

THE ECONOMIC IMPACT OF SNOWMOBILING IN MAINE¹

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Abstract: This paper reports the results of a study designed to measure the economic impact of snowmobiling in Maine during the 1995-96 season. Two surveys were conducted to provide the necessary data. First was a survey of Maine residents and non-residents who registered their snowmobiles in Maine during the 1995-96 season. Second was a survey of New Hampshire resident snowmobilers, since they have reciprocity in Maine. The total economic impact of \$225,973,240 and 2,700 full-time equivalent jobs was determined using an input-output model of the Maine economy. The impacts of each sector are reported, along with a description of the socio-demographic characteristics of snowmobilers in Maine.

Introduction

Snowmobiling is a popular winter recreational activity in Maine. During the 1995-96 snowmobiling season, over 69,000 snowmobiles were registered by Maine residents and another 6,500 were registered for use in Maine by non-residents. The sport has undergone several changes in recent years. Technological improvements, for example, have made snowmobiles more reliable and more comfortable to ride, which in turn, has altered the riding habits of snowmobilers. For example, snowmobilers no longer only ride in and around their own community; overnight trips of several hundred miles are becoming quite common.

Major improvements in snowmobile trails and trail maintenance over the last ten years have also contributed to the changing riding habits. The interconnecting trails system now allows people to ride from one end of the state to the other, and the Maine trails connect to those in

neighboring states and provinces. Trail grooming has also improved as local snowmobile clubs and municipalities have purchased new and better equipment. Consequently, people can ride greater distances over better trails today than they could ten years ago. All of these changes have contributed to the rapid growth of the sport in Maine.

The growth of snowmobiling has also increased the importance of snowmobiling to the Maine economy. Snowmobiling is now a major winter activity that has a large impact on the state economy, especially in more rural areas. In addition to purchasing snowmobiles and accessories, snowmobilers purchase gas, food, accommodations and other services in the communities where they ride.

One of the problems facing the snowmobiling industry in Maine, however, is the lack of current information about the sport. The last study of snowmobiling in Maine was conducted in the early 1980s, and is inadequate for describing the current status of the sport. Representatives of the sport need up-to-date information about the impact of snowmobiling on the Maine economy. To partially rectify this problem, the Department of Resource Economics and Policy at the University of Maine, in conjunction with the Maine Snowmobile Association, conducted a study of snowmobiling in Maine for the 1995-96 season. The purpose of this paper is to describe the methods used in the study and to summarize the results. Specifically, we provide a profile of the Maine snowmobiling population and the overall economic impact of snowmobiling in Maine, including direct, indirect and induced impacts.

Procedures

Two surveys were conducted as part of the overall study. One was a survey of Maine residents and non-residents who registered their snowmobiles in Maine for the 1995-96 snowmobiling season. The second was a survey of New Hampshire residents who registered their sleds in New Hampshire for the 1995-96 snowmobiling season. Since New Hampshire residents can ride their snowmobiles in Maine without registering them in Maine, the second survey was required to obtain a complete overview of snowmobiling activities in Maine. The results of the study reported below are based on the information obtained from these two surveys.

A stratified random sample of snowmobile registrations was obtained from the Maine Department of Inland Fisheries and Wildlife for resident and non-resident snowmobiles registered in Maine. The sample was selected in a way that insured each snowmobile registration within a registration category had an equal probability of being selected. The name and address of the person on the registration form was recorded, along with the snowmobile registration number. Respondents were asked to answer questions about the specific snowmobile selected in the sample.

The resident sample contained 1,500 registrations while the non-resident sample contained 981 registrations. The Dillman Total Design Method was used to conduct the mail

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survey in the spring of 1996, immediately after the 1995-96 snowmobiling season.

A stratified random sample of snowmobile registrations was also obtained from the New Hampshire Department of Corrections for the survey of New Hampshire snowmobilers. The sample contained a total of 1,000 registrations, with 400 selected from the counties that border Maine, and the other 600 selected from the remaining counties of New Hampshire. The Dillman Total Design Method was also used to conduct the mail survey of New Hampshire snowmobilers. This survey was conducted in the fall of 1996.

The questionnaire sent to residents and non-residents who registered their snowmobiles in Maine contained the questions needed to estimate the economic impact of snowmobiling by these two groups. For example, respondents were provided with the snowmobile registration number of the specific sled selected for the sample, and they were asked whether it was purchased in 1995-96 and, if so, how much they paid for it, excluding the value of any trade-in. Other questions obtained the net price on trailers purchased during the 1995-96 season.

Three additional questions provide the remaining information needed to estimate the economic impact of snowmobiling in Maine for these groups. The first question asked for trip-related expenses associated with the use of the specified snowmobile. These expenses include gas and oil for the snowmobile, a share of gas expenses for the tow vehicle, a share of restaurant/lounge purchases, groceries, accommodations and other expenditures related to snowmobile trips. Note that only a share of these expenses were reported. For example, if two snowmobiles were trailered to an area, respondents reported only one-half of the fuel costs for the tow vehicle, since expenses were collected on a per-snowmobile basis.

The second question asked respondents to report all 1995-96 expenditures made in Maine for maintenance, repairs, accessories and storage of the specific snowmobile identified in the survey. They were also asked whether the snowmobile was insured during 1995-96, and if so, the annual amount of the insurance premium for the snowmobile.

Finally, the third question asked for clothing and other specialty snowmobiling-related purchases made in Maine for the primary rider of the snowmobile identified in the survey. Items such as coats, boots, gloves, helmets, face masks and gauntlets are listed as possible purchases. Only expenditures incurred for the primary rider of the snowmobile were requested to insure that these expenses were directly related the specific snowmobile identified in the survey.

The questionnaire sent to New Hampshire snowmobilers was similar to that described above. However, there was one major modification. Expenditure data were collected on a per-household basis rather than a per-snowmobile basis because registration numbers for specific snowmobiles could not be obtained for New Hampshire snowmobiles.

Results

The original sample size for the Maine Resident/Non-resident survey was 2,481; however, 31 of the surveys could not be delivered because of incorrect or incomplete addresses. In total, 1,684 questionnaires were returned for an overall response rate of 68.7 percent of the deliverable questionnaires. The response rate for residents and non-residents was 69.2 and 68.0 percent of deliverable questionnaires, respectively.

For the sample of 1,000 New Hampshire snowmobilers, 64 of the surveys could not be delivered because of incomplete or incorrect addresses. Of the 936 deliverable surveys, 532 were completed and returned, for an overall response rate of 56.8 percent.

Socio-Demographic Characteristics

Selected socio-demographic characteristics of residents and non-residents who registered snowmobiles in Maine in 1995-96 are reported in Table 1, along with the characteristics of New Hampshire snowmobilers. It should be noted that the characteristics reported for New Hampshire snowmobilers only reflect those who snowmobiled in Maine during the 1995-96 season, and may not accurately portray all New Hampshire snowmobilers.

As expected, most people whose names appeared on the snowmobile registrations are male: about 87 percent of residents, 92 percent of non-residents and 89 percent of New Hampshire residents. It should be noted that this gender mix reflects the person whose name appeared on the snowmobile registration form and may not accurately reflect the gender mix of the actual riders of the snowmobiles.

The average age of residents (42.8 years) is slightly higher than that of non-residents (41.1) and New Hampshire riders (40.8), and the average household size of 3.1 persons for residents is also slightly higher than for non-residents (3.0) and New Hampshire respondents (2.8). The average age and household size for snowmobilers are similar to those reported for other outdoor recreation participants. Non-residents have a higher level of education than residents. However, the education levels of both residents and non-residents are about the same as for the population as a whole. Information on the education level of New Hampshire snowmobilers who snowmobiled in Maine during 1995-96 was not obtained.

The average household income of the non-resident and New Hampshire groups are much higher than that of the Maine resident group. This difference is not unusual, as Maine residents have lower incomes than residents of the other New England states. Furthermore, non-resident snowmobilers incur higher costs to snowmobile in Maine. Therefore, their income level is probably higher than the average income of all snowmobilers in their home state. Although the average income of resident snowmobilers is less than that of non-residents and their New Hampshire counterparts, it is well above the average income of Maine residents in general.

Table 1. Socio-Demographic Characteristics of Resident and Non-Resident and New Hampshire Snowmobilers in Maine, 1995-96.

Characteristic	Maine Resident	Non-Residents	NH Residents
Gender (% Male)	86.8	92.2	89.3
Average Age	42.8	41.1	40.8
Average Number of People in Household	3.1	3.0	2.8
Average Education (years)	12.8	13.3	na ¹
Average Household Income (\$)	47,492	68,213	60,466
Have Personal Computer at Home? (% yes)	43.7	49.5	57.2
Access to Internet and World Wide Web? (% yes)	31.9	43.8	46.6

¹To shorten the survey, the education level of New Hampshire respondents was not requested.

The Internet and World Wide Web are becoming popular sources of information about many things, including snowmobiling. For example, snowmobile manufacturers and some dealers have developed home pages, and some localities are providing trail information through home pages. Use of the Internet and World Wide Web for seeking and distributing information is growing rapidly, and is becoming an important method of communication.

Given the potential of the Internet and World Wide Web as an information source, we asked respondents whether they have a computer in their home, and whether they have access to the Internet. Almost 44 and 50 percent of residents and non-residents, respectively, reported having a computer in their home. Furthermore, over 57 percent of New Hampshire respondents have a home computer. These figures are well above the national average.

Among those with computers, about 32 percent of residents, 44 percent of non-residents and almost 47 percent of New Hampshire respondents have access to the Internet through their home computer. Hence, about 14 percent of residents, 22 percent of non-residents and 27 percent of New Hampshire respondents in the surveys have access to the Internet in their home. Others may have access through computers at work.

Other information about snowmobilers is also helpful for describing participants. For example, 41.8 percent of resident snowmobilers indicated that their first snowmobiling experience in Maine occurred before 1970.

Only about eight percent of residents reported that they first snowmobiled in Maine between 1990 and 1995. Hence, most resident snowmobilers have been active in the sport for a long period of time. In contrast, 47 percent of non-residents indicated that they first snowmobiled in Maine between 1990 and 1995. This clearly indicates that Maine has attracted a large number of non-resident snowmobilers in recent years.

Resident households own an average of 2.21 snowmobiles and non-residents own an average of 2.38 snowmobiles per household. Respondents from New Hampshire own an average of 2.1 snowmobiles per household. Furthermore, 40 percent of the New Hampshire respondents indicated that they snowmobiled in Maine during the 1995-96 season. Those who snowmobiled in Maine took an average of about three snowmobiling trips in Maine during 1995-96 and rode an average of 534 miles. This compares to 682 miles for non-residents and 704 miles for Maine residents.

Economic Impact

Total 1995-96 snowmobiling-related expenditures are summarized in Table 2. They include expenditures on new and used snowmobiles and trailers purchased in the state during 1995-96, trip-related expenses, repair, maintenance and accessory expenses, and expenses for clothing and specialty items. The total expenditures in Table 2 for these three categories include the expenditures made by residents and non-residents who registered their snowmobiles in Maine, and the expenditures made in Maine by New Hampshire residents who snowmobiled in Maine.

The insurance expenses represent the estimated premiums paid by residents only, as it was assumed that non-residents and New Hampshire residents insured their snowmobiles through agencies located outside the State. Finally, the total amount collected through snowmobile registration fees paid by residents and non-residents who registered their snowmobiles in Maine is reported, along with the amount municipalities contributed to trail maintenance and grooming, over and above the amount they received in registration fees and grants. Overall, these expenditures total about \$152.5 million for 1995-96.

Expenditures associated with the purchase of new and used snowmobiles account for almost half (48.3 percent) of the total expenditures. The next largest category, trip-related expenses by residents, non-residents and New Hampshire residents while snowmobiling in Maine accounts for 25.1 percent of total expenditures. Maintenance, repair and accessory expenses rank third and represent 11 percent of total expenses. Clothing and specialty item expenses and trailer purchases account for 6.5 and 4.9 percent, respectively, of total expenditures.

In the language of economic impact analysis, the \$152,487,000 in total expenditures represents the direct economic impact of snowmobiling on Maine's economy. It is referred to as the direct impact because it represents the dollar expenditures spent directly by the participants in the activity. The total economic impact, in contrast, includes

not only the direct impact, but the indirect and induced impacts as well. Indirect effects are output changes in backward-linked sectors caused by the changing input needs of the sectors directly affected by snowmobiling. Induced effects represent changes in economic output caused by changes in household incomes generated by the direct and indirect effects.

Table 2. Total Expenditures Associated with Snowmobiling in Maine, 1995-96.

Expenditure Category	Amount (\$1,000)
Total Expenditures on Snowmobiles	\$73,511
Total Expenditures on Trailers	7,513
Total Trip-Related Expenditures (Residents, Non-Residents and New Hampshire Residents)	38,253
Total Maintenance, Repair, Accessory Expenditures (Residents, Non-Residents and New Hampshire Residents)	16,986
Total Clothing/Specialty Item Expenditures (Resident, Non-Resident and New Hampshire Residents)	10,003
Insurance Expenditures (Residents only)	4,432
Snowmobile Registration Expenditures (Residents and Non-Residents)	1,752
Extra Municipal Expenditures	37
Total Expenditures	\$152,487

To estimate the total impact of snowmobiling, one must either construct an input-output model or have access to multipliers derived from an input-output model. For this study, an input-output model of the Maine economy was constructed using IMPLAN, or IMPact analysis for PLANning, developed and used by the U.S. Forest Service.

Once the input-output model is constructed, each type of expenditure was assigned to the appropriate sector of the input-output model. In the first column of Table 3, the economic sector and the type of expenditures assigned to that sector are shown. For example, the types of expenditures associated with the Dealers and Service Stations sector include dealer sales of new and used snowmobiles and trailers, all gasoline sales, end-of-season service, and one-half of snowmobilers' expenses for accessories, clothing and helmets. The other economic sectors in the model and the types of expenses assigned to each sector are also shown in Table 3.

The total expenses made in each sector are shown in the second column of Table 3. For example, the total expenses assigned to the Dealers and Service Stations sector equal \$73,837,291. Note that the total expenses shown in the second column equal the total direct expenditures of snowmobilers, or \$152,487,621.

Table 3. Total Snowmobiling Expenditures by Economic Sector and the Margined Expenditures for Each Sector, 1995-96.

Economic Sector/Expenditure Type	Total Expenditure	Total Marginal Expenditure
<u>Dealers and Service Stations:</u> dealer sled and trailer sales, all gas and oil expenses, season service, and one-half of accessory, clothing and helmet expenses;	\$73,837,291	\$18,867,081
<u>Repair and Service:</u> all repairs, expendable parts, performance parts/labor, storage and other maintenance expenses;	9,931,494	6,565,955
<u>Wholesale and Retail:</u> specialty items, misc. and other trip expenses, and one-half of clothing, accessory, and helmet expenses;	11,191,359	3,356,214
<u>Insurance:</u> annual insurance premiums;	4,432,000	4,432,000
<u>Eating and Drinking Establishments:</u> restaurant and lounge expenses;	6,952,941	6,952,941
<u>Food Stores:</u> food and beverage expenses;	4,747,201	939,946
<u>Non-Profit and Clubs:</u> snowmobile club donations and memberships;	1,191,133	1,191,133
<u>Recreation Services:</u> rentals, guides and tours;	407,568	407,568
<u>Hotels and Motels:</u> overnight accommod.;	4,788,743	4,788,743
<u>Government:</u> registration fees and turnpike tolls;	1,971,390	1,971,390
<u>Households:</u> private party sled and trailer sales	33,036,551	33,036,551
Total Direct Expenses	\$152,487,621	\$82,509,522

The last column of Table 3 shows the margined expenses, or the expenses for that sector that are multiplied by the output multiplier for that sector. Note that only \$18,867,081 of the expenditures made in the Dealers and

Service Stations sector are used in the multiplier analysis. Before conducting the multiplier analysis, it is necessary to multiply the total expenditures in that sector by the sector's marketing margin.

This margin reflects roughly the difference between the price the firms in that sector pay for the goods they sell and the

price they charge consumers. Note that for some sectors, such as Insurance, Eating and Drinking Establishments and Non-Profit Organizations and Clubs, the margined expenses are equal to the total expenses. That is, the marketing margin is equal to one. However, the marketing margin is as low as .12 for gasoline sales and only .21 for the sale of new snowmobiles.

Finally, the following formula is used to estimate the total economic impact for each sector:

$$\begin{aligned} \text{Total Sector Impact} = & \text{Direct expenses} \\ & + \text{Margined expenses} \times (\text{sector multiplier} - 1) \end{aligned}$$

This formula provides an estimate of the total economic impact for each sector. The total expenses for a given sector represent the direct impact, and multiplying the margined expenses by the sector multiplier less one yields the indirect and induced impacts. This equation is applied to every economic sector from which snowmobilers purchased goods and services, and the results are summed over all sectors to estimate the total impact of snowmobiling in Maine. The process results in an estimate of \$225,973,240 for the total economic impact of snowmobiling. The total impact is composed of \$152,487,621 in direct impacts and \$73,485,569 in indirect and induced impacts.

The overall multiplier for the snowmobiling expenditures can be determined by dividing the total impact by the direct impact, or \$225,973,240 / \$152,487,621. This overall multiplier is equal to 1.48, which is quite low for an overall input-output multiplier. Several factors contribute to this low multiplier. First, many of the expenditures associated with snowmobiling have to be margined before applying the multiplier. This reduces the overall multiplier effect. Second, many of the goods and services purchased by snowmobilers, such as snowmobiles, clothing and parts, are

manufactured out of state. Therefore, a large part of the money spent for these items leaves the state and does not circulate within the state and generate indirect and induced impacts.

It should also be mentioned that over \$33 million of the expenditures made by snowmobilers involve purchases from private households. When an individual purchases a used snowmobile from another household, there is a transfer of money from the buyer to seller, but the total amount of income held by households in the state does not change. Hence, there are no new dollars to be multiplied through the economy. Therefore, these purchases do not have a multiplier effect, which further reduces the overall multiplier.

Finally, employment multipliers were also generated from the input-output model and were used to estimate the employment impact of snowmobiling. The total employment effect of snowmobiling is the creation of about 2,700 full-time-equivalent jobs in Maine. About half of these jobs are associated with the direct impact of snowmobiling, and the other half stem from the indirect and induced impacts.

Summary and Conclusions

The results of the study clearly indicate that snowmobiling has grown in popularity in the last 20 years, and its importance to the Maine economy has also increased. For example, the economic impact of snowmobiling has approximately doubled since the early 1980s. The growth in the industry is partially due to the technological improvements in snowmobiles themselves and improvements in the state's trail system.

We believe that potential for further growth also exists. Non-residents who register their snowmobiles in Maine account for less than ten percent of all machines registered in Maine. This is a much lower percentage than in neighboring states. Given the quality of the trail system, we believe that more non-resident snowmobilers can be attracted to the state through an aggressive marketing campaign. This would increase further the economic impact of snowmobiling in the state, which has become increasingly important in many rural areas, and would provide the incentive for further improvements in the state's trail system.