One-way Snowmobile Trail Study

A report to the Minnesota Legislature

Pursuant to the Laws of Minnesota, 1997 - Chapter 226, Section 47

March 16, 1998

Prepared for the Minnesota Legislature
by the Minnesota Department of Natural Resources
Trails and Waterways Unit

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Legislative Authorization for One-way Trail Study

This report has been prepared by the Minnesota Department of Natural Resources Trails and Waterways Unit in fulfillment of Chapter 226, Section 47, Laws of Minnesota, 1997:

> ***"The commissioner of natural resources must survey and identify, with the cooperation of local grant-in-aid trail groups, possible one-way circular trail systems for snowmobile use. A recommendation must be made to the 1998 Legislature."***

Minnesota has one of the nation's most extensive snowmobile trail systems. More than 18,000 miles of snowmobile trail are maintained by local, state or federal organizations. Almost 275,000 snowmobiles were registered in Minnesota as of July 31, 1997. To explore means of enhancing safety on these trails, the 1997 Legislature directed the Department of Natural Resources Trails and Waterways Unit to conduct a study of one-way systems, in cooperation with local snowmobile organizations.

Existing Snowmobile Trails System

The system of local, grants-in-aid, state and federal snowmobile trails combined with the use of road rights-of-way and frozen public waters (where permitted) creates a vast, interconnected network of trails across Minnesota. *(See the attached map of the more than 18,000 miles of snowmobile trails.)*

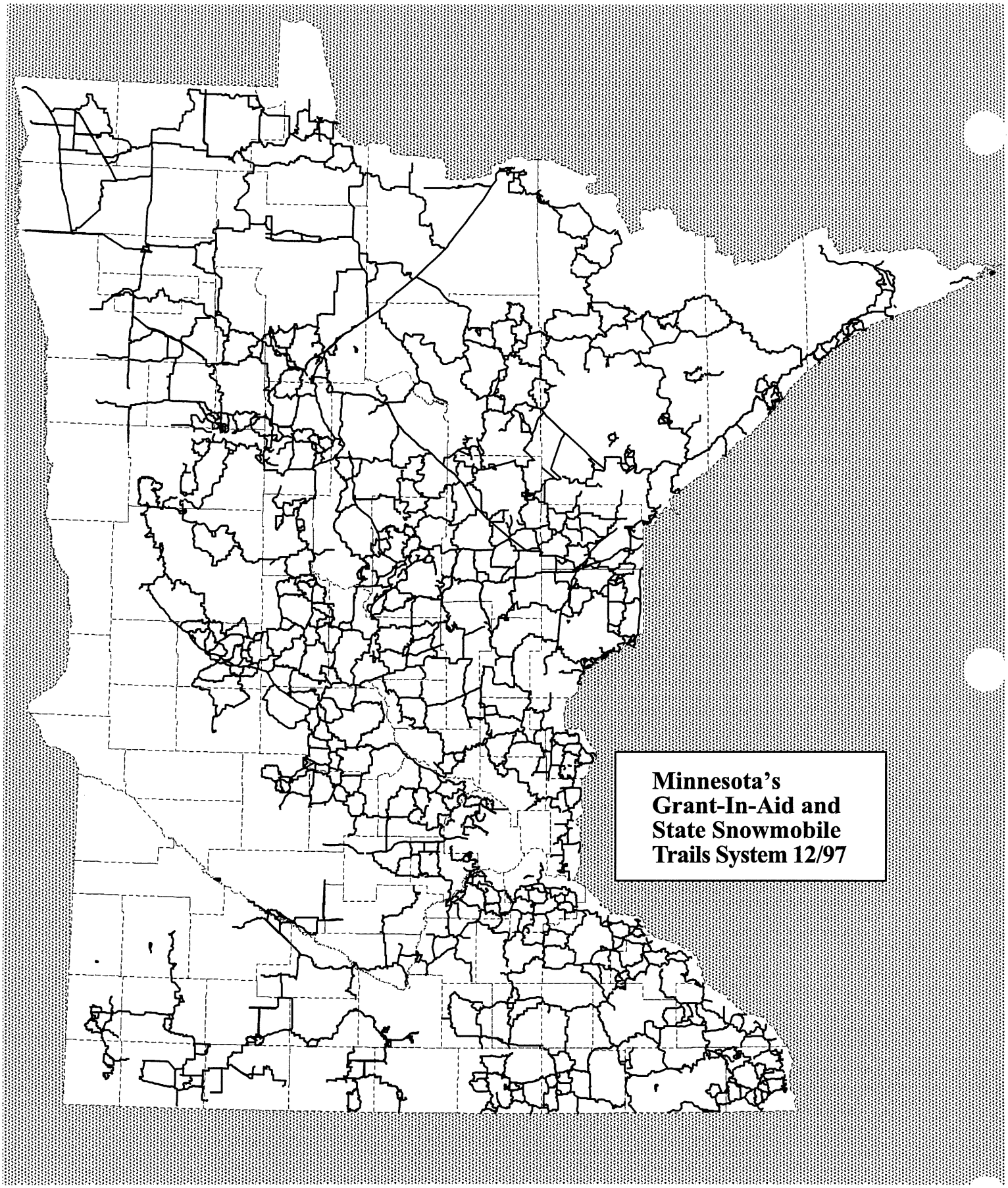
Snowmobiles may also be used

- in the bottom outside slope of state and county highways.
- in the same direction as highway traffic in the ditch from ½ hour after sunset to ½ hour before sunrise. Other than this time, snowmobilers can ride in either direction in the bottom or outside slope.
- on a bridge (other than main traveled lanes of an interstate highway bridge) on the extreme right-hand side.
- or on township roads or city streets on the extreme right-hand side (when not restricted by local ordinance).

Rules of the road (or trail) for snowmobiles are similar to that for cars. When meeting another snowmobile head-on, each snowmobile is to stay to the right.

Review of Recent Snowmobile Accident Reports

Eighty percent of reported fatal and non-fatal accidents in Minnesota in the winter of 1996-7 occurred in road rights-of-way, on lakes or streams, on private lands or private trails, compared to 20% on government marked trails. Alcohol and excess speed were


Minnesota's
Grant-In-Aid and
State Snowmobile
Trails System 12/97

major contributing factors to many of these accidents. Younger males (under 40) were the most likely to be involved in accidents. Striking a fixed object was the most commonly reported type of accident (40% of all fatal and non-fatal accidents).

Machine-to-machine collisions were cited as the cause of about 19% of the 1996-7 reported accidents. Not all of these were head-on collisions. Many accidents involved snowmobilers in a group traveling in the same direction, rear-end collisions, incidents when one snowmobile was passing a snowmobile traveling in the same direction, or a snowmobile striking another snowmobile that was stopped alongside the trail or road.

One-way trails might have prevented some of these accidents. However, increased safety education and training for operators, and increased compliance with existing speed, drug, and alcohol laws would also have prevented some of these accidents.

Feedback from Minnesota Snowmobilers, Snowmobile Organizations and Grant-In-Aid Trail Groups

A concerted effort was made by DNR Trails and Waterways field staff to gather information from snowmobile clubs statewide. Little support for the concept of one-way circular loop trails was reported. Chief among the questions raised was the number of potentially hazardous situations created when snowmobilers who believed that there was no oncoming traffic on a designated one-way trail loop suddenly faced unexpected, illegal oncoming traffic.

Following are some of the potential advantages and challenges in implementing a one-way system identified by local snowmobile clubs and trail managers.

One-way Trail Advantages

Wider Lanes of Travel

Creating a single or two side-by side but separate one-way trails from a two-way trail might allow a wider lane of travel, and therefore more room for avoidance of hazards.

One-Direction Flow of Traffic

There could be less opportunity for head-on collisions, or collisions at intersections, if all snowmobile traffic was flowing in the same direction.

Current two-way trails can tend to "dish out" from use. Heavy use and spinning tracks tend to push snow to the outside of the corner, and the inside of the curve becomes icy and narrower. Because of this dishing out, snowmobiles coming from either direction get pulled or funneled to the inside of the corner. The trail then becomes only 4-5 feet wide,

which makes meeting head-on in corners precarious. Groomers try to pull the built-up outside corner down and in to maintain a level 10' wide trail, but traffic can quickly rebuild the banks. One-way trails would also dish out, but snowmobilers wouldn't be meeting traffic head-on in corners.

Short Loops for Slower-Speed Enjoyment

Some snowmobilers have expressed the idea that short loop (2-5 miles) single lane trails for family riding, scenic enjoyment and exploration "like the old days" would be nice to have. Short one-way loops in scenic and unique areas may allow families to travel at a slower pace. In some sites, providing a narrower one-way trail might have less impact on that special site.

In the "old days" before the developed trails of today, trails were single paths and exploratory in nature. There is a desire by many riders to still have these experiences as a change of pace. The DNR Trails and Waterways Regional Supervisor in Grand Rapids has spoken to snowmobilers who have expressed a need to putt along slowly and enjoy the woods. Clubs and individual snowmobilers currently do maintain special little side loops for this same experience. Most are not marked, but are locally known for this slower paced, exploratory and scenic quality that other trails lose because of heavy traffic and higher speeds.

One-way trails can use topography to the advantage of the traveler - allowing the best view from one direction. Also, one-way trails could use the terrain to make grooming easier. Since it can be difficult for groomers to groom while climbing steep hills, a one-way trail loop could be routed so that groomers would be going downhill on steep slopes.

One-way Loop Issues and Challenges

Design Constraints

Location of one-way loop trails could be a potential for areas with clearly defined boundaries and a limited number of entry points (for example, within a defined parcel or park). In order for loop trails to work well, loops would need to be extremely short, or there would need to be interconnections to loops traveling in the opposite direction, for those situations where backtracking was necessary. Turn-outs would need to be provided along one-way trails.

Paired parallel or 'twin trails' were seen by some as more workable. However, environmental impacts of clearing an additional trail would need to be addressed.

Unintentional Wrong-way Use
With the potential for entry to a loop snowmobile trail system at number of points along the trail (private land, road and trail crossings, public waters, public land) there is a great possibility for *unintentional* use of a one-way trail going the wrong way. First-time visitors, out-of-state tourists, or others unfamiliar with the one-way concept are at risk for this unintentional wrong-way use. All potential entry points onto the trail would need to be clearly signed. Access control and signing would be easier if the trail loop was located in an area where there are only a few entry points onto the loop.

Change from Existing Patterns of Use
Changing established patterns of travel can create problems. Snowmobilers who have traditionally used trails for years can be unaware of a change, and may not notice changes, even if signs are posted. For example, on the Douglas State Trail, where all snowmobile trail traffic has been rerouted onto a signed, groomed trail on the natural-surface treadway parallel to the main paved trail, some longtime users still use the main treadway despite extensive signage, press releases, etc. When stopped, they have said they were unaware of the change, and simply hadn't noticed the signs, since they were so familiar with the trail.

A one-way loop is different from the long-established pattern on the existing network of 18,000 miles of trail system.

Intentional Wrong-Way Use
Even with a clearly marked one-way system, there is the potential for *intentional* use of the trail going in the wrong way. The temptation exists for some people to knowingly go the wrong way for a short distance on the trail to get to a desired location in a more direct manner, rather than circle the long way around.

When some people do not understand the rationale behind or the need for a new regulation, or they do not personally endorse the new regulation as a positive solution to a problem, compliance suffers.

Also, snowmobilers who are forced to change their plans, and need to return to their starting point due to mechanical problems, lack of gasoline, changes in weather conditions, or other situations, might have to backtrack rather than complete the lengthier circuit of a one-way loop.

If a party of snowmobilers discovers that one member was no longer keeping up with the group, the natural reaction is to backtrack on the same trail to find that snowmobiler and find out what the problem is.

Any of these intentional uses going the wrong way could create the hazard of unexpected two-way traffic on a designated one-way trail, if there was no available alternate route to

quickly return to the starting point.

Emergency Vehicles Using the Trail Going the Wrong Way
Situations could arise where emergency or enforcement vehicles must go the wrong way on a one-way trail in order to reach an accident or respond to other emergencies in the shortest time possible.

Potential to Create a False Sense of Security
Even on a one-way trail, there is a still a potential for head-on collisions between trail users using the loop as intended and either intentional or unintentional wrong-way operators. When trail users have an expectation of not having to worry about oncoming traffic on a one-way system, it may create a false sense of security. This might lead them to alter their driving habits of keeping to the right, watching for oncoming traffic, or maintaining a speed that would allow them plenty of reaction time to avoid oncoming traffic. The possibility that a one-way trail could encourage increased speeds was a concern to some snowmobilers.

This false sense of security may create situations for potential accidents that would not arise when all parties are aware that they are on a two-way trail and need to be aware of oncoming traffic.

Loss of Inter-connectivity/Increased Costs
In order to maintain the degree of inter-connectivity that is an advantage to snowmobilers traversing Minnesota's extensive network of two-way trails, one-way trails would need a parallel or very nearby one-way trail in the opposite direction. Increased costs were foreseen by some clubs for maintaining and signing two one-way trails over a single two-way trail.

Experiences of Other States or Provinces

Representatives of the American Council of Snowmobile Associations were unable to think of an example of a major one-way trail loop system in the U.S. Discussions were held with representatives of snowmobile organizations in Ontario and Manitoba. The response by the Ontario representative was that a one-way trail would only be considered where there was a significant constraint due to lack of width for the trail, and that their manual of trail design standards did not recommend one-way trails except in extreme situations for short distances.

A representative of the trail system in Manitoba said that there were two types of divided trails within provincial parks in his region. One trail has the lanes of travel divided by a centerline barrier of brush and snow embankments, but closely paralleling each other

(designed like interstate freeways). Another trail, now in its second year, has the two one-way trails totally separated by some distance, as much as several hundred yards at some points.

Their experience with these types of paired one-way trails has been very positive, and Manitoba will continue with this layout in the future. They think that dividing the directions of travel has enhanced safety, particularly in light of the very heavy use and the high speed capabilities of newer machines. There has also been some feedback from clubs doing the grooming that maintenance for the divided trails is less because the use is more dispersed. They have observed that the trails are not so 'beat up' after a weekend of heavy use, and need less grooming work to get them back into shape.

The Manitoba trail system spokesperson did not know of any one-way loops that did not have a paired one-way trail in the opposite direction. He did not think that they would consider circular one-way loops without a nearby loop in the reverse direction.

Both trails discussed above were conversions from traditional two-way trails. The environmental impacts of clearing additional forested land for the trails was an issue that needed to be addressed in the design of the trails. Trail maps and trail markings emphasize that these trails have divided lanes for each direction of travel.

No statistical study of trail safety before and after conversion to paired one-way trails has been done as yet in Manitoba. They did not think there had been any major accidents on these trails in the two years since their establishment. They did know of a serious head-on collision on another trail that was not under their management, where one of the operators had been driving the wrong way on a marked one-way trail.

Conclusion

The concept of one-way circular loop trails has not received broad support among local snowmobile organizations. Some potentially serious issues have been identified in changing routes that have previously been used as two-way routes to a one-way circular loop.

However, potential exists on some trails in northern Minnesota (such as the Arrowhead or Taconite State Trails), or in large areas of public ownership, where there is sufficient width in the trail right-of-way, to experiment with creation of two one-way trails, side-by-side, separated by an earthen or brush and snow berm. This would involve extra work in summer in preparing the site to create a berm, or clearing and brushing the two trail treadways. Signage, information, and maps to ensure that the new trail layout was understood by all snowmobilers would be needed.

This layout might meet the desired objectives of reducing conflicts between snowmobiles traveling in opposite directions, while still allowing the traditional use of the trail in both directions. Interconnections between the two trails could reduce the problems foreseen for one-way loops, because trail users could more easily backtrack, change plans, or return to a disabled machine.

The concept of two side-by-side one-way trails could be examined in more depth for use in Minnesota. The success of the paired one-way trails would need to be evaluated in terms of the acceptance by snowmobilers, the compliance with use of the treadways as designated, environmental impacts, and the benefit gained in relationship to the extra effort needed to create and groom the dual one-way treadways.