OUTDOOR RECREATION CONFLICT ON TRAILS IN SQUAMISH, BRITISH COLUMBIA: AN EXAMINATION OF THEORETICAL MODELS AND MANAGEMENT

by

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Understanding the social interactions of trail users is a challenge for recreation managers globally. Recreationists are not homogenous and differences in their expectations, behaviours and values may create conflict and consequently, recreationists’ levels of satisfaction may be decreased.

On the one hand, numerous management practices have been suggested to deal with recreation conflict; of these, zoning and educational programs are two of the most commonly cited to address interpersonal and social values conflict respectively. However, the efficacy of these two approaches is still in doubt. Additionally, although past research found that many different attributes of recreationists are associated with conflict, no agreement has been reached on how to measure this conflict or even where the conflict comes from.

On the other hand, several potential sources of conflict have been identified in literature, though they have not yet been included within the conflict models. Some authors have suggested that the underlying causes of conflict should first be identified in order for conflict management to be effective.

This research is a survey-based, cross-sectional case study of trail users on nine areas of the Squamish trail network in British Columbia in which 1) identify potential sources of conflicts among recreationists; 2) look for possible causal relationships between sources of conflict and the degrees of both the trail user’s activity style and resource specificity; and 3) assess the efficacy of two management practices (i.e., spatial zoning and educational signs) at reducing interpersonal and social values conflict respectively.

Results indicate that spatial zoning and educational signs are useful at reducing interpersonal conflict and social values conflict, but only with regard to specific sources of conflict and at low effect sizes. Results also suggest that very different characteristics of recreationists significantly predict several sources of conflict. By investigating several characteristics of recreationists as well as their sensitivity to sources of conflict, this research has demonstrated that recreation conflict can be explained by different recreationist attributes, depending on the source of conflict under examination. The findings in this study lay the foundation for expanding further the existing conflict models in years to come.
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GLOSSARY

BC  British Columbia

BCMTCA  British Columbia Ministry of Tourism Culture and the Arts

BCMAL  British Columbia Ministry of Agriculture and Lands

BCMF  British Columbia Ministry of Forests

BCMFR  British Columbia Ministry of Forests and Range

BCMSRM  British Columbia Ministry of Sustainable Resource Management

CAB  Conflict attributed to behaviours not directly related to any specific activity group. Examples are littering, hearing noise or lack of courtesy.

CAO  Conflict attributed to other recreationists or activity group such as hikers, mountain bikers or dirt bikers.

IPC  Interpersonal conflict

SVC  Social values conflict
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DEDICATION

A mi abuela, a mi madre y a mis hermanos
To grandma, to mum and to my brothers
CO-AUTHORSHIP STATEMENT

The tables below indicate percentages of co-authors’ contributions at each stage of research.

Chapter 2 - Managing interpersonal and social values conflict among recreationists on the Squamish trail network in British Columbia.

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CHAPTER 1. INTRODUCTION

1.1 Introduction

After the Second World War, demand for outdoor recreation opportunities rose to new levels and prompted the development of recreation infrastructures now common in developed countries (i.e. parking lots, trails, visitor centres, interpretative facilities) (Stankey et al., 1990 in Harshaw & Meitner, 2006; Bell et al., 2007). Outdoor recreation opportunities in British Columbia (BC) are highly valued by both British Columbians and visitors from around the world (British Columbia Ministry of Forests & Range [BCMFR], 2006). Coinciding with the deceleration of BC’s forest industry in the 1990s (Kozak et al., 2008), outdoor recreation has grown in importance in the province (Harshaw & Meitner, 2006; Harshaw et al., 2007). The extensive trail networks throughout the forest land base in BC are important for supporting many outdoor recreation activities (British Columbia Ministry of Tourism Culture & the Arts [BCMTCA], 2008b).

Trail networks can improve people’s quality of life by providing access to numerous recreation opportunities, by connecting communities, and by providing necessary green space for wildlife corridors (Ontario Ministry of Health Promotion [OMHP], 2005; British Columbia Ministry of Agriculture & Lands [BCMAL], 2008). Trails play an important role in building healthier and more prosperous communities (OMHP, 2005; BCMTCA, 2008b): they promote people’s well-being, improve mental and physical health which prevents diseases, attract tourism to local communities and develop socially strong communities. Although the use of these trails for recreation may represent a threat to their conservation, such use may also increase the environmental awareness of citizens by promoting the conservation and appreciation of nature (Cascade Environmental, 2008, BCMTCA, 2008b; OMHP, 2005; Bell et al., 2007). Trails in this study refer to paths or routes (single or double track) used for outdoor recreation purposes that can be enjoyed by both non-motorized and motorized recreationists.

Over the past several decades the number of trail networks has multiplied, especially near densely populated urban areas (Bell et al., 2007), which has increased some of the challenges of trail management. BC has numerous and diverse trails that provide a wide variety of outdoor recreation experiences for participants, as well as offering significant health, economic, social, cultural/heritage, and environmental benefits to individuals, communities and the province (BCMTCA, 2008b). According to the Trails Strategy for BC, the province recognizes the existence of
30,000 km of trails, but estimates of the actual extent of trails in BC suggest that total length may be ten times higher (BCMTCA, 2008b). These trails are used for walking, hiking, mountain biking, jogging, dog-walking, horseback riding, snowmobiling, dirt biking, trials biking, all terrain vehicle use, bird watching, and other nature-based activities.

Squamish, which lies in the world renowned tourist destination of the Sea to Sky Corridor, has garnered an international reputation for exceptional outdoor recreation. In recent years, the demand for outdoor recreation trails has increased dramatically (Cascade Environmental, 2008). The Squamish trail network consists of approximately 200 km of forested single and double-track trails close to a local population of 18,000 people and located less than one hour from Metro Vancouver’s 2.5 million residents. The area is suitable for winter and summer activities (e.g., hiking, mountain biking, dirt biking, jogging, dog walking, snowmobiling, cross-country skiing or riding all terrain vehicles) and is highly valued and utilized by both residents and visitors. An increase in demand for, and the subsequent proliferation of trails has combined with evolving use patterns to create numerous challenges in managing this extensive trail network (Cascade Environmental, 2008).

Recreationists may engage in outdoor activities for different reasons, but high quality experiences are the ultimate goal of most outdoor recreationists (Manning, 1999). Therefore, providing high quality recreation experiences are the underlying goal of outdoor recreation managers and researchers. In recreation research, visitor satisfaction (understood as the congruence between expectations and outcomes) has traditionally been the measure for the quality of experience. Recreation managers face the challenge of providing satisfying experiences and opportunities to a wide variety of recreationists in their jurisdictions. Because recreationists are not homogenous (Rollins & Robinson, 2002), differences in trail users’ expectations, behaviours and values may consequently result in conflict and decreased levels of satisfaction (Manning, 1999). Conflict in the outdoor recreation literature is commonly understood as a threat to high quality experiences (Moore, 1994; Manning 1999). Despite this, some authors (Manning & Valliere, 2001; Marcouiller et al., n.d.b) have suggested that more study is needed to understand the relationship between quality and conflict, since research to date has found that levels of satisfaction may remain relatively high despite conflict experiences.

The conceptualization of conflict has evolved from being characterized as competition between recreationists over the same resources to a more complex construct that considers differences in

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1 In this thesis, the terms “recreation” and “outdoor recreation” are used interchangeably.
values, goals and belief systems (Moore 1994, Graefe & Thapa, 2004). The study of different potential sources of conflict that may lead to actual conflict is critical not only to understanding the effect that recreationist attributes have on conflict, but also to developing effective management strategies to ensure high-quality outdoor experiences. Understanding the social interactions of recreational trail participants is also a challenge for recreation managers throughout the world (Bell et al., 2007).

Typical examples of conflicts that managers have to deal with include: bird watchers being upset when motorized users frighten away birds with engine noise; families with children might have safety concerns when other users pass too closely at high speeds; a cyclist might complain because a group of hikers is spread over the width of the trail without thinking of other users; a dirt biker passing hikers might be upset because of their inquisitive stares; or joggers might experience conflict when coming across dog feces on trails.

Despite the complexity of conflict management, the literature has suggested specific approaches to alleviate certain types of conflict (Vaske et al., 1995, 2000; Manning, 1999; Carothers et al., 2001; Moore, 1994; Hammitt & Schneider, 2000). The management of conflict among trail users is a critical issue identified by the Trails Strategy for BC for sustainable trail networks throughout the province (BCMTC, 2008b). Despite a long tradition of recreation management (Clawson, 1974 in Marcouiller et al., n.d.b), the efficacy of such management in reducing conflict has not yet been widely explored (Moore, 1994). For example, conflicts in the Sea-to-Sky Corridor have been identified in several past reports (e.g., British Columbia Ministry of Sustainable Resource Management [BCMSRM], 2002; Cascade Environmental, 2008; BCMAL, 2008; and Catalyst Community & Resort Planning, 2008) but the efficacy of the suggested management approaches in these studies has yet to be evaluated empirically. Instruments to evaluate the efficacy of conflict management practices are necessary to advance the field of addressing outdoor recreation conflict.

1.1.1 Methodological approach

Drawing on recommendations from the literature, this study analyzes the efficacy of two commonly cited management practices for reducing specific types of conflict in one area of BC so as to provide broader guidance for land managers in addressing such conflicts. This study also models conflict potential, using recreationist characteristics predictors often cited in the literature so as to better understand the role of each of these characteristics in different sources of conflict.
In order to examine trail user conflicts, I conducted a survey-based, cross-sectional case study\(^2\). This method has been successfully used in previous research (Dillman, 2000; Vaske, 2008). The research was conducted on nine trail areas in Squamish, BC: Alice Lake Provincial Park, Stawamus Chief Provincial Park, Smoke Bluffs Regional Park, Brohm Lake Recreation site, Cat Lake area outside the Recreation Site, Backendale area, Crumpit Woods area, Garibaldi Highlands and Diamond Head area\(^3\). In this study, outdoor recreation refers to activities that people undertake in a natural outdoor environment as part of their daily or weekend routine. It does not consider multi-day activities (e.g., camping).

In the following sections of this introductory chapter, the outdoor recreation conflict literature is reviewed, as are the outdoor recreation policies pertaining to the study site. Subsequently, goals are identified and the structure of following chapters is presented.

### 1.2 Literature review

This section reviews overall concepts of outdoor recreation conflict and management in order to frame the research developed in the following chapters. Conflict conceptualization issues and principles of conflict are identified first. Recreationist characteristics or attributes are described in the context of recreation conflict and are reviewed in light of their potential contributions for explaining conflict. Subsequently, the existing conflict models are reviewed to examine the main potential sources of conflict, the problems of conflict measurement and the most commonly cited management practices intended to address conflict.

#### 1.2.1 Conflict definition

For as long as humans have interacted with one other, there has been conflict (Daniels & Walker, 2001). Conflict is an inherent part of human nature that occurs when social interactions lead to negative outcomes for at least one of the parties. In its simplest form, conflict can be understood as an incompatibility of issues, parties, processes or outcomes (Daniels & Walker, 2001). However conflict is not a simple construct, and the elements of each context depicts its complexity.

Complexity can be explained by cultural differences, deeply held values and world views, scientific

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\(^2\) This research complies with standard practices for human research. All survey materials have been reviewed and approved by the University of British Columbia Behavioural Research Ethics Board. See Appendices A, B, C, D, and E.

\(^3\) See Appendix F for a map location of the areas.
and traditional knowledge or legal requirements (Daniels & Walker, 2001). In the literature, the conceptualization of conflict is vast and has evolved from being characterized as simple competition between incompatible recreationists over the same resources, to a much more complex conceptualization of conflict that considers differences in values, goals and belief systems (Moore, 1994; Graefe & Thapa, 2004). Disagreement exists about the definition of the underlying causes of recreation conflict. Conflict has been defined as “goal interference attributed to others behaviour” (Jacob & Schreyer 1980, p. 369) and has become the most widely used definition. This definition assumes that individuals participate in outdoor recreation activities to achieve certain outcomes (i.e., goals). This definition however, stands in contrast to two other models: Adelman et al. (1982) suggest that conflict is due to differences in norms and social values (i.e., social values conflict); Vitterso et al. (2004) introduced a new body of research within recreation conflict literature which argued that recreation conflict is affective and is related to the subjective emotional state of the recreationist (i.e., affective conflict). All three conflict models will be developed in the following sections after an examination of some characteristics of conflict that have consistently been found in the empirical research.

1.2.2 Conflict principles

Researchers tend to agree that conflict is typically asymmetrical, can be experienced in different arenas and levels, and that individuals may engage in coping behaviours to adapt to conflict.

Recreation conflict is typically asymmetrical; that is, when two groups are in conflict, there is a tendency for one group to perceive conflict more deeply than the other group. For example, non-mechanized recreationists are more likely to experience conflict with more mechanized activities (i.e., motorized) than vice versa (Vaske et al., 2000; Thapa & Graefe 2004).

Outdoor recreation conflict can occur in several arenas: among recreationists within the same activity (intra-activity conflict), or different activities (inter-activity conflict); among visitors and managers; or between recreationists and other types of resource uses (Manning, 1999). Conflict within each arena can also exist at two levels: ‘direct confrontation’, including perceived associated impacts of the other activity upon the environment; and ‘indirect confrontation’ representing a general feeling of disliking (or unwillingness to appreciate) the other group’s views (Jackson & Wong, 1982 in Manning, 1999).

Some recreationists may adopt several behavioural changes (i.e., responses to conflict) as coping mechanisms to reduce stress during the recreational experience (Manning & Valliere, 2001). For
example, displacement, product shift, and rationalization are coping strategies that may be used by recreationists in response to outdoor recreation conflict. Displacement coping strategies might imply moving to another area; a product shift response might be altering the recreationist’s definition of the recreation opportunity to accord with the condition experienced; and rationalization might be rating the recreation experience as satisfactory, regardless of conditions (Manning & Valliere, 2001). Recreationists who cannot cope with conflict may ultimately experience diminished satisfaction (Manning, 1999).

1.2.3 Recreationist attributes related to conflict

Both empirical and theoretical studies have found that numerous recreationist attributes can be associated with recreation conflict (Jacob & Schreyer 1980; Watson et al., 1994; Gibbons & Ruddell, 1995; Blahna et al., 1995; Vaske et al., 1995; Ramthun, 1995; Confer et al., 2005; Mann & Absher, 2007). Most authors (Jacob & Schreyer 1980; Confer et al., 2005; Thapa & Graefe, 2004; Mann & Absher, 2007; Vaske et al., 2000) describe recreationist attributes for conflict as either “factors” or “determinants”. Recreationist attributes refer to subjective and situational contexts that, depending on their effect when potential conflict situations occur, can cause the recreationist to fail to achieve their desired experience (Watson et al., 1994).

Jacob & Schreyer (1980) defined four major factors that have been broadly applied and extended in subsequent research. The first, activity style, refers to the personal meaning that recreationists assign to an activity. The second factor, resource specificity relates to the significance attached to using a specific recreation resource (i.e., setting) for a given recreation experience. The third factor, mode of experience, relates to the expectations of how the natural environment will be perceived. Lastly, lifestyle tolerance refers to the tendency toward accepting or rejecting lifestyles different from one’s own. Additionally, empirical studies have also identified other recreationist attributes to be statistically related to conflict: motivations or goals for recreation (Gibbons & Ruddell, 1995); types and degree of mechanization employed (Lucas, 1964; Adelman et al., 1982; Moore, 1994); residency status (Confer et al., 2005); perceived similarity of groups or activities (Adelman et al., 1982); level of experience or commitment (Vaske et al., 1995) attachment to place, (Gibbons & Ruddell, 1995); tolerance for sharing resources, (Ivy et al., 1992); and recreation-related norms (Ruddell & Gramann, 1994).

Unfortunately, no consensus has been reached about either how to measure these recreationist attributes or how to integrate them into the conflict models. Originally, factors were conceptualized
as producing conflict (Jacob & Schreyer, 1980), but Watson et al. (1994) suggested that these attributes may be better at predicting predispositions toward conflict (sensitivity to conflict) than predicting actual goal interference. Other authors have supported Watson et al. (1994) conceptualization of recreationist attributes as predictors of sensitivity to conflict (e.g., Ramthun, 1995; Manning, 1999).

1.2.4 Conflict models

According to Owens (1985), the published literature about outdoor recreation conflict has primarily been descriptive and applied, while the theoretical frameworks have only been superficially discussed. Although conflict has traditionally been defined as goal interference, other models have arisen to complement the traditional model.

1.2.4.1 Interpersonal conflict model

The interpersonal conflict model (also called cognitive model) is based on the traditional definition of conflict and therefore assumes that recreation activities are goal-directed. This assumption is parallel to expectancy-value theories (Fishbein & Ajzen, 1975 in Manning, 1999), which maintain that people engage in an activity because they expect it to yield particular outcomes. According to Kajala (1994), the goal interference model also has roots in the goal-directed and need-satisfaction models of leisure behaviour (for a more complete definition see Kajala, 1994). At the same time the concept of goal interference derives from discrepancy theory (Fishbein & Ajzen, 1975 in Manning, 1999), which asserts that dissatisfaction is due to the difference between actualized and desired goals. Conflict arises when motivations (or goals) for participation are compromised due to anticipated experiences being unfulfilled. In other words, when an individual considers that he or she was prevented from having a satisfactory experience due to the intrusion of others, conflict arises. According to the traditional definition of conflict, it can occur among different recreationists within the same activity group or between activity groups (Jacob & Schreyer, 1980). In this conceptual model, the authors also developed what they called the hypothesized determinants, or factors for conflict described in the previous section (recreationist attributes related to conflict), of this literature review: activity style, resource specificity, mode of experience and lifestyle tolerance. These authors have also emphasized that conflict is not an objective state, but must be understood as an individual's interpretation and evaluation of past and future interactions with other recreationists. Other researchers who have conceptualized conflict as
goal interference include among others Ivy et al., 1992; Ruddell & Gramann 1994; Watson et al., 1994, Schneider 2000.

1.2.4.2 Social Values Conflict model

During the 1980s, there were few references to conflict outside the goal-oriented model of Jacob & Schreyer (1980). However, there was some descriptive research conducted in this regard. For example, Adelman et al. (1982) provided arguments for social-psychological explanations of the conflict between canoeists and motor boaters. In another case study, Wellman et al. (1982) studied the conflicts of white-water canoeists to see if attitudes toward deprecative behaviour varied with recreation specialization. In this case, few differences in attitudes were found between the two specialized groups: highly specialized versus relatively unspecialized white-water canoeists.

Theoretical approaches that refer to conflict as being value-based expanded in the 1990s with the work of Ruddell & Gramann (1994). This research suggested that conflicts emerge when recreationists do not share the same norms or values about an activity. But it was not until Vaske et al. (1995) that the idea of value-based conflict was clearly developed to distinguish between interpersonal and social values conflict. Vaske et al. (1995; 2007) suggested that the difference between the interpersonal conflict (goal interference) model and the social values model was that the former type of conflict requires the physical presence or behaviour of an individual, a group of recreationists or their associated impacts, whereas social values conflict (social acceptability) occurs between recreationists with different beliefs and values, even if there has been no physical contact between them. Vaske et al. (1995), using empirical data from surveys of visitors in Mt. Evans, Colorado, provided empirical support for the distinction of social values conflict versus interpersonal conflict by comparing hunter and non-hunter conflict perceptions. The study found that even though few non-hunters physically observed any hunting-associated events (e.g., seeing hunters, seeing an animal being shot), many expressed a conflict in social values: simply knowing that hunting occurred on the mountain was sufficient to activate conflict perceptions (Vaske et al., 1995). Further studies that supported the notion of social values conflict followed, such as the study of conflict between skiers and snowboarders (Vaske et al., 2000; 2004), or that between hikers and mountain bikers in Carothers et al. (2001).

Cordell & Tarrant (2002) argue that unacceptable behaviour may occur between both recreationists participating in the same activity, as well as between recreationists participating in different activities. Despite the different conceptualization of conflict in this model, researchers
have often integrated Jacob & Schreyer’s (1980) factors of conflict into the normative model. Vaske et al. (2000) found significant correlations between activity style, resource specificity and lifestyle tolerance and snowboarders’ beliefs about unacceptable skier behaviour as well as significant correlations between activity style and lifestyle tolerance and the skiers’ beliefs about unacceptable snowmobiler behaviour.

1.2.4.3 Affective conflict model

The more recently developed affective conflict model stems from the assumption that emotions and feelings influence both perceptions of conflict, and satisfaction with recreation experiences (Lee & Shafer, 2002; Lee et al., 2005). Lee & Shafer (2002) proposed that the subjective emotional state (mood) of the recreationists should be taken into account when investigating conflict. The authors suggest that emotions can lead to immediate evaluations of interactions with other recreationists, which may result in either contentment or perceived conflict.

Vitterso et al. (2004) used a similar approach, and conducted a field experiment to see if subjective feelings were important in recreation conflict. The experiment consisted of having two groups of cross-country skiers complete a questionnaire to measure the quality of their affective experience – as measured by feelings of relaxation, peacefulness, joy, harmony, annoyance. The first group was exposed to an operating snowmobile while the second was not. The results demonstrated that the first group had a significantly reduced quality of affective experience after encountering a snowmobile compared to the second group. Furthermore, encounters with snowmobiles positively affected cross-country skiers’ beliefs about the extent to which noise from snowmobiles disturbed the quality of ski-touring in general (Vitterso et al., 2004).

Various authors (e.g., Lee & Shafer 2002; Vitterso et al., 2004; and Lee et al., 2005) have expressed the need for an in-depth understanding of the emotions and feelings that develop from recreation conflict. Vitterso et al. (2004) recognized that there was not a fully developed affective model to offer, although subjective feelings should be an explicit part of a comprehensive theory of recreational conflict; they also suggested that more research was needed to understand the effect that conflict has on a person’s recreation experience. Exploring and understanding users’ subjective feelings and experiences may offer great assistance in advancing the understanding of recreation conflict and how best to manage this issue.
1.2.4.4 Comprehensive conflict models

Following suggestions for the necessity of a more comprehensive model (Schneider, 2000; Marcouiller et al., n.d.b; Tumes, 2007), some attempts were made to produce more comprehensive models. The approach used in the current study has been proposed in Manning (1999), and is an integrative model that interprets the traditional definition of conflict as “goal interference attributed to others’ behaviour” (Jacob & Schreyer 1980, p.369) in a way that eliminates much of the preceding debate (Figure 1.1).

![Figure 1.1. Expanded conflict model adapted from Manning (1999)](image)

In the expanded conflict model, Manning (1999) understands conflict as goal interference attributed to others’ behaviour, but suggests that under this definition, two types of conflict emerge: direct (i.e., having an interpersonal conflict) and indirect (i.e., having a social values conflict). In this model Manning (1999) also reaffirms that factors determine sensitivity to conflict rather than conflict itself, and suggests that Jacob & Schreyer’s (1980) factors (i.e., activity style, resource specificity, mode of experience and lifestyle tolerance), if interpreted broadly, can integrate all of the recreationist attributes that are statistically related to the conflict found in the empirical research cited above. For example, Manning (1999) understands recreation motivations to
be part of a person’s recreation activity style, while recognizing that social values contributing to lifestyle tolerance or place attachment are another dimension of resource specificity. The affective dimension of conflict is not explicitly addressed in Manning’s (1999) expanded conflict model. Additionally, some authors have identified some weaknesses in Manning’s (1999) expanded conflict model. For example, Marcouiller et al. (n.d.b) who further expanded Manning’s (1999) expanded conflict model, specifically argued that a general lack of up-front resource management input in the model limits its management applicability. However, neither Manning’s (1999) nor Marcouiller’s et al. (n.d.b) comprehensive models integrate the different potential sources of conflict, possibly due to the disagreement that exists on how to measure conflict.

1.2.5 Potential sources of conflict

The literature has been inconsistent in defining sources of conflict for these models. According to Schneider (2000), these inconsistencies in meaning and measurement impede advancement. Some authors (e.g., Carothers et al., 2001; Vaske et al., 1995; Confer et al., 2005) considered that sources of conflict are interpersonal conflict and social values conflict, whereas other authors (e.g., Vaske et al., 2000) understood Jacob & Schreyer’s (1980) factors as sources of conflict. To add more confusion to this issue, some authors (e.g., Carothers et al., 2001; Hammitt & Schneider, 2000) attributed the source of conflict to a combination of interactions between individuals: understood this way, sources of conflict can arise from the interaction of recreationists in the same activity (i.e., intra-activity or in-group conflict), from the interaction of recreationists in different activities (i.e., inter-activity or out-group conflict), or from the interaction of visitors and managers, or visitors and other resource users (Manning, 1999). Finally there are some authors who have conceptualized sources of conflict as behaviours of recreationists that interfere with the enjoyment of other trail users (e.g., Thapa & Graefe 2004). The events or behaviours are not a source of conflict themselves but potentially they can result in a negative evaluation. From here on, they will be called potential sources of conflict rather than sources of conflict. In other words, and according to discrepancy theories, sources of conflict are events or interactions between recreationists that trigger a negative evaluation of an experience.

Looking at sources of conflict from this latter perspective, sources can potentially be either the encounter of undesirable trail users (e.g., motorized users, mountain bikers, or hikers), or the encounter of non-activity based behaviours (e.g., litter, rudeness, or noise). Recreation research tends to examine the potential for conflict arising from the interaction between different activities.
or trail users. However, certain non-activity based behaviours (i.e. crowding, littering or being rude or discourteous behaviour) have also been reported as potential sources of conflict (Moore, 1994; Schneider & Hammitt 1995; Gibbons & Ruddell, 1995 and Graefe & Thapa, 2004).

Based on the literature reviewed, there are two broad classifications of potential conflict sources: (1) conflict as a result of encounters with other trail users (i.e., conflict with hikers, mountain bikers, motorized users to mention a few), and (2) conflict with non-activity based behaviours (such as noise or lack of courtesy, that is not directly attributed to a specific activity group). This second group of potential conflict sources can be further classified as: conflict arising from safety issues (e.g., when various types of recreationists use trails at different speeds) (Moore, 1994; Manning, 1999; Vaske, 2000; Tumes, 2007); from perceived crowding (Moore, 1994; Schneider & Hammitt 1995; Lee et al., 2005); from lack of respect for others (Moore, 1994) and also from environmental impacts of other recreationists (Moore, 1994; Manning, 1999).

1.2.6 Conflict measurement

Despite the existing volume of conflict-related research, “there has never been agreement on how recreation conflict should be measured” (Watson et al., 1995, p. 237). While the discipline of psychology contains numerous studies that address the concept of conflict, several authors (e.g., Vaske et al., 2000; Graefe & Thapa 2004; Confer et al., 2005) have given support to Watson’s et al. (1994) affirmation that “the psychology literature has not settled on the best way to measure conflict” (p.375).

Although Jacob & Schreyer (1980) proposed the basis for a definition of conflict, they did not offer a specific methodology to measure the extent of conflict. Therefore, measurement methods are varied and unclear. The literature concerning recreation conflict often measures conflict using scales, such as enjoy/dislike (the encounter) or was it desirable/undesirable. However, according to Watson et al. (1994), it is not clear that these scales are measuring actual conflict. For example, Adelman et al. (1982) based his research of conflict on social-psychological attraction theory, which states that users who perceive themselves as similar (in values, beliefs or recreational goals, socio-economic status) are more likely to like each other than users who perceive themselves as different. The research of Adelman et al. (1982) suggests that the measures of enjoy/dislike are based on attraction theory, and are focused more on the positive side than what may be desirable for measuring conflict (which is more closely related to discrepancy or reactance theories). Yet, Watson et al. (1994) argued that the standards enjoy/dislike or desirable/undesirable measures do not
precisely fit Jacob & Schreyer’s (1980) definition of conflict. Blahna et al. (1995) stated that most studies had measured conflict using affective responses from the recreationists (i.e., like/dislike encounter others or their related impacts; enjoy/not enjoy encounter others or their related impacts, problem/no problem for the recreationists enjoyment). Examples of research utilizing such kinds of questions are Watson et al. (1994), Blahna et al. (1995), Graefe & Thapa (2004).

Broadly then, interpersonal conflict usually has been measured through either a group of forced-choice questions that ask respondents to evaluate specific encounters, or by obtaining an indication of general disposition toward other groups, based on interval scale responses. Response categories were typically anchored by ‘very desirable’ and ‘very undesirable’ (Watson et al., 1994). However, generally accepted measures of recreation conflict are yet to emerge (Ivy et al., 1992). To differentiate interpersonal conflict and social values conflict, some authors have measured conflict by combining the frequency of occurrence variables (observed vs. not observed) with the corresponding-perceived-problem variables (acceptable vs. unacceptable) (Carothers et al., 2001; Vaske et al., 2007). Recreationists who had observed a conflict event in the area and believed it caused a problem for their enjoyment were considered to have experienced interpersonal conflict; conversely, subjects who had not observed a conflict event in the area yet, but believed it caused a problem for their enjoyment, were considered to have experienced social values conflict. Authors have noted that the protocol used to differentiate social values conflict is conceptually clear (Carothers et al., 2001; Graefe & Thapa, 2004; Vaske et al., 1995). However, conceptual problems have been identified in regards to the operationalization of interpersonal conflict using this method. That is, individuals who experience interpersonal conflict (i.e., observe an event and judge it to be a problem) may also be experiencing social values conflict (i.e., even if they didn’t observe the problem, they still thought it was a problem). That is the case because this approach does not permit the researcher to know what the respondent would have answered if he/she had not observed the problem previously. To avoid this overlap of conflict types, Vaske et al. (2007) suggested asking respondents a third question: if respondents who experienced interpersonal conflict answered the question ‘what behaviours interfered with your goals and enjoyment’ by selecting ‘just knowing they are there bothers me’, then they were classified as having experienced both social values conflict and interpersonal conflict. Otherwise respondents were classified as experiencing only interpersonal conflict.
1.2.7 Conflict management

In spite of the lack of a unified definition of conflict, management practices to reduce conflict between users have emerged (Marcouiller et al., n.d.b; Bell et al., 2007). According to some researchers (Watson et al., 1994), more definition of the concept is needed in order to assess conflict and recommend adequate management techniques. Manning (1999) clearly states that management actions may not be effective if they do not address the underlying causes.

Although a wide range of management practices for conflict exist (Moore, 1994) there are two that are often cited in the literature (Manning, 1999; Vaske et al., 2000; Carothers et al., 2001; Cordell & Tarrant, 2002): zoning and the application of educational programs. When the conflict is related to interpersonal conflict – the encounter of other recreationists or their impacts – researchers have often recommended zoning (i.e., physically separating the incompatible recreationists) as an option. Conversely, when the conflict is related to social values conflict – differences in the recreationists’ norms or values – educational programs (such as educational signs or brochures) are believed to be more effective.

Zoning can refer to the physical separation (i.e., spatial zoning) of the incompatible activities (e.g., motorized use in some specific areas and non-motorized use in others), or to the separation of the activities by time (i.e., temporal zoning), that restricts the use of the trails to different periods during the year (e.g., mountain biking during the dry season and hiking only during the rest of the year) (Moore, 1994). Educational programs include: regulations and rationales for regulations, low-impact and shared use messages, information intended to disperse use, alternative routes, interpretive rides/walks/etc. led by land management staff; presentations to clubs, retailers, school groups, etc.; volunteer trail patrols, user swaps, multi-use trail educational kits for schools, joint planning meetings, public meetings, role modelling by rangers and others, leafleting on or off the trail (e.g., trailheads, equipment stores), ‘trail days’ events, ‘safety days’ events or even trained personnel stationed at trailheads, visitor centres or campgrounds (Moore, 1994).

Although recreation managers have addressed conflict for the past 35 years (Clawson, 1974 in Marcouiller et al., n.d.b) management approaches to reduce conflict have not been widely explored and have been described as being of poor quality (Moore, 1994). The efficacy of both, zoning management practices in addressing interpersonal conflict, and of educational programs in addressing social values conflict, still need to be tested empirically. Some authors have suggested that the challenges that managers face in reducing conflict through management are due to not considering the actual causes of conflict (Owens, 1985; Watson et al., 1994; Moore, 1994; Kajala,
1994; Manning, 1999; Schneider, 2000; Cordell & Tarrant, 2002; Marcouiller et al., n.d.a; Tumes, 2007). For example, Manning (1999) affirms that management action may not be effective when the underlying causes of conflict are not addressed.

1.3 Outdoor recreation context in British Columbia

The Government of BC faces the challenge of coordinating growing non-market recreation activities with First Nations rights and tenure, conservation, and market forest uses represented by the traditional forest, mining and tourism industries. Careful planning and management needs to be applied with respect to outdoor recreation if there is to be successful coordination with these other land-based forest activities. Outdoor recreation management in BC, and in general, is complicated because it involves the management of social interaction between a diverse spectrum of recreation participants and motivations (Harshaw et al., 2007).

In this section past and current outdoor recreation policy in BC are summarized, highlighting the main challenges for outdoor recreation management in the province in order to contextualize the cases studied in this thesis.

The BC Ministry of Forests was the primary provincial agency charged with the mandate to manage the recreation resource on provincial public lands outside parks and settled areas before the BC Ministry of Tourism Culture and the Arts assumed this responsibility in 2006. Over the past 30 years, other agencies – including the Ministry of Sustainable Resource Management, Land Use Coordination Office and Land and Water BC – have also shared some of the responsibilities for the management of recreation in BC along with the BC Ministry of Forests. Under the management of the BC Ministry of Forests, there was no overarching policy for outdoor recreation. Legislative authority and policy were spread out among different pieces of legislation (e.g., BC Forest Act, 1996; BC Forest Practices Code Act, 1996; BC Forest & Range Practices Act, 2002; British Columbia Ministry of Forests [BCMF], 2006; and BCMTCA, 2008a). Although recreation values were considered in provincial policy and practices, they did not receive the same consideration as timber values in BC. In 1994, the Forest Practices Code introduced a legislative framework for the management of recreation sites and trails that continued in the Forest & Range Practices Act as one of the eleven forest values in BC (BC Forest & Range Practices Act, 2009). Outdoor recreation in the Forest and Range Practices Act consisted of two components: the identification, protection and management of the provincial forest recreation resource, and the provision of safe, sanitary, socially acceptable and
environmentally sound recreation sites and trails for public use (BCMFR, 2009). Despite also being one of the three principal management mandates of forest management (Harshaw, 2005), the degree to which these components are included and negotiated in planning and management processes has not been consistent.

In 2006, the BC Ministry of Tourism Culture and the Arts took over responsibility for the management of outdoor recreation on approximately 1300 designated recreation sites and 800 designated trails. In collaboration with other provincial agencies, including the Integrated Land Management Bureau and the Ministry of Forests and Range, the BC Ministry of Tourism Culture and the Arts also manages dispersed public outdoor recreation on Crown land (i.e., publicly owned land) outside parks and settled areas. The goal of the BC Ministry of Tourism Culture and the Arts is to accommodate recreation demand for BC’s existing network of multiple-use recreational trails, and to authorize new trails with the support of local governments and the private sector, both of which are seen to play a role in meeting demand for recreation opportunities (BCMTCA, 2006).

The BC Ministry of Tourism Culture and the Arts has developed a variety of policies and directions to guide the management of outdoor recreation in conjunction with other ministries. These documents demonstrate that a stronger and more strategic approach to recreation policy is being developed and implemented in the province; (BCMTCA, 2006; Cascade Environmental, 2008; and BCMTCA, 2008b).

The vision of the Trails Strategy for BC anticipates having a world-renowned network of sustainable trails that provides opportunities for all and that promotes social, economic and environmental benefits for trail users, communities and the province as a whole. The guiding principles of the strategy are: (1) building on partnership and collaboration, (2) fostering environmental as well as cultural stewardship, (3) securing recreation opportunities for all users (4) and providing benefits for the community and the province as a whole (BCMTCA, 2008b). These principles underlie subsequent approaches that the BC Ministry of Tourism Culture and the Arts is undertaking in regard to trails. Although the Trail Strategy is a young initiative, it has been grounded in an extensive body of research and consultation. The draft Trails Strategy for BC incorporated a series of background studies, including an inter-jurisdictional survey of BC and Alberta, Ontario, Australia, Colorado State, and Washington State in order to identify the best existing trail recreational models (BCMTCA, 2007).

The Trails Strategy for BC describes a framework for addressing issues related to trail use conflict. Although conflict management is at the top of the list of priorities, most local governments and land
managers have yet to address conflict in a pro-active approach (BCMTCA, 2008b). One of the objectives of the provincial Trails Strategy is to encourage the establishment of local and regional trail committees to undertake collaborative planning to address issues such as trail conflict, as well as to contribute to a sustainable and beneficial provincial trails network. Currently few areas in BC have developed plans that specifically consider trail conflict outside of broader access management planning. Within the context of the Sea to Sky Corridor, Squamish has started on the development of a regional plan (i.e., Sea to Sky Corridor Recreation Trails Strategy) that considers conflict management as a key component of a sustainable and beneficial trail system (Cascade Environmental, 2008).

Unfortunately, the BC Ministry of Tourism Culture and the Arts and local governments have limited resources to fully enforce compliance with recreation policy throughout all regions of BC. The application of recreation management is also constrained by the lack of a coordinated recreation policy, the Ministry’s staff and budget levels, and as well, a lack of experience (BCMTCA, 2006). According to the Outdoor Recreation Council of BC, a rapidly increasing population, along with growing pressures from an ever-diversified range of outdoor recreation activities on BC land, together call for a united policy that sets the framework for managing the social initiatives, ecological impacts and economic opportunities for community development (Outdoor Recreation Council, n.d.).

1.4 Research objectives

The goals of this thesis are to understand recreationists’ attributes that contribute to conflict between outdoor recreationists on the Squamish trail network, and to test the efficacy of conflict management approaches often cited in the literature. In order to achieve these goals, the following specific objectives frame this thesis:

I. To investigate the effect that activity style and resource specificity have on recreationists’ sensitivity to potential conflict sources when considering other recreationist attributes such as motivations for recreation participation, degree of mechanization and demographic characteristics on the Squamish trail network in BC;

II. To evaluate the efficacy of educational signs at reducing social values conflict; and

III. To evaluate the efficacy of separating motorized recreationists from non-motorized recreationists at reducing interpersonal conflict.
1.5 Thesis structure

In order to address these specific objectives, this thesis addresses them in the following order. Chapter two investigates potential sources and types of conflict on the Squamish trail network in order to investigate the efficacy of some of the applied management practices designed to address conflict. The investigation starts with a literature review to identify the main potential sources of conflict cited in the literature, the main types of conflicts known up to date and the management approaches suggested by researchers and managers to address such conflict. The chapter then examines the Squamish trail network case by empirically testing the efficacy of educational signs and spatial zoning at reducing interpersonal and social values conflict respectively.

In chapter three, theoretical models are described, as are recreationists’ attributes related to conflict. Subsequently, several models of conflict are tested using different potential conflict sources in order to identify which recreationist attributes best predict different potential conflict sources. More specifically, an analysis of the relationship between seven potential sources of conflict and the individual’s activity style and resource specificity controlled by motivations for recreation, level of technology and demographic variables is carried out.

In the last chapter of the thesis the major findings of this thesis are summarized in order to evaluate current knowledge in the field. Furthermore, modifications to the existing conflict models are suggested in order to advance the research in outdoor recreation conflict modelling. Additionally, this last chapter discusses possible management applications within the Squamish trail network as well as broader strategies for recreation managers in general. Finally, new working hypotheses for future research opportunities are proposed.
1.6 References


British Columbia Forest Act, RSBC 1996, c 157 s 35.
British Columbia Forest and Range Practices Act, SBC 2002 c 69.


CHAPTER 2. MANAGING INTERPERSONAL AND SOCIAL VALUES CONFLICT AMONG RECREATIONISTS ON THE SQUAMISH TRAIL NETWORK IN BRITISH COLUMBIA

2.1 Introduction

A great deal of research has addressed recreation conflict over the last four decades (e.g., Clark et al., 1971; Vaske et al., 2010). Research applications on this subject have expanded beyond traditional backcountry settings to include front-country areas near the built environment (Graefe & Thapa, 2004). People with heightened environmental awareness and high expectations of satisfaction from outdoor recreation activities are increasingly using trail networks for recreation (Bell et al., 2007; Cordell et al., 2004). However, recreationists are not homogenous (Rollins & Robinson, 2002) and differences in their expectations, behaviours and values may create conflict between different types of trail users. Understanding the social interactions of recreational trail users is a challenge for recreation managers globally (Bell et al., 2007). Further, managing conflict on forest trails surrounding densely populated areas adds greater complexity to this task (Bell et al., 2007, Cascade Environmental, 2008).

This chapter analyzes the efficacy of different management strategies in alleviating recreation conflict on the Squamish trail network in British Columbia (BC) Canada. In particular, the influence that spatial zoning of non-motorized activities has in decreasing the potential frequency and severity of interpersonal conflict (IPC), and the effect that educational signs have in the frequency and severity of social values conflict (SVC) are examined. Using a survey-based, cross-sectional case study of trail users on nine trails in the Squamish trail network, this research seeks to 1) identify the types and potential sources of conflicts occurring and 2) assess differences in the levels and frequency of such types and sources of conflict when zoning management practices and educational programs were applied compared to areas with no management in order to make causal inferences.

This research may assist BC trail managers to identify critical opportunities for managing conflict management in their areas. More generally, trail managers will find some suggestions for developing effective trail management strategies to inform approaches in addressing the challenging task of conflict management.

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First, this chapter describes the current BC outdoor recreation context and study site; the conceptual and empirical literature on outdoor recreation conflict and management are also reviewed. Second, hypotheses, methods, analyses and results of the experimental study are described. Finally, management practices are discussed in relation to the types and sources of conflict and recommendations are given to increase the efficacy of such practices.

### 2.1.1 Outdoor recreation context in BC

BC’s outdoor recreation opportunities are highly valued by both British Columbians and visitors from around the world (British Columbia Ministry of Forests & Range [BCMFR], 2006). Over 94 percent of BC’s extensive land base is public land amounting to over 87 million hectares of land available for recreation and other uses (British Columbia Ministry of Agriculture & Lands [BCMAL], n.d.). A network of trails, likely numbering in the hundreds of thousands of kilometres (British Columbia Ministry of Tourism Culture & the Arts [BCMTCA], 2008), provides the primary means for people to participate in recreation opportunities throughout this land base. BC trails provide a wide variety of outdoor recreation experiences for participants as well as significant health, economic, social, cultural/heritage, and environmental benefits to individuals, communities and the province (BCMTCA, 2008).

Land managers in BC are increasingly faced with addressing user conflicts over trail use (particularly between motorized and non-motorized activities) under their jurisdiction (Cascade Environmental, 2008). Conflict among trail users is a key issue identified by the Trails Strategy for BC. According to the Strategy, resolving conflict among trail users is a key component of an effective trails strategy, and critical to a sustainable and beneficial trail network in the Province (BCMTCA, 2008). The Strategy describes a framework for addressing issues related to trail use conflicts. Although conflict management is at the top of the list of priorities, most local governments and land managers have yet to address conflict in a pro-active approach (BCMTCA, 2008). One of the goals of the provincial trails strategy is to encourage the establishment of local and regional trail committees to undertake collaborative planning to address issues such as trail conflict and contribute to a sustainable and beneficial provincial trails network. At this point, few areas in BC have developed plans that specifically consider trail conflict outside of broader access management planning. Within the context of the Sea to Sky Corridor, Squamish has initiated on the development of a regional plan (i.e., Sea to Sky Corridor Recreation Trails Strategy) that considers conflict management as a key component of a sustainable and beneficial trail system (Cascade Environmental, 2008).
2.1.2 Study area

The Squamish trail network in the Sea to Sky Corridor falls within the Squamish Forest District and is one of the most highly utilized recreation areas in North America, accounting for more than 6 million recreation visits per year. The area supports both winter and summer recreation opportunities and attracts a wide range of motorized and non-motorized recreationists (BCMSRM, 2002). The Squamish trail network is an extensive community based trail network that has approximately 200 km of forested single track and double track trails near a population of 18,000 people and located less than one hour from Greater Vancouver’s 2.5 million residents. The trail network is located on a mix of public integrated resource lands, protected parkland and private undeveloped forested lands. Trail recreation activities include hiking, mountain biking, dirt biking, jogging, dog walking and riding all terrain vehicles.

Recreation conflicts in the Sea to Sky Corridor, including the Squamish trail network, have been addressed in several reports (Cascade Environmental, 2008; BCMAL, 2008; BCMSRM, 2002; Catalyst Community & Resort Planning, 2008), especially with regard to conflicts between motorized and non-motorized participants. Past recommendations for the reduction of potential for conflict include: promotion of stakeholder participation early in the planning process, encouragement of cross-jurisdictional cooperation, development of an inventory and mapping of recreation activities, development of codes of conduct and trail etiquette, use of signage and education, designation of separated areas for motorized and non-motorized use, and encouragement and enforcement of regulations.

Due to Squamish’s status as a world-renowned tourist destination and the numerous studies undertaken in the area, this trail network is an excellent case study to investigate both trail user conflicts and the efficacy of management practices at reducing such conflicts. The focus of this research is outdoor recreation activities outside the winter season in the front country of the Squamish BC trail network. For the purposes of this study, outdoor recreation refers to day-use activities that people undertake in a natural, outdoor environment; it does not consider overnight activities (i.e., camping).

2.1.3 Literature review

Conflict has existed for as long as humans have interacted with each other (Daniels & Walker, 2001). Conflict is inherent to human nature when social interactions lead to negative outcomes for at least one of the parties. Post World War II, the growth in outdoor recreation has lead to
competition and conflict between recreation participants over natural resources (Owens, 1985). The conceptualization of recreation conflict has evolved from that of simple competition over common resources by incompatible recreation participants to a much more complex understanding that considers differences in values, goals and belief systems (Moore, 1994; Graefe & Thapa, 2004). This section reviews the literature on recreation conflict definition and conflict models, and examines the various management practices most commonly used for dealing with different potential sources of conflict.

2.1.3.1 Conflict definition and potential sources of conflict

Traditionally, outdoor recreation conflict has been defined as “goal interference attributed to others’ behaviour” (Jacob & Schreyer, 1980, p. 369). In other words, conflict is a result of goals not being met as a result of the behaviour of other recreationists (Blahna et al., 1995). However, some authors do not agree with this definition and argue that conflict is due to differences in social values (Adelman et al., 1982) or that conflict is affective (i.e., driven by subjective feelings) (Vitterso et al., 2004). However, there has been agreement that recreation conflict is affected by a number of factors. Jacob & Schreyer (1980) defined four major factors (i.e., recreationists’ attributes): activity style; resource specificity; mode of experience; and lifestyle tolerance. Activity style is often expressed as the personal meaning assigned to an activity; resource specificity is understood as the significance attached to using a specific recreation resource; mode of experience refers to the different expectations of how the natural environment will be perceived; and lifestyle tolerance is related to the tendency to accept or reject lifestyles different from one’s own (Jacob & Schreyer, 1980). In addition to Jacob & Schreyer’s (1980) four factors, it is now recognised that recreation experiences are also influenced by other subjective as well as situational variables that, depending on their effect, can prevent people from achieving their desired experience. These variables include: the characteristics of the setting, recreationists’ expectations, the differences between user expectations and the actual experience, personal norms and values, social norms, personal attachment to the area, frequency of participation, and social interference during the activity (Moore, 1994). Conflict has also often been described as asymmetrical. (Adelman et al., 1982; Gibbons & Ruddell, 1995; Watson et al., 1994): there is a tendency for one group (mostly traditional and non-motorized participants) to report more conflict than the other encountered group.

The literature has also described several potential sources of conflict. Recreation conflict can occur between activity groups, among different participants within the same activity, or in relation
to undesired behaviours not directly attributed to any specific recreational activity. Recreation conflict research typically focuses on conflict between different activities (i.e., hikers, mountain bikers, dirt bikers) which is also called out-group conflict (Vaske et al., 2000). However, certain other non-activity based behaviours, such as littering or discourtesy, have also been reported as potential sources of conflict (Graefe & Thapa, 2004; Gibbons & Ruddell, 1995). Examples of frequent potential sources of conflict among trail users reported by trail managers and recreation participants include noise, speed, smell of exhaust, unexpected encounters, lack of courtesy, trail damage (e.g., trail erosion), difference in expectations, uncontrolled dogs, horse manure, littering, wild behaviour and lack of respect for others (Moore, 1994). Potential sources of conflict attributed to the behaviours of others have been classified as: (1) safety issues, such as when various types of participants use trails at different speeds (Manning, 1999; Vaske et al., 2000; Moore, 1994); (2) environmental issues (Manning, 1999; Moore, 1994); (3) lack of respect for others (Moore, 1994); (4) and from crowding (Moore, 1994; Schneider & Hammitt, 1995).

2.1.3.2 Conflict models

According to some authors (e.g., Owens, 1985; Manning, 1999; Schneider, 2000) the published literature about conflict has been more descriptive and applied, while the theoretical frameworks have only been discussed superficially. As a result, there are few theoretical discussions (e.g., Jacob & Schreyer, 1980; Owens, 1985; Vaske et al., 1995; Schneider, 2000; Lee et al., 2005) about recreation conflict, and numerous descriptive ones (e.g., Adelman, et al, 1982; Ivy et al., 1992; Watson et al., 1994; Vaske et al., 1995; Vaske et al., 2007). Within the theoretical literature, there has been disagreement about the nature of recreation conflict.

There are several conceptual models that describe recreation conflict; the cognitive and normative models are the two most commonly cited. The cognitive model suggests that conflict is goal interference attributed to the behaviour of another recreationist (Jacob & Schreyer, 1980; Gibbons & Ruddell, 1995); conflict in this model is associated with the physical presence of an individual or group that interferes with the goals of another individual or group. Therefore when recreationists encounter others, a cognitive processing of information occurs and conflict is experienced as interfering with one’s goals. The requirement for some kind of interaction between recreation participants has led to this type of conflict being called interpersonal conflict (IPC) (Vaske et al., 1995; Carothers et al., 2001). The encounter can be direct or indirect; in the case of the latter just hearing the sound of hunters’ guns may cause conflict. A mountain biker, for example, may
directly experience interpersonal conflict if they encounter a dirt biker passing too closely on the trail, or indirectly experience such conflict if they just hear the noise of nearby engines.

The normative model (also called the social values model) is based on the assumption that the source of conflict is based on differences between user norms. When recreationists do not share the same norms or social values, conflict can emerge regardless of actual physical presence or contact (Cordell & Tarrant, 2002). Unlike IPC, SVC has been described as conflict that can occur even when there is neither a direct encounter, nor an indirect encounter between recreation participants (Carothers et al., 2001). Norms are defined in this paper as being beliefs of acceptable behaviours within a given context (Carothers et al., 2001). An example of SVC is individuals who, despite not having seen motorized recreationists in a recreation area, disagree philosophically with allowing motorized use in the area; and this affects in their enjoyment which results in conflict. Moore (1994) states that if individual recreationists begin to form interest groups and identify with opposing kinds of participants, conflict may come either from a misunderstanding of viewpoints or from basic differences in philosophy.

Of the two models of conflict, the cognitive model, or IPC model, has received more widespread acceptance (Gibbons & Ruddell, 1995; Ivy et al., 1992; Ramthun, 1995). However, there is also support for the normative model, or SVC model (Vaske et al., 1995, Vaske et al., 2000, Carothers et al., 2001; Vaske et al., 2007). For example, Vaske et al. (1995), attribute conflicts about hunting to differences in social values held by hunters and non-hunters. Some authors have argued for a more comprehensive conflict model (Manning, 1999, Tumes, 2007; Schneider, 2000; Marcouiller et al., n.d.b), and some attempts have been made to produce such a model. The approach used in this study was proposed by Manning (1999), and is an integrative model that interprets the traditional definition of conflict as “goal interference attributed to others’ behaviour” (Jacob & Schreyer, 1980, p.369) in a way that resolves much of the preceding debate (Figure 2.1).
Manning (1999) utilizes the concept of “goal interference attributed to others” as the framework for explaining different sources of conflict. Conflict between participants in differing recreation activities then, is understood both as direct (i.e., cognitive conflict or IPC) and indirect (i.e., normative conflict or SVC), and the factors related to conflict are now defined in terms of sensitivity to conflict rather than conflict itself. However other authors have identified some weaknesses in Manning’s (1999) expanded conflict model in relation to the outcomes. Marcouiller et al. (n.d.b) specifically indicate a general lack of up-front resource management input in the model, which limits its applicability to resource planning and management. Additionally, the new models do not seem to integrate the different potential sources of conflict, possibly due to the disagreement that exists on how to measure conflict.

2.1.3.3 Conflict management

Conflicts between visitors of recreational trails still occur in parks and recreational areas even after a considerable period of applied recreation management practices (Moore, 1994). However, there are also other areas where conflict between trail users may not always be a serious problem, especially when motorized recreationists are absent. For example, a study of three rail-trails in Iowa, Florida, and California found that on average, recreationists – all non-motorized – reported little conflict. Similarly, in a survey of rail-trail managers conducted by the US Rails-to-Trails Conservancy in 1991, over half of the responding 83 managers reported ‘no’ or ‘few if any’ conflicts on their trails; however, many of the managers interviewed in his research felt that conflict was a problem.
and several also volunteered that they expected conflict to increase unless something was done soon (Moore, 1994). Thus, there is evidence that there are some trail networks where different kinds of recreation participants successfully share trails. Unfortunately, the existing literature does not offer much insight into how widespread the problem of recreational trail conflict is, especially when motorized use occurs in combination with other uses. Similarly, on the Squamish trail network, conflict over land use and among trail user groups has been characterized as existing and increasing (Cascade Environmental, 2008). Yet to be studied however, are both the extent to which conflict is a problem, and the efficacy of applied management practices in reducing or at least limiting an increase in conflict.

A wide variety of possible management responses to conflict problems exist (Moore, 1994). Although there are authors who have identified alternatives that can be used to deal with specific types of conflict in recreation (e.g., Moore, 1994; Hammitt & Schneider, 2000), the two most common management practices are zoning and the application of educational programs (Manning, 1999). When the type of conflict is goal interference related to direct or interpersonal contact, it is considered more appropriate to use zoning to separate conflict participants (Manning, 1999; Vaske et al., 2000; Carothers et al., 2001; Cordell & Tarrant, 2002). Zoning approaches include temporal zoning (e.g., allowing mountain bike use in the fall and winter and hikers during spring and summer season), spatial zoning (e.g., allowing motorized use far from hiking areas), or zoning for specific activities (e.g., only non-motorized activities). Zoning can ensure that different types of recreation participants are physically separated. It may be less effective when the conflict is attributable to differing social values, because such conflict does not require the physical presence of or actual contact between recreationists. Educational programs are more likely to be effective when conflict is related to indirect contact or differences in social values. Off-site and on-site education and information campaigns can highlight rules and regulations as well as identify acceptable behaviour when engaging in various recreation activities (Cordell & Tarrant, 2002). Educational programs include all support media that incorporate the following: regulations, low-impact and shared use messages, information to disperse use, alternatives routes and reasons for regulations. Examples of such support media are: signs, brochures, flyers, pamphlets, slide shows, videos, newsletters, maps, guidebooks and visitors’ guides. For example, a Colorado education campaign about a ballot initiative for spring black bear hunting demonstrated that education can reduce the potential for conflict (Manfredo et al., 1995).
However, the efficacy of both zoning management practices in addressing IPC as well as educational programs in addressing SVC still needs to be tested empirically. Manning (1999) found that no primary research had been conducted on the potential efficacy of zoning and that studies have found mixed results in relation to the efficacy of educational programs. The authors of this paper were not able to find a study that had tested either the efficacy of zoning in specifically alleviating IPC or educational programs in specifically alleviating SVC. Some authors have attributed the challenges of management practices in reducing conflict to a lack of consideration of actual causes, such as differences in their expectations, attitudes and social norms (Owens, 1985; Watson et al., 1994; Moore, 1994; Kajala, 1994; Manning, 1999; Schneider, 2000; Cordell & Tarrant, 2002; Marcouiller et al., n.d.a; Tumes, 2007). For example, Manning (1999) clearly states that management actions may not be effective if they do not address these underlying causes of conflict. According to Manning (1999), this means applying zoning when the underlying cause of conflict is direct or interpersonal and applying educational programs when conflict is related to indirect or social values.

2.2 Hypotheses

Although recreation managers have been managing conflict for over 35 years (Clawson, 1974 in Marcouiller et al., n.d.b), the efficacy of this management strategy in reducing conflict has not been widely explored (Moore, 1994). Management practices that help reduce conflict do not appear to be consistently successful due to a lack of understanding of the nature of conflict (i.e., differences in expectations, values and social norms) (Manning, 1999; Outdoor Recreation Council of British Columbia, 2000). In order to better understand the nature of conflict, four potential sources of conflict cited in the literature will be analyzed: conflict arising from (1) safety issues (Manning, 1999; Vaske et al., 2000; Moore, 1994); (2) environmental issues (Manning, 1999; Moore, 1994) (3) lack of respect for others and (Moore, 1994) (4) crowding (Moore, 1994; Schneider & Hammitt 1995). These will be studied in relation to the two kinds (models) of conflict examined in the literature (IPC and SVC) in order to investigate the efficacy of management practices (zoning and education) in reducing conflict. Educational signs, often located at trailheads, are one of the initiatives most often cited in the literature and are widely used in the study area. Signs not only provide education about behavioural norms (e.g., speed limits) to promote tolerance and respect for others and to the environment, but also remind the trail users of other regulations or information about the area.
Educational signs also promote trail etiquette and maintenance of trails. Of all zoning management strategies (e.g., temporal, spatial), spatial zoning is a frequent practice in Squamish. For the purpose of this exploratory study, these two management strategies (educational signs and spatial zoning) were tested to determine their efficacy in alleviating SVC and IPC.

The first hypothesis examined (1) differences in the frequency of several sources of SVC between recreation participants at trailheads with educational signs – as one type of educational program – and at trailheads without educational signs; and (2) differences in the severity of several sources of SVC between recreation participants at trailheads with educational signs – as one type of educational program – and at trailheads without educational signs. If respondents at trailheads with educational signs report SVC less frequently and at lower levels than those at trailheads without educational signs, then we can infer that the educational signs are a likely cause of reduced SVC. Thus, H₁ is as follows:

Recreationists will report social values conflict less frequently and at lower levels of severity at trailheads with educational signs than at trailheads without educational signs.

Hypothesis two, examined (1) differences in the frequency of several types of IPC between recreationists in areas zoned for non-motorized participants only, and in un-zoned areas where motorized and non-motorized participants share trails; and (2) differences in the severity of several types of IPC between recreation participants in zoned and un-zoned areas. If respondents in zoned areas reported IPC less frequently and at lower levels, than those in un-zoned areas, then we can infer that the zoning caused the SVC alleviation. Thus, H₂ is as follows:

Recreationists will report interpersonal conflict less frequently and at lower levels of severity in zoned (non-motorized use only) areas than in areas that are un-zoned.

### 2.3 Methods

Data for this study were obtained from self-administered questionnaires at 9 different locations within the Squamish trail network. Data was collected through onsite surveys using random sampling during the first 17 days of September 2009 which included one long weekend (3 days), two

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5 See Appendix D and E for data collection protocol and questionnaire sample.

6 See Appendix F for a map location of the areas.
regular weekend (2 days/each) and ten week days. The final sample size was 340 respondents (57.1% response rate).

Areas were classified according to the existence of educational signs in the area as well as according to zoning management practices applied (i.e., zoned or un-zoned). Seven areas were identified as using zoning for non-motorized recreationists only and five areas were identified as using educational signs.

### 2.3.1 Independent variables

Respondents were classified as either surveyed at trailheads with educational signs or at trailheads without educational signs, in order to test the effect that such signs have on SVC in $H_1$. The educational sign (present versus absent) was the independent variable in $H_1$. Educational signs at different trailheads in the Squamish trail network contained similar information. Figure 2.2 depicts a typical educational sign on the Squamish trail network; Figure 2.3 shows a typical trailhead in the area.

![Educational sign evaluated.](image-url)
Respondents were classified as being surveyed at trailheads within zoned areas (i.e., where motorized use was not allowed by regulations) or at trailheads within un-zoned areas in order to test the effect that separating non-motorized recreation participants have on IPC in $H_2$. Un-zoned areas in the Squamish trail network were identified as those outside protected areas or Recreation Sites where there were no formal regulation of differing kinds of recreationists allowed. Those un-zoned areas in Squamish were often public or private land which do not have formal use regulations at present (i.e., all kinds of recreationists are allowed). Zoning (non-motorized only versus allowing both kinds of uses) was the independent variable in $H_2$.

### 2.3.2 Dependent variables

Similar to previous research, SVC and IPC were operationalized from two sets of questions regarding 16 behaviours as multiple indicators of conflict (i.e., conflict measures) (Carothers et al., 2001; Vaske et al., 1995; Vaske et al., 2007). The sixteen conflict measures were selected from the literature (see Carothers et al., 2001; Vaske et al., 2000; Vaske et al., 2007, Confer et al., 2005; Blahna et al., 1995; Watson et al., 1994) as well as from the BC Trails Strategy feedback forms (BCMTCA, 2009) filled out by trail users. The sixteen conflict measures were subsequently reclassified into four potential sources of conflict: safety issues, environmental issues, respect to others and crowding. All the conflict behaviours identified were considered to be measures of conflict attributed to the encounter of unacceptable behaviours from other recreationists. However,
it is important to note that the unacceptable behaviours identified were not directly related to any specific user group.

Following the procedures of previous research (Carothers et al., 2001; Vaske et al., 1995; Vaske et al., 2007), respondents were asked how frequently they had observed the sixteen unacceptable behaviours (Table 2.1) using a 5-point interval scale. For analysis purposes, and to be consistent with past research (Carothers et al., 2001; Vaske et al., 1995; Vaske et al., 2007), answers were reclassified into ‘did observe’ (i.e., at least once) or ‘did not observe’ the potential conflict behaviour.

Table 2.1. Measures of conflict attributed to the behaviours of others classified by potential sources of conflict

<table>
<thead>
<tr>
<th>Potential conflict sources</th>
<th>Unacceptable behaviours utilized as conflict measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety issues</td>
<td>Not yielding the right of way</td>
</tr>
<tr>
<td></td>
<td>Not obeying signs</td>
</tr>
<tr>
<td></td>
<td>Dangerous behaviour</td>
</tr>
<tr>
<td></td>
<td>Riding too fast</td>
</tr>
<tr>
<td></td>
<td>Failure to give warning when approaching</td>
</tr>
<tr>
<td></td>
<td>Passing too close</td>
</tr>
<tr>
<td>Environmental issues</td>
<td>Excessive noise</td>
</tr>
<tr>
<td></td>
<td>Excessive exhaust smells</td>
</tr>
<tr>
<td></td>
<td>Environmental damage</td>
</tr>
<tr>
<td></td>
<td>Litter on trails</td>
</tr>
<tr>
<td></td>
<td>Trail erosion</td>
</tr>
<tr>
<td>Respect to others</td>
<td>Dust from other users</td>
</tr>
<tr>
<td></td>
<td>Dogs off-leash</td>
</tr>
<tr>
<td></td>
<td>Rudeness and discourteousness</td>
</tr>
<tr>
<td></td>
<td>Graffiti</td>
</tr>
<tr>
<td>Crowding</td>
<td>Too many users on the trail</td>
</tr>
</tbody>
</table>

Respondents then evaluated the extent (as a measure of severity) to which each conflict-behaviour was a problem for their enjoyment of the area using a 4-point interval scale (i.e., no problem to extreme problem) (Vaske et al., 2007). Finally for each respondent, the frequency of occurrence (observed, not observed) responses were combined with their corresponding perceived problem behaviours to identify two conflict types: interpersonal conflict and social values conflict. Subjects who observed a conflict event in the area and believed it caused a problem for their enjoyment were considered recreationists that had experienced IPC; subjects who had not
observed a conflict event in the area yet believed it caused a problem for their enjoyment were considered recreationists that experienced SVC.

Authors have noted that the protocol used to differentiate SVC is conceptually clear (Carothers et al., 2001; Graefe & Thapa, 2004; Vaske et al., 1995). However, problems have arisen when operationalizing IPC using the method employed in this research. Individuals that experience IPC (i.e., observe an event and judge it to be a problem) may also be experiencing SVC (i.e., even if they didn’t observe the problem they still have thought it was a problem). To avoid this overlap of conflict types and to follow the methodology suggested by Vaske et al. (2007), respondents were asked to answer a third question. If respondents who experienced IPC answered the question ‘what behaviours interfered with your goals and enjoyment’ by selecting ‘just knowing they are there bothers me’, then they were classified as having both SVC and IPC. Otherwise respondents were classified as experiencing only IPC. Unfortunately, due to the low response rate to this question, respondents in the interpersonal conflict category were not segmented further according to their agreement with the statement ‘just knowing they are there bothers me’. Individuals who observed an event and perceived it as a problem were then considered to be expressing only IPC – although we acknowledge that potentially they could be expressing SVC too. SVC measures were used as dependent variables in $H_1$ and IPC measures were used as dependent variables in $H_2$.

2.3.3 Analyses

Histograms from conflict responses indicated that sample data was positively skewed. The Kolmogorov-Smirnov tests of normality were significantly different from normal ($p < 0.001$), and although variances were homogeneous throughout the data, non-parametric analyses were applied to test hypotheses because of un-normal distribution of the data.

Chi-square tests were undertaken to identify any differences in frequency of conflict. For analysis purposes, and consistent with past research (Carothers et al., 2001; Vaske et al., 1995; Vaske et al., 2007), variables were dichotomized for each hypothesis (SVC vs. No SVC and IPC vs. No IPC). This analysis compared the frequency of SVC between subjects surveyed at trailheads with educational signs ($n=181$) and at trailheads without them ($n=153$), in order to test for significant differences. Similarly the analysis compared the frequency of IPC between recreation participants in zoned ($n=62$) and un-zoned areas (=91), in order to test for significant differences.

In order to test the severity of SVC and IPC for each of the hypotheses, non-parametric Mann-Whitney tests were used for differences between areas. The means of each of the 16 measures of
SVC were compared in order to test for significant differences in the means between subjects surveyed at trailheads with educational signs (n=181) versus trailheads without them (n=153). Similarly the means of each of the 16 measures of IPC were compared in order to test for significant differences in the means between recreation participants in zoned (n=62) versus un-zoned areas (=91).

The Pearson’s correlation coefficient r (Field, 2005) was used to evaluate the strength of the associations or the importance of the effect from Mann-Whitney tests results; Field (2005) suggests the following criteria to classify effect size: large effect size >0.50; medium effect size >0.30; and small effect size <0.30. Phi is used in order to measure the strength of association between the two categorical variables for the Chi-Square tests (i.e., between SVC and educational signs and between IPC and zoning). Additionally, although Phi is an adequate effect size measure, the odds ratio was also calculated to ease interpretation (Field, 2005).

Due to activity group sample size constraints, not every activity group could be examined in the hypotheses. Thus, we examine H₁ regarding non-motorized participants as a group; and H₂ regarding (1) non-motorized participants as a group and (2) mountain bikers alone.

### 2.4 Results

#### 2.4.1 Respondent profiles

Respondents included hikers, mountain bikers, dirt bikers, climbers, joggers, dog walkers and all terrain vehicle riders in much lower proportions (Table 2.2).

<table>
<thead>
<tr>
<th>Respondent types</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiker/walker</td>
<td>136</td>
<td>40.7</td>
</tr>
<tr>
<td>Mountain biker</td>
<td>80</td>
<td>24.0</td>
</tr>
<tr>
<td>Dirt biker</td>
<td>36</td>
<td>10.8</td>
</tr>
<tr>
<td>Climber</td>
<td>26</td>
<td>7.8</td>
</tr>
<tr>
<td>Jogger/runner</td>
<td>18</td>
<td>5.4</td>
</tr>
<tr>
<td>Dog walker</td>
<td>16</td>
<td>4.8</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>3.9</td>
</tr>
<tr>
<td>All terrain vehicle/quad rider</td>
<td>8</td>
<td>2.4</td>
</tr>
<tr>
<td>Jeep 4x4 rider</td>
<td>1</td>
<td>0.3</td>
</tr>
</tbody>
</table>
The average age of respondents was 30 years old; 61.3% were male and 38.7% were female. More than half of respondents (52.6%) were local residents living in Squamish, Whistler and Pemberton, while 32.4% were from other places in BC (mostly from the Vancouver area). The rest of the respondents were either from other provinces in Canada or other countries. More than one third (35.5%) of respondents belonged to a leisure club, of which 79.3% were outdoor recreation clubs. The majority of respondents (79.9%) considered themselves to be quite or very knowledgeable about things they could do to be respectful of other recreation participants. Almost two-thirds (64.7%) of respondents claimed to be quite or very knowledgeable about things that they could do to be environmentally friendly. The recreation participants surveyed were distributed in the different management areas (Table 2.3).

### Table 2.3. Distribution of respondents in areas surveyed

<table>
<thead>
<tr>
<th>Area name</th>
<th>Educational signs</th>
<th>No educational signs</th>
<th>Only non-motorized</th>
<th>Motorized and non-motorized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Lake Provincial Park*</td>
<td>-</td>
<td>26</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>Garibaldi Highlands+</td>
<td>-</td>
<td>27</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>Diamond Head†</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>40</td>
</tr>
<tr>
<td>Cat Lake Area‡</td>
<td>-</td>
<td>51</td>
<td>-</td>
<td>51</td>
</tr>
<tr>
<td>Brackendale§</td>
<td>28</td>
<td>-</td>
<td>28</td>
<td>-</td>
</tr>
<tr>
<td>Smoke Bluffs Park∆</td>
<td>34</td>
<td>-</td>
<td>34</td>
<td>-</td>
</tr>
<tr>
<td>Crumpit Woods•</td>
<td>24</td>
<td>-</td>
<td>24</td>
<td>-</td>
</tr>
<tr>
<td>Stawamus Chief Provincial Park ¥</td>
<td>86</td>
<td>-</td>
<td>86</td>
<td>-</td>
</tr>
<tr>
<td>Brohm Lake Interpretive Forest φ</td>
<td>24</td>
<td>-</td>
<td>24</td>
<td>-</td>
</tr>
</tbody>
</table>

* 76.9% hikers and 23.1% dog walkers; + 78.0% mountain bikers; † 92.5% mountain bikers; ‡ 70.6% dirt bikers; § 44.4% mountain bikers and 37.0% joggers; ∆ 45.0% hikers and 39.4% climbers; • 39.1% hikers and 30.4% mountain bikers; ¥ 80% hikers; φ 77.3% hikers and 22.7% dog walkers.

It is important to note the only in zoned areas educational signs were found. This means that the role of educations will only affect, in this study, non-motorized recreationists.

#### 2.4.2 Descriptive statistics

In total, 84.4% of respondents reported having experienced some kind of conflict while pursuing a recreation activity in the Squamish trail network. Of those reporting conflict, 43.1% reported slight problems, 26.8% reported moderate problems and 14.5% reported extreme problems related to the sixteen conflict behaviours. Littering (27.7%) and environmental damage (24.1%) were more
frequently reported as highly unacceptable behaviours (i.e., extreme problem). When looking at the three main user groups in Squamish, there was no obvious pattern to the severity of conflict throughout the sixteen measures of conflict. In general terms, mountain bikers seem to be more sensitive to conflict which means that report on average, the highest levels of conflict in six out of sixteen conflict measures (Figure 2.4).

Interestingly, hikers were less sensitive than mountain bikers and dirt bikers, experiencing on average, the lowest levels of conflict compared to other trail users in six out of sixteen measures of conflict. These results contrast with the traditional direction of asymmetry found in previous research, in which hikers reported less conflict than mountain bikers (Ramthun, 1995; Carothers et al., 2001). The distribution of groups of recreation participants in each area may explain these patterns. For example, hikers are often concentrated in areas that do not permit motorized activities, and instead often shared trails with dog walkers or climbers. The similarities between these three types of recreationist may explain the low severity of conflict reported by hikers.

Conversely, although mountain bikers usually concentrate on specific trails, they also share some trailheads with motorized recreationists (i.e., Diamond Head). This may explain their sensitivity to conflict.

![Figure 2.4. Average severity of sources of conflict per groups of respondents in all areas surveyed; the scale ranges from 0 (no problem) to 4 (extreme problem).](image-url)
Motorized participants were not found in zoned areas or at trailheads with educational signs, so it was not possible to analyze the effect of zoning and education on motorized respondents as there were no other areas to compare them to. Therefore, hypotheses were only tested for non-motorized participants. Descriptively, and consistent with the hypotheses, the level and frequency of problem responses were less in managed areas. Respondents at trailheads with educational signs had lower levels of SVC than control subjects. Similarly, respondents in zoned areas had lower levels of IPC than control subjects. In the following sections the results from hypotheses testing will be examined in detail.

2.4.3 Hypothesis 1

When non-motorized trail users were analyzed separately, nine of sixteen conflict measures of the frequency of SVC were significantly higher at trailheads without educational programs (Table 2.4). Based on the odds ratio, non-motorized trail users were 3.50 times more likely to experience SVC due to ‘too many users’ at trailheads without educational signs than at trailheads with educational signs. Similarly, trail users were 5.27 times more likely to experience SVC due to “litter on trails” at trailheads without educational signs than at trailheads with educational signs. Three of the nine conflict measures had a medium effect size (i.e., too many users, litter on trails and not obeying signs). When the results were classified by sources of conflict, responses showed significant differences between areas for the following: three conflict measures arising from safety issues, three conflict measures arising from environmental issues, two conflict measures arising from respect for others and crowding.

Eight of the sixteen conflict measures showed significantly higher levels of social values conflict at trailheads without educational signs compared to those with educational signs. However, the effect sizes were low, except for litter on trails which had a medium effect size (\( \Phi > 0.30 \)) (Table 2.4). When the results were classified by sources of conflict, responses showed significant differences between areas for the following: three conflict measures arising from safety issues, three conflict measures arising from environmental issues, one conflict measure arising from respect to others and crowding. As it is shown in Table 2.4, the medians of the SVC measures of respondents at trailheads with educational signs are all 0 (which means ‘no problem’) according to the scale, whereas the medians of the SVC measures of respondents at trailheads without educational signs are 1 (i.e., slight problem) or 2 (moderate problem).
Table 2.4. Mann-Whitney non-parametric test and Chi-Squares results of SVC for non-motorized recreationists

<table>
<thead>
<tr>
<th>SVC indicators organized into sources of conflict</th>
<th>N</th>
<th>Frequency (Chi-Square)</th>
<th>Severity (Mann-Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X^2</td>
<td>Phi</td>
</tr>
<tr>
<td>Crowding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too many users on the trail</td>
<td>142</td>
<td>12.50**</td>
<td>-0.3</td>
</tr>
<tr>
<td>Safety issues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not yielding the right of way</td>
<td>125</td>
<td>5.47*</td>
<td>-0.21</td>
</tr>
<tr>
<td>Dangerous behaviour</td>
<td>134</td>
<td>7.12*</td>
<td>-0.23</td>
</tr>
<tr>
<td>Failure to give warning when approaching</td>
<td>110</td>
<td>4.92*</td>
<td>-0.21</td>
</tr>
<tr>
<td>Environmental issues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive noise</td>
<td>118</td>
<td>4.59*</td>
<td>-0.2</td>
</tr>
<tr>
<td>Excessive exhaust smells</td>
<td>162</td>
<td>7.164*</td>
<td>-0.21</td>
</tr>
<tr>
<td>Litter on trails</td>
<td>61</td>
<td>8.73*</td>
<td>-0.38</td>
</tr>
<tr>
<td>Respect for others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rudeness and discourteousness</td>
<td>156</td>
<td>8.10*</td>
<td>-0.23</td>
</tr>
<tr>
<td>Graffiti</td>
<td>166</td>
<td>6.38*</td>
<td>-0.2</td>
</tr>
</tbody>
</table>

Only significant conflict measures are shown in the table; * sig < 0.05, ** sig < 0.001, Mdn⁰: medians of respondents at trailheads without educational signs. Mdn¹: medians of respondents at trailheads with educational signs. Median values: 0 no problem, 1 slight problem, 2 moderate problem, 3 extreme problem. In Chi-Squares the degrees of freedom for all conflict measures = 1.

2.4.4 Hypothesis 2

When non-motorized trail users were analyzed separately, three of the sixteen measures of frequency of conflict showed significantly higher levels of interpersonal conflict in un-zoned areas (Table 2.5). Based on the odds ratio, non-motorized recreationists were 7.28 times more likely to experience interpersonal conflict due to ‘dust from other users’ in un-zoned areas compared to zoned areas. The other two significant conflict measures had a low effect size (i.e., excessive noise and excessive exhaust smells). When the results were classified by sources of conflict, responses showed significant differences between areas for the following: two environmental issues and two social issues. When mountain bikers were analyzed separately, three of the sixteen measures of frequency of conflict show significantly higher levels of interpersonal conflict in un-zoned areas (Table 2.6). Based on the odds ratio, mountain bikers were 10.63 times more likely to experience interpersonal conflict due to dust from other users in un-zoned areas compared to zoned areas. Similarly, mountain bikers were 8.18 times more likely to experience interpersonal conflict due to excessive exhaust smells in un-zoned areas compared to zoned areas. Finally, mountain bikers were
7.50 times more likely to experience interpersonal conflict due to excessive noise in un-zoned areas compared to zoned areas. ‘Dust from other users’ had a high effect size and the other two significant conflict measures have a medium effect size (i.e., excessive noise and excessive exhaust smells). When the results were classified by sources of conflict, responses showed significant differences between areas for the following: two environmental issues and two social issues.

When non-motorized trail users were analyzed separately, five of the sixteen conflict measures showed significantly higher severity of interpersonal conflict in un-zoned areas compared to zoned areas; however the effect sizes were mostly low. An exception was ‘dust from other users’ which had a medium effect size. When the results were classified by sources of conflict, most conflict measures arising from environmental issues were significantly different between zoned and un-zoned areas. When mountain bikers were analyzed separately, seven of the sixteen conflict measures showed significantly higher levels of interpersonal conflict in areas with no zoning compared to zoned areas (for non-motorized areas/activities only). The effect sizes were mostly medium or low (Table 2.6). When the results were classified by sources of conflict it was clear that, in the case of mountain bikers, interpersonal conflict arises from environmental issues.

### Table 2.5. Mann-Whitney non-parametric test and Chi-Squares results of IPC for non-motorized recreationists in zoned or un-zoned areas

<table>
<thead>
<tr>
<th>Conflict indicators organized into sources of conflict</th>
<th>N</th>
<th>Frequency (Chi-Square)</th>
<th>Severity (Mann-Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X^2</td>
<td>Phi</td>
</tr>
<tr>
<td><strong>Safety issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to give warning when approaching</td>
<td>155</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive noise</td>
<td>149</td>
<td>7.66*</td>
<td>-0.23</td>
</tr>
<tr>
<td>Excessive exhaust smells</td>
<td>106</td>
<td>6.29*</td>
<td>-0.24</td>
</tr>
<tr>
<td>Environmental damage</td>
<td>167</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respect for others</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust from other users</td>
<td>136</td>
<td>14.80**</td>
<td>-0.33</td>
</tr>
</tbody>
</table>

Only significant conflict measures are shown in the table; * sig < 0.05. ** sig < 0.001. Mdn⁰: medians of respondents in un-zoned areas. Mdn¹: medians of respondents in zoned areas. Median values: 0 no problem, 1 slight problem, 2 moderate problem, 3 extreme problem. In Chi-Squares the degrees of freedom for all conflict measures = 1.
Table 2.6. Mann-Whitney non-parametric test and Chi-Squares results of IPC for mountain bikers in zoned or un-zoned areas

<table>
<thead>
<tr>
<th>Conflict indicators organized into sources of conflict</th>
<th>N</th>
<th>Frequency (Chi-Square)</th>
<th>Severity (Mann-Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X²</td>
<td>Phi</td>
</tr>
<tr>
<td>Safety issues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to give warning when approaching</td>
<td>51</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Environmental issues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive noise</td>
<td>39</td>
<td>7.43*</td>
<td>-0.44</td>
</tr>
<tr>
<td>Excessive exhaust smells</td>
<td>41</td>
<td>7.00*</td>
<td>-0.41</td>
</tr>
<tr>
<td>Environmental damage</td>
<td>52</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Litter on trails</td>
<td>60</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trail erosion</td>
<td>66</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Respect for others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust from other users</td>
<td>56</td>
<td>14.42**</td>
<td>-0.51</td>
</tr>
</tbody>
</table>

Only significant conflict measures are shown in the table; * sig < 0.05. ** sig < 0.001. Mdn⁰: medians of respondents in un-zoned areas. Mdn¹: medians of respondents in zoned areas. Median values: 0 no problem, 1 slight problem, 2 moderate problem, 3 extreme problem. In Chi-Squares the degrees of freedom for all conflict measures = 1.

2.5 Discussion

Overall, results from H₁ suggest that non-motorized respondents experienced less SVC at trailheads with educational signs than at ones without them. Results also support H₂: non-motorized respondents in zoned areas experience IPC less frequently and at lower levels than in un-zoned areas. However, the findings do not support the hypotheses for all SVC and IPC conflict measures. For example, SVC and IPC measures such as: ‘not obeying signs’, ‘dangerous behaviours’, ‘dogs off-leash’, or ‘passing too close’, were not affected by management.

2.5.1 Educational signs for social values conflict

When considering at the first hypothesis, educational signs appear to be comparatively effective at reducing both the frequency and level of SVC in half of the conflict measures. Educational signs had an effect on all four potential sources of conflict analyzed; at least one of the measures of each source of conflict was statistically less severe and less frequent at trailheads with educational signs than at trailheads without them. However overall, the differences accounted for a small amount of total variability. According to Graefe & Thapa (2004), SVC may be a reflection of one’s own values and philosophies rather than a level of conflict in the area in question. Thus responses might be considered a measure of potential conflict because respondents are speculating about behaviours...
that they believe exist, even though they may not have experienced them. Despite how SVC measures are understood (i.e., either as actual measures of conflict or as potential conflict measures), results overall corroborated Moore (1994), who suggested that persuasive communication has a low potential to influence ‘unsanctioned’ or ‘unavoidable behaviours’ (e.g., trail erosion, not obeying signs), a moderate potential to influence ‘careless acts’ such as littering and a high potential to modify ‘unskilled actions’ such as crowding.

Results of SVC arising from crowding were consistently less severe and less frequently reported at trailheads with educational signs compared to trailheads without them, likely because the educational signs informed users about the possibility of encountering crowds and recommended coping behaviours. Recreationists were therefore more aware in how to respond to crowding.

SVC arising from safety issues were also less problematic at trailheads with educational signs although this did not reduce problems related to other recreation participants not obeying signs, riding too fast or passing too close. Consistent with Moore (1994), persuasive communication has a low potential to influence unsanctioned acts such as not obeying signs. However we would expect careless acts such as riding too fast or passing too close to have been reduced by educating recreation participants (Moore, 1994). It is possible that these results were influenced by the fact that a large proportion of non-motorized respondents examined in this study were mountain bikers, and that their perception of riding too fast or passing too close may be different when compared to hikers’ perceptions.

SVC arising from environmental issues were comparatively less frequent and less severe at trailheads with educational signs than at trailheads without them; litter on trails and exhaust smells were behaviours that differed the most between trailheads with and without educational signs; educational signs didn’t seem to be effective at comparatively reducing SVC when it stemmed from trail erosion or environmental damage. This may be because they are both unavoidable consequences of the use of trails and can only be mitigated during the design and maintenance stages of the trails rather than from the use of educational tools (Moore, 1994).

SVC related to the respect for others were the least affected by the use of educational signs at trailheads compared to trailheads without any educational information; only the rudeness and discourteousness measure of SVC was significantly lower in frequency and severity at trailheads with educational signs than at trailheads without them. Graffiti was perceived to be a problem less frequently at trailheads with educational signs; however differences were small (despite being statistically significant). Off-leash dogs do not seem to be a problem on the Squamish trail network.
Even at trailheads without educational signs, three quarters of respondents indicated they did not have a problem with off-leash dogs. Educational signs did not have an effect on respondents’ perception of the SVC measure dust from other users, when compared with the severity and frequency of conflict at trailheads without educational signs.

It is possible that other variables not taken into account in this study contribute to the patterns of conflict identified. For example, recreationists may behave differently in Provincial Parks (i.e., Alice Lake Provincial Park or Stawamus Chief Provincial Park) than they do in less intensively managed forest lands. It is also possible that recreationists’ factors (i.e., activity style, resource specificity, mode of experience and lifestyle tolerance) are related to the efficacy of management practices. For example, recreationists with higher levels of lifestyle tolerance may experience less conflict in un-zoned areas than recreationists with lower levels of lifestyle tolerance.

Results from $H_1$ can help to inform the Trails Strategy for BC and subsequently sectoral and local trail management plans about the specific content of educational signs or other educational initiatives should contain in order to effectively address conflict that stems from differences in norms and social values. One recommendation is to carefully select messages to address existing problems which will need to be informed by studies to determine the principal concerns in each region. The content of signs in Squamish should perhaps more strongly encourage the avoidance of such careless behaviour as riding too fast or passing too close on shared trails. Additionally, combining different educational approaches may produce better results (Moore, 1994) according to the literature. It is probable then, that a combination of educational programs will result in larger differences of SVC – both the frequency and the level of SVC – between areas with combined educational strategies than areas without educational program or areas relying on a sole technique.

Managers should also be aware that educational programs may be more likely to address SVC arising from uninformed behaviours or careless behaviours but will be unlikely to address conflict arising from unsanctioned behaviour. In such cases, other strategies such as enforcement might be more effective for these types of behaviour. Moore (1994) indicates that a survey of rail-trail managers conducted in the US in 1991 by the Rails-To-Trails Conservancy found that the most effective measures to promote trail etiquette were ranger patrols, signs and brochures. Within the Squamish context, the application of ranger patrols will be very difficult due to the diversity of trail network jurisdictions and funding constraints. However, the design of education materials at the main trailheads in the Squamish trail network could potentially be more effective in helping reduce SVC if they incorporate all necessary information. This would include regulations, an explanation
why and how regulations will be enforced and what penalties are applicable on all trailhead signs, brochures and maps (Ryan, 1993 in Moore, 1994).

2.5.2 Zoning for interpersonal conflict

With regard to H2, zoning was less effective than the previous hypothesis at reducing the severity and frequency of IPC among non-motorized respondents, in terms of the number of conflict indicators that were significantly different between areas. When examining IPC within more homogeneous groups such as mountain bikers, results demonstrate that more IPC indicators resulted significantly less frequent and less severe in zoned areas versus un-zoned areas. When mountain bikers were analyzed separately, the majority of IPC’s measures which zoning mitigated, fell into the environmental source of conflict. Furthermore, it would seem that behaviours that were significantly less severe and less frequent in zoned areas were the ones most often related in the literature (Moore, 1994) with the encounter of non-motorized participants with motorized participants (e.g., dust from other users, excessive exhaust smells, excessive noise, environmental damage or trail erosion). Conversely, comparisons between zoned and un-zoned areas did not affect the levels or frequency of IPC measures that were not necessarily related to any specific activity group (e.g., not obeying signs, rudeness and discourteousness, or dangerous behaviour). Zoning, however, did have a positive effect on littering despite being a conflict behaviour not directly related to any specific type of recreation activity. This may suggest that in un-zoned areas where motorized and non-motorized recreationists share trails, there is more often litter on trails. Such a result is not unexpected, taking into account that un-zoned areas in Squamish are either public or private land where there is, for the moment, no actual management providing cleaning services (i.e., in Garibaldi Highlands, Cat Lake area). Conversely, zoned areas are being managed in regards to cleaning services because of their status as Provincial Parks (e.g., Alice Lake Provincial Park and Stawamus Chief Provincial Park); Regional Parks (e.g., Smoke Bluffs Park); Recreation Sites (e.g., Brohm Lake Recreation Site); or another type of non-formal management institution (Brackendale, Crumpit Woods). Overall results from the second hypothesis suggest that zoning management practices on the Squamish trail network are successful at reducing IPC that comes from encounters between mountain bikers and motorized recreationists. However, zoning comparatively does not reduce IPC when it is unrelated to encounters with motorized users.

It is important to keep in mind that due to the method used to test the dependent variables, respondents who experienced IPC potentially also experienced SVC as well (Vaske et al., 2007).
Because of the low response rate to the survey question intended to clarify the conflict-type (i.e., if IPC or IPC and SVC), further classification was not possible. Therefore it is possible that non-motorized respondents at zoned and un-zoned areas who have experienced IPC also experienced SVC. If recreationists did experience IPC and SVC at the same time, this could explain why zoning management practices were less able to reduce conflict in those areas.

The Trails Strategy for BC should consider these findings before further developing a framework based on employing zoning in more areas to cope with recreation conflict. Zoning to separate motorized and non-motorized participants may be an effective management practice in order to alleviate IPC when it stems from the behaviour of certain participants who you are aiming to separate other participants from. However there is still IPC within zoned areas, meaning that there are other issues related to the encounter of less incompatible recreation groups that still need to be resolved.

2.5.3 Distribution of recreation participants in the management areas

Besides the discussion of the hypotheses it is also important to note that the types of recreation participants were unequally distributed among management areas. This fact had two consequences in the study. First, it limited the analyses: all activity groups could not be compared between management areas. For example, in un-zoned areas, there were surprisingly few non-motorized recreationists; in the Cat Lake area only 11.7% of respondents were non-motorized. This drastically reduced the possibilities of separately analyzing different groups of recreationists (i.e., hikers or mountain bikers) in zoned and un-zoned areas to determine if management practices were affecting the level and frequency of conflict. Second, unequally distributed activities in un-zoned areas may indicate that recreation groups tend to self zone. Un-zoned areas in Squamish are considered to be those where there is no formal regulation that restricts use based on activity type; public land outside of BC Parks or private land in Squamish generally do not have formal regulations on the types of use that are permitted – all kinds of recreationists are allowed in most areas. Despite the fact that these areas allow both non-motorized and motorized use, non-motorized recreationists seem to have coped with conflict by redistributing themselves within the area to avoid encounters. For example, although both mountain bikers and dirt bikers recreate in un-zoned areas, there seems to be an unwritten rule underlying their behaviours which concentrates dirt bikers in the Cat Lake area whereas mountain bikers are concentrated in the Diamond Head area (both areas are not zoned). Within zoned areas, non-motorized participants were also unequally distributed. For
example, hikers were more often observed at the Stawamus Chief Provincial Park, Brohm Lake Recreation Site and Alice Lake Provincial Park, whereas mountain bikers were more often seen at Diamond Head or Garibaldi Highlands.

The unequal distribution of recreationists in both zoned and un-zoned areas may indicate that recreation participants tend to self-organize into areas where fewer incompatible groups share the trails. This finding supports previous research on coping behaviours (Schneider & Hammitt, 1995, Manning & Valliere, 2001) and also gives support to the Marcouiller’s et al. (n.d.b) conflict framework which suggests that conflict between recreationists can be understood as representing relative levels of incompatibility between them.

As a consequence of the self-zoning phenomenon, it is also possible that the conflicts reported in this study predominantly arise from differences in social values (i.e., unobserved conflict but still a problem) as participants tend to concentrate where there are relatively homogenous groups in terms of behaviour and so the types of conflict that will be more often reported are unobserved but still a problem. Further research should investigate the clusters of respondents in order to see if self-zoning strategies affect the perception of conflict as being SVC or IPC.

Self-zoning as a coping strategy seems to be an option for participants as long as there is space for it. However where there is no physical or temporal space for self-zoning, education may be an alternative option. On the Squamish trail network, conflicts are still reported in areas where different types of non-motorized participants interact, which may indicate that if there are areas where each group could go to recreate with like participants, they will. Unfortunately, there is a space limitation which is expected to continue to increase as development of public and private land around Squamish accelerates – a common issue in trail communities throughout BC and recreationists need to adapt to some kind of heterogeneity. Education is often used to help users develop more realistic expectations of what and whom they are likely to find on a particular trail (Moore, 1994). It is possible that the more people are informed about adopting safe behaviours, and respect for the environment as well as other trail users, the more homogeneous the community will be, despite the differences in activities. As a result less zoning may be needed. Understanding in which particular cases zoning and education work will ease the job of BC recreation managers when they implement their own conflict management strategies.
2.5.4 Management context

There were no places in the study area that applied educational programs at trailheads as a management practice exclusively. Educational programs were present only in zoned areas, although this was not taken into account when testing hypotheses. In \( H_1 \), when the differences in the level and frequency of SVC between the two conditions (educational signs vs. no educational signs) were tested, the analyses did not control for changes in the zoning variable. In \( H_2 \), something similar occurred; when differences in the level and frequency of IPC between the two conditions (zoned vs. un-zoned) were tested, the analyses did not control for changes in the variable educational sign. It is probable that the combination of zoning and educational signs have an even larger effect on the reduction of both SVC and IPC. Because this study was a first application relating educational programs and zoning to the reduction of SVC and IPC respectively, the relationships were tested in separate hypotheses. Unfortunately, the sample size was not large enough to compare each of the combinations of recreation activities separately. Since the combination of zoning and educational programs is not unusual, further analyses should investigate the synergies of zoning management practices and educational programs at reducing SVC and IPC.

2.6 Conclusions and implications

Overall, data reported in this study supports the predicted relationships. By examining the presence or absence of educational signs at trailheads, we were able to identify the average levels and frequency of social values conflict for the two respondent groups. Similarly, by examining the presence or absence of zoning management practices, we were able to examine in the average levels and frequency of interpersonal conflict between the two groups. Zoning and education seem to be useful for reducing interpersonal conflict and social values conflict respectively, but only with regard to specific conflict measures and/or at low effect sizes. The findings in this study lay the foundation for the inclusion of management practices in the new expanded conflict models still to be constructed.

Future research should consider including other educational programs (e.g., flyers, web information, information centres, talks) when examining social values conflict, as well as other types of zoning (e.g., motorized only, seasonal zoning) when studying interpersonal conflict. Researchers should also investigate the effect of any interaction between zoning and education on social values conflict and interpersonal conflict. As was done in this research, any such further studies should
continue to include multiple indicators of potential problem situations grouped as different potential sources of conflict in order to understand where conflicts come from (i.e., safety issues, environmental issues, respect to others and crowding).

Previously in BC, there have been some initiatives directed towards developing effective management of trail user conflicts. However, the strategies have usually been reactive and were implemented as problems appeared. Cordell & Tarrant (2002) note that resolving conflict at its initial stages can help to avoid costly political and legal action. The Draft Trails Strategy for BC is a clear example of the change in direction of the provincial government towards a more proactive approach in managing the provincial trail network. The principles of collaborative planning, environmental and cultural stewardship, secure opportunities for all recreation participants and the goal of providing benefits for individual communities and the Province as a whole are all examples of this more proactive attitude in trail management. Managing trail user conflict is complex (Bell et al., 2007; Cordell & Tarrant, 2002), but better understanding of social interactions may help effective decision-making (Dearden & Rollins, 2002). Research suggests that efforts should be made at involving interest groups in order to find management alternatives (Vaske et al., 2007; Moore, 1994). User involvement is needed when planning strategies to cope with conflict in shared-use areas so as to ensure equitable access to Crown land for all recreationists, as well as to maintain the ability of recreation visitors to achieve their desired recreation experience (Cascade Environmental, 2008). It may be valuable to include the findings of this research in the final Trails Strategy for BC in the form of broad recommendations for conflict management which local plans can incorporate in their more specific guidelines. Furthermore, the finding of this research could inform the implementation plan for the Trails Strategy for BC.
2.7 References


CHAPTER 3. MODELLING THE RELATIONSHIPS OF RESOURCE SPECIFICITY AND ACTIVITY STYLE TO SOURCES OF CONFLICT ON THE SQUAMISH TRAIL NETWORK IN BRITISH COLUMBIA

3.1 Introduction

Over the last several decades, the number of trail networks near densely populated urban areas has multiplied (Fábos & Ryan, 2004; Bell et al., 2007). The high recreation use of these trails may represent a threat to the conservation of nature, though such use may also increase the environmental awareness of citizens as well as their quality of life (Bell et al., 2007). Recreationists are not homogenous (Rollins & Robinson, 2002) and differences in their expectations, behaviours and values may create conflicts between trail users. Examples of conflicts include: families with children might have safety issues when other recreationists pass too closely at high speeds; cyclists may complain because a group of hikers is not considering other recreationists by being spread over the width of the trail; a dirt biker might be upset because of the inquisitive or hostile glares of hikers when passing.

Past research suggests that many different recreationist attributes – also called factors by some authors (Jacob & Schreyer, 1980; Carothers et al., 2001) – are associated with recreation conflict. For example, Jacob & Schreyer (1980) indentified four factors related to conflict: activity style, resource specificity, mode of experience, and tolerance for lifestyle diversity. Several empirical studies have also examined the role of motives in explaining recreation conflict (e.g., Clark, 1971; Gibbons & Ruddell, 1995; Mann & Absher, 2007). Additionally, other recreationist attributes have been related to conflict, including the degree to which recreationists report symbolic attachment to recreation areas (e.g., Gibbons & Ruddell, 1995), and the degree of mechanization employed (e.g., Bury et al., 1983, Moore, 1994). Although empirical studies have found that these variables can affect the result of interactions between recreationists, no agreement has been reached about how to measure conflict or where the conflict comes from. According to Cordell & Tarrant, (2002) early identification of outdoor recreation conflict and effective conflict resolution depend on understanding where and how conflicts arise.

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This study analyzes the influence that activity style (i.e., the personal importance recreationists place on an activity) and resource specificity (i.e., the significance people attached to using a specific recreation resource) have on the likelihood of recreationists experiencing several potential sources of conflict on the Squamish trail network, British Columbia (BC). The study explores these relationships while controlling for motivations, degree of mechanization of trail users and demographic characteristics. The goal of this study is to develop preliminary models that indicate the role of the recreationist’s attributes in determining sensitivity to potential sources of conflict – according to where such conflict comes from.

3.1.1 Study area

The Squamish trail network in the Sea to Sky Corridor is a very popular site for recreation purposes and accounts for over 6 million recreation visits per year. The area is suitable for both winter and summer activities, and attracts a wide range of motorized and non-motorized participants (British Columbia Ministry of Sustainable Resource Management [BCMSRM], 2002). The trail network is located in a mix of public integrated resource lands, protected parkland and private undeveloped forested lands. It is an extensive community based trail network that has approximately 200 km of forested single track and double track trails near a population of 18,000 people and located less than one hour from Greater Vancouver’s 2.5 million residents.

Conflict in the Sea to Sky Corridor has been a concern for years and has been addressed in several reports (BCMSRM, 2002; Cascade Environmental, 2008; British Columbia Ministry of Agriculture & Lands [BCMAL], 2008; Catalyst Community and Resort Planning, 2008). The network has also been studied within the Sea to Sky Corridor Recreation Trail Strategy; a pioneer provincial attempt to provide a strategic direction for the management of recreational trails. This local strategy influenced the development of the overall Trails Strategy for BC, prepared by the provincial government. Due to its status as a world-renowned tourist destination, as well as the numerous previous studies undertaken in the area, the Squamish trail network provides an excellent case study to investigate trail user conflict and the determinants that influence recreation conflict.

First we review the literature on outdoor recreation conflict which will include conflict’s basic principles and recreationist’s attributes as well as conflict models, potential conflict sources and measurement issues. Then the effects that the recreationists’ activity style and resource specificity have on various potential sources of conflict are tested by analysing recreationists’ responses to a
Squamish trail network onsite survey. Finally, recommendations for conflict modeling are suggested so as to increase the understanding of trail use conflict in places such as Squamish.

3.2 Literature review

3.2.1 Conflict conceptualization

The conceptualization of conflict in the literature is broad and has evolved from being characterized as simple competition between incompatible recreationists over the same resources to a much more complex conceptualization of conflict that considers differences in values, goals and belief systems (Moore, 1994; Graefe & Thapa, 2004). However, disagreement exists over the definition of the underlying causes of recreation conflict. Jacob & Schreyer (1980) defined conflict as “goal interference attributed to others’ behaviour” (p. 369) whereas Adelman (1982) suggested that conflict is due to differences in norms and social values. On the other hand, Vitterso et al. (2004) introduced a new body of research within the recreation conflict literature which argued that recreation conflict is affective and is related to the subjective emotional state of the recreationists. However, research, has tended to agree that recreation conflict can be characterized by some principles and that it is affected by a number of recreationist’s attributes.

3.2.2 Conflict principles

The key principles related to conflict among trail users are: conflict is typically asymmetrical; conflict can be experienced at different levels; and conflict can affect the quality of experiences.

Recreation conflict is typically asymmetrical. That is, there is a tendency for one group (mostly traditional and non-motorized recreationists) to perceive conflict more often than recreationists from new of motorized activities. The asymmetrical character of conflict is consistent across empirical studies. For example, Adelman et al. (1982) identified the presence of one-way conflict between canoeists and motor-boaters: canoeists disliked the presence of motor-boaters, but the motor-boat recreationists were not bothered by, and often enjoyed seeing and interacting with, paddlers. Such one-way conflict has also been found between hikers and horseback riders (Watson et al., 1994). In other research, Gibbons & Ruddell (1995) found that helicopter skiers in Utah's Wasatch National Forest reported no conflict, while non-motorized backcountry recreationists in the same area reported high levels of conflict with the helicopter skiers. A similar asymmetrical pattern
was found by Vaske et al. (2007) who reported that skiers experienced substantially more problems than snowmobilers did.

Empirical research, suggests that conflict exists at two levels: direct and indirect (Jackson & Wong, 1982 in Manning, 1999). The first level is direct confrontation, including perceived associated impacts of the other activity upon the environment. The second level refers to indirect confrontation representing a general feeling of disliking (or unwillingness to appreciate) the other group's views.

Conflict is understood broadly as one of the most serious threats to quality trail experiences (Moore, 1994). In recreation research, quality has traditionally been measured as visitor satisfaction (Manning, 1999). Some have argued that it is threats to the quality of the recreation experience that causes conflict, not competition for resources, (BCMSRM, 2002). Manning (1999) argues that visitor satisfaction is the underlying goal of outdoor recreationists and defines visitor satisfaction as the match between recreationist expectations and outcomes. However, Manning & Valliere (2001) and Marcouiller et al. (n.d.b) have suggested that more research is needed to understand the relation between quality, visitor satisfaction and conflict since they found that overall satisfaction may be a superficial and even misleading measure of quality in outdoor recreation.

In response to conflict, recreationists may use several coping strategies: displacement such as moving to another area; product shift such as when individuals alter their definition of the recreation opportunity according to the condition experienced; and rationalization such as when individuals may rationalize their experiences and rate them as satisfactory experiences regardless of conditions (Manning & Valliere, 2001). Other authors have classified coping strategies as either problem-focussed or emotion-focussed. Problem-focused strategies are typically actions that involve planning and active coping, whereas emotion-focused actions such as regulating one’s emotions and distancing strategies are seen as indirect. Coping often involves a combination of both strategies (Iwasaki & Schneider, 2003).

3.2.3 Recreationist’s attributes

Conflict is more complex than competition for land or resources. It is now recognised that recreation experiences are influenced by subjective as well as situational contexts that, depending on their effect, can cause the recreationist to fail to achieve their desired experience. Empirical and theoretical studies have found that recreation conflict can be associated with numerous attributes of recreationists. Jacob & Schreyer (1980) defined four major factors (i.e., four different types of
recreationists attributes) related to conflict that have been broadly used and extended in subsequent research: activity style; resource specificity; mode of experience; and lifestyle tolerance.

Activity style refers to the personal meaning that recreationists assign to an activity. These individual meanings – not the activity itself – contribute to conflict evaluation. That is, the more intense the personal meaning a recreationist gives to an activity is, the greater the likelihood of conflict occurring when there is an encounter with a recreationist with a less intense personal meaning attached to the activity (Tumes, 2007).

Resource specificity relates to the significance attached to using a specific recreation resource (i.e., setting) for a given recreation experience. Recreationists who are ‘attached’ to a resource are believed to have developed a sense of possession. The more a particular activity or place is central to an individual or group of recreationists within the same activity, the more attached to an area they feel, relative to a competing individual or group. This difference in perception can initiate feelings of conflict (Watson et al., 1994). Some authors suggested broadening the concept of resource specificity to include the notion of place attachment and place experience (Watson et al., 1993; Gibbons & Ruddell, 1995; Vaske et al., 2000). Place attachment is related to an ongoing relationship with a specific setting and to the emotional attachment the recreation participant has with the land (Vaske et al., 2000). Place experience relates to the individual’s experience in the recreation setting; unlike veteran recreationists, novice recreationists have little previous information accumulated to base their judgement of other recreationists in the area (Watson et al., 1993).

Mode of experience relates to the expectations of how the natural environment will be perceived. Jacob & Schreyer (1980) explain that “modes or ways of experiencing an environment are described as a continuum ranging from unfocused to focused” (p.375). For some recreationists, the setting is crucial to their experience; for others the setting may only be a backdrop for achieving particular social or activity goals (Watson et al., 1994). Therefore, the more focused the mode of experiencing the environment becomes, the more rigid are the definitions of what constitutes acceptable stimuli for the individual, and the more intolerant of external stimuli the individual is. For example, a group of hikers may pause to more closely examine the natural environment (i.e., stones are picked up, berries eaten, birds identified) and therefore may be more prone to conflict with unfocussed recreationists. Whereas a group of downhill mountain bikers (unfocused activity) may be less likely to experience conflict because they are less focussed on the environment; they only experience its generalities and overall spatial relationships.
Lifestyle tolerance refers to the tendency toward accepting or rejecting lifestyles different from one’s own. Carothers et al., (2001) explain that “when recreationists encounter others, a cognitive processing of information occurs. This action often results in the categorization of others according to some group membership, which helps to simplify and order environmental stimuli.” (p.32). According to Vaske et al. (2000) more research is needed to understand the relationship between lifestyle tolerance and conflict.

In addition to Jacob & Schreyer’s (1980) conflict factors, empirical studies have also found other recreationists’ attributes to be statistically related to conflict. These include: motivations or goals for recreation (Gibbons & Ruddell, 1995), types and degree of mechanization employed (Lucas, 1964; Adelman et al., 1982; Moore 1994), residency status (Confer et al., 2005), social values (Vaske et al., 1995), perceived similarity of groups or activities (Adelman et al., 1982), level of experience or commitment (Vaske et al., 1995) attachment to place, (Gibbons & Ruddell, 1995), tolerance for sharing resources, (Ivy et al., 1992), and recreation-related norms (Ruddell & Gramann, 1994).

While these attributes may affect the result of interaction between recreationists, no agreement has been reached about how to measure these attributes consistently or about how to model recreation conflict (Graefe & Thapa, 2004). Among the four Jacob & Schreyer’s (1980) factors, activity style and resource specificity factors have been the recreationist’s attributed better defined and more consistently measured in the literature.

### 3.2.4 Conflict models

Outdoor recreation conflict research has more often been applied rather than theoretical (Owens, 1985; Manning, 1999; Schneider, 2000). As a result, there have been few theoretical discussions (e.g., Jacob & Schreyer, 1980; Owens, 1985; Vaske et al., 1995; Schneider, 2000; Lee et al., 2005) and numerous descriptive ones (e.g., Adelman, et al, 1982; Ivy et al.,1992; Watson et al., 1994; Vaske et al., 1995; Vaske et al., 2007). Although conflict has been traditionally defined as goal interference, other models have arisen in literature to complement the traditional conflict model.

The interpersonal conflict model (also called cognitive model) is based on the traditional definition of conflict and therefore assumes that recreation activities are goal-directed. Conflict arises when motivations (or goals) for participation are compromised due to anticipated experiences being unfulfilled. In other words, when an individual considers he or she was prevented from having a satisfactory experience due to the intrusion of others, conflict arises. Cordell & Tarrant (2002) named Jacob & Schreyer’s (1980) model “the cognitive model” (Cordell & Tarrant, 2002 p.13).
Conflict in this model is associated with the physical presence or behaviour of an individual, group of recreationists, or their associated impacts that interferes with the goals of another individual or group; therefore when recreationists encounter others, a cognitive processing of information occurs and conflict is experienced as interfering with one’s goals. The requirement for some kind of interaction to occur between recreation participants has led to this type of conflict being called interpersonal conflict (IPC) (Vaske et al. 1995; Carothers et al., 2001). According to the traditional definition of conflict, it can occur among different recreationists within the same activity group or between activity groups (Jacob & Schreyer, 1980).

The social values conflict model (also called normative model) is based on the assumption that conflict emerges when recreationists do not share the same norms or social values, regardless of the actual physical presence or any contact between them (Vaske et al., 1995; 2000). Vaske et al. (1995; 2007) argued that while interpersonal conflict (goal interference) requires the physical presence or behaviour of an individual, group of recreationists or their associated impacts, social values conflict (social acceptability) occurs between recreationists with different beliefs and values, even if there is no physical contact between them. The key to this new model of conflict identified in Vaske et al (1995) is that the issue becomes normative. Norms are defined in the study as standards of acceptable and unacceptable behaviours for specific places (Cordell & Tarrant, 2002). Examples include acceptable number of snowmobilers on a shared trail with non-motorized recreationists or the inappropriateness of dog waste on the trail. Cordell & Tarrant (2002) specify that unacceptable behaviour may occur between both recreationists participating in the same activity as well as between recreationists in different activities.

The affective conflict model has been developed more recently, and is based on the assumption that emotions and feelings influence both perceptions of conflict and satisfaction with recreation experiences (Lee & Shafer, 2002; Lee et al., 2005). Lee & Shafer (2002) provided a new body of research within recreation conflict literature in which the subjective emotional state of the recreationist is taken into account. These authors suggest that emotions lead to immediate evaluations of interactions with other recreationists, which result in either contentment or perceived conflict. For example, if an individual experiences a positive emotion after interacting with other recreationists, the individual would be content with the interaction. Conversely if the individual experiences a negative emotion, conflict would be perceived. According to Lee & Shafer (2002), the leisure experience as an emerging state of mind resulting from interactions between recreation participants and their surroundings is dynamic and consists of several phases which
indicate that several emotions occur during the recreational experience and may even change throughout the phases.

According to Schneider (2000) recreation conflict is conceptually constrained because it remains insufficiently modelled. Following the arguments of some authors for the necessity of a more comprehensive model (Schneider, 2000; Marcouiller et al., n.d.b; Tumes, 2007), recent scholars have proposed a more integrative approach to defining conflict. The approach used in the current study has been proposed in Manning (1999) and is an integrative model that interprets the traditional definition of conflict as “goal interference attributed to others’ behaviour” (Jacob & Schreyer, 1980, p. 369) in a way that attempts to resolve much of the preceding debate (Figure 3.1).

In the expanded conflict model, Manning (1999) utilizes the concept of goal interference attributed to others’ behaviours as the framework for different types of conflicts and suggests that recreationist’s attributes determine sensitivity to conflict rather than conflict itself. Manning (1999) suggests that Jacob & Schreyer’s (1980) factors, if interpreted broadly, can be seen to encompass all
of the recreationist’s attributes found to be statistically related to the conflict cited above. For example, Manning (1999) understands recreation motivations to be part of a person’s recreation activity style, and recognizing that social values contribute to lifestyle tolerance or place attachment as another dimension of resource specificity. Conflict can occur in different arenas, including between or within recreationists groups, between visitors and managers, and between recreationists and other types of resource uses. In the expanded conflict model, conflict is understood both as direct (i.e., having an interpersonal dimension) and indirect (i.e., having a social values dimension). The affective dimension of conflict does not seem to be explicitly addressed in Manning’s (1999) expanded conflict model, although the affective dimension of conflict is implicit in the model. This may be due to the fact that most studies employ questions intended to elicit affective responses – such as the extent that a trail user enjoys or dislikes encounters, or find contacts to be a problem or desirable/undesirable (e.g., Blahna et al., 1995; Watson et al., 1994; Vaske et al., 1995; Vaske & Carothers, 2001; Vaske et al., 2007). Furthermore, goal disconfirmation (i.e. not achieving the goals expected) results in frustration and discontent – emotions which are seen as the prime cause of overt conflict (Blahna et al., 1995). Finally, according to the model, visitors can respond to conflict by engaging in coping behaviours that is fail to succeed can lead to dissatisfaction (Manning, 1999).

3.2.5 Potential sources of conflict

Recreation conflict research typically focuses on the conflict between different activities (i.e., hiking, mountain biking, dirt biking). However, certain non-activity based behaviours such as crowding, littering or discourteousness have also been reported as potential sources of conflict (Moore, 1994; Schneider & Hammitt, 1995; Gibbons & Ruddell, 1995; Graefe & Thapa, 2004). Examples of frequent sources of conflict among trail users reported by trail managers as well as recreation participants include noise, speed, smell of exhaust, surprise, lack of courtesy, trail damage (e.g., trail erosion), difference in expectations, uncontrolled dogs, horse manure, littering, rowdy behaviour, lack of respect for others, and too many people (Moore, 1994; Confer et al., 2005). Crowding, as defined by Schneider & Hammitt (1995), is a special case of conflict that occurs when the number of encounters exceeds a person’s social-psychological capacity. Sources of conflict can be classified into two groups: (1) conflict when encountering other trail users – including perceived associated impacts of the other activity upon the environment (i.e., conflict attributed to others or CAO) and (2) conflict with non-activity based behaviours – not directly attributed to a
specific activity group (i.e., conflict attributed to the behaviour of other recreationists or CAB). This second group of sources of conflict can be sub-classified as conflict arising from safety issues (e.g., when various types of recreationists use trails at different speeds) (Moore, 1994; Manning 1999; Vaske, 2000); from crowding (Moore, 1994; Schneider & Hammitt, 1995); from lack of respect for others (Moore, 1994) and also from environmental impacts of other recreationists (Moore, 1994; Manning, 1999) (Figure 3.2).

<table>
<thead>
<tr>
<th>Sources of conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflict attributed to others (CAO)</td>
</tr>
<tr>
<td>• Hikers</td>
</tr>
<tr>
<td>• Mountain bikers</td>
</tr>
<tr>
<td>• Dirt bikers</td>
</tr>
<tr>
<td>• Other trail users</td>
</tr>
<tr>
<td>Conflict attributed to behaviours (CAB)</td>
</tr>
<tr>
<td>• Safety issues</td>
</tr>
<tr>
<td>• Social respect</td>
</tr>
<tr>
<td>• Environmental respect</td>
</tr>
<tr>
<td>• Crowding</td>
</tr>
</tbody>
</table>

**Figure 3.2. The two groups of potential sources of conflict.**

### 3.2.6 Conflict measurement

A debate surrounds the empirical methods used to measure conflict. Despite the existing volume of conflict-related research, “there has never been agreement on how recreation conflict should be measured” (Watson, 1995, p. 237). Although Jacob & Schreyer (1980) proposed a basis for the definition of conflict, they did not offer a specific methodology to measure the extent of conflict. Therefore, measurement methods are diverse. The literature on recreation conflict often measures conflict within scales, such as enjoy/dislike the encounter; desirable/undesirable encounter or problem/no problem event. However, according to the most specific definition of recreation conflict which appeared in Jacob & Schreyer (1980), these scales do not precisely fit their definition (Watson et al., 1994) and instead measure sensitivity to conflict or attitude versus conflict, rather than conflict itself (Manning, 1999). Using the expanded conflict model, Manning (1999), in keeping with the definition of conflict as goal interference attributed to others, suggested that conflict is
measured more specifically and indirectly by asking respondents if and how individuals in other activities interfered with their goals or enjoyment.

Trail user’s activity style and resource specificity are the two of Jacob & Schreyer’s (1980) factors most widely studied and most consistently measured. Therefore this study utilizes activity style and resource specificity factors together with motivations, degree of mechanization and demographic characteristics to explore a new approach for understanding conflict when several potential sources of conflict are considered: conflict arising from encounters with different user groups (i.e., hikers, mountain bikers and dirt bikers); and conflict arising from crowding, safety issues, environmental issues and social respect. To maintain comparability with past research and to be consistent with Watson et al., (1994) findings, problem/no problem event and desirability of encounter are used as measures of sensitivity to conflict and to measure actual conflict a measure of how individuals in other activities interfered with their goals or enjoyment is utilized in this study.

3.3 Hypotheses

This research examines the relationship between two of Jacob & Schreyer’s (1980) factors (i.e., the individual’s activity style and resource specificity) and several potential sources of conflict. Specifically, we examine the relationship between the activity style, and the resource specificity (including both frequency of participation in an area and place attachment) of individuals with measures of the degree of actual or potential conflict reported when encountering recreationists and/or events (e.g., when encountering hikers, mountain bikers, dirt bikers); and when experiencing non-activity based behaviours arising from crowding, safety issues, environmental issues and social respect. It is expected that the more intense an individual’s activity style and resource specificity is, the greater the potential for conflict is, when in contact with other recreationists or events.

The following two hypotheses frame this research:

H1: The more activity style trail users have the more sensitive they are to conflict sources; and
H2: The more resource specificity trail users have the more sensitive they are to conflict sources.
3.4 Methods

Data for this study was obtained from surveying trail users at 9 different locations (i.e., trailheads) within the Squamish trail network. Data was collected using onsite surveys. Trailheads were randomly selected during the first 17 days of September 2009 to include one long weekend (3 days), two regular weekend (2 days/each) and ten week days.

3.4.1 Variables measured

3.4.1.1 Recreationists’ attributes as independent variables

Activity style and resource specificity are the two main independent variables under study. The majority of measures utilized to predict sensitivity to sources of conflict were multiple-item interval scales. The variables included in the activity style measures included activity expertise, centrality of the activity to participant lifestyle, frequency of participation (measured as average days per month in the spring, summers, fall and winter) and years of participation (measured in years of participation in the activity). The variables included in the resource specificity factor included measures of place experience in the area such as frequency of participation (measured as average days per month in the spring, summers, fall and winter) and years of participation (measured in years of participation in the area) and measures of place attachment extracted from the BC trail strategy feedback forms (British Columbia Ministry of Tourism Culture & the Arts [BCMTCA], 2009) as well as from Vaske et al. (2000), Watson et al. (1994). For the place attachment measures, respondents indicated their degree of agreement on a 5-point scale with the following six statements using 5-point Likert scales (agree/disagree): these trails mean a lot to me; a lot of my life is organized around these trails; these trails are the best place for what I like to do; I identify strongly with these trails; I have helped to build and/or maintain these trails; and I get more satisfaction from these trails than from any other trails.

Additionally, other trail user’s profile characteristics commonly cited in the literature as influencing conflict were used as control variables (independent variables) to test the stability of the two main independent variables (i.e., activity style and resource specificity) (Babbie, 2004). The

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8 See Appendix F for a map location of the areas.

9 See Appendix D and E for data collection protocol and questionnaire sample.
control variables are: motivations for recreation, degree of mechanization and demographic characteristics.

Fourteen motivations for outdoor recreation participation were selected from the literature (Manning, 1999) as well as from an analysis of BC Trails Strategy feedback forms completed by trail users (BCMTCA, 2009) as initial predictors of sensitivity to conflict: to think about my personal values, to take risks, to give my mind a rest, to meet other people, to use my equipment, to spend time with my family/friends, to develop my skills/abilities, to enjoy nature, to get exercise, to escape from routine, to be free to make my own choices, to experience solitude, to discover new things, and to have fun.

Degree of mechanization dependency was obtained by classifying trail users as low mechanization (i.e., hikers, joggers), medium mechanization (i.e., mountain bikers), and high mechanization (i.e., dirt bikers and all terrain vehicles’ riders). The more the recreationists are technologically dependent, the higher the degree of mechanization assigned. Finally, demographic characteristics such as age, residency status and gender were included as control variables in the analyses. The residency status categories of respondents were: (1) local residents from Squamish; (2) residents from nearby towns (Whistler and Pemberton); (3) other residents of BC; (4) residents of other places in Canada; and (5) foreign residents.

3.4.1.2 Measures of potential conflict sources as dependent variables

Two groups of potential conflict sources were measured. The first group measured sensitivity to three potential sources of conflict attributed to the encounter with others (CAO). In this group, it is the encounter with the user group that can potentially cause the conflict and not any specific behaviour. Based on the degrees of desirability of encounters with various types of recreationist groups on the trails, CAO response categories were measured with a 5-interval scale from ‘very undesirable’ to ‘very desirable’ (Watson et al., 1994). The three potential sources of conflict attributed to the encounter of others measured in this study were conflict attributed to encounters with (1) hikers, (2) mountain bikers and (3) dirt bikers. These three potential sources of conflict were selected because these three user groups are the three main recreationists found on the Squamish trail network.

The second group of potential sources of conflict referred to non-activity based behaviours (CAB): conflict is not attributed to the behaviours of any specific trail user group. In this second group it is the behaviour and not the user group that causes the conflict (i.e., littering, being rude, or
passing too close). For the purpose of the analyses, these potential non-activity based behaviours were reclassified into the following four sources: crowding, safety issues, environmental issues and social respect. Potential CAB was assessed using four subscales: six measures of conflict were utilized to create the safety conflict scale (Table 3.1); three measures of conflict were used to create the social respect conflict scale; five were used to measure the environmental respect scale; and one measure was used for crowding. Following the procedures of previous research (Vaske et al., 1995; Carothers et al., 2001; Vaske et al., 2007), respondents evaluated the extent to which each of the potential non-activity based behaviours were a problem for their enjoyment of the area using a 4-point interval scale from ‘no problem’ to ‘extreme problem’. The non-activity based behaviours used to measure each source of potential for CAB are shown in Table 3.1.

Table 3.1. Measures of potential conflict sources attributed to behaviours (CAB).

<table>
<thead>
<tr>
<th>Non-activity based behaviours utilized as potential conflict measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety issues</td>
</tr>
<tr>
<td>Not yielding the right of way</td>
</tr>
<tr>
<td>Not obeying signs</td>
</tr>
<tr>
<td>Dangerous behaviour</td>
</tr>
<tr>
<td>Riding too fast</td>
</tr>
<tr>
<td>Failure to give warning when approaching</td>
</tr>
<tr>
<td>Passing too close</td>
</tr>
<tr>
<td>Environmental issues</td>
</tr>
<tr>
<td>Excessive noise</td>
</tr>
<tr>
<td>Excessive exhaust smells</td>
</tr>
<tr>
<td>Environmental damage</td>
</tr>
<tr>
<td>Litter on trails</td>
</tr>
<tr>
<td>Trail erosion</td>
</tr>
<tr>
<td>Social respect (respect to others)</td>
</tr>
<tr>
<td>Dust from other users</td>
</tr>
<tr>
<td>Rudeness and discourteousness</td>
</tr>
<tr>
<td>Dogs off-leash</td>
</tr>
<tr>
<td>Graffiti</td>
</tr>
<tr>
<td>Crowding</td>
</tr>
<tr>
<td>Too many users on the trail</td>
</tr>
</tbody>
</table>

Additionally, a third conflict measure was used in this study to test Jacob & Schreyer’s (1980) definition of ‘goal interference’ conflict by directly asking recreationists whether the behaviour of another trail user interfered with their enjoyment during the past year (Watson et al., 1994). When respondents answered affirmatively, they were asked to identify the user group that interfered with their enjoyment as well as the interfering behaviour. A ‘yes’ response indicated that the trail user’s goals/enjoyment was interfered with by other recreationist’s behaviour.
3.4.2 Analyses

Factor scores resulting from factor analyses were used as scale measures for some independent (i.e., activity style, resource specificity) and dependent variables (i.e., conflict factor attributed to safety issues, conflict factor attributed to environmental issues and conflict factor attributed to social respect issues). Factor analyses were undertaken to ensure the validity and reliability of the independent variables indexes. To diagnose the suitability of applying factor analysis, bivariate correlations were evaluated to test for symptoms of multicollinearity between variables. Cronbach’s Alpha was calculated to test for internal consistency of the scales. Tests were undertaken to examine whether the exclusion of any of the items resulted in gains on the internal consistency of the index. The rest of the variables used in the analyses came from direct measures so did not need transformation.

3.4.2.1 Hypotheses testing

Hierarchical multiple regression, based on the importance of the variables in predicting conflict reported in past research, was used to examine the relationships between the dependent and independent variables. In total, eleven independent variables were included in three steps of each of the regression models as predictors of the potential sources of conflict under analysis (Table 3.2).

<table>
<thead>
<tr>
<th>Groups of variables</th>
<th>Predictors included in models</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors</td>
<td>Activity style factor</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Place experience factor</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Place attachment factor</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Motivations</td>
<td>Think about my personal values</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experience solitude</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Take risks</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Discover new things</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mechanization &amp; demographic characteristics</td>
<td>Degree of mechanization</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Residency status</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

X represents the predictors included in each step of the multiple regressions.
After initial analyses (above), seven different types of potential conflict sources were designed to be tested – one in each model as shown in Figure 3.3. Additionally another model to test actual conflict was designed.

Due to sample size limitations, regressions were not applied to individual recreationist groups. However, degree of mechanization was used to control for the differences between activities. Respondents visiting the trail for the first time were not included in the regressions because the subset of questions dedicated to frequency of participation in the area was not applicable to new visitors.

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**Recreationist’s attributes as predictors of conflict**

**Independent variables**
- Activity style:
  - Activity style factor
    - Expertise
    - Centrality
    - Frequency
    - Years
- Resource specificity:
  - Place experience factor
    - Frequency participation
    - Years participation
  - Place attachment factor
    - 6 attachment statements

**Control Variables (additional independent variables)**
- Motivations:
  - Think about personal values
  - Experience solitude
  - Take risks
  - Discover new things
- Mechanization:
  - Degree of mechanization
- Demographic characteristics:
  - Age
  - Residency status
  - Gender

**Actual or potential conflict as dependent measures**
- Conflict
  - Model 0: Conflict as goal interference
- Sensitivity to 3 conflict sources attributed to others (CAO)
  - Model 1: conflict with hikers
  - Model 2: conflict with mountain bikers
  - Model 3: conflict with dirt bikers
- Sensitivity to 4 conflict sources attributed to behaviours (CAB)
  - Model 4: conflict with crowding
  - Model 5: conflict with safety factor
  - Model 6: conflict with social respect factor
  - Model 7: conflict with environmental respect factor

**Figure 3.3. Proposed relationships in the models.**
3.5 Results

3.5.1 Respondent profiles

Sample size was 340 respondents which represents a response rate of 57.1%. Almost forty-one percent of respondents were hikers (40.7%), 24.0% were mountain bikers and 10.8% were dirt bikers. The rest were climbers, joggers, dog walkers and all terrain vehicles' riders in much lower proportions. The average age of respondents was 30 years old; 61.3% were male and 38.7% were female.

The recreation participants surveyed were distributed in the different management areas as per Table 3.3:

<table>
<thead>
<tr>
<th>Sample location</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stawamus Chief Provincial Park</td>
<td>86</td>
<td>25.3</td>
</tr>
<tr>
<td>Cat Lake Area</td>
<td>51</td>
<td>15.0</td>
</tr>
<tr>
<td>Diamond Head</td>
<td>40</td>
<td>11.8</td>
</tr>
<tr>
<td>Smoke Bluffs Park</td>
<td>34</td>
<td>10.0</td>
</tr>
<tr>
<td>Brackendale</td>
<td>28</td>
<td>8.2</td>
</tr>
<tr>
<td>Garibaldi Highlands</td>
<td>27</td>
<td>7.9</td>
</tr>
<tr>
<td>Alice Lake Provincial Park</td>
<td>26</td>
<td>7.6</td>
</tr>
<tr>
<td>Crumpit Woods</td>
<td>24</td>
<td>7.1</td>
</tr>
<tr>
<td>Brohm Lake Interpretive Forest</td>
<td>24</td>
<td>7.1</td>
</tr>
</tbody>
</table>

In Alice Lake Provincial Park the majority of respondents were hikers (76.9%) and dog walkers (23.1%); similarly, in the Brohm Lake Interpretive Forest 77.3% were hikers and 22.7% were dog walkers. In Stawamus Chief Provincial Park the majority of respondents were hikers (80.0%), whereas mountain bikers dominated in the Garibaldi Highlands (78.0%) and in Diamond Head (92.5%). Most respondents in the Cat Lake area were dirt bikers (70.6%). Brackendale respondents were most often mountain bikers (44.4%) and joggers (37.0%). In the Smoke Bluffs Regional Park subject surveyed were mostly hikers (45.0%) and climbers (39.4%). In the Crumpit Woods area the majority of the recreationists surveyed were hikers (39.1%) and mountain bikers (30.4%)

With respect to activity style profiles, the majority of respondents were engaged in their preferred activity on the day that they completed their questionnaire: 55.6% of the hikers surveyed
considered hiking to be their preferred activity on Squamish trails; 81.3% of mountain bikers surveyed considered mountain biking to be their preferred activity on Squamish trails; 65.7% of dirt bikers considered dirt biking to be their preferred activity on Squamish trails. In terms of self-reported recreation skill assessment, more than one third of respondents (35.2%) considered themselves to be intermediate recreationists while 54.4% considered themselves to be advanced or experts in their activities. The three groups that considered themselves to be experts in their activities were dog walkers (50.0%), joggers (38.9%) and mountain bikers (27.5%). The majority of respondents (63.8%) of respondents considered their activities to be central or very central to their lifestyles. The three groups that most often considered their activities to be very central to their lifestyles were dog walkers (62.5%), joggers (50.0%) and mountain bikers (43.8%).

The three trail user groups that most often reported that the trails where they were surveyed were their preferred sites to practice their activities were mountain bikers (67.5%), dirt bikers (66.7%) and climbers (65.4%). Among all trail users, 79.4% were not new visitors to the Squamish trail network. Among frequent visitors, 35.5% were hikers, 26.0% mountain bikers and 10.9% dirt bikers. Of the more than one third (35.5%) of respondents who belonged to a leisure club, three quarters (79.0%) were members of outdoor recreation clubs. More than half of respondents (52.6%) were local residents living in the communities of Squamish, Whistler and Pemberton, while 32.4% were residents from other places in BC (mostly from Greater Vancouver). The remainder of respondents were from other provinces of Canada (8.3%) or other countries (6.7%).

The majority of respondents (79.9%) considered themselves to be quite or very knowledgeable about things they could do to be respectful of other recreationists. Dirt bikers reported being the most knowledgeable activity group (54.3%). Almost sixty-five percent (64.7%) of respondents claimed to be quite or very knowledgeable about environmentally friendly behaviour. Dirt bikers were the recreationist group that most often considered themselves to be very knowledgeable (40.0%).

3.5.1.1 Descriptive results of the variables included in the models

Factor scores were used as measures of the scales activity style and resource specificity. Factor analysis of the activity style variables extracted one sole factor; Cronbach’s Alpha confirmed this unidimensionality and reliability of the scale ($\alpha=.657$). Similarly, resource specificity scales were identified through factor analysis. In this case, two subscales were obtained: one subscale related to an emotional attachment ($\alpha=.861$) which the literature also calls place attachment; the other
subscale related to frequency of participation and years of participation (α=.360) and was interpreted as place experience. Despite the low reliability coefficient of the place experience scale, factor scores were still used as a measure of place experience in order to maintain consistency with previous research (Watson et al., 1993).

Factor analyses were also undertaken for three types of potential sources of conflict and one sole factor was extracted in each case. The reliability of the scales for each of the potential sources of conflict are (α=.907) for safety issues, (α=.893) for environmental issues (α=.865) for social respect events. The ‘off-leash dogs’ measure of conflict was eliminated from all of the scales due to the low reliability of the scales when this conflict related behaviour was included. Finally one single item was used to measure conflict from crowding (i.e., to what extent did the subject consider too many users on the trail to be a problem for their enjoyment).

With respect to conflict with other recreationists, half of respondents were neutral about encounters with hikers, almost half of respondents considered encounters with mountain bikers as being neutral and around 43% of respondents considered encounters with dirt bikers to be very undesirable (Table 3.4).

### Table 3.4. Responses to how desirable is encountering the following at the area (mode in bold).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hikers</strong></td>
<td>323</td>
<td>3.1%</td>
<td>2.8%</td>
<td>50.5%</td>
<td>23.2%</td>
<td>20.4%</td>
<td>3.55</td>
<td>0.949</td>
</tr>
<tr>
<td><strong>Mountain bikers</strong></td>
<td>316</td>
<td>3.5%</td>
<td>10.8%</td>
<td>46.5%</td>
<td>25.3%</td>
<td>13.9%</td>
<td>3.35</td>
<td>0.967</td>
</tr>
<tr>
<td><strong>Dirt bikers</strong></td>
<td>317</td>
<td>42.6%</td>
<td>23.3%</td>
<td>21.5%</td>
<td>5.0%</td>
<td>7.6%</td>
<td>2.12</td>
<td>1.231</td>
</tr>
</tbody>
</table>

In total, 84.4% of respondents reported being sensitive to some kind of conflict attributed to non-activity based behaviours; of these, 43.1% reported slight problems, 26.8% reported moderate problems, and 14.5% reported extreme problems in relation to the sixteen non-activity based behaviours. Littering (27.7%) and environmental damage (24.1%) were reported most frequently as highly unacceptable behaviours. When stratifying by activity and selecting only the three main recreationist groups in Squamish, there was no obvious pattern to the severity of conflict throughout the sixteen non-activity based behaviours measured. In general terms, mountain bikers seem to be more sensitive to conflict, experiencing, on average, the highest levels of conflict in six out of the sixteen non-activity based measures of conflict.
The majority (82.4%) of respondents indicated that other trail users had not interfered with their recreational goals; only 1.2% responded that other recreationists interfered with their goals ‘a lot’.

Finally, Manning’s (1999) four motivations for outdoor recreation participation were included in the models. After an initial analysis that included all fourteen variables, we repeated the tests excluding redundant variables in order to select fewer motivations that were statistically significant. Those four motivations were the ones that most improved the model: experience solitude, take risks, think about my personal values and discover new things.

### 3.5.2 Multiple Regression Models

Due to the lack of variability in the measure of conflict as goal interference, this model was not tested. In general, six of the seven models examined significantly predicted conflict. Conflict arising from environmental values was the only type of conflict that was not significant. Although the regression models indicated some significant effects, the predictors in the models accounted for low variability in conflict sources (30%). The individual contribution of variables to each of the regression model can be found in Table 3.5 and Table 3.6.

**Model 1. Conflict with hikers:** None of the factors identified by Jacob & Schreyer (1980) contributed significantly to the prediction of conflict with hikers. However, motivations, degree of mechanization and demographic variables made a significant contribution in predicting conflict with hikers. Overall, the predictors accounted for 30% of the variability of conflict attributed to encounters with hikers. Discovering new things was the most important predictor within the motivational variables in the final step of the model ($\beta = -.203$). This predictor was negatively associated with conflict with hikers which indicates that people willing to discover new things are less likely to experience conflict with hikers. Degree of mechanization was positively associated with conflict and was the most influential predictor in the final step of the model ($\beta = .319$), with the greatest contribution and the highest standard coefficient when compared to the other significant predictors. This indicated an inverse asymmetry of conflict. The typical asymmetry found in previous studies (i.e., where less technological recreationists are more prone to conflict with recreationists using higher degrees of mechanization than *vice versa* (Adelman et al., 1982; Blahna et al., 1995; Vaske et al., 2007) was not present in this analysis; dirt bikers were more often sensitive to conflict with hikers.

**Model 2. Conflict with mountain bikers:** Three variables, activity style factor, the motivation ‘discover new things’ and demographic characteristics, made significant contributions to predicting
conflict with mountain bikers. Overall, the predictors accounted for 26% of the variability of conflict attributed to encounters with mountain bikers. Activity Style was the most influential predictor in the final step of the model ($\beta = - .361$) but in the opposite direction to what was predicted; that is, the higher the recreationist’s activity style, the less conflict they experience with mountain bikers. Discovering new things was the single significant predictor among all motivations in the final step of the model ($\beta = .239$) and was also negatively correlated. The demographic predictors Age ($\beta = .253$) and residency status ($\beta = .213$) were significant; with age being the second most influential predictor in the final step of the model.

Model 3. Conflict with dirt bikers: None of Jacob & Schreyer’s (1980) factors, nor any motivations, contributed significantly to the final step of the model. Only two variables degree of mechanization ($\beta = - .522$) and residency status ($\beta = - .199$) made a significant contribution to predicting conflict with dirt bikers. Overall, the predictors accounted for 28% of the variability of conflict attributed to encounters with dirt bikers and the degree of mechanization was the most influential predictor in the final step of the model.

Table 3.5. CAO models (final step). Standardized coefficients ($\beta$)

<table>
<thead>
<tr>
<th>Independent variables (recreationist attributes)</th>
<th>Model 1 Conflict with Hikers</th>
<th>Model 2 Conflict with Mountain bikers</th>
<th>Model 3 Conflict with Dirt bikers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity style</td>
<td>-.145</td>
<td>-.361 **</td>
<td>.014</td>
</tr>
<tr>
<td>Place experience</td>
<td>.113</td>
<td>.093</td>
<td>.141</td>
</tr>
<tr>
<td>Place attachment</td>
<td>-.113</td>
<td>-.015</td>
<td>.006</td>
</tr>
<tr>
<td>Think about my personal values</td>
<td>-.174</td>
<td>.010</td>
<td>.046</td>
</tr>
<tr>
<td>Experience solitude</td>
<td>.193 *</td>
<td>.061</td>
<td>-.105</td>
</tr>
<tr>
<td>Take risks</td>
<td>.040</td>
<td>-.054</td>
<td>.147</td>
</tr>
<tr>
<td>Discover new things</td>
<td>-.203 *</td>
<td>-.239 *</td>
<td>.030</td>
</tr>
<tr>
<td>Degree of mechanization</td>
<td>.319 **</td>
<td>-.134</td>
<td>-.522 ***</td>
</tr>
<tr>
<td>Residency status</td>
<td>-.084</td>
<td>.213 *</td>
<td>-.199 *</td>
</tr>
<tr>
<td>Age</td>
<td>-.227 *</td>
<td>.253 *</td>
<td>-.110</td>
</tr>
<tr>
<td>Gender</td>
<td>-.077</td>
<td>.043</td>
<td>-.156</td>
</tr>
<tr>
<td>R²</td>
<td>.300 ***</td>
<td>.262 **</td>
<td>.277 ***</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>.226</td>
<td>.183</td>
<td>.201</td>
</tr>
</tbody>
</table>

The significance of the variable is denoted as follows: *** $p < 0.001$; ** $p < 0.005$; * $p < 0.05$. The higher the value (bigger absolute value) of the standardized coefficient ($\beta$), the more important it is in predicting the model. The plus/minus sign of the standardized betas indicate the direction of the relationship. A positive relation indicates that as the independent variable increases, the dependent variable increases; a negative relation indicates that as the independent variable increases, the dependent variable decreases.
Model 4. Conflict attributed to crowding: Jacob & Schreyer’s (1980) conflict factors and the degree of mechanization made significant contributions to the prediction of conflict from crowding. Overall the predictors accounted for 22.2% of the variability of conflict attributed to crowding. None of the motivation variables made a significant contribution to the final step of the model. Place experience ($\beta = .321$) was the most important predictor in the final step of the model and degree of mechanization ($\beta = -.231$) was the other significant predictor in the final step of the model.

Model 5. Conflict attributed to safety issues: Place attachment and one motivational variable made a significant contribution to predicting conflict arising from safety issues. Overall, the predictors accounted for 19.8% of the variability of conflict attributed to the encounter of hikers. The place attachment ($\beta = .208$) factor contributed significantly to the final step of the model, although comparatively think about my personal values ($\beta = .321$) was the most influential predictor in the final step of the model.

Model 6. Conflict attributed to environmental respect: The only predictor that made a significant contribution to the model was the motivational variable, think about my personal values ($\beta = .224$). However, the model did not significantly predict conflict arising from environmental issues.

Model 7. Conflict attributed to social respect: Only place attachment ($\beta = .288$) and one motivational variable (i.e., to think about my personal values) made a significant contribution to predicting conflict arising from safety issues in the final step of the model. Overall the predictors accounted for 20.6% of the variability of conflict attributed to social respect. The place attachment factor contributed significantly to the final step of the model although comparatively, think about my personal values ($\beta = .289$) was the most influential predictor in the final step of the model.
Table 3.6. CAB models (final step). Standardized coefficients (β)

<table>
<thead>
<tr>
<th>Independent variables (recreationist attributes)</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity style</td>
<td>.112</td>
<td>-.059</td>
<td>.028</td>
<td>-.138</td>
</tr>
<tr>
<td>Place experience</td>
<td>.321 *</td>
<td>-.213</td>
<td>-.116</td>
<td>-.153</td>
</tr>
<tr>
<td>Place attachment</td>
<td>.013</td>
<td>.208 **</td>
<td>.147</td>
<td>.288 *</td>
</tr>
<tr>
<td>Think about my personal values</td>
<td>.071</td>
<td>.321 **</td>
<td>.224 *</td>
<td>.289 **</td>
</tr>
<tr>
<td>Experience solitude</td>
<td>.016</td>
<td>-.002</td>
<td>.040</td>
<td>-.016</td>
</tr>
<tr>
<td>Take risks</td>
<td>.144</td>
<td>-.128</td>
<td>-.091</td>
<td>-.129</td>
</tr>
<tr>
<td>Discover new things</td>
<td>.053</td>
<td>-.103</td>
<td>-.014</td>
<td>-.029</td>
</tr>
<tr>
<td>Degree of mechanization</td>
<td>-.231 *</td>
<td>.076</td>
<td>.013</td>
<td>.120</td>
</tr>
<tr>
<td>Residency status</td>
<td>-.005</td>
<td>-.152</td>
<td>-.178</td>
<td>-.143</td>
</tr>
<tr>
<td>Age</td>
<td>-.053</td>
<td>-.081</td>
<td>-.131</td>
<td>-.069</td>
</tr>
<tr>
<td>Gender</td>
<td>-.030</td>
<td>-.085</td>
<td>-.043</td>
<td>-.009</td>
</tr>
<tr>
<td>R^2</td>
<td>.222 **</td>
<td>.198 *</td>
<td>.127</td>
<td>.206 *</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>.141</td>
<td>.110</td>
<td>.034</td>
<td>.119</td>
</tr>
<tr>
<td>n</td>
<td>117</td>
<td>112</td>
<td>115</td>
<td>113</td>
</tr>
</tbody>
</table>

The significance of the variable is denoted as follows: *** p< 0.001; ** p< 0.005; * p< 0.05. The higher the value (bigger absolute value) of the standardized coefficient (β), the more important it is in predicting the model. The plus/minus sign of the standardized betas indicate the direction of the relationship. A positive relation indicates that as the independent variable increases, the dependent variable increases; a negative relation indicates that as the independent variable increases, the dependent variable decreases.

Overall, the degree of mechanization of the recreationist was the most important predictor of potential conflict with hikers and dirt bikers. Resource specificity factors only contributed significantly to the CAB models – except for the model that determined potential for conflict attributed to environmental issues, which was not significant. The activity style factor was only a significant predictor in the model of conflict attributed to encounters with mountain bikers. Demographic variables contributed significantly only in the models that measured potential CAO. Motivations seem to contribute significantly to some models predicting CAO and CAB. Specifically, thinking about my personal values was the only motivational predictor that contributed significantly in three out of the four CAB models.

In terms of the direction of the associations, significant resource specificity dimensions (i.e., place experience and place attachment) across models were positively associated with conflict measures in each model (i.e., the more resource specificity the higher the potential for conflict). Activity style factor of trail users was significantly negatively associated with conflict in model 2 (i.e., conflict with mountain bikers), contrary to what we hypothesized. Motivations were more often positively
associated with conflict except for discover new things, which was negatively associated. The demographic predictors age and residency status were negatively associated with conflict measures. Degree of mechanization was positively and negatively associated with conflict depending on the source conflict measured.

3.6 Discussion

This discussion concentrates on understanding which predictors are more influential to the seven conflict measures to asses for potential management solutions to the sources of conflict.

3.6.1 Conflict versus potential for conflict

The results of this study indicate that trail users in Squamish do not seem to conceive of conflict as the literature suggests they might with regard to the theoretical definition of conflict as goal interference. Unlike Watson et al. (1994), where up to one half of respondents (depending on activity type) indicated that the behaviour of other activity groups had interfered with their recreational goals, less than one in five respondents in this study reported that other trail users interfered with their enjoyment – of these 13.4% specified that other recreationists interfered only ‘a little’ – which was the lowest possible attribute in the scale. However, at the same time, more than 80% of respondents reported experiencing some degree of problem attributed to non-activity based behaviours (CAB). Watson et al. (1994) also measured conflict using the like/dislike and desirable/undesirable scales and as found here, their research showed that when tapping affective responses, recreationists reported higher levels of conflict than using the Jacob & Schreyer’s (1980) goal interference measure of conflict. These findings, and those by Watson et al. (1994), may suggest that recreation conflict measurement still needs further clarification. We argue that the inconsistencies between the results of the different conflict measures in this study – goal interference conflict measure and affective/attitudinal conflict measures – are due to a real disconnect between how researchers understand conflict and how trail users do. While the goal of researchers is to understand the nature of conflict (e.g., as goal interference attributed to others, either other recreationists or others’ behaviours) and their predictors (e.g., activity style, motivations, demographic characteristics), recreationists seem to respond to conflict affectively – (enjoy/not enjoy the individual interactions with others and the overall recreation experience). Future investigation should be more oriented towards the study of affective and/or attitudinal
responses of conflict so as to better explore the relationship of these responses to recreationists attributes.

Schneider (2000) disagrees that conflict should be measured in terms of perceived problems, and argues that there is a difference between a perceived problem and actual conflict that might bias management practices. In this study, recreationists were asked about: how much of a problem it was for the trail user to experience non-activity based behaviours, and how much other recreationists interfered with their enjoyment; the results clearly show that these are two different constructs. However, the results do not clarify whether conflict is goal interference or recreationists’ perceived problems. We agree with Schneider (2000) that these characterizations should not be ignored; we argue that this confusion is not between the concepts of problem and conflict as goal interference, but rather between perceived conflict and actual conflict. We suggest that trail users can report potential for conflict as an affective reaction (like/dislike, problem/no problem, enjoy/not enjoy) more accurately than they can report goal interference. This is not to say that conflict does not occur as a result of goal interference, but that such occurrences are not directly measureable in survey research. According to Manning (1999), sensitivity to conflict is measured indirectly by asking respondents the degree to which they like meeting other participants or behaviours: conflict is measured directly by asking respondents if and how participants in other recreation activities interfered with their goals or enjoyment. Our results indicate that is more difficult to accurately measure conflict than it is to measure perceived conflict – so there is still the need to find a way to measure conflict between individuals. To this end we suggest that qualitative research using interviews could help to explore actual conflict (Tumes, 2007).

### 3.6.2 Sensitivity to conflict and satisfaction

The results from trail users’ evaluation of the quality of their experiences contrast strongly with their evaluations of conflict. Almost all respondents indicated they had satisfying experiences when using the trails and affirmed they had accomplished their goals for that day; two-thirds reported that overall, they very much enjoyed recreating on the trails. From these results, it may be concluded that there is little relationship between sensitivity to conflict and satisfaction in the Squamish trail network. It is assumed that actual conflict (and not sensitivity to conflict) results in diminished satisfaction. But since most of the conflict research to date has been focussed on the potential for conflict and not on actual conflict, more research should be done in regards to
recreationists’ overall evaluations of their experiences and conflict. It might be that conflict affects short-term evaluations but not overall assessments of satisfaction (Vitterso et al., 2004).

### 3.6.3 Activity style and sources of conflict

The activity style of trail users contributed significantly to the prediction of conflict with mountain bikers. However, results show that the relationship was negative: the more activity style a trail user has, the less likely they are to experience conflict with mountain bikers on the Squamish trail network. The outdoor recreation conflict theory assumes that recreationists with high levels of activity style will be more sensitive to conflict, but this was not the case with mountain bikers on the Squamish trail network. Mountain bikers, dog walkers and joggers were the three groups with higher levels of expertise and centrality. Taking into account that the proportion of mountain bikers in the area was much higher than the other two trail user groups, it is possible that mountain bikers were the activity group with the highest levels of activity style and so are less sensitive to conflict with themselves. Additionally, the Squamish trail network is dominated by mountain bikers, and most local residents are aware that many trails are built and maintained by mountain bikers. Perhaps encounters with mountain bikers throughout the network are common to trail users in Squamish, and therefore fewer conflicts are experienced with mountain bikers. More experienced recreationists tended to be less sensitive to conflict, which is consistent with Mann & Absher (2007) who attributed this to the lack of conflict perception of experienced recreationists due to their awareness of where to go and which situations fit their needs. Ramthun (1995) also suggested a similar explanation and attributed the results to the effect of expectations on general satisfaction. Ramthun (1995) argued that more experienced recreationists may have a better idea of what they expect to encounter on the trails and so were not bothered by encounters with other recreationists or their behaviours. Another possible explanation for these results is displacement (Ramthun, 1995): trail users with high levels of activity style might have abandoned the area and moved to another trail network to cope with conflict and therefore did not participate in the survey. In general though, the conflict literature has indicated that recreationists tend to be more tolerant of individuals engaged in the same activity when compared to individuals with other activities (Lucas, 1964; Jackson & Wong, 1982 in Manning, 1999; Gibbons & Ruddell, 1995).
3.6.4 Resource specificity and sources of conflict

Resource specificity factors proved to be a significant predictor of conflict with non-activity based behaviours (CAB) as was hypothesized. Trail users with higher levels of place experience and place attachment tended to be more sensitive to conflict. Place experience was a significant predictor in the conflict model arising from crowding. The more often recreationists participated in using the Squamish trail network, the more sensitive they were to crowding. Changes in visitation trends that increase participation in the area might be affecting subjective crowding perceptions of recreationists who have been recreating both frequently and for a long period of time in the area. The place attachment dimension of resource specificity significantly influenced conflict models arising from both safety issues and social respect as hypothesized. Place attachment especially affected social respect conflict and was a significant predictor in all three steps of the regression model. None of the models of CAO were explained by any resource specificity factors. This may indicate that conflict with specific activity groups does not relate to how attached the recreationists are to the resource (in terms of place experience and place attachment) but is more related to social norms.

3.6.5 Motivations, degree of mechanization and demographic predictors

Motivations have an impact in the conflict models. When trail users’ motivations were introspective (e.g., solitude or think about personal values), more conflict was experienced when they interacted with others or their behaviours. Interestingly, motivations for solitude did not predict conflict with regard to crowding. Motivations that stem from external influences (e.g., discover new things), predict less conflict with hikers and mountain bikers. This suggests that people striving to discover new things experience less conflict with hikers and with mountain bikers, but not with dirt bikers. This may be due to social norms that discriminate against motorized use in the area have a stronger effect than a willingness to discover motorized recreation. However, the results show no clear trend of how motivations interact with different conflict measures.

Unlike the CAB models, demographic characteristics seem to have a large impact in predicting sensitivity to CAO as does the degree of mechanization; these characteristics seem to strongly affect the way other recreationists are perceived. Previous research has suggested that the effects of demographic characteristics on motives or conflict factors are comparatively minor (Mann & Absher, 2007); however, on the Squamish trail network, age and residency status predictors contribute considerably to predicting sensitivity to CAO. The fact that demographic variables do not predict
conflict, when not attributed to a specific type of activity group, may mean that trail conflicts with a specific type of activity group are driven by demographic characteristics of what it is acceptable. Older participants experienced less conflict with hikers; conversely, the older participants are, the more they experience conflict with mountain bikers. Older recreationists in the area tend to be hikers and this might explain the asymmetry of these results.

Residency status influenced the prediction of conflict in models 2 and 3. The direction of the prediction was different between the models. Similar to the results of Confer et al. (2005), tourists perceived less conflict with dirt bikers than local residents did. The explanation for this result could be that as tourists are temporary visitors, they may have less place attachment to the land as well as fewer opportunities of interacting with dirt bikers, whereas local residents have both place experience and more chances of interaction that can result in negative evaluations. However, tourists perceived more conflict with mountain bikers than local residents did. This result is not surprising due to the overwhelming use of the trails in Squamish by visitors from Greater Vancouver, mostly for hiking purposes. Additionally, the lack of government or municipal support for trail maintenance outside protected areas may mislead non-local recreationists in attributing the problem of trail maintenance (i.e., trail erosion) to the activity of more mechanized recreationists (such as mountain bikers).

With respect to the asymmetry of conflict, some results from the predictor degree of mechanization were unexpected. The degree of mechanization was found to be significant predictor of conflict with hikers. What was unexpected was the large negative impact that degree of mechanization had in predicting conflict with hikers, which showed that the more degree of mechanization recreationists used, the more conflict with hikers they will experience. This suggests that dirt bikers are most likely to experience conflict with hikers, likely as a defensive reaction from anticipated conflict with them. This result is contrary to the direction of the traditional concept of asymmetry in recreation conflict (e.g., Adelman et al., 1982; Watson et al., 1994; Gibbons & Ruddell, 1995).

Trail users' degree of mechanization has a significant negative effect in conflict with dirt bikers; the more degree of mechanization recreationists had, the less conflict there was with dirt bikers. This predictor had both the greatest impact and was the most important predictor in the model, which indicates that there was no in-group (within the motorized group) conflict. It has been demonstrated in previous studies that recreationists are more tolerant and experience less conflict
to individuals engaged in the same activity than to individuals in other activities (Vaske et al., 2000; Thapa & Graefe, 2004).

3.6.6 Implications of the result for conflict models

Based on Manning’s (1999) expanded conflict model, we suggest the following additions to the model as a result of the findings in this study (Figure 3.4). The interactions explored in this study refer only to what Manning (1999) calls intra-activity or inter-activity conflict; therefore, the modifications in the model refer only to those types of interactions.

Figure 3.4. Further expanded conflict model adapted from Manning (1999) including potential conflict sources and additional recreationists attributes.
According to Manning’s (1999) expanded conflict model, conflict stems from goal interference that can result from both direct and indirect interactions. However, we argue that conflict can arise from at least two groups of sources: encounters (direct or indirect) with other recreationists (CAO) or from encounters (direct or indirect) with non-activity based behaviours (CAB). Therefore, we suggest adding different potential sources of conflict to the model for further study. Whether these encounters are desirable or undesirable (i.e., result in conflict) depend on recreationists’ sensitivity determined by their motivations, activity style, resource specificity, mode of experience, tolerance, age, residency status, or degree of mechanization. As Manning (1999) suggested, recreationists’ motivations will shape their activity style while place attachment and place experience will shape their resource specificity. As a result of the interactions with others, the individual may evaluate the relationship between their expectations and level of satisfaction with the experience, and decide to cope with conflict through displacement, product shift or rationalization (Schneider & Hammitt, 1995). For example, an individual may use a product shift strategy by modifying their recreation experience, which may alter some of the recreationist’s attributes that shape their experiences. In other words, if the recreationist decides to stay in the area (not to displace) they may re-set the recreation experience and therefore reassess their expectations. We argue that this adaptation to the recreation experience will alter the individual’s sensitivity towards conflict by encouraging complementary relationships, rather than competition or antagonistic relationships between recreationists. Despite the fact that the data set could not confirm the positive relationship between conflict sensitivity and dissatisfaction, we have decided to maintain the diminished satisfaction outcome in the model until further investigation is undertaken in that particular aspect of conflict modelling research.

Other conflict models that examine at the conflict construct from this compatibility perspective are being developed. Marcouiller et al. (n.d.a) conceptualize conflict as a relative compatibility of interaction among recreationists within the spectrum of a social interaction scale. The authors also suggest that the relative compatibility of different recreationists is also influenced by characteristics such as asymmetry of interaction, relevant geographic scale and actual site characteristics (such as accessibility to the site, site design and nature infrastructure). Akin to Manning’s (1999) expanded conflict model, Marcouiller et al. (n.d.b) argue that the recreationist’s attributes and contextual characteristics mentioned above may be mitigating or compounding, that is the interaction modifies the relative compatibility of recreation uses. Mitigating factors will be more likely to increase the complementarity of different recreationists while compounding factors will tend to increase the
competition amongst recreationists (Marcouiller et al., n.d.b). More research is needed in these areas to find a better connection between these conflict model views.

Future research should invest more effort in investigating what the best predictors are for each of the potential conflict sources defined in this study, as well as to how both compatibility and goal interference conflict models relate to each other. As approach combining qualitative and quantitative methods for data collection may be more effective in developing more understanding of new expanded conflict models.

3.7 Conclusions

The results of this study demonstrate that very different characteristics significantly predict conflict across models. Comparing the results across models increases our awareness of the importance of measuring conflict in a way that is both consistent and transparent. By investigating several predictors and sources of potential conflict, we have demonstrated that recreation conflict is not homogenous in general (relative to that explained by the same predictors). Degree of mechanization and demographic characteristics better explain conflict with others, whereas resource specificity predictors seem to better explain conflict with non-activity based behaviour. Motivations also play an important role in predicting sensitivity to conflict, however the directions of these relationships are mixed. Data reported in this study supports the predicted relationships of resource specificity but not in relation to activity style. The explanatory power of the models was low, likely because of the heterogeneity of the groups included in the analyses. Generally recreationist’s attributes predicting conflict may vary greatly across groups (Mann & Absher, 2007; Thapa & Graefe, 2004; Gibbons & Ruddell, 1995). Due to sample size limitations, all recreationists were included in the multiple regression models to investigate differences in the predictors for each conflict model. It is possible that due to the differences between activity groups these regression models have less explanatory power. Developing regression models for each of the sources of conflict identified in this study but also for each type of activity group will probably lead to higher explanatory power.

The hierarchical multiple regression models were useful in understanding the effect that including new predictors had in the final step of the model. For example, despite the importance of Jacob & Schreyer (1980) predictors for conflict found in the literature, results from this study
indicate that activity style and resource specificity factors are as important as motivations or other demographic variables are at predicting conflict.

Recreationist’s attributes that determined sensitivity to conflict, such as activity style or resource specificity, varied considerably across models depending on the source of the conflict under study. The relative contribution of these preconditions to predict conflict will vary, depending on what we understand for conflict. Unless we clearly define what is meant by conflict, potential for conflict or sources of conflict, these preconditions may not be helpful. In defining the potential sources of conflict in an area, it will be useful to model which predictors have a significant effect in which sources of conflict. It has been demonstrated in this study that activity style does not significantly contribute towards explaining sensitivity to conflict in any of the sources of conflict related to non-activity based behaviours. Only in one model (conflict with mountain bikers) was the activity style factor a significant predictor in the final regression model.

Conflict models such as Manning’s (1999) expanded conflict model should include different measurements of potential sources of conflict and clearly define how they are measured, so as to better understand where conflict comes from and how it can be managed. Researchers have already gone to great lengths to include as many influential predictors as possible so as to account for as much variability as possible within the new expanded models. In this study, fewer predictors were selected, but several ways to understand conflict have been modelled so as to explore the function of some of the main predictors on several sources of conflict. It is clear from the results that not all recreationists’ attributes predict all sources of conflict but all of them partially predict one or another source of conflict – except in the case of conflict arising from environmental damage. Differences in the role that predictors play in each of the models raise awareness of the importance of including several measures of conflict within the models to better understand the underlying causes of conflict. We recommend expanding further the conflict models in such a way that several potential sources of conflict are taken into account. Management practices will be better oriented when sources of conflicts are better identified and measured.

We consider that many of the results in this study are site specific to the Squamish trail network. Several social characteristics that are unique to the Squamish trail network and its overall ‘setting’ (i.e., social, political, physical, recreationist profile, community demographics etc.) are probably influencing how trail users in the area perceive conflict. In a sense, a conflict should be modelled by site, since a trail network like Squamish acts like a closed system and would be very different when compared to nearby trails in Whistler or the Fraser Valley. In order for land managers to develop
strategies to address conflict, they would be well advised to have a model that describes the specific recreationist’s attributes that affect conflict in the area, rather than having to consider all potential recreationists’ attributes. For example, conflict on the Squamish trail network is often reported most consistently amongst volunteers and trail stewards and there is a fear among local residents of tourists (with less place attachment) recreating on the trails. In the literature, a link has been found between tourist and resident perceptions of conflict that suggests local resident perceive a decreased quality of outdoor recreation experiences with an increase in tourism (Confer et al., 2005). Perhaps a more efficient way to manage conflict in the Squamish trail network area would be to focus on those volunteers and trail stewards with higher place attachment and study the sources of their perceived conflict.
3.8 References


CHAPTER 4. CONCLUSIONS

Recreation conflict remains a challenge for managers globally, despite the results from extensive research done in the past four decades (e.g., Clark et al., 1971; Vaske et al., 2010). Conflict has been discussed in recreation literature theoretically and empirically and although important findings have been made, there is still a need to develop a better understanding of conflict in order to manage it successfully. Understanding recreationists, sources of conflict, and the effect that management practices have in reducing such conflicts, is essential to advance this field of research so as to serve managers tasked with managing conflict in the outdoors.

The goal of this thesis was to increase our understanding of the preconditions that lead to conflict between outdoor recreationists, as well as to test the efficacy of conflict management approaches often cited in the literature. In order to achieve these goals, I focused on three sub-objectives: first, to investigate the effects that activity style and resource specificity have on recreationists’ sensitivity to potential conflict sources when considering other contextual factors such as motivations for recreation participation, degree of mechanizations and demographics on the Squamish trail network in BC.; second, to evaluate the efficacy of educational signs at reducing social values conflict; and third, to evaluate the efficacy that separating motorized recreationists from non-motorized recreationists has in reducing interpersonal conflict.

In order to achieve these objectives, I conducted a survey-based, cross-sectional case study on nine trail areas in Squamish, British Columbia: Alice Lake Provincial Park, Stawamus Chief Provincial Park, Smoke Bluffs Regional Park, Brohm Lake Recreation site, Cat Lake area outside the Recreation Site, Backendale area, Crumpit woods areas, Garibaldi Highlands and the Diamond Head area. This research approach allowed an examination in depth of the potential sources of conflict, as they relate to either management or recreationists’ profiles and utilized conflict measures traditionally employed in previous research.

This concluding chapter of the thesis (1) summarises the status of the working hypotheses and its implications, (2) makes recommendations for the improvement of recreation research and management, (3) reflects on the strengths and weaknesses of the thesis research design, and (4) suggests avenues for further research.
4.1 The status of working hypotheses and implications

4.1.1 Management to reduce interpersonal and social values conflict

In the examination of the efficacy of management approaches to reduce interpersonal and social values conflict among recreationists on the Squamish trail network, BC (Chapter 2), I empirically tested what has often been concluded from studies focussed on recreationists’ profiles and potential for conflict (e.g., Vaske et al., 1995; Manning, 1999; Schneider, 2000; Vaske et al., 2000; Carothers et al., 2001; Graefe & Thapa, 2004; Vaske et al., 2007): that zoning and educational programs may be successful in diminishing interpersonal and social values conflict respectively. Two hypotheses were examined in order to test this statement.

The first hypothesis examined differences in the frequency and severity of several sources of social values conflict between recreation participants at trailheads with educational signs – one type of educational program – versus trailheads without educational signs. If respondents at trailheads with educational signs reported social values conflict less frequently and at lower levels than those at trailheads without educational signs, then we can infer that the educational signs were a likely cause of the reduced social values conflict. By considering the presence or absence of educational signs at trailheads, I was able to identify changes in the average levels and frequencies of social values conflicts that arise from several sources for the two respondent groups (i.e., at trailheads with and without educational signs). Results suggest that respondents experienced fewer social values conflicts at trailheads with educational signs than at trailheads without them. However, results did not support the hypotheses for all sources of social values conflict analysed; and in the sources where significant differences on the frequency and severity of social values conflict sources were found, those differences were often not very large (i.e., low effect sizes).

The second hypotheses sought to find differences in the frequency and severity of several types of interpersonal conflict between recreationists in areas zoned for non-motorized participants only compared to un-zoned areas where motorized and non-motorized participants shared trails. I expected recreationists to report interpersonal conflict less frequently and at lower levels of severity in zoned areas (non-motorized use only) than in un-zoned areas. After studying the presence of zoning management practices, I identified changes in the average levels and frequencies of several sources of interpersonal conflict between the two groups (i.e., at trailheads within zoned and un-zoned areas). The data also supported this hypothesis, although differences between the areas compared were often small (i.e., low effect sizes). Respondents in zoned areas experienced
interpersonal conflicts less frequently and at lower levels than in un-zoned areas. However, as with the first hypothesis, results did not support the second hypothesis for all sources of interpersonal conflict analysed.

In both hypotheses, sources of conflict (for both social values and interpersonal conflict) such as other recreationists not obeying signs, behaving in a dangerous way, having dogs off-leash, or passing to close were not significantly different at trailheads with educational signs compared to trailheads without them, nor in zoned areas compared to un-zoned areas.

4.1.1.1 Conflict versus potential for conflict

Trail users in Squamish did not perceive conflict as the literature suggests they might with regard to the theoretical definition of conflict as goal interference. In the examination of the efficacy of management approaches to reduce interpersonal and social values conflict among recreationists on the Squamish trail network, BC (Chapter 2), results demonstrated that fewer than one in five respondents reported that other trail users interfered with their enjoyment. Of these respondents, slightly more than one in ten specified that other recreationists interfered only ‘a little’. Yet over eighty percent of respondents reported that they experienced some problems attributed to non-activity based behaviours. These inconsistencies may be due to a disconnect between how researchers in the literature understand conflict and how trail users do. If the goal of researchers is to understand the nature of conflict (e.g., as goal interference attributed to others, either other recreationists or other recreationist behaviours) in such a way that management (e.g., behaviour management) can reduce it, we as researchers may need to first understand the affective responses of recreationists. This is not to say that conflict does not occur as a result of goal interference, but that it is not directly measureable in survey-based research. Results indicate that it is harder to measure actual conflict compared to conflict sensitivity. This indicates there is still a need to find a way to measure conflict between individuals. It is likely that qualitative research (i.e., semi-structured interviews) might help further exploration of both conflict as well as sensitivity to conflict concepts.

4.1.2 Modelling sources of conflict

In examining conflict models (Chapter 3), I investigated the relationship between two of Jacob & Schreyer’s (1980) factors and several sources of conflict while also considering other contextual factors. In particular, I analyzed the relationship between the activity style and the resource
specificity of individuals with measures of the degree of actual or potential conflict reported and also considered other contextual factors such as motivations for recreation, degree of mechanization and demographic characteristics. In order to do this, I measured two groups of potential sources of conflict: conflict when encountering recreationists and/or events (e.g., when encountering hikers, mountain bikers, dirt bikers); and conflict when experiencing non-activity based behaviours arising from crowding, safety issues, environmental issues and social respect. I expected that the more intense an individual’s activity style and resource specificity was, the greater would be the potential for conflict in relation to the sources identified.

The results supported the predicted relationships with respect to resource specificity, but not in relation to activity style in some of the models. I found that very different predictors significantly predict conflict across models. As hypothesized, resource specificity factors (i.e., place experience and place attachment) were significant predictors of conflict with non-activity based behaviours. Recreationists with higher levels of place experience and place attachment tended to be more sensitive to non-activity based conflict behaviours. Conversely, activity style contributed significantly to the prediction of conflict with mountain bikers but in the opposite direction to that predicted; that is, the more activity style a trail user had, the less likely they were to experience conflict with mountain bikers. In regard to the contextual factors, degree of mechanization and demographic predictors were better at explaining conflict with others. Motivations also played an important role in predicting sensitivity to conflict, though the directions of the predictions were mixed.

By examining several potential predictors and sources of conflict, I have demonstrated that recreation conflict in general is complex – relative to that explained by very different predictors depending on the source of conflict analysed. Results from this study also indicate that activity style and resource specificity factors were no more important than motivations or other demographic variables were at predicting several source of conflict. The relative importance of recreationist attributes varies, depending on what sources of conflict were under study. Due most likely, to the heterogeneity of the groups included in the analyses, the explanatory power of the models was low – generally because recreationist attributes predicting conflict vary greatly across groups (Mann & Absher, 2007; Thapa & Graefe, 2004; Gibbons & Ruddell, 1995).

Measuring conflict in the ways previous research had done and then comparing the results across models, increased awareness of the importance of having transparent and consistent measures of conflict. Unless we, as researchers, clearly define what is meant by conflict and potential for conflict, and make clear what sources of conflict are being analyzed, recreationist’s
attributes (i.e., Jacob & Schreyer’s (1980) factors, motivations for recreation participation or demographic characteristics) will not be useful for conflict literature. Ultimately, it will be a great advance in conflict management if researchers model which predictors have a significant effect on which sources of conflict across different contexts.

To summarize, this research was useful in helping to understand whether management practices decrease frequency and severity of recreationists’ conflicts compared to un-managed trails as well as helping to identify recreationists attributes that influence sensitivity to several conflict sources. Results from this thesis may provide managers and researchers with new knowledge for advancing the goal of providing satisfactory experiences to both recreationists in Squamish and in general. When people have satisfactory outdoor recreation experiences, individuals, society, the environment and the economy reap benefits in the form of increased individual health (Parsons, 1991; Bell et al., 2007), social capital (Hemmingway, 1999), environmental awareness and community development (Bell et al., 2007).

4.2 Recommendations

4.2.1 Further extending conflict models

Conflict models, such as Manning’s (1999) expanded conflict model, should include different measurements of potential sources of conflict and clearly define how they are measured, so as to better understand where conflict comes from and how it can be managed. Researchers have already gone to great lengths to include as many influential predictors as possible in order to account for as much variability as possible within the new expanded models. However, inconsistencies in both the meaning and measurement of outdoor recreation conflict have impeded the advancement of conflict modelling and thus the examination of effective management strategies to alleviate conflict (Schneider, 2000).

In the examination of the relationships of resource specificity and activity style to sources of conflict on the Squamish trail network in BC, few predictors were included in the models, but several ways of measuring conflict were modelled so as to explore the function of some of the main predictors on several sources of conflict. It is clear from the results that not all recreationist attributes predict all sources of conflict but all of them partially predict one or another source of conflict – except in the case of conflict arising from environmental damage. Differences in the role that predictors played in each of the models (Chapter 3) raises awareness of the importance of
including several discrete measures of conflict within the models to better understand the underlying causes of conflict. I recommend expanding the conflict models further in such a way that several potential sources of conflict are taken into account and specific recreationist attributes are identified to predict each source of conflict. Management practices will be better oriented when sources of conflict and recreationist attributes that determine sensitivity of conflict are better identified and measured.

As a result of the findings in this thesis – considering results from both the conflict management study and the conflict modelling study –, I suggest the inclusion of management practices as well as the integration of predictors for specific sources of conflict. Although, this is the first study of its kind, and no general conclusions can be extracted from the results, I present in the following figure a comprehensive conflict model based on Manning’s (1999) expanded conflict model. It includes up-front management strategies and several sources of conflict (Figure 4.1).

Figure 4.1. Modifications suggested in Manning’s (1999) expanded conflict model. The new model includes up-front management, potential conflict sources, and additional recreationist attributes.
The modifications in the model refer only to intra-activity or inter-activity conflict (Manning 1999) and not managers or other resources, as the interactions explored in this study refer only to those types of interactions.

According to Manning’s (1999) expanded conflict model, conflict stems from goal interference as a result of both direct and indirect interactions. This study though, argues that conflict can arise from at least two groups of sources: an encounter with other recreationists (CAO: Conflict attributed to other recreationists) or an encounter (direct or indirect) with non-activity based behaviours (CAB: Conflict attributed to non-activity based behaviours). Consistent with Manning (1999), whether these encounters are desirable or undesirable (i.e., result in conflict) depends on recreationists’ sensitivity as determined by their motivations, activity style, resource specificity, mode of experience, tolerance, age, residency status and degree of mechanization. According to Manning’s (1999) model, recreationists may decide to cope with conflict. I suggest that when this occurs, the recreationist may recreate their individual sensitivity towards conflict and that this results in more complementary relationships rather than competition or antagonistic relationships between recreationists.

Other conflict models have been developed that examine the conflict construct from this compatibility perspective. This study did not investigate in depth these other models, though this is not to say that they do not contain important pieces of information worth including in future models. Marcouiller’s et al. (n.d.a) approach to model conflict may be very helpful in understanding the different degrees of compatibility among recreationists. More research is needed in these areas to find a better connection between the approaches of these conflict models.

With respect to including management in the models, Marcouiller et al. (n.d.b) clearly indicated that the lack of integration of management strategies in Manning’s (1999) model limits its applicability to resource planning. In Figure 1.1 I have drafted the preliminary inclusion of up-front management in Manning’s (1999) expanded conflict model. It is assumed that if the sources and types of conflict are identified in an area, management is effective at reducing such conflict. Thus, in the proposed model, I suggest that educational programs such as signs or brochures will alleviate social values conflicts, and zoning will do the same for interpersonal conflicts. Note that zoning management practices are included within the educational programs box in Figure 4.1. The reason for drafting the management strategies in this manner is a result of findings from this research. As discussed in Chapter 2, zoning management practices may be effective at reducing interpersonal conflicts that arises from the encounters (direct or indirect) of recreationists that zoning separates.
(in this study this indicates the separation of mountain bikers from motorized recreationists).
Therefore, zoning does not work to alleviate interpersonal conflict when such conflict arises from non-activity based behaviours. This means that other management strategies are needed in such cases in order to alleviate interpersonal conflict. I suggest that educational programs may be a useful tool to reduce conflict in already areas zoned.

Additionally, it is possible that the more people are informed about adopting safe behaviours and respecting the environment as well as other trail users, the less conflicted the community will be, despite differences in activity profiles. As a result, less zoning may be needed. Understanding in which particular cases zoning and education work will ease the job of recreation managers when they implement their own conflict management strategies.

Despite the focus of this thesis on non-activity based behaviours rather than on the analysis of confronting activities (i.e., hikers to mountain bikers, mountain bikers to dirt bikers), further innovative research in this field could consider the analyses of conflict sensitivity using cluster analyses of recreationist motivations. This current research had limited possibilities of analyzing the results by activity groups, although this limitation raised awareness of the importance of other variables. For example, using groups of trail users classified by their motivations for recreation participation instead of using an activity group’s framework to analyze conflict sensitivity has the potential to uncover new knowledge in this field of study (e.g., comparing confronting recreationist motivations). Preliminary research questions include: do recreationists with similar motivations experience similar types of conflict despite the activity practiced? Do recreationists with introspective motivations (e.g., solitude, inner peace) experience more social values conflicts or interpersonal conflicts when interacting with other recreationists who have motivations that require external input (e.g., discover new things, meet other people)?

4.2.2 Management recommendations

4.2.2.1 Potential implications for the Squamish trail network

Results indicate that recreation participants tend to self-zone. Self-zoning as a coping strategy to avoid conflict seems to be an option for trail users as long as there is space available. Trail user conflicts are still reported in areas of the Squamish trail network where different types of non-motorized participants interact with each other, which may indicate that if there were areas where each group could go to recreate with like participants, they would. I suggest that the self-zoning
phenomenon occurs in such a way that trail users displace into areas where less incompatible
groups share the trails. It is possible that the more people are informed about adopting safe
behaviours, as well as the need to maintain respect for the environment and other trail users, the
more homogeneous the community will be, despite the differences in activities. As a result, less
zoning may be needed and it might only have to be used in the case of antagonistic activities.
Unfortunately, there is a space limitation which is expected to get worse as development of public
and private land around Squamish accelerates. This is a common occurrence in communities
throughout BC regarding trail use and indicates that recreationists need to adapt to some kind of
heterogeneity. Studying the different degrees of incompatibility of recreationists in a specific area
may help managers define which groups need to be separated by zoning.

Additionally the fact that, in the case of Squamish, demographic variables do not predict conflict
when not attributed to a specific type of activity group – but nevertheless still have a large impact in
predicting conflict attributed to other recreation groups – may mean that trail conflict attributed to
an activity group are driven by stereotypes or prejudgements.

Managers in Squamish may then apply educational programs both in zoned and un-zoned areas
by targeting the content of signs at encouraging tolerance and compatibility of other recreationists
sharing the trail (e.g. encouraging the avoidance of careless behaviour such as riding too fast or
passing too close). Although not tested in this study, the literature suggests that combining different
educational approaches may produce better results (Moore, 1994).

Managers should consider that educational programs may be more likely to solve social values
conflicts arising from uninformed behaviours or careless behaviours and less likely to solve conflict
arising from unsanctioned behaviour. The reduction or prevention of unsanctioned behaviour may
need enforcement in order to be managed.

4.2.2.2 Recommendations on the Trails Strategy for BC

The conclusions of this research should be included as guidelines in the implementation of the
regional plans under the framework of the Trails Strategy for BC. For example, managers should be
aware that zoning to separate motorized and non-motorized participants may be an effective
management practice to reduce interpersonal conflict, when such conflict arises from the behaviour
of certain participants whom you are aiming to separate other participants from. However, it is
important to consider that interpersonal conflict may still occur within zoned areas, which suggests
means that there are other issues that still need to be resolved related to encounters of less compatible recreation groups. Guidelines for the implementation of the local plans should mention that the traditional framework based on zoning areas to manage recreation conflict may not always be effective and educational programs may also be needed in addition to zoning in order to reduce conflict among less compatible recreationists.

Implementation guidelines should also include recommendations about the specific content of educational signs or other educational initiatives. Such programs should contain messages that effectively address conflict stemming from differences in norms and social values. Recommendations are to carefully select messages that address existing problems and this will imply preliminary work or studies (i.e., surveys) to determine the principal concerns in each region.

Several recreationist attributes help explain different sources of conflict but some of them are likely to be site-specific. Therefore I suggest that managers develop their own conflict models according to the elements of their trail networks. For example, conflict on the Squamish trail network is often reported most consistently amongst volunteers and trail stewards (J. Hawkings, personal communication, April 1, 2010) so perhaps a more efficient way to manage conflict on the Squamish trail network area would be to focus on those volunteers and trail stewards with higher place attachment and study the sources of their perceived conflict.

4.2.3 Policy recommendations

There is not an explicit outdoor recreation policy in BC, and the lack of guidelines to help the decision making process is detrimental to increasing public participation in recreation activities in the Province. The BC Trail Strategy is the first attempt to comprehensively manage trails in the province to date. Trail management practices have been applied in BC without a common strategy. The BC Trail Strategy will provide some guidance in order to reduce conflict but it is not yet a policy. Much more political will is needed in order to provide enough personnel and financial support to address recreation user conflict in BC.

This thesis has contributed to knowledge about the frequency and severity of different types of conflict occurring on the Squamish trail network and has identified ways to manage this conflict. It has also examined recreationist profiles and their sensitivity to different sources of conflict in the self-proclaimed outdoor recreation capital of Canada. Overall, this study raises awareness of the need to plan conflict management on a broader scale to ensure it is effective. As mentioned previously, it seems that many of the findings in this thesis were site-dependent. Although it is
difficult to generalize results, it can be noted that without a broader policy that provides support and resources for communities to develop inventories and diagnose local trail network problems, any conflict management is likely to be unsuccessful. Inventories of supply and surveys of demand are as necessary as studying possible social, economic and ecological conflicts. Bell et al., (2007) emphasize the need for studies that gather information about the intensity of recreational use so as to ensure visitor satisfaction and minimal visitor impact. Taking into account that BC has historically undertaken recreation resource inventories, I recommend that BC should resume inventories such as the Recreation Features Inventory (Vukelich, 1995), the Visual Landscape Inventory (British Columbia Ministry of Forests [BCMOF], 1997), and the Recreation Opportunity Spectrum Inventory (BCMOF, 1998) in order to update the data and complement it with new information.

According to the Outdoor Recreation Council of BC, a rapidly increasing population, along with growing pressures on BC land and an ever diversifying range of outdoor recreation activities, all call for a united policy to set the framework for addressing the social initiatives, ecological impacts and economic opportunities for community development (Outdoor Recreation Council, n.d.). Bell et al., (2007) have predicted that, in the coming years, motorized use in recreation settings is likely to increase and negatively impact recreationists whose motivations are to experience peace, quiet and solitude. Therefore, the author recommends conducting longitudinal surveys every five to ten years as a tool to help policy makers adapt policies to new emerging trends, as well as to help planners develop strategies at their own level (Bell et al., 2007). I would recommend undertaking longitudinal studies of the Squamish trail network as well as other trail networks in BC where conflict has been reported in order to understand changes in recreation needs and conflict perception of recreationists over time, so as to better inform management in the future.

4.3 Strengths and weaknesses of the research

This thesis is the first study to empirically test the efficacy of management practices at alleviating social values and interpersonal conflict. Furthermore this research has analyzed conflict from a new perspective by taking into account different potential sources of conflict when studying the effect that recreationist attributes have in sensitivity to those conflict sources.

Researchers do not always agree about the underlying causes of conflict. Additionally, they have not yet agreed on a way to measure conflict types or recreationist attributes that determine conflict sensitivity. Some authors critique conflict measuring techniques as being poorly developed.
attempted to measure conflict similar to the way it has previously been measured; however, there is not one correct way to measure conflict. One of the problems has been to find exactly what measures of conflict were utilized, since some articles do not overtly indicate the survey questions asked. Therefore, the validity of the measures of conflict used may be questioned by other authors. Furthermore, the comparability of current results may be limited due to a lack of knowledge of the specific conflict measures of previous research.

4.3.1 Squamish trail network
This study was restricted to the Squamish trail network in British Columbia. Data was collected from an onsite survey between September 3rd and September 19th 2009; as a result only summer activities were examined. More specifically this sample refers to nine recreation areas of the Squamish trail network that represent the majority of the recreation areas in the Squamish front-country. Thus this research did not exhaustively sample the entire Squamish trail network. The research method used in this thesis has successfully provided new knowledge about the types of conflict, sources of conflict and recreationist profiles of recreationists using the Squamish trail network. While it may be argued that this area represents a key place to study conflict in BC, there are also other such areas in the province. I consider that many of the results in this study are specific to the Squamish trail network context. The results therefore cannot be generalized for the rest of BC. Several contextual factors (i.e., social, political, physical, recreationist profile and community demographics) unique to the Squamish trail network are likely to influence trail user behaviour and conflict perceptions. I consider that conflict models should be site-customized, since a trail network like Squamish acts like a closed system and could be very different when compared to trails in Whistler or the Fraser Valley (i.e., areas not far away from the study site). Even though no other studies have addressed the efficacy of management practices at reducing social values conflict and interpersonal conflict, the results presented here represent only the sampled trail network and are of limited generalizability.

4.3.2 The unequal distributions of the sample
Results indicated that different types of recreation participants were unequally distributed among management areas. This fact constrained the analyses because activity groups could not be compared between management areas. For example, in un-zoned areas, there were surprisingly very few non-motorized recreationists: in the Cat Lake area only 11.7% of respondents were non-
motorized. As a consequence, I was not able to separately analyze different groups of recreationists (i.e., hikers or mountain bikers) to determine the effect that management practices have in reducing conflict, nor analyze the effect that recreationist profiles (i.e., activity style, resource specificity, demographics and motivations) have on sensitivity to several sources of conflict.

4.3.3 Sample Size

Due to sample size limitations, all recreationists were included in the multiple regression models instead of using the models per each user group in Chapter 3. However, degree of mechanization was used to control for the differences between activities. In the examination of managing interpersonal and social values conflict among recreationists on the Squamish trail network in BC (Chapter 2) I was able to analyze only non-motorized users and in one of the hypotheses I analyzed mountain bikers only. It is possible that due to the differences between activity groups, the results in this thesis have less explanatory power. Developing regression models for each of the sources of conflict identified in this study as well as for each type of activity group will probably lead to higher explanatory power.

4.3.4 The non-normal distribution of the sample

The hierarchical multiple regression models were useful in understanding the effect that including new predictors had in the final model. However, parametric tests were undertaken despite the non-normality of the distribution of the sample data. In the case of testing the efficacy of management practices in reducing types of conflict (Chapter 2), the distribution of the sampled data was highly non-normal and non-parametric tests were undertaken. Conversely, parametric analyses were undertaken to predict sources of conflict using two of the Jacob & Schreyer’s (1980) factors (i.e., recreationist attributes) in order to maintain comparability with previous studies. Additionally, results from factor analyses provided scales closer to normal, and parametric tests were done because multiple regressions have proven to be robust to un-normality.

According to the method used to operate the dependent variables in the study (Chapter 2) it is possible that respondents who experience interpersonal conflict could potentially experience social values conflicts as well (Vaske et al., 2007). It was not possible to differentiate which respondents, among the ones who experienced interpersonal conflict, also experienced social values conflicts because of the low response rate to the survey question intended to clarify the conflict-type (i.e., if interpersonal conflict or interpersonal conflict and social values conflict). Therefore it is likely that
non-motorized respondents at zoned and un-zoned areas who experienced interpersonal conflict also experienced social values conflict. If recreationists did experience interpersonal conflict and social values conflict at the same time, it could explain why zoning management practices were less able to reduce conflict in zoned areas compared to the efficacy of educational signs in reducing social values conflict.

4.3.5 Management context

None of the trailheads surveyed in this study exclusively used educational programs without being in zoned areas. This fact was not taken into account when testing hypotheses in Chapter 2. When the differences in the level and frequency of social values conflict between the two experimental conditions (educational signs vs. no educational signs) were tested (Chapter 2), the analyses were not controlled for changes in the variable zoning. Similarly, when differences in the level and frequency of interpersonal conflict between the two experimental conditions (zoned vs. un-zoned) were tested, the analyses were not controlled for changes in the variable educational sign. It is probable that the combination of both zoning and educational signs would have an even bigger effect on the reduction of both social values conflict and interpersonal conflict however because this study was a first investigation, hypotheses were therefore necessarily tested separately: educational programs to reduce social values conflict and spatial zoning to reduce interpersonal conflict. The combination of management practices and conflict were not covered since sample size was not large enough to compare each of the combinations individually.

4.4 Future research

Schneider (2000) affirms that historically a quantitative bias in methodological approach has impeded the advance of recreation conflict research and subsequent management. Further research on this topic could be undertaken by investigating ways of measuring conflict, regardless of whether it is social values based or interpersonal. This research replicated the methodology used by Vaske et al. (1995) and Carothers et al. (2001) to address the distinction between interpersonal and social values conflict. Using this approach, the no-conflict and social values conflict categories were conceptually clear (i.e., if an event is not observed and not considered to be a problem, no conflict is apparent). However, when this method is used to operationalize interpersonal conflict, there is a caveat: subjects who had observed an event and perceived this event to be a problem may be
expressing social values conflict, interpersonal conflict, or a combination of both. Using the Vaske et al. (2007) methodology, I was unable to resolve this caveat due to the low response rate of the question intended to resolve it. Nevertheless, I would argue that future research should investigate alternative methods of distinguishing social values conflict from interpersonal conflict when combining recreationists’ answers from two sets of questions regarding trail events (i.e., the frequency-of-occurrence variables (observed vs. not observed) with the corresponding perceived-problem variables (acceptable vs. unacceptable). However during the development of the thesis and from informal conversations with recreationists, I gathered that personal values and social norms are a complex construct that may be better measured qualitatively than through a survey question. I agree with Tumes (2007) who asks for qualitative approaches in order to better understand the underlying causes of conflict: further development in understanding recreation conflict is needed and he argues that looking at this issue through a qualitative analysis of user viewpoints might bring new insight to the discipline. Combining different research methods such as qualitative and quantitative data collections may be more effective in developing more understanding of new expanded conflict models.

Since results from the study (Chapter 3) seem to indicate that very different variables were good predictors of conflict sensitivity when different potential sources of conflict were analyzed, future research should invest in finding out which are the best recreationist attributes that can be used to predict various sources of conflict under different contexts.

As I have noted previously, zoning aimed at separation may be useful to resolve conflict arising from the encounter of antagonistic recreationists. However, there are other degrees of compatibility that may be better resolved by using educational programs. It would be interesting to analyze the efficacy of management practices at resolving conflict when such conflict arises from several degrees of incompatibility between recreationists. Researchers should investigate how both degrees of compatibility (Marcouiller et al., n.d.b) and goal interference conflict models (Jacob & Schreyer, 1980) relate to each other.

Future research should also consider including other kinds of educational programs when studying social values conflict, as well as other types of zoning (e.g., motorized only, seasonal zoning) when studying interpersonal conflict. For example, there is still a need to investigate the efficacy of the use of flyers, web information, information centres, or talks into mitigating social values conflicts. Similarly, more research is needed to confirm that seasonal zoning or other zoning approaches are useful at reducing interpersonal conflict. Researchers should also investigate the
effect that combining several management practices have on the degree and frequency of both types of conflict (social values conflict and interpersonal conflict) since the combination of zoning and educational programs is not unusual in practice. As was done in this research, further studies should include multiple indicators of potential sources of conflict, in order to understand where conflict come from (i.e., safety issues, environmental issues, respect to others and crowding).
4.5 References


Appendix A - UBC Research Ethics Board Certificate of Approval

The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - MINIMAL RISK

<table>
<thead>
<tr>
<th>PRINCIPAL INVESTIGATOR:</th>
<th>INSTITUTION / DEPARTMENT:</th>
<th>UBC BREB NUMBER:</th>
</tr>
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<tbody>
<tr>
<td>Howard Harshaw</td>
<td>UBC/Forestry/Forest Resources Mgt</td>
<td>H09-01737</td>
</tr>
</tbody>
</table>

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Site</th>
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<tbody>
<tr>
<td>UBC</td>
<td>Vancouver (excludes UBC Hospital)</td>
</tr>
<tr>
<td>Other locations where the research will be conducted:</td>
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</table>

The data for this study will be collected on-site at trailheads in the Squamish BC Recreational trail network. The Recreational trail network consist in the following areas: Brohm Lake Interpretive Forest Cat Lake Trails Area Cat Lake Rec site Area Alice Lake Provincial Park Area Brakendale/ Cheekeye Fan Area Garibaldi Highlands Area Diamond Head Area Municipal Trails Area Crumpet Woods Area Stavamus Chief Provincial Park Area The visitor survey will be completed on-site by respondents. However it is possible that some respondents may wish to take the questionnaire home and and mail in the completed questionnaire.

CO-INVESTIGATOR(S):
N/A

SPONSORING AGENCIES:
N/A

PROJECT TITLE:
Case Study of Squamish trail user conflicts

CERTIFICATE EXPIRY DATE: August 12, 2010
### DOCUMENTS INCLUDED IN THIS APPROVAL:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Version</th>
<th>Date</th>
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<tr>
<td>Research Proposal_Squamish</td>
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<td>July 6, 2009</td>
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<td>Cover letter with consent form_Squamish</td>
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</table>

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:

- Dr. M. Judith Lynam, Chair
- Dr. Ken Craig, Chair
- Dr. Jim Rupert, Associate Chair
- Dr. Laurie Ford, Associate Chair
- Dr. Anita Ho, Associate Chair
CERTIFICATE OF APPROVAL - MINIMAL RISK AMENDMENT

<table>
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<td>Institution</td>
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<td>UBC</td>
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<td>Case Study of Squamish trail user conflicts</td>
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</tbody>
</table>

Expiry Date - Approval of an amendment does not change the expiry date on the current UBC BREB approval of this study. An application for renewal is required on or before: August 12, 2010
Expiry Date - Approval of an amendment does not change the expiry date on the current UBC BREB approval of this study. An application for renewal is required on or before: August 12, 2010

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<td>August 17, 2009</td>
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<tr>
<td>Questionnaires_Squamish</td>
<td></td>
<td></td>
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</tbody>
</table>

The amendment(s) and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

---

Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:

Dr. M. Judith Lynam, Chair
Dr. Ken Craig, Chair
Dr. Jim Rupert, Associate Chair
Dr. Laurie Ford, Associate Chair
Dr. Anita Ho, Associate Chair
Appendix B - Verbal statement of introduction

Ana Elia Ramon’s Verbal Statement of Introduction

Hello, my name is Ana Elia. I am a UBC Master Student conducting an important trail user survey in this area for my research on trail user conflicts in BC. I am interested in finding out about what people attitudes are when encountering different users or user trail behaviours. Your voluntary cooperation would be greatly appreciated. Would you have some time to fill out a short questionnaire? The questionnaire takes about 5 to 10 minutes to complete. You can take your time to decide if you would like to participate as long as I am here and I will be here until...(it will vary and the average time will be two hours).

You can just return the survey to the receptacle over there or give it back to me personally.

Teressa McMillan’s Verbal Statement of Introduction

Hello, my name is Teressa. I am a research assistant to a UBC Master Student conducting an important trail user survey in this area for her research on trail user conflicts in BC. She is interested in finding out about what people attitudes are when encountering different users or user trail behaviours. Your voluntary cooperation would be greatly appreciated. Would you have some time to fill out a short questionnaire? The questionnaire takes about 5 to 10 minutes to complete. You can take your time to decide if you would like to participate as long as I am here and I will be here until...(it will vary and the average time will be two hours).

You can just return the survey to the receptacle over there or give it back to me personally.
Appendix C - Questionnaire cover letter and consent form

Squamish Trail User Survey
CONSENT FORM

Ana Elia Ramon Hidalgo
Master Candidate
Forest Resources Management
University of British Columbia

Dr. Howard Harshaw
Master’s Supervisor
harshaw@interchange.ubc.ca

6/17/2009

Greetings,

I am a UBC graduate student doing my Master of Science at the Faculty of Forestry within a program called Forest & Society. I am collecting data for my master’s thesis on trail user conflicts and I believe that the information you provide will be helpful for my research and valuable for the future of the Squamish Trail Network as well as other BC trail networks.

PURPOSE
The purpose of the project is to discover the types of conflicts that occur between recreational users on Squamish Trails as well as to examine the management practices that are being applied to reduce such conflicts.

This trail user survey will collect information about:

- Recreation use (i.e., frequency of participation, trail preferences, motivations);
- User conflict such as undesirable encounters or behaviour on trails; and
- Attitudes regarding such trail events.

This project will help to understand the nature of user conflicts in order to better apply management practices to reduce conflict on Squamish Trails (as well as in other areas with similar contexts).

The results of this study will be publicly available in April 2010 on the Internet at:

www.hd-research.ca
STUDY PROCEDURES
The questionnaire will take about 10 minutes to complete. After completing the questionnaire please return it to the receptacle you will find near the trail head or give it back to the person that handed you the questionnaire.

This questionnaire is not a test of your knowledge about conflicts or trail management. I understand you might not know some of the answers to the questions so I have included a “don’t know” option.

CONFIDENTIALITY
The information gathered will remain anonymous and confidential during all stages of the analysis as well as in the final report. It will contain summary statistics (e.g., averages and percentages of group members’ responses to various questions) but the results will be presented in a manner that will prevent the identification of individual respondents. Please do not write your name anywhere on this questionnaire.

CONTACT INFORMATION
If you have any questions before, during or after completing the questionnaire please talk to me personally or contact me by

Email: anaelia@interchange.ubc.ca; or by
Phone:

If you have further questions about the research you can also contact my supervisor Dr. Harshaw at the phone number listed at the top of the first page. If you have any concerns about your rights or treatment as a research subject, you may contact:

UBC Office of Research Services
Research Subject Information Line
(604) 882-8598

CONSENT
Your participation in this study is completely voluntary. If you feel uncomfortable answering any of the questions do not answer them although I would encourage you to complete all the questions, if possible. By completing and returning the questionnaire you are consenting to participate in this study. I recommend that you keep a copy of this consent for your records.

I would like to take this opportunity to THANK YOU for your participation.

Your sincerely,

Ana Elia R. Hidalgo

Version: July 17, 2009
Appendix D – Data collection

The following method of data collection was used in this research:

- The survey was conducted in nine areas within the Squamish trail network:
  - Alice Lake Provincial Park
  - Stawamus Chief Provincial Park
  - Smoke Bluffs Regional Park
  - Brohm Lake Recreation site
  - Cat Lake area outside the Recreation Site
  - Backendale area
  - Crumpit Woods area
  - Garibaldi Highlands
  - Diamond Head area.
- Survey period: September 3rd to September 19th
- Survey days: 10 week days, 1 long weekend, 2 regular weekends.
- Two daily sampling periods of 4 hours each:
  - morning period: 10:00 to 14:00;
  - afternoon period: 17:00 to 19:00.
- The survey collected information about recreation use (i.e., frequency of participation, trail preferences, motivations); user conflict such as undesirable encounters or behaviour on trails; and attitudes regarding such trail events
- People that visited the Squamish trail network during the period surveyed made up the survey population of this research project.
- I used random sampling of trailheads within each of the trail areas identified in Squamish.
- Subjects were randomly chosen at trailheads. I selected the subjects as they came to the trailheads.
- My research assistant and I approached the subjects at the trailheads to obtain consent.
Appendix E – Questionnaires

Questionnaires used in the nine areas surveyed contained the same information and questions. However, the questionnaire title and site specific questions refer to the area where subjects were surveyed. A sample questionnaire for the Brohm Lake Interpretive Forest area is shown on the following pages.
**Squamish Trail User Survey**

**BROHM LAKE INTERPRETIVE FOREST TRAILS**

**NOTE:** The questions below ask about your use of the **BROHM LAKE INTERPRETIVE FOREST** trails.

1. Are you participating today in a guided outdoor activity as a paying customer of a commercial recreation/tourism operator?  
   - [ ] No  
   - [ ] Yes

2. Is this your first time at **BROHM LAKE INTERPRETIVE FOREST** trails?  
   - [ ] No  
   - [ ] Yes

3. What recreation activity did you do today on the trails? _______________

**NOTE:** The following questions ask about the recreation activities you do on **SQUAMISH AREA** trails.

4. Please indicate the activities that you do on Squamish area trails. *(Check all that apply)*
   - [ ] Hiking
   - [ ] Dog walking
   - [ ] Dirt biking (motorcycling)
   - [ ] Climbing
   - [ ] Jogging
   - [ ] Mountain biking
   - [ ] Trial bike riding (motorcycling)
   - [ ] Other: ______________
   - [ ] Family walks
   - [ ] Horse riding
   - [ ] ATV/Quad riding
   - [ ] Other: ______________

**NOTE:** The following questions refer to your preferred activity on **SQUAMISH AREA** trails.

5. From the list above, what is your preferred activity? _______________

6. Why do you like to participate in your preferred activity? *(Check all that apply)*
   - [ ] To think about my personal values
   - [ ] To spend time with my family/friends
   - [ ] To be free to make my own choices
   - [ ] To take risks
   - [ ] To develop my skills/abilities
   - [ ] To experience solitude
   - [ ] To give my mind a rest
   - [ ] To enjoy nature
   - [ ] To discover new things
   - [ ] To meet other people
   - [ ] To get exercise
   - [ ] I don’t know
   - [ ] To escape from routine
   - [ ] Other: ______________

7. On a scale of 1 to 5, with 1 being ‘beginner’ and 5 being ‘expert’, how skilled are you at your preferred activity? 
   - Beginner: ___________  
   - Expert: ___________

8. On a scale of 1 to 5, with 1 being ‘not central at all’ and 5 being ‘very central’, how central to your lifestyle is your preferred activity? 
   - Not central at all: ___________  
   - Very central: ___________

9. On average, how many days per month in each season do you participate in your preferred activity? 
   - Spring: ______ days/month  
   - Summer: ______ days/month  
   - Fall: ______ days/month  
   - Winter: ______ days/month

10. How many years have you participated in your preferred activity? ______ year(s)

Version: August 17, 2009
NOTE: These questions ask about EXPERIENCES you may have had over time at BROHM LAKE INTERPRETIVE FOREST trails.

11 Including today, how often did you come across the following at BROHM LAKE trails in the past year?

Trail users:

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Many Times</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hikers/Joggers</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Families walking</td>
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<td></td>
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<tr>
<td>Dog walkers</td>
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<tr>
<td>Mountain bikers</td>
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<td>Horse riders</td>
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<tr>
<td>Dirt bikers (motorcyclists)</td>
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<tr>
<td>Trials motorcyclists</td>
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<tr>
<td>Quads/ATVs</td>
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Events (i.e., behaviour of other trail user)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Many Times</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive noise</td>
<td></td>
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<tr>
<td>Not yielding the right of way</td>
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<tr>
<td>Not obeying signs</td>
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<tr>
<td>Dangerous behaviour</td>
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<td>Excessive exhaust smells</td>
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<tr>
<td>Dust from other users</td>
<td></td>
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<tr>
<td>Environmental damage (disturbance of wildlife, flora, waterways)</td>
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<tr>
<td>Dogs off-leash</td>
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<tr>
<td>Litter on trails</td>
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<tr>
<td>Riding too fast</td>
<td></td>
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<tr>
<td>Failure to give warning when approaching</td>
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<tr>
<td>Passing too close</td>
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<tr>
<td>Trail erosion from other users (ruts, muddy patches, potholes)</td>
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<td>Rudeness and discourtesy</td>
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<td>Graffiti</td>
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<tr>
<td>Too many users on the trail</td>
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<td>Other:</td>
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</table>

NOTE: Tell me about your encounters with other trail users during the last year at BROHM LAKE INTERPRETIVE FOREST trails.

14 Including today, has the behaviour of other trail users interfered with your recreational goals at BROHM LAKE INTERPRETIVE FOREST trails in the past year?

☐ Yes, a lot ☐ Somewhat ☐ A little ☐ No

15 If you answered “Yes, a lot”, “Somewhat” or “A little” to the previous question, please complete the following:

What trail users interfered?

What behaviour interfered?

Version: August 17, 2009
**NOTE:** Now that I know about your trail experiences, I would like to know about your **ATTITUDES** regarding the following events at **BROHM LAKE INTERPRETIVE FOREST** trails.

**12** To what extent do you consider that the following behaviours from other trail users are a problem for your enjoyment of **BROHM LAKE INTERPRETIVE FOREST** trails?

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>No problem</th>
<th>Slight problem</th>
<th>Moderate problem</th>
<th>Extreme problem</th>
<th>I don't know</th>
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</thead>
<tbody>
<tr>
<td>Excessive noise</td>
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<tr>
<td>Not yielding the right of way</td>
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<tr>
<td>Not obeying signs</td>
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<tr>
<td>Dangerous behaviour</td>
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<tr>
<td>Excessive exhaust smells</td>
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<tr>
<td>Dust from other users</td>
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<tr>
<td>Environmental damage (disturbance of wildlife, flora, waterways)</td>
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<td>Dogs off-leash</td>
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<td>Litter on trails</td>
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<td>Riding too fast</td>
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<td>Failure to give warning when approaching</td>
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<td>Passing too close</td>
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<tr>
<td>Trail erosion from other users (ruts, muddy patches, potholes)</td>
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<tr>
<td>Rudeness and discourteousness</td>
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<td>Graffiti</td>
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<td>Too many users on the trail</td>
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<td>Other:</td>
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</table>

**13** How desirable is encountering the following at **BROHM LAKE INTERPRETIVE FOREST** trails.

<table>
<thead>
<tr>
<th>Encounter Type</th>
<th>Very undesirable</th>
<th>Undesirable</th>
<th>Neutral</th>
<th>Desirable</th>
<th>Very desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hikers/joggers</td>
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<td>Families walking</td>
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<td>Dog walkers</td>
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<td>Mountain bikers</td>
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<td>Horse riders</td>
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<td>Dirt bikers (motorcyclists)</td>
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<td>Trials motorcyclists</td>
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<td>Quads/ATVs</td>
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</table>

**INTERPRETIVE FOREST** trails.

ferred with your goals or enjoyment? __________________________

ferred with your goals or enjoyment? ☐ Just knowing they are in the area bothers me. ☐ Other (please explain): __________________________

___________________________
NOTE: The questions below ask about your experience with educational programs for trail users.

On a scale of 1 to 5, with 1 being ‘not knowledgeable’ and 5 being ‘very knowledgeable’:

16 How much do you know about things you can do to be ENVIRONMENTALLY FRIENDLY while on trails? Not knowledgeable 1 2 3 4 5 Very knowledgeable

17 How much do you know about things you can do to be RESPECTFUL OF OTHER USERS while on trails? Not knowledgeable 1 2 3 4 5 Very knowledgeable

NOTE: The questions below ask about your use of the BROHM LAKE INTERPRETIVE FOREST trails.

18 Are BROHM LAKE INTERPRETIVE FOREST TRAILS your preferred Squamish trails? □ No □ Yes

19 On average, how many days per month in each season do you use the trails you were in today?

   Spring: ______ days/month   Summer: ______ days/month   Fall: ______ days/month   Winter: ______ days/month

20 How long have you been visiting the trails you used today? ______ year(s)

21 Please indicate how much you agree or disagree with the following statements about the trails you have used today:

   These trails mean a lot to me. Strongly disagree 1 2 3 4 5 Strongly agree
   A lot of my life is organized around these trails.
   These trails are the best place for what I like to do.
   I identify strongly with these trails.
   I have helped to build and/or maintain these trails.
   I get more satisfaction from these trails than from any other trails.

22 OVERALL, do you have satisfying experiences when you come to these trails? □ No □ Yes

23 Did you achieve the goals that you had TODAY before coming to the trails? □ No □ Yes

24 On a scale of 1 to 5, with 1 being ‘do not enjoy’ and 5 being ‘enjoy a lot’, how much do you enjoy these trails overall? Do not enjoy 1 2 3 4 5 Enjoy a lot

NOTE: Tell me about yourself. You will not be identified in any way and your answers will be confidential.

25 What year were you born in? 19 _______ 26 gender? □ Female □ Male

27 What is your postal/ZIP code? _______ 28 How long have you lived at your current postal/ZIP code? _______ year(s)

29 Please list any outdoor recreation clubs or organizations that you belong to: ________________________

30 Do you have any additional comments about SQUAMISH/BROHM LAKE INTERPRETIVE FOREST trail users?

Version: August 17, 2009  Thank you for completing the survey!
Appendix F - Map of the areas sampled
Map showing the areas sampled

Sample Location | Area #
---|---
Brohm Lake Interpretive Forest | 1
Cat Lake Area | 2
Alice Lake Provincial Park | 3
Brackendale | 4
Garibaldi Highlands | 5
Diamond Head | 6
Smoke Bluffs Park | 7
Crumpit Woods | 8
Stawamus Chief Provincial Park | 9

Adapted from Googlemaps.com