

## TRENDS IN RECREATIONAL VEHICLE TRAFFIC IN NORTHEASTERN MINNESOTA<sup>1</sup>

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### INTRODUCTION

Many northeastern Minnesota communities depend upon outdoor recreation activities and tourism for a substantial portion of their yearly cash inflow. While the recreation and tourism industry in the region has grown steady in recent years, it may prove to be less stable in the future than other industries, for at least two basic reasons: (1) while sociologists and recreation planners may dispute the assertion, outdoor recreation is considered by many a luxury or a non-essential activity and therefore subject to alteration of activity participation due to changing economic status of families and individuals. (2) the recreation and tourism industry is dependent to a large part on a highly mobile population. Because of these two characteristics, recreation and tourism patterns can be subject to rapidly changing trends as a result of inflation, increasing energy costs and gasoline availability.

To respond to data needs of program planners and decision makers within the recreation and tourism industry, a recreational vehicle traffic monitoring program was implemented to determine if an easily conducted, standardized count of traffic could adequately describe patterns of recreational oriented movement in and out of the Duluth area. The monitor was designed to identify: vehicles that were most common; movement of boats, canoes, dirt bikes, skis, snowmobiles etc; periods of high and low volumes; and changing patterns of movement.

In addition to the traffic monitor, existing supplemental data was expected to aid in determining the effect that external factors had on levels and patterns of recreational activity. While temperature, weather, season, events, and holidays were to be examined as potential impacts, the overriding concern of many people in the industry focused on spiraling gasoline prices and the potential of nonavailability of gasoline supplies.

Studies and theories concerning recreational traffic and response to gasoline restrictions both in Canada and Europe have been conducted by Dr. R. I. Wolf (1969,1977). Unavailability of fuel is thought to be a more potent force in restraining travel than its rising cost but there is little research that can support this contention. Wolf has found that there appears to be a change in travel patterns in Europe as a result of the continuing escalation in fuel costs or in its restricted availability. Europeans are turning toward public transportation to provide for their required travel to and from work and their social obligations, but reserve their private auto for travel to their recreational second home or their favorite recreation area. Will Minnesotans and their visiting neighbors respond similarly? This is what we wanted to know.

### STUDY AREA

Duluth is located at the western tip of Lake Superior in northern Minnesota. It is a center of recreation for northern Minnesota

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and Wisconsin in its own right, but virtue of its beautiful harbor, adjacent Lake Superior, long ocean-like beach, cultural and retail opportunities and transportation linkages.

Expansion and new development of recreation opportunities is evident in Duluth. The Marine Museum, one of the most visited attractions in Minnesota, was expanded in 1978-1979. Cleanup of the picturesque and largely undeveloped St. Louis River which flows through the city has already begun; a new, advanced, waste-water treatment plant located on the river started operations in the fall of 1978. Several new hiking trails planned for 1980 are in some of Duluth's 110 city parks.

The recreation-tourism industry is a very important segment of Duluth's economy. Uel Blank reported that during 1972, visitors traveling through Duluth typically made expenditures equal to 28 percent of the city's total retail sales for a summer week. A yearly projection of non-resident vehicles had Duluth-Superior as their major destination and survey data indicated a conservative estimate of 3.8 million non-resident person-trips to Duluth-Superior for vacation purposes alone each year.

Duluth also serves as a gateway for much of the popular northwoods lake country. It is the largest retail center in the upper Minnesota-Wisconsin region, and thus serves the needs of travelers passing through (and is the destination of many Canadian shopping trips). In addition, the city's geographical position at the head-of-the-lake has led to the intersection of several highways through the city. Backpackers hiking down the main street of Duluth also is a common sight.

Northern Minnesota and Wisconsin have great recreation potential year-round, from fishing in the spring to boating in summer; hunting, fishing, and "leaf-peeping" during autumn; and snowmobiling and skiing in winter. Although summer may always be the busiest tourist season of the year, activity during the other seasons is on the increase. Thompson Hill Visitor's Center had its highest 1978 daily total on September 30th, during the height of the fall foliage season!

#### PROCEDURES

Interstate 35 south of Duluth was chosen for the traffic counts for two main reasons: first, it brings traffic primarily from the St. Paul-Minneapolis area and further south. Most people vacationing in northern Minnesota come from that direction. Secondly, it has one of the highest volumes of traffic entering Duluth from any direction and the highest percentage of out-of-state recreational

traffic (Blank).

Friday afternoons from 1 to 5 p.m. were selected as the optimum counting period for this survey and is assumed to represent the beginning of the weekend recreational traffic period. In addition, Thompson Hill Information Center (located near the observation station) hourly counts indicate that 1-5 p.m. on Fridays is the peak flow period of the week for visitors coming into the area. Counting any later in the afternoon was not possible during the winter months, and week-end traffic counts would have been more expensive and much harder to arrange. In any case, consistency seemed to be the crucial factor in conducting counts throughout the year, since whatever time period selected for counting would only represent a portion of the total weekly recreational traffic.

The traffic count tally sheets were designed to be inclusive of all types of visible recreational traffic and as objective as possible. In some categories there were unavoidable errors, but these were felt to be relatively small and inconsequential. Recreational traffic was classified in two ways. First, counters noted the type of vehicle carrying or pulling recreational equipment, e.g. sedan, pickup, motorhome, four-wheel vehicle, van or other. Second, the type and number of recreational indicators were recorded such as boats, skis, camper-trailers, snowmobiles etc. Recreational equipment was further classified where appropriate, as either "warm-weather" or "cold-weather" indicators.

Counting was begun in late July on a test basis. Official counting for this study started August 5, 1977 and ended on July 27, 1979, two complete years of data. Separate counts were kept of northbound and southbound traffic for each hour. At the end of four hours of counting, the totals for each hour in each direction were calculated.

Weather forecasts for each weekend were obtained from the National Weather Service on Friday morning. Any special tourist or recreational-related events occurring that weekend were also noted. Presence or absence of ice on Lake Superior and inland lakes was recorded, as well as the status of hunting and fishing seasons. Supplementary data obtained from other sources were tabulated at the end of the count year. Such data included Thompson Hill Visitor Information Center inquiries, Minnesota Department of Transportation traffic averages, gasoline prices, hotel/motel occupancy rates, Amtrak passenger and recreational baggage totals.

#### RESULTS AND DISCUSSIONS

This study was initiated in August 1977

and the first year report analyzed data collected between August 1977 and July 1978. The first year report (Norton, Hales, and Wood 1978) demonstrated that a standardized count of recreational traffic can be made that can reflect several trends in both type and volume of recreational travel. Such counts were useful in isolating those events and factors which significantly influence recreational travel patterns. The second year of data was then examined to determine trends, consistently and impacts of events such as gasoline non-availability in comparison to the first year data.

#### Treatment of Data

Separate hourly totals of recreational traffic were combined and the four-hour study totals of vehicles were used for most analyses. Analyses included: 1) Seasonal variations in volume of recreational traffic and types of equipment tallied, 2) Comparisons of volume and types of northbound versus southbound recreational traffic, 3) Correlation between patterns of travel revealed by collected data and by other travel indicators, such as Amtrak passenger counts, total traffic volume (as determined by the Minnesota Department of Transportation) and visitor-use data of the Thompson Hill Information Center; 4) Relationships between recreational travel patterns and factors which possibly influence travel such as holidays, special events, hunting and fishing season openings, weather conditions and gasoline price and availability.

For brevity sake, only four factors which were identified to exert significant influence upon recreational traffic will be discussed here: 1) weather, 2) holidays-special events, 3) gasoline price and 4) gasoline availability. A more detailed report on the second year data is in preparation.

#### Weather Conditions

Weather conditions during 1978-79 were generally similar to those during 1977-78. In both years, the beginning of November was marked by a rapid decrease in temperature, early December was marked by a warm spike, and the spring climb in temperatures was longer and more gradual than the fall decrease. Temperatures started increasing in early March and climbed steadily until early June before leveling off. Major differences between the two years were as follows: 1) There was more snow during 1978-79 than 1977-78. Snow depth climbed steadily to a peak of 30 inches in late February and early March. During 1977-78, maximum average accumulation was only 12 inches by the end of February. 2) 1978-79 was a windier year than 1977-78, particularly during the fall and winter months. 3) Road conditions were more often poor during

1978-79 than during 1977-78, especially during winter. 4) The winter of 1978-79 was colder than that of 1977-78. Temperatures dropped below 32°F two weeks earlier than 1977-78 and did not reach above 32°F again until one week later. Also, there was no January thaw as there had been in 1977-78. 5) The spring was colder and later than in 1977-78. Average temperature stayed below 40°F until mid-May when it suddenly jumped to 50°. In 1977-78, average temperatures had reached 50° by late April and stayed above that temperature from then on.

#### Holidays and Special Events

Holidays were, of course, the same from one year to the next, as were the openings of hunting and fishing seasons. Types of special events, however, differed somewhat during the two years. Also, they did not always fall at the same time. In some cases a holiday and special event occurred on the same weekend during one year but on different weekends during the other year. This allowed separation of the effects which those two factors had on recreational travel.

#### Gasoline Prices

During 1977-78, gasoline prices in both Duluth and Minneapolis averaged \$.58 to \$.62 per gallon. They varied by no more than \$.08 per gallon throughout the year. They showed neither a net increase or decrease, but ended the year at approximately the same price as they started the year.

1978-79 was quite a different story. Prices rose approximately \$.05/gallon in the first six months of the study-year. During the second six-month period, they jumped another \$.28/gallon. This represented a 50% increase in prices between July 1978 and July 1979. Between August and December, Duluth gasoline prices were roughly \$.04/gallon higher than Minneapolis prices, as they had been through 1977-78. However, during the period of rapid price increase in the winter and spring, Minneapolis and Duluth prices were similar. By June and July, Duluth gasoline averaged \$.02/gallon less than Minneapolis gasoline.

#### Gasoline Availability

No shortages of gasoline availability occurred or threatened to occur during 1977-78 or during the first 9 months of 1978-79. However, by May 1979, the Minnesota Energy Agency began issuing warnings of upcoming shortage and voluntary cutback in gasoline consumption was urged. During June, gasoline shortages became more and more common until the end of the month, when they were fairly severe in some places. During

July, gasoline supply stabilized somewhat and by the end of the month, threats of more shortages were not so severe.

With these considerations in mind, it is now possible to compare the two years of recreational travel monitoring, with an eye toward identifying causes of differences between the two years.

#### Patterns of Traffic Flow

Seasonal changes in volume and composition of recreational traffic seen in 1978-79 were very similar to those seen in 1977-78. Bimodal distribution of traffic volume was observed during both years. Fall periods of very low recreational flow began and ended one to two weeks earlier in 1978-79 than in 1977-78, possibly due to the somewhat earlier drop in fall temperatures.

Spring periods of very low flow occurred during the same weeks in the two years. Beginning and end of the cold season, as defined by types of recreational vehicles counted, differed by no more than a week between the two years of observation. The appearance of cold season recreational equipment corresponded closely with the first appearance of snow, which was similar in the two years, rather than with other weather conditions, which varied a little between the two years.

Response to holidays and special events, as indicated by recreational traffic counts, was extremely consistent between the two years. All major holidays brought about the same response in recreational traffic. Special events varied from year to year, but three main events, the Duluth Annual Folk Festival, Fall Foliage Peak and University of Minnesota-Duluth graduation occur yearly. In both years of the study, the weekends of these three events showed large increases in recreational traffic in the north direction. All but the fall foliage peak also brought about a large increase in southbound traffic. During 1978-79, the combined effects of fall foliage peak and the opening of small game hunting may be linked with a decrease in southbound traffic, regardless of the large increase in northbound traffic.

During both years, there was a noticeable trend for special events within the city of Duluth to correspond with slight decreases in southbound traffic, i.e. recreational traffic leaving Duluth. Some examples are Park Point Art Fair, major UMD hockey games during 1977-78, Duluth Days - all-city celebration in 1977-78, Duluth city ski-jumping contest in 1978-79, and the city softball tournament in 1978-79. Essentially these events kept Duluth residents home and off the highway to

other places.

Finally, response of recreational traffic volume to hunting season opening weekends was quite similar in the two years. Opening of deer season consistently caused large increases in recreational traffic in both the north and south directions. Opening of small game season corresponded with very low levels of recreational traffic. However, opening weekends of steelhead fishing, smelting and other fishing showed only slight increases in traffic in 1978-79, while in 1977-78, smelting and inland fishing opening weekends were accompanied by large increases. There are at least two possible explanations for this. 1) Since the spring of 1978-79 was much colder and slower in coming to northern Minnesota than the previous spring, the beginning of fishing season was not as desirable a time to be outdoors for many people. Also, inland lakes were frozen much later. The smelt run was slower and more spread out than the previous year, therefore smelting activity would not be likely to bring about as sharp an increase in traffic as the previous year. 2) The price of gasoline was increasing at the sharpest rate during this period of April, May and June of 1978-79. This may have discouraged people from traveling as far as they normally would have for fishing, especially when considered in combination with the cold and wet spring that northern Minnesota was experiencing.

#### Volume and Composition of Recreational Traffic

Although seasonal trends in relative numbers of vehicles were similar in 1977-78 and 1978-79, there were significant differences in the absolute numbers of recreational vehicles at any given time. During August, September, October and November, recreational traffic volume in the second year was equal to or somewhat lower than the first year. Between December and March, both north and southbound traffic were significantly higher than in the previous year. In April, southbound traffic was much higher, but northbound traffic was 33% lower than in 1977-78. From May on, both north and southbound recreational traffic were lower in the second year than in the first year.

Most likely, the large increase in cold-season recreation can be directly related to the continuous and deep snow cover present in 1978-79. Amtrak records of skis carried during the same time period showed an increase of greater than 200% over 1977-78, which is probably indicative of the same thing. Cold and wet spring weather may account for the increase in southbound traffic and the decrease in northbound traffic during April and perhaps early May. However, by late May, temperatures were once again seasonable and

weather cleared up. It seems likely that the net decreases in recreational traffic during May, June and July may have been due to changes in the price and availability.

A closer look at May, June and July data lends evidence to this suggestion. Table 1 presents the changes which occurred in recreational traffic between 1977-78 and 1978-79 on a weekly basis. It is apparent that early May and late June of the second year experienced the greatest reductions in recreational traffic of 20 to 55% from the previous year. As mentioned previously, low levels in early May may have been due to the unseasonable cold temperatures. However, neither temperature nor other weather factors explain the continued low levels of recreational activity after mid-May. From mid-May to mid-June, recreational travel volume recovered somewhat, however, it remained depressed approximately 10% relative to 1977-78.

TABLE 1: Weekly changes in recreational traffic volume between 1977-78 and 1978-79; May, June, and July

	Total Recreational Traffic.		% Change from 1977-78 to 1978-79
	1977-78	1978-79	
May 1	158	73	-54 %
2	185	145	-22
3	156	148	- 8
4	306	274	-10
June 1	143	168	+17
2	285	250	-11
3	247	243	- 2
4	247	203	-38
5	562	256	-54
July 1	251	337	+34
2	362	273	-25
3	282	200	-29
4	305	275	-10
<b>Total</b>	<b>3484</b>	<b>2845</b>	<b>-18 %</b>

In late June and the first three weeks of July, volume once again fell to levels 20-50% below those of the previous year. One exception was the first weekend of July, when volume was up by 23%. This is misleading, however since the first July weekend was the 4th of July holiday weekend in 1978-79, while in 1977-78 the last week of June had been the main holiday weekend. The best way to compare this period and eliminate the holiday bias was to lump the two weekend totals. When lumped, overall net change for the two-week holiday period once again showed a substantial reduction of 27% in recreational traffic volume. During the last week of July,

traffic volume returned to only 10% below 1977-78 levels.

The factor which seems most likely responsible for the general decrease in recreational traffic between the spring of 1977-78 and the spring of 1978-79 is the high escalation rate of the price of gasoline which occurred during spring of 1978-79. By itself, this factor seemed to account for a decrease of roughly 10%. Other factors in combination with high gasoline prices were capable of further reducing recreational travel to levels 20-50% below 1977-78. These other factors were the unseasonable cold weather in early May and the gasoline shortages in late June and early July. Once gasoline shortages were somewhat ameliorated in late July, travel seemed to have increased back to 10% below 1977-78 levels.

The observed spring decrease in travel was more marked in the northbound direction than the southbound. Average percent change for May through July was -23% for northbound traffic but only -13% for southbound. In 1977-78, northbound traffic between January and July averaged 70% higher than southbound. In 1978-79, it averaged only 8% higher, before January, northbound traffic exceeded southbound by a similar amount of less than 20% in both years. January was the month during which gasoline prices first started to increase after sixteen months of stability. This differential directional effect may have been due to the fact that areas south of Duluth were hit harder by both gasoline price increases and shortages than was the Duluth area. A check with local stations verified this as supplies were available during the entire period.

In addition to the depressive effect which high gasoline prices and low availability had on travel volume, they may have been responsible for changes seen in the mode of travel which people used. Table 2 shows the

TABLE 2: Distribution of carrier types in 1977-78 and 1978-79

Carrier type	1977 - 78	1978 - 79
SEDAN	45 %	38 %
PICKUP	28	41
FOUR WHEEL DRIVE	6	6
MOTORHOME	15	10
MOTORCYCLE	3	3
CONVERTED BUS	1	1
CHARTER BUS	1	1
OTHER	1	0
<b>TOTAL</b>	<b>100 %</b>	<b>100 %</b>

relative abundances of different vehicle types during the two years. Motorhomes and sedans showed significant decreases in relative abundance between 1977-78 and 1978-79 while pickups increased. Change in absolute numbers of different types of vehicles are shown in Table 3. Between the first and the second year, motorhomes decreased by 44%, sedans by 29%, 4-wheel drive vehicles by 18%, and other vehicles by 30%. Pickup numbers increased by 23%, despite an overall decrease of 16% in total recreational travel.

ciation, Birmingham, England. September 3-4, 1977.

TABLE 3: Change in numbers of recreational vehicles from 1977-78 to 1978-79

Type of Carrier	1977-78	1978-79	% Change
Sedans	4063	2871	-29 %
Pickups	2528	3098	+23
4-Wheel Drive	542	453	-18
Motorhome	1354	756	-44
Other	542	378	-30
Total	9029	7556	-16

A drop in the number of motorhomes is understandable in light of gasoline price changes. Motorhomes are typically much less gasoline efficient than other types of vehicles. The shift from sedans to pickups is less understandable. However, gas mileage of large sedans and pickups are comparable. Possibly the shift represents a movement away from vehicles with fairly limited usage to those which are more versatile in their use and utility.

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