AN EXPLORATORY STUDY OF OHV RIDERS IN NEW YORK STATE: FINDINGS AND IMPLICATIONS FOR MANAGEMENT

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Abstract.—Objectives of this study were to determine demographic and experience characteristics of OHV riders, examine their motivations and resource attribute preferences, and to investigate the correlation between preferences and support for management actions and perception of potential problems. Findings showed that information and parking, rules and signs, and the natural setting were the most important resource attributes for riders. Riders were aware of potential problems related to the activity and supported all the management actions described. Management implications of these findings are briefly discussed.

1.0 INTRODUCTION

The U.S. Forest Service defines an off-highway vehicle (OHV) as any motor vehicle designed for, or capable of, cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (U.S. Forest Service, 2005). This research addresses the use of OHVs that are designed primarily for use over land and does not include snowmobiles. According to the National Survey of Recreation in the Environment (NSRE) (Cordell et al., 2005), recreational OHV riding has been one of the fastest growing recreational activities nationwide in the last 10 years. Managing OHV use has become a challenge for many public land-management agencies (U.S. Forest Service, 2006). As participation in the sport has grown, it has rapidly outstripped the available riding facilities. This has led to illegal use and environmental damage on public and private lands.

The purpose of this paper is to provide managers with information that will aid in the development of programs, policies, and riding areas that meet the needs of OHV riders in an effective and sustainable manner by:

1. Identifying OHV users' motivations for riding
2. Identifying the resource attributes which are important to OHV riders
3. Examining the correlations between Resource Attribute Preferences (RAP) and motivations
4. Examining the correlations between RAP and support for management actions; and between RAP and the perception of potential problems

2.0 METHODS

The population for this study was OHV users in New York; a mail-back survey was used (Dillman, 2000). Due to state policy regarding privacy, it was not possible to obtain a mailing list of registered riders from the New York State Department of Motor Vehicles. OHV riding clubs were asked to volunteer mailing lists of club members. Mailing lists were obtained from 22 OHV riding clubs in New York and a draft version of the survey was pretested by 19 OHV club officers. The survey was mailed to 1,070 households during the summer and fall of 2006.

Data were analyzed using SPSS version 12.0. Principle Components Analyses (PCA), varimax rotation were used for the motivation and RAP items. Factor loadings greater than 0.4 and eigenvalues greater than 1.0 were required (Child, 1970; Mueller, 1978 as cited in Hou et al., 2005). Cross-loaded variables were rejected. All of the factors retained had acceptable alpha (Cronbach, 1951) values of 0.6 or higher (Cortina, 1993 as cited in Hou et al., 2005). Factors

were labeled on the general theme that the variables appeared to address.

Factor scores were computed by multiplying the individual item scores by the factor loading coefficients, adding these values together for all of the items within the factor, and then dividing by the number of items within the factor. Grand means were calculated by adding the responses to items within a factor and dividing by the number of items, without multiplying by factor loadings. The Pearson product moment correlation coefficient (PPMC) was used to determine the strength and direction of the relationship between the RAP factor scores and the motivation factor scores, management action items, and potential problem items (Bluman, 2006).

To reduce respondent burden, RAP items were split between two versions of the survey (Version A physical setting preferences and Version B social and managerial setting preferences). Significant differences were found between Version A and Version B for six of the 54 shared survey items. Because the differences were small and scattered among different survey sections, researchers felt that the two survey samples were similar enough to justify directly comparing the RAP items using descriptive statistics. All multivariate analyses were conducted separately for Versions A and B.

3.0 RESULTS

Of the 1,070 surveys mailed to valid addresses, 707 were returned for an adjusted response rate of 66 percent. Twenty-two of these surveys were unusable and removed from the sample because they were incomplete or completed by two people. The remaining 685 surveys were retained for data analysis.

The respondents to this survey were 92 percent male. The average age of respondents was 48 years. When asked to check a box representing their experience level (novice, intermediate, advanced, or experienced), a majority of respondents described themselves as being advanced (59 percent) or intermediate (24 percent) riders. The average length of riding experience was 16 years. Eighty-one percent of respondents primarily ride quad ATVs, followed by off-highway motorcycles (OHMs) (9 percent), and 4-wheel-drive autos (8 percent).

3.1 Motivation and RAP Factors

Separate PCAs were conducted for the 12 motivation items, the 20 RAP items in Version A, and the 17 RAP items in Version B (Tables 1, 2, and 3). Each of these analyses resulted in selection of a four-factor model. A RAP item on Version B, the item *trails designed for children* did not load significantly on any of the factors, and so was dropped from the analysis. The relative importance of the factors indicate that Social Affiliation is an important motivation for riding, and that Information and Parking, Rules and Signs, and the Natural Setting are the most important resource attributes.

3.2 Support for Management Actions

Respondents were asked their level of support for five separate actions (Table 4). The most strongly supported management action was *Using funds from OHV registration fees to develop and maintain state*

Table 1.—Factors and variables for motivation items*

	Factor Loading	M	SD
Social Affiliation (α = .76)		1.47	.623
Be with my friends	.774	1.72	.567
Be with my family	.632	1.45	.890
Be with my group or club	.825	1.41	.846
Meet new people	.797	1.31	.924
Adventure and Challenge (α = .77)		1.11	.835
Experience new things	.760	1.41	.814
Experience excitement	.824	1.16	1.013
Master a challenge	.802	0.77	1.166
Equipment and Skill (α = .79)		0.80	.917
Develop my skills	.715	1.17	1.009
Try my equipment	.856	0.70	1.136
Talk to others about my equipment	.848	0.52	1.127
Social Status (α = .76)		– 0.99	1.077
Push the limits	.821	– 0.91	1.315
Impress others	.876	– 1.07	1.126

*Measured on a scale from 2 (Strongly agree with the statement) to –2 (Strongly disagree).

Table 2.—Factors and variables for physical setting attributes*

	Factor Loading	M	SD
Natural Setting (α = .90)		3.34	0.605
Scenic views	.824	3.47	0.746
Forested areas	.817	3.41	0.836
Streams, ponds, or lakes along trail	.801	3.34	0.865
Remote areas	.758	3.32	0.907
Riding in a natural setting	.737	3.29	0.960
Chance to see plants or wildlife	.806	3.20	1.007
Trail Design (α = .76)		2.70	0.776
Long interconnected trails (20+ miles)	.529	3.23	1.086
Medium trails (10-20 miles)	.802	3.06	0.995
Point-to-point trails	.757	2.85	1.152
Short trails (less than 10 miles)	.748	2.69	1.152
Loop trails	.580	2.53	1.270
Flat trails (as opposed to hilly)	.458	1.85	1.213
Trail Condition (α = .70)		2.00	1.015
Rough trail surface (as opposed to smooth)	.592	2.41	1.154
Trails that are muddy	.851	2.02	1.362
Trails that show signs of heavy OHV use (ruts, puddles, exposed rocks and roots)	.781	1.56	1.335
Trail Difficulty (α = .79)		1.46	0.972
Steep slopes (as opposed to gradual)	.578	2.04	1.254
Trails that cut across slopes (as opposed to going directly up or down slopes)	.622	1.90	1.199
Designated play areas with jumps	.813	1.11	1.326
Tracks (short loop trails for racing)	.828	0.77	1.192

*Measured on a scale from 0 (Not at all Important) to 4 (Extremely Important).

Table 3.—Factors and variables for social and managerial setting attributes*

	Factor Loading	M	SD
Information and Parking (α = .68)		3.41	0.686
Information /maps of trails available at trailheads	.630	3.43	0.847
Trailhead parking for autos and trailers	.652	3.42	0.860
Information /maps of trails available online	.742	3.37	0.927
Rules and Signs (α = .89)		3.39	0.884
Rules for riding on trails	.895	3.46	0.909
Knowing that rules are enforced	.834	3.43	0.917
Speed limit signs and safety considerations	.843	3.27	1.082
Facilities and Access (α = .87)		2.53	0.940
Access to communities from trails	.591	3.08	1.114
Trailhead loading /unloading facilities	.475	3.06	1.108
Road access to points along trails	.605	2.79	1.130
Camping at trailheads	.780	2.26	1.280
Bathrooms with running water	.738	2.25	1.293
Designated picnic areas	.844	2.19	1.236
Camping along trails	.807	2.10	1.299
Social Setting (α = .74)		2.50	0.910
Opportunity to ride as a group	.680	2.93	1.030
Trails shared by other types of OHV users	.725	2.55	1.246
Interacting with riders not in my group	.774	2.28	1.140
Multiple-use trails shared by other types of users	.638	2.24	1.398

*Measured on a scale from 0 (Not at all Important) to 4 (Extremely Important).

Table 4.—Support for management actions*

	% Supporting (1 or 2)	% Neutral (0)	% Opposing (-1 or -2)	M
Using funds from OHV registration fees to develop and maintain state riding areas and trails	97.0	1.8	2.1	1.85
Limiting or closing access seasonally to reduce erosion	69.2	16.7	14.0	0.86
Charging fees at state riding areas to fund maintenance and development of trails and facilities	62.1	15.4	22.5	0.60
Setting limits on the number of riders at the area to reduce impacts to the natural resource	48.0	26.1	26.0	0.30
Setting limits on the number of riders at the area to reduce crowding	37.1	31.7	31.1	0.03

*Measured on a scale from -2 (Strongly Oppose) to 2 (Strongly Support).

riding areas and trails. The action of *Limiting or closing access seasonally to reduce erosion* was also well supported. The least supported management actions were *Setting limits on the number of riders in the area*.

3.3 Potential Problems Related to OHV Riding

A PCA, which is not summarized in this paper but which is discussed in the related thesis (Baker, 2007), of the 10 potential problem items was conducted to determine the different categories of problems. The categories found were problems related to Operator Behavior and problems affecting the Recreational Setting. The items within each factor are indicated by headings in Table 5, which summarizes the respondent's perception of the seriousness of the potential problems. Respondents to this survey considered the issues relating to operator behavior to be more problematical than the issues which affect the recreational setting.

Table 5.—Assessment of potential problems*

	% Selecting "An Extreme Problem" (4)	% Selecting "Not a Problem" (0)
Operator Behavior		
Lack of adult supervision of child riders	31.0	16.3
Riding in illegal areas	28.9	5.7
Property damage by riders	26.2	11.5
Reckless riding	24.3	8.4
Riding in streams and wetlands	12.1	16.8
Recreation Setting Effects		
Noise from OHVs	9.4	32.0
Trail erosion from OHVs	9.0	15.5
Effects of OHVs on other people in area	5.7	23.1
Effect of OHVs on plants	3.8	29.0
Effects of OHVs on wildlife	4.1	40.9

*Measured on a scale from 0, "Not a Problem", to 4, "an Extreme Problem"

3.4 Pearson Correlations

Pearson Correlations were used to compare the strength and direction of relationships between the RAP factors and Motivation factors, Management Actions, and Potential Problems (Table 6). Social Affiliation was correlated with all but one of the RAP factors, and Trail Condition was correlated with all of the Motivation factors. Social Status was negatively correlated with the three most important resource attribute factors. Significant correlations were also found between several of the RAP factors and the Management Action items (Table 7). Rules and Signs resource attributes were correlated with support of all five of the management actions. A few significant correlations were found between the RAP factors and potential problems (Table 8). Social Setting resource attribute preferences were correlated with all of the items in the Operator Behavior factor of potential problems. To save space, in Table 8 only problems in the Operator Behavior factor are displayed. Only three significant relationships with Recreation Setting items were found.

Table 6.—Pearson correlations between RAP factors and motivation factors

	Social Affiliation	Adventure and Challenge	Equipment and Skills	Social Status
Information and parking	.227**		.193**	–.128*
Rules and signs	.327**		.140**	–.120*
Natural setting	.328**			–.164**
Trail design	.236**	.117*		
Social setting	.363**	.182**	.308**	
Facilities and access	.364**		.201**	
Trail difficulty		.413**	.166**	.390**
Trail condition	.245**	.237**	.217**	.231**

**Significant at 0.01
*Significant at 0.05 level

Table 7.—Pearson correlations between RAP factors and management actions

	Funding from registration fees	Funding from charging fees at areas	Seasonal closures/use limits to reduce erosion	Use limits to reduce impacts on resource	Use limits to reduce crowding
Information and parking		.140*		.161**	.114*
Rules and signs	.125*	.128*	.205**	.181**	.178**
Natural setting	.112*		.110*		
Trail design					
Social setting	.123*			.181**	.178*
Facilities and access					
Trail difficulty		.185**	-.117*		
Trail condition		.141*	-.141*		

**Significant at 0.01 level
*Significant at 0.05 level

Table 8.—Pearson correlations between RAP factors and operator behavior problems

	Riding in illegal areas	Reckless riding	Lack of supervision of child riders	Property damage by riders	Riding in streams and wetlands
Information and parking					
Rules and signs		.201**			
Natural setting					
Trail design					
Social setting	.182**	.192**	.203**	.137*	.163**
Facilities and access		.139*	.234**		.188*
Trail difficulty					
Trail condition					

**Significant at the 0.01 level
*Significant at the 0.05 level

4.0 DISCUSSION

Information and Parking was an important RAP. The need for accurate information about riding areas was positively correlated with Social Affiliation and Equipment and Skills motivations. Planning a ride with a group of people requires organization and a need for accurate information about the destination. Riders seeking to test their equipment or develop their skills may require specific information about the attributes of the setting to know whether the destination will meet their needs. The Information and Parking factor was negatively correlated with Social Status motivations. Riders motivated by impressing others and pushing the limits may not be as concerned about obtaining specific information in general.

Rules and Signs was the second most important RAP. Many respondents stated in the comments section of the survey that *a small number of irresponsible riders give OHV riders in general a bad name*. Clearly stated and enforced rules and signage along trails could help to curtail these problems. The Rules and Signs factor was positively correlated with Social Affiliation motivations. Rules and Signs provide a base for normative behavior at the area, making it easier for groups and individuals to interact with each other. These attributes also increase the safety of riding at the area.

5.0 CONCLUSION

The first objective of this research was *to identify OHV users' motivations for riding*. Findings show that social affiliation and adventure and challenge are two of the

strongest motivating factors. Facilities designed to accommodate groups would increase the attractiveness of a riding area; these include: large staging areas and frequent pull-outs along the trails, large permanent maps and small map-brochures at entry points, and group-friendly policies such as reduced rates for groups or families.

The second objective of this research was to *identify the resource attributes which are important to OHV riders*. The types of resource attributes that the riders felt were most important were Information and Parking, Rules and Signs, and the Natural Setting. Managers should distribute more information about areas where people can ride legally and develop and enforce rules that promote safe, nondestructive riding. Designation and management of additional public trails in natural settings may reduce illegal riding and make the impacts of this activity easier to manage.

The third objective of this research was to *examine the correlations between Resource Attribute Preferences and motivations*. The need for accurate information about riding areas was positively correlated with social motivations for riding. Planning a ride with a group of people requires organization and accurate information. In addition, logistical issues, such as adequate parking, also become more important. Similarly, the low number of legal and designated riding areas in New York requires riders to plan longer trips in order to participate in the activity. Coordinating trips to nonlocal areas requires more information and logistical support.

Importance of the Information and Parking factor was positively correlated with Equipment and Skills motivations. Riders seeking to test their equipment or develop their skills may require specific information about the attributes of the setting to know whether the destination will meet their needs. The Importance of the Information and Parking factor was negatively correlated with Social Status motivations. Riders motivated by impressing others and pushing the limits may not be as concerned about obtaining specific information about settings or legal riding opportunities.

The fourth objective of this research was to *examine the correlations between RAP and support for management actions; and between RAP and the perception of potential problems*. The Rules and Signs factor was correlated with support for all of the management actions and awareness of reckless riding as a problem, and Social Setting was correlated with support for use limits, as well as for awareness of all of the Operator Behavior potential problems. This shows that some riders are aware of the role of management in developing and enforcing rules and managing reckless behavior, and that some riders are sensitive to the effect of the behavior of others on the social setting. The sensitivities of these riders will influence the experience quality at the riding destination.

A limitation of this research is that it was conducted with a sample consisting of members of OHV clubs older than 18 years. Future research could focus on identifying and understanding other groups outside of club membership, particularly younger riders. A survey also could be conducted in other states where there are more riding opportunities in order to determine how much of the information gained here is unique to the circumstances of New York riders.

6.0 CITATIONS

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