

MANAGING OUTDOOR RECREATION CONFLICT ON THE SQUAMISH, BRITISH COLUMBIA TRAIL NETWORK

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Abstract.—Recreationists with high expectations of satisfaction from outdoor recreation activities are increasingly using trails networks near urban areas. But differences in expectations, behaviors and values of trail users may create conflicts resulting in unsatisfactory experiences. The objective of this study was to test the efficacy of management practices that may reduce social value conflict (SVC) and interpersonal conflict (IPC). The research is a survey-based, cross-sectional case study of the Squamish Trail Network (n = 340). We hypothesize that in areas where educational programs are applied, recreationists will report less SVC than in areas without such programs. Similarly, we hypothesize that in areas zoned for nonmotorized activities, recreationists will report less IPC than in unzoned areas. Results suggest that while specific management practices are effective in reducing IPC and SVC, the differences account for low variability. Other factors not considered in this study may be affecting the efficacy of conflict management.

1.0 INTRODUCTION

Publicly-owned forests in Canada have traditionally been managed for timber resources (Harshaw et al. 2007). Coinciding with the deceleration of British Columbia's forest industry in the 1990s (Kozak et al. 2008) and an increase in public awareness regarding environmental issues and concerns (Tarrant and Cordell 2002), there has been a shift in management emphasis to a more comprehensive approach to forest management that recognizes nontimber

values, including outdoor recreation (Harshaw et al. 2007). The increase in environmental awareness, accompanied by high expectations of satisfaction from outdoor recreation activities has resulted in higher trail network use every day (Bell et al. 2007). Recreationists are not homogenous, however, and differences in trail users' expectations, behaviors, and values (Rollins and Robinson 2002) may create conflict and decreased levels of satisfaction.

1.1 Theory

Conflict has traditionally been understood in an outdoor recreation context as the result of goal interference attributed to another's behavior (Jacob and Schreyer 1980). This definition is based on the assumption that conflict is goal oriented and is grounded within the expectancy and discrepancy theories (see Manning 1999 for a review). Vaske et al. (1995) labelled this type of conflict as the interpersonal conflict model (IPC) and considered this model as just one source of conflict. The authors demonstrated that conflict can also arise when users do not share the same norms or social values, independent of physical presence or actual contact between them (Vaske et al. 2000, Vaske et al. 1995). This conflict model is usually called conflict in social values (or social values conflict, SVC).

The literature has often suggested management approaches to alleviate certain types of conflict (Carothers et al. 2001, Manning 1999, Moore 1994, Vaske et al. 2000, Vaske et al. 1995,). Although certain authors (Hammitt and Schneider 2000, Moore 1994) have identified alternative practices that can be used to address recreation conflict, the two most common practices are zoning and the application of educational programs. The former separates users in space and time and is often effective with interpersonal conflict or direct contact. Educational programs are more likely to be effective when the conflict arises from differences in social values or normative values

(i.e., indirect contact). That is because social values conflicts require neither actual encounters between users nor indirect encounters such as noise from the distance or trail erosion (Cordell and Tarrant 2002, Manning 1999).

Some authors indicate that the failure of management practices to reduce conflict may be related to the lack of consideration of underlying causes (Cordell and Tarrant 2002, Kajala 1994, Manning 1999, Marcouiller et al. 2005, Moore 1994, Owens 1985, Schneider 2000, Watson et al. 1994, Tumes 2007). However, none of these cases examined the efficacy of education and zoning management practices at addressing with these two sources of conflict (SVC and IPC). In this study, we explore several types of conflict situations and investigate whether recreationists perceive the conflict as SVC or as IPC in order to test the efficacy of management practices applied in the area.

1.2 Objectives

Two objectives framed this study: (1) to comparatively test the efficacy of educating trail users in order to reduce social value conflict (SVC); and (2) to test the efficacy of separating incompatible users by zoning in order to reduce interpersonal conflict (IPC). We hypothesized that: (H_1) at trailheads with educational posters, users will report SVC less frequently and at a lower level than at trailheads without educational posters; and (H_2) in zoned areas, trail users will report IPC less frequently and at a lower level than in areas that are not zoned.

1.3 Background

With 6 million recreational visits per year, the Squamish trail network in the Sea-to-Sky Corridor is one of the most highly utilized recreation areas in North America due to its diversity of landscapes and natural resources. It is suitable for both winter and summer recreation opportunities (hiking, jogging, dog walking, mountain biking, dirt biking, all-terrain vehicles (ATV) riding, snowmobiling, cross-country skiing) and the area attracts a wide range of motorized and nonmotorized recreationists (British Columbia Ministry of Sustainable Resource Management 2002).

Conflict on the Squamish trail network has been reported in several documents (British Columbia Ministry of Sustainable Resource Management, n.d.) Due to its status as a world-renowned tourist destination for local, regional, and international visitors, the Squamish trail network is an excellent case study for investigating trail user conflict as well as the effectiveness of management practices in reducing such conflict.

2.0 METHODS

The study consists of a survey-based, cross-sectional case study of nine Squamish trail areas that have employed different management practices. Data were collected via an onsite survey between September 3 and September 19, 2009; the sample period included one long weekend, two regular weekends, and 10 weekdays. Only summer activities were considered in this study. Sample size was 340 with a 57 percent response rate.

2.1. Independent Variables

To test the first hypothesis, we compared the responses of people surveyed at trailheads that had educational posters ($n = 185$) with the responses of people that were surveyed at trailheads without educational posters ($n = 155$). Figure 1 shows an example of the educational poster. To test the second hypothesis, respondents were classified as either being surveyed in an area zoned for nonmotorized use only ($n = 249$), or being surveyed at an area where the use of the trails is shared by motorized and nonmotorized users together ($n = 91$).

2.2 Dependent Variables

Respondents were asked about the extent to which a series of events (Table 1) posed problems for their enjoyment of the trail-based activity. Respondents were then classified according to whether they were surveyed at trailheads with educational posters (yes or no) and whether they were surveyed in areas zoned only for nonmotorized users or in areas where trails were shared with motorized users.



Figure 1.—Educational poster evaluated.

IPC and SVC measures were derived from previous research (Carothers et al. 2001, Vaske et al. 1995, Vaske et al. 2007). From two sets of questions regarding 15 potential conflict events, we were able to distinguish whether the subjects were experiencing SVC or IPC. Respondents evaluated the extent to which events were unacceptable as well as the number of times that they had observed such events.

First, respondents were asked how frequently they had observed a set of 16 potential problematic events. Response attributes ranged from “never” to “almost always” in a 5-point interval scale. Second, respondents assessed the extent to which each of the 16 conflict-behaviors were a problem for their enjoyment of the area. Response categories ranged from “no problem” to “extreme problem” in a 4-point interval scale. Finally, in order to classify each response as either an SVC measure or an IPC measure, the frequency of occurrence responses (observed, not observed) were combined with their corresponding perceived problem variables for each respondent and produced two conflict typologies: (a) IPC when

Table 1.—Conflict events asked of each recreationist across different managed areas

Not yielding the right of way
Not obeying signs
Dangerous behavior
Riding too fast
Failure to give warning when approaching
Passing too close
Excessive noise
Excessive exhaust smells
Environmental damage
Litter on trails
Trail erosion
Dust from other users
Dogs off-leash
Rudeness and discourteousness
Graffiti
Too many users on the trail

conflict had been previously observed; and (b) SVC when, despite not having witnessed the conflict event, respondents still considered it to be a problem.

Although participants who experienced IPC could also experience SVC (see Vaske et al. 2007 for review), our study approach considered that individuals who had witnessed a behavior and evaluated it as problematic experienced only IPC and not SVC (acknowledging the caveats that this methodology has). SVC events were used as the dependent variables in H_1 and IPC measures were used as the dependent variables in H_2 .

2.3 Analyses

Due to nonnormally distributed data, nonparametric tests were used to analyze the data. The Mann-Whitney test was used in H_1 to compare levels of SVC under the two conditions (educational posters vs. no educational posters) and in H_2 to compare levels of IPC under the two conditions (zoned areas and unzoned areas). The Chi-square test was used in H_1 to compare frequency of SVC under the two conditions (educational poster vs. no educational posters) and

in H_2 to compare frequency of IPC under the two conditions (zoned areas and unzoned areas). In order to use the Chi-Square tests, the dependent variables were dichotomized as follows: when respondents considered an event to be no problem, the answer was classified as no conflict, and when respondents considered an event to be a slight, moderate or extreme problem, the answer was classified as a conflict.

3.0 RESULTS AND DISCUSSION

Most respondents (52.6 percent) were from the local communities of Squamish, Whistler, and Pemberton, or came from the region surrounding nearby Vancouver (28.7 percent). Over 60 percent (61.3 percent) were female while 38.7 percent were male. In relation to the distribution of activities, 40.7 percent of respondents were hikers, 24.0 percent were mountain bikers, 10.8 percent were dirt bikers and the rest (24.6 percent) were climbers, joggers, dog walkers and ATV riders. Younger recreationists (those below 30 years old) were often hikers (29.8 percent) and mountain bikers (26.3 percent), while older respondents (above 50 years old) were most likely to be hikers (65.9 percent). Dirt bikers were widely spread across different age groups.

More than 80 percent of respondents (84.4 percent) reported experiencing some kind of problem but only 14.5 percent reported extreme problems in relation to the 16 conflict behaviors. Littering (27.7 percent) and environmental damage (24.1 percent) were more frequently reported as highly unacceptable potential conflict behaviors. Overall, respondents reported having a problem less frequently in managed areas compared to areas that had neither zoning nor educational posters.

3.1. Social Values Conflict

In terms of perceived frequency of conflict, half of the measures of social values conflict were significantly different between areas with educational posters and areas without educational posters. At trailheads with educational posters, respondents reported significantly fewer instances of conflict for 8 of the 16 SVC measures. Where only nonmotorized users were analyzed between the two areas, conflicts for 9 out of 16 SVC were significantly less frequent.

In relation to the severity of social values conflict, again half of the measures were significantly less severe for respondents surveyed at trailheads with education posters compared to trailheads without educational posters (Table 2). Thus, it seems that the use of the posters does have an effect on the perception of conflict among recreationists. The same number of conflict measures were significantly different in areas where nonmotorized users alone were analyzed. More homogeneous groups (i.e., mountain bikers, hikers, dirt bikers) could not be examined due to small sample size. Despite finding significantly lower levels and less frequency of conflict in some SVC measures in areas with educational posters, the sizes of the effects were low (*Low effect size 0.01-0.29; **medium effect size 0.30-0.50; (Field 2005)).

3.2. Interpersonal Conflict

When analysing the effect that zoning (separating nonmotorized users from motorized users) had on the severity and frequency of occurrence of IPC, few measures were significantly different between respondents in zoned and unzoned areas. In terms of the frequency of IPC reported, when all users were

Table 2.—Results by hypotheses

Respondents	H_1 Education to reduce SVC		H_2 Zoning to reduce IPC	
	Frequency	Severity	Frequency	Severity
All	8*	8*	2*	2*
Nonmotorized	9*	8*	3*/**	5*/**
Mountain bikers	—	—	3**	7**

P-values < 0.05; *Low effect size 0.01-0.29; **medium effect size 0.30-0.50; — could not be calculated due to small sample size.

analyzed together, there were significant differences for 2 of the 16 measures of IPC (i.e. these measures were reported less frequently in zoned areas). When more homogeneous groups (i.e., nonmotorized users only and mountain bikers only) were analyzed, significantly more IPC measures (3) were reported less frequently in zoned areas (Table 2).

With regard to the severity of IPC reported in both types of areas, 2 out of 16 conflict measures were significantly more severe in areas where recreationists shared the trails with motorized respondents. When only nonmotorized respondents were considered in the analyses, 5 out of 16 types of conflicts were significantly less severe in zoned areas. In the case of mountain bikers, 7 out of 16 types of conflicts were significantly less severe in the zoned area. Overall, the magnitude of the independent variables' effect varied from small to medium.

In Squamish, recreationists at trailheads with educational posters and in zoned areas reported less SVC and IPC compared to recreationists in unmanaged areas, although the differences accounted for low variability (mostly low effect sizes and few medium effect sizes). The combination of several educational programs may have a larger effect on mitigating SVC when compared to a single program approach (Moore 1994). Similarly, when considering zoning management practices, the combination of temporal and spatial management practices may have a larger impact on the alleviation of IPC. Also, increased enforcement of management practices may have had an effect on the severity and frequency of conflict (Vaske et al. 1995). According to Bell et al. (2007), managing trail user conflict can be an especially complex task. Even when the root cause of the increase in conflict is simply an increase in demand for most outdoor recreation activities (Cordell and Tarrant 2002), many other factors may be related to conflict, such as trail features, recreation opportunities, types of users, land planning, ecological impact, management practices, economic resources, and staff availability.

4.0 CONCLUSIONS AND IMPLICATIONS

We can conclude from this study that educational posters and zoning as management practices can help to mitigate SVC and IPC. However, results indicate that individual management practices have a small effect on reducing conflict when compared to areas where those management practices do not exist.

This study considered the efficacy of educational programs and zoning management practices as they relate to SVC and IPC, respectively. Previous literature has suggested that a combination of management practices have the potential to more strongly reduce user conflicts (Moore 1994) compared to one strategy. For example, the combination of educational posters with brochures, signage, information and enforcement may more efficiently alleviate SVC. Similarly, applying several zoning management practices onsite (temporal zoning, physical zoning, user zoning) may increase the efficacy of these approaches at reducing IPC.

Future research should include other educational programs (flyers, Web information, information centres, and talks) when studying SVC as well as other types of zoning (motorized only, seasonal zoning) when studying IPC. Furthermore, researchers should also investigate the effect that combining zoning and educational programs has on the severity and frequency of SVC and IPC reported by recreationists. Reducing trail recreation conflict through management can provide more satisfactory experiences (Rollins and Robinson 2002) and can avoid costly political and legal action if conflicts are avoided or resolved at the initial stages (Cordell and Tarrant 2002). However, there is a need for better understanding of social interaction (i.e., conflict) in order to produce effective decisionmaking (i.e., management) (Dearden and Rollins 2002). This study is the first of its kind to test empirically the theoretical assumptions that relate education to SVC mitigation and zoning to IPC mitigation.

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