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OFF-ROAD VEHICLE USERS IN IDAHO: DISTRIBUTION AND ACTIVITY

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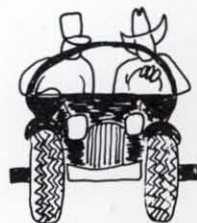
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Off-Road Vehicle Users in Idaho: Distribution and Activity

John E. Mitchell, John H. Schomaker, Dennis B. Propst

INTRODUCTION

Recreational off-road vehicle (ORV) usage in Idaho and many other western states has aroused an emotional response within a large portion of our citizenry — both for and against. Despite the constant attention afforded this subject over the past few years, however, very little useful information of an unbiased nature is available to those who must plan for and manage ORV activities, especially on our public lands. The problem is compounded by an apparently unabated growth rate of ORV use in Idaho. In 1973, we estimate there were nearly 90,000¹ licensed snowmobiles, motorcycles, and 4-wheel drive vehicles in the state — one for every eight residents — and this figure does not account for what may be a substantial number of unlicensed ORVs.

In 1972, Governor Cecil D. Andrus appointed an Off-Road Vehicle Advisory Committee (ORVAC) to analyze off-road vehicle use problems in Idaho and to submit recommendations for resolving these problems. The ORVAC was also charged with the responsibility of developing a comprehensive ORV plan for the state. The committee is representative of various land management agencies, private business interests, user groups, and environmental awareness groups.

The ORVAC, in order to carry out its assigned goals, needed an ORV activity data base for public lands in the state. In June of 1973, the Idaho Parks and Recreation Department contracted with the College of Forestry, Wildlife and Range Sciences, University of Idaho, to perform such a study, broken into four areas: user, managerial, environmental, and legal. This publication reports on a major portion of the user substudy, which had as its objectives:

1. To determine characteristics of ORV owners (i.e., are ORV owners a representative sample of our whole population, or do they come from a distinct sub-population?)
2. To estimate use patterns of ORV activity, including:
 - a. Percentage distribution of use categories
 - (1) Non-recreational transportation
 - (2) Outdoor recreation
 - (a) Sightseeing
 - (b) Hunting
 - (c) Fishing
 - (d) Camping
 - (e) Picnicking
 - (f) Skiing
 - (g) ORV operation per se
 - (h) Other
 - (3) Other
 - b. Temporal distribution of ORV use
 - (1) Annual
 - (2) Weekly
 - c. Relationships between trip origin and trip destination by
 - (1) Land ownership
 - (2) Planning region

Study objectives concerning ORV owner attitudes and perceptions, and the resulting data, will be included in another report.

¹ Taken from Idaho Department of Law Enforcement records.

The authors are Assistant Professor, Range Resources, and Assistant Professor, Wildland Recreation Management, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, and Graduate Associate, Virginia Polytechnic Institute, Blacksburg, W. VA, respectively.

METHODS

Study Design

We were concerned with ORV owners and rates of ORV use. Therefore, the populations we sampled were defined as all registered snowmobile owners, all registered motorcycle and trailbike owners, and all registered owners of 4-wheel drive vehicles in the state of Idaho, respectively. Smaller groups of ORV users, such as all-terrain vehicle (ATV) and dunebuggy owners, were not included in the population frame.

We made one basic premise based on these populations. Since we expected that an unknown proportion of all snowmobiles owned and operated in Idaho for recreational purposes would not be registered, we assumed that the population of snowmobile owners who registered their vehicles was the same size as that which did not. The same assumption was made for owners of unregistered motorcycles and 4-wheel drives, but we expected their ownership proportions to be smaller.

We designed and sent an 11-page user study questionnaire to the three categories of ORV owners, soliciting numerous detailed responses. A systematic random sampling design was then selected (Lapin 1975). A simple random design was not practical because the process of picking ORV owners from the registration on such a basis would have been too cumbersome and uneconomical.

Names of registered ORV owners were acquired from the Department of Law Enforcement vehicle registration records in Boise. The procedure for sampling both snowmobile and trailbike owners was to divide the desired sample size into the population size of registered vehicles. We determined a sampling density (e.g., one registration card in 50) that would be necessary if we were to systematically sample the whole population and arrive at the aforementioned sample size. We next measured the thickness (inches) of 50 vehicle registration cards. The actual sampling then took place by using a ruler to systematically measure our way through the cards, extracting an observation (vehicle owner) at each increment.

Streetbike and 4-wheel drive registrations are stored at the Department of Law Enforcement by county. For these categories it was necessary to stratify the sampling procedure on a county basis. The numbers of streetbikes for each county were known.

Four-wheel drive vehicles posed a greater problem, due to the fact that their registrations and those for all passenger automobiles and pickup trucks in the state are interspersed. Furthermore, the fact that a vehicle has 4-wheel drive is not explicitly indicated on the form. It was necessary to use the manufacturer's vehicle identification number (VIN) or serial number to identify a vehicle as being 4-wheel drive. The 4-wheel drive target population was defined by the following criteria:

Table 1. Proportional distribution of snowmobile, trailbike, and 4-wheel drive questionnaires mailed and returned, by month for which data were sought.

Month	Snowmobile		Trailbike		4-Wheel Drive	
	Mailed	Returned	Mailed	Returned	Mailed	Returned
June 1974	.01	.01	.16	.12	.10	.11
July	.01	0	.16	.14	.10	.08
August	.01	<.01	.16	.12	.10	.09
September	.01	<.01	.11	.10	.09	.07
October	.02	.02	.05	.04	.09	.07
November	.13	.12	.06	.07	.13	.14
December	.14	.14	.04	.03	.21	.22
January 1975	.17	.18	.02	.03	.02	.03
February	.16	.16	.02	.02	.02	.02
March	.15	.15	.03	.03	.03	.04
April	.15	.18	.06	.10	.04	.05
May	.03	.03	.14	.19	.08	.07
	1.00	1.00	1.00	1.00	1.00	1.00
Total Questionnaires	513	240	574	222 ^a	626	223 ^a

^a Includes those respondents not using their ORVs for recreational purposes.

Note: In order to obtain the number of questionnaires mailed/returned for a given month, multiply the total number of questionnaires sent out for the ORV category by its proportion for that month.

1. Vehicles manufactured since 1955
2. Four-wheel drive pickups with a maximum vehicle load weight of one ton
3. All "jeep" style vehicles, whether 2- or 4-wheel drive

Vehicles manufactured by the following companies were considered: American Motors, Chrysler Corporation, Ford Motor Company, General Motors, International Harvester, Kaiser and Toyota.

The technique for acquiring a sample of 4-wheel drive owners was modified from that used for snowmobile and trailbike owners. First, estimates for the numbers of 4-wheel drive vehicles in each county were derived by taking subsamples of 100 to 900 consecutive registration cards (subsample size was related to total number of registered passenger cars and pickups), and counting the number of 4-wheel drive registrations to determine their proportions. These proportions were thereafter used to stratify the sample among counties; the proportions also formed the basis for estimating the total 4-wheel drive vehicle population registered in Idaho.

The same systematic random design was used, except when an observation point in the deck of registration cards was selected that was not a 4-wheel drive. The sampler would then sort through the deck sequentially until he found an appropriate card. The next systematic measurement then originated from that point.

Questionnaires were mailed monthly to registered ORV owners over the 1-year period from June 1974 through May 1975. They were not sent equally across all 12 months, but were distributed throughout the year to approximate the expected relative use of the ORVs in question (Table 1). Consequently, most of the snowmobile questionnaires were mailed in the winter, trailbike questionnaires in the summer, and 4-wheel drive questionnaires in the summer and fall.

The complete samples (i.e., lists of respective ORV owners) were not acquired at one time, either. Several trips to Boise were needed to complete the sampling task. Samples for each ORV category were collected in 1-month lots. All monthly sample sizes and random starting numbers were calculated in advance in order to ease the job of data acquisition.

Determining a sample size sufficient to produce significant conclusions proved to be a problem because the questionnaire completion and return rate was lower than anticipated. Initially, a sample size of just over 300 for each of the three user groups was judged adequate to achieve the study objectives. This number was based on questionnaire items requiring a binomial response — agree or disagree. We wanted to estimate within 5 percent the

true proportion, 95 percent of the time, for all population proportions lying in the internal 5 to 95 percent. The rate at which questionnaires were mailed to ORV owners was increased, first to 1500, and finally to 1713, or around 550 to each user group. The final numbers of questionnaires sent and returned are shown in Table 2.

In order to maximize the user response rate, both pre-mailings, designed to eliminate ORV owners who were not interested in participating, and follow-up mailings were used. Even with the use of these techniques, however, the final user response rate was only 47 percent for snowmobilers, 32 percent for motorbike owners, and 28 percent for 4-wheel drive owners (Table 2). No attempt was made to determine whether the population of non-respondents possessed characteristics different from the respondent population.

Data Analysis

Nearly all analyses were performed using statistical programs contained in Statistical Package for the Social Sciences (SPSS) (Nie et al. 1975). Specifically, we used two sections of SPSS: 1) descriptive statistics and one-way frequency distributions, and 2) contingency tables and related measures of associations — subprogram cross-tables. Confidence intervals were calculated at the 0.05 level.

ORV QUESTIONNAIRE ITEMS

Question 1. Do you operate a business that rents ORVs?

- ☐ Yes go to question 2.
☐ No go to question 5.

Question 2. How many machines are involved in your operation?

- ☐ Snowmobiles
☐ Trailbikes
☐ 4-Wheel Drives

Question 3. During the past calendar month, what was your average daily rental rate?

- ☐ % Snowmobiles
☐ % Trailbikes
☐ % 4-Wheel Drives

Question 5. We need to know the approximate age and sex of each member of your household and his/her relation to the head. Start with the head of the household. Respondent must be a responsible adult member of the household and should be identified with (x).

Question 7. In what county is your residence located? _____

Question 8. What is the approximate population of the area where you reside?

- | | |
|--|--|
| <input type="checkbox"/> Rural Farm Area | <input type="checkbox"/> 5,000 to 24,999 |
| <input type="checkbox"/> Rural Non-Farm Area | <input type="checkbox"/> 25,000 and over |
| <input type="checkbox"/> 500 to 4,999 | |

Question 9. To help us interpret the results of this study we need to know the approximate total income for your family during the past taxable year. Please check the appropriate box.

- | | |
|--|--|
| <input type="checkbox"/> Under \$3,000 | <input type="checkbox"/> \$8,000 - \$10,000 |
| <input type="checkbox"/> \$3,000 - \$5,000 | <input type="checkbox"/> \$10,000 - \$15,000 |
| <input type="checkbox"/> \$5,000 - \$8,000 | <input type="checkbox"/> Over \$15,000 |

Question 11 (Snowmobile Question 10). Please indicate the number of machines owned by you or other members of the household at the end of each of the following years.

Machines	Current	1973	1972	1971	1970	1965	1960
Snowmobiles	_____	_____	_____	_____	_____	_____	_____
Trailbikes	_____	_____	_____	_____	_____	_____	_____
4-Wheel Drives	_____	_____	_____	_____	_____	_____	_____

Question 12 (Snowmobile Question 11). Do you or other members of the household belong to any of the following types of organizations?

- ☐ Snowmobile Club
☐ Trailbike Club
☐ 4-Wheel Drive Club

Question 13 (Snowmobile Question 12). During the past 2 calendar months, what percentage of the total *operating time* of your snowmobile involved the following activities?

- _____ % Job-Oriented Transportation
 _____ % Personal (Non-Recreation) Transportation
 _____ % Outdoor Recreation
 _____ % Other: _____
 100%

Trip Data Questions 15-21 (Snowmobile Questions 14-20).

Answer question 14 by describing the *most recent* outdoor recreational trip or outing. Working backwards, describe any previous trips during the past two (2) calendar months in questions 15-20 as required. When completed, go to question 20.

- a) Trip number _____
- b) Date and time left: _____
- c) Date and time returned: _____
- d) Trip destination: _____
 State _____
 County or nearest city or village _____
- e) Who owned the land on which most recreational activity occurred (place X)?
☐ U.S.F.S. ☐ State of Idaho ☐ Commercial Facility
☐ B.L.M. ☐ Industry ☐ Do not know
☐ Private ☐ Other Federal ☐ Other: _____
- f) Number of people involved: _____ Under 12 years
 _____ Total
- g) Was snowmobiling the primary purpose of the trip?
☐ Yes go to question 15.
☐ No complete "h".
- h) Which of the following best describes the primary purpose of the trip? (check ☒ one)
☐ Sightseeing ☐ Camping ☐ Picnicking
☐ Hunting ☐ Trail Riding ☐ Other: _____
☐ Fishing ☐ Skiing

Following are brief descriptions of the analyses performed on questionnaire items used in the preparation of this report:

Questions 1 through 3 dealt with rental vehicles. We received only two responses from individuals renting ORVs. As this is too small a sample to allow for any inferences at all, no analyses were performed on these questions.

Data on age, sex and family relationships from question 5 were analyzed in terms of frequency of distribution of family size and age of head of household.

Answers to question 7 were tabulated and compared with appropriate population census data.

We calculated frequency distributions to present a data synopsis of questions 8 and 9. We compared our distributions with their respective population parameters of all Idaho citizens, again derived from 1970 census data.

Questions 5 through 9 were designed to provide an insight into ORV owner patterns, and to ascertain whether owners of registered ORVs are representative of Idaho's entire population.

We determined average ORV ownership levels during the years given in question 11, by the three categories of ORV users owning an ORV in 1974. Frequency distributions were also tabulated.

Frequency distributions were derived for organization data in question 12, and for the four use categories named in question 13.

One of the primary objectives of the project and its questionnaire was to provide a "data base" which the ORVAC and various land management agencies could use for their planning activities. Therefore, we attempted to extract a maximum of valid quantitative relationships from the raw data through the following analyses:

By converting date and time of departure and arrival into appropriate month and day-of-week units, we were able, using one-way frequency distributions, to estimate weekly and annual frequency distributions of ORV use activity.

Second, and perhaps most important, we have made an attempt to estimate and categorize matrix-type tables of information that might be called, "who-goes-where." We utilized both the one-way frequency distribution and the cross-tabs routines of SPSS to generate these results. We decided to provide the following information in the tables:

1. Recreational snowmobile, trailbike, and 4-wheel drive trips by Idaho planning region of origin and Idaho planning region of destination. Moreover, within planning region of destination, we estimated a frequency distribution of land ownership visited. The planning regions are shown in Fig. 1. The trip information was actually collected on a county basis,

but was too voluminous to report in such a form. The county data have been submitted to the Idaho Department of Parks and Recreation, Boise, and are available from them.

2. ORV activity levels, calculated from the same data, in terms of planning region of destination only, in the following units:
 - a. Machine-days
 - b. Person-days

These results were also broken down into land ownership categories.

The next set of information derived from the trip data pertained to the size of groups participating in recreational ORV activities. We obtained frequency distributions of numbers of people, including both children and adults.

The remainder of the questions in the user questionnaire were handled in another report, dealing with attitudes and perceptions of both users and managers.

RESULTS AND DISCUSSION

The format for presenting the results of analyses is as follows: first, we discuss information concerning the sampling procedures and socio-economic characteristics of ORV owners. The results of all other patterns and activities relating to the ORV users are then presented separately by ORV category, i.e., snowmobile, trailbike, and 4-wheel drive.

Characteristics of Families Owning ORVs

Age of Head of Household

There is no statistical difference among the average ages of heads of households owning snowmobiles, trailbikes and 4-wheel drives (Table 3). In general, the average owner is about 40 years old, which is somewhat above the median age for heads of households in Idaho.

In addition to average age, the age distributions for heads of households for the three ORV categories are also interesting. The distribution of snowmobile owners (Fig. 2) is the closest of the three to a symmetric unimodal distribution. It does show, however, some signs of positive skewness (tapering to the right side), which is to be expected.

The age distribution of trailbike owners is the most positively skewed (Fig. 2). This is also to be expected, since trailbike owners do tend to be slightly younger than the others (Table 3).

Finally, the age distribution of heads of households owning 4-wheel drives shows a remarkable uniformity between the ages of 26 and 55. The percentages may be held up at the higher age levels by the cost of owning a 4-wheel drive vehicle, and the fact that 4-wheel drives are used relatively little for recreational purposes per se (i.e., in Table 2 it can be seen that 50 out of 223 respondents, or 22 percent, claimed never to use their 4-wheel drives for recreational activities).

Family Size

The average family sizes of people owning snowmobiles, trailbikes, and 4-wheel drives do not differ statis-

Table 2. Estimated 1973 Idaho population of off-road vehicles (ORVs), and actual sample sizes used to conduct the ORV user study.

ORV	Estimated ¹ Population (N)	Questionnaires Mailed (m)	Questionnaires ² Returned (n)	$\frac{n}{m}$	$\frac{n}{N}$
Snowmobile	17,816	513	240	.47	.013
Motorbike	35,144 ^a	574	183	.32	.005
4-Wheel Drive	34,200 ^b	626	173	.28	.005
TOTAL	87,160	1713	596	.35	.007

¹ Includes registered vehicles only.

² Excludes respondents who did not use their ORVs for recreational purposes. There were 39 motorbike owners and 50 4-wheel drive owners in this category.

^a Assumes 75 percent ORV use of 43,150 registered street bikes, plus 2781 registered trailbikes.

^b Derived by taking a subsample of 6786 passenger vehicle registration cards on a proportional basis from each county, estimating the population of 4-wheel drives in the counties, and summing.

tically; in all ORV categories the average size is about 3.5 members (Table 4).

The frequency distribution of family sizes did not differ to any degree, either (Fig. 3). The only observation that warrants mention is the apparent tendency for families owning ORVs to have either two or four members.

Areal Distribution

If our sample is representative, the distribution of registered ORVs in Idaho closely reflects the population as a whole. Table 5 depicts the relationships between these distributions by county. The only apparent outliers we see are

County	Snowmobiles	Trailbikes	4-Wheel Drives
Ada	-	+	-
Adams	+		+
Bonneville	+		-
Canyon			-
Caribou	+		
Cassia		-	
Custer			+
Fremont	+		
Lemhi			+
Valley			+

where (-) indicates less-than-expected, and (+) means more-than-expected. Even these differences, however, may be due to sampling error, or to factors extrinsic to outdoor recreation.

The distribution of ORV owners with reference to place of residence is puzzling (Table 6). Respondents living in larger towns (25,000 plus) and cities owned the most motorbikes per capita. Snowmobile and 4-wheel drive ownership was heaviest in small towns and villages (500-4900). A lower ownership density reported for rural areas may reflect a variance in the respondents' perception of "rural" from that used for the census data base.

Average Income

Owners of registered ORVs in Idaho definitely do not reflect the income distribution of the general population in Idaho. According to the 1970 census, only about 10 percent of male heads of household had incomes exceeding \$15,000 per year. Owners of snowmobiles, trailbikes, and 4-wheel drives, on the other hand, reported respective income distributions more than 50, 30, and 40 percent above \$15,000 for 1974 (Table 7). To be more precise, these differences are more qualitative in nature than quantitative. They actually cannot be compared,

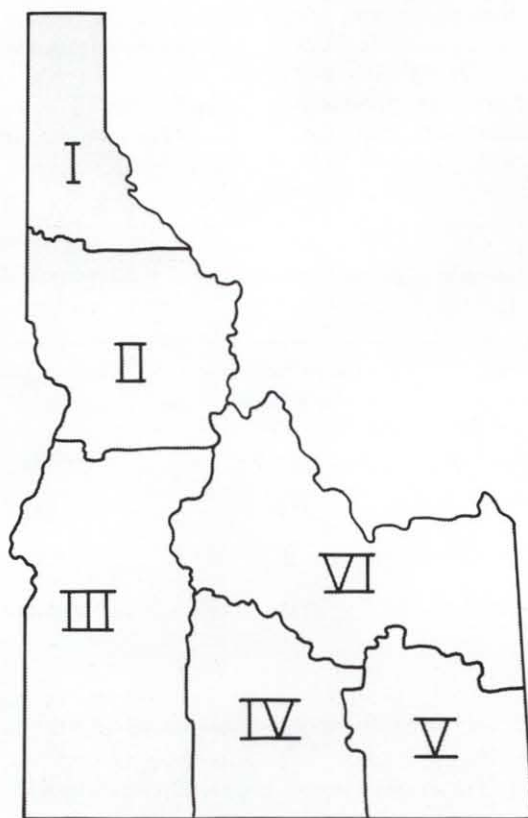


Fig. 1. Idaho State Planning Regions.

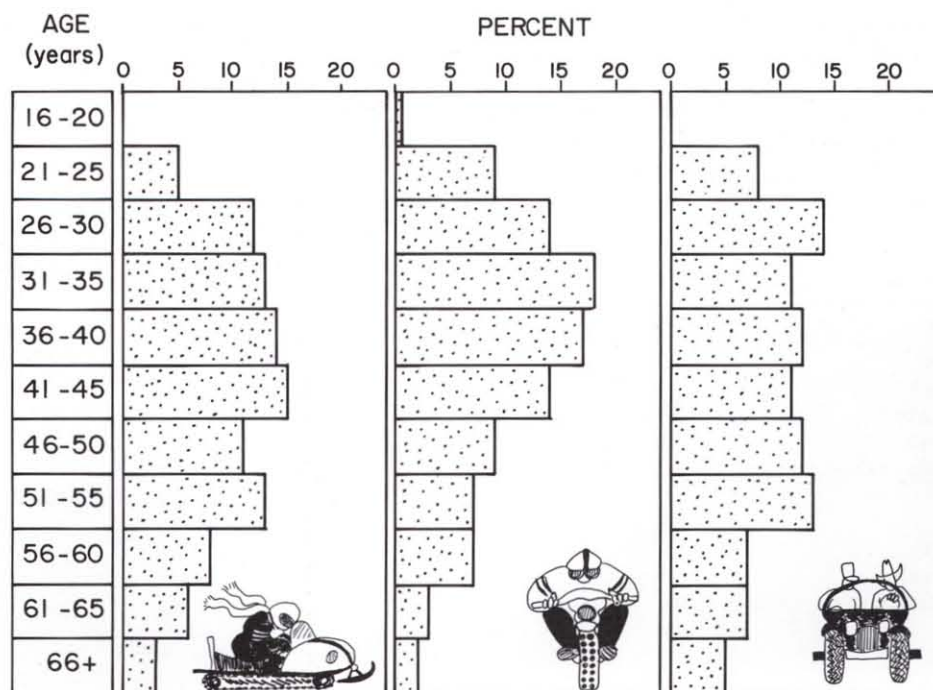


Fig. 2. Estimated age-class distribution of heads of households owning snowmobiles, trailbikes, and 4-wheel drives in Idaho.

since the questionnaire asked for family income, while the census data only reports income received by heads of households. Income derived from other working family members is not included in the latter distribution, nor could we locate such data.

Nonetheless, we can conclude that, financially, ORV owners tend to be in what is commonly called the "middle class" and above.

Numbers of Machines Owned

Each respondent was asked to record how many snowmobiles, trailbikes, and 4-wheel drives he or she presently owned. In addition, the questionnaire asked for the same information for the preceding years of 1973,

Table 3. Average ages of heads of households owning registered snowmobiles, trailbikes, and 4-wheel drives in Idaho.

ORV	Sample Size	Age of Head
Snowmobile	237	43.4 ± 1.58^a
Trailbike	178	39.9 ± 1.81
4-Wheel Drive	171	43.5 ± 1.99

^a Confidence interval half-width, $\alpha = .05$

Table 4. Average sizes of families owning registered snowmobiles, trailbikes, and 4-wheel drives in Idaho.

ORV	Sample Size	Average Family Size
Snowmobile	239	$3.7 \pm .21^a$
Trailbike	182	$3.6 \pm .25$
4-Wheel Drive	173	$3.4 \pm .24$

^a Confidence interval half-width, $\alpha = .05$

1972, 1971, 1970, 1965, and 1960. Distributions, means, and 95 percent confidence intervals of the responses to this question are presented in Tables 8, 9, and 10 for owners of snowmobiles, trailbikes, and 4-wheel drives, respectively.

As can be seen, the "average" snowmobile owner possessed slightly more than two snowmobiles, and every other person owned a trailbike and 4-wheel drive in 1974 (Table 8). As expected, the number falls with time.

Among "average" trailbike owners, every third respondent also owned a snowmobile, and every fourth owned a 4-wheel drive. The average owner had slightly

Table 5. Distribution by county of questionnaire respondents owning registered snowmobiles, motorbikes and 4-wheel drives, in comparison with Idaho's population distribution.

County	Percent of Respondents			Actual Population ¹
	Snowmobile	Trailbike	4-Wheel Drive	
1. Ada	8.5	23.8	12.8	15.8
2. Adams	1.7	1.1	1.7	0.4
3. Bannock	7.2	6.6	5.2	7.3
4. Bear Lake	2.1	0	0.6	0.8
5. Benewah	0.8	0	2.3	0.9
6. Bingham	4.2	1.7	2.9	4.1
7. Blaine	1.7	0.6	2.3	0.8
8. Boise	0.8	0.6	0.6	0.2
9. Bonner	1.3	2.2	2.9	2.2
10. Bonneville	16.1	8.8	1.7	7.2
11. Boundary	0	1.1	0.6	0.9
12. Butte	0.4	1.1	0	0.4
13. Camas	0.8	0.6	1.2	0.1
14. Canyon	4.7	6.1	3.5	8.6
15. Caribou	4.2	0.6	1.7	0.9
16. Cassia	2.1	0.6	1.7	2.4
17. Clark	0.8	0	0	0.1
18. Clearwater	1.3	1.7	2.3	1.5
19. Custer	0	0	1.7	0.4
20. Elmore	1.3	3.9	1.7	2.5
21. Franklin	2.5	1.1	1.2	1.0
22. Fremont	4.2	1.1	1.7	1.2
23. Gem	0	1.1	2.3	1.3
24. Gooding	1.3	1.1	0.6	1.2
25. Idaho	2.5	1.7	4.1	1.8
26. Jefferson	2.1	1.7	1.2	1.6
27. Jerome	2.1	0.6	1.7	1.4
28. Kootenai	2.5	5.0	2.9	5.0
29. Latah	2.5	2.8	2.9	3.5
30. Lemhi	1.3	0.6	2.3	0.8
31. Lewis	0	0.6	0.6	0.5
32. Lincoln	0.8	0	1.2	0.4
33. Madison	2.5	1.1	1.7	1.9
34. Minidoka	1.7	3.3	3.5	2.2
35. Nez Perce	2.1	4.4	4.7	4.3
36. Oneida	0.4	0	0	0.4
37. Owyhee	0.4	1.1	0.6	0.9
38. Payette	0	1.7	2.9	1.7
39. Power	2.5	0	1.2	0.7
40. Shoshone	1.3	2.8	2.9	2.8
41. Teton	1.7	0	0	0.3
42. Twin Falls	2.5	6.6	8.7	5.9
43. Valley	1.7	0	2.3	0.5
44. Washington	0.4	1.1	0.6	1.1

¹ Information from 1970 census.

Table 6. Estimated registered ORV owner population densities, by size of community, in comparison with Idaho's total population.

Category of Density	Percent of Respondent Households ¹			Census Population ²
	Snowmobile	Trailbike	4-Wheel Drive	
City: 25,000 +	28.2 ± 7.3	39.4 ± 9.1*	19.2 ± 7.5	24.9
Town: 5,000–24,999	17.6 ± 6.1	18.9 ± 7.3	16.3 ± 7.0	17.6
Village: 500–4,999	24.4 ± 7.0*	17.2 ± 7.0	33.1 ± 8.9*	11.7
Rural: Farm and Non-farm ³	29.8 ± 5.8*	24.4 ± 8.0*	27.9 ± 8.5*	45.8

¹ Bonferroni t-statistic ; $t_{0.05,4} = 2.50$

² Data from 1970 census.

³ Rural-farm and rural-nonfarm combined into one category.

* Indicates actual population percentage lies outside confidence interval.

Table 7. Estimated distribution of total family income for registered ORV owners in Idaho, in comparison with Idaho's total population.

Income Class	Estimated Percent of ORV Owners in Income Class			Population ¹
	Snowmobile	Trailbike	4-Wheel Drive	
Under \$3,000	0.4	1.1	3.5	15.6
\$3,000–4,999	3.4	3.4	4.1	14.0
\$5,000–7,999	11.1	10.8	8.8	29.9
\$8,000–9,999	8.5	16.5	13.5	15.8
\$10,000–14,999	26.1	35.8	28.2	16.6
\$15,000 +	50.4	32.4	41.8	8.1

¹ Data taken from 1970 census listing of income for male heads of households in Idaho; does not account for working wives, etc.

more than two trailbikes in 1974 (Table 9). Finally, the "average" 4-wheel drive owner had slightly more than one 4-wheel drive, and half also owned a trailbike and snowmobile in 1974 (Table 10). It should be emphasized that the only interpretable information contained in Tables 8 through 10 reflects the values for the current year, 1974, unless the previous ownership patterns of 1974 owners are of interest. This is due to the lack of any estimates of pre-1974 ORV owners who were not members of the sampling frame, i.e., those who had moved from Idaho, died, or sold their ORVs prior to 1974.

Membership in ORV Clubs

Owners of registered snowmobiles, trailbikes, and 4-wheel drives in Idaho tend to join ORV user organizations at somewhat different rates (Table 11). Snowmobile owners appear to be the most gregarious in belonging to clubs; our data show that around one owner in five belongs

to a snowmobile club of some kind. Trailbike owners are intermediate in club membership, with slightly more than one in 10 belonging to a trailbike club. Owners of 4-wheel drives are the least apt to belong to a user club having to do with the category of ORV about which they were being queried; fewer than 5 percent are estimated to belong to 4-wheel drive clubs. This is probably due, in great part, to the assumed fact that most 4-wheel drive vehicles are not purchased primarily for recreational purposes in Idaho.

As for membership in other user clubs besides the ones associated with the ORV category of primary interest, rates are expectedly lower with one notable exception. Although the difference is not statistically significant, 4-wheel drive owners are more apt to be members of snowmobile clubs than 4-wheel drive clubs (Table 11). Such a situation is certainly feasible since about one in four 4-wheel drive owners also possesses a snowmobile (Table 10).

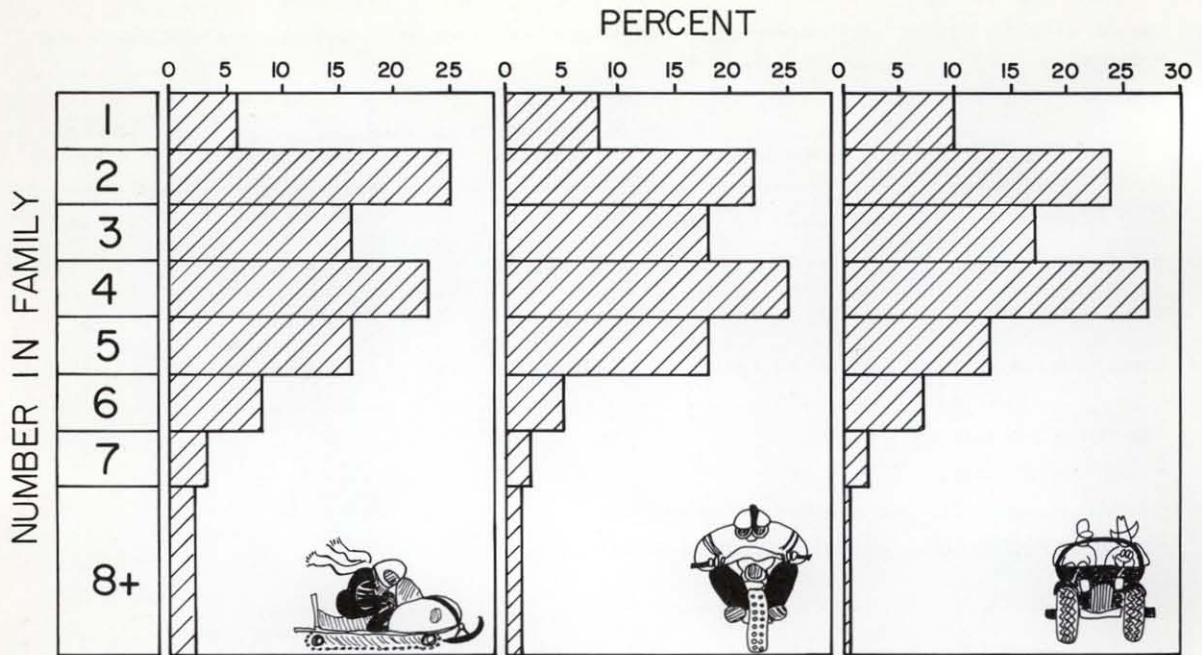


Fig. 3. Estimated family size distribution of families owning registered snowmobiles, trailbikes, and 4-wheel drives in Idaho.

Table 8. Estimated distribution and mean of the number of snowmobiles, trailbikes, and 4-wheel drives owned over the past 15 years by 1974 registered snowmobile owners in Idaho.

ORV	No. Owned	Distribution of Owners (%)						
		1974	1973	1972	1971	1970	1965	1960
Snowmobile	0	--	12	28	44	60	93	99
	1	23	25	26	22	19	6	< 1
	2	48	40	31	28	19	1	< 1
	3	15	14	11	4	1	< 1	0
	4	12	8	3	2	1	0	0
	5+	2	1	1	< 1	0	0	0
	Average	2.24	1.87	1.40	1.00	.62	.09	.01
Trailbike	Error ¹	±.18	±.20	±.20	±.19	±.14	±.06	±.02
	0	67	70	73	77	78	90	96
	1	16	16	18	16	16	9	4
	2	10	9	6	5	4	1	< 1
	3	5	4	1	1	1	0	0
	4+	2	1	2	1	< 1	0	0
	Average	.62	.52	.42	.34	.29	.12	.05
4-Wheel Drive	Error	±.19	±.16	±.14	±.12	±.10	±.06	±.04
	0	62	71	75	80	83	90	93
	1	31	24	21	18	16	10	7
	2+	7	5	4	2	1	0	0
	Average	.48	.35	.28	.22	.18	1.0	.07
	Error	±.13	±.11	±.09	±.07	±.06	±.04	±.04

¹ Confidence interval half-width, $\alpha = .05$

Note: These distributions do not include people who owned snowmobiles prior to 1974, but who no longer did in 1974.

Table 9. Estimated distribution and mean of the number of trailbikes, snowmobiles, and 4-wheel drives owned over the past 15 years by 1974 registered trailbike owners in Idaho.

ORV	No. Owned	Distribution of Owners (%)						
		1974	1973	1972	1971	1970	1965	1960
Trailbike	0	--	14	28	37	56	80	89
	1	38	39	36	34	26	15	9
	2	29	23	18	18	12	4	2
	3	21	16	12	7	4	< 1	< 1
	4	10	5	4	4	2	0	0
	5+	2	3	2	0	0	0	0
	Average	2.08	1.68	1.33	1.06	.69	.25	.14
	Error ¹	±.21	±.25	±.24	±.21	±.18	±.10	±.08
Snowmobile	0	80	83	85	89	92	98	99
	1	9	7	6	7	6	1	< 1
	2	8	7	7	2	2	< 1	0
	3+	3	3	2	2	< 1	< 1	0
	Average	.36	.33	.26	.16	.11	.06	.01
	Error	±.16	±.16	±.13	±.10	±.08	±.09	±.02
4-Wheel Drive	0	76	78	85	88	90	94	94
	1	21	19	14	12	10	6	6
	2+	3	3	1	0	0	0	0
	Average	.28	.25	.17	.12	.10	.06	.06
	Error	±.10	±.09	±.07	±.05	±.05	±.04	±.04

¹ Confidence interval half-width, $\alpha = .05$

Note: These distributions do not include people who owned trailbikes prior to 1974, but who no longer did in 1974.

Table 10. Estimated distribution and mean of the number of 4-wheel drives, snowmobiles, and trailbikes owned over the past 15 years by 1974 registered 4-wheel drive owners in Idaho.

ORV	No. Owned	Distribution of Owners (%)						
		1974	1973	1972	1971	1970	1965	1960
4-Wheel Drive	0	--	21	34	46	54	73	81
	1	85	66	57	47	40	24	16
	2	12	11	8	5	4	2	2
	3	2	1	4	1	1	1	1
	4+	1	1	1	1	1	0	0
	Average	1.21	.95	.79	.68	.60	.37	.28
	Error ¹	±.11	±.14	±.15	±.19	±.19	±.17	±.17
Snowmobile	0	73	79	81	84	91	98	99
	1	11	9	9	10	6	2	1
	2	11	10	7	4	2	0	0
	3+	5	2	3	2	1	4	0
	Average	.50	.39	.34	.24	.14	.04	.01
	Error	±.20	±.17	±.17	±.13	±.10	±.05	±.02
Trailbike	0	72	77	80	84	86	92	96
	1	19	14	14	12	11	7	4
	2	6	7	4	4	3	1	0
	3	1	0	1	4	0	0	0
	4+	2	2	4	0	0	0	0
	Average	.45	.38	.28	.21	.17	.09	.05
	Error	±.18	±.16	±.13	±.10	±.08	±.06	±.06

¹ Confidence interval half-width, $\alpha = .05$

Note: These distributions do not include people who owned 4-wheel drives prior to 1974, but did not in 1974.

Table 11. Estimated percentages of 1974 registered snowmobile, trailbike, and 4-wheel drive owners who are members of ORV user organizations.

Owner Category	Type of Organization	Membership (% of all ORV owners)	
		\bar{X}	Error ^a
Snowmobile	Snowmobile	21.2	± 5.3
	Trailbike	4.0	± 2.7
	4-Wheel Drive	2.5	± 2.2
Trailbike	Snowmobile	3.5	± 2.7
	Trailbike	12.5	± 4.7
	4-Wheel Drive	0.	
4-Wheel Drive	Snowmobile	8.8	± 4.3
	Trailbike	2.4	± 2.3
	4-Wheel Drive	2.9	± 2.5

^a Confidence interval half-width, $\alpha = .05$

Snowmobiles

Vehicle Uses

We expect that most snowmobiles are purchased at least in part for recreational purposes. The response we received to questions concerning off-road use indicates a high degree of recreational usage. For example, an astonishing 90 percent of snowmobile trips were made for the primary purpose of snowmobiling per se (Fig. 4); sight-seeing came in as an extremely distant second.

Party Size and Distribution on Trips

The number of people participating in snowmobile activities ranged from 1 to 100. Obviously, the events associated with larger groups (we used 10 people as an arbitrary dividing line) were organized snowmobile functions attended by multiple families. The average party size on snowmobile, trailbike, and 4-wheel drive trips is provided in Table 12.

Since this report is concerned to a greater extent with the ORV owner family unit, we also calculated the average party size for snowmobile trips involving 10 or fewer people (Table 13). The cutoff is based on exami-

Table 12. Estimated average party size (number of people) for ORV activities in Idaho.

ORV Activity	Sample Size	Average Number in Party		
		Adults	Children ¹	Total
Snowmobile	319	5.58	1.25	$6.83 \pm .76^a$
Trailbike	210	3.95	1.79	5.74 ± 1.24
4-Wheel Drive	212	3.55	.84	$4.39 \pm .72$

¹ Includes children less than 12 years of age.

^a Confidence interval half-width, $\alpha = .05$

nation of the overall frequency distribution, which approached zero above 10 people and fluctuated at a low level through the rest of its range.

The relative frequency distribution of family-sized groups ($n \leq 10$) provides an interesting pattern (Fig. 5). First, snowmobile owners do not often go on trips by themselves (i.e., less than 5 percent of the time), which speaks either for a high level of safety consciousness or an intrinsic pattern of gregariousness. Second, family groups on snowmobile trips are more likely to be even numbered, a relationship which is not expected for numbers above two. We were especially surprised to find the proportion of 3 and 5 person groups so far below 4 and 6 person groups, respectively.

Table 13. Estimated average party size for family groups involved in ORV activities in Idaho.¹

ORV Activity	Sample Size	Average Number in Party
Snowmobile	269	$4.66 \pm .28^a$
Trailbike	196	$3.85 \pm .34$
4-Wheel Drive	198	$3.39 \pm .28$

¹ Includes only those trips where $n \leq 10$ people.

^a Confidence interval half-width, $\alpha = .05$

Trip Distribution in Time

Snowmobiling is primarily a weekend event. According to our data, 75 percent of the trip-days were on a Friday, Saturday, or Sunday (Table 14). The remaining 25 percent of recreational snowmobile-related activities took place Monday through Thursday. If a snowmobile trip lasted more than one day, it had to be counted in each day of the week that it occurred. Therefore, these data are in trip-days.

The annual distribution of snowmobile trips is also presented in Table 14. At first glance the data appear to closely mimic the expected frequency distribution by month, i.e., 85 percent of all trips occur during the months December through March and the remaining activity within a month or two of this period. Unfortunately, the reliability of these data is uncertain, due primarily to the original experimental design which dictated unequal sample sizes with time (Table 1). If the proportion of snowmobile trips by month is compared with the proportion of questionnaires received (which may be done in Table 14), it is entirely possible, if not altogether appropriate, to conclude that snowmobile trip frequencies are merely a function of the amount of trip information solicited. The only months in which reported trip frequency statistically exceeded expected trip frequency were February and March. In fact, the reported trip frequency even fell below the expected frequency for the month of November — just the opposite of what would be anticipated.

Table 14. Estimated temporal distribution of recreational snowmobile trips in Idaho.

A. Weekly Distribution

Day	Percent of Total Activity ¹
Monday	5.1 ± 2.8 ^a
Tuesday	5.4 ± 2.9
Wednesday	6.3 ± 3.1
Thursday	6.9 ± 3.2
Friday	15.2 ± 4.1
Saturday	29.9 ± 5.8
Sunday	31.2 ± 5.9

B. Annual Distribution

Month	Percent of Total Activity ²	Average Percent of Total Questionnaires Returned During This Period ³
January	19.5 ± 6.5 ^a	16.9
February	24.4 ± 7.0	15.4
March	24.1 ± 7.0	16.5
April	10.8 ± 5.1	10.8
May	1.0 ± 1.6	2.3
June	0	.6
July	0	.2
August	0	.4
September	0	1.3
October	0	7.1
November	5.2 ± 3.6	12.9
December	15.0 ± 5.8	15.6

^a Confidence interval half-width, $\alpha = .05$

¹ Based on N = 448 trip-days.

² Based on N = 307 trips.

³ Based on the assumption that the number of trips taken by each user was evenly distributed across the 2-month reporting period covered in the questionnaire.

We examined the relation between numbers of questionnaires sent and numbers received to see if evidence existed for a differential response rate with time. Any such evidence would be an indication of an undefined sampling bias that might affect or explain the annual trip distribution in Table 14. However, it does not appear that the questionnaire response rate was time-variant in nature (Table 1).

As a result of the above factors, we conclude that the annual distribution may be interpreted only qualitatively, because the actual data reflect more factors than just the population frequency distribution of snowmobile activity by month.

Trip Distributions in Space

Recreational trips, like all trips, must originate and terminate someplace. We present data in this section

which provide frequency distributions of the following information:

1. Where snowmobile trips originate (i.e., the snowmobile owner's residence) by Idaho planning region;
2. Snowmobile trip destinations by Idaho planning region;
3. Land ownership at the points of destination where actual snowmobile activity takes place.

The above-mentioned information by Idaho planning region (see Fig. 1) is consolidated in Tables 15 and 16.

First, looking at snowmobile trips by planning region (Table 15), we estimate that the region with the highest proportion of trips originating from it is Region VI (about 30 percent), followed by Regions III and IV (each with about 20 percent of the total). In comparing the proportion of departures with the state population in each planning region, one can see that Region VI has an especially high number of snowmobile trip departures, while departures from Regions II and III are below expectation.

An examination of snowmobile trip terminations (Table 15) provides us with an interesting, but not surprising, conclusion. The large majority of recreational snowmobile trips are taken within the region of origin. In fact, on the average, nearly 9 out of 10 such trips never leave the planning region in which the owner resides (Table 17). This relationship holds true for all six regions.

Over one-half of all snowmobile trips are made onto land identified by snowmobile owners as National Forest (Table 16). This is to be expected since the U.S. Forest Service controls about 70 percent of the forested land (Green and Setzer 1974), which is where snowmobiles generally go in Idaho.

Second in popularity after U.S. Forest Service lands for snowmobile events comes privately owned land (Table 16). It is interesting to note that approximately 60 percent of snowmobile trips made onto private lands occur in Idaho Planning Regions V and VI, while only about 8 percent of trips onto private land occur in Region II. This is apparently true even though most of the forested lands around the population centers in Region II (Lewiston and Moscow) are privately owned.

The only other significant category of land ownership reported is that controlled by the Bureau of Land Management (BLM). Approximately 13 percent of snowmobile trips are conducted on BLM land, mostly in Planning Region III (Table 16).

In addition to examining spatial distributions of snowmobile events in terms of trips or trip-days, we have also looked at the same distributions in units of machine-

Table 15. Proportional distribution of snowmobile trips in Idaho by planning region of origin and planning region of destination.¹

Origin Planning Region	Destination Planning Region							Total	Population ²
	I	II	III	IV	V	VI	Unknown		
I	.050	.003		.003		.003	.022	.081	.118
II		.043						.043	.116
III		.016	.161	.012		.003	.003	.196	.330
IV			.003	.168		.006	.031	.208	.144
V				.003	.137	.012	.009	.161	.152
VI				.003	.006	.224	.065	.298	.139
Unknown						.012		.012	
Total	.050	.062	.165	.189	.143	.261	.130	1.000	

¹ Based on N = 322 trips.

² From 1970 census.

Table 16. Proportional distribution of snowmobile trips in Idaho by planning region of destination and land ownership category.¹

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	.034	.028	.078	.127	.050	.127	.099	.543
BLM	.003	.006	.050	.022	.025	.019	.003	.127
Other Federal								—
State of Idaho	.003	.006		.006		.009	.003	.028
Industry	.003	.003				.006		.012
Private	.003	.016	.022	.025	.050	.071	.016	.202
Comm. Facility			.006	.003	.003		.003	.016
Unknown			.006			.009	.003	.019
Other		.003	.003		.009	.006	.003	.025
No Response	.003			.006	.006	.012		.028
Total	.050	.062	.165	.189	.143	.261	.130	1.000

¹ Based on N = 322 trips.

days (Table 18) and person-days (Table 19). Tables 18 and 19 show Idaho planning region of destination by land ownership category in the same manner that Table 16 depicts trip data. We made no attempt to describe the relationships between origin and destination in units of person-days or machine-days. We could discern no significant differences among the three distributions — trips, machine-days, or person-days.

Trailbikes

Vehicle Uses

Interpreting the trailbike questionnaires provides us with a recreational usage problem. According to data in Table 2, 39 out of 222 respondents (18 percent) did not use their machines for recreational purposes. Fewer

than 40 percent of the people receiving questionnaires completed and returned them. This lack of response may have been due, at least in part, to the owner not using his trailbike or motorcycle for recreational purposes. We believe that this may have been the case, but cannot document it.

In the original study design, an assumption, based on industry statistics, was made that all trailbikes and 75 percent of all street motorcycles are used for recreational ORV purposes. There was no attempt to differentiate the small and light motorcycles built for off-road use from those which are not. We feel this error, aided by the length and complexity of the questionnaire itself, has likely affected the trailbike data base to some degree, at least in terms of recreational and non-recreational usage. On the other hand, we are fairly confident that the remainder of

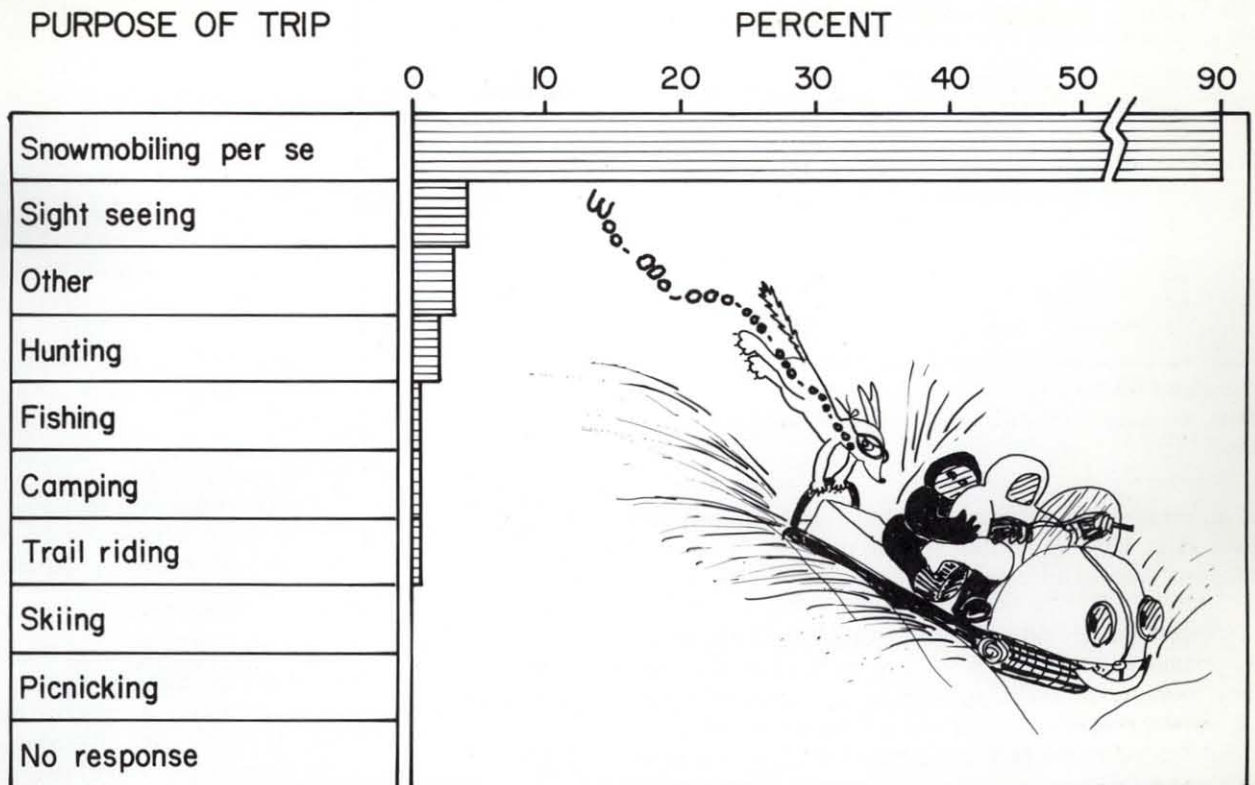


Fig. 4. Frequency histogram of the primary purposes of recreational snowmobile trips taken in Idaho.

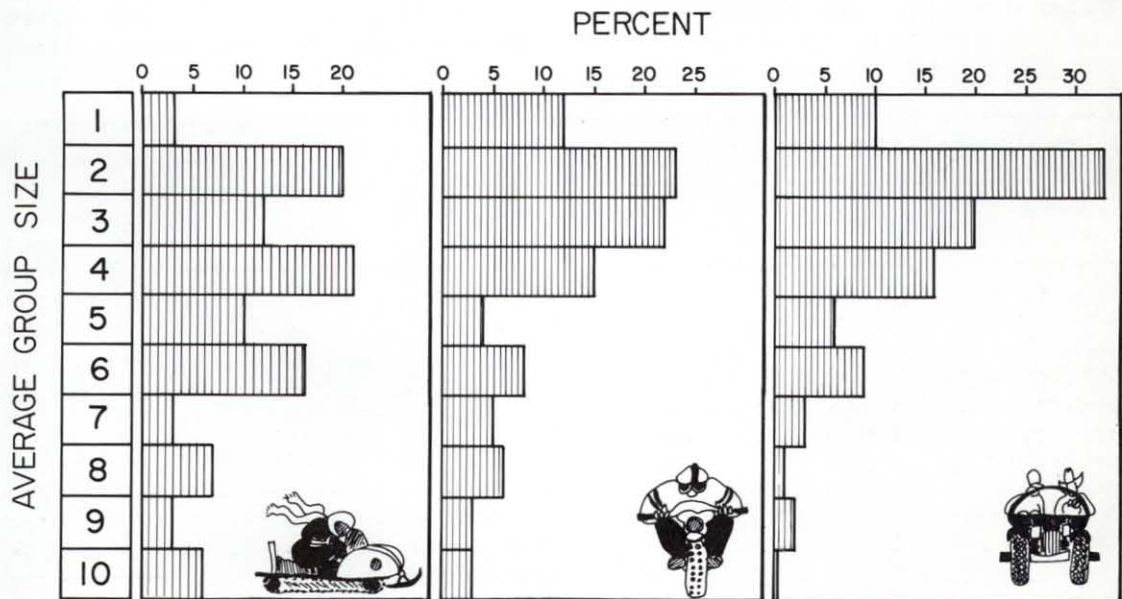


Fig. 5. Group size frequency distributions of snowmobile, trailbike and 4-wheel drive users in Idaho participating in family sized ($n \leq 10$) recreational ORV trips.

Table 17. Percentage of snowmobile trips in Idaho having destinations in the same planning region as their origin.¹

Planning Region	Percent Trips ²
I	84
II	100
III	84
IV	95
V	90
VI	96
Average	91

¹ Based on N = 276 trips.

² Does not include trips for which origin or destination is not known.

the information provided by trailbike and motorcycle owners is at least as reliable as that furnished by snowmobile and 4-wheel drive owners.

Approximately 60 percent of recreational ORV trips using trailbikes (motorbikes of any size) were for the express purpose of trailbiking per se, according to registered owners (Fig. 6). Hunting and fishing were essentially tied for second place; each contributed about 8 to 9 percent of the total.

Party Size and Distribution on Trips

Trailbikers are somewhat more likely to take recreational trips in large groups than are snowmobilers, but rarely do they exceed a group size of 50 people (Table 12). Although their average group size is slightly less than that of snowmobilers and greater than 4-wheelers, none of the differences are statistically significant. Strangely enough, children are more often present on trailbike trips than on

trips involving other ORVs. Our sample statistics on group size of trailbike trips are less efficient (i.e., wider confidence interval) than those for snowmobile and 4-wheel drive groups. This is probably due to the fact that group sizes are most variable in the trailbike category.

Family-sized groups ($n \leq 10$) of trailbike riders tend to be smaller than comparable snowmobile groups, and are a little larger than 4-wheel drive groups. Again, the significance of the difference is marginal. The relative frequency distribution of family-sized trailbike groups shows the expected degree of positive skewness (Fig. 5). The propensity for even-sized family groups seen on snowmobile outings is not evident in trailbike events.

Trip Distributions in Time

Recreational trips on trailbikes, like those involving snowmobiles, occur primarily on the weekend; 50 percent of the trips took place on Saturday and Sunday in our sample, with the remainder transpiring on Mondays or Fridays (Table 20).

The annual distribution of recreational trailbike trips (Table 20) looks like a normal bell-shaped curve around the month of June, except for an expected hunting season spurt in October. As in the case of snowmobiles, at least in a quantitative sense, this distribution is subject to the same constraints we discussed earlier.

Trip Distributions in Space

The distribution of recreational trailbike trips by both Idaho planning region of origin and of destination, and by land ownership category within planning region of destination, is provided in Tables 21 and 22.

We estimate that by far the largest proportion of trailbike trips originate in Planning Region III (Table 21). The

Table 18. Distribution of snowmobile activity by Idaho planning region and land ownership category in terms of machine-days¹ from 322 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	33	42	91	117	36	131	32	482
BLM	9	5	43	31	30	46	3	167
Other Federal								--
State of Idaho	13	6		13		18	9	59
Industry	4	2				2		8
Private	2	12	31	17	82	65	9	218
Comm'l. Facility			14	3	2		3	22
Unknown			18			8	2	28
Other		4	6		4	6	4	24
No Response	2			8	4	4		18
Total	63	71	203	189	158	280	62	1028

¹ The number of machine-days on a given trip equals the number of snowmobiles involved times the length of the trip in days.

Table 19. Distribution of snowmobile activity by Idaho planning region and land ownership category in terms of person-days¹ from 322 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	36	121	402	404	151	325	86	1525
BLM	21	10	141	60	95	57	9	393
Other Federal								—
State of Idaho	25	10		37		69	55	196
Industry	22	2				2		26
Private	39	73	100	31	235	211	23	712
Comm'l. Facility			10	3	20			33
Unknown			5			20	4	29
Other		9	11		6	21	23	70
No Response	22			12	9	8		51
Total	165	225	669	547	516	713	200	3035

¹ The number of person-days on a given trip equals the number of people involved times the length of the trip in days.

Table 20. Estimated temporal distribution of recreational trailbike trips in Idaho.

A. Weekly Distribution

Day	Percent of Total Activity ¹
Monday	14.0 ± 4.8 ^a
Tuesday	6.3 ± 3.4
Wednesday	6.9 ± 3.5
Thursday	8.7 ± 3.9
Friday	13.5 ± 4.7
Saturday	23.2 ± 5.8
Sunday	27.4 ± 6.2

B. Annual Distribution

Month	Percent of Total Activity ²	Average Percent of Total Questionnaires Returned During This Period ³
January	1.5 ± 2.5 ^a	2.5
February	1.0 ± 2.0	2.7
March	2.6 ± 3.3	6.5
April	13.3 ± 7.0	14.6
May	12.8 ± 6.8	15.5
June	19.5 ± 8.1	12.8
July	13.4 ± 7.0	13.1
August	9.7 ± 6.1	11.0
September	7.7 ± 5.5	7.2
October	10.8 ± 6.4	5.9
November	5.1 ± 4.5	5.2
December	2.6 ± 3.3	2.9

^a Confidence interval half-width, $\alpha = .05$

¹ Based on N = 379 trip-days.

² Based on N = 195 trips.

³ Based on the assumption that the number of trips taken by each user was evenly distributed across the 2-month reporting period covered in the questionnaire.

only region with a significantly lower percentage of trailbike trip origins than expected is Planning Region V.

Nearly two-thirds of all trailbike trips take place on land administered by the U.S. Forest Service and BLM (Table 22). Moreover, the distribution is about equally divided between these two agencies. As would be expected, most of the trailbike activity on BLM land takes place in Planning Region III, the region with by far the most BLM land. Most of the trips to U.S. Forest Service lands also take place in Region III. A little over 10 percent of trailbike trips take place on land owned by the State of Idaho, with most of them occurring in Planning Regions I and II in the northern part of the state. About 10 percent of trailbike trips terminate on privately owned lands.

Recreational trips involving trailbikes, like those with snowmobiles, tend to stay in the same planning region in which they originate (Table 23). On the average, nearly 90 percent of trailbike trips never leave the region of origin; on the other hand, at least one exception to this rule is evident. Our data show that only one-half of the trailbike trips starting in Planning Region V stay in that region, and fewer than three-fourths of trips originating in Planning Region IV do not leave that area. This is partially an aberration of our sample, however, because 33 percent of the trips beginning in Planning Region V ended at destinations unknown to the respondent. It is probable that many of these did actually remain in the region of origin.

Recreational trailbike trip data by Idaho planning region and land ownership in units of machine-days and person-days are given in Tables 24 and 25, respectively.

All three distributions by region are remarkably consistent with each other. Although it cannot be interpreted, it is interesting to note that the trailbike trip data

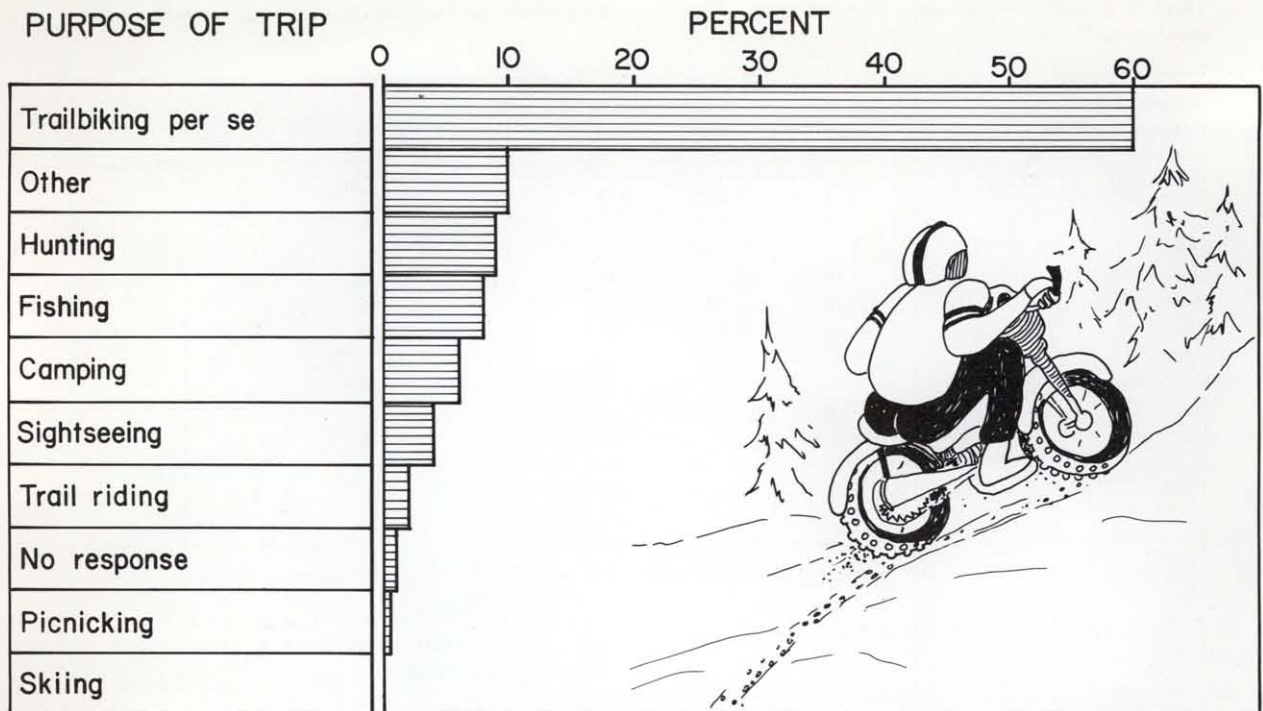


Fig. 6. Frequency histogram of the primary purposes of recreational trailbike trips taken in Idaho.

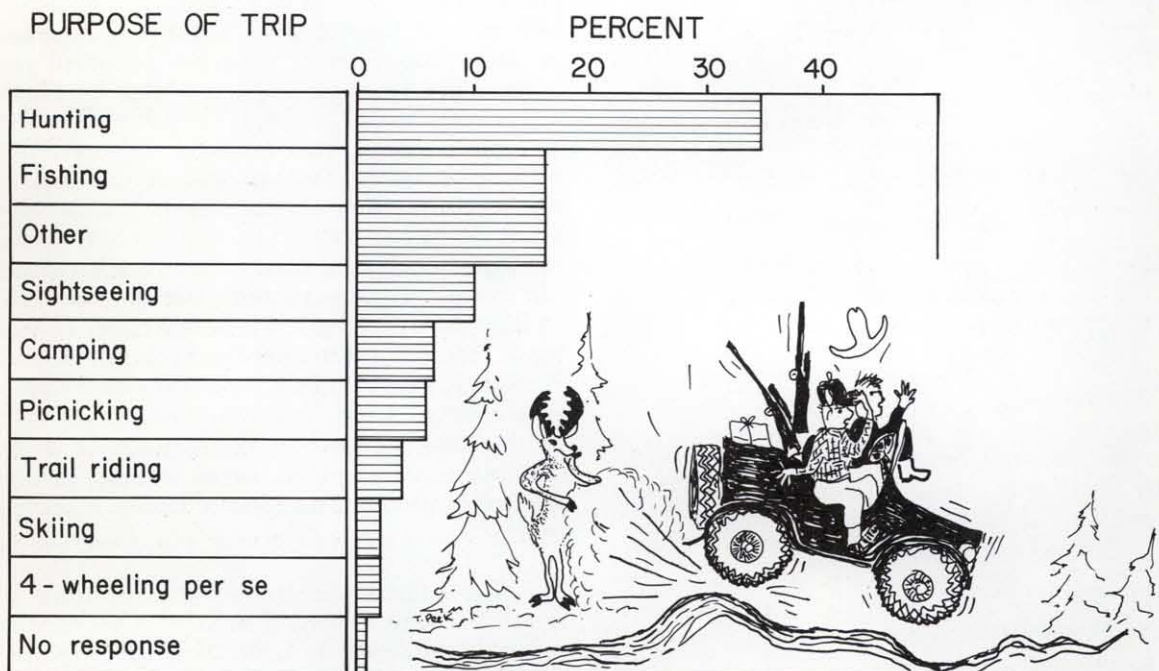


Fig. 7. Frequency histogram of the primary purposes of recreational 4-wheel drive trips taken in Idaho.

Table 21. Proportional distribution of trailbike trips in Idaho by planning region of origin and planning region of destination.¹

Origin Planning Region	Destination Planning Region							Total	Population ²
	I	II	III	IV	V	VI	Unknown		
I	.073	.005				.005	.010	.093	.118
II		.132						.132	.116
III		.005	.327			.015	.068	.415	.330
IV		.005	.024	.107	.005	.010	.010	.161	.144
V					.029	.029	.029	.088	.152
VI					.005	.083	.024	.112	.139
Unknown									
Total	.073	.146	.351	.107	.039	.141	.141	1.000	

¹ Based on N = 205 trips.

² From 1970 census.

Table 22. Proportional distribution of trailbike trips in Idaho by planning region of destination and land ownership category.¹

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	.015	.034	.112	.054	.015	.073	.044	.346
BLM		.005	.146	.044	.015	.039	.039	.288
Other Federal				.005				.005
State of Idaho	.044	.044	.020		.005		.010	.122
Industry								—
Private	.005	.049	.039		.005	.015	.015	.127
Comm. Facility			.005				.005	.010
Unknown	.010	.010	.024	.005		.005	.010	.063
Other		.005	.005			.005	.010	.024
No Response						.005	.010	.015
Total	.073	.146	.351	.107	.039	.142	.141	1.000

¹ Based on N = 205 trips.

in machine-days have a significantly lower proportion of total machine-days listed under the "unknown" destination. We believe this may be just an idiosyncrasy in the data.

Four-Wheel Drives

Vehicle Uses

According to the information obtained for Table 2, we estimate that about 20 percent (50 out of 223 respondents) of Idaho's registered 4-wheel drive owners do not utilize their vehicles for recreational ORV purposes. Those owners who do use their 4-wheel drives in such a manner have entirely different characteristics or stated reasons for justifying their use in comparison with snowmobile and trailbike owners (Fig. 7).

In comparison with snowmobilers and trailbikers, very few (i.e., less than 5 percent) 4-wheel drive owners go on recreational ORV trips for the sole purpose of

driving their machines (Fig. 7). In our opinion, this characteristic deserves further study at some time. Four-wheelers appear to be much more inclined to view ORV travel as a means to some other end, rather than as an end in itself.

Hunting and fishing easily stand out as the most popular stated reasons for using 4-wheel drives recreationally; about one-half of all trips are for these purposes (Fig. 7). After them, sightseeing comes in a distant third.

One factor which we are not able to evaluate is whether the trips reported by 4-wheel drive owners were truly ORV in nature, i.e., whether they were on roads requiring 4-wheel drive or actually off-road. It is our intuitive feeling that at least some of the trips upon which our statistics are based took place on passable roads open

Table 23. Percentage of trailbike trips in Idaho having destinations in the same planning region as their origin.¹

Planning Region	Percent Trips ²
I	88
II	100
III	94
IV	71
V	50
VI	94
Average	88

¹ Based on N = 176 trips.

² Does not include trips for which origin or destination is not known.

to normal vehicular traffic. This check, however, was not built into the questionnaire.

Party Size and Distribution on Trips

Four-wheelers tend to have the smallest party size on recreational ORV trips of all three ORV machine categories (Table 12). They have fewer adults and significantly fewer children (under 12 years) – which is surprising, considering the fact that a 4-wheel drive vehicle seems the most suited to carry youngsters as passengers. This may be partially explained by the circumstance that 4-wheel drives are used extensively for hunting, a sport in which we do not expect small children to participate.

Most trips involving 4-wheel drives are small group affairs. According to Table 13, the average group size of family-sized groups is essentially no different than the overall average group size (Table 12). The distribution of family-sized groups, moreover, is about what we expected – a smoothly shaped, positively skewed curve (Fig. 5).

Trip Distribution in Time

Recreational trips that use 4-wheel drive vehicles have, by far, the most even weekly distribution of the ORV categories (Table 26). While about 40 percent of all trip-days do take place over Saturday and Sunday, the remainder of the activity is evenly spread over the other 5 days. Again, such a distribution can be somewhat attributed to hunting, and to a lesser extent, fishing, sports for which people commonly take vacation time from their jobs to allow more than weekend participation.

The annual distribution of 4-wheel drive activity shows a late summer and fall peak, which corresponds with big game hunting seasons (Table 26). We must qualify this distribution due to the manner in which it was collected, i.e., unequal sample sizes.

Trip Distribution in Space

The distribution of recreational 4-wheel drive trips by Idaho planning region of origin and destination and by land ownership category within planning region of destination are provided in Tables 27 and 28.

Slightly more than one-half of all 4-wheel drive trips originate in Idaho Planning Regions III and IV (Table 27). The only regions that appear to have a density of trips not in proportion to their population are Planning Regions IV (more trips than expected) and VI (fewer trips than expected).

At least one-half of 4-wheel drive trips are on land administered by the U.S. Forest Service (Table 28). Idaho Planning Regions II and III appear to include the most popular U.S. Forest Service land destinations.

Table 24. Distribution of trailbike activity by Idaho planning region and land ownership category in terms of machine-days¹ from 205 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	5	28	99	73	6	106	14	331
BLM		4	109	108	6	10	8	245
Other Federal			3	15		4		22
State of Idaho	49	27	6		3		2	87
Industry								—
Private	1	46	22	2	3	6	4	84
Comml. Facility			4				1	5
Unknown	4	7	13	9		4	4	41
Other		3		4		4	9	20
No Response						2	3	5
Total	59	115	256	211	18	136	45	840

¹ The number of machine-days on a given trip equals the number of trailbikes involved times the length of the trip in days.

Table 25. Distribution of trailbike activity by Idaho planning region and land ownership category in terms of person-days¹ from 205 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	13	21	384	91	9	359	21	798
BLM		8	275	60	8	12	10	373
Other Federal				38				38
State of Idaho	27	56	21		3		2	109
Industry								—
Private	2	319	53	4	4	9	366	757
Comm'l. Facility			17				7	24
Unknown	7	30	16	8		8	3	72
Other		10	9			4	24	47
No Response						2	6	8
Total	49	444	675	201	24	394	439	2226

¹ The number of person-days on a given trip equals the number of people involved times the length of the trip in days.

Table 26. Estimated temporal distribution of recreational 4-wheel drive trips in Idaho.

A. Weekly Distribution

Day	Percent of Total Activity ¹
Monday	11.6 ± 4.0 ^a
Tuesday	11.0 ± 3.9
Wednesday	11.9 ± 4.1
Thursday	11.2 ± 4.0
Friday	12.1 ± 4.1
Saturday	19.3 ± 5.0
Sunday	22.9 ± 5.3

B. Annual Distribution

Month	Percent of Total Activity ²	Average Percent of Total Questionnaires Returned During This Period ³
January	2.3 ± 2.9 ^a	2.7
February	0	2.9
March	2.8 ± 3.2	4.0
April	4.6 ± 4.1	5.8
May	2.9 ± 3.3	9.2
June	8.8 ± 5.5	9.6
July	9.7 ± 5.8	8.5
August	10.6 ± 6.0	8.1
September	6.0 ± 4.6	7.2
October	12.0 ± 6.3	10.8
November	24.1 ± 8.3	18.4
December	16.2 ± 7.2	12.8

^a Confidence interval half-width, $\alpha = .05$

¹ Based on N = 455 trip-days.

² Based on N = 216 trips.

³ Based on the assumption that the number of trips taken by each user was evenly distributed across the 2-month reporting period covered in the questionnaire.

Four-wheelers are less likely to remain in the planning region of trip origin while involved in recreational ORV activities than either snowmobilers or trailbikers (Table 29). We suspect two factors cause this: 1) 4-wheel drive vehicles are inherently more mobile than rigs hauling or towing other kinds of ORVs; and 2) it is likely that hunters tend to range farther from their home area than people involved in other recreational activities discussed herein. By examining Table 27, we see that most inter-regional travel occurs back and forth between Planning Regions III and IV.

Recreational 4-wheel drive trip data by planning region and land ownership in units of machine-days and person-days are given in Tables 30 and 31.

CONCLUSIONS

It is apparent that ORV use has been rapidly increasing over the past 5 years, and there is no evidence to indicate this rate is abating. Moreover, most of the use is taking place on publicly owned lands — especially those administered by the U.S. Forest Service and the Bureau of Land Management. The actual populations of ORVs cannot be accurately measured at this time. As the older snowmobiles and trailbikes, purchased in years when registration was neither emphasized nor enforced, wear out and are replaced by newer machines, this problem should diminish. On the other hand, the real problem facing investigators and managers alike is not the population of ORVs but ORV activity rates. This, we feel, has been assessed in as unbiased a manner as possible.

Table 27. Proportional distribution of 4-wheel drive trips in Idaho by planning region of origin and planning region of destination.¹

Origin Planning Region	Destination Planning Region							Total	Population ²
	I	II	III	IV	V	VI	Unknown		
I	.075					.005	.023	.103	.118
II		.146	.005			.005	.009	.164	.116
III		.019	.197	.042		.014	.023	.296	.330
IV		.005	.033	.160	.014	.009	.014	.235	.144
V	.005				.089	.014	.038	.146	.152
VI					.005	.028	.023	.056	.139
Unknown									
Total	.080	.169	.235	.202	.108	.075	.131	1.000	

¹Based on N = 213 trips.

²From 1970 census.

Table 28. Proportional distribution of 4-wheel drive trips in Idaho by planning region of destination and land ownership category.¹

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	.056	.094	.113	.070	.061	.061	.089	.545
BLM	.005		.038	.056	.005	.009	.019	.131
Other Federal								—
State of Idaho	.005	.005	.047				.005	.061
Industry	.009		.014					.023
Private	.005	.066	.014	.038	.023		.009	.155
Comm'l. Facility							.005	.005
Unknown			.009	.038	.005		.005	.056
Other		.005			.014			.019
No Response						.005		.005
Total	.080	.169	.235	.202	.108	.075	.131	1.000

¹Based on N = 213 trips.

The difficult nature of planning and management of ORV use in Idaho is confirmed in this study. Heavy concentration of snowmobiling and trailbiking occurs on weekends. Areas or facilities provided for weekend activity levels will sit idle the majority of the week. Conflicts among users are more pronounced on weekends than during the week, when use is lighter. Only a small percentage of ORV users belong to clubs. This is unfortunate from a management point of view. Clubs could serve as a valuable focal point for the provision of information. Successful dissemination of the information is in question, given the small percentage of users in clubs. The potential exists, of course, to provide information to club members and let it be diffused to non-club members indirectly.

Table 29. Percentage of 4-wheel drive trips in Idaho having destinations in the same planning region as their origin.¹

Planning Region	Percent Trips ²
I	94
II	94
III	72
IV	72
V	83
VI	86
Average	80

¹Based on N = 185 trips.

²Does not include trips for which origin or destination is not known.

Table 30. Distribution of 4-wheel drive activity by Idaho planning region and land ownership category in terms of machine-days¹ from 213 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	12	43	111	18	22	41	21	268
BLM	1		19	18	1	4	25	68
Other Federal								--
State of Idaho	1	2	17				4	24
Industry	2		3					5
Private	31	17	5	34	5		2	94
Comml. Facility							2	2
Unknown			3	15	1		20	39
Other		3			3			6
No Response						2		2
Total	47	65	158	85	32	47	74	508

¹ The number of machine-days on a given trip equals the number of 4-wheel drive vehicles involved times the length of the trip in days.

Table 31. Distribution of 4-wheel drive activity by Idaho planning region and land ownership category in terms of person-days¹ from 213 randomly selected trips.

Destination Land Ownership	Destination Planning Region							Total
	I	II	III	IV	V	VI	Unknown	
Forest Service	78	159	196	52	62	97	32	626
BLM	48		53	43	1	4	105	254
Other Federal								--
State of Idaho	6	1	55				12	74
Industry	11		15					26
Private	147	53	8	88	17		7	320
Comml. Facility							6	6
Unknown			5	82	2		99	188
Other		4			17			21
No Response						1		1
Total	290	217	332	265	99	102	261	1566

¹ The number of person-days on a given trip equals the number of people involved times the length of the trip in days.

Two other key findings of this study have implications for ORV planning in Idaho. First, snowmobiling and trailbiking are done primarily for the recreational activity itself. Thus, planning for these activities is somewhat simplified because supplementary recreational activities need not be given a great deal of attention. Second, and perhaps more important, most ORV activity occurs within the planning region of the user's residence. The planning regions of the state are, therefore, reasonable subunits for ORV planning. Because little travel occurs between regions, each region can be evaluated in a planning framework relatively independently of the others. This approach allows the identification of unique and special problems in each planning region.

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