hikes (Figure 21).

**Figure 21: Mean number of Chilkoot Trail hikes, by cluster and by year**



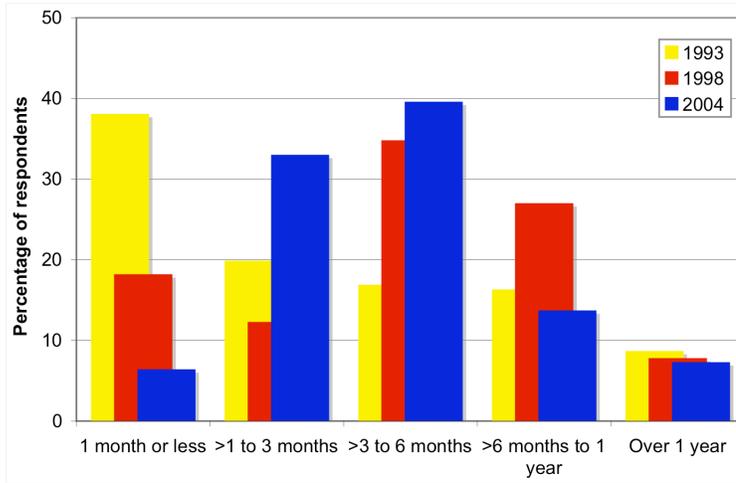
### 5.3.6. Advance planning period

A clear decrease in the spontaneity of Chilkoot Trail trips was observed between 1993 and 2004 (Figure 22). In 1993, reservations were not required, while in 1998 and 2004, 72 and 89 percent of respondents, respectively, made advance reservations to hike the trail. Obviously, the introduction of the reservation system<sup>1</sup> has forced hikers to change their booking behaviour, leading to a decline in the general spontaneity of hiking the trail.

In 1993, 38 percent of respondents planned their trips one month or less in advance, compared to 18 percent in 1998, and a mere 6 percent in 2004. On the other hand, 40 percent of 2004 and 35 percent of 1998 visitors planned their trip between 3 and 6 months in advance, while only 17 percent did so in 1993. The percentage of hikers who planned their trip over one year in advance has been fairly constant over the years at around 8 percent of all visitors.

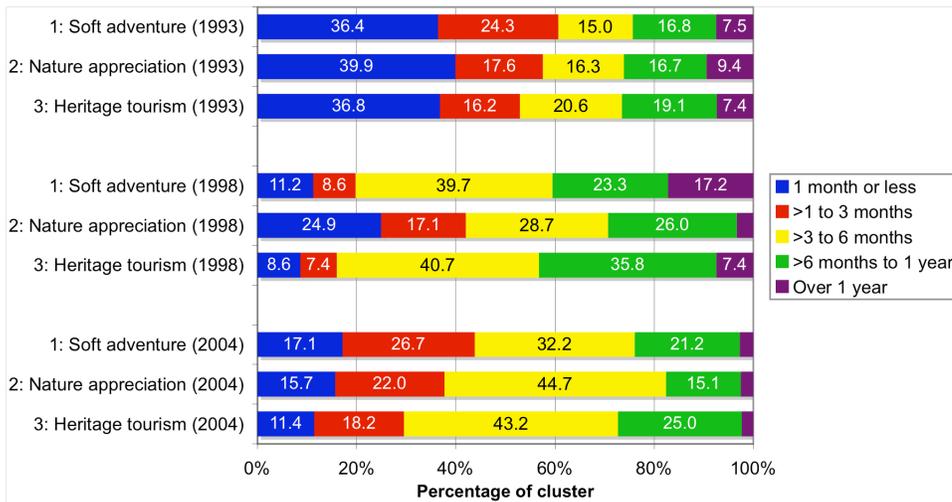
<sup>1</sup> Hikers were not required to register before 1997, they could book their trip up to one year prior to their hike between 1997 and 2002 and, starting in 2003, public bookings were only taken as of January of the same year

**Figure 22: Advance planning period, by year**



In 1993, and therefore prior to the implementation of the reservation system, the distribution of advance planning periods was comparable for all three clusters (Figure 23). By 1998, following the implementation of the reservation system, a large proportion of hikers in the nature appreciation cluster continued to plan their trip one month or less prior to their hike (25%), while those in the other two clusters extended their planning periods. The disparity between clusters' planning period distributions largely disappeared in 2004, when most hikers planned their hikes between 3 to 6 months in advance.

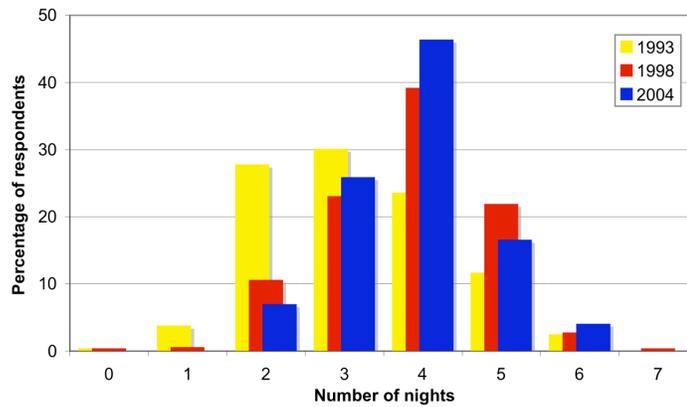
**Figure 23: Advance planning period, by cluster and by year**



### 5.3.7. Time spent on the trail

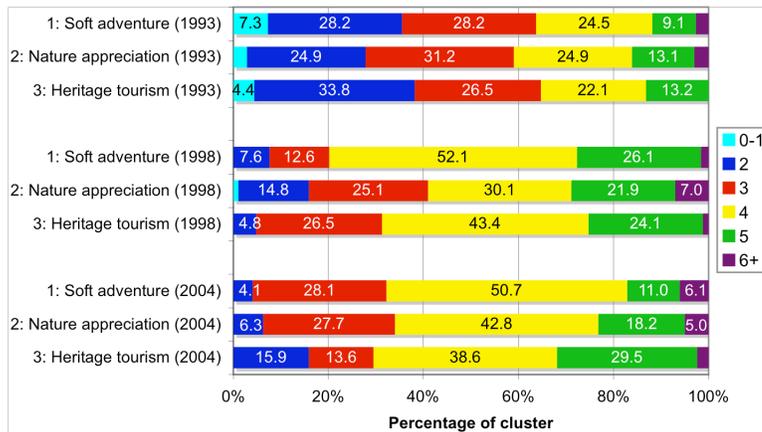
Hikers are spending more time on the trail than they did prior to the implementation of the management policies of 1997 (Figure 24). In 1998 and 2004, a majority of hikers spent a total of 4 nights (mode) on the trail, up from 3 nights in 1993. The increase in mean number of nights spent on the trail, from 3.58 in 1993, to 3.83 and 3.85 nights in 1998 and 2004, has however not been statistically significant. Still, it is interesting to note how the popularity of spending 4 nights on the trail has increased by 22.8 percent over the twelve years of this study, while the number of respondents who spent 2 nights on the trail has decreased by 20.8 percent since 1993.

**Figure 24: Number of nights on the trail, by year**



In 1993, hikers in all three clusters were spending similar numbers of nights on the trail, with a small proportion in each cluster spending as little as zero or one night on the trail (Figure 25). Following the 1997 management changes, hikers spending less than two nights on the trail have almost disappeared. In 1998, hikers in the nature appreciation cluster were still the ones spending the least number of nights on the trail (41% were still spending 3 nights or less on the trail, compared to 20% and 31% for the soft adventure and heritage tourism clusters, respectively). In 2004, approximately one third of hikers in all three clusters were spending three nights or less on the trail.

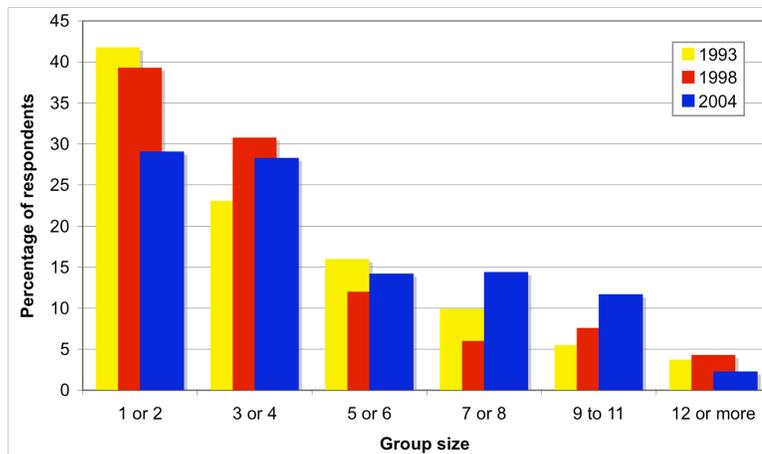
**Figure 25: Number of nights on the trail, by cluster and by year**



### 5.3.8. Personal party size

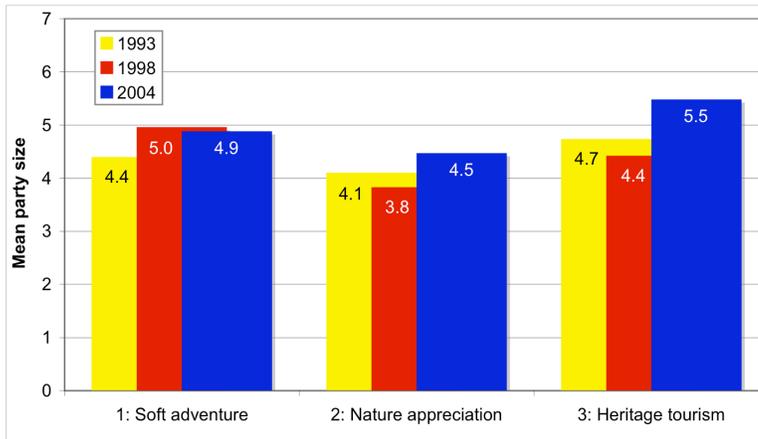
A maximum group size of twelve hikers per group was implemented at CTNHSC in 1997. In both 1993 and 1998, the mean party size was of 4.2 hikers per group, and increased significantly in the second time period to 4.9 in 2004. Overall, the trends observed in personal group sizes include a general increase in parties of 4 or more hikers, and a decrease in smaller parties (Figure 26).

**Figure 26: Total group size, by year**



Overall, the nature appreciation cluster consisted in a larger number of smaller parties than the other groups, with a mean personal group size of 4.1 compared to 4.7.

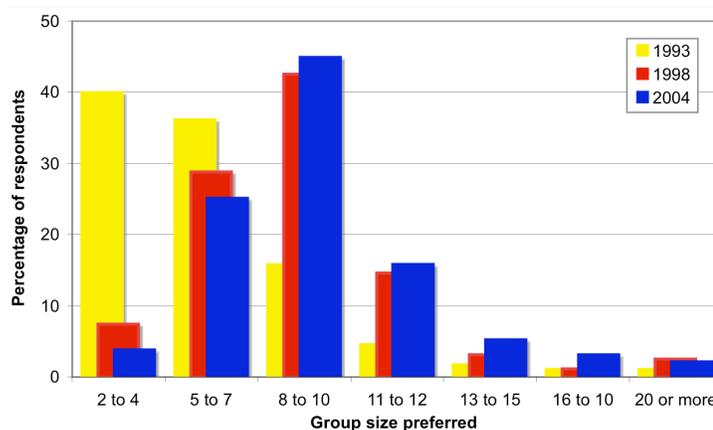
**Figure 27: Mean personal party size, by cluster and by year**



### 5.3.9. Preferred maximum group size

A significant change in hikers’ maximum group size preferred occurred between 1993 and 1998 (Figure 28); 1993 respondents preferred smaller groups, with a majority preferring groups of up to 4 people; in both 1998 and 2004, they preferred group sizes of maximum 8 to 10 hikers. Among the lower three quartiles, 1993 respondents preferred group sizes of 7 or less; this threshold increased to 10 or less in 1998 and 2004.

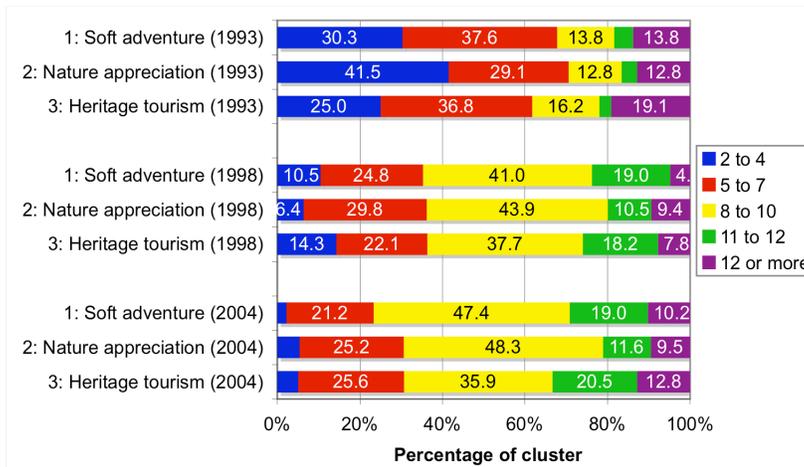
**Figure 28: Preferred maximum group size, by year**



In 1993, a greater proportion of hikers in the nature appreciation cluster preferred smaller group sizes than the other two clusters (Figure 29). This difference disappeared in 1998, when 36 percent of hikers in all three clusters preferred groups of up to seven hikers. In

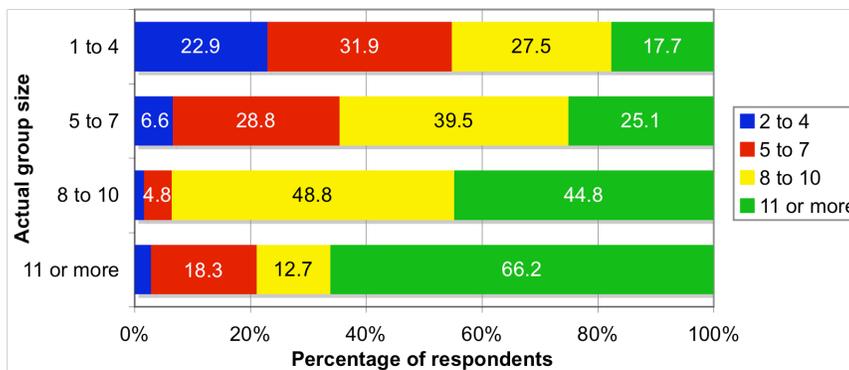
both 1998 and 2004, hikers from all three clusters preferred group sizes of 8 to 10, close to the actual maximum group size put into place at CTNHSC in the summer 1997.

**Figure 29: Preferred maximum group size, by cluster and by year**



In general, respondents who were part of smaller groups preferred smaller maximum group sizes, while those who were part of larger ones, also preferred larger group sizes (Figure 30). For each of the smaller categories, the majority of respondents preferred maximum group sizes slightly larger than their own; groups of 1 to 4 generally preferred maximums of 5 to 7, while groups of 5 to 7 preferred groups of 8 to 10. Members of the largest groups generally preferred maximum group sizes equal to their own.

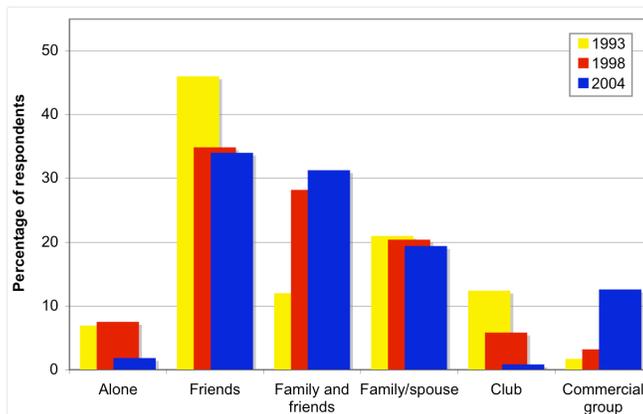
**Figure 30: Preferred maximum group size, by actual group size**



### 5.3.10. Group composition

The hikers' type of personal party has changed significantly over both study periods (Figure 31); respondents have increasingly been hiking the trail with both friends and family (increase of 19% between 1993 and 2004) and less with friends only (decrease of 22% between 1993 and 2004). In all three years, the most popular type of party (mode) was comprised of friends only, but the proportion of this group versus those comprising of both friends and family was lower in both 1998 and 2004, than it was in 1993. The number of hikers who travelled alone has also decreased, from 6.9 and 7.5 percent of all respondents in 1993 and 1998 respectively, to only 1.8 percent in 2004. Finally, the percentage of hikers who were travelling as part of a club has been decreasing over the years (from 12% of all respondents in 1993 to 1% in 2004), while the proportion of those travelling as part of a commercial group has increased (from 2% to 13%).

**Figure 31: Type of personal party, by year**

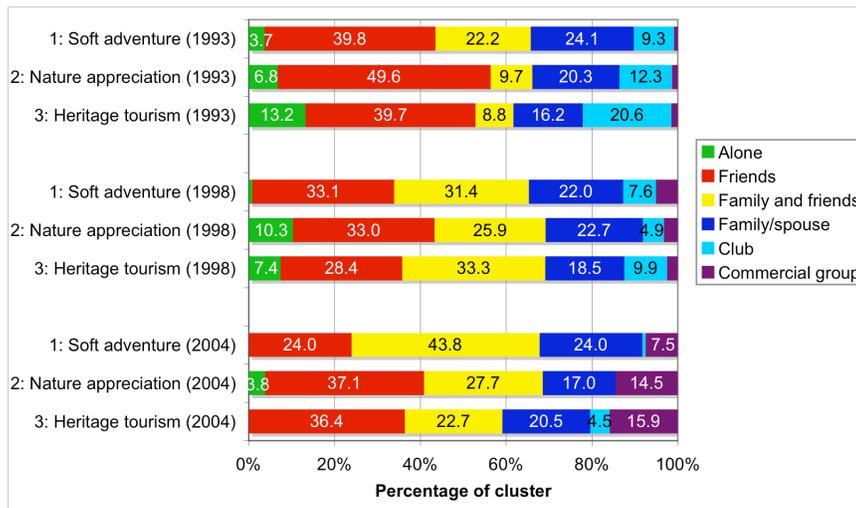


The soft adventure cluster has the lowest overall proportion of respondents travelling alone (1.3%), compared to the nature appreciation (7.1%) and heritage tourism (7.8%) clusters. However, the trend observed by cluster and by year tells a different story; 13 percent of heritage tourism members travelled alone in 1993 (highest proportion among

all three clusters), and this proportion decreased by 50 percent in 1998 (Figure 32). By 2004, heritage tourism members travelling by themselves had all but disappeared.

Overall, a greater proportion of hikers in the heritage tourism cluster travel as part of a club or a commercial group. The trend observed by year in terms of a decrease in hikers travelling as part of a club is observed across all clusters.

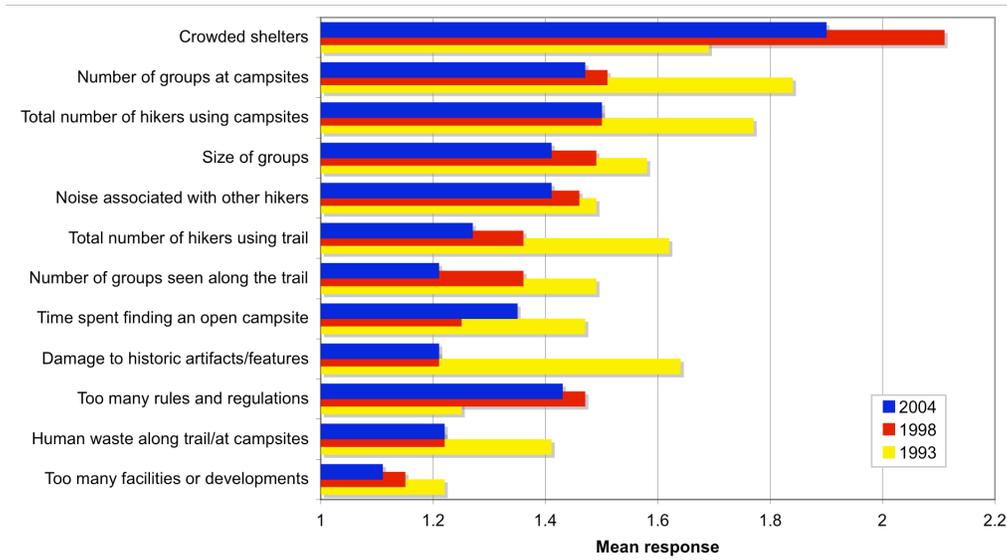
**Figure 32: Type of personal party, by cluster and by year**



## 5.4. Extent of problems in the park

In each of the three visitor surveys, respondents were asked to rate a set of twelve problems on a scale from 1 (not a problem) to 5 (a very serious problem). Figure 33 depicts visitors' mean responses to the problems over the three years of observation; most problems have been perceived as equally or less serious after 1993, with the exception of *crowded shelters* and *too many rules and regulations*, which were felt to be more serious in 1998 and 2004 than in 1993.

**Figure 33: Extent of problems in the park<sup>1</sup>, by year**



Following the same convention as explained in Section 5.1, Table 10 outlines the direction and intensity of change in visitors' perception of the extent of various actual or potential problems in the park. Ten out of twelve problems changed significantly during the first period of the study, while only three did in the second time period (Table 10). Mean responses to two problems changed significantly in opposing directions; *crowded shelters* were perceived to be a more serious problem in 1998, while *time spent finding an open campsite* was less of a problem in 1998 than in the other two years. The *number of groups seen along the trail* has been perceived as less of a problem over the years.

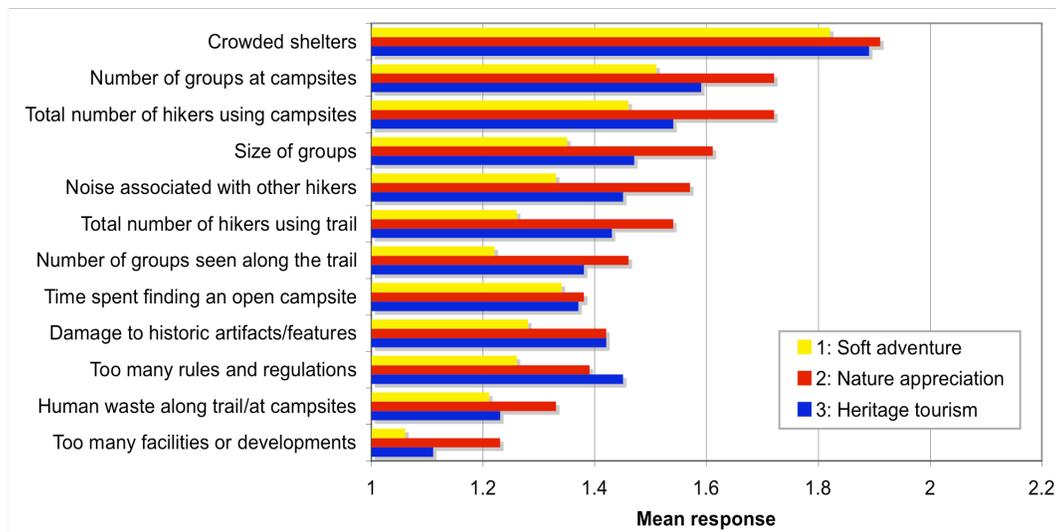
<sup>1</sup> Based on a scale ranging from 1 (not a problem) to 5 (a very serious problem)

**Table 10: Comparison of mean responses for problems in the park, by year**

Problem items	Mean responses		Significant difference	Mean responses		Significant difference
	1993	1998		1998	2004	
Crowded shelters	1.69	2.11	→→	2.11	1.90	←←
Number of groups at campsites	1.84	1.51	←←	1.51	1.47	X
Total number of hikers using campsites <sup>1</sup>	1.77	1.50	←←	1.50	1.50	X
Size of groups	1.58	1.49	X	1.49	1.41	X
Noise associated with other hikers	1.49	1.46	X	1.46	1.41	X
Total number of hikers using trail <sup>2</sup>	1.62	1.36	←←	1.36	1.27	X
Number of groups seen along the trail	1.49	1.36	←←	1.36	1.21	←←
Time spent finding an open campsite	1.47	1.25	←←	1.25	1.35	→
Damage to historic artifacts/features	1.64	1.21	←←	1.21	1.21	X
Too many rules and regulations	1.25	1.47	→→	1.47	1.43	X
Human waste along trail/at campsites	1.41	1.22	←←	1.22	1.22	X
Too many facilities or developments	1.22	1.15	←	1.15	1.11	X

Hikers in cluster one are consistently more tolerant to the series of problems presented to them, while those in cluster two are less tolerant (Figure 34). Cluster three usually rated the problems' seriousness somewhere between the other two groups.

**Figure 34: Extent of problems<sup>3</sup>, by cluster over all three years of observation**



In 1993, it was already apparent that the soft adventure cluster was more tolerant to many of the problems than the other two groups (Figure 35). In particular, this cluster rated five

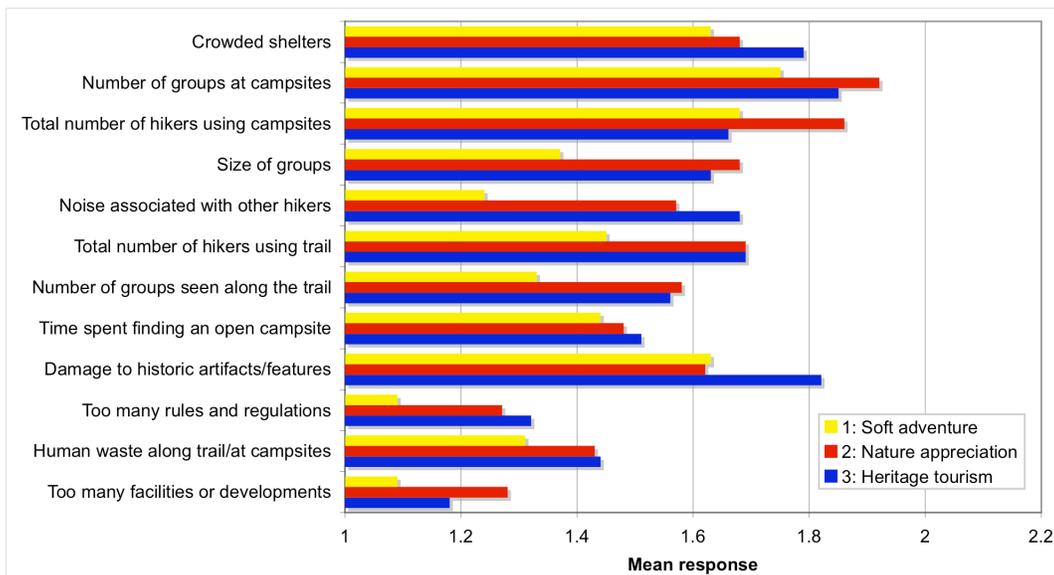
<sup>1</sup> Wording in 1993 and 1998 was “Number of hikers using campsites”

<sup>2</sup> Wording in 1993 and 1998 was “Number of hikers using trail”

<sup>3</sup> Based on a scale ranging from 1 (not a problem) to 5 (a very serious problem)

of the problems as significantly less serious than did members of the nature appreciation cluster (i.e., noise associated with other hikers, size of groups, number of groups seen along the trail, too many rules and regulations, and too many facilities and development), and two as significantly less serious than the heritage tourism cluster (i.e., noise associated with other hikers and too many rules and regulations). No significant difference was observed between the nature appreciation and heritage tourism clusters in 1993.

**Figure 35: Extent of problems<sup>1</sup>, by cluster (1993)**

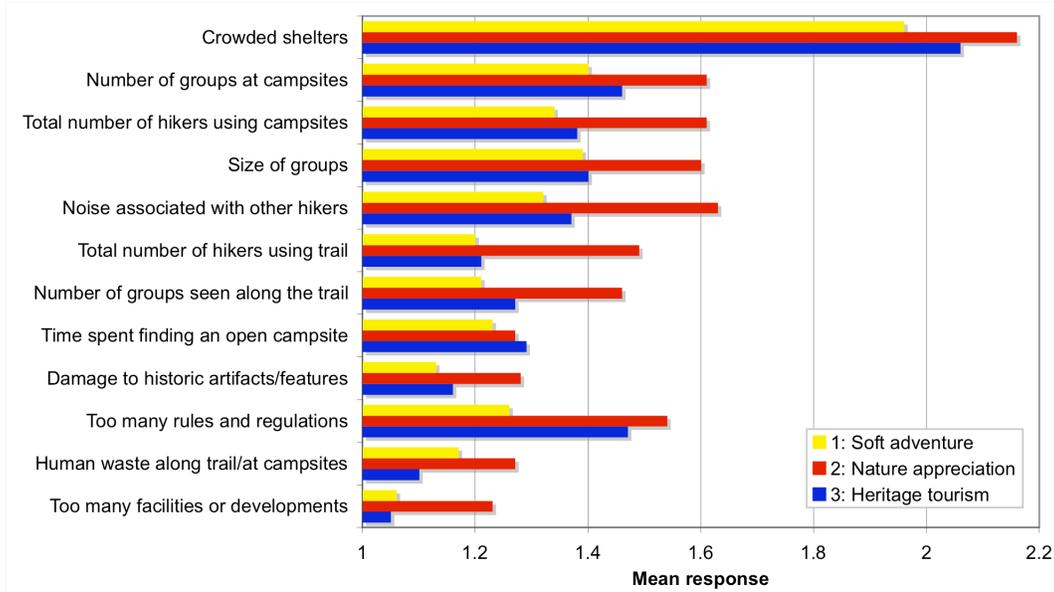


In 1998, the nature appreciation cluster continually rated problems as being more serious than did their counterparts in clusters one and three (Figure 36). In six instances, significant differences can be observed between the mean responses of clusters one and two (i.e., noise associated with other hikers, number of groups seen along the trail, too many rules and regulations, too many facilities and development, total number of hikers using trail, and total number of hikers using campsites), while the same was true for only

<sup>1</sup> Based on a scale ranging from 1 (not a problem) to 5 (a very serious problem)

two problem statements between clusters two and three (i.e., too many facilities and development and total number of hikers using trail). This time, no significant differences could be observed between the soft adventure and heritage tourism clusters.

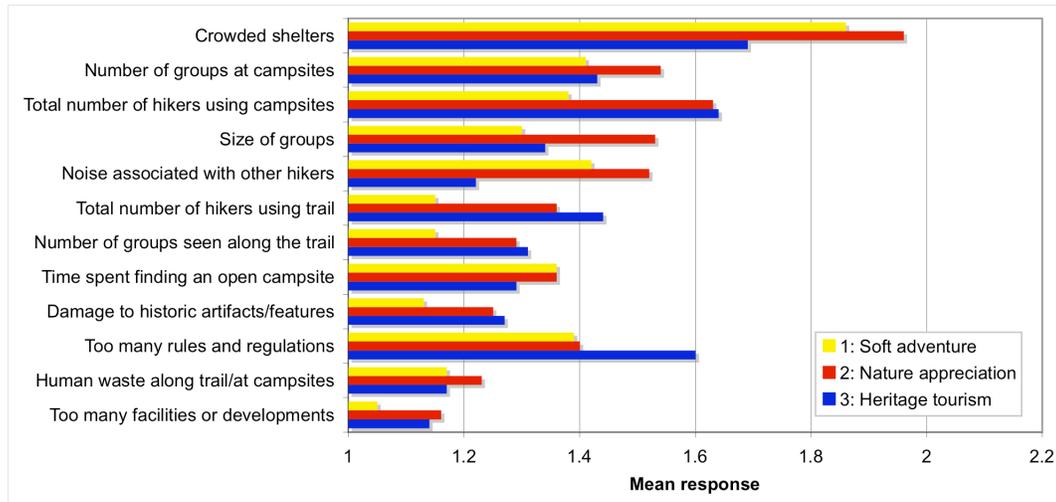
**Figure 36: Extent of problems<sup>1</sup>, by cluster (1998)**



By 2004, the relative differences between the three clusters' mean scores have decreased substantially (Figure 37). Cluster one still rated problems as less serious than the other two, but the difference was not as pronounced, with only three significant differences observed between clusters one and two (i.e., size of groups, total number of hikers using trail, and total number of hikers at campsites), and one between clusters one and three (i.e., noise associated with other hikers). As was the case in 1993, no significant difference could be observed between the nature appreciation and heritage tourism clusters in 2004.

<sup>1</sup> Based on a scale ranging from 1 (not a problem) to 5 (a very serious problem)

**Figure 37: Extent of problems<sup>1</sup>, by cluster (2004)**



## 5.5. Social encounters

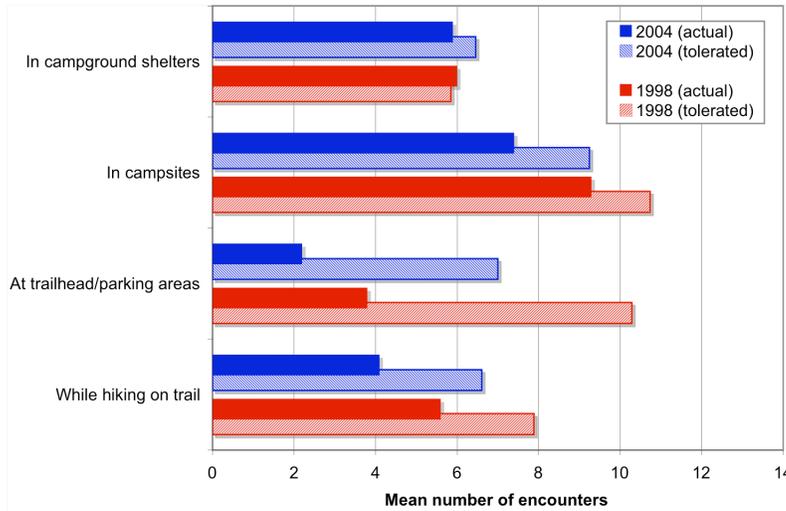
Other researchers have found that, over time, the relationship between use level, number of encounters, and perceived crowding is either inconsistent (Kuentzel and Heberlein, 2003) or is consistently negative and weak (Stewart and Cole, 2001). For this study, tolerated and actual encounters were evaluated in 1998 and 2004 only. An investigation of change in social encounters for those two years still seems valuable in order to understand change and stability in the visitor population.

At CTNHSC, summer visitation was almost 25 percent higher in 1998 than in 2004 (3,918 visitors in 1998 and 3,073 in 2004). The actual numbers of encounters reported by hikers reflect this decline, with higher actual encounter levels reported at all locations except in campground shelters in 1998 (Figure 38). At the same time, tolerated encounters were also consistently higher in 1998 than they were in 2004, except again in

<sup>1</sup> Based on a scale ranging from 1 (not a problem) to 5 (a very serious problem)

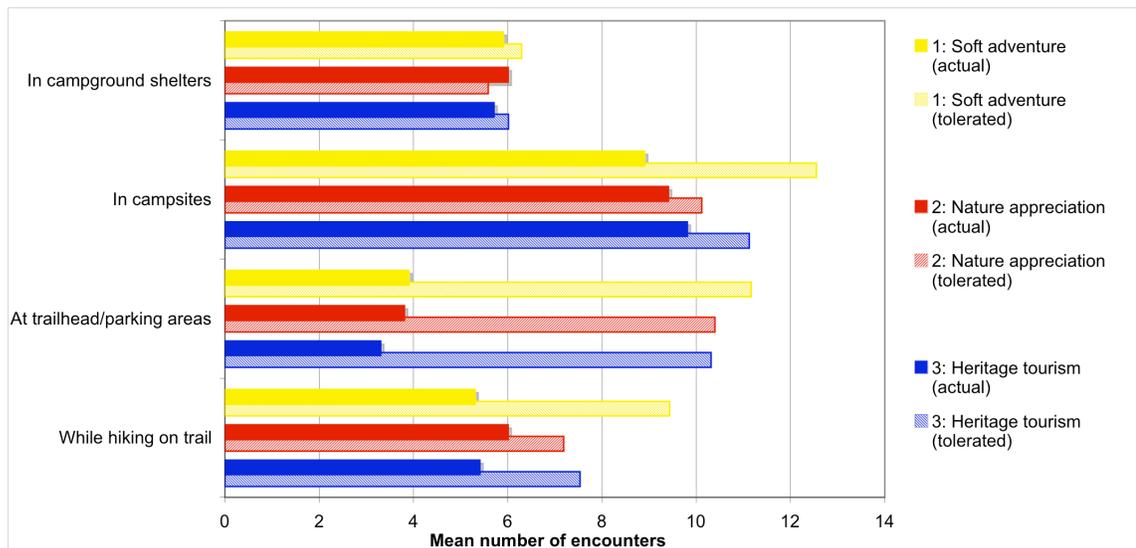
campground shelters. These results suggest that at CTNHSC, actual encounter levels may be influencing hikers' tolerated number of encounters.

**Figure 38: Tolerated v. actual encounters with other summer users per day, by year**



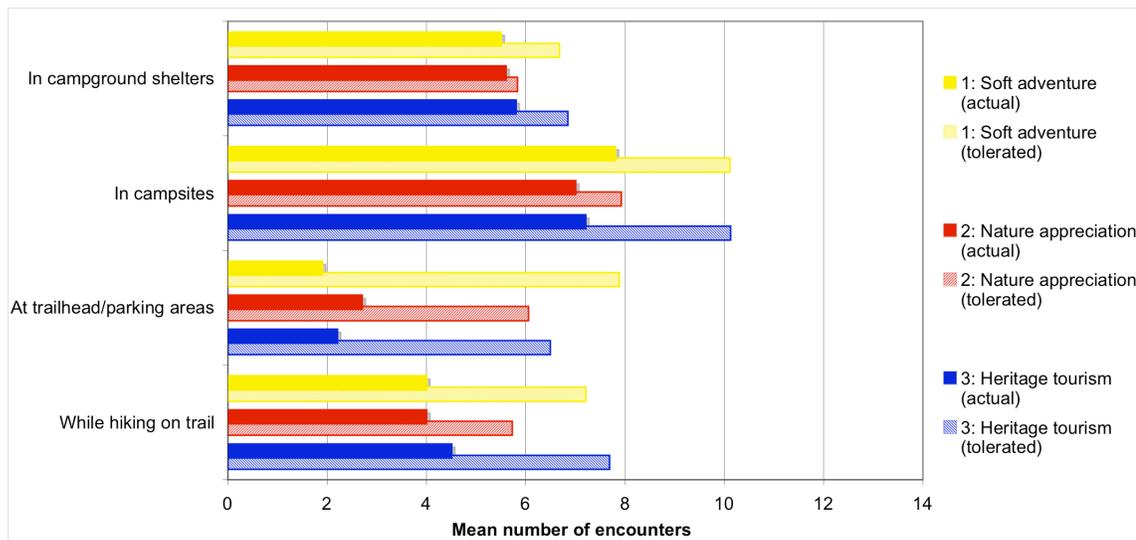
The same evaluation by cluster shows that number of encounters reported by members of all three clusters was comparable in 1998 (Figure 39). Cluster one consistently reported higher tolerance levels than other clusters. However, only one difference was statistically significant: tolerated encounters while hiking on the trail, between clusters one and two.

**Figure 39: Tolerated v. actual encounters with other summer users per day, by cluster (1998)**



In 2004, the actual numbers of encounters were within hikers' tolerated encounter levels for all three clusters and at all locations (Figure 40). However, as actual numbers of encounters decreased, tolerated encounter levels have also decreased for all clusters. The only exception relates to hikers' tolerated numbers of encounters at campground shelters, which have remained stable for all three segments between 1998 and 2004. When not accounting for campground shelters, tolerated numbers of encounters have decreased by an average of 2.3 groups per day at each location. It appears that hikers' tolerance level for encounters with other summer users may be at least partially influenced by their actual number of encounters.

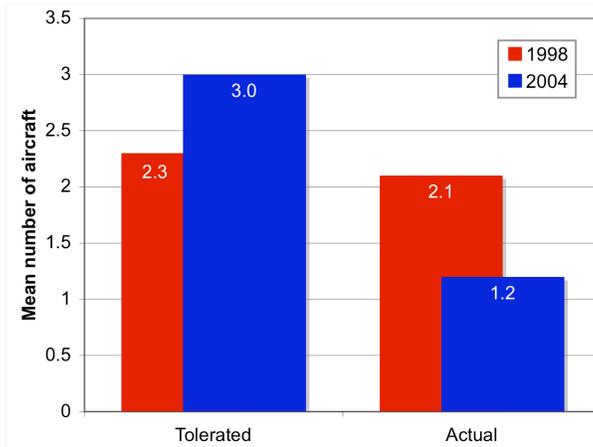
**Figure 40: Tolerated v. actual encounters with other summer users per day, by cluster (2004)**



The pattern of actual and tolerated number of encounters was very different for the number of low flying aircraft heard or seen per day. In that case, the higher number of low flying aircraft observed, the less tolerant visitors became. In both 1998 and 2004, respondents' aircraft encounter levels stayed within their daily stated tolerance norms

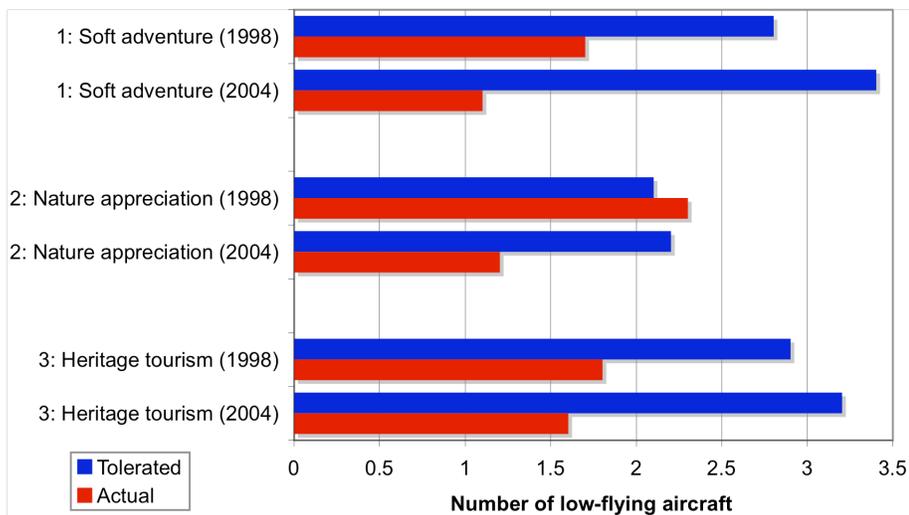
(Figure 41). However, the difference between actual and tolerated numbers of aircraft seen or heard per day has increased to 1.8 in 2004, while it was a mere 0.2 in 1998.

**Figure 41: Tolerated v. actual number of low flying aircraft heard or seen per day, by year**



Actual encounters with low flying aircraft reported by the three clusters were comparable over the two years evaluated (Figure 42); however, the nature appreciation cluster was least tolerant to such encounters, with actual numbers even exceeding their tolerated norm in 1998. The soft adventure and heritage tourism clusters had comparable levels of tolerance for low flying aircraft in both 1998 and 2004.

**Figure 42: Tolerated v. actual number of low flying aircraft heard or seen per day, by cluster and by year**

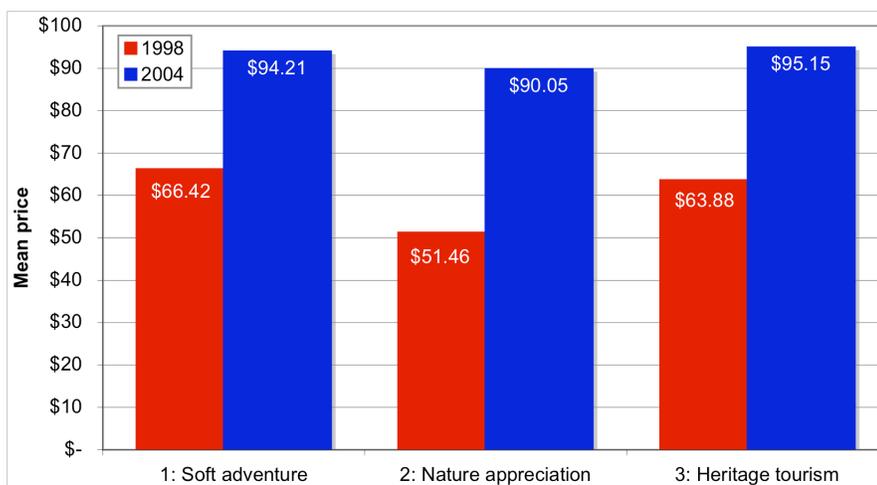


## 5.6. Willingness to pay

A contingent valuation question (i.e., a non-market valuation technique used to estimate the consumer surplus associated with environmental assets such as protected areas) was asked in 1998 and 2004 in an attempt to understand hikers' willingness to pay (WTP) for hiking the Chilkoot Trail. In the questionnaire, survey respondents were first reminded of the current price to hike the Chilkoot Trail (i.e., \$35 in 1998, and \$50 in 2004) and were then asked to indicate at what price they would decide not to hike the trail. The mean maximum prices (the so-called 'choke price') were \$58.77 (standard deviation of 37.63) in 1998, and \$92.37 (standard deviation of 52.32) in 2004.

The WTP for an experience at CTNHSC increased for all three visitor segments between 1998 and 2004 (Figure 43). In 1998, the nature appreciation cluster reported a WTP significantly lower than the other two clusters. This difference practically disappeared in 2004.

**Figure 43: Mean maximum price, by cluster and by year**



## **5.7. Synthesis of trends observed in CTNHSC visitor population**

In the previous sections, general trends observed in the CTNHSC visitor population and the results to analyses attempting to distinguish three visitor segments were presented.

Several characteristics differed in the profile of the visitor population and in each segment over the years. Below is a summary of these observations.

### **5.7.1. Trends in visitor population**

Over the years, the average age of visitors has increased, they are more educated, and are more experienced hikers. The gender distribution has changed with almost as many women as men now hiking the trail. The hikers' length of stay on the trail has increased, they are planning their trips more in advance, and they are travelling as part of larger groups, which are comprised of both friends and family. They also prefer larger maximum group sizes. Their motivations to hike the trail have not changed extensively, with the exception of a decrease in the importance of *getting away from crowds* and *developing one's skills and abilities*, and an increase in the importance of *being with friends* and *doing something with one's family* after 1993. Also, some of the motives relating to the historic significance of the trail were rated as more important in 1998, which coincided with the Klondike Gold Rush Centennial celebrations. Most of the problems were perceived as being less serious in 1998 and 2004, with the exception of *too many rules and regulations* and *crowded shelters*, which were perceived to be more serious after 1993.

### **5.7.2. Profile of visitor segments**

The soft adventure cluster represents individuals that are highly motivated to visit the trail for its social and adventure components. The typical hiker in this group could be characterized as:

- Slightly older than those in the other two segments (mean age of 38.7)
- Well educated (63% of this group are college graduates or higher)
- Very likely to be from Canada (more than half of its membership is Canadian)
- Having some backcountry experience
- Preferring maximum group sizes to be slightly larger than is preferred by the other two groups
- Not likely to be travelling alone (only 1.3% of hikers in this group report travelling alone) and very likely to be travelling with both friends and family (33.6%)
- Travelling in a medium-sized group (mean group size of 4.7)

The nature appreciation cluster placed high importance on motivations relating to experiencing peace, nature, and solitude. Typical hikers in the nature appreciation cluster tended to be:

- Slightly more likely to be a male (56% of males and 44% of females members)
- Slightly younger than the soft adventure cluster (mean age of 35.1)
- Well educated (63% of this group are college graduates or higher)
- More likely to be a foreign visitor (20% are from other countries compared to approximately 10% in the other two clusters)
- More experienced in the backcountry than the other two groups
- Preferred smaller maximum group sizes
- Likely to have planned their trip one month or less in advance
- Travelling either alone or with friends
- Travelling as part of a smaller group (mean group size of 4.1)

Finally, hikers in the heritage tourism cluster were highly motivated by the heritage component of the trail. A typical member of this cluster could be characterized as:

- More likely to be a male (71% of males and 29% of females)
- Youngest of the three clusters (mean age of 34.0)
- Less educated than the other groups (47% are college graduates or higher)
- Having some backcountry experience
- Most likely to have planned their trip months ahead (62% planned their trips between 3 and 12 months in advance)
- Travelling as part of a medium sized group (mean group size of 4.7 hikers)

### **5.7.3. Trends in visitor segments**

A comparison of change in the relative proportion of the three market segments showed that, after 1993, the proportion of visitors that are highly motivated by items that define the nature appreciation cluster has decreased. This hints at a potential case of displacement of part of this group. At the same time, individuals who are part of the soft adventure cluster appear to be 'favoured' by the recreation regulations over the other two clusters, as seen in the increment of its membership over the three years of the study. This finding suggests that opportunities meeting the needs of individuals in the nature appreciation cluster may have been reduced, while the needs of the soft adventure cluster may be met to a larger extent. The temporary increase in the heritage tourism cluster during the 1998 summer appears to be the result of that summer's Gold Rush Centennial celebrations. The 1998 celebrations, with their focus on the Klondike Gold Rush, may have led to an increase in interest and/or different expectations by 1998 visitors. These trends in visitor composition and responses, as well as other trends presented throughout this section are discussed further in the following chapter.

## **Chapter 6: Discussion and Recommendations**

In recent years, the CTNHSC has experienced several changes at the management level.

A quota system was implemented in 1997 in an attempt to limit biophysical, cultural, and social impacts associated with increasing recreational use levels. At the same time, a recreational user fee for overnight visitors was introduced after field offices were directed to recover the costs of providing services and facilities from the beneficiaries. These restrictive management policies achieved the intended management goals. The quota system reduced user volumes and redistributed use, which in turn limited some of the impacts of recreational use. The user fee generated income for park management and operations. However, this study's findings reveal that there is more to the story than this simple judgment of success. The implementation of these regulations may also have resulted in indirect consequences, affecting different types of visitors in different ways.

This discussion will identify and, as far as possible, explain the relationships between management interventions and changes in the visitor population. It will also link the findings of this study to the relevant literature on trends in outdoor recreation. The concluding portion of this section will outline the importance of longitudinal visitor research to park management practices, and will present further research ideas to strengthen the findings of this study.

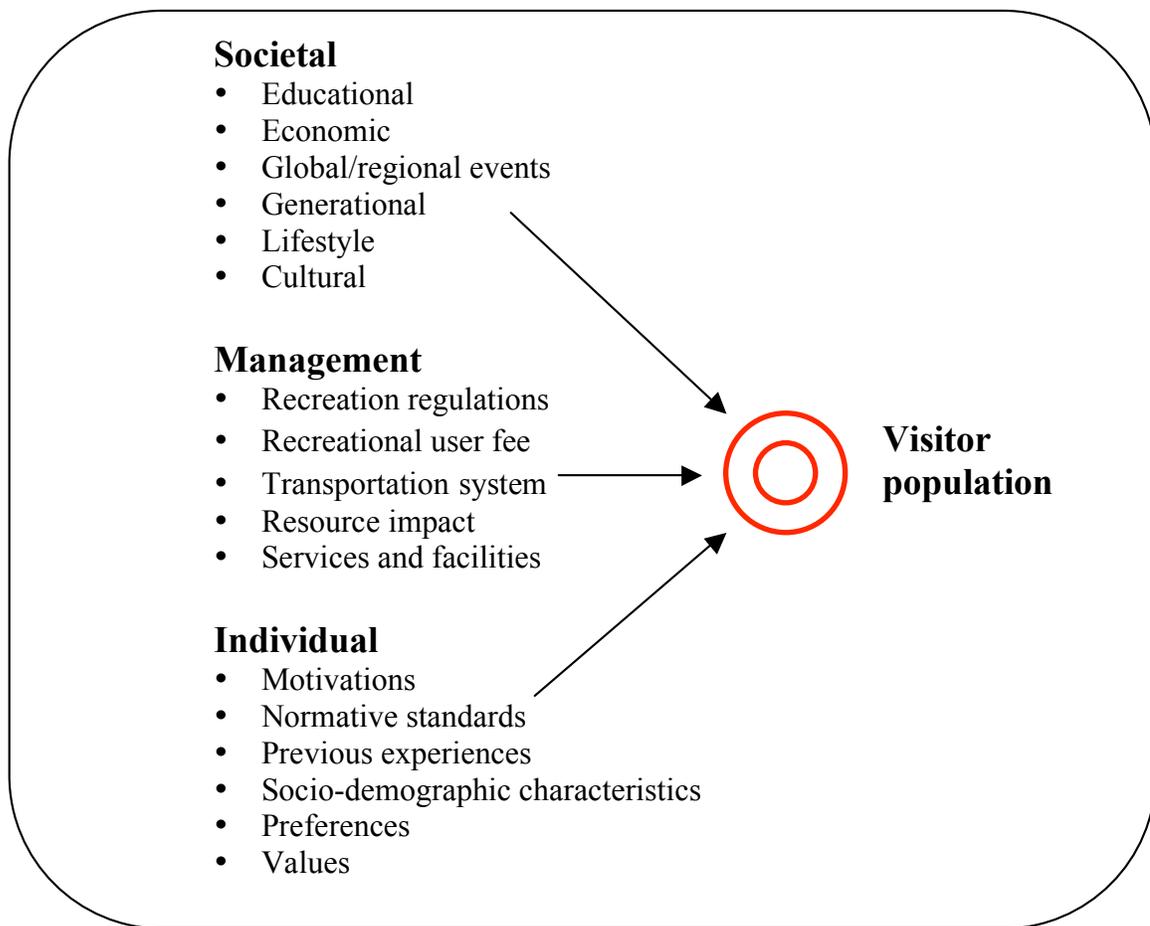
## **6.1. Trend analysis and recommendations**

Between 1993 and 2004, CTNHSC visitors were interviewed on three occasions about their experiences on the Chilkoot Trail. These data provided three separate snapshots of the trail's visitor population over a twelve-year period. The first survey was undertaken in the summer of 1993. This baseline survey described the visitors prior to the restrictions of 1997. It also acted as a benchmark to which later surveys could be compared. The second snapshot was taken in the summer of 1998, one year after the implementation of the fees and quota system. Unfortunately, this was also the Klondike Gold Rush Centennial year and therefore the results of that year's survey may have been somewhat influenced by the presence of visitors who were attracted by these special celebrations. Because this second examination was undertaken only one year following the implementation of the restrictive policies, the situation reflected in the visitor survey may also still have been somewhat unstable. Finally, a third round of data was gathered in 2004.

The sampling and administration procedures, as well as the instrumentation were kept as similar as possible throughout the three cross-sections to allow for comparisons between the samples. Although, the surveys provide repeated cross-sectional data of the visitor population, the continuity and comparability in the data and data collection methods allowed looking at trends over twelve years. The continuity in the data available offered a rare opportunity to observe the effects of management policies on backcountry visitors over time. It also facilitated the understanding of adaptation processes that have taken place in the CTNHSC visitor population as a result of management changes.

Several factors, including societal, managerial, and individual user trends, affected the CTNHSC visitor population throughout the period of this study (Figure 44). In order to understand how management changes affected the visitor population, data on individual trends was gathered in the three surveys underlying this study. Inevitably, societal trends also affect the visitor population, rendering the analysis of change as a result of specific management interventions more complex. Throughout this discussion, the interconnectedness between user specific and societal trends, and the possibility of their confounding effect will be taken into account and acknowledged as a limitation of this type of empirical social science research.

**Figure 44: Summary framework of factors influencing visitor population**



Section 6.1.1. discusses the general trends observed in the visitor profiles over the twelve years, and relates these trends to the quota system and user fee as far as possible. Then, Section 6.2.2. elaborates on societal trends that have potentially also had an effect on the CTNHSC visitor population during the period of this study.

### **6.1.1. Individual trends in relation to management actions**

Chilkoot Trail visitors are generally older, more educated, and report greater hiking experience. An overall trend toward gender parity was also observed. Visitors are spending more time on the trail, are planning their trips more in advance, and are travelling as part of larger groups, which comprise both friends and family (rather than friends only). Their motivations to visit CTNHSC have not changed extensively, and most problems were perceived as being less serious after 1993. The only exceptions with regard to problem rating were an observed increase in the seriousness of the problems *too many rules and regulations* and *crowded shelters*.

The quota system, and its associated restrictions, was implemented in order to counter potential problems associated with high levels of recreational use. It was therefore to be expected that most problems, particularly those relating to social encounters, would be perceived as being less serious after its implementation. While several social encounter problems were in fact perceived as being less serious after 1993, visitors rated the problem of *crowded shelters* as most serious in 1998 and least serious in 1993, reflecting actual visitation levels (see Figure 3). The problem of *too many rules and regulations* on the other hand was perceived as being most serious in 1998, one year after the introduction of several restrictions, and decreased by 2004. It appears as though visitors

were initially less tolerant to the restrictions, but that a process of adaptation took place during the second time period of the study, resulting in an increase in visitors' willingness to accept restrictions.

Of more interest is the fact that various segments of the visitor population were affected differently by the introduction of restrictions. Visitors were divided into three distinct motivation-based clusters: the soft adventure, nature appreciation, and heritage tourism clusters. It was found that the soft adventure cluster was most tolerant, and that the nature appreciation cluster was least tolerant to the newly introduced management practices. Several aspects of the visitor profile supporting these speculations will be presented below. In some instances, it appeared that groups based on socio-demographic variables rather than these motivation-based segments were affected in similar ways; these findings will also be presented when appropriate.

Up to 1998, members of the nature appreciation cluster perceived the problem of *too many rules and regulations* as significantly more serious than did the other two clusters. The soft adventure cluster rated it as least serious out of the three groups. In an attempt to determine if the restrictive management approach is in fact biased against the nature appreciation cluster, an evaluation of other observed differences in the three segments is presented throughout this section.

In spite of summer visitation levels being lowest in 1993 (2,977 visitors) and highest in 1998 (3,958 visitors), an overall decrease in the extent of problems relating to social

encounters on the trail and at campsites was observed between 1993 and 1998. Then again, visitors' perception of the same problems was fairly stable between 1998 and 2004, even though 2004 visitation (3,080 visitors) returned to a level similar to that of 1993. Kuentzel and Heberlein (2003) observed similar results at the Apostle Islands National Lakeshore where visitors' normative standards with regard to encounter levels were inconsistent with actual visitation levels over the years.

In general, hikers adapted their tolerated encounter levels to reflect their actual encounter levels. In 1998, the average difference between tolerated and actual encounters for all locations was 2.9 (i.e., visitors would tolerate to encounter an average of 2.9 more groups per day). Although visitors reported lower actual encounter numbers in 2004 than in 1998 (reflecting the lower overall visitation level for that year), a similar phenomenon was observed: the difference between visitors' tolerated and actual encounters in 2004 was comparable to the difference observed in 1998 at 2.5. Unfortunately, data for 1993 is unavailable, making it impossible to know if these trends also existed prior to the implementation of the quota system.

The Chilkoot Trail is a 53-kilometer linear park with very limited access. Because the permit system only allows a certain number of hikers to go over the Chilkoot Pass on any given day, the use limit seems to have contributed to a better spatial and temporal distribution of visitors within the park than before its implementation. These results are consistent with the main purposes of use limit programs. By reducing and redistributing recreational use, social impacts and thus, visitors' perception of the problems relating to

social encounters generally decreased. Hikers' mean personal party size has also increased over the period of this study, possibly leading to lower numbers of groups encountered. Larger groups and in turn fewer encounters may have helped decrease visitors' perceived crowding at certain locations.

The only social encounter problems occur at campground shelters. Members of all three clusters agreed that relatively speaking (i.e. comparing between years) *crowded shelters* were a greater problem after 1993, and peaked in 1998. Visitors' global evaluations of crowding at shelters seem to more closely reflect actual visitation levels than their evaluations of crowding at other locations. Apparently the number of shelter spaces is insufficient to accommodate the number of hikers allowed by the use limit program, and could therefore be considered as an indicator of crowding to calibrate the number of permits that are made available each day.

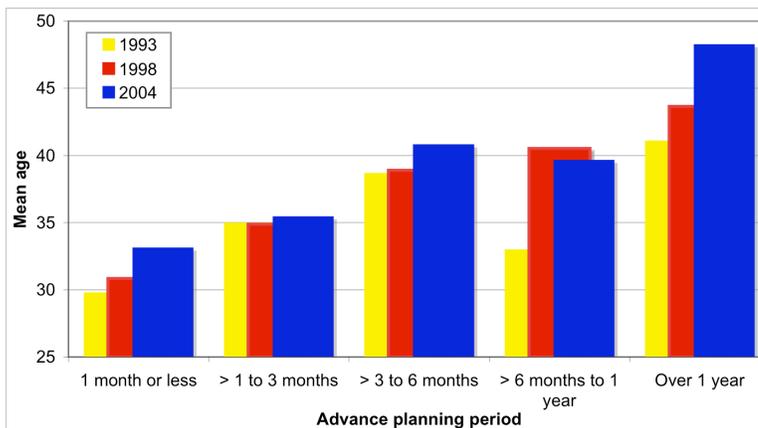
Several management options exist to help reduce perceived crowding at campground shelters. First, Parks Canada should continue to remind hikers about shelter sharing; hikers should be encouraged to use shelters for cooking only and move on as quickly as possible, instead of dominating a shelter for too long. An additional possible solution would be to enforce hikers' planned itineraries. Although this solution would further restrict the visitors and reduce their individual level of freedom, this management strategy could reduce and should be pursued if crowding at shelters continues to be perceived as a problem. Tradeoff analyses of visitor preferences regarding the burden of such restriction may be required to elucidate the importance of less crowding versus

greater freedom of choice and, in turn, facilitate judgments with regard to social carrying capacity by CTNHSC managers. Lawson and Manning (2001a) used indifference curve analysis to assess potential tradeoffs between limiting visitor use (to ensure a high quality experience) and allowing high levels of visitor use (to ensure that large numbers of visitors retain access). Other adaptive measures such as adding more shelters or extending existing ones would accommodate more hikers at the busiest shelters and potentially further reduce visitors' perceived crowding along the trail. If these operational suggestions remain ineffective, the ultimate question will be if shelter space should be expanded or trail use should be limited further.

In 1997, CTNHSC implemented a combined request-queuing rationing system (i.e., 42 permits available for advance reservations, and 8 permits left for unreserved walk-ons). As would be expected, hikers have planned their hikes more in advance after the implementation of such policy. Advance planning behaviour of all three clusters was comparable in 1993. By 1998, all segments had increased their advance planning period, but members of the nature appreciation cluster reported shorter advance planning periods than their counterparts. This difference disappeared in 2004, with similar advance planning periods for all three clusters. As seen in the lag period to adapt to the new requirements of the reservation system (i.e., increased advance planning), it appears that members of the nature appreciation may initially have been most affected by the policy, but had adapted by 2004.

Implementation of the reservation system also seems to have affected the age profile of hikers using the trail. It was found that the proportion of hikers in the 20 to 34 age group has decreased significantly over the years, while that of hikers between 35 and 59 years of age increased by the same extent. Further investigation into different age groups' advanced trip planning behaviour showed that overall, younger hikers had a tendency to plan their trips less in advance than older hikers (Figure 45). This relationship hints at a possible displacement of younger hikers who may not be able or willing to plan ahead.

**Figure 45: Mean age of respondents for each advance planning period, by year**



Although eight permits are left for unreserved walk-ons each day, the reservation system may still be displacing younger hikers who are less likely to plan in the long term.

Obviously, the selected ratio between reserved and non-reserved permits influences the type of hikers attracted to the trail. If deemed necessary (based on Parks Canada's objectives with regard to the types of visitor experiences it wants to provide at CTNHSC) the number of permits left for unreserved walk-ons may be increased to accommodate the needs of this more spontaneous clientele.

The implementation of a reservation system also meant that visitors had to begin scheduling their trips around the dates they were offered, based on the number of permits still available each day. Visitors who could not obtain a desirable departure date may have decided not to visit the park. These ‘potential hikers’ (i.e., persons who inquire about the trail, but never make a reservation) should be researched in more detail. One option would be to keep a log of successful and unsuccessful inquiries at the reservation desk, and eventually to undertake a follow-up interview with unsuccessful inquiries. Unfortunately, no such follow-up studies of potential visitors to parks were found in the academic literature. This information would contribute to understanding the external effects of management actions better.

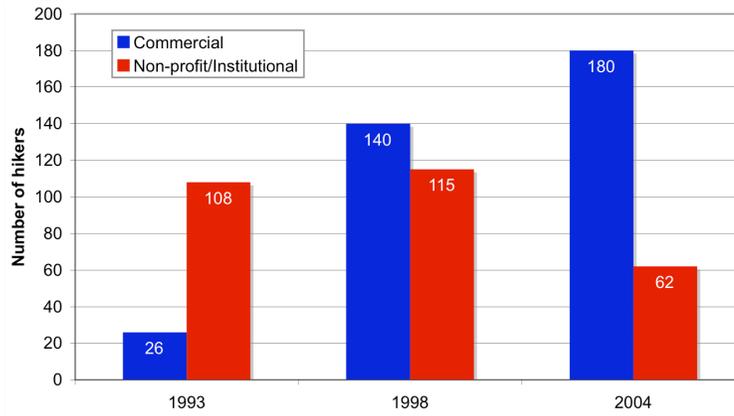
A change in the distribution of hikers by country of origin was observed in the second time period of this study. While the proportion of Canadian hikers increased, that of foreign visitors decreased. It is possible that the reservation system may disadvantage overseas visitors (e.g., due to challenges posed by language barriers, time differences, etc.), and in turn may be displacing this group of visitors. However, this is unlikely as the relative decrease in foreign visitors was only observed between 1998 and 2004, and not earlier. Again, keeping a log of unsuccessful inquiries and successful bookings would allow Parks Canada to make more conclusive statements on the breakdown of hikers by place of residence.

The maximum group size preferred by CTNHSC hikers increased significantly during the first period of this study. This general increase might indicate that hikers became

accustomed to the prescribed maximum group size of the use limit program. In turn, they reported maximum group sizes preferred closer to the actual maximum of 12. Although this overall trend is reflected in each of the segments, a significantly larger proportion of members in the nature appreciation cluster reported a preference for smaller groups in 1993 compared to the other segments. In 1998, the difference between clusters' preferences disappeared, and in 2004 hikers in the soft adventure cluster generally preferred larger maximum group sizes than the other two clusters. These findings correspond to visitors' reported motivations for hiking the trail. The nature appreciation cluster is highly motivated by the peace and solitude aspects of the trail, while the soft adventure group rates highest on the social interaction items.

The quota system and its associated limit on group size may be displacing large non-profit/institutional groups from visiting the trail. In 1993, more than one in ten hikers reported travelling as part of such a group, compared to less than two percent who were part of a commercial trip. These proportions were already changing in 1998, but it was in 2004 that changes in these types of personal parties were really felt. By 2004, less than one percent of hikers travelled as part of a non-profit/institutional group and 13 percent reported using the services of commercial operators. These reported group types are in agreement with the actual frequencies recorded by Parks Canada (Figure 46).

**Figure 46: Frequency of hikers, by type of large organized group and by year<sup>1</sup>**



The introduction of a user fee succeeded at offsetting some of the operational costs of providing recreational services and protecting park environments from use at CTNHSC. However, it is possible that the user fee also resulted in the displacement of hikers who were not able or willing to pay to hike the Chilkoot Trail. Although visitors' willingness to pay (WTP) to hike the Chilkoot Trail was not evaluated in the 1993 survey, an independent WTP visitor survey was undertaken in the summer of 1995 (Techneos Information Strategies Inc., 1996), prior to the introduction of the user fee. Some of the results of that survey can be used here to provide a pre-user WTP benchmark to which post-user fee data can be compared. Even though direct comparison with the 1995 data is impossible because of significant differences in the instrumentation, the comparison will allow to better understand the possible impact of the fee on Chilkoot Trail visitors.

The 1995 survey provides evidence that visitors supported cost recovery and were willing to pay a reasonable amount when they understood the intent and purpose of the fee. They also sought fairness, value and choice in a recreational user fee. However, many hikers indicated that they preferred service reductions to the introduction of user fees. In

<sup>1</sup> Source: Parks Canada – Yukon Field Unit

particular, they preferred no provision of firewood at Lindeman City (61%), a reduction in bridge construction (48%), and in the provision of visitor reception and orientation (38%). Overall, 1995 visitors indicated an average WTP of \$26 to hike the trail. If there had been a fee charged for that year, only seven percent stated that they would have not visited CTNHSC<sup>1</sup>. From these results, it appears that hikers supported the introduction of user fees that would be used for cost recovery, even though they may prefer a reduction in services than to be charged to hike the trail. Based on these results, it can be expected that at CTNHSC the displacement of visitors due to a user fee may be rather low, as seen in the general support for such an initiative.

Visitors' mean maximum WTP has been increasing over the period of 1995 to 2004. When looking at 1998 and 2004 data, this general increase can be observed across all three clusters. However, members of the nature appreciation segment reported significantly lower maximum WTP than other clusters in 1998. This difference was still present in 2004, but was no longer statistically significant. At the same time, membership in this group has decreased proportionally between 1993 and 1998. These two observations combined suggest that part of the nature appreciation cluster may have been displaced due to the fee introduction. Further research will be necessary to confirm relationships between clusters' WTP and their displacement.

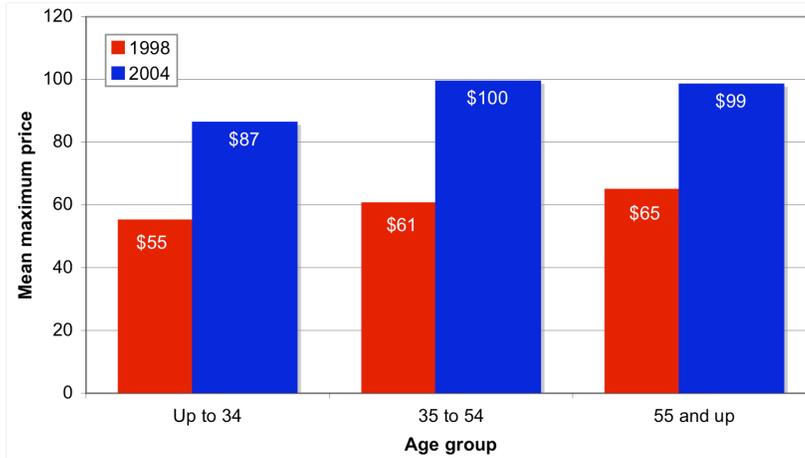
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<sup>1</sup> Responses would depend upon the amount of the fee charged, which was not specified (Techneos Information Strategies Inc. 1996)

Hikers' WTP increased for all age groups over the period of 1998 to 2004 (Figure 47).

Although it appears that younger hikers were generally willing to pay less than older hikers, differences between different age groups' WTP were not significant.

**Figure 47: Mean maximum willingness to pay, by age group and by year**



Despite these optimistic results with regard to different age groups' WTP for an experience on the Chilkoot Trail, CTNHSC managers believe that fees may still be driving away younger summer seasonal workers living in Skagway, Alaska and in the Yukon Territory. Because recreational activities such as the one investigated in this study are self-selective and the current research approach only reflects current visitors' WTP to hike the trail, it is impossible to understand dissatisfied hikers who have opted not to visit the trail due to the fees. Dissatisfied hikers may not have been captured in this survey and their opinion may therefore not be represented appropriately in these numbers.

Buckley (2003) examined possible issues associated with visitor fees at Australia's national parks. According to his results, a recreational user fee may impact local visitors' decisions to visit a park more than it might for tourists who are making a one-time visit to the site. Buckley found that a user fee may be an insignificant imposition for tourists who

may even be happy to make a contribution to conservation. On the other hand, user fees may influence local residents' decisions about where they go, what they do and how often they visit. Van Sickle and Eagles (1998) argue that it would be more acceptable to charge higher fees to recreationists not living in a park's jurisdiction because they are not contributing their tax dollars toward the preservation and management of the park. Walpole, Goodwin, and Ward (2001) also suggested using a dual pricing structure to avoid discriminating against domestic visitors.

A breakdown of hikers by place of residence showed that more hikers from Alaska (increase of 7.9% of all respondents) and the Yukon (increase of 6.9%) visited CTNHSC in 2004 than in 1998 (specific areas of residence unavailable for 1993). At the same time, the population size of these two areas has not increased radically. The change observed at CTNHSC with regard to local visitation, is therefore not simply due to population increases in these areas. Contrary to Buckley's (2003) findings, the number of local visitors is actually increasing rather than decreasing at the Chilkoot Trail in conjunction with charging a fee and/or a higher fee. In addition, 1995 local visitors (i.e., Yukon, Alaska, and other parts of Canada) reported higher WTP to visit CTNHSC than did visitors from other parts of the U.S.A. and the world (Techneos Information Strategies Inc., 1996). These results refute Buckley's suggestion about a possible displacement of local visitors due to a user fee.

Hikers generally spent a longer time on the trail in 1998 and 2004 than they did in 1993. The overall increase in the number of nights spent on the trail might in part be a result of

the recreational user fee. After 1997, visitors paying to hike the trail may have wanted to increase the benefits from their trip by spending more days on the trail. Throughout the study, the number of nights spent on the Chilkoot Trail were comparable for all clusters, except in 1998, when a large proportion of members of the nature appreciation cluster spent fewer nights on the trail than other clusters. By 2004, this difference had disappeared.

Another reason for spending more time on the trail might be that hikers now have to plan an itinerary before they can make a reservation and purchase a permit. Although itineraries are not enforced at CTNHSC, hikers may still decide to follow their planned itinerary, resulting in longer trips on average. The outside influencing factor here could be that the White Pass and Yukon Railroad train was running less frequently in later surveys; visitors may have been staying longer on the trail because they had (or wanted) to, in order to take the train out of the trail, as there was less frequent service in 2004, than before. It is clear that further investigation will be necessary to confirm these speculations.

### **6.1.2. Societal trends**

Kuentzel and Heberlein (2003) believe that structural factors outside the system, including societal trends, may also have considerable effect on the visitor composition. And according to Eagles (2004, p. 18) “park use and park management are reflections of societies and culture.” Unfortunately, a case study of one (such as this one) does not allow disassociating societal trends from case study trends. Further research of trends at the system’s level or the comparison of multiple case studies will be necessary to

understand the impacts of external factors. Nevertheless, an attempt is made here to point out possible societal trends that may be affecting the CTNHSC visitor population.

It was suggested earlier that younger hikers may have been partly displaced by the quota system. However, it is also possible that visitor demographics are changing as a result of changing generational trends. In 1988, Shelby et al. warned that “the baby boom generation that led the trend to backcountry recreation in the 1960s and ‘70s may return to these pursuits as their children grow older” (1988, p. 287). At the turn of the century, adults between the ages of 35 and 54 were six percent more likely than the (U.S.) national average to be involved in some type of sporting activity (Fetto, 2000). Confirming Shelby et al.’s 1988 speculation, Fetto (p. 72) wrote “there's not much joking going on these days when it comes to adventure travel for aging boomers [...] boomers are living up to their reputation that they were born to be wild.” Based on such observations, it is plausible that part of the displacement of younger hikers is due to the baby boomer generation taking over areas of outdoor recreation such as the Chilkoot Trail and not solely to management changes. However, a 1998 to 2004 trend study looking at the American population’s outdoor recreation participation observed a different trend in backpacking participation. The findings show a steady growth in 16 to 24 year-old backpackers since 1998, offsetting attrition among older backpackers (45 years and older) who comprised 17 percent of the American backpacker population in 1998, down to 15 percent in 2004 (Outdoor Industry Association, 2005).

The trend observed in use patterns with regard to hikers' increased length of stay on the trail may also be associated with such generational trend. An older hiker population may desire to spend more days on the trail than a younger crowd, possibly leading to this change in use pattern at CTNHSC.

Over the years, an increase in visitors' education levels was observed at CTNHSC. Part of this increase may relate to the overall increase in age structure of park visitors as seen in the parallel increase of both variables over the years. It could also potentially be attributable to a societal trend of higher educational pursuits. In 1991, one in four (25.1%) Canadians 15 years and over had completed college, university, or graduate school; this proportion had increased to 29.7 percent by the 1996 census, and again to 32.9 percent by 2001 (Statistics Canada, 2006), confirming the possibility of an overall trend in higher education.

Over the second time period of this study, the proportion of Canadian hikers visiting CTNHSC increased, while that of foreign hikers (i.e., other than Canada and the U.S.A.) decreased. It is possible that part of the change in visitors' country of origin could be due to the events of September 11, 2001. These events seem to have affected tourism movements worldwide toward a more localized tourism industry as seen in the decline in commercial air travel following 9/11 (Kim and Gu, 2004).

## **6.2. Visitor responses to restrictive management actions**

The implementation of several restrictive policies at CTNHSC was not about exclusion, but about the protection of cultural and natural resources and the continuous provision of

quality visitor experiences. Overall, the restrictive approach seems to have succeeded in enhancing visitors' experiences and/or improving the conditions of the trail; after 1997, visitors perceived the majority of problems presented to them as significantly less serious than prior to 1997. Nevertheless, one fundamental drawback of such policies is that visitors who are more sensitive to rules and regulations may be displaced (Hall and Cole, 2000; Kuentzel and Heberlein, 2003; Lucas, 1983; Shelby et al., 1988). Visitors may also employ other coping strategies to adapt to changed environments (Vorkinn, 1998). Those who felt dissatisfied with the changed environment at CTNSHC may have changed their expectations and reevaluated their experiences through a product shift. In the following subsections, these two coping mechanisms (i.e., product shift and displacement) are investigated further in terms of how they may apply to CTNHSC visitors.

### **6.2.1. Displacement of visitors**

Displacement is a behavioural response that relates to the spatial or temporal interchangeability of recreational experiences (Vorkinn, 1998). It requires that visitors move away from an area where an unacceptable change in the recreation environment has occurred (Hall and Cole, 2000; Vorkinn). As noted by Robertson and Regula, "displacement is not an all or nothing proposition" (2001, p. 180). For example, in an area that is heavily used, inaction may result in the displacement of those sensitive to crowding or resource impact, while the introduction of a use limit program may displace those sensitive to regulations.

At CTNHSC, the introduction of a quota system may have displaced certain sub-groups of visitors. As seen in an evaluation of relative proportion of hikers by cluster and by

year, the soft adventure cluster has been increasing over the years, while the nature appreciation cluster decreased between 1993 and 1998, and remained stable thereafter. Members of the nature appreciation cluster rated the motive *being unconfined by rules and regulations* as significantly more important to them than other clusters did, while the soft adventure cluster rated the importance of this item lowest out the three groups. Based on visitors' reported motivations to hike the trail, it is fair to assume that members of the nature appreciation segment would be less tolerant and those in the soft adventure cluster more tolerant to restrictive management practices. As would be expected based on their motivations, the soft adventure cluster rated the problem of *too many rules and regulations* as least serious and the nature appreciation cluster rated it as most serious among the three groups. These observations hint at a possible case of displacement of part of the nature appreciation cluster between 1993 and 1998, when restrictions were introduced on the trail, while the more tolerant soft adventure cluster may be favoured by the current situation.

Several potential cases of displacement in sub-segments of visitors have also been observed across the three clusters. In particular, younger hikers have a tendency to plan their trips less in advance than older hikers. The reservation system, which necessitates longer planning periods, may have resulted in the displacement of part of this group. It also appears that some foreign visitors may have been displaced by the reservation system. Finally, the quota system may be displacing large organized non-commercial groups who may not be able to organize themselves around the requirements of the new policies as easily as commercial organized groups.

### **6.2.2. Product shift**

A product shift refers to a cognitive adaptation, which requires visitors to alter “previously established evaluative standards to correspond to an area’s changing conditions” (Schindler and Shelby, 1995, p. 91). Laven, Manning, and Krymkowski (2005) proposed that visitors’ expectations are based on existing conditions. In that sense, the 1998 Klondike Gold Rush Centennial celebrations may have impacted visitors’ expectations. Their motivations may have become more focused on the heritage aspects of the trail, resulting in a possible product shift for some of that year’s respondents.

When looking at the changes that took place by 1998, an overall increase in the mean importance of observing historic features and artifacts, and reliving the stampeders use of the trail is observed for that year. In addition, several within-segment differences can be observed in the profile of the heritage tourism cluster over the years (differences with members of the same cluster, but from different years). In particular:

- the proportion of female hikers was larger than observed in the other two years;
- the mean age of its members increased; and
- their level of backcountry experience on a trail of this length increased.

The changes observed in this cluster’s profile point to a potential product shift in part of the CTNHSC visitor population during that year. Because the 1998 Centennial celebrations proposed an experience with a greater focus on the heritage significance of the trail than in other summers, it seems natural that visitors’ expectations and thus motivations would be somewhat altered, resulting in certain hikers to report different motivations to hike the Chilkoot Trail in 1998 than they would have in a ‘regular’ year. Because the cluster analysis used in this study determines visitor segments based on their

motivations, hikers who would have otherwise fallen into a different segment may have reevaluated their experience and reported motivations that are associated with the heritage tourism cluster as more important to them that year.

The nature appreciation cluster decreased in proportion between 1993 and 1998, potentially as a result of the displacement of certain of its members due to the management changes. However, because the Chilkoot Trail is unique and no alternative exists in the region to provide visitors with a comparable experience, some potentially dissatisfied hikers in the nature appreciation cluster may have decided to still visit the trail. This was the case despite the fact that they would have preferred a less restrictive experience with more opportunities for peace and solitude. Several trends observed in 1998 suggest that the nature appreciation cluster may not have adapted to the management policies of 1997 at the same rate as other clusters. Notably:

- their average advance planning period was shorter than other segments;
- they were spending less time on the trail;
- they reported significantly lower maximum willingness to pay;
- they perceived several problems as being more serious than other clusters did;
- they reported preferring significantly smaller group sizes; and
- the number of low flying aircraft they reported seeing or hearing per day exceeded their tolerated number of encounters.

By 2004, the three clusters were closer together in terms of their individual profiles. This suggests that, by then, members of the nature appreciation cluster may have reevaluated their experience to fit the changed environment of the Chilkoot Trail. The greater homogeneity between the three clusters' profile in 2004, in particular in terms of a decrease in the relative difference between the clusters' ratings of problems on the trail,

suggests that the adaptation of the nature appreciation cluster through a product shift may have occurred between 1998 and 2004.

Although possible cases of displacement and product shift were observed for part of the visitor population over the period of this study, overall, visitor responses to the management actions of 1997 were positive. Two reasons may have facilitated visitors' adaptation to the introduction of restrictive policies at CTNHSC: 1) the large proportion of first-time/one-time users visiting CTNHSC. These visitors may not have clear expectations about their trail experience, resulting in greater satisfaction with current conditions; 2) CTNHSC is unique and no comparable alternative option exists in the area to substitute for the experience it offers, thus resulting in very low displacement of visitors.

### **6.3. Contribution of this research**

Contemporary visitor monitoring practices in Canadian national parks require that visitor surveys monitor their park experiences every five years (Parks Canada, 2003). This study demonstrates that such evaluations should not solely rely on a cross-sectional research design, as important dynamics may remain disguised. The longitudinal comparison of three samples of CTNHSC visitors allowed the investigation of visitor reactions to changes at the management level over time. As seen in this exercise, the CTNHSC visitor population is dynamic and evolving; CTNHSC visitors appear to have changed parallel to management changes. Addressing the concerns of current visitors, without acknowledging the fact that a process of adaptation may have taken place, would not have made such conclusion possible.

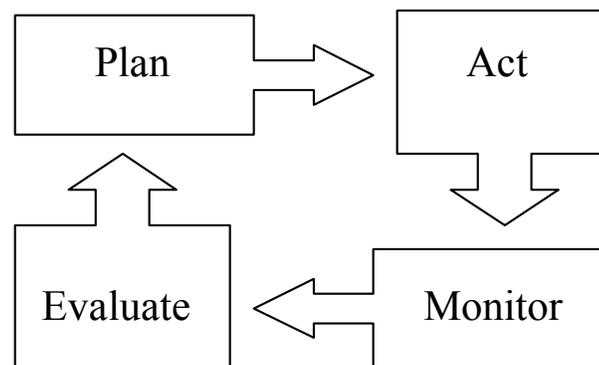
The lack of knowledge about the impacts of management decisions on the visitor composition and their responses may cause problems during the implementation and potentially result in suboptimal situations. Based on the results of this study and other research on visitor responses to management actions, it appears that regardless of the management strategy used by park managers, some visitors will be affected. Although it will never be possible to satisfy all types of needs at all locations, managers should be cognizant of the type of recreation opportunities and conditions (and associated visitor segments) they want to favour, and at the same time acknowledge which group they are likely to impact negatively. Being able to predict the probable consequences of alternative management actions on the visitor population would greatly facilitate such decision-making processes for protected area management. The present research began to address this issue with regard to the possible impacts associated with the implementation of a quota system and recreational user fee on the visitor composition and responses.

#### **6.4. Adaptive visitor management**

Longitudinal studies are particularly useful when a management agency is considering an adaptive management framework, which usually is closely associated with ecosystem management. Adaptive management is a systematic approach to improving resource management and accommodating change by learning from outcomes or management interventions (Figure 48). Objectives and policies are adjusted, and management policies are deliberately designed to enhance the rate of improvement. A successful adaptive management approach requires 1) reliable feedback about effectiveness of current management strategies, and 2) an understanding of ecosystem functions and thresholds

(Taylor, Kremsater, and Ellis, 1997), or in the case of visitor management, an understanding of the human dimensions of parks visitation. As in the natural sciences, adaptive management for the social sciences implies the use of experimental research designs, regular monitoring, and survey-based research (including trend studies). Although experimental research is inherently more difficult in the social sciences, visitor management for parks and protected areas would be greatly enhanced by using such approach.

**Figure 48: The adaptive management cycle**



Under an adaptive management framework, managers must continually monitor the results of their decisions and seek ways to improve them. In his discussion of adaptive management, den Otter (2000) suggests that the introduction of a policy be regarded as one simple experiment and an opportunity for learning. One of the strengths of adaptive management is that it recognizes change, complexity, and uncertainties as realities of human systems management (Slocombe and Dearden, 2002). By using such management approach, managers continuously learn from their experiences of undertaking different management actions and can adjust their objectives and management policies based on

previous learning. The learning and improvement feedback loop will lead to increased visitor management effectiveness.

## **6.5. Further research**

Although some of the impacts of management actions on Chilkoot Trail visitors have been identified in this research, several questions remain. Further research will be necessary to elucidate further some of the issues identified in this study.

### **6.5.1. Segmentation analysis**

By isolating different sub-populations based on their motives to visit CTNHSC, it was possible to uncover which visitor segments were more impacted by management changes. Possible visitor responses to management changes have been addressed earlier in this discussion. Although the trends observed at CTNHSC are pointing toward potential cases of displacement and product shift of various sub-groups, it is still precarious to predict the potential effects of a quota system and recreational user fee on specific user groups or visitor types. More research using longitudinal study designs and the segmentation technique developed for this research will need to be undertaken to determine which segments of visitors are more at risk of being affected by these management actions.

The segmentation analysis can be more effective if it is undertaken at an area that introduces only one major management policy over the period of the study. Doing so would allow the separation of effects on visitors with each specific management policy; it would also allow to yield even more precise conclusions on visitor responses to management changes than was possible with this research. The analytical approach used

here can also be more effective if other areas (cases) apply a very similar analytical approach leading to comparative case studies.

### **6.5.2. Stated choice models**

The present analysis presented several cases where multicollinearity potentially exists between independent variables. Various forms of stated choice models, have been used in recreation research to determine visitor preferences for alternative management scenarios (Haider, Anderson, Beardmore, and Anderson, 2004; Lawson and Manning, 2001b). The strengths of such models are in their ability to explore currently non-existing management or experience alternatives, and to avoid multicollinearity (Haider 2002; Haider et al. 2004). In addition, by presenting respondents with combinations of attributes instead of separate variable statements, it forces respondents into making tradeoffs between alternative hypothetical scenarios. Using stated choice models in addition to a longitudinal visitor research design would allow exploring and answering questions regarding visitors' preferences for alternative management options.

### **6.5.3. Internalization of external trends**

Trend studies do not provide the basis for evaluating causation and thus, understanding why certain changes or phenomena have occurred is often limited to inferences (Menard, 2002). The discussion presented earlier acknowledges that sources of change other than those studied may have affected the data. The large number of possible confounding variables interfering with visitor responses in recreational settings may constrain the possibility of formulating precise predictions with regard to the likely impact of alternative management scenarios. Even when a strong association between two variables

is observed, it is not by itself sufficient evidence to conclude a cause-and-effect relationship between them (Moore and McCabe, 2001). However, relationships observed, as in this study, may serve to identify hypotheses, which may later be tested experimentally. Also, when the same variables are correlated in several studies, it provides the basis to actually exclude the possibility of external factors having to do with the relationship. As attempted by Cole et al. (1995), one could compare the findings of a case study such as this one against comparable wilderness trend studies in an attempt to differentiate changes observed at the park level with changes observed at the system level.

#### **6.5.4. Combination of longitudinal research designs**

Although cross-sectional studies are useful in providing information on current issues and situations, by incorporating a new dimension (i.e., time) into the analysis, trend studies take the exogenous effect of time into consideration. The trends observed in the data from the three surveys undertaken with the CTNHSC population allowed drawing inferences about the possible impacts of management actions on the visitor over the period studied.

Trend studies allow evaluating changes at the group level, but contrary to panel studies do not allow disaggregate analyses of respondents and thus, the evaluation of cause-and-effect relationships. Panel studies require that the same individual be interviewed at different points in time with regard to their experiences, preferences, etc. Because panel studies allow for the analysis and measurement of non-aggregated or intra-individual changes in the cases themselves across survey years, they are generally preferred for investigating recreation displacement, but such replication tend to be difficult, costly, and

time-consuming (Robertson and Regula, 1994). Using the panel study design in addition to the trend study design would provide for additional insight into causal relationships. Where resources are available the use of both designs (i.e., trend and panel) concurrently may facilitate understanding the dynamics of changes occurring in a population. At areas where repeat visits are common, panel studies should be undertaken to understand the process of adaptation of current visitors to management changes. However, at sites such as the Chilkoot Trail, where the majority of hikers are one-time visitors only, panel studies may not be ideal to study displacement. In this kind of situation, grouping visitors into distinctive sub-populations that are representative of the various market segments for the area may be more practicable than setting an expensive and time-consuming panel.

## **6.6. Conclusion**

This study showed that although the management actions undertaken at CTNHSC succeeded at reducing and redistributing use, and generating income for park management, they also had indirect effects on the visitor population. In particular, some visitors may have been displaced after the implementation of restrictive management approaches. Other respondents appear to have changed their expectations and reevaluated their experience at CTNHSC to match the current situation through a product shift. The use of a trend study design allowed observing these changes over time.

The key message from this study is that it is important to develop a better understanding about the affects of different management strategies on specific user groups, and in turn recognize the impacts of various management decisions on actual or potential visitors prior to the implementation of policies. Understanding the process of adaptation that

takes place as a result of management actions (or inaction) and how different sub-populations of visitors are likely to be affected will lead to a better management of the system of parks and protected areas in Canada. The importance of long term monitoring cannot be stressed enough. Without the use of a longitudinal study design, it would have been much more challenging, if not impossible, to describe any of the findings of this study, which documents the process of adaptation that occurred at CTNHSC over the past 12 years. Additional long term empirical research looking at how recreationists perceive, behave in, and respond to management actions will be necessary to further improve management decisions.

## Reference List

- Barich, R.R. & Bielby, D.D. (1996). Rethinking marriage: Change and stability in expectations, 1967-1994. *Journal of Family Issues*. March 1996, 139-69.
- Bixler, R.D., Noe, F.P. & Hammitt, W.E. (1992). Restrictive and non-restrictive management of park visitors. *Journal of Environmental Systems*. 21(4), p. 335-48.
- Buckley, R. (2003). Pay to play in parks: An Australian policy perspective on visitor fees in public protected areas. *Journal of Sustainable Tourism*. 11(1), 56-73.
- Burde, J.H. & Curran, K.A. (1986). User perception of backcountry management policies at Great Smoky Mountains National Park. In Kulhavy, D.L., & Conner, R.N., (eds.), *Wilderness and natural areas in the eastern United States: A management challenge* (pp. 223-28). Nacogdoches, TX: Center for Applied Studies, School of Forestry, Stephen F. Austin State University.
- Canadian Parks Service. (1989). *Chilkoot Trail National Historic Park visitor survey 1986*. Winnipeg: Prairie and Northern Regional Office.
- Chakrapani, C. (2004). *Statistics in market research*. London, UK: Bath Press Ltd.
- Cole, D.N., Watson, A.E. & Roggenbuck, J.W. (1995). *Trends in wilderness visitors and visits: Boundary Waters Canoe Area, Shining Rock, and Desolation Wildernesses*. Research Paper INT-RP-483. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.
- Cordell, H.K., Herbert, N.G. & Pandolfi, F. (1999). The growing popularity of birding in the United States. *Birding*. October 1999, 168-76.
- Cordell, H.K., Tarrant, M.A. & Green, G.T. (2003). Is the public viewpoint of wilderness shifting? *International Journal of Wilderness*. 9(2), 27-32.
- Crompton, J.L. & Kim, S.S. (2004). Temporal changes in perceived constraints to visiting State parks. *Journal of Leisure Research*. 36(2), 160-82.
- Dearden, P. & Dempsey, J. (2004). Protected areas in Canada: decade of change. *The Canadian Geographer*. 48(2): 225-39.
- den Otter, M.A. (2000). *The development of adaptive management in the protected areas of the foothills model forest*. Edmonton, Alberta: Canadian Forest Service.

- Eagles, P.F.J., McCool, S.F. & Haynes, C.D. (2002). *Sustainable tourism in protected areas : Guidelines for planning and management*. Cambridge, U.K.: Thanet Press Limited.
- Eagles, P.F.J. (2004). *Trends affecting tourism in protected areas*. Working Papers of the Finnish Forest Research Institute 2, 18-26. Retrieved April 15, 2006 from <http://www.metla.fi/julkaisut/workingpapers/2004/mwp002.htm>
- Elliot, T. W. (1994). *Attitudes toward limiting overnight use of Chilkoot Trail National Historic Site*. MSc. Thesis; University of Montana, MT.
- Fetto, J. (2000). The wild ones. *American Demographics*. 22(2), 72.
- Grapentine, T. (1997). Managing multicollinearity: Real-world survey data can create surrealistic analytic models. *Marketing Research*. 9, 10-21.
- Haas, G.E. (1999). *A working definition and process model*. In the Book of abstracts for the 1999 Congress on Recreation and Resource Capacity. November 29-December 2, 1999, Snowmass, CO.
- Haider W., Anderson, C., Beardmore, B., & Anderson, D.A. (2004). *Recreational trail use of residents in Jasper National Park, Canada*. Working Papers of the Finnish Forest Research Institute 2, 85-92. Retrieved April 15, 2006 from <http://www.metla.fi/julkaisut/workingpapers/2004/mwp002.htm>
- Hall, T. & Cole, D. (2000). *An expanded perspective on displacement: A longitudinal study of visitors to two wilderness in the Cascade Mountains of Oregon*. USDA Forest Service Proceedings RMRS-P-15-Vol.4, 113-21.
- Hammit, W.E. & Cole, D. (1998). *Wildland Recreation: Ecology and Management*. New York: John Wiley & Sons, Inc.
- Hammit, W.E., Backman, K.F. & Davis, T.J. (2001). Cognitive dimensions of wilderness privacy: An 18-year trend comparison. *Leisure Sciences*. 23, 285-292.
- Harris, C.C. & Driver, B.L. (1987). Recreation user fees: Pros and cons. *Journal of Forestry*. 85(5), 25-29.
- Hermer, J. (2002). *Regulating eden: The nature of order in North American parks*. Toronto: University of Toronto Press.
- Iwasaki, Y. & Smale, B.J.A. (1998). Longitudinal analyses of the relationships among life transitions, chronic health problems, leisure, and psychological well-being. *Leisure Sciences*. 20, 25-52.

- Jackson, E.L. & Witt, P.A. (1994). Change and stability in leisure constraints: A comparison of two surveys conducted four years apart. *Journal of Leisure Research*. 26(4), 322-36.
- Jackson, S. (1998). *Chilkoot Trail National Historic Site 1998 summer recreational use study*. Burnaby, BC: Centre for Tourism Policy and Research, Simon Fraser University.
- Johnston, M.E. (1997). Polar tourism regulation strategies: controlling visitors through codes of conduct and legislation. *Polar Record*. 33(184), 13-20.
- Kim, H. & Gu, Z. (2004). Impact of the 9/11 terrorist attacks on the return and risk of airline stocks. *Tourism and Hospitality Research*. 5(2), 150-163.
- Kuentzel, W.F. & Heberlein, T.A. (1992). Cognitive and behavioral adaptations to perceived crowding: A panel study of coping and displacement. *Journal of Leisure Research*. 24(4), 377-93.
- Kuentzel, W.F. & Heberlein, T.A. (2003). More visitors, less crowding: Change and stability of norms over time at the Apostle Islands. *Journal of Leisure Research*. 35(4), 349-371.
- Laven, D.N., Manning, R.E. & Krymkowski, D.H. (2005). The relationship between visitor-based standards of quality and existing conditions in parks and outdoor recreation. *Leisure Sciences*, 27, 157-173.
- Lawson, S. & Manning, R.E. (2001a). Solitude versus access: A study of tradeoffs in outdoor recreation using indifference curve analysis. *Leisure Sciences*. 23, 179-91.
- Lawson, S. & Manning, R.E. (2001b). Crossing experiential boundaries: Visitor preferences regarding tradeoffs among social, resource and managerial attributes of the Denali wilderness experience. *The George Right Forum*, 18(3), 10-27.
- Légaré, A.M. & Haider, W. (2005). *Chilkoot Trail National Historic Site of Canada: 2004 summer recreational use study*. Burnaby, BC: School of Resource and Environmental Management, Simon Fraser University.
- Lucas, R.C. (1983). The role of regulations in recreation management. *Western Wildlands*. 9(2), 6-10.
- Lucas, R.C. (1985). *Visitor characteristics, attitudes, and use patterns in the Bob Marshall Wilderness Complex, 1970-82*. Research paper INT-345. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

- Martin, E. (1983). Surveys as social indicators: Problems in monitoring trends. In Rossi, P.H., Wright, J.D., & Anderson, A.B. (Eds.), *Handbook of survey research* (pp. 677-743). Orlando, FL: Academic Press.
- McCool, S.F. (2001). Limiting recreational use in wilderness: Research issues and management challenges in appraising their effectiveness. In Freimund, W.A. & Cole, D.N. (Comps.), *Visitor use density and wilderness experience: Proceedings 2000 June 1-3 Missoula, MT*. Proc. RMRS-P-20. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Station.
- McCool, S.F. & Christensen, N.A. (1996). Alleviating congestion in parks and recreation areas through direct management of visitor behavior. In D.W. Lime (Ed.), *Crowding and congestion in the National Park System: Guidelines for management and research*, MAES Misc. Pub. 86-1996. St-Paul, MN: Department of Forest Resources and Minnesota Agricultural Experiment Station, University of Minnesota.
- McDonald C.D. & Hammitt, W.E. (1986). Identification of visitor subgroup differences to facilitate management decisions. In Kulhavy, D.L., & Conner, R.N., (eds.), *Wilderness and natural areas in the eastern United States: A management challenge* (pp. 247-52). Nacogdoches, TX: Center for Applied Studies, School of Forestry, Stephen F. Austin State University.
- Menard, S. (2002). *Longitudinal research (2nd ed.)*. Thousand Oaks, CA: Sage Publications.
- Monz, C., Roggenbuck, J., Cole, D., Brame, R. & Yoder, A. (2000). *Wilderness party size regulations: Implications for management and a decision-making framework*. USDA Forest Service Proceedings RMRS-P-15-Vol.4, 265-73.
- Moore, D.S. & McCabe, G.P. (2001). *Introduction to the practice of statistics (third edition)*. New York: W.H. Freeman and Company.
- More, T. & Stevens, T. (2000). Do user fees exclude low-income people from resource-based recreation? *Journal of Leisure Research*. 32(3), 341-57.
- Moscardo, G., Morrison, A.M., Pearce, P.L., Lang, C. & O'Leary, J.T. (1995). Understanding vacation destination choice through travel motivation and activities. *Journal of Vacation Marketing*, 2(2), 109-22.
- Mowen, A.J., Payne, L.L. & Scott, D. (2005). Change and stability in park visitation constraints revisited. *Leisure Sciences*. 27, 191-204.
- Outdoor Industry Association. (2005). *Outdoor recreation participation study, 7th edition for year 2004*. Boulder, CO: Leisure Trends Group.
- Parks Canada. (1994). *Guiding principles and operating policies*. Ottawa, Ontario.

- Parks Canada Agency. (2000). "Unimpaired for future generations?" *Protecting ecological integrity with Canada's National Parks. Vol. II "Setting a new direction for Canada's National Parks."* Report of the Panel on the Ecological Integrity of Canada's National Parks. Ottawa, Ontario.
- Parks Canada Agency. (2003). *Parks Canada Agency: Corporate plan 2003/04 – 2007/08*. Ottawa, Ontario.
- Parks Canada Agency. (2004). *Parks Canada action plan in response to the report of the panel on the ecological integrity of national parks*. Retrieved June 25, 2004 from [www.pc.gc.ca](http://www.pc.gc.ca)
- Pearce, P.L. & Lee, U.I. (2005). Developing a travel career approach to tourist motivation. *Journal of Travel Research*. 43, 226-37.
- Robertson, R.A. & Regula, J.A. (1994). Recreational displacement and overall satisfaction: A study of Central Iowa's licensed boaters. *Journal of Leisure Research*. 26(2), 174-81.
- Roggenbuck, J.W. & Lucas, R.C. (1987). Wilderness use and user characteristics: A state-of-knowledge review. In Lucas, R.C. (Comp., Ed.) *Proceedings of the national wilderness research conference: Issues, state-of-knowledge, future directions* (pp. 203-44). General Technical Report INT-22Q. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.
- Shelby, B., Bregenzer, N.S. & Johnson, R. (1988). Displacement and product shift: Empirical evidence from Oregon rivers. *Journal of Leisure Research*. 20(4), 274-88.
- Schindler, B. & Shelby, B. (1995). Product shift in recreation settings: Findings and implications from panel research. *Leisure Sciences*, 17, 91-107.
- Slocombe D.S. & Dearden, P. (2002). Protected areas and ecosystem-based management. In Dearden, P. & Rollins, R. (eds.), *Parks and protected areas in Canada: Planning and management (2nd ed.)* (pp. 295- 320). Toronto: Oxford University Press.
- Smale, B.J.A. (1992). *Benefit segmentation of the visitors to Nahanni National Park Reserve (1991)*. Waterloo, ON: University of Waterloo.
- Statistics Canada. (2006). *Canadian statistics*. Retrieved February 10, 2006 from <http://www40.statcan.ca/101/cst01/>
- Stewart, W.P. & Cole, D.N. (2001). Number of encounters and experience quality in Grand Canyon Backcountry: Consistently negative and weak relationships. *Journal of Leisure Research*. 33(1), 106-20.

- Taris, T.W. (2000). *A primer in longitudinal data analysis*. London: Sage Publications Ltd.
- Taylor, B., Kremsater, L., & Ellis, R. (1997). *Adaptive management of forests in British Columbia*. Victoria, BC: BC Ministry of Forests.
- Techneos Information Strategies Inc. (1996). *Chilkoot Trail 1995/96 visitor survey: Canadian Heritage, Parks Canada Pacific and Yukon region*. Calgary, AB: Parks Canada.
- Tucker, W. (2001). Minimum group sizes: allowing public access and increasing safety. *The George Wright Society*. 187-92. Retrieved January 1, 2006 from [www.georgewright.org/31tucker.pdf](http://www.georgewright.org/31tucker.pdf)
- Van Sickle, K.V. & Eagles, P.F.J. (1998). Budgets, pricing policies and user fees in Canadian parks' tourism. *Tourism Management*. 19(3), 225-35.
- Vorkinn, M. (1998). Visitor response to management regulations – A study among recreationists in southern Norway. *Environmental Management*. 22(5), 737-46.
- Wagar, J.A. (1964). *The carrying capacity of wild lands for recreation*. Ann Arbor, MI: University Microfilms.
- Walpole, M.J., Goodwin, H.J. & Ward, K.G.R. (2001). Pricing policy for tourism in protected areas: Lessons from Komodo National Park, Indonesia. *Conservation Biology*. 15(1), 218-27.
- Wicks, B.E. & Backman, K.F. (1994). Measuring equity preferences: A longitudinal analysis. *Journal of Leisure Research*. 26(4), 386-401.
- Womble, P., Wolf, W., & Field, D.R. (1978). *Hikers on the Chilkoot Trail: A descriptive report*. Seattle, WA: Sociology Studies Program, Cooperative Park Studies Unit, College of Forest Resources, University of Washington.
- Wright, B.A., Rodgers, E.B.D. & Backman, K.F. (2001). Assessing the temporal stability of hunting participation and the structure and intensity of constraints: A panel study. *Journal of Leisure Research*. 33(4), 450-69.

## Appendix: Results of Significance Tests

- Stars indicate significant differences (\* < 0.1, \*\* < 0.05, and \*\*\* < 0.01) for independent samples t-tests, Pearson’s chi-square tests, and one-way analysis of variance (ANOVA) tests.
- Pairs of letters beside mean responses (e.g., 1.12<sup>ab</sup>, 1.04<sup>ac</sup>, 2.04<sup>bc</sup>) indicate significant differences of < 0.05 at the 5 percent level for multiple comparisons – Bonferroni (only applicable to comparisons between multiple mean responses).

**Table A: Mean importance of motivations, by cluster**

Motivation items	ANOVA	Cluster		
		1	2	3
Observe its scenic beauty	***	1.12 <sup>ab</sup>	1.04 <sup>ac</sup>	2.04 <sup>bc</sup>
For the adventure	***	1.24 <sup>ab</sup>	1.54 <sup>ac</sup>	1.74 <sup>bc</sup>
Enjoy the sights/smells of nature	***	1.35 <sup>ab</sup>	1.16 <sup>ac</sup>	2.41 <sup>bc</sup>
Experience the peace and tranquility	***	1.86 <sup>ab</sup>	1.35 <sup>ac</sup>	2.32 <sup>bc</sup>
Because of its challenge	***	1.49 <sup>ab</sup>	1.81 <sup>a</sup>	1.97 <sup>b</sup>
Be with friends	***	1.86 <sup>ab</sup>	2.14 <sup>a</sup>	2.19 <sup>b</sup>
Be with others who enjoy the same things I do	***	1.92 <sup>ab</sup>	2.01 <sup>ac</sup>	2.42 <sup>bc</sup>
Re-live the stamperders use of the trail	***	1.61 <sup>a</sup>	2.07 <sup>ab</sup>	1.78 <sup>b</sup>
Observe historic features and artifacts	***	1.75 <sup>a</sup>	2.08 <sup>ab</sup>	1.88 <sup>b</sup>
View wildlife in its natural habitat	***	2.33 <sup>ab</sup>	1.69 <sup>ac</sup>	2.58 <sup>bc</sup>
Learn about the history of the Gold Rush	***	1.90 <sup>a</sup>	2.15 <sup>ab</sup>	1.92 <sup>b</sup>
Improve my physical health	-	2.23	2.08	2.40
Get away from crowds	***	2.73 <sup>a</sup>	1.82 <sup>ab</sup>	2.89 <sup>b</sup>
Develop my skills/abilities	***	2.17 <sup>ab</sup>	2.27 <sup>a</sup>	2.40 <sup>b</sup>
Escape noise	***	2.98 <sup>ab</sup>	1.68 <sup>ac</sup>	2.72 <sup>bc</sup>
Do something with my family	***	2.41 <sup>ab</sup>	2.86 <sup>a</sup>	2.99 <sup>b</sup>
Experience solitude	***	2.99 <sup>a</sup>	1.92 <sup>ab</sup>	2.80 <sup>b</sup>
Learn more about nature	***	2.46 <sup>ab</sup>	2.10 <sup>ac</sup>	2.87 <sup>bc</sup>
Learn about native history and culture	***	2.67 <sup>a</sup>	2.22 <sup>ab</sup>	2.69 <sup>b</sup>
Let my mind move at a slower pace	***	3.37 <sup>ab</sup>	2.22 <sup>ac</sup>	3.00 <sup>bc</sup>
Release tension	***	3.13 <sup>a</sup>	2.25 <sup>ab</sup>	2.95 <sup>b</sup>
Be unconfined by rules and regulations	***	3.42 <sup>ab</sup>	2.44 <sup>ac</sup>	2.98 <sup>bc</sup>
Meet new people	-	2.87	2.99	3.13
Retrace the steps of a Gold Rush era relative	***	3.37 <sup>ab</sup>	2.89 <sup>ac</sup>	2.55 <sup>bc</sup>

**Table B: Comparison of distributions for categorical variables<sup>1</sup>, by year and by cluster**

<b>Categorical variables</b>	<b>1993</b>	<b>1998</b>	<b>2004</b>
Type of personal party	***	-	***
Advance planning period	-	***	-
Maximum group size preferred	-	*	-
Gender	***	-	**
Education level	-	-	**
Country of residence	***	***	-
Hiking experience - Length	***	*	*
Hiking experience - Multi-day	***	-	-

**Table C: Mean responses for numerical variables, by year and by cluster**

<b>Numerical variables</b>	<b>ANOVA</b>			<b>1993 Cluster</b>			<b>1998 Cluster</b>			<b>2004 Cluster</b>		
	<b>93</b>	<b>98</b>	<b>04</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>
Nights on the trail	-	-	-	3.95	3.69	3.06	4.02	3.78	3.90	3.87	3.88	3.89
Total group size	-	***	*	4.40	4.10	4.74	4.96 <sup>c</sup>	3.83 <sup>c</sup>	4.42	4.88	4.47	5.48
Chilkoot Trail hikes	-	-	-	1.37	1.26	1.25	1.29	1.68	1.07	1.20	1.33	1.16
Age	**	-	***	36.1 <sup>ab</sup>	32.8 <sup>a</sup>	31.4 <sup>b</sup>	38.9	36.2	37.1	40.8 <sup>d</sup>	37.3	32.3 <sup>d</sup>

**Table D: Daily mean tolerated encounters with other groups, by year and by cluster**

<b>Number of groups tolerated...</b>	<b>ANOVA</b>		<b>1998 Cluster</b>			<b>2004 Cluster</b>		
	<b>1998</b>	<b>2004</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>
...while hiking on the trail	**	**	9.43 <sup>a</sup>	7.18 <sup>a</sup>	7.53	7.2	5.72	7.68
...at trailhead/parking areas	-	*	11.16	10.39	10.31	7.88 <sup>b</sup>	6.05 <sup>b</sup>	6.49
...in campsites	-	**	12.54	10.11	11.12	10.11 <sup>c</sup>	7.92 <sup>c</sup>	10.12
...in campground shelters	-	-	6.29	5.58	6.01	6.67	5.83	6.84

**Table E: Daily mean actual encounters with other groups, by year and by cluster**

<b>Number of groups seen...</b>	<b>ANOVA</b>		<b>1998 Cluster</b>			<b>2004 Cluster</b>		
	<b>1998</b>	<b>2004</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>
...while hiking on the trail	-	*	5.3	6	5.4	4	4	4.5
...at trailhead/parking areas	-	-	3.9	3.8	3.3	1.9	2.7	2.2
...in campsites	-	-	8.9	9.4	9.8	7.8	7	7.2
...in campground shelters	-	**	5.9	6	5.7	5.5	5.6	5.8

<sup>1</sup> Pearson chi-square test

**Table F: Daily mean tolerated and actual low-flying aircraft seen or heard, by year and by cluster**

Number of low-flying aircraft...	ANOVA		1998 Cluster			2004 Cluster		
	1998	2004	1	2	3	1	2	3
...tolerated	-	-	2.8	2.1	2.9	3.4	2.2	3.2
...seen or heard	-	**	1.7	2.3	1.8	1.1 <sup>a</sup>	1.2	1.6 <sup>a</sup>

**Table G: Daily mean number of encounters, by year**

Encounters	t-test	1998	2004
Number of groups tolerated on trail	***	8.22	7.06
Number of groups tolerated at trailhead	**	10.98	8.05
Number of groups tolerated in campsites	**	10.73	9.7
Number of groups tolerated in campground shelters	-	5.84	6.92
Number of groups seen on trail	***	5.59	4.12
Number of groups seen at trailhead	***	3.75	2.2
Number of groups seen in campsites	***	9.29	7.35
Number of groups seen in campground shelters	-	6.01	5.85
Maximum number of aircraft tolerated	-	2.28	2.96
Maximum number of aircraft seen or heard	***	2.08	1.18

**Table H: Mean responses for potential or actual problems in the park, by cluster (1993)**

Problem items	ANOVA	Cluster		
		1	2	3
Too many facilities or developments	**	1.09 <sup>a</sup>	1.28 <sup>a</sup>	1.18
Human waste along trail/at campsites	-	1.31	1.43	1.44
Too many rules and regulations	**	1.09 <sup>ab</sup>	1.27 <sup>a</sup>	1.32 <sup>b</sup>
Damage to historic artifacts/features	-	1.63	1.62	1.82
Time spent finding an open campsite	-	1.44	1.48	1.51
Number of groups seen along the trail	**	1.33 <sup>a</sup>	1.58 <sup>a</sup>	1.56
Total number of hikers using trail	*	1.45	1.69	1.69
Noise associated with other hikers	***	1.24 <sup>ab</sup>	1.57 <sup>a</sup>	1.68 <sup>b</sup>
Size of groups	**	1.37 <sup>a</sup>	1.68 <sup>a</sup>	1.63
Total number of hikers using campsites	-	1.68	1.86	1.66
Number of groups at campsites	-	1.75	1.92	1.85
Crowded shelters	-	1.63	1.68	1.79

**Table I: Mean responses for potential or actual problems in the park, by cluster (1998)**

Problem items	ANOVA	Cluster		
		1	2	3
Too many facilities or developments	***	1.06 <sup>a</sup>	1.23 <sup>ab</sup>	1.05 <sup>b</sup>
Human waste along trail/at campsites	*	1.17	1.27	1.10
Too many rules and regulations	**	1.26 <sup>a</sup>	1.54 <sup>a</sup>	1.47
Damage to historic artifacts/features	*	1.13	1.28	1.16
Time spent finding an open campsite	-	1.23	1.27	1.29
Number of groups seen along the trail	***	1.21 <sup>a</sup>	1.46 <sup>a</sup>	1.27
Total number of hikers using trail	***	1.20 <sup>a</sup>	1.49 <sup>ab</sup>	1.21 <sup>b</sup>
Noise associated with other hikers	***	1.32 <sup>a</sup>	1.63 <sup>a</sup>	1.37
Size of groups	*	1.39	1.60	1.40
Total number of hikers using campsites	***	1.34 <sup>a</sup>	1.61 <sup>a</sup>	1.38
Number of groups at campsites	*	1.40	1.61	1.46
Crowded shelters	-	1.96	2.16	2.06

**Table J: Mean responses for potential or actual problems in the park, by cluster (2004)**

Problem items	ANOVA	Cluster		
		1	2	3
Too many facilities or developments	*	1.05	1.16	1.14
Human waste along trail/at campsites	-	1.17	1.23	1.17
Too many rules and regulations	-	1.39	1.40	1.60
Damage to historic artifacts/features	-	1.13	1.25	1.27
Time spent finding an open campsite	-	1.36	1.36	1.29
Number of groups seen along the trail	*	1.15	1.29	1.31
Total number of hikers using trail	***	1.15 <sup>ab</sup>	1.36 <sup>a</sup>	1.44 <sup>b</sup>
Noise associated with other hikers	**	1.42	1.52 <sup>a</sup>	1.22 <sup>a</sup>
Size of groups	**	1.30 <sup>a</sup>	1.53 <sup>a</sup>	1.34
Total number of hikers using campsites	**	1.38 <sup>a</sup>	1.63 <sup>a</sup>	1.64
Number of groups at campsites	-	1.41	1.54	1.43
Crowded shelters	-	1.86	1.96	1.69