

Conflict in Outdoor Recreation: A Theoretical Perspective

by Gerald R. Jacob and Richard Schreyer
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Pages 368-380

The authors attempt to build a theory of Recreational Conflict and identify its characteristics.

Conflict is defined as goal interference attributed to others behavior.

Major factors behind outdoor recreational conflicts have been found to be:

1. Activity Style: The various personal meanings assigned to an activity.
2. Resource Specificity: The significance attached to using a specific recreation resource for a given recreational experience.
3. Mode of Experience: The varying expectations of how the natural environment will be perceived.
4. Lifestyle Tolerance: The tendency to accept or reject lifestyles different from one's own.

The intensity of the above factors, differences between factors for the two groups, and amount of interaction (usually determined by population of the groups, size of the area, and speed of the activity) can be used to estimate intensity of Recreational Conflict in an area.

Recreational Specialization and Norms of Depreciative Behavior Among Canoeists

by J. Douglas Wellman, Joseph W. Roggenbuck, and Alan C. Smith
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Mild whitewater canoeists were studied to see if attitudes toward depreciative behavior varied with specialization. A list of 68 actions felt to be objectionable was prepared (examples are: cutting down live trees, use of drugs and alcohol, disturbing livestock, not wearing a life vest). Highly Specialized canoeists (those investing a lot of money and time in the activity) were asked to rate various depreciative behaviors in seriousness of the behavior. Similarly a group of Lowly Specialized canoeists were asked the same questions.

Overall there was an absence of consensus among both low and high specialists as to the seriousness of various behaviors. A large standard deviation was found in the ratings of the answers from both groups to many of the questions. There was not a tendency for Highly Specialized Canoeists to be in more agreement with their peers than for Lowly Specialized Canoeists to be in agreement.

Few differences in attitudes between the two groups were found. In the 11 questions of 68 that showed a statistical difference, 9 of involved the Highly Specialized group rating the behavior more serious than the Lowly Specialized group. Several of these questions were in the safety area.

Perceived Conflict Between Urban Cross-Country Skiers and Snowmobilers in Alberta

by Edgar L. Jackson and Robert A. G. Wong

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Pages 47-62.

Conflict is one way. Skiers perceive snowmobilers as interfering with their activity. Snowmobilers enjoy or are indifferent to skiers. Minimal mutual understanding exists between the groups. Differences in perceived conflict are much more complex than competition for land; they involve recreational orientation and motivations for participation. Cross-country skiers prefer self-propelled, low-impact activities which reflect their desire for solitude, tranquility, and a relatively undisturbed natural environment. Snowmobilers prefer machine oriented, more demanding activities that provide a sense of adventure in a setting that also provides socializing.

The authors made this statement based on studying previous research: "One of the most bitter forms of conflict is that which exists between recreationist who engage in mechanized activities and those who prefer non-mechanized or self-propelled forms of recreation, exemplified by snowmobiling and cross-country skiing."

The study's objective was to examine direct aspects of the perceived conflict and to differentiate groups based upon recreational orientation (see what other recreational activities they participate in) and motivations for participation.

Four basic interrelated principles of Recreational Conflict are discussed.

1. Mechanized vs. non-mechanized recreationists. Factors include noise and knowledge of presence of machines, both of which compromise solitude and tranquility desired by non-mechanized recreationists.
2. Conflicts are usually asymmetrical (one way). Usually the non-mechanized group is "mad as hell" at the mechanized group, but the mechanized group is very tolerant or even indifferent to the non-mechanized group."
3. The conflict is more complex than competition for land or resources. It arises because of motivations for participation are compromised and anticipated experiences are unfulfilled. Members of one group feel they were prevented from having a complete experience due to the intrusion of others. It is the quality of the recreation experience that causes conflict, not competition for resources.
4. Conflict exists at two levels. Direct contact including perceived 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. If sides begin to form interest groups and become identified with opposing platforms, conflict may represent a misunderstanding of viewpoints or a basic difference in philosophy.

This study focused purely on urban residents due to prior evidence suggesting conflicts between rural residents are less intense than those between urban dwellers.

Questionnaires were used to determine other recreational activities members of each group participate in. Skiers were found to more frequently participate in quieter, less demanding activities such as walking, hiking and bicycling while snowmobilers were much more likely to participate in noisier more demanding activities such as hunting, trail biking, and dune bugging.

Questions were asked about which kinds and sizes of groups they would like to encounter on the trail. Cross-country skiers wanted to see other skiers and no snowmobiles. Snowmobilers did not care who else was on the trail.

When asked if they agreed or disagreed with the statement, "skiers and snowmobilers can mix happily if both use common sense." 74% of the skiers disagreed, while 87% of the snowmobilers agreed. This illustrates the asymmetricalness of the conflict. The skiers are upset and the snowmobilers do not even recognize the conflict.

In determining motivations for participation, cross-country skiers found physical exercise, tranquility, solitude, and absence of man made features more important. Snowmobilers were more interested in being with family and friends, adventure and challenge, meeting other people, getting away from radio and TV, getting to a destination, and prestige.

Suggestions for conflict reduction included:

- Establishing a dialog between the groups, since currently they have little mutual understanding of each other.
 - Zoning areas for exclusive use by each group appears to be an obvious solution, however, unless it is done carefully and fairly with respect of both groups, zoning may escalate conflict. It may increase alienation between the two groups, especially if one group perceives favoritism toward the other.
 - In addition to zoning, some form of informational exchange to facilitate mutual understanding.
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A Study of Conflict in Recreational Land Use: Snowmobiling vs. Ski-Touring

by Timothy B. Knopp and John D. Tyger
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Pages 6-17.

A recreational activity may become associated with a particular social group. Traditional mechanized vs. non-mechanized conflict may extend to different attitudes of groups involved. These attitudes may be extensions of cultural trends. At one Off Road Vehicle hearing, the authors heard proponents of Off Road Vehicles refer to their opponents as "long-haired unemployed hippies" and "elitist millionaires." While off roaders are frequently classified as "lower-class, uneducated and consumer oriented."

The authors wanted to test the hypothesis: Those individual who engage in motorized recreation are less likely to understand and/or sympathize with the concept of devoting specific recreational areas for distinct purposes than are those who prefer activities with less environmental impact.

In Minnesota snowmobiling and large scale ski touring arrived at about the same time. Snowmobiles did begin to become popular a few years before ski touring.

Everybody wants to go though untouched virgin powder snow. Snowmobiles are able to "track up" large areas of virgin snow far faster than ski tourers. In a matter of a few hours, several snowmobiles can "rip up" the snow from horizon to horizon. This is very resented by skiers.

Snowmobiles require registration which makes it easy to identify owners, determine the number snowmobiles, and to estimate the number of participants. The authors do mention a certain level of non-compliance (unregistered snowmobiles) and acknowledge snowmobiles are often used by children of the owner.

Ski tourers and snowmobilers were asked a number of environmental issue questions. Ski tourers were found much more likely to conform to "environmentalist views." When the same groups were quizzed on educational background, even though snowmobilers were more likely to have a high school education and some college level schooling than the general population of Minnesota, they were far below the ski touring group in the percentage of college graduates (3.6 % vs. 40.6%). When queried about incomes, ski tourers were found more likely to belong to the segment of the population that has already "arrived" while snowmobilers may still be striving to improve themselves financially.

The authors observed that snowmobiling has received considerable press and media coverage, partially due to strong promotion by manufactures. Ski touring is now receiving moderate media exposure but will probably never receive the exposure generated by the snowmobile manufacturers.

It is relatively easy for the average person to understand a public library or public road is intended for a specific purpose, but their perception of a park is much more subjective. The authors proved participants a number of statements and measured their agreement with them. A few of the statements are listed below.

- In a public park or forest a person should be allowed to enjoy his own kind of recreation.
- Some recreation activities should not be permitted in some areas because they disturb other recreationists.
- Protecting a natural environments is not worthwhile if it means keeping out motorized transportation and therefore discouraging those who are less physically able to enter under their own power.

Results were as expected. Snowmobilers tend to be more likely to think everybody should be able to "do their own thing", and everybody should have access, while ski tourers are more likely to feel some activities should not be permitted because they disturb others. When snowmobilers were divided into two groups (from the big cities vs. rural) there were no significant differences in the responses (big city vs. rural).

In their conclusions, they state that an "anything goes" attitude on public land may reduce any resistance a normal person might have toward identifying themselves with a sport as controversial as snowmobiling. Once converted to a given form of recreation a participant will often find himself under pressure to conform to attitudes of his fellow participants. The analogy "birds of feather flock together" may be appropriate. Many participants from both groups were members of sport clubs centering around their chosen activity.

People choosing between two forms of activity may be swayed by generalized attitudes, especially if the activities are conflicting and mutually exclusive.

As the nations attitude becomes more concerned about the environment, more support is expected for "less consumptive forms of recreation." Trends of this nature probably deserve more attention than current participation rates. Public land management officials would like to favor the winning side in any conflict, yet how they respond to perceived demand has the effect of encouraging or discouraging particular activities. Responding only to current rates of participation, may bring about increased conflicts in the future.

Social Psychological Explanations for the Persistence of a Conflict Between Paddling Canoeists and Motorcraft Users in the Boundary Waters Canoe Area

by Bonnie Jane Eizen Adelman, Thomas A. Herberlein, and Thomas M. Bronnicksen.

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Pages 45-61.

The Boundary Water Canoe Area (BWCA) stretches along 200 miles of the Canadian border with northeastern Minnesota. A one way conflict has existed between paddling canoeists and motorcraft users in the BWCA for over 15 years. Similar conflicts between mechanized and non-mechanized recreationist have existed elsewhere. This paper uses social psychological interaction theory in an attempt to explain why recreational conflict occurs and persists in a particular area.

A study identifying conflicts between canoeists and motorcraft users in the BWCA area was done in 1964 (about 15 years before this paper).

The paper begins by focusing on why this conflict is asymmetric (one way). Generally a person who likes another is liked in return. Also, one who dislikes the other is disliked in return. This relationship does not hold in mechanical vs. non-mechanical recreational conflict. Since we do not often know the other person's inner most thoughts, we respond based on outward cues. A paddlers first impression of a motor boat may be based on obvious cues of speed and noise of the boat.

Researchers have previously found motor craft users either enjoy or do not mind meeting canoes on the water. The majority of boaters see canoeists as having similar attitudes and values to themselves. On the other hand, canoeists perceive boaters as having dissimilar attitudes and values.

The authors hypothesized the two groups had different perceptions of the BWCA in terms of what it is, what it should be, and reasons for their visit. The two groups have a competitive relationship, in that boaters could reach the best fishing and camping spots first. And finally, that canoeists reciprocate waves and smiles to motor boaters while silently disliking them. This greeting behavior masks their true feelings and helps perpetuate the asymmetric relationship.

A questionnaire was developed to determine general reactions toward meeting and seeing other users on the lakes in the area. Participants were also asked how they felt about their own group, the other group, the environment, life style interests, camping style, if they felt the other group was competing with them for resources, and to select adjectives describing the other group. The results of the study showed conflict originally discovered in 1964 still existed in the same area. Paddlers enjoyed meeting or seeing other paddlers while they disliked meeting or seeing motorcraft users. Motorcraft users were neutral toward meeting or seeing other motorcraft users and enjoyed meeting or seeing paddlers. 67% of the motorcraft users enjoyed meeting paddlers on the water, while only 4% of the paddlers enjoyed meeting boaters.

More paddlers held negative feelings toward boaters than boaters did toward paddlers. When motorcraft users met paddlers on the water they felt 45 % of paddlers were neutral to them and that 33% of paddlers really enjoyed seeing them. In reality 71% of paddlers disliked boaters.

The majority of motorcraft users did not perceive themselves as disturbing paddlers, yet 45% of paddlers thought they were occasionally disturbed and 34% felt they were frequently disturbed by boaters.

A number of questions were asked about the environment, camping style, wilderness, and what they do at BWCA. 80% of boaters felt they had similar feelings to paddlers on these issues, but only 30 % of paddlers felt they had similar feelings as boaters. 75% of motorcraft users felt paddlers were "A Lot Like Me" while only 7% of paddlers felt boaters were "A Lot Like Me."

Significantly more paddlers than motorcraft users felt the other group got in their way at portages, made too much noise, disturbed their fishing, got in their way on the water, were noisy in campgrounds at night, and took all the good campsites. Additionally 61% of paddlers felt that motorcraft waves upset their craft.

As expected, paddling canoeists were reciprocating waves and smiles of power boaters while in fact disliking them. Significant differences did exist between the two groups on reported and perceived behavior of who smiled first.

Before this new study, the authors suspected the asymmetricalness of conflict discovered in 1964 would no longer exist on the same site. If canoeist despised power boaters at this site for 15 years, surely the boaters would "pick up on it" and begin to dislike canoeists. In addition, legislation had been proposed concerning use of the area and boaters might feel threatened by canoeists and begin to despise them. The study found the conflict is still "one way." The authors noted that motorcraft users, perceiving paddlers as similar to themselves, and liking them, initiated the waves and smiles to paddlers. Only after receiving friendly greetings, did paddlers smile back.

The only suggestion toward resolution offered was, "managers need to address the needs of both groups and work on helping them address the needs of both groups and work on helping them understand the needs and perceptions of other visitors."

Factors in User Group Conflict Between Hikers and Mountain Bikers

by Roy Ramthun

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The location of this study was the Mill Creek Canyon near Salt Lake City UT a very heavily used recreational area with fewer restrictions than others in the area.

The rapid growth of mountain biking has created the possibility for conflicts between them and other user groups. This study examined 4 factors:

- Outgroup evaluation (judgement of other users based on group membership)
- Leisure activity identification (how strongly users identify with the activity)
- Years of experience
- Frequency of participation

that may make individuals more sensitive to behavior of other groups. They present the Jacob and Schreyer theory for studying conflicts in outdoor recreation settings. (see "Conflicts in Outdoor Recreation a Theoretical Perspective") and focus on importance of the level of tolerance an individual has for the other group.

Measures of Conflict

Social interaction plays a major role in the conflict process. While hikers may recognize the behavior of bikers may interfere with their experience, if those behaviors are seldom encountered, conflict seldom occurs. Research on crowding in recreational sites has shown there is a great difference between perceptions of participants and what actually occurred. An individual's belief that a particular situation is a problem may not correspond to the individual's attitude or conduct in field situations. In this study, participants were asked if they felt there were problems with conflicts between bikers and hikers, then they were asked if they actually experienced this conflict on their last visit.

5.6 % of the bikers felt hikers had caused problems such as not yielding the trail to bikers, while 32.2% of hikers felt bikers had caused problems with their experiences. The conflict appears to be asymmetric (one way) as are most recreational conflicts.

The outgroup evaluation variable (the stereotyping and assumptions about people that are members of the other group) proved to be the most powerful predictor for sensitivity to interference by members of the group.

"Years of experience" was found to be significant in predicting sensitivity to outgroup behavior, but not in the way it was hypothesized to be. Those with the most experience were actually most tolerant of behavior of the other group. It was earlier felt those with the most experience would feel more resource ownership and thus be less tolerant of others. Some suggestion for the actual situation were those with more experience have more realistic expectations of the experience (they know in advance they may run into

bikers)> Additionally, the principle of displacement may be in effect. The very experienced users who were most antagonized by bikers may have already left and gone somewhere else.

. Frequency of participation and the intensity of identification with the activity were not found to be significant predictors of sensitivity.

Possible Ways of Reducing the Conflict

- Efforts that help users understand the behaviors, motivation, and land use needs of others.
- Materials to educate hikers about the rationale for cyclists' distinctive clothing and about riding techniques that cyclists must use to ensure their safety. Educational materials may also include references to efforts made by cycling organizations to develop trail etiquette or maintain local trails.
- Similar efforts aimed at cyclists could emphasize orientation toward local recreation areas shared by hikers, bikers, and other user groups.

An emphasis on understanding and acceptance, if successful would help to redefine the social situation in outdoor recreation settings.

Who Hates Whom in the Great Outdoors: The Impact of Recreational Specialization and Technologies of Play

by Bill Devall and Joseph Harry
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The authors offer the concept that social relationships in outdoor recreation setting are heavily influenced by recreational technologies. Recreationists participate in clusters of technological similar recreations. They hypothesized users of more physically obtrusive technologies are resented by users of less obtrusive technologies.

A questionnaire was used to obtain data from participants in many different recreational activities in the Willamette Basin of Oregon. The study found distinct clusters of recreational technologies did exist, resenting relationships were found between users of different technologies, but these resentments were directed toward both obtrusive and non-obtrusive technologies. Conflicts were surprisingly found to be between clusters rather than within their own principle cluster.

The authors suggest that a significant portion of user perceived crowding does not simply result from too many users at a site, but is due to mixing various technologies at the site. Problems may be particularly severe when one activity involves quiet, slow speed, and an appreciation for nature and the other activity requires speed and noise ("oar power" vs. "motor power").

Diversification in recreational technologies occurs in hybridization or combination of pre-existing devices and activities. An example of this is water skiing, a combination of skiing and motor boating. This kind of hybridization tends to give rise to technological clusters of related activities. The activities of boating and fishing yield a variety of activities including: motor boat fishing, rowboat fishing, shore fishing, motor boating, rowing, etc. The authors suggest that an individual will tend to participate in activities within a cluster much more frequently than those of other clusters.

Newer technologies such as snowmobiles, all-terrain vehicles and hovercraft tend to be much more "*sensory obtrusive*" than older technologies. Resenting relationships between devices of different technologies tends to be asymmetrical (one way). For example, canoeists resent boaters, but boaters haven no objection to canoeists.

When speed is involved an additional problem may enter the system. Users of fast moving recreational equipment may feel constrained by the presence of slower moving equipment. While slower moving recreationists may fear being "ran over."

I. SYNTHESIS OF THE MULTIPLE-USE TRAIL LITERATURE AND PRACTICE

A. Challenges Faced by Multiple-Use Trail Managers

The manager of any trail faces many challenges, usually within the context of too few staff and too little money. The underlying challenges faced by trail managers, however, remain the same regardless of the type of trail and whether it serves a single group or many different ones. Trail managers attempt to: 1) maintain user safety, 2) protect natural resources, and 3) provide high-quality user experiences. These issues can become more complex and more difficult to manage as the number and diversity of trail uses increase, but the challenges and the tools available to address them remain basically the same.

Maintaining User Safety

Unsafe situations or conditions caused by other trail users can keep visitors from achieving their desired trail experiences. This goal interference due to safety concerns is a common source of conflicts on trails. There are a number of threats to user safety that can occur on trails. Some of these include:

- Collisions and near misses among users and/or their vehicles.
- Reckless and irresponsible behavior.
- Poor user preparation or judgment.
- Unsafe conditions related to trail use (e.g., deep ruts, tracks on snow trail, etc.).
- Unsafe conditions not related to trail use (e.g., obstacles, terrain, weather, river crossings, etc.).
- Poor trail design, construction, maintenance or management.
- Other hazards (e.g., bears, lightning, cliffs, crime, etc.).

To help maintain user safety on trails, planners and managers can attempt to control or influence many factors, including the following:

- User speed (often has more to do with speed differential than the speed itself).
- Mass of user and vehicle (if any).
- Sight distances.
- Trail width.
- Trail surface.
- Congestion (e.g., number of users per mile).
- Users overtaking one other silently/without warning.
- Trail difficulty (obstacles, terrain, condition, etc.).
- User skill level and experience.
- User expectations and preparedness (e.g., walkers who understand they may see bicycles on a particular trail can better prepare themselves for possible encounters).
- Emergency procedures.

- On-site management presence.

Protecting Natural Resources

Resource impacts such as soil erosion, damaged vegetation, polluted water supplies, litter, vandalism, and many other indications of the presence of others can lead to feelings of crowding and conflict. These feelings can occur even when there is no actual contact among different trail users. A hiker's enjoyment might be reduced by seeing All-Terrain Vehicle (ATV) tracks near a wilderness boundary, for example, or an equestrian user might be upset to see many cars with bike racks at the trailhead before beginning a ride.

Minimizing environmental impacts is a high priority for resource and recreation managers. Natural resources include soils, wildlife, vegetation, water, and air quality. Historic, cultural, and archaeological resources are also vulnerable to impacts caused by trail use. A considerable amount of trail manager time and resources is spent attempting to minimize impacts affecting each of these resources. All trail use, regardless of travel mode, impacts natural resources. Research indicates that the following factors influence the amount of resource damage caused by trail use:

- Soil characteristics: type, texture, organic content, consistence, depth, moisture (e.g., muddy versus dry), temperature levels (especially frozen versus thawed), etc.
- Slope of surface and topography
- Position in land form (e.g., northern versus southern exposure)
- Elevation
- Type of ecosystem
- Type of wildlife
- Type of vegetation in trail
- Type of vegetation and terrain beside trail (influencing widening)
- Quality of trail design and construction (especially regarding drainage)
- Level of maintenance (e.g., effectiveness of drainage)
- Type of use
- Type of vehicle
- Level of use
- Concentration or dispersal of use
- Season of use
- Difficulty of terrain (to user)
- Up or down hill traffic direction
- Style of use or technique (e.g., skidding tires versus controlled riding)

There is a large body of research regarding the natural resource impacts of outdoor recreation. Much of this research is reviewed in *Visitor Impact Management: A Review of Research*, by Kuss, Graefe, and Vaske (1990). It provides an excellent summary and synthesis of the findings of more than 230 articles related to the vegetation and soil impacts of recreation, 190 related to water resources impacts, and another 100 related to

impacts on wildlife. Many of these deal directly or indirectly with trail use. Another excellent reference is a bibliography prepared by the National Off-Highway Vehicle Conservation Council (date unknown). It identifies more than 750 studies relating to off-highway vehicles and their use. A large number of these relate to resource impacts and resource protection.

Based on their thorough review of the literature, Kuss et al. (1990) conclude that evaluations of impacts should be made on a site-specific or area-specific basis due to the many interrelated factors affecting them. They do, however, offer the following generalizations regarding the impacts of various trail uses: backpacking causes more damage than hiking without a pack; hiking and backpacking cause greater changes to trails than walking; horses and packstock cause greater damage than hiking; trail biking causes more damage than hiking; and track-driven vehicles cause more damage than wheel-driven vehicles. They note, however, that site-specific factors can lead to exceptions to these generalizations. In a recent study of erosion damage caused by trail use, Seney (1991) concluded that horses produced more erosion than hikers, off-road bicycles, or motorcycles and that wet trails were more susceptible to damage than dry trails.

It is sometimes difficult to distinguish trail damage caused by trail users from damage caused by nonusers. For example, equestrian trail use is often blamed for damage caused by livestock grazing on public lands. Damage that appears to have been caused by motorized trail users may have been caused by trail crews accessing work sites or by miners traveling to and from their claims. In many cases, the initial construction of the trail itself causes greater resource impact than subsequent trail use (Keller 1990).

One aspect of protecting natural resources that is particularly relevant to multiple-use trail management is the relationship between amount of use and levels of natural resource impact. Numerous studies of the effects of camping indicate that the greatest environmental impact occurs with low use (see review by Kuss et al. 1990). In other words, the initial users of lightly used areas cause the most damage to soils and vegetation. The rate of degradation generally decreases after a certain amount of damage has been done. This has important implications for the issue of whether to concentrate or disperse trail use. In trail settings where this same relationship holds, dispersing trail use to relatively unused trails may greatly increase environmental impacts.

Providing High-Quality User Experiences

Researchers believe that people who participate in outdoor recreation activities do so because they hope to gain certain rewards or outcomes (Vroom 1964; Driver and Tocher 1970). These outcomes consist of a wide variety of experiences such as solitude, challenge, being with friends or family, testing skills, experiencing nature, and others (Driver and Knopf 1977; Driver and Brown 1978; Tinsley and Kass 1978). What experiences are desired vary a great deal across activities, among people participating in the same activity, and even within the same individual on different outings (Schreyer

and Roggenbuck 1978; Graefe, Ditton, Roggenbuck, and Schreyer 1981). In fact, recreationists are often seeking to satisfy multiple desires in a single outing (Hendee 1974, Driver and Tocher 1970). So recreation behavior is understood to be goal-directed and undertaken to satisfy desires for particular experiences. The quality of these experiences is often measured in terms of users' overall satisfaction (Williams 1988).

In a perfect world, land managers could provide nearby, high-quality opportunities for every type of experience trail users might possibly seek. This is rarely possible, of course. Limited budgets, limited amounts of land, and the sheer number of users with different preferences make it impossible to perfectly satisfy all the people all the time. Flexibility, compromise, and common courtesy on the parts of all users are necessary to maximize the opportunities for high-quality experiences for everyone.

Threats to Quality Experiences

Past research has consistently found that outdoor recreationists are well satisfied with their recreation experiences (Kuss et al. 1990, 191). However, recreation experiences are affected by many subjective as well as situational factors: the conditions encountered at an area, users' expectations, any discrepancies between what users expect and what they actually find or experience (Lawler 1973; Peterson 1974; Schreyer and Roggenbuck 1978; Todd and Graefe 1989), social and personal norms (shared "rules" or "standards" of good or bad, right or wrong, etc.), use levels (Kuss et al. 1990), and "social interference" (Brehm 1966; Proshansky, Ittelson and Rivlin 1970). For a complete review of research related to the recreation experience, see Kuss, Graefe, and Vaske (1990). Two of the most serious threats to quality trail experiences on multiple-use trails are discussed in more detail below.

Crowding-Crowding is more than the objective density of users in a particular area. It is a subjective judgment on the part of an individual that there are too many other people there. In other words, it is a negative evaluation of a particular density of people in an area (Stokols 1972; Rapoport 1975; Kuss et al. 1990). As such, crowding can reduce the quality of recreation experiences. Level of use does appear to affect feelings of crowding, but in most cases not directly. Levels of perceived crowding vary with such mediating factors as:

- Number of encounters
- Number of encounters preferred
- Number of encounters expected
- Discrepancy between actual and expected encounters
- Motivations for participation (e.g., solitude versus social interaction)
- Preferences (desires)
- Expectations (what was anticipated)
- Behavior (as opposed to the number) of others
- Visitor attitudes
- Type of area (e.g., primitive versus urban)
- Location of contacts (e.g., trailhead versus campsite)

- Proximity of others
- Size of group
- Size of group encountered
- User's experience level
- Perceived environmental disturbance
- Type of encounter
- Obtrusiveness of visual impact (e.g., bright-colored versus earth-toned clothes, tents, and equipment)

See Kuss et al. (1990) for an excellent review and synthesis of research related to crowding. Crowding on trails can be the result of others participating in the same trail activity or different activities. Crowding can be related to feelings of conflict on trails.

Conflict-The verb "share" is generally defined as "to distribute parts of something among others; to retain one part of something and give the rest or part of the rest to another or others; to take or use a part of something with someone or something; to do or experience something with others; to join with others in doing or experiencing something." On the other hand, the verb "conflict" is defined as "to be at variance, clash, to struggle, or contend" (New Webster's Dictionary 1992). Conflict can cause serious impacts to recreation experiences, to the point of causing some users to end their use and be displaced by other pre-emptive users (Schreyer 1979).

According to recreation researchers, conflict is a special type of dissatisfaction. It is generally defined as "goal interference attributed to another's behavior" (Jacob and Schreyer 1980, 369; Jacob 1977). For example, when a trail user fails to achieve the experiences desired from the trip and determines that it is due to someone else's behavior, conflict results and satisfaction suffers. As defined by Jacob and Schreyer (1980), conflict is not the same thing as competition for scarce resources. If people attribute not getting a parking place at a trailhead to their own lack of planning, there is no conflict. If they blame the lack of parking places on horseback riders who they feel have parked their trucks and trailers inconsiderately (whether or not this is truly the case), conflict will likely result. In both cases, users did not achieve their goals, and dissatisfaction resulted, but only one was due to conflict as defined here.

As with crowding, conflict is not an objective state but depends on individual interpretations of past, present, and future contacts with others. Jacob and Schreyer (1980, 370) theorize that there are four classes of factors that produce conflict in outdoor recreation:

- **Activity Style**-The various personal meanings attached to an activity. Intensity of participation, status, range of experience, and definitions of quality (e.g., experts and novices may not mix well).
- **Resource Specificity**-The significance attached to using a specific recreation resource for a given recreation experience (e.g., someone running her favorite trail near where she grew up along Lake Tahoe will not appreciate seeing a tourist demonstrate a lack of respect for her "special place" by littering).

- **Mode of Experience**-The varying expectations of how the natural environment will be perceived (e.g., bird watchers who are "focused" on the natural environment will not mix well with a group of ATV riders seeking speed and thrills who are "unfocused" on the environment).
- **Tolerance for Lifestyle Diversity**-The tendency to accept or reject lifestyles different from one's own (e.g., some trail users "just don't like" people who do not share their values, priorities, trail activities, etc.).

These four factors have been redefined by Watson, Niccolucci, and Williams (in press) as "specialization level," "definition of place," "focus of trip/expectations," and "lifestyle tolerance." Their research suggests that these factors may be better at predicting predispositions toward conflict than predicting actual goal interference.

Notice that none of the above factors thought to produce (or predispose some to) conflict are necessarily related to the particular activity a trail user might be engaged in at the time. Also note that no actual contact need occur for conflict to be felt.

Taking an approach similar to that of Jacob and Schreyer (1980), Owens (1985) attempts to differentiate more clearly between "conflict" and "crowding" from a goal-oriented social and psychological perspective. He defines "recreational conflict" as "a negative experience occurring when competition for shared resources prevents expected benefits of participation from accruing to an individual or group." He defines "social and psychological conflict" as "competition for shared resources amongst individuals or groups whose leisure behavior is mutually exclusive or has contrary objectives and as existing whenever two or more individuals or groups perceive the (recreational) utility of particular (countryside) resources in terms of opposing values or goals." In other words, social interrelationships and differences among users are more the root problem than the physical influences they might have on one another. Owens develops this concept by introducing two propositions:

1. "Conflict is a process of social interaction which is operationalized with the general motivational goal of eliminating environmental instability and restoring perceived equilibrium" (p. 251). According to Owens, all behavior settings have normative "rules." When competing groups view a setting and its purpose in different ways and/or there is inappropriate behavior, these rules begin to break down. In such cases people will employ various coping mechanisms (behavioral, cognitive, or affective) to try to eliminate the source of stress and try to return things to a more desirable state. Conflict occurs when these coping strategies are inadequate, unsuccessful, or unavailable in an acceptable period of time and alternatives seem to be unavailable (i.e., if a person's coping strategies don't work, his feelings of crowding can become feelings of conflict).
2. "Conflict is a cumulative process of social interaction which once established becomes an enduring psychological state guiding the behavior of individuals and/or groups" (p. 252). Owens proposed that this is how conflict can be distinguished from crowding. Crowding is an immediate reaction to present conditions and thus transient. Conflict is more persistent and enduring, lasting

beyond a particular outing. Owens sees conflict itself as an experience which can be viewed as a continuum from "simmering discontent and frustration" to confrontation. It may or may not alter actual behavior. If overt confrontation appears, much of the damage of conflict may have already occurred.

Kuss et al. (1990) noted three types of coping strategies, all of which change the character of the experience for the user forced to cope:

- Users re-evaluate the normative definition of what is acceptable (i.e., they adapt and accept the conditions they find).
- Users change their behavior (e.g., use less frequently, use at off-peak times, etc.).
- Users are displaced altogether (i.e., conditions are unacceptable to them, so they stop the activity or stop visiting that area).

In studies of recreationists on trails, rivers, and lakes, several themes and patterns have been found to relate to conflict. These themes tend to support the four theoretical propositions proposed by Jacob and Schreyer (1980) that were discussed above. These themes are:

- **Level of Technology**-Participants in activities that use different levels of technology often experience conflict with one another. Examples include cross-country skiers and snowmobilers, hikers and motorcyclists, canoe paddlers and motor boaters, and nonmotorized raft users and motorized raft users (Lucas 1964; Knopp and Tyger 1973; Devall and Harry 1981; Adelman, Heberlein, and Bonnicksen 1982; Noe, Hull, and Wellman 1982; Noe, Wellman, and Buhyoff 1982; Bury, Holland, and McEwen 1983; Gramann and Burge 1981).
- **Conflict as Asymmetrical**-Many times, feelings of conflict are one-way. For example, crosscountry skiers dislike encountering snowmobilers, but snowmobilers are not as unhappy about encountering cross-country skiers. This type of one-way conflict has been found between many different activities (Stankey 1973; Schreyer and Nielsen 1978; Devall and Harry 1981; Jackson and Wong 1982; Adelman, Heberlein and Bonnicksen 1982). In general, trail users enjoy meeting their own kind, but dislike uses that are faster and more mechanized than their own (McCay and Moeller 1976; Goldbloom 1992).
- **Attitudes Toward and Perceptions of the Environment**-Users in conflict have been found to have different attitudes toward the environment (Knopp and Tyger 1973; Sarembe and Gill 1991) and may perceive the environment differently. Perceptions may be influenced by when the user first visited the area, with long-time and frequent visitors being most sensitive to contacts with others (Nielsen, Shelby and Haas 1977; Schreyer, Lime and Williams 1984). People who view the environment as an integral part of the experience are more susceptible to conflict than those who see the environment as just a setting for their activity. (Low Impact Mountain Bicyclists of Missoula (LIMB), for example, encourages riders "to use mountain bikes to enjoy the environment, rather than use the environment to enjoy mountain bikes" (Sprung 1990, 29). Some experiences are dependent upon very specific environments. Likewise,

people can become attached to particular settings (Williams and Roggenbuck 1989; Moore and Graefe 1994). Some mountain bikers feel hikers are too possessive toward trails (Hollenhorst, Schuett and Olson 1993).

- **Others as Different**-Users experiencing conflict perceive others to be different from themselves in terms of background, lifestyle, feelings about wilderness, activities, etc. (Adelman, Heberlein and Bonnicksen 1982). However, trail-user groups are sometimes more similar than they believe (Watson, Williams and Daigle 1991). Method of travel and group size are the most visible cues users can evaluate to determine their similarity to other groups (Kuss et al. 1990). One negative contact can lead some sensitive users to conclude that "all of them are rude."
- **Violation of Norms**-Individuals and groups with different standards of behavior (social and individual norms that define what behavior is appropriate) often conflict with one another (Jacob and Schreyer 1980; Vaske, Fedler and Graefe 1986). Norms of behavior are established through social interaction and refined through an ongoing process. These norms influence how people behave and how they expect others to behave. For example, many fishermen resent canoeists who shout and yell (Driver and Bassett 1975). They apparently hold a norm that boisterous behavior is inappropriate in those situations. The strength of the norm violated (as well as the importance of the goal interfered with) will influence the magnitude of the conflict. Norms appear to be more useful than goals for predicting conflict (e.g., a hiker and a motorcyclist may share the same goals of experiencing nature and escaping from the city but may cause conflict for one another).
- **Level of Tolerance**-Level of tolerance for others is related to level of conflict (Jacob and Schreyer 1980; Ivy, Steward and Lue 1992). Levels of tolerance vary widely among individuals depending upon personal norms and situational factors such as group size, where the contact occurs, when the user first visited the area, motivations, and frequency of use (Vaske et al. 1986; Shelby and Heberlein 1986). Levels of tolerance are lowest in "wilderness" areas. Assumed images of activities and stereotyping influence tolerance as well (White and Schreyer 1981; Williams 1993). This is consistent with the belief among members of LIMB that Missoula's "live and let live" attitude contributed to their success in minimizing user conflicts on area trails.
- **Environmental Dominance**-Users who differ in terms of the importance they give to "conquering" the environment are likely to conflict. This is related to the importance of autonomy, control, challenge, and risk-taking goals (Bury, Holland and McEwen 1983).

Another theme related to trail conflict often expressed by trail managers and trail users is the resentment toward newcomers that is often expressed by traditional trail users. This is similar to the "last settler syndrome" (Nielsen, Shelby and Haas 1977) where visitors want a particular place to remain the way it was when they first arrived. The first or traditional users want to be the last ones allowed access. Mountain bikers commonly complain that hikers want to unfairly exclude them from backcountry areas just because bicycle use is new and untraditional. This "last settler syndrome" is

particularly acute in areas where one user group has built and/or maintained trails which are later invaded by other types of uses. Managers and new users must be sensitive to the understandable ownership the traditional users feel toward trails they have built and care for. A similar sense of ownership and tradition makes it more difficult to close trails to a particular use once that use is established. The animosity felt by some long-time mountain bikers toward managers of the Mt. Tamalpais area (Marin County, north of San Francisco) is likely magnified by the fact that in the early days of mountain biking, all trails there were open to mountain biking. Single-track trails were subsequently closed to mountain bike use.

In addition to the general causes of conflict summarized above, it is instructive to look at specific factors that lead to feelings of conflict on trails. Sources of conflict can be either willful or innocent. Some users are irresponsible and unfriendly. They behave in ways they know will annoy others or damage resources. Many, however, are simply not aware of how they should behave on trails. Examples of common sources of conflict among trail users reported by trail managers and users include noise, speed, smell of exhaust, surprise, lack of courtesy, trail damage (e.g., erosion, tracks, skid marks, etc.), snow track damage, different (and sometimes unrealistic) expectations, uncontrolled dogs, horse manure, fouled water sources, littering, animal tracks in snow, wild behavior, and lack of respect for others. Flink and Searns (1993) believe conflict results from an increase in demand for trail resources, increased use of existing limited trails, poor management, underdesigned facilities, lack of user etiquette, and disregard for the varying abilities of trail users (p. 194).

A study of readers of Backpacker magazine found that over two-thirds felt the use of mountain bikes on trails was objectionable (Viehman 1990). Startling other trail users, running others off the trail, being faster and more mechanized, damaging the resources, causing erosion, frightening wildlife, and "just being there" were the biggest concerns (Kulla 1991; Chavez, Winter and Baas 1993). Keller (1990) notes that brightly colored clothes, a high-tech look, and the perception of a technological invasion can all be sources of conflict felt by others toward mountain bikers.

Just as some physical damage to trails is not caused by trail users, some conflicts on trails are not due to other trail users at all. Aircraft noise from sightseeing planes and helicopters, for example, is a major irritant to trail users in Hawaii. Noise and smells from nearby roads or developments can have as much or more impact on trail experiences than conflicts with other users.

So, following this collection of items that can cause conflict on trails, the relevant question is, how big a problem is trail conflict? Certainly, conflict is a major problem on some multi-use trails (Flink and Searns 1993). As mentioned earlier, however, past research has consistently found that outdoor recreationists are well satisfied with their recreation experiences (Kuss et al. 1990, 191). This has been found in a variety of settings, including trails. Because the conflict studies noted above were designed to examine recreational conflict, many of them focused on areas where visible conflicts were occurring. These studies do not give a clear picture of the scope of conflict that

might be occurring on trails in general. Conflicts are certainly a serious threat to satisfaction, but serious conflicts may not be the norm.

Several studies of multiple-use rail-trails have included questions related to user conflicts. In a survey of rail-trail managers conducted by the Rails-To-Trails Conservancy in 1991, over half of the 83 managers responding reported no conflicts or "few if any" conflicts on their trails. The most common type of conflicts reported were between hikers and bikers, followed by conflicts between equestrians and bikers. Conflicts involving in-line skaters, cross-country skiers, and dogs were also reported. A study of three rail-trails in Iowa, Florida, and California found that users reported little problem with conflict on average. More than 2,000 users were asked to rate "conflicts with other activities" and "reckless behavior of trail users" on a 7-point scale where "1" represented "not a problem" and "7" represented "a major problem." The mean response was less than 2 on each trail for "conflicts with other activities" and ranged from 1.5 to 2.8 for "reckless behavior of trail users" (Moore, Graefe, Gitelson and Porter 1992, 111-26). The same study included an open-ended question that asked "What things did you like least about the trail?" The top three responses were recorded for each user. Of a total of 2,128 comments, 316 (14.8 percent) related to the behavior of other users. The most common of these (239) were about bicyclists being inconsiderate, riding two-abreast, passing with no warning, going too fast, and other unspecified concerns about bikers. An additional 72 (3.4 percent) identified crowding as the thing liked least. Similar results were found in a study of trail users on 19 multi-purpose pedestrian and bike trails in Illinois (Gobster 1990, 32). "Use problems" (crowding, conflict, and reckless users) received mean ratings of less than 2 on a 5-point scale where "1" represented "not a problem" and "5" represented a "major problem."

A recent National Park Service study of backcountry recreation management provided information related to conflicts on backcountry trails in 93 national parks (Marion, Roggenbuck and Manning 1993). Nine percent of the parks reported that conflicts between horses and hikers were a problem in many or most backcountry areas. Three percent of the parks reported that conflicts between hikers and mountain bikers were a problem in many or most areas. Day users (apparently due to their large numbers), overnight users, horse users, and mountain bikers were all felt to cause visitor conflicts. Day users, overnight users, OHV/ATV users, horse users, and mountain bikers were also reported to create problems through inconsiderate behavior.

Conflicts among trail users are a serious problem in some areas. On Mt. Tamalpais in Marin County, California, for example, "renegade" mountain bikers have allegedly built illegal trails and engaged in vandalism and sabotage to attempt to gain access to single-track trails closed to them. However, there are also areas where users are successfully (and apparently happily) sharing trails. Unfortunately, the existing research does not offer much insight into how widespread a problem recreational conflict is on trails. Many of the managers we talked to felt conflict was a problem. Several also volunteered that they expected conflicts to increase unless they could do something about the problem soon.

Summary

Managers of multiple-use trails face many interrelated challenges. Most important, they must attempt to keep users safe, minimize negative impacts to natural resources, and provide for high-quality visitor experiences. All of these challenges involve managing various types of impacts caused by recreational use. Conflicts among trail users are one of these impacts. After extensively reviewing the recreation literature, Kuss et al. (1990) developed five principles related to the impacts caused by outdoor recreation (pp. 5, 187-188). Although developed to explain the environmental and social impacts of outdoor recreation in general, they apply equally well to the impacts (including conflict) that challenge managers of multiple-use trails in particular. They consider contacts between users and the damage users cause to the environment as "first-order" social impacts (p. 189). They feel these impacts interact to cause combinations of perceived crowding, dissatisfaction, perceived resource impacts, as well as conflicts between users. Their principles can be summarized as follows:

- Recreational use can cause an interrelated set of impacts to occur (e.g., damage to natural resources caused by one group can lead to feelings of conflict or crowding in another group). There is no single predictable response to recreational use.
- Impacts are related to level of use, but the strength and nature of the relationships vary widely and are influenced by many aspects of use intensity and a variety of situational variables.
- Tolerance to impacts vary (e.g., all individuals do not respond the same way to encounters with other visitors, just as all soils or plants react differently to trampling).
- Impacts are activity-specific. Some activities create impacts more quickly or to a greater degree than others. Impacts even from the same activity can vary according to such factors as mode of transportation, characteristics of visitors, party size, and behavior.
- Impacts are site-specific. Given a basic tolerance level to a particular type of recreation, the outcome of use may still depend on the time and place of the encounter or disturbance.

Conflicts on trails can be a serious, complex challenge, but one that must be addressed if users are to have safe, satisfying experiences. The next section details the tools available to address the challenge of conflict on multiple-use trails.

B. Ways to Avoid or Minimize Conflicts on Multiple-Use Trails

As noted earlier, most participants are satisfied with their outdoor recreation experiences. The challenges discussed in the preceding section, however, can lead to severe consequences if not managed properly. In addition, the nature of the recreation experience limits the manager's options in addressing the potential negative impacts of trail use. Freedom, and freedom of choice in particular, are essential for high-quality outdoor recreation on and off trails. Multiple-use trail managers must be sensitive to this

fact and avoid restriction and manipulation whenever possible. The "minimum tool rule" proposed by Hendee, Stankey, and Lucas (1990) for wilderness management is an appropriate guideline for the management of most multiple-use trails as well. They advocate using the least intrusive measures (whether physical or managerial) that will still achieve area objectives. This sensitivity is critical to maintaining the freedom and naturalness so important to most trail-based recreation.

A wide variety of possible responses to addressing conflict problems exists. For example, rail-trail managers responding to a survey by the Rails-To-Trails Conservancy listed the following as techniques they use to overcome conflict-related problems on their trails (listed from most to least frequently reported):

- signage
- education
- meeting with user groups
- expanding facilities
- police or ranger patrols
- enforcement of regulations
- brochures articles in newsletters or local newspapers
- imposing speed limits
- volunteer trail patrols
- partial closings
- bicycle bell give-aways

In a recent National Park Service study of backcountry recreation management in 93 national parks (Marion et al. 1993), managers listed the following as actions they had taken to reduce visitor crowding and conflict in backcountry areas (the numbers following each indicate the percent of managers reporting that they used that technique):

- Inform visitors about crowded conditions they may encounter in certain areas (56 percent)
- Encourage quiet behavior and activities (45 percent)
- Inform visitors about conflicting uses they may encounter in certain areas (40 percent)
- Encourage use of less popular access points and backcountry areas (38 percent)
- Encourage off-season use (29 percent)
- Designate trails for different types of visitor use (27 percent)
- Encourage visitors to use natural-colored equipment and clothing (18 percent)
- Encourage weekday use (14 percent)
- Segregate different types of visitor use by geographic area (12 percent)
- Discourage use during peak seasons (12 percent)
- Discourage weekend use (4 percent)
- Encourage outfitters and large groups to use lesser used areas (2 percent).

The following section discusses these and other possible responses managers can take when faced with one or more of the safety, resource protection, or user experience

challenges noted in the previous section. These responses are grouped into two broad categories: physical responses and management responses. Management responses are further broken down into three types: information and education, user involvement, and regulations and enforcement. There is considerable overlap between the physical and management responses as well as among the three types of management responses. An effective program will include many different tools.

Strategies will differ depending upon whether the trail is an existing one or one planned for new construction. There is no reason to wait for any problem to occur before taking steps to address it. This is especially true of conflict. It is always better to try to avoid conflict before it becomes a challenge rather than try to reduce it after it is entrenched. Responses may also be affected by factors outside the manager's immediate control. Occasionally sharing trails is not an option for managers or users such as when a private or corporate landowner agrees to allow only certain activities (e.g., snowmobile use). These situations may occur as conditions of a lease, easement, or other agreement.

A more common situation that can limit managers' options is overall agency policy. See Keller (1990) for an excellent discussion of the two general policy approaches that guide decisions on mountain bike access (and access for other trail activities) to public lands. Keller identifies a "trails open unless declared closed" policy and a "trails closed unless declared open" policy. Although policies can be changed, they form the context within which managers and users must address conflict and promote cooperation.

Note that although many of the following approaches are directed toward trail users, most require action on the part of trail managers as well as users. Some strategies will require training for the managers, staff, and volunteers who implement them. Conflict resolution training for individuals facilitating initial meetings of different user groups would be very helpful, for example. As pointed out by Keller (1990) the land manager's approach to the issue can be every bit as important as the proposal itself (p. 24).

Physical Responses

Proper trail design, layout, and maintenance (or redesign and reconstruction when necessary) are essential for user safety and resource protection and are important contributors to user satisfaction as well. Proper design includes more than aesthetics and minimizing resource impacts. It can be used to encourage trail users to behave in more appropriate ways. Influencing proper behavior through the subtleties of design is preferable and often more effective than attempting to do so after the fact through education programs or regulations. For example, it is easier and more effective to prevent shortcutting of switchbacks by designing climbing turns in rugged, well-screened areas than by posting educational signs at poorly designed switchbacks.

Different users often have very different needs and desires in terms of physical trail attributes such as surface, slope, length, safe sight distances, amenities, etc. Various standards and recommendations are available for different user groups (see American Association of State Highway and Transportation Officials 1991; USDA Forest Service

1991; Flink and Searns 1993; Ryan 1993; Seier 1990). These needs and preferences are far from universal even within one user group, however. Walkers, joggers, runners, hikers, people walking dogs, and people pushing strollers are all pedestrians, for example, but they do not have the same needs and desires in terms of physical trail attributes or trail settings. The best physical responses will always be dictated by specific local conditions. Managers and planners should identify the present and likely future trail users and determine the needs and desires of those users. Users of different ages, motivations, activity preferences, etc., will have different physical trail needs and preferences. Ryan (1993), for example, suggests hosting a "community design workshop" for proposed rail-trails to identify these needs and preferences.

Options.

Here is a partial list (in no particular order) of physical design, layout, and maintenance alternatives that can help avoid or minimize trail conflicts:

- Provide adequate trail mileage and a variety of trail opportunities in terms of terrain, difficulty, scenery, etc. Trail impacts, including conflicts, may be due more to the number of users on the trail than the types of users present or their behavior. Therefore, one important physical response option is to provide more trails and perhaps different kinds of trails where possible and appropriate. This will help disperse use and contribute to user satisfaction.
- Use the least intrusive physical manipulation that will achieve area objectives (Hendee, Stankey and Lucas 1990). Some physical solutions can reduce the opportunities for some experiences sought by trail users (e.g., manipulated or hardened surfaces can make solitude and enjoyment of natural surroundings less achievable).
- Provide separate trails when necessary and possible. This may be necessary only for problem sections. In other situations, whole trails or separate systems should be provided for different uses.

Flink and Searns (1993) advocate designing trails with specific users in mind to avoid conflict and unsafe trail conditions. They propose the following six alternative layouts for land-based trails (pp. 208-210).

- Single Tread, Single Use-The Appalachian Trail, for example, is designed and managed primarily for hiking.
- Single Tread, Multiple Use-Almost any urban, multiple-use trail is an example of this type of configuration. The W&OD Trail west of Washington, D.C., for example, is open to walking, running, bicycling, in-line skating, and other uses on the same paved tread.
- Single Tread Time of Use-(i.e., different types of use allowed on the single tread at different times of day, days of week, season of the year, etc.). This concept is similar to swimming pool regulations that set aside certain times for lap swimming only. Snowmobile trails that are open for multiple use during parts of the year but are restricted to snowmobiling during winter months illustrate

this as do multiple-use trails that are set aside for periodic special events such as "walk-a-thons." Beachside trails in southern California that are closed to biking when the lifeguard determines they are too crowded are a form of time zoning. At such times a red light is lit indicating that bikers must walk their bikes.

- Single Tread, Zoning for Multiple Use-(i.e., different types of use allowed on different sections of the trail). For example, the Heritage Trail east of Dubuque, Iowa, has one section set aside for cross-country ski use in the winter while the rest is available for snowmobiles. This type of zoning is also accomplished through design on the Platte River Greenway near Denver. Urban sections are paved and open to most nonmotorized uses, while some more rural sections are surfaced in crusher fines and are unusable by in-line skates and narrow-tired bicycles.
- Multiple Tread, Multiple Use-(i.e., different treads provided for different types of users within the same corridor). The heavily used Ojai Trail northwest of Los Angeles in Ventura County has adopted this approach. A 10-foot-wide paved trail for bicyclists and pedestrians runs parallel to a 10-foot-wide wood chip trail designed for equestrian use. The two are separated by a 42-inch-high wooden fence. The Venice Beach Trail south of Los Angeles separates two-way bicycle traffic from two-way pedestrian and skater traffic using a yellow center line and stamps on the pavement to indicate appropriate uses within each lane.
- Multiple Tread, Single Use-(i.e., provide different treads for various skill levels or preferences among the same user type). Urban trails that include a hard-surfaced trail for walkers with a nearby dirt path for runners illustrate this configuration as do cross-country ski areas that provide a set track on one side of a wider platform groomed for "skating."

McCoy and Stoner (1992) feel that providing separate trails for different users groups has many drawbacks, however. They point out that it can be expensive, cause resentment, be difficult to enforce, and limit opportunities for communication and cooperation among users. When separate trails are necessary, they suggest encouraging rather than requiring single use and explaining the reasons for this strategy at trailheads. This approach combines physical design with information and education efforts. Advocates of multiple-use trails see providing separate trails as a last resort. They feel positive interactions among users on the trail is the best way to foster communication, understanding, and a strong, cooperative trail community.

- Paint a centerline on heavily used multi-purpose greenways. This can help communicate that users should expect traffic in both directions (Flink and Searns 1993) and encourage users to travel on the right and pass on the left.
- Screen trails for sight, sound, and smells (e.g., exhaust fumes from motorized vehicles). Design in buffers (physical, visual, etc.) by using topography, vegetation, the sound of rivers, etc. to insulate users from one another when possible. Add buffers as needed on existing trails.
- Provide separate trailheads for different users.
- Separate uses at trailheads and for the first (most crowded) stretches of the trail. These separate segregated trails could then converge, perhaps a mile from the

trailhead, after users are more spread out. On the other hand, Attila Bality of the National Park Service Southwestern Region advocates forcing all trail users to share the same trail for some distance (e.g., a mile) before having single-use or restricted-use trails diverge from the main trail if necessary. His feeling is that users will only learn to understand one another and share trails if encouraged to do so. Some may not share unless forced to do so.

- Design in adequate sight distances.
- Build trails wide enough to accommodate the expected use. Many sources and recommended standards are available for various user groups (see American Association of State Highway and Transportation Officials 1991; USDA Forest Service 1991; Flink and Searns 1993; Ryan 1993).
- Build trails wide enough for safe passing, and/or provide pullout areas.
- Design and construct trails to minimize erosion. Resource damage attributable to a particular user group can cause conflict as well. Numerous excellent sources of information are available regarding trail construction and maintenance techniques (See Flink and Searns 1993; Ryan 1993; Albrecht 1992; American Hiking Society 1990; USDA Forest Service 1991; USDA Forest Service 1984; Proudman and Rajala 1981; Birchard and Proudman 1981). Some recommended actions to control erosion are:
 - Drain the surface—design for drainage, and install drainage structures where needed. Excellent suggestions for options on mountain bike trails are included in McCoy and Stoner (1992).
 - Avoid steep grades.
 - Use full bench construction (full trail tread supported by undisturbed soil rather than fill) when possible.
 - Design trails across slopes, not parallel to the fall line.
 - Keep trails (especially inclines) in areas of erosion-resistant soils.
 - Use trail-hardening techniques where appropriate (e.g., geo-tech fabrics, turf stone or tread support blocks, etc.).
 - Minimize erosion at switchbacks on mountain bike trails by keeping surface rough (slow speeds prevent mountain bikers from locking brakes), providing rock and log barriers at edges to prevent shortcutting and speeding to outer edge, or using climbing turns instead.
- Design to control speeds where necessary (e.g., where mountain bikes are sharing trails with walkers). Obviously, these techniques should only be used in situations where they will not create a safety hazard. To control speeds, managers have attempted to:
 - Vary the trail surface (e.g., add aggregate).
 - Vary the trail terrain (e.g., no banked turns).
 - Design to include frequent turns. But avoid sharp turns after long straight sections on mountain bike trails since fast riders may lock their brakes and skid into these turns.

- Add or leave barriers (e.g., rocks, roots, bumps, curves, washboard surfaces, downed trees, narrow sections, waterbars, and other drainage structures, bumps, or "roll and dip" sections as described by McCoy and Stoner 1992). Be aware, however, that the Americans With Disabilities Act prohibits building barriers that would make a facility less accessible to persons with disabilities.
- Where trail systems consist of a combination of single-track and road sections, design and manage so that single-track sections are traveled uphill and the roads downhill. This will slow mountain bikes on narrow sections and reduce skidding.
- Design entrances to and exits from loops at angles to encourage one-way traffic where desired. (This reduces the problem of signing for one-way traffic, which may lead some users to let down their guard and not expect the oncoming traffic which may still occur.)
- Provide adequate facilities (toilets, places to tie horses, etc.).
- Have an effective maintenance program appropriate to the type of trail and its use. Flink and Seams (1993, 298-299) consider such programs essential for users' safety and experiences and provide an excellent example for greenways. According to Ryan (1993), trail maintenance programs should address, at a minimum, the following: signs and markings, sight distance and clearance, surface repair, drainage, sweeping and clearing, structural deterioration, and illumination. She suggests involving the public in these activities through adopt-a-trail or similar programs.

Management Responses

Once a trail is physically in place, managers can still have a tremendous influence on user safety, natural resource protection, and user experiences. Management actions can take many forms, from doing nothing to closing areas. The alternatives can be grouped into three categories: information and education, user involvement, and regulations and enforcement. Considerable overlap exists among these three groups, of course. This is especially true of information/education and user involvement (e.g., a volunteer trail patrol provides information and educates users, involves users in taking responsibility for their own trails and use, and may well assist in communicating and enforcing regulations and preventing resource damage). Information and education, user involvement, and regulations and enforcement are discussed separately below.

Information and Education-Uninformed, unintentional, unskilled, and careless actions by users are often cited as the causes of many problems in outdoor recreation areas (Roggenbuck 1992; Roggenbuck and Ham 1986). Many managers feel that this is particularly true of trail-related problems. If this is true, educating the public and persuading them to act responsibly should be effective strategies for improving behavior on trails. According to McCoy and Stoner (1992), "effective communication is the best way to prevent user dissatisfaction and conflict." Ryan (1993) advocates education as the key to solving problems associated with mountain bike use and for promoting trail-user etiquette. Many others echo the importance of trail-user education (Merriman

1988). Whether the behavior being promoted is called trail etiquette, trail ethics, trail courtesy, or trail sharing, information and education efforts are almost universally supported as an essential strategy for providing opportunities for high-quality recreation experiences. Influencing human behavior through information and education is an attractive alternative to controlling or coercing compliance through more heavy-handed techniques that can impact recreation experiences (Manfredo 1992; Lucas 1981). This preference is strongly held by recreationists (Roggenbuck and Ham 1986) and seems to be shared by most managers. Like other good things, however, even information and education can be overdone. Lucas (1981) cautions managers against providing too much information, especially in backcountry settings where users may be seeking discovery and exploration.

Considerable literature exists on the use of information and education in recreation settings. An excellent reference is *Influencing Human Behavior: Theory and Applications in Recreation, Tourism, and Natural Resources Management*, edited by Manfredo (1992). Particularly relevant is the chapter by Roggenbuck entitled, "Persuasion to Reduce Resource Impacts and Visitor Conflicts." He notes that a user's motive for engaging in undesirable behavior will influence how effective persuasion will be in changing the behavior. In terms of the five types of undesirable visitor actions identified by Hendee et al. (1990), Roggenbuck proposes that persuasive communication has low potential for influencing illegal or unavoidable (e.g., human waste) acts, but has very high potential for changing uninformed acts. Similarly, persuasion has moderate potential to influence careless acts (e.g., littering) and high potential of modifying unskilled actions. Gramann and Vander Stoep (1987) categorize violations of norms in parks into six types. Roggenbuck places them in the following order in terms of how effective persuasive communication would be in altering each. From the least likely to be influenced by persuasion to the most likely, they are: status-conforming (i.e., do it to be "in" with the group), willful, releasor-cue (e.g., seeing others do it), responsibility-denial, unintentional, and uninformed.

Roggenbuck (1992) identifies three distinct conceptual routes to persuasion and learning. Each has relevance to designing effective information and education efforts to promote trail sharing.

- **Applied Behavior Analysis**-This approach addresses the user's behavior itself and not beliefs, attitudes, thoughts, or values that may be associated with it. This is most frequently attempted through rewards, punishments, manipulation of the environment, or behavioral prompts (e.g., written or oral messages that state "Share the Trail"). Because this approach does not deal with underlying beliefs or attitudes, however, it is not likely to bring about long-term changes in behavior.
- **Central Route to Persuasion** (also called the "central route to attitude change" by Petty, McMichael and Brannon 1992)-This approach attempts to change behavior by changing the attitudes and beliefs related to them. It attempts to get recipients to consider the message more carefully and then agree with it. If recipients consider the message and agree with it, they change their beliefs and

then act accordingly (one hopes in more desirable ways). In other words, get users to consciously consider their actions rather than spontaneously engage in behavior that may be undesirable (Vincent and Fazio 1992). The central route to persuasion should have better long-term effects because users' new beliefs and attitudes guide their behavior now and in the future. For example, if a user considers and agrees with a campaign promoting an attitude of "Treat Other Trail Users the Way You Would Like To Be Treated," they might internalize the message and act more considerately in the future. To be effective, the user must be motivated to pay attention, be able to understand and process the message, and have the necessary skills and abilities to respond. According to Roggenbuck, the effectiveness of the persuasion will be influenced by characteristics of the recipient, the message, and the situation. Low-knowledge, first-time users are generally easiest to persuade. Strong, well-supported, specific, clear, relevant, interesting messages tailored to particular audiences are most effective. Well-timed situations with adequate time and few distractions are needed for central route persuasion.

- Peripheral Route to Persuasion (also called the "peripheral route to attitude change" by Petty, McMichael and Brannon 1992)-This approach applies when users are unable or unwilling to give the message their attention or consideration. Therefore, little attitude change or long-term effect is achieved. When users are overloaded with information, they often block out managers' messages or use simple decision rules (e.g., is the source credible or important?) to determine their response. For users in a crowded and distracting trailhead parking lot, for example, a poster of Clint Eastwood with the caption, "Good guys share trails," may be more effective than a carefully thought out, well-supported trail-sharing brochure. Timing and some (but not too much) repetition of the message are critical to the success using the peripheral route to persuasion.

The following information and education advice offered by Roggenbuck and Ham (1986) applies well to any such efforts to reduce trail conflict or promote trail sharing:

Programs become feasible and effective when managers are able to identify clientele groups and their characteristics, place information where people can easily receive it, provide information early in the decision-making process, and present the information in an interesting and understandable way (p. Management-62).

Identifying the particular users in need of the information is a critical and often overlooked part of the education process. For example, Matheny (1979) found that 14- to 17-year-olds were the users most likely to shortcut switchbacks on trails. A successful campaign to reduce shortcutting of trail switchbacks would specifically target those users and do so in ways that would be interesting and compelling to them. Similarly, information and education efforts to avoid or reduce trail conflicts should be directed at the particular users involved.

Information and education programs related to promoting trail sharing should have one or more of the following objectives:

- Communicate why the trail is shared (Reese 1992).
- Communicate that cooperation can benefit all. Skye Ridley, executive director of the Pikes Peak Area Trails Coalition, notes that the challenge is to convince people that "it's cool to share trails."
- Teach about other users (especially similarities among users). One study found mountain bike riders to be similar to hikers in many respects. Although the riders had fairly accurate perceptions of these similarities, the hikers did not (Watson, Williams, and Daigle 1991). Determining the similarities among different user groups and documenting the extent to which trail users participate in multiple trail activities could ease "us and them" feelings and reduce conflict.
- Communicate the consequences of problem behaviors (e.g., from impact on other users to loss of access for offenders).
- Build consideration and trust.
- Teach trail ethics, including the following:
 - Courtesy toward other trail users and concern toward the environment (Keller 1990).
 - Who should yield to whom and why.
 - Respect and tolerance for others.
 - Responsibility for resource protection.
 - What interferes with other activities.
- Communicate physical and social trail conditions to help users have more accurate expectations of what and whom they are likely to find on a particular trail:
 - Difficulty (grade, length, tread, etc.).
 - Trail length and location.
 - What types and numbers of users might be encountered. Ivy, Steward, and Lue (1992) suggest communicating worst-case scenarios to boaters to allow users to adjust their goals more appropriately. Some managers point out that users have to be realistic and understand that they will sometimes run into the "few bad apples" that exist in every user group.
- Teach what causes resource impacts and how to minimize them (e.g., "stay on the trail," "don't skid down hills," etc.).
- Reach users as early as possible. Many managers feel conflicts are most severe near trailheads since users tend to be most congested there. They suggest focusing education efforts at trailheads and in the first mile or two of trail.

Trail etiquette and trail-sharing guidelines are found in many brochures and other literature produced by a wide variety of trail organizations and management agencies. Appendix 4 contains a comprehensive list of specific examples of written materials that deal directly or indirectly with avoiding or reducing trail conflicts by promoting responsible trail use, trail sharing, etiquette, use dispersal, low-impact use, etc. The names of the organizations producing them are included, and their addresses can be found in Appendix 2.

In addition to the existing programs and literature just noted, trail managers and advocates use many other strategies for communicating with and educating trail users. Many of these are listed below. Some are noted by Kulla (1991), Ryan (1993), and Martin and Taylor (1981), while the majority were suggested in conversations with trail managers. Using a combination of the following approaches will produce better results than relying on only one or two techniques. Alternatives include:

- Posters.
- Brochures, flyers, pamphlets, newsletters, and other printed materials.
- Maps, guidebooks, visitors' guides, etc. These can incorporate trail regulations, low-impact and shared-use messages, information to disperse use, alternative routes, as well as the reasons for the regulations.
- Interpretive rides/walks/etc., by land management staff.
- Presentations before clubs, retailers, school groups, etc.
- Videos (e.g., "In Their Shoes" produced by Arizona State Committee on Trails).
- Volunteer trail patrols.
- "User swaps." This concept builds on the very successful "ROMP and STOMP" events named after the social gatherings between an equestrian group and a mountain bike club called Responsible Organized Mountain Pedalers (ROMP) in California. These joint rides and social events promoted communication between the groups, gave users the opportunity to try the other's trail activity, and also desensitized the horses to mountain bikes. This concept can be extended to become user swaps between any or all trail activities.
- Slide shows.
- Multi-use trail educational kits for schools (Isbill 1993).
- Joint planning meetings.
- Public meetings.
- Role modeling by rangers and others.
- Personal requests and information from peers.
- Leafletting on or off the trail (most appropriate at trailheads, equipment stores, etc., rather than on the trail itself).
- "Trail Days" events.
- "Safety Days" on the trail for presentations, workshops (e.g., radar checks to teach bicyclists what the speed limit feels like when they are riding), fun, and public relations.
- Information sent to recent purchasers of trail vehicles, bicycles, or equipment.
- Trained personnel (staff or volunteers) stationed at trailheads, visitor centers, campgrounds, etc. (e.g., use backcountry rangers or other trail staff/volunteers to inform and educate users about trail sharing).
- Fact sheets.
- Articles in magazines, newspapers, and other mass media outlets.
- Educational "roadblocks" on trails.
- Classes by retailers, land managers, or trail groups to teach trail techniques and trail ethics, communicate area policies, etc.
- Multi-use surveys at trailheads.

- Similarities among user groups communicated and emphasized. The "Mountain Bike Action Kit," for example, suggests that bicyclists attending meetings or hearings "try not to look like bicyclists at all!" (Bicycle Federation of America 1990, 7).
- Understanding of other user groups' concerns.
- Attendance at other trail-user groups' meetings.
- One-on-one peer education on the trail.
- Bumper stickers or window stickers.
- "Hang tags," developed by LIMB for bikes sold or repaired in its area, have a mountain bike code of etiquette on one side and a "positive people interaction" or "care for the land" message on the other. This approach is also used by Recreational Equipment, Inc. (REI).
- Workshops on low-impact use, trail sharing, etc.
- Theme events to enhance activity image (e.g., "bike for birds").
- New users recruited and educated.
- Public service announcements (PSAs).
- Informational signs.
- Signs with positive messages and images for sport (e.g., promoting responsible mountain biking).
- "Burma Shave" signs (i.e., an entertaining, sequential series of signs).
- "No Trace Race" or "No Trace Ride" events to provide a fun way to communicate low-impact messages (Kulla 1991).
- Positive messages/images promoted by equipment manufacturers in their advertising. This is done effectively by the National Off-Highway Vehicle Conservation Council.
- Accurate information provided to users so they know what encounters to expect on particular trails.
- Water bottles printed with "Rules of the Trail."
- Contests and awards for individuals or groups.

When asked how they promoted trail etiquette, a survey of rail-trail managers conducted by the Rails-To-Trails Conservancy in 1991 found that numerous methods were being used on rail-trails. The 78 managers responding listed the following techniques. They are arranged here from the most to the least frequently reported: signs, brochures, ranger patrols, trail guides, presentations to civic groups, presentations to children, visitor contact areas, volunteer patrols, surveys, striping the trail surface, press releases, and trail-user groups/word of mouth. When asked which of these were the most effective, ranger patrols were mentioned most frequently followed by signs and brochures.

User Involvement-In many respects, user involvement is a special, intensive kind of active, hands-on user education. By actively involving users in trail planning, management, or conflict resolution, they are forced to work together and, as a result, can begin to better understand and appreciate one another's needs, expectations, and perspectives (e.g., user swaps such as "ROMP and STOMP" events). Trail advocates, planners, and managers should attempt to work with unaffiliated individual users and/or with organized user groups before resorting to obtrusive regulations or trail closures.

There are obvious efficiencies in working with organizations, but attempts should also be made to involve unaffiliated users. These independents are often less informed and more in need of education. There may also be cases, however, where members of an organized group have negative attitudes toward other users or are uncooperative (Owens 1985). In these cases as well, working with unaffiliated users is essential.

There are many compelling reasons to involve trail users in trail planning and management. Most important, involving users does the following:

- Gives different users the opportunity to learn about and work with one another.
- Gives different users the opportunity to understand one another's needs and see their similarities with one another.
- Builds understanding, cooperation, and trust through working together.
- Gives trail advocates, planners, and managers an efficient channel to learn from users and communicate with them.

There are numerous options for how to involve trail users. The following strategies are effective ways of involving users in any aspect of trail planning or management. They can be used to involve any trail-user group or can be used as ways to get different user groups to interact constructively. Options include:

- Public meetings (although this approach often is not seen as a means for involving users for the long term, it can be used as one way of initiating many of the approaches that follow).
- Trail advisory councils composed of representatives of various user groups.
- Joint trail construction or maintenance projects among different user groups.
- Joint trail construction or maintenance skills workshops among different user groups.
- "Trail Days" events sponsored jointly by different user groups.
- Joint fundraising or lobbying efforts.
- "Adopt-a-trail" efforts.
- Volunteer trail groups. They can be organized around a particular trail (the Bay Area Ridge Trail Council is an excellent example), a single trail activity, a coalition of different activities, etc.
- Cooperative lobbying for trails.
- Cooperation among organizations on trail planning.
- Volunteer trail patrols.
- "ROMP and STOMP" events.
- Volunteer "Host" programs.
- Land manager trail walks with affected user groups to discuss problems and explore solutions (Keller 1990).
- Issues identification workshops, community design workshops, public hearings, citizen advisory committees, surveys, and mass media outreach are all suggested as effective public involvement tools for creating or managing multi-use trails (Ryan 1993).

With any user involvement effort, it is essential to involve the right-users early on. Recruiting users who are open-minded, constructive, and willing to work together will make creative and successful solutions much more likely. The East Bay Regional Park District, for example, credits much of the success of its volunteer trail patrol to the hand-picked group of constructive equestrian and mountain bike leaders they recruited to head up the program.

Involving trail users early on sometimes means that the users themselves must initiate their own involvement efforts. For example, the International Mountain Bicycling Association (IMBA) and the Sierra Club, a vocal opponent of mountain bikes on trails, recently began a series of meetings to try to resolve their differences. The meetings are being facilitated by professional mediators and will attempt to establish an ongoing dialogue, develop mutually agreeable standards and policies, and begin a joint public mountain biking education program. Recreation Equipment, Inc. (REI), is underwriting the meetings (IMBA 1993).

Regulations and Enforcement-There will always be some who cannot be influenced by positive, less forceful means of persuasion (Baker 1990; Watson, Williams and Daigle 199D- Most trail-sharing programs will not succeed without regulations and effective enforcement for those whose lack of consideration could negate the positive impact made by the majority. Regulations and enforcement efforts are most effective when developed and implemented with the input and cooperation of affected user groups (Ryan 1993 Kepner-Trego Analysis 1987). It is also important to communicate to users the reasons for any regulations adopted. This will help minimize misunderstandings and confusion among those affected (McCoy and Stoner 1992). However, it is important to re-emphasize that excessive regulations and enforcement can spoil recreation experiences for many users. Conflict with other users could be effectively reduced through elaborate surveillance systems and heavy-handed enforcement where all inconsiderate users were immediately "cuffed and stuffed" into awaiting police cruisers. But the freedom and sense of escape so many trail users seek would be lost. Only the minimum intrusion necessary to achieve area objectives should be employed.

Regulations-Well thought out regulations provide managers and their staffs with the authority to enforce safe and courteous trail behavior (Flink and Searns 1993) and help clarify for users what is expected of them. Regulations should be posted prominently at trailheads and other appropriate locations. There are three broad areas of regulations that managers often consider.

- **Speed limits**-Controlling vehicle speeds on trails is essential for user safety as well as the peace of mind of other users. Although education can be effective in this regard, speed regulations are sometimes necessary. Ryan (1993) cautions that speed limits should be used only as a last resort since they require consistent, ongoing enforcement, may not improve real or perceived safety on the trail, and may discourage bicyclists from using trails for commuting. Addressing mountain biking in particular, Kulla (1991) suggests that speeds

must allow riders to stop in one-half the distance they can see. Keller (1990) considers a single speed limit for an entire trail unreasonable and advocates basing limits on sight distances and other trail features.

- **Zoning**-Separating users can be an effective way of minimizing contacts and reducing conflicts. This approach is not without its critics, however. Arbitrary zoning may unnecessarily restrict use if the potential for conflict is low (Owens 1985). Segregating, restricting, or prohibiting users is advocated only as a last resort by Keller (1990), who suggests dispersing use to guard against concentrating mountain bikes on a small number of trails and possibly increasing impacts there. Where appropriate, zoning can be organized around:
 - Time of use (by day/week/month/season/year/etc.).
 - Trail section (e.g., snowmobiling on half of a trail and cross-county skiing on the other half).
 - Activity.
 - Type of trail experience sought. For example, some areas can be set aside where conditions are best for solitude, self-reliance, and challenge while other areas can be managed for more comfortable, secure, and social experiences. The USDA Forest Service and Bureau of Land Management accomplish this by using the Recreation Opportunity Spectrum (ROS) to plan for and zone a continuum of different settings areas where conditions are most conducive for achieving different types of experiences (Clark and Stankey 1979). The six classes of settings are "Primitive," "Semi-Primitive Non-Motorized," "Semi-Primitive Motorized," "Roaded Natural," "Rural," and "Urban." The following factors are considered and managed when assigning areas to particular classes and managing them to provide the desired experiences: access, remoteness, naturalness, facilities and site management, social encounters, visitor impacts, and visitor management. Acknowledging that the products of recreation (and trail) outings are experiences, and planning and managing to provide for a wide range of opportunities for different experiences is more realistic than managing for different activities (e.g., hiking, off-road motorcycling, hunting, etc.). Trail users participating in the same activities do not all desire the same trail experiences. See Hammitt (1988) for use of the ROS as a means of analyzing and managing conflict potential.
- **Right-of-Way**-Regulations on who must yield to whom are helpful. For example, the IMBA "Triangle" could be enforced, whereby bicyclists yield to pedestrians, and pedestrians and bicyclists both yield to horseback riders. Some managers would also like to see this modified into a "Yielding Square" that would include the responsibilities of motorized users to those they meet on the trails.

The following are other examples of regulations that have been or could be established for multiple-use trails:

- Forbid cutting of switchbacks.
- Mandate one-way travel on certain trails.
- Require bicyclists to walk their bikes in congested or conflict-prone areas or during congested times.
- Require bicycles to have bells as is now the case on trails managed by the East Bay Regional Park District in California.
- Close trails or trail sections during sensitive seasons (e.g., muddiest times or wildlife breeding times).
- Charge user fees (to help fund trail programs or disperse use).
- Designate appropriate places to tie horses.
- Require completion of a trail-sharing and/or minimum impact course to be eligible for a mandatory trail permit.
- Require users to repair any impacts their use might have caused (e.g., after a major motor cycle event or large group equestrian event).
- Require users to stay on the trails.
- Close certain sections, areas, or types of trails (e.g., no mountain bikes on crowded single-track trails).
- Enact a "Model Path User Ordinance" like that of King County, Washington, which contains 10 articles covering issues from littering to respect for other users.

Enforcement-How to gain compliance with necessary regulations has been a great challenge in many trail areas. This is especially true where land areas are large and budgets are lean. The following are important considerations for determining

how to enforce regulations on trails:

- Inform users of the regulations:
 - Post regulations at trailheads and include them in trail brochures and on maps (Ryan 1993). Ryan also suggests communicating why and how the regulations will be enforced and what the applicable penalties are.
 - Post and enforce regulations from the very beginning on newly opened trails. Establishing desirable patterns of behavior from the start is far easier than trying to change bad user habits later on.
 - Some feel using wordings such as "Not Recommended" rather than "No" in messages produces a more cooperative atmosphere and better compliance (McCoy and Stoner 1992). Many managers, however, feel that offending users will take advantage of more lenient wordings.
- Communicate the reasons for regulations to the users affected. For example, communicating to mountain bikers that "up trail and down road" rules for travel directions are enforced to help keep speeds at safer levels and skidding at a minimum may help with compliance.
- Enforce rules and regulations consistently to assure that there is no perception of discrimination among different user groups.
- Employ a variety of on-site enforcement personnel if possible and appropriate:

- Peer policing programs (e.g., peer pressure).
 - Volunteer trail patrols.
 - Uniformed enforcement officers.
 - Cooperative agreements with local law enforcement and fire protection agencies.
- Consider sentencing trail offenders to work service on the trail as part (or all) of their penalty (Goldstein 1987 as cited in Keller 1990).
 - Communicate emergency procedures for users and emergency personnel.

Summary

The previous section presents some of the many physical and management responses available to attempt to avoid and minimize conflicts on multiple-use trails. All of these have been employed on multiple-use trails with varying degrees of success. The right choice for any particular situation will depend on many local factors and involve some experimentation. General principles to guide responses are offered in the next section. In general, though, using a strategy that employs a combination of techniques with a long-term perspective is best. The city of Edmonton, Alberta, for example, has had good results with an integrated program of design, social marketing, education, regulation, and enforcement for its trail system.

Unfortunately, there are cases where conflict has degenerated to the point where the only feasible recourse is direct intervention by experts trained in conflict resolution. Even binding arbitration may be necessary and appropriate in some cases where the techniques mentioned above were employed too late or too tentatively.

C. Conclusion

Multiple-use ("shared-use") trails are an efficient, economical, and increasingly common way to provide trail opportunities. Due to limited rights-of-way, multiple-use trails are sometimes the only alternative. Through thoughtful planning and diligent management, such trails can provide safe, high-quality recreation experiences without unacceptable damage to natural resources. However, the conflicts that sometimes accompany shared use of trails can be very emotional and are not issues that managers are likely to eliminate altogether. With time, patience, commitment, and cooperation among users and between users and managers (McCoy and Stoner 1992) as well as diligent and aggressive planning and management, shared-use trails can be an excellent way to accommodate many types of users with minimal conflict.

There is no one best way to accommodate multiple uses on the same trail while at the same time avoiding (or at least minimizing) conflicts. The best approach will always be dictated by local conditions and the resources available. However, the literature reviewed and the trail manager input received do provide considerable guidance. Based on this information, 12 principles are offered for minimizing conflicts on multiple-use trails.

1. **Recognize Conflict as Goal Interference** - Recreational conflict can best be understood as "goal interference attributed to another's behavior" (Jacob and Schreyer 1980, 369). Therefore, trail conflicts are possible among different user groups, among different users within the same user group, and as a result of factors (e.g., lack of tolerance for others) not related to a user's trail activity at all.
2. **Provide Adequate Trail Opportunities** - Offer adequate trail mileage and provide opportunities for a variety of trail experiences. This will help reduce congestion and allow users to choose the conditions that are best suited to the experiences they desire. As in the Recreation Opportunity Spectrum (ROS), this will require a focus on trail experiences as opposed to trail activities. Opportunities for different trail experiences can be maximized by providing trails that vary in terms of terrain, difficulty, access, remoteness, naturalness, facilities and site management, social encounters, visitor impacts, and visitor management.
3. **Minimize Number of Contacts in Problem Areas** - Each contact among trail users (as well as contact with evidence of others) has the potential to result in conflict. So, as a general rule, reduce the number of user contacts whenever possible. This is especially true in congested areas and at trailheads. Disperse use and provide separate trails where necessary after careful consideration of the additional environmental impact this may cause. Recognize that separating trail users may limit opportunities for communication, understanding, and eventual cooperation among different user groups.
4. **Involve Users as Early as Possible** - Identify the present and likely future users of each trail and involve them in the process of avoiding and resolving conflicts as early as possible, preferably before conflicts occur. For proposed trails, possible conflicts and their solutions should be addressed during the planning and design stage with the involvement of prospective users (Ryan 1993, 79). New and emerging uses should be anticipated and addressed as early as possible with the involvement of participants. Likewise, existing and developing conflicts on present trails need to be faced quickly and addressed with the participation of those affected.
5. **Understand User Needs** - Determine the motivations, desired experiences, norms, setting preferences, and other needs of the present and likely future users of each trail. This "customer" information is critical for anticipating and managing conflicts. This process must be ongoing and will require time, patience, effort, and sincere, active listening.
6. **Identify the Actual Sources of Conflict** - Help users to identify the specific tangible causes of any conflicts they are experiencing (e.g., "teenagers partying and littering at Liberty Campground," "horses fouling the water at Peabody Spring," "mountain bikers speeding down the last hill before the Sills Trailhead," etc.). In other words, get beyond emotions and stereotypes as quickly as possible, and get to the roots of any problems that exist.
7. **Work With Affected Users** - Work with all parties involved to reach mutually agreeable solutions to these specific issues. Users who are not involved as part of the solution are more likely to be part of the problem now and in the future. For

example, the Bay Area Ridge Trail Council is considering "full and balanced representation" of key user groups on its county committees as it plans sections of its new trail (Isbill 1993).

8. **Promote Trail Etiquette** - Minimize the possibility that any particular trail contact will result in conflict by actively and aggressively promoting responsible trail behavior. Use existing educational materials or modify them to better meet local needs. Target these educational efforts, get the information into users' hands as early as possible, and present it in interesting and understandable ways (Roggenbuck and Ham 1986).
 9. **Encourage Positive Interaction Among Different Users** - Trail users are usually not as different from one another as they believe. Providing positive interactions both on and off the trail will help break down barriers and stereotypes, and build understanding, good will, and cooperation. This can be accomplished through a variety of strategies such as sponsoring "user swaps," joint trail building or maintenance projects, filming trail-sharing videos, and forming Trail Advisory Councils.
 10. **Favor "Light-Handed Management"** - Use the most "light-handed approaches" that will achieve area objectives (Hendee, Stankey, and Lucas 1990). This is essential in order to provide the freedom of choice and natural environments that are so important to trail-based recreation. Intrusive design and coercive management are not compatible with high-quality trail experiences.
 11. **Plan and Act Locally** - Whenever possible, address issues regarding multiple-use trails at the local level (Keller 1990; Kulla 1991). This allows greater sensitivity to local needs and provides better flexibility for addressing difficult issues on a case-by-case basis. Local action also facilitates involvement of the people who will be most affected by the decisions and most able to assist in their successful implementation.
 12. **Monitor Progress** - Monitor the ongoing effectiveness of the decisions made and programs implemented. It is essential to evaluate the effectiveness of the actions-designed to minimize conflicts; provide for safe, high-quality trail experiences; and protect natural resources. Conscious, deliberate monitoring is the only way to determine if conflicts are indeed being reduced and what changes in programs might be needed. This is only possible within the context of clearly understood and agreed-upon objectives for each trail area. Two existing visitor impact management frameworks do consider area objectives and offer great potential for monitoring trail settings and trail use impacts:
 - Visitor Impact Management System (VIM)-This model, developed for the National Park Service by the National Park and Conservation Association, assists managers in setting objectives, selecting impact indicators, and monitoring impacts against measurable standards set for each area (Graefe, Kuss and Vaske 1990).
 - Limits of Acceptable Change (LAC)-This system was developed by and for the USDA Forest Service and operates much like the VIM framework (Stankey, Cole and Lucas 1985).
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Lee, B. and C. S. Shafer. 2002. "The dynamic nature of leisure experience: An application of Affect Control Theory." *Journal of Leisure Research* 34(3): 290-310.

This study represents a relatively new body of research within the recreation conflict literature, that of the subjective emotional state of the user. Leisure and recreation experiences are generally believed to emerge through a dynamic interaction process. Affect Control Theory provides one basis for understanding emotions experienced during the recreation experience. This study adopts the theory and applies it a survey of 111 respondents on multiple-use trail in an urban greenway. The INTERACT II program is used to predict emotions based on respondents' evaluations of events they encountered along the trail. The paper presents specific examples from the survey of how and why emotions differ both within a respondent's experience and between respondents' experiences. For example, the event "saw a lot of fish" was associated with mostly positive emotions such as "cheerful", "pleased", "peaceful" or "serene." While the event "passed on narrow part of trail" was associated with a wider range of emotions from "cheerful" and "satisfied" to "petrified" and "gloomy." The authors conclude that Affect Control Theory was useful in examining within and between subject variations and provided reasons that helped to explain why some of these differences might occur. The theory has the potential to contribute to the understanding of the complex and subtle in recreation creates a dynamic experience.

Vitterso, J., R. Chipeniuk, M. Skar and O. Vistad. 2004. "Recreational conflict is affective: The case of cross-country skiers and snowmobiles." *Leisure Sciences* 26(3): 227-243.

The study used a novel field experiment to test the assumption that subjective feelings are important in recreation conflict. During a weekend, cross-country skiers in a popular recreation area were assigned randomly to an experimental group who were exposed to an operating snowmobile, and a control group who were not exposed. In the experimental group, skiers were asked to fill out a self-administered survey shortly after encountering a snowmobile, while skiers in the control group filled out a self-administered survey without having been exposed to a snowmobile. Surveys respondents were given no clue as to the relationship of the snowmobile and survey being conducted. Results showed that relative to the control group, skiers who encountered a snowmobile had the quality of their affective experiences - as measured by feelings of relaxation, peacefulness, joy, harmony, annoyance - significantly reduced. This result points to the subjective nature of recreation conflict. Furthermore, the encounter with the snowmobile effected the participants' beliefs about the extent to which noise from snowmobiles disturbed the quality of ski-touring in general.

Lee, B., C. Shafer and I. Kang. 2005. "Examining relationships among perceptions of self, episode-specific evaluations, and overall satisfaction with a leisure activity." *Leisure Sciences* 27(2): 93-109.

This research looks at a common aspect of recreation conflict research, user satisfaction. However, the approach taken and theoretical constructs differ from past research. The purpose of this research was to investigate how satisfaction might relate to interactions that an individual has during leisure experience and to examine the relationships among emotions, episode-specific evaluations, and overall satisfaction. A research model was suggested based on Affect Control Theory, the confirmation/disconfirmation paradigm, Mehrabian and Russell's (1974) approach-avoidance concept, and the sub-domain dependency theory of leisure satisfaction. Two hypotheses are proposed: 1) episodes producing positive emotions will be more favorably evaluated than those producing negative emotions; and 2) leisure participants overall satisfaction will be higher if they experience more contentment than conflict in terms of reaction to specific episodes. A survey was conducted of 145 trail users on multi-use trail in Houston, Texas. The findings indicated that evaluations of episodes were significantly related to the emotions experienced due to those episodes, thus confirming hypothesis 1. Furthermore, the study also confirmed hypothesis 2, with people who had over 50% of their episodes that led to contentment having significantly different mean satisfaction than those who had over 50% of their episodes leading to conflict.

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This study represents a relatively new body of research within the recreation conflict literature, that of the subjective emotional state of the user. Leisure and recreation experiences are generally believed to emerge through a dynamic interaction process. Affect Control Theory provides one basis for understanding emotions experienced during the recreation experience. This study adopts the theory and applies it a survey of 111 respondents on multiple-use trail in an urban greenway. The INTERACT II program is used to predict emotions based on respondents' evaluations of events they encountered along the trail. The paper presents specific examples from the survey of how and why emotions differ both within a respondent's experience and between respondents' experiences. For example, the event "saw a lot of fish" was associated with mostly positive emotions such as "cheerful", "pleased", "peaceful" or "serene." While the event "passed on narrow part of trail" was associated with a wider range of emotions from "cheerful" and "satisfied" to "petrified" and "gloomy." The authors conclude that Affect Control Theory was useful in examining within and between subject variations and provided reasons that helped to explain why some of these differences might occur. The theory has the potential to contribute to the understanding of the complex and subtle in recreation creates a dynamic experience.

Cordell, H. K. and M. A. Tarrant. 2002. *Socio-6: Forest-based outdoor recreation*. Retrieved October 4th, 2005. [Web link](#).

Within this larger review of forest-based recreation in the Southern United States, the authors conduct a brief review of the recreation conflict literature. The authors find a general increase in recreation-based conflict due general rising demand and increase in technology-driven activities. For managers, early detection of user conflicts and effective conflict resolution depend on understanding where and how conflicts arise. Resolving conflict at its initial stages can help avoid costly political and legal actions. Two primary conceptual models are seen as helping managers understand recreation conflict: the cognitive (goal interference) and normative models (social values).

Shultis, J. 2001. "Consuming nature: The uneasy relationship between technology, outdoor recreation and protected areas." *The George Wright Forum* 18(1): 56-66.

This paper reviews the impact of technology on recreation management and the role that technological change has had on parks and recreation experiences. Empirical evidence from other studies suggest that increasing use of technology in outdoor recreation will have result in a lessened emotional attachment to the land, which will in turn decrease long-term commitment to conservation. The author argues that recreationists, managers and the general public will continue to have conflicting views on how technology should be managed in parks. Without a more of a battle from groups concerned about the impact on technological in parks and its links to a conservation ethic, managers will struggle to keep new technologies from having a impact on recreation experiences.

Hammit, W. E. and I. E. Schneider. 2000. "Recreation conflict management". In *Trends in Outdoor Recreation, Leisure and Tourism*, edited by W. C. Gartner and D. W. Lime, 347-356. New York: CABI Publishing.

This article reviews the study and management of conflict in recreation. It emphasizes that conflict does not always lead simply to negative impacts, but can have positive influences. For example, conflict can indicate when something within the current system needs attention and force a management response. Four eras of recreation conflict management are discussed. The first era, the activity-space allocation era, focused on the issue of competition for recreation space and emphasized issues relating to crowding, over-use, and activity and space incompatibility. Management actions focused on separating uses in both time and space. The second era, the perception-cause era, focused on understanding the behavioral aspects of recreation conflict with a focus on motivations, user perceptions, preferences and social carrying capacity. Management actions in this era focused on education programs, the recreation opportunity spectrum and social carrying capacity models. The third era, the institutional-public involvement era, was dominated by an emphasis on values and interest groups in the planning process. During this era management made attempts, which were often mandated, to involve the public in

decision-making. In the fourth era, the coping-resolution era, recreation conflict is recognized as an inevitable part of outdoor recreation and, instead, research and management have focused on how people cope with and respond to conflict. Management has increasingly focused on more participatory involvement of stakeholders and the recognition that conflict can not be avoided, but multiple strategies exist to minimize the amount and the negative impact of the conflict that does occur.

Watson, A. E., M. J. Niccolucci and D. R. Williams. 1993. *Hikers and recreational stock users: Predicting and managing conflicts in three wildernesses*. Intermountain Research Station Research Paper INT-468. United States Department of Agriculture, Forest Service.

This study takes a detailed look at conflicts between hikers and recreational stock users in three wilderness areas: the John Muir Wilderness; the Sequoia-Kings Canyon Wilderness and the Charles C. Deam Wilderness. Using the goal interference model proposed by Jacob and Schreyer, along with modifications suggested by subsequent research, the determinants of conflict between these two users groups were assessed through user surveys. Three measures of conflict (two attitudinal - enjoyment/dislike and a 5-point Likert scale of desirable to undesirable - and one goal interference - interference with the quality of a wilderness experience) were used to assess 17 potential predictors of conflict. The predictors of conflict more accurately predicted attitudinal measures of conflict than they predicted the goal interference measure of conflict, which is a result consistent with other research. Strong and consistent predictors of conflict between hikers and horse users were general feelings of inappropriateness of horse use in wilderness, differences in perceptions of visitors' status related to horse use, differences in the strength of attachment to the wilderness, and the value placed on opportunities for solitude. From a management perspective, the option of separating uses by providing some trails for hikers only is generally supported by hikers, but not by horse users. The authors conclude that while persuasive and educational messages may reduce conflict between hikers and horse users, if managers fail to reduce the number of encounters that create conflict or impacts of horse use that hikers label as inappropriate, they may find some restrictions on horse use to be necessary