

Research Studies Related to Snowmobiling Impacts

RECREATION CONFLICTS

1. **Winter Recreation on Western National Forest Lands – A Comprehensive Analysis of Motorized and Non-Motorized Opportunity and Access**, (2006) Winter Wildlands Alliance http://www.winterwildlands.org/resources/reports/WWA_WinterRecreation.pdf

This report is an effort by Winter Wildlands Alliance (WWA), a national organization for human-powered snow sports enthusiasts (primarily active in the West) that advocates for solitude, “to provide data to Forest Service officials and other public land managers to help them better address the issue of equitable opportunity and access for quality recreation on national forest lands.” The introduction alleges “untenable conditions on forest lands” caused by “taxing natural resources” and “escalating conflict” between snowmobilers and human-powered users like cross-country skiers and snowshoers.

The basis of this report is data collected from national forests in the West through Freedom of Information Act (FOIA) requests between 2003 and 2005. Raw data was gathered from national forests which “receive regular snowfall” in California, Colorado, Idaho, Montana, Nebraska, Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming. WWA also used Forest Service National Visitor Monitoring Program (NVUM) data regarding annual visitor numbers for cross-country skiing, snowshoeing, and snowmobiling for this report. WWA then manipulated this information to support its position that there is a “disparity between motorized and non-motorized opportunity and access” across national forests in the Western United States.

Unfortunately many facts have been distorted and twisted by WWA to arrive at its desired conclusions and ‘findings.’ Since these allegations could adversely affect snowmobiling access to these national forest lands if not challenged, the following responses have been prepared by ACSA to represent snowmobiling’s perspective.

Specific WWA ‘findings’ and ACSA’s responses to place this misinformation in the proper context are as follows:

- a) **WWA: Of the winter trails reported on Forest Service lands in the West, “only 1,681 miles (8%) of the estimated 20,389 total groomed miles are designated as nonmotorized.” The balance is open to snowmobiles.**

***Response:** 1) First and foremost, there are over 18,000 miles of groomed snowmobile trails on national forests in the West because snowmobilers have chosen to tax themselves through State snowmobile registrations, user fees, and gasoline taxes they pay to fund the grooming of these trails. In no instance is the Forest Service paying for the grooming of snowmobile trails with Forest Service funds. In contrast, the grooming that occurs on the majority of the 1,681 miles of nonmotorized trails on these forests is either funded by the Forest Service or subsidized with State Recreational Trails Program (RTP) grant funds, which are derived from the Federal fuel tax paid by snowmobilers and other motorized recreational vehicle users. If nonmotorized winter recreationists want more miles of groomed trails, then they need to bring their own funding to the table as the snowmobilers have done. 2) A large percentage of cross-country skiers and snowshoers do not desire or require groomed trails for their backcountry recreational experience – so the perceived demand and accompanying shortage is substantively overstated by WWA.*

3) A snowmobiler requires significantly more miles of trail for a typical / 'daily average' outing than what a nonmotorized recreationist does. The WWA report itself, on page 8, states that, "...the average distance traveled by a snowmobiler in a day ranges between 127 and 367 miles. By comparison, a skier or snowshoer will be hard pressed to cover more than five to ten miles on ungroomed snow in a day." First of all, in the interest of accuracy and proper disclosure, the '127 and 367 miles' cited by WWA comes from a University of Minnesota report – Midwest statistics improperly applied to a Western setting. And while '127 miles' may be accurate for a Midwest average, '367 miles' vastly overstates an 'average' snowmobiling outing – anywhere. Comparable studies from several Western states show that the average distance traveled in a day by a snowmobile rider in the West actually ranges from 70 to 120 miles. Additionally, national forest planners across the West commonly use a '3-mile radius (6 mile round trip) from a trailhead' as the distance traveled 'by the average skier or snowshoer' during a day-trip outing. Therefore, snowmobilers require 7 to 24 times more miles of trail and open riding area than what cross-country skiers and snowshoers do for an 'average' daily outing.

- b) **WWA: Of the 116 million acres of national forest lands within these 11 states, approximately 81 million acres (70%) are open to snowmobiles. And of the remaining 35 million acres which are designated as 'non-motorized,' more than two-thirds lie within designated wilderness areas – which WWA decries since "distances from plowed parking areas and trailheads make the vast majority of wilderness areas inaccessible to skiers and snowshoers."**

Response: 1) It is misleading to frame this in the perspective that '81 million acres are open to snowmobiles' since a significant amount of these acres do not have consistent snowcover at a depth which would support snowmobiling traffic. While the exact number of acres on these forests without dependable snow cover is unavailable, it is substantive and could be as great as 25 to 50 percent of the total national forest area in these 11 states. As a result, the total acres open to snowmobiles is greatly overstated. On the other hand, cross-country skiing and snowshoeing can occur with less snow depth than what is required for the safe operation of a snowmobile, so this factor does not similarly limit nonmotorized opportunities.

2) WWA inappropriately included some forests to purposely inflate the 'acres open to snowmobiling' numbers. There are several examples of this flawed methodology. The most extreme example of this is the inclusion of the 1.1 million acres that comprise the Nebraska National Forest – which is actually a collection of national grasslands in central South Dakota and central to northern Nebraska, along with two small national forest units in central and northern Nebraska. None of these lands are in the 'West' and none are in the Snowbelt. Additionally, the State of Nebraska has zero miles of groomed snowmobile trails, so there is no useful purpose in including Nebraska in this report other than to intentionally use these acres to inflate numbers.

Another example is the Custer National Forest in Montana. Most of its 1.3 million acres is actually national grasslands in North and South Dakota (out of the Snowbelt, out of the 'West,' and no miles of groomed trails), so including the forest in its entirety severely misconstrues what is actually available for winter recreation on the ground.

Inclusion of the Humboldt-Toiyabe National Forest, which consists of all of Nevada and the far eastern edge of California, is another example of using questionable national forest areas to purposely inflate raw numbers for this WWA exercise. The Humboldt-Toiyabe consists of over 6.3 million acres of land, over 5.3 million acres which are supposedly 'open to snowmobiles' – even though much of this forest/state is not in the Snowbelt and is actually classified as desert. And there are only 46 miles of groomed snowmobile trails and 2 miles of groomed nonmotorized trails in the whole state – so if the area was really in the Snowbelt, there would certainly at least be more miles of

snowmobile trails. Additionally, NVUM shows zero annual cross-country ski, snowshoe, and snowmobile visits on the forest. While actual use numbers are likely somewhat higher than zero, the fact remains, as a whole, this is not a prime winter sports forest and should not have been included in this report's calculations.

When one looks at the report's State Summaries, from California to Wyoming and every state in between, WWA's raw data particular to individual forests has been skewed across the board to include lands that do not meet the definition of being realistically useable for winter recreation, and in particular, useable for snowmobiling.

3) Just because WWA deems two-thirds of the '35 million acres' designated as nonmotorized as 'inaccessible' because it is remote wilderness, does not justify WWA advocating for more areas of the forests to be closed to snowmobiling. The fact remains that these lands have been removed from motorized access, so the nonmotorized community needs to pursue ways to make better use of lands they already have exclusive use of – versus being quick to say we can't access them easily so we want other areas set aside for us. To a large degree, all lands greater than a three-mile radius from a plowed parking area are equally 'inaccessible,' irrespective as to whether they are within a designated wilderness area or not, since they would be too far to access under human-power. Therefore, WWA's push for more nonmotorized areas is really more of a smokescreen based upon principled-based set-asides (which realistically would be used by none or very few) versus set-asides that are logical and practical for nonmotorized recreation access, i.e. within 3 miles of a trailhead.

c) WWA: NVUM data shows 5.6 million cross-country skier and snowshoer visits and 4.4 million snowmobile visits on these forests annually.

***Response:** Yes, there are slightly (12%) more nonmotorized visits (56% of total) than snowmobile visits (44% of total), primarily because it is much less expensive to participate in nonmotorized recreation. Snowmobiling requires a substantial investment of tens of thousands of dollars for a snowmobile, clothing, trailer, and a tow vehicle – along with higher daily trip costs for fuel, oil, repair parts, user fees, and other associated trip expenditures like food and oftentimes lodging. On the other hand, cross-country skiers and snowshoers can get started in their sport for as little as one or two hundred dollars – and even the most advanced technology gear is thousands of dollars less than a \$10,000 snowmobile commonly used in the West – and daily trip costs are next to nil compared to a snowmobilers.*

d) WWA: “Despite the fact that NVUM surveys show 28% more cross-country skier and snowshoe visits than snowmobile visits, more than twice as many “backcountry” forest acres are designated motorized (multi-use) as non-motorized in winter. When difficult-to-access wilderness areas are taken out of the equation the disparity becomes more severe, with designated motorized acreage outnumbering non-motorized, non-wilderness acreage by more than seven times.”

***Response:** 1) WWA has not used “28%” in the proper context for this discussion – which is about equity in ‘dividing up the national forest pie’ amongst user groups. NVUM surveys show there were a total of 10,033,576 winter visits on these national forests. A total of 4,391,317 visits (44%) were by snowmobiles, while the other 5,642,259 visits (56%) were by cross-country skiers and snowshoers. Snowmobiles represent slightly less than half the visits while nonmotorized uses represent slightly more than half of the visits. This is a difference of 12%, not 28%, in respect to the division of the total national forest ‘visitation pie.’*

2) As discussed above in WWA Finding b), WWA has improperly framed the actual useable acres open to snowmobiles on these national forests, which in turn leads to an imprecise conclusion that there are 'more than twice as many backcountry acres designated motorized.' When one discounts unusable acres (because of snow cover, terrain, dense timber, etc.), there is likely only less than 40 million acres usable for snowmobiling on these forests – which is less than half of what is professed by WWA. The reality is that, in terms of just raw acres, there is actually little disparity.

3) As discussed above in WWA Finding Number 1, the average snowmobiler requires substantively more area (average daily outing: 70 to 120 miles) for an outing than what an average skier or snowshoer does for a day-trip (average daily outing: 5 to 10 miles). This means that snowmobilers require 7 to 24 times more area than what skiers and snowshoers do for a successful outing. So, in reality, snowmobilers are being shorted on space needed for a quality recreational outing – not skiers and snowshoers.

- e) **WWA: “There are 11 times more groomed trails open to snowmobiles than there are groomed trails designated as nonmotorized. This results in a ratio of 14 times more skier and snowshoer visits per nonmotorized mile than snowmobile visits per motorized mile.”**

Response: 1) There are more miles of groomed snowmobile trails because snowmobilers tax themselves to fund grooming their own trails. Nonmotorized users typically do not. Additionally, there is a greater need for snowmobile trail grooming than ski trail grooming due to the heavier moguling effect of snowmobile traffic.

2) A large percentage of cross-country skiers and snowshoers do not desire or require groomed trails for their backcountry recreational experience. Therefore, the perceived demand and accompanying shortage is substantially overstated by WWA.

3) The purpose of snowshoes is to provide flotation for travel across the top of uncompacted snow, so a groomed trail is not needed for this recreational activity. Therefore the inclusion of snowshoes in this discussion about groomed/compacted trails is inappropriate and was done only to improperly inflate the number of overall nonmotorized trail users.

4) It is wrong for WWA to assume that all 5.6 million cross-country skier and snowshoer visits to national forests occur on groomed trails. Rather, off-trail backcountry visits constitute a very large percentage of overall nonmotorized winter visits on these Western national forests. Therefore actual on-trail visits by skiers is exponentially smaller, which would also result in 'nonmotorized visits per mile of groomed trail' being exponentially smaller than what has been alleged by WWA.

5) Again, snowmobilers require 7 to 24 times the number of groomed miles than what skiers and snowshoers do for a quality recreational experience.

- f) **WWA contends “that in most cases the designation “multi-use” is a misnomer and is de facto single use motorized” because “the opportunity for a quality human-powered recreation experience is lost on forest lands designated as multi-use because those lands are in fact dominated by motorized use.”**

Response: 1) Concerns about multi-use and single-use cut both ways. Even though snowmobilers pay 100% of the cost to groom their trails, they typically allow them to be used for other “multi-uses” including the nonmotorized activities of cross-country skiing, snowshoeing, and dog sledding. Without the generosity of snowmobilers’ allowing the multiple-use of their trails, there would often be

no groomed trail opportunities for nonmotorized trail users since they usually don't favor taxing themselves to pay their own way. On the other hand, as nonmotorized trail users continually try to whittle away at snowmobiling access, a growing number of snowmobilers are starting to advocate for single-use (snowmobiles-only) on groomed snowmobile trails. The real issue is self-generated funding – or the lack thereof in respect to skiers.

2) In respect to acres/areas designated as nonmotorized/closed to snowmobiles: any such closure that extends farther than a 3- to 5-mile radius from a trailhead/plowed parking area and is in a non-wilderness setting is for all intents and purposes unnecessarily closed to all uses since it is too remote to be used by most cross-country skiers and snowshoers. The result is a de facto wilderness / 'no use' area. The focus for nonmotorized use needs to be within these 3- to 5-mile zones – but beyond that distance multiple use or even 'domination' by snowmobiles should be okay since no one else will likely be there.

g) WWA: “Motorized use impacts the human-powered winter recreation experience in a number of ways: noise, exhaust and air pollution, safety concerns, and tracks.”

***Response:** Noise – first, several of the examples of noise issues cited by WWA were inappropriately from Canada, New Hampshire, and Wisconsin. All of these areas are outside the West (supposedly the focus of this report) and examples of conflicts that are due to much higher population densities than what are found in snowmobiling areas in the West. WWA also misquotes studies done in Yellowstone National Park, where the truth is, sound levels have decreased dramatically and (contrary to claims by WWA) noise standards are not being exceeded. Additionally, WWA inappropriately downplays the role four-stroke engines and other changes driven by EPA regulation of snowmobiles have brought to the industry. Today's snowmobile is much quieter than sleds of old.*

Exhaust and air pollution – again, sleds of today are cleaner than sleds of the past due to EPA's regulation of snowmobile engines – a fact wrongly trivialized by WWA in its report. The report erroneously makes generalized and unjustified statements about snowmobile emissions 'across the United States.' This is improper since this report is supposedly a look at conditions on national forests in the West. And since registered snowmobiles in the nine real 'Western States' (Nebraska and South Dakota are Midwest States) represent only 15% of all snowmobiles in the United States, any attempt to extrapolate national emissions data to Western forests is ill-founded since the West's snowmobile density is profoundly less than what it is in the balance of the country. WWA also makes inappropriate comparisons between snowmobile engines and personal watercraft engines – they are simply not the same. The report also fails to recognize that new four-stroke engines, direct and semi-direct engine technology, and the use of low-emission synthetic engine oils have all made dramatic improvements which have substantially eliminated these issues from days gone by.

Safety concerns – the report states that “excessive speed, alcohol, reckless driving, and inexperience (underage driving) are the most commonly issued citations and causes of accidents involving snowmobiles.” But the source of this 'statistic' is the Minnesota DNR – a Midwestern State where snowmobiling is distinctly different than it is in the wide-open spaces of the West. The truth is that these issues are not common in the West and that similar statistics do not exist in respect to Western States. This is just one more example of WWA improperly using non-western data in an attempt to manufacture 'statistics' to justify its preconceived positions. But if WWA is strongly concerned about “vulnerability of self-powered recreationists,” maybe it's time to get them off the groomed the snowmobile trails and let them find ways to pay for grooming their own exclusive-use trails.

Tracks – the report illogically states that, “Due to snowmobilers traveling freely on the vast majority of national forest lands, pristine terrain for skiers and snowshoers is rapidly disappearing

under the tracks of snowmobiles.” But since the vast majority of skiers and snowshoers never get beyond a ‘3- to 5-mile radius’ from where they parked their car – what difference does it really make if the ‘vast majority of national forest lands’ beyond that zone are tracked up or not? This area close to parking areas should be the focus of efforts to balance uses, while the balance of forests, outside of wilderness areas and sensitive habitats, that are largely inaccessible to most nonmotorized users should be left open to multiple uses which includes snowmobiling access. This section of the report, again, makes improper reference to snowmobiler characteristics in Minnesota. The long and the short of it is that untracked terrain is important to motorized and nonmotorized winter recreationists alike – so education directed at both groups as to how to ‘share the powder’ is likely to gain more ground than misdirected efforts to enact wholesale closures to snowmobiling on national forests.

- h) WWA: “The data documented in this report supports WWA’s position that, in every applicable national forest, sizeable and accessible areas should be closed or remain closed to over the snow vehicles to insure a quality recreation experience for human-powered winter recreationists.”**

Response: The data, applied in the proper context, does NOT support WWA’s position. Rather, what has really been documented by this report is the fact that WWA has inappropriately applied global statistics to issues that are best considered at the local level. While there are always localized situations where motorized and nonmotorized recreationists can benefit from working together to resolve concerns, the situation on national forest lands in the West is not as bleak or as one-sided as what WWA depicts. The authors of this report misrepresented several facts which resulted in numerous flawed conclusions – aimed at justifying their predetermined positions. The bottom line is that there are no credible reasons to support additional broad closures to over-snow vehicles on these Western national forests.

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

Abstract: 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. Survey 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.

3. **Forests and regional development: Economic impacts of woodland use for recreation and timber in Wisconsin.** Marcouiller, D. W. and Mace, T. (1999) Madison, WI: University of Wisconsin Extension

Abstract: This study's primary objective was to research the economic impact of multiple uses of the Wisconsin's forests. Of particular relevance to issues of recreation conflict, was this study's use of importance-performance measures to investigate the compatibility of alternative forest uses. In general, the results suggest that recreational and timber production uses of the forest were compatible land uses. This was more likely to be true for hunters and motorized recreationists than with the broad category of "quiet" forest recreationists. The authors' intent was to identify the relative compatibility of alternative

forest uses and they conclude that there are more compatibilities among forest use alternatives than there are incompatibilities. This runs counter to much traditional thought, both among academics and policymakers.

4. **Analyzing public inputs to multiple objective decisions on national forests using conjoint analysis.** Dennis, D. F. (1998) *Forest Science* 44(3): 421-429

Abstract: This study focuses on public perspectives of approach multiple-use regimes for national forests. The emphasis is not only the compatibility or desirability between different recreational uses, but also between different recreational uses and different types of forest management. This study uses a novel approach, employing a conjoint ranking survey to solicit public preferences for various levels of timber harvesting, wildlife habitats, hiking trails, snowmobile use, and off-road vehicle access in the Green Mountain National Forest. Despite high levels of conflict and extreme positions seen during public debates on these issues, the results of this study found more tempered opinions. Respondents preferred moderate levels of timber harvesting and snowmobile access and lower levels of off-road vehicle access. They favored a mixture of mature closed canopy and younger more open forests over either extreme and were somewhat indifferent toward extending the network of hiking trails. This study illustrates one approach for determining peoples' perceptions on the relative compatibility between different recreation uses.

5. **Conflicts on multiple-use trails: Synthesis of the literature and state of the practice (Federal FHWA-PD-94-031).** Moore, R. L. (1994). North Carolina State University, Department of Parks, Recreation, & Tourism Management.
<http://www.americantrails.org/resources/ManageMaintain/MooreConflictMgmt.html>

Abstract: The National Recreational Trails Advisory Committee identified trail-user conflicts on multiple-use trails as a major concern that needs resolution. The Committee asked the Federal Highway Administration to produce a synthesis of the existing research to foster understanding of trail conflict, identify approaches for promoting trail-sharing, and identify gaps in current knowledge.

This synthesis is intended to establish a baseline of the current state of knowledge and practice and to serve as a guide for trail managers and researchers. The goal of the report is to promote user safety, protect natural resources, and provide high-quality user experiences. It reviews management options such as trail design, information and education, user involvement, and regulations and enforcement.

Trail conflicts can occur among different user groups, among users within the same user group, and as a result of factors not related to trail user activities at all. Conflict has been found to related to activity style, focus of trip, expectations, attitudes toward and perceptions of the environment, level of tolerance for others, and different norms held by different users.

This report provides 12 principles for minimizing conflicts on multiple-use trails. Although this report is about conflicts on trails, it is intended to promote cooperation and understanding among trail users and to inspire ideas that will help reduce trail conflict. It is intended to be used by trail managers, State and local trail coordinators, researchers, and trail-user volunteer organizations.

Executive Summary

The National Recreational Trails Advisory Committee identified trail-user conflicts on multiple-use trails as a major concern that needs resolution. The Advisory Committee recognized that there is a significant amount of literature and expertise on this topic, but no one source that summarizes the available information. The Committee asked the Federal Highway Administration to produce a synthesis of the existing research to foster understanding of trail conflicts, identify promising approaches for promoting

trail sharing, and identify gaps in our current knowledge. This synthesis is intended to establish a baseline of the current state of knowledge and practice and to serve as a guide for trail managers.

The challenges faced by multiple-use trail managers can be broadly summarized as maintaining user safety, protecting natural resources, and providing high quality user experiences. These challenges are interrelated and cannot be effectively addressed in isolation. To address these challenges, managers can employ a wide array of physical and management options such as trail design, information and education, user involvement, and regulations and enforcement. Past research has consistently found that most outdoor recreationists are satisfied with their recreation experiences. Likewise, most trail experiences on multiple-use trails are probably enjoyable and satisfying. Conflicts among trail users do exist, however, and these conflicts can have serious consequences.

Conflict in outdoor recreation settings (such as trails) can best be defined as "goal interference attributed to another's behavior" (Jacob and Schreyer 1980, 369). As such, trail conflicts can and do occur among different user groups, among different users within the same user group, and as a result of factors not related to users' trail activities at all. In fact, no actual contact among users need occur for conflict to be felt. Conflict has been found to be related to activity style (mode of travel, level of technology, environmental dominance, etc.), focus of trip, expectations, attitudes toward and perceptions of the environment, level of tolerance for others, and different norms held by different users. Conflict is often asymmetrical (i.e., one group resents another, but the reverse is not true).

The existing literature and practice were synthesized into the following 12 principles for minimizing conflicts on multiple-use trails. Adherence to these principles should help improve sharing and cooperation on multiple-use trails.

- 1) **Recognize Conflict as Goal Interference** -- Do not treat conflict as an inherent incompatibility among different trail activities, but goal interference attributed to another's behavior.
- 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.
- 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 and lost opportunities for positive interactions this may cause.
- 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. 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.

- 6) **Identify the Actual Sources of Conflict** -- Help users to identify the specific tangible causes of any conflicts they are experiencing. 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.
 - 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. 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. 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. 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. The available research on recreational conflict is helpful for understanding and managing conflicts on trails. There is a great deal we do not know, however. This report concludes by identifying many conflict-related research topics that have not been adequately explored. Some of this suggested research is theoretical in nature, and some is suggested for applied experimentation by managers in the field. Trail managers recognize trail conflicts as a potentially serious threat. Many are optimistic, however, and feel that when trail conflict situations are tackled head on and openly they can become an opportunity to build and strengthen trail constituencies and enhance outdoor recreation opportunities for all users.
6. **Perceived conflict between urban cross-country skiers and snowmobilers in Alberta.** Jackson, E. L. and Wong, R. A. G. (1982) *Journal of Leisure Research* 14(1): 47-62.

Abstract: This study looks at three indicators of perceived conflict between urban cross-country skiers and snowmobilers in Alberta, Canada. The results indicate that conflict between these groups is asymmetrical with skier perceiving snowmobilers interfering negatively with their activity, while snowmobilers are indifferent to meeting skiers. While snowmobilers do not have conflict with skiers on the trail, they may have negative attitudes towards skiers because of off-site confrontations. The conflict between skiers and snowmobilers is seen as being more fundamental than simply a conflict between these two activities.

Cross-country skiers have an aversion to mechanization in recreation and are motivated to recreate in order fulfill needs of solitude, tranquility, physical exercises, and to develop an awareness of the natural environment. In contrast, snowmobilers are more machine-orientated, with a leaning towards socialization, adventurousness, and escapism.

7. **Conflict in outdoor recreation: A theoretical perspective.** Jacob, G.R., & Schreyer, R. (1980). Journal of Leisure Research, (Fourth Quarter 1980), 368-381.
<http://nohvcclibrary.forestry.uga.edu/SCANNED%20FILES/M-0062-conflict%20in%20outdoor.pdf>

Abstract: An attempt to build a theoretical interpretation of conflict in order to assist recreation managers identify a "conflict potential." Using existing recreational conflict literature, four causes (activity, resource, expectation, and tolerance) are established, and ten propositions link these causes to conflict. A variety of inter- and intra-group actions between many different activities, such as motor boaters vs. non motor, hiker vs. trail bike, skiers vs. snowmobilers, are examined, to derive the interpretive theory.