MANAGEMENT PERCEPTIONS OF OFF-HIGHWAY VEHICLE USE ON NATIONAL FOREST SYSTEM LANDS IN APPALACHIA

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Abstract.—In 2005, the U.S. Forest Service (USFS) issued new standards for dealing with unmanaged recreation. All National Forest System units are to develop travel management plans by 2009. The purpose of this study was to determine differences in perceptions between USFS managers of national forests in Appalachia with low and high levels of off-highway vehicle (OHV) use regarding OHV-related issues and management tactics. This information will help managers in this region make informed decisions about OHV management when developing travel plans. Managers with high levels of OHV use reported more physical impacts, safety issues, and use of more management tactics. It is recommended that managers weigh the costs, benefits, and resource impacts of OHV use prior to designating additional areas for OHV recreation.

1.0. INTRODUCTION

In 2005, the USDA Forest Service (USFS) updated the Code of Federal Regulations to provide consistent standards for managing motorized vehicle use on National Forest System (NFS) lands. This new travel management rule requires NFS units to complete an inventory of all authorized and unauthorized (e.g., "social") roads and trails. From that inventory, they are to develop a travel atlas consisting of maps indicating all designated roads and trails on that unit. Additionally, each unit is to create a motor vehicle use map showing where both on- and off-road travel are permitted. All NFS units are to complete these travel management plans by 2009.

For managers to make decisions regarding off-highway vehicle (OHV) recreation opportunities, it is important for them to have up-to-date information about the ramifications of different management strategies. There are currently considerable gaps in the OHV literature. Most studies that describe successful techniques for OHV management have been based in the western United States. Ecosystem, social, and climatic differences can make it difficult to apply these results successfully to east coast sites. Because this study takes place on the east coast, it will help address this gap in the OHV literature.

The purpose of this study is to determine differences in perceptions of OHV-related activity and interest, related physical and social issues, and preferred management tactics among District Rangers (DRs) on NFS units in the Appalachian Region. For the purposes of this study, an OHV is defined as any three- or four-wheel all-terrain vehicle or off-road motorcycle used for recreational purposes.

2.0 LITERATURE REVIEW

2.1. Conceptual Framework

This research was based on a study by Chavez and Knap (described in an unpublished 2004 report and in a 2006 Research Paper), in which they surveyed DRs in California about OHV-related issues and management tactics. Chavez and Knap organized the wide variety of concepts and issues in their study according to the framework of the Recreational

Opportunity Spectrum (ROS) created by Clark and Stankey (1979). The ROS helps resource managers classify different sections of large sites based on the recreation experiences likely to be generated there. Recreation opportunity classes are established based on a set of criteria weighing physical, social, and managerial settings appropriate to that area. In discussing OHV-related issues and management tactics in this literature review, we will address them within the contexts of the physical, social, and managerial settings of the ROS.

2.2 OHV-Related Physical Impacts

According to Meyer (2002), "Few OHV trails are planned trails where a full range of environmental considerations was carefully weighed before construction. In fact, few trails are specifically constructed for OHV use" (p. 8). Such unplanned trails frequently cross areas that are not suitable for OHV recreation at current use levels (Marion & Leung, 2004). OHV use on improperly designed, -constructed, and -maintained trails has been found to cause soil erosion and compaction, introduction of exotic plant species, and damage to soil biota and vegetation – and to cause this damage more rapidly than other forms of recreation (Meyer, 2002; Chin et al., 2004; Leung & Marion, 2000).

2.3 OHV-Related Social Issues

The primary social issue related to OHV recreation is user conflict. The recreation conflict literature indicates that some conflict between mechanized and nonmechanized recreationists is related to the rate of speed at which their preferred activities take place and the noise generated by recreation machines (Krumpe & Lucas, 1986; Vittersø et al., 2004). Conflict between mechanized and nonmechanized recreationists tends to be asymmetrical; that is, nonmotorized recreationists tend to experience goal interference from mechanized or motorized recreationists more than their mechanized or motorized counterparts experience from them (Krumpe & Lucas, 1986). Examples of nonmechanized versus mechanized conflict include studies of cross-country skiers and snowmobilers (Knopp & Tyger, 1973; Vittersø et al., 2004), hikers and mountain bikers (Carothers et al., 2001; Heer et al., 2003), hikers and OHV users (Behan et al., 2001; Shultis, 2001), and canoeists and motorboaters (Ivy et al., 1992).

2.4. OHV-Related Management Tactics

Resource managers have a variety of available tactics for managing various types of recreation. Management tactics can be divided into four categories: direct, indirect, resource hardening, and collaborative. Direct tactics involve the immediate presence or action of a resource manager, and may include monitoring and limiting what recreationists do in a given area. Indirect tactics are used in situations where resource managers wish to influence recreationist behavior without having to be present themselves. Resource hardening consists of building facilities or manipulating trails or other surfaces by natural or artificial means in order to increase the durability of the recreation site. Collaborative tactics involve one or more stakeholders or stakeholder groups in decisionmaking about how an area is to be managed (Brooks & Champ, 2006; Chavez, 1996; Manning, 1999).

3.0 METHODS

3.1 Study Region

The Appalachian Regional Commission (2003) defined the Appalachian Region as the portion of the Appalachian Range extending through southern New York, most of Pennsylvania, southeastern Ohio, all of West Virginia, eastern Kentucky, western Virginia, eastern Tennessee, western North Carolina, northeastern Mississippi, and northern Alabama, Georgia, and South Carolina (Fig. 1). All national forests in the Appalachian Region were surveyed. Because the national forest in New York is not in this region and because there are no national forests in Maryland, those states were not included in the study.

3.2. Instrumentation and Sampling

The survey instrument was based on the research of Chavez and Knap (2004), and modified with input from academic experts on OHV use and USFS DRs and Recreation Staff Officers. The instrument was

Figure 1.— The Appalachian Region (from Appalachian Regional Commission, 2002).

pretested at West Virginia University (WVU) and at the Oregon Dunes National Recreation Area in USFS Region 6.

This study was intended to be a census of all 42 DRs on the 14 national forests in the Appalachian Region. Data were collected using a modified Dillman (2000) method. A prenotification email was sent from the USFS National OHV Program Manager. A week later, the survey instrument was mailed along with a cover letter, survey instructions, and a postage-paid return envelope. After 90 days a followup letter was sent to nonrespondents along with another survey instrument, instructions, and return envelope. Thirty-one responses were received; 29 instruments were usable yielding a 69.0 percent modified response rate

3.3. Treatment of Data

Because the data violated assumptions for parametric analysis, Mann-Whitney comparisons of independent samples were used to examine any item-by-item differences. The independent variable was the level of OHV recreation opportunity available, operationalized as high (above the median ratio of trails open and closed to OHV use, 12.16 percent) and low (below the median ratio of trails open and closed to OHV use, 12.16 percent). Dependent variables were perceptions of OHV activity and interest, perceptions of physical impacts, perceptions of social issues, and preferred management tactics. Kendall's tau-b was used to perform correlation analyses using any overall tendencies between the independent and dependent variables in each category.

4.0. RESULTS

4.1. Perceptions of OHV-related Activity and Interest

Of these 42 items, there were few significant differences between DRs with high and low levels of OHV recreation opportunities on their Districts. DRs with high levels of OHV recreation opportunities were more likely to report that they charged fees ($U = 37.50$, $p < .05$). They were also more likely to report that in the past year OHV users had volunteered to maintain trails ($U = 29.50$, $p < .05$). DRs with low levels of OHV recreation opportunities were more likely to report that in the last year OHV users had not volunteered to monitor or maintain trails ($U = 17.00$, $p < .01$). There was a small to moderate positive correlation between the level of trail opportunity provided on a District and positive views of personal contacts with OHV users (τ_{23}=.363, $p <$ .05); in other words, as the level of OHV opportunity on a ranger district increased, DRs viewed personal contacts with OHV users more positively.

4.2. Perceptions of OHV-related Physical Impacts

Thirteen items measured physical impacts that respondents had seen or received reports about in the past year. There were no significant differences found on an item-by-item basis between DRs with high and low levels of OHV recreation opportunities on their districts ($p > .05$, in all cases). There was a small to moderate positive correlation between the level of OHV recreation opportunities and the total number of impacts reported ($\tau_{26} = .327$, $p < .05$); the level of OHV recreation opportunity on a ranger district increased, the number of physical impacts reported also increased.

4.3. Perceptions of OHV-related Social Issues

For 10 of the 12 social issue-related items, there were no significant differences between respondents with low and high levels of OHV recreation opportunities on their districts ($p > .05$). DRs with high levels of OHV recreation opportunities were more likely to report two safety-related issues: lack of safetywear ($U = 42.00$, $p < .05$) and inexperienced drivers in difficult terrain ($U = 34.50$, $p < .01$). There was no significant difference found between the level of OHV recreation opportunity on a Ranger District and the total number of social issues reported ($p > .05$).

4.4. Preferred OHV-related Management Tactics

Respondents were asked to select from 39 different direct, indirect, resource-hardening, and collaborative management tactics. There were several significant differences in the types and numbers of management tactics DRs used, depending on the level of OHV recreation opportunity their district provided. DRs with high levels of OHV recreation opportunities were more likely to prefer two direct tactics: seasonal trail closures ($U = 34.00$, $p < .01$) and relocating or redesignating trails ($U = 46.50$, $p < .05$). They were also more likely to use indirect management tactics like posters or signs ($U = 46.50$, $p < .05$), maps ($U = 41.50$, $p < .05$), brochures ($U = 41.00$, $p < .05$), and trail use recommendations ($U = 40.50$, $p < .05$). The only resource-hardening management tactic DRs reported using was drain dips: DRs with a high level of OHV recreation opportunities were more likely to report using this tactic ($U = 34.50$, $p < .01$). DRs with a high level of OHV recreation opportunities were more likely to report using one collaborative management tactic: personal contacts ($U = 48.50$, $p < .05$). Overall, DRs with a high level of OHV recreation opportunities were more likely to report using a greater number of management tactics than DRs with a low level of OHV recreation opportunities ($U = 36.00$, $p < .01$), perhaps due to the larger number of physical impacts they reported.

5.0 DISCUSSION AND RECOMMENDATIONS

DRs with high levels of OHV recreation opportunities tended to have more positive direct encounters and a greater amount of volunteerism among OHV users, but they also tended to have a greater number of physical and social impacts related to OHV use on their districts. Along with the increased number of impacts reported by the DRs with high levels of OHV use, those DRs reported that they used more varied management tactics than the tactics employed by DRs with low levels of OHV recreational opportunities. Possibly in an attempt to counter the increased costs related to the number of management tactics employed, DRs with high levels of OHV recreation opportunities were more likely to charge fees for OHV recreation on their districts.

As managers on national forests near the deadline to develop their new travel management plans, DRs in Appalachia who are considering increasing the amount of OHV recreational opportunities on their districts will need to weigh these costs and benefits. Unauthorized and illegal use do not seem to decrease when more trails are added, so expanding recreation opportunities for OHV users may not necessarily decrease the number of user-created trails or issues with riders leaving designated areas. Overall, adding more OHV trail opportunities may have other drawbacks for managers. More trails may increase the costs of personnel and trail management, necessitate the implementation of a fee system, and/or may necessitate using more varied management tactics to deal with OHV-related impacts. Managers who add more OHVs in their Districts, however, may experience an increase in volunteerism by OHV users and an increase in positive encounters with those users.

Increasing the amount of OHV-related recreational opportunities should not be predicated upon whether more trail budget money might become available or whether OHV users might be more likely to volunteer. Choosing to add or open more OHV trails should be based on the suitability of the resource for such trails

on the resource's capacity; and on the district's ability to support and maintain the trails over time. When these conditions cannot be met, providing additional trail opportunities may have more drawbacks than benefits.

5.1 Future Research

This study, like Chavez's and Knap's (2004, 2006), was geographically limited. A nationwide study would provide more general information about management perceptions and tactics. Further region-specific studies, however, would also be helpful to provide information about regionalized issues. Future study is also necessary to determine how recreationists (motorized/nonmotorized) and DRs perceive management issues. This issue was raised by Brooks and Champ (2006) in a study of unmanaged recreation in the Rocky Mountains, where they found that users and managers differed both in their definitions of the problems and the solutions for unmanaged recreation.

6.0. CITATIONS

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