

# Private Forest Landowner Attitudes toward Off-Highway Vehicle Access: A Minnesota Case Study

Dennis R. Becker, Grant L. Wilson, and Stephanie A. Snyder

ABSTRACT

Off-highway vehicle (OHV) riding has increased dramatically in the past decade, creating challenges for finding suitable places to ride, particularly where access to public lands is limited. This research examines the attitudes and willingness of private forest and seasonal recreation landowners to provide OHV access. A series of focus groups was conducted to inform a survey questionnaire mailed to a random sample of landowners in north central Minnesota. Results indicate low willingness among landowners to provide public OHV riding opportunities. Approximately 3% of respondents currently allow public access, but that increases significantly if OHV riding behaviors are to reflect lowered noise levels, increased age of riders, low speeds, and small group sizes. Results also indicate that landowner attitudes regarding OHV effects and rider behaviors differ when riders are family and friends versus the public.

**Keywords:** off-highway vehicles, private forestland, recreation access, motorized recreation

The popularity of off-highway vehicles (OHVs), including all-terrain vehicles, motorcycles, and trucks, has grown substantially in recent years. Registrations of all-terrain vehicles and off-highway motorcycles surged nationally from 2.92 million in 1993 to an estimated 8.01 million in 2003; OHV participation is projected to increase 42% by 2015 (Cordell et al. 2005). In Minnesota, the number of registered all-terrain vehicles was just under 250,000 in 2006 and is projected to grow by 39% by 2014 (personal communication, Tim Kelly, Minnesota Department of Natural Resources, July 17, 2007). Concurrently, demand for places to ride will also increase. This demand will be met in part with trails on public lands, but those trails are unlikely to meet the needs of this growing recreation segment in Minnesota or other parts of the country.

OHV recreation provides some \$600 million in annual benefits in Minnesota (Schneider and Schoenecker 2006). Capturing those benefits and expanding economic opportunities has led some communities to pursue development of public trails, as well as interest in increased use of public right-of-ways and potential leasing of private forestlands. Research indicates that a segment of OHV riders prefers private property as a venue for recreating (Lord et al. 2004, Schoenecker 2006), but whether and in what circumstances landowners might allow OHV access is largely unknown. This research provides information on the types of landowners in Minnesota who are willing to provide OHV access, under what conditions they would provide it, and their primary concerns.

## Public Recreation Access on Private Lands

A number of studies have explored landowner willingness to provide public access for hunting and other forms of recreation, but few have sought to investigate attitudes toward OHV access. Previous research indicates that landowner willingness is influenced by attitudes about the recreation type (Wright et al. 1990), attributes or vulnerability of the resource base (Tull and Brussard 2007), and

concerns about personal liability (Sigmon 2004). In a study of access policies in the 1980s, 47% of Minnesota landowners were found to restrict motorized recreation access to friends, family, and close associates (Wright et al. 1990). Another 25% reserved exclusive rights for themselves, and 24% granted open access to the public. Among landowners with open access policies, uses such as hunting, camping, and motorized recreation were prohibited by more than 65% of respondents. Passive forms of recreation, such as photography, bird watching, and hiking were generally allowed. Several studies have also reported that as landowners increase their personal use of their property for recreation, public access decreases (Brown et al. 1983, Wright and Fesenmaier 1988).

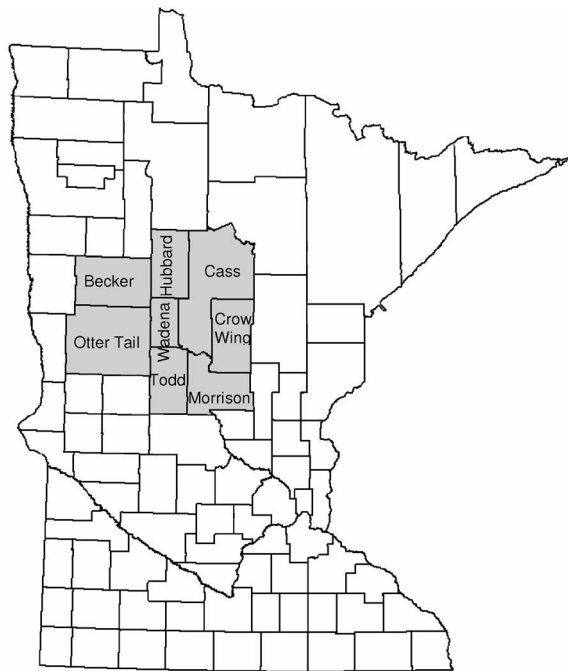
A key factor influencing landowners' willingness to allow public access is how they view the appropriateness of the recreational activity, which is influenced by the compatibility with the owners' uses of their land (Teasley et al. 1999) and biases they may have toward an activity (Wright et al. 1990). Beliefs about the appropriateness of the activity are in turn influenced by perceptions about its benefits, which in the case of OHV riding may include accomplishment of work tasks (Nelson et al. 2000), transportation, or hunting and fishing access (English et al. 2004).

Willingness to allow access has also been found to be influenced by concerns about recreator behavior and possible adverse effects on property. Concerns for soil erosion caused by OHV riding, vegetation loss, sedimentation, and wildlife dislocation are common (Groom et al. 2007, Tull and Brussard 2007). The perceived potential for resource damage, including littering and vandalism, also strongly influenced access decisions (Teasley et al. 1999). However, adverse effects or behavior need not be experienced personally for landowners to be concerned. Landowners can be influenced by neighbors or friends who have had negative experiences or occurrences of damage (Siemer and Brown 1993).

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**Figure 1. Central Minnesota counties in the study region.**

Finally, concern for personal liability has been found to affect public access decisions on private property (Wright et al. 2002). All states have some form of a recreation use statute granting landowners immunity from liability when providing free access (Sigmon 2004). However, many landowners are unaware of the statutes in their state and limit access out of concern for liability (Wright et al. 2002). Alternatively, financial incentive programs, such as leasing or fee-based permits, have been found to positively influence willingness to allow access, in particular for hunting (Mozumder et al. 2007, Kilgore et al. 2008).

## Study Methods

The purpose of this study was to identify factors influencing Minnesota landowners' views on OHV riding and willingness to grant access. Focus groups were conducted in an eight-county region of north central Minnesota during the summer of 2007 (Figure 1) and were structured using general procedures to develop and identify ideas to help formulate a questionnaire regarding attributes affecting OHV access (Krueger and Casey 2000). The study region was selected for the high number of registered all-terrain vehicles and concentration of OHV riding and for the distribution of private forestlands.

Fifty-three people with experience with OHVs, across a range of social and professional networks, were identified through purposive sampling. Fifteen individuals ultimately attended one of four focus groups; two focus groups were organized for private forest landowners, one for recreation landowners (e.g., lake cabins), and one for county officials. County officials such as land use planners and administrators commonly interact with landowners regarding OHV issues, are responsible for maintenance of highway right-of-ways affected by OHVs, and provide resources for recreation and enforcement. All focus group discussions were recorded, transcribed, and analyzed to identify issues for questionnaire development.

Following Dillman (2000), a questionnaire followed by a postcard reminder and replacement survey was mailed to a random

sample of landowners in the same eight-county region during the fall of 2007. Private lands classified for tax purposes as either timberland or seasonal recreation land were used to identify the sample population, which included a total of 4,271 timberland and 47,812 seasonal recreation landowners. Mailing addresses were identified from 2006 county tax records representing about 6.9 million ac. The sample population was stratified by timberland and seasonal recreation landowners. Response rates of completed useable surveys were 61.4% (775 surveys sent) and 52.3% (825 surveys sent) for timberland and seasonal recreation landowners, respectively. A non-response bias check revealed that responding seasonal recreation landowner parcels were on average significantly larger (33 ac) than nonrespondent lands (7 ac). Many landowners declining to participate similarly indicated that their parcels were too small to qualify for the survey. Nonrespondent timberland parcels were on average similar in size (43 ac) to respondents' parcels (49 ac).

## Focus Group Findings

The purpose of OHV riding emerged as an important determinant in the focus groups. A high percentage of participants had ridden or owned an OHV, with most using them for work purposes rather than recreation. Location of riding and rider characteristics (e.g., age, speed) also influenced attitudes toward OHVs. For instance, participants in all groups frequently talked about deterring OHVs from riding through mud holes and on steep slopes because of the negative environmental impacts. Landowners were also reluctant to allow OHV riding out of concern for personal liability.

Many focus group participants also talked about concerns related to property damage and about conflicts with the other activities on their land, in particular hunting and nonmotorized recreation. Trespassing, consciously or not, was also an issue. Discussions centered on actions taken to prevent OHV access or to rectify effects. To alleviate pressure for places to ride OHVs, participants expressed interest in fee-based access and lease programs on private lands in concert with public agencies. They also talked about trailside businesses and designated riding areas as ways to capture local economic benefits.

## Survey Findings

Survey respondents were largely Caucasian (98%) and male (79%) and had owned their property for about 20 years. The average age of respondents was 59, with a household income of \$50,000–75,000; approximately 37% were retired. The number of respondents across all landowners who rode OHVs was evenly split between those who did and those who did not (50%). Of those who did, recreational riding was the most frequently identified use (81%), followed by riding for hunting (77%) and work-related activities (59%).

## Land Use and OHV Access

Respondents were asked how frequently they or family or friends engaged in different activities on their land. A majority of timberland owners (55%) reported using their property most frequently for hunting, followed by solitude and escape (49%). Sixty-one percent of timberland owners reported use of OHVs. In contrast, seasonal recreation landowners reported using their property most frequently for solitude and escape (71%), followed by fishing (49%). Thirty-eight percent of those seasonal recreation landowners reported using OHVs. Timberland owners engaged in more hunting

**Table 1. Number of landowners allowing off-highway vehicle (OHV) access by type (percentage).**

Landowner type	Granting OHV access to:				
	Family only	Friends and family	General public	No access	Total
OHV riders	52 (6%)	184 (22%)	20 (2%)	158 (19%)	413 (50%)
Nonriders	10 (1%)	32 (4%)	4 (1%)	374 (45%)	420 (50%)
Total	62 (7%)	216 (26%)	24 (3%)	532 (64%)	834 (100%)

( $F = 59.414$ , degrees of freedom [df] = 2,  $P < 0.001$ ), forestry-related activities ( $F = 36.557$ , df = 2,  $P < 0.001$ ), and OHV riding ( $F = 6.574$ , df = 2,  $P < 0.001$ ) than seasonal recreation landowners, but they reported using their property less for fishing ( $F = 61.688$ , df = 2,  $P < 0.001$ ) and birding ( $F = 59.414$ , df = 2,  $P < 0.001$ ). OHV riders, regardless of ownership type, reported using their property most frequently for solitude and escape (59%) and hunting (58%), followed by hiking (29%), whereas nonriders reported using their property most frequently for solitude and escape (59%) and fishing (35).

In terms of those to whom landowners grant OHV access, no statistical difference was found among types of landowners, acres, or years owned (Table 1). The majority did not allow OHV access (64%); approximately 26% permitted family and friends to ride on their property, and just 3% allowed public access, which is consistent with the study by Wright et al. (1990). Landowners who rode OHVs were more likely than nonriders to grant access to family and friends but were equally opposed to public access. A greater percentage of nonriders did not allow OHV riding on their property (45%) as compared with riders (19%).

Respondents were then asked a series of questions pertaining to scenarios in which they might provide OHV access, differentiated by friends and family and the public. A greater percentage of timberland owners were “slightly” or “completely” willing to allow access to friends and family when the following conditions were met: speeds were below 10 mph, the size of riding groups was less than three people, riders were 16 years of age or older, riding occurred on their property fewer than five times per year, and noise levels were low (Table 2). A significantly smaller percentage of seasonal recreation landowners were willing to allow access in the same situations: speeds less than 10 mph ( $F = 23.323$ , df = 1,  $P < 0.001$ ), size of group less than three people ( $F = 20.846$ , df = 1,  $P < 0.001$ ), riders 16 years of age or older ( $F = 15.478$ , df = 1,  $P < 0.001$ ), and noise levels were low ( $F = 22.689$ , df = 1,  $P < 0.001$ ).

Nonriders were significantly less willing than riders to allow access to family and friends in every scenario ( $P < 0.001$ ). However, up to 41% of nonriders responded that they would be more willing to allow access if rider speed, noise, and the number of riders were low. Willingness to allow access also increased percentagewise if riders asked permission, were older than 25 years of age, and used the property fewer than five times per year. No statistical difference was found among number of acres or years owned.

In terms of willingness to allow public access, most landowners were “completely” or “slightly” unwilling to allow public riding, in particular when noise (2.3%) and speeds were high (3.1%), riding occurred on steep inclines (3.0%), and riders were younger than 12 years of age (3.3%). Approximately 17% of respondents who rode OHVs indicated they would be “slightly” or “completely” willing to allow public access if riders asked permission. A similar percentage said they would allow public access if noise levels were low, riders were older than 25, and riding was restricted to along roads next to private property.

Riders and nonriders differed significantly ( $P < 0.01$ ) in every situation, except when noise levels were high. For instance, landowners who rode OHVs were significantly more willing to allow public access when riders were under 15 years of age ( $F = 9.384$ , df = 1,  $P < 0.01$ ) and when riding occurred along roads and driveways ( $F = 32.604$ , df = 1,  $P < 0.01$ ), outside wetlands ( $F = 10.191$ , df = 1,  $P < 0.01$ ), and not on steep slopes ( $F = 11.345$ , df = 1,  $P < 0.01$ ). There was no difference between timberland and seasonal recreation landowners.

### Impacts of OHV Riding

To assess the influence of perceived impacts on access decisions, landowners were asked a series of questions pertaining to possible benefits and negative effects of OHVs on their property. Regardless of ownership or whether they rode OHVs, respondents most frequently reported hunter assistance (42%), safe place for family to ride (39%), improved work productivity (37%), and efficient transportation (36%) as “somewhat” or “very” important benefits. Timberland owners perceived a greater benefit of OHVs for hunting assistance than did seasonal recreation landowners ( $F = 3.491$ , df = 5,  $P < 0.01$ ), as well as efficient transportation ( $F = 3.021$ , df = 5,  $P < 0.01$ ). Timberland owners were also predictably more concerned about hunting interference ( $F = 4.965$ , df = 3,  $P < 0.01$ ). Likewise, landowners who rode OHVs frequently perceived greater benefits of using OHVs than did nonriders. For instance, riders were more likely to report benefits of having a safe place for family members to ride ( $F = 41.576$ , df = 5,  $P < 0.001$ ). They were also more likely to report benefits of efficient transportation ( $F = 40.075$ , df = 5,  $P < 0.001$ ) and increased work productivity ( $F = 25.611$ , df = 5,  $P < 0.001$ ) and contact with friends ( $F = 18.822$ , df = 5,  $P < 0.001$ ). Alternatively, nonriders perceived the greatest benefit to be hunter assistance (23%), although significantly less than riders ( $F = 44.636$ , df = 5,  $P < 0.001$ ).

In terms of negative impacts, nonriders were most concerned about environmental damage related to soil erosion, vegetation and wildlife disturbance, and property damage tied to vandalism and littering (Table 3). Although nonriders were generally more concerned about the negative impacts of OHVs, a majority of riders also reported high levels of concern. The most significant differences were concern for noise and vegetation damage.

Interestingly, although respondents were concerned about the negative effects of OHVs, more than one-third had not personally experienced or observed those impacts of greatest concern, including invasive species impacts (56%), interference with other OHVs (54%), liability (45%) or soil damage (39%). Among the effects most observed on respondents' property were liability (33%), rutting (26%), hunting interference (25%), littering (24%), and wildlife disturbance (23%). The effects most frequently observed on public lands were damage to soil (42%) and vegetation (40%), littering (39%), and damage to wetlands (38%). Crop damage, interference with OHV riding, and spread of invasive plants were among the least observed across all categories.

**Table 2. Percentages of landowners reporting “slightly willing” or “completely willing” to allow off-highway vehicle (OHV) access by type of group.**

	Friends and family				General public			
	Seasonal recreation	Timberland	OHV rider	Nonrider	Seasonal recreation	Timberland	OHV rider	Nonrider
	.....(%).....							
Speed of riders								
<10 mph	41.0	56.8	75.1	25.1	9.2	8.7	13.6	4.3
10–20 mph	26.8	39.0	53.2	13.9	7.1	6.5	10.3	3.3
>20 mph	11.9	19.1	25.5	7.0	2.9	3.3	4.5	1.8
Number of riders								
One	39.2	55.7	73.4	24.1	8.3	9.0	13.0	4.6
2–3	30.0	44.7	61.7	14.7	8.7	8.5	13.6	3.6
4+	15.2	24.5	34.6	6.8	7.1	5.1	9.3	3.1
Age of riders								
<12 years	9.1	14.4	18.6	6.1	3.2	3.4	4.8	1.8
12–15 years	21.6	28.6	40.9	10.5	5.3	5.3	7.8	3.1
16–25 years	36.1	49.9	68.5	18.3	9.2	6.9	11.7	4.6
>25 years	40.5	58.4	77.5	22.5	10.1	9.1	14.7	4.4
Frequency of riding								
<5 times/year	37.5	55.0	72.0	22.9	8.2	8.3	12.5	4.1
5–10 times/year	26.3	39.1	51.4	15.7	6.7	6.2	10.2	2.8
>10 times/year	21.4	28.2	42.1	8.5	6.1	4.8	8.5	2.6
Location of riding								
Woodlands	34.1	48.7	65.3	18.5	10.6	8.2	14.3	4.6
Water crossings or wetlands	12.2	14.2	20.4	6.9	5.1	2.8	5.6	2.1
Steep inclines	8.6	13.0	17.4	5.1	3.5	2.6	4.3	1.6
Driveways or along roads	37.2	45.9	62.8	20.9	9.1	8.3	14.3	3.1
1/2 mi or less from buildings	27.2	35.2	45.8	13.9	7.6	5.6	10.8	2.6
Size of riding area								
<1/2 mi <sup>2</sup> used	29.2	43.1	56.8	18.0	7.0	6.9	10.3	3.8
1/2–1 mi <sup>2</sup> used	19.4	28.9	42.5	8.2	6.9	5.4	9.0	3.4
Time of year of riding								
Winter	37.6	44.3	61.0	21.6	11.4	9.1	14.3	6.1
Spring	26.1	36.3	51.1	12.7	8.6	7.4	12.0	4.2
Summer	36.6	48.1	67.1	19.2	10.8	8.7	15.1	4.9
Fall	35.2	51.3	67.1	20.3	10.9	8.5	14.6	4.9
During hunting season	26.3	37.2	47.5	16.6	8.6	5.7	9.5	4.4
Noise level created by riders								
Low	40.7	56.1	73.1	25.1	12.2	9.9	15.9	6.2
Moderate	19.5	27.6	37.0	11.5	6.3	5.2	8.4	3.4
High	4.8	9.5	11.8	3.4	2.2	2.3	3.1	1.6
Permission and liability								
Riders sign liability waiver	20.9	28.4	34.7	15.5	6.3	7.9	10.4	4.0
Riders ask for permission	34.3	44.5	57.6	22.6	10.8	12.4	17.0	6.4

**Landowner Management Actions**

Timberland owners reported higher incidences (34%) of known unauthorized access than seasonal recreation landowners (18%) ( $F = 13.757$ ,  $df = 1$ ,  $P < 0.001$ ) and were more likely to have taken actions such as posting trespass signs ( $F = 29.896$ ,  $df = 1$ ,  $P < 0.001$ ), erecting barriers ( $F = 10.740$ ,  $df = 1$ ,  $P < 0.001$ ), and using gates or fencing to restrict access ( $F = 19.202$ ,  $df = 1$ ,  $P < 0.001$ ). Across all landowners, posting signs (22%) and erecting barriers (21%) were the most frequent. Few respondents reported that they charged fees (0.3%) or had riders sign liability waivers (0.6%). Redirecting riders to authorized routes (16%) and reporting illegal activities (14%) were the two most commonly cited actions that landowners were considering taking in the future. Among landowners who took action, the average amount of time over the previous 3 years for planning, maintenance, and repairs was about 4.5 days. The average amount of money spent over the same period was less than \$100.

**Discussion**

Our results indicate that rider behavior strongly influences landowner attitudes toward access. Only about 3% of landowners reported allowing public access, but willingness to allow fu-

**Table 3. Percentages of landowners “moderately concerned” or “very concerned” about negative impacts associated with off-highway vehicle (OHV) access on their property (n = 879).**

Negative impact	OHV		F test <sup>a</sup>	P value
	riders	Nonriders		
	.....(%).....			
Litter	79.4	83.7	3.203	0.023
Hunting interference	77.7	69.8	3.346	0.019
Vandalism	76.3	85.2	3.646	0.012
Soil erosion	75.4	85.2	10.148	0.000
Liability concern	74.4	80.4	2.090	0.100
Wetland damage	74.2	80.4	3.742	0.011
Wildlife disturbance	72.8	82.9	10.117	0.000
Vegetation damage	67.4	82.6	12.517	0.000
Driveway damage	64.5	76.7	5.182	0.002
Noise	63.7	80.3	17.506	0.000
Building damage	62.8	71.0	2.184	0.089
Interfere with nonmotorized recreation	60.4	75.1	10.840	0.000
Timber damage	57.3	74.1	9.360	0.000
Spread of invasives	56.0	69.4	5.574	0.001
Threat to personal safety	54.8	62.3	2.083	0.101
Road damage	54.5	68.7	5.445	0.001
Crop damage	51.3	60.1	3.699	0.012
OHV riding interference	47.1	33.7	20.879	0.000

<sup>a</sup> One-way analysis of variance



ture access increased if riders asked for permission, noise levels were low, or riders were older than 25 years of age. Landowners allowed greater access for family and friends than for the public, but family access also increased if similar rider behaviors were instituted. These findings suggest that access could be increased if constraints are placed on riders in terms of their age, speed of riding, and location of riding. Collectively, this could increase the amount of land available for OHV riding, alleviating pressure on public lands.

We also hypothesized that willingness to allow access would differ by type of landowner and whether respondents rode OHVs. This was confirmed in that willingness to allow access to friends and family was significantly greater among timberland owners than seasonal recreation landowners. Timberland owners had, on average, larger parcel sizes with more area available for riding. The implication is that with continued trends in forest parcelization in Minnesota and the decreasing size of properties (Mundell et al. 2007), OHV riders may find it increasingly difficult to find places to recreate. Therefore, targeting specific landowners who are willing to provide access under certain circumstances could be increasingly important to maintaining riding opportunities.

Differences in willingness to allow access were also connected to how landowners use and manage their property. Previous research indicates that public access decreases as landowners increase their personal use of their property (Wright and Fesenmaier 1988). Timberland owners were found here to use their property more for hunting than seasonal recreation landowners and were significantly more concerned about hunting interference. Those who rode OHVs were similarly more likely to engage in hunting than nonriders, but they were more likely to allow public access. This suggests that access decisions are more complex than frequency of use. Types of recreation activity, compatibility with management objectives (e.g., timber management, wildlife habitat), and who is accessing the property were key determinants.

Perceived negative effects were also found to be important. However, it was notable that many landowners had not personally experienced such effects on their own property. Although they were broadly concerned about issues such as soil erosion and wetlands, effects were more likely to have been experienced by friends and neighbors or observed on public lands. This is consistent with previous research in hunting (Siemer and Brown 1993) that illustrates that the perception of damage, regardless of the type or personal experience, can be a deterrent to access. As such, it represents an area in which OHV clubs and organizations have a possible role to play in educating members and the public about the need for responsible riding, as well as working with landowners to improve perceptions of and receptiveness toward OHVs.

This research identified a number of factors affecting landowners' willingness to allow OHV access. However, developing predictive models to estimate the likelihood of public access, which would help in creating landowner profiles, was not possible because of the small number of respondents willing to consider public access. Additional research is therefore needed to more clearly identify the situations in which access might be acceptable and the characteristics of willing landowners. This might include research on fee-based recreation opportunities or leasing of private lands much in the same way it has worked for hunting access. This would include determining levels of compensation and program characteristics that would be attractive to landowners. Also, the degree to which these findings reflect per-

ceptions and behaviors outside the sample region is unknown. Additional research is needed that examines these issues for a broad cross-section of landowners. Finally, reported willingness to provide access does not necessarily equate to increased access; landowner behaviors are influenced by a complex array of factors, of which behavioral intent is just one (Ajzen 1991).

## Conclusion

Increased access to private lands for OHV riding may offer one means of addressing growing demand, particularly where there is a high degree of private landownership. However, there is a dearth of information about landowner perceptions and OHV management on which to make these decisions. The implication of this research is that it provides a rare insight into how riding behaviors influence landowners' willingness to allow access. Improving our understanding may help address potential conflict between riders and private landowners. It might also help to maximize the benefits for affected groups and identify actions to minimize or thwart environmental and property damage.

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