

Protecting park resources using interpretation

JAMES H. GRAMANN

Park staff use two general approaches to protect natural and cultural resources from purposeful or unwitting damage by visitors. Under a "direct approach," a park's staff manages visitor behavior overtly through surveillance, by enforcing regulations, and by physically channeling visitors away from sensitive areas. "Indirect approaches" use information and interpretation to promote voluntary conformance with rules. This article reviews the theoretical basis for indirect management, presents research evaluating its effectiveness, and discusses gaps in current social science knowledge related to indirect management as a resource-protection tool.

Theoretical basis

Several experiments have tested the effectiveness of interpretation and information in reducing rule violations and damaging behavior in outdoor settings. The results of many of these are consistent with predictions of prosocial behavior theory (Gramann et al. 1995). "Prosocial behavior" is defined as voluntary behavior done to help others, without the incentive of material rewards for helping or the threat of probable punishment for not helping. In many cases, obeying protective rules in parks is prosocial behavior. This is because no tangible reward for rule obedience exists, and the likelihood of being caught and punished for disobedience is often small.

Two propositions form the core of prosocial behavior theory (Schwartz 1977). First, other things being equal, prosocial actions should be more likely when people are *aware of the consequences* of their helping (or not helping) for others or for the environment. Second, persons should be more likely to behave prosocially when they *feel personally responsible and qualified to help*. The first of these conditions is called "awareness of consequences" and the second "ascription of responsibility."

Applying prosocial behavior theory to resource protection requires an understanding of the reasons for damaging actions. Gramann and Vander Stoep (1987) described several motives for these actions and

Figure 1. An NPS interpreter greets hikers at the Shiloh National Military Park trailhead to deliver one of three test messages designed to reduce damaging behavior during hikes.



how they could be addressed using interpretation and education within the framework of prosocial behavior theory.

One reason visitors violate protective rules is that they are unaware that certain regulations exist. Obviously, interpretation and information—if it reaches the relevant audience—can play a major role in making people more aware of protective regulations in parks.

However, sometimes visitors violate rules, even if they are aware of them. One reason for this is that they may not realize the negative consequences of their actions for other users or for the environment. Many impacts on resources are cumulative, becoming evident only after many damaging actions occur over long periods. Because visitors' time in parks is short, people may not connect their behavior with damaging effects. However, they might refrain from harmful actions if this cause-effect relationship were explained in an "awareness-of-consequences" message. Interpretation is one way to make people aware of the consequences of their behavior for a park's resources.

Sometimes, visitors are aware of a rule and its reasons, but obeying it in a particular circumstance may seem unreasonable or even impossible. This leads to "responsibility-denial," a situation in which people deny having a reasonable obligation or the skills to comply with rules. For example, prohibitions against dumping waste from recreational vehicles may be ignored if sanitary dump stations are full or if the fee for use seems excessive. Responsibility-denial can be countered by publicizing reasonable alternatives to prohibited actions or by making people feel qualified to help in certain situations. The latter dynamic underlies many adopt-a-site programs, including

litter cleanup campaigns and archeological site-protection efforts. In a prosocial-behavior framework, these programs increase people's ascription of responsibility to protect natural and cultural resources.

Of course, people sometimes damage resources willfully and vindictively. Although such malicious behavior may be relatively uncommon in many parks, a single instance can produce significant and costly damage. Willful violators are fully aware that their actions are wrong, but they persist because they are pursuing goals that are in fundamental conflict with resource protection. Willful vandalism almost always requires direct and forced compliance with regulations. However, research shows that providing interpretation and information about rules, and enlisting visitors in resource protection, can be very effective as indirect approaches to changing many other types of harmful behaviors.

Research

The effectiveness of interpretation and education in resource protection was demonstrated in several experiments conducted in national parks and other recreation areas during the 1980s and early 1990s (Gramann et al. 1995). Unfortunately, little research evaluating indirect management has been done since, leaving key questions unanswered. These are discussed at the end of this article.

The following study describes an evaluation of interpretation's effectiveness in reducing cultural resource damage at Shiloh National Military Park (figure 1), a Civil War battlefield in Tennessee (Vander Stoep and Gramann 1987). Other demonstrations of indirect management's effectiveness have been done in national forests (Martin 1992,

Roggenbuck and Berrier 1982) and at reservoirs operated by the Army Corps of Engineers (Oliver et al. 1985). Therefore, the utility of indirect management as a resource protection tool seems to generalize across a variety of outdoor settings.

Cultural resources at Shiloh consist mainly of monuments, statues, and cannons. Although some resource damage in the park is caused by weathering and aging, visitors also contribute to the deterioration of cultural resources. At the time of the study, much of the destructive behavior was linked by NPS staff to organized youth groups who hiked through the park. Damaging behavior ranged from graffiti and defacement (a relatively rare problem) to more common actions, such as climbing or sitting on statues (figure 2). To combat the problem, three experimental treatments and a control condition were tested over 12 fall weekends. The behavior of hikers at four different locations in the park was monitored using time-lapse photography.

In treatment 1, the awareness-of-consequences (AC) treatment, hikers were met by a uniformed interpreter as they arrived at the trailhead that was the starting point for most of the hikes. They were welcomed to the park and told about specific behaviors, such as touching or rubbing bronze statuary and striking and climbing on monuments that caused damage over a period of time. They were asked to help protect the park's resources by setting an example for others, and then allowed to proceed. This treatment was in effect on three randomly assigned weekends and was intended to promote awareness of protective rules and the reasons for them.

Treatment 2 was the awareness-of-consequences plus resource protection treatment (AC + RP). Hikers received the same AC message as those in the first treatment, and were then asked to participate in a "Heritage Guardian" program. This involved returning a form on which hikers recorded any damage to cultural resources they observed during their visit (fresh scratches, breaks, marks, and missing pieces) and listed conditions they felt encouraged others to behave destructively. Groups were told they were distinctively qualified to help the National Park Service because they hiked in areas seldom reached by other visitors. Participation was voluntary, but no groups declined to take part. This treatment was designed to reduce responsibility-denial by promoting ascription of responsibility.

In Treatment 3, the AC + RP + I treatment, incentives were added to the first two messages. Two incentives were awarded for returning a completed Heritage Guardian form to the park. The first was a 24-inch streamer similar to those scouts attach to troop banners. The streamer was blue, printed in gold, and marked with the words "Shiloh NMP Honor Award/Heritage Guardians." The second incentive was a certificate signed by the park superintendent. This treatment was also in effect on three randomly assigned weekends. Although not based on prosocial behavior theory, it was thought that incentives might be an effective external motivator for young people who had not yet developed internal codes of appropriate behavior.

Finally, on three other weekends, a control condition was in effect. Groups were welcomed to the park and then allowed to proceed on their hikes. This control served as a baseline against which the effectiveness of the other three treatments was measured.

The amount of damaging behavior on each weekend was scored by two judges who independently reviewed each roll of film. The judges were "blind" to the treatments, i.e., unaware of the experimental conditions in effect on any weekend. Scoring was done by analyzing the film frame-by-frame using a stop-action projector. For ease in identification on camera, all persons included in the treatments and control condition were given bright orange stickers to wear that read "I'm a 25th Anniversary Trail Hiker."



Figure 2. Hikers climb on a large headquarters monument at Shiloh. Besides damaging the monument, this behavior exposes youth to risk of injury if they fall or are pushed.

Results

All treatments significantly reduced damaging actions when compared to the control condition (figure 3, following page). This was especially true for climbing and hitting, the most harmful activity. Table 1 shows that the three treatments were equally effective in this case, reducing hitting and climbing by about 88% compared to the baseline condition. The treatments were least effective in reducing touching or rubbing of monuments. This may have been because the Heritage Guardian program required hikers to examine monuments to identify scratches and other damage. This would appear as touching and rubbing on film.

Statistical analysis showed that the treatments did not differ significantly from each other in their effectiveness in reducing the most damaging behaviors. The simplest and least costly measure—a simple awareness-of-consequences message—was as effective as the Heritage Guardian program and the incentives.

Table 1.
Percent change in damaging behavior vs. control (combined sites)

Behavior	Experimental Treatment		
	AC	AC+RP	AC+RP+I
All behaviors	-77.7*	-73.6*	-58.7*
Sitting on base	-70.8*	-78.2*	-52.2
Touching	-65.4*	-24.4	+4.6
Climbing, hitting	-87.9*	-87.6*	-87.1*

*difference from control condition significant at $p = 0.05$

See "Interpretation" on page 36

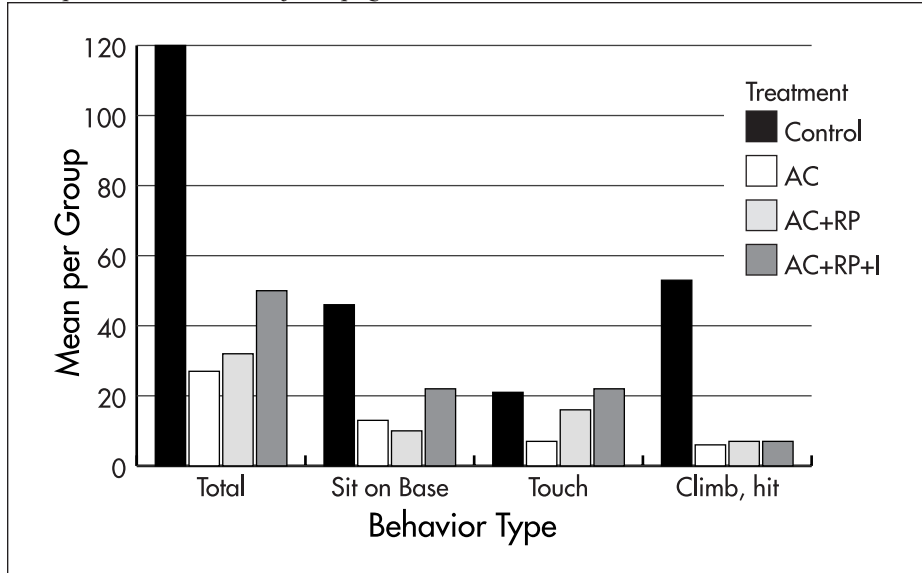


Figure 3. Change in damaging behavior by treatment (combined sites).

Applications to other situations

In other experimental research utilizing control groups, interpretation (either in verbal or printed form) has been used to significantly reduce littering in a highly developed Corps of Engineers campground (Oliver et al. 1984), camping at overused national forest wilderness sites (Roggenbuck and Berrier 1982), wildlife feeding at Crater Lake National Park (Schwarzkopf 1984), off-trail hiking at Mount Rainier National Park (Johnson and Swearingen 1992), and pumice removal at Mount St. Helens National Volcanic Monument (Martin 1992). In none of these circumstances was the targeted behavior completely eliminated; however, the situation was dramatically improved compared to baseline conditions in which no actions were taken.

The Shiloh messages did not threaten punishment for rule violations, but other field experiments support the effectiveness of these types of "sanction" messages. This is especially true if visitors feel punishment for violations is serious and likely (Gramann et al. 1995, Johnson and Swearingen 1992). Unfortunately, this condition is often hard to satisfy in many areas of the national park system.

An interesting question raised by indirect management research in rural parks is how well such techniques would work in urban areas. At more remote parks, many visitors seem predisposed toward resource protection. In communicating rules, interpreters are often working *with*, rather than *against*, visitors' basic values. But in urban parks, visitor populations are more diverse,

The simplest and least costly measure—a simple awareness-of-consequences message—was as effective as the Heritage Guardian program and the incentives.

The messages at Shiloh were delivered verbally by a uniformed interpreter with excellent social skills. This probably contributed to their effectiveness. Even so, other studies suggest that written messages in brochures and signs that state *and* explain rules can be effective in changing visitor behavior (Christensen et al. 1992). However, limited research indicates that written messages are not as effective as verbal messages in doing this (Gramann et al. 1992).

and many users may not share as strongly in the underlying value of resource protection. In these areas, a combination of indirect and direct management approaches would seem to be the most effective approach, but no research in urban park settings has been published on this topic. Nevertheless, despite these gaps in the knowledge base, in many situations common to the national park system, social science research shows that interpretation can be an effective resource-protection tool. **P₅**

Literature Cited

- Christensen, H. H., D. Johnson, and M. Brookes, editors. 1992. Vandalism: research, prevention, and social policy. General Technical Report PNW-GTR-293. USDA Forest Service, Portland, Oregon.
- Gramann, J. H., R. Bonifield, and Y. Kim. 1995. Effect of personality and situational factors on intentions to obey rules in outdoor recreation areas. *Journal of Leisure Research* 27:326-43.
- Gramann, J. H., H. Christensen, and G. Vander Stoep. 1992. Indirect management to protect cultural and natural resources: research, ethics, and social policy. Pages 251-64 in H. Christensen, D. Johnson, and M. Brookes, editors. Vandalism: research, prevention, and social policy. General Technical Report PNW-GTR-293. USDA Forest Service, Portland, Oregon.
- Gramann, J. H. and G. Vander Stoep. 1987. Prosocial behavior theory and natural resource protection: a conceptual synthesis. *Journal of Environmental Management* 24:247-57.
- Johnson, D. R. and T. Swearingen. 1992. The effectiveness of selected trailside sign texts in deterring off-trail hiking at Paradise Meadows, Mount Rainier National Park. Pages 103-119 in H. Christensen, D. Johnson, and M. Brookes, editors. Vandalism: research, prevention, and social policy. General Technical Report PNW-GTR-293. USDA Forest Service, Portland, Oregon.
- Martin, D. S. 1992. The effect of three signs and a brochure on visitors' removal of pumice at Mount St. Helens. Pages 121-31 in H. Christensen, D. Johnson, and M. Brookes, editors. Vandalism: research, prevention, and social policy. General Technical Report PNW-GTR-293. USDA Forest Service, Portland, Oregon.
- Oliver, S. S., J. Roggenbuck, and A. Watson. 1985. Education to reduce impacts in forest campgrounds. *Journal of Forestry* 83:234-36.
- Roggenbuck, J. W., and D. Berrier. 1982. A comparison of the effectiveness of two communication strategies in dispersing wilderness campers. *Journal of Leisure Research* 14:77-89.
- Schwartz, S. H. 1977. Normative influences on altruism. In L. Berkowitz, editor. *Advances in Experimental Social Psychology* 10:221-79.
- Schwarzkopf, S. K. 1984. Feeding of golden-mantled ground squirrels by park visitors at Crater Lake National Park. Research Paper, CPSU/OSU 84-89. NPS Cooperative Park Studies Unit, Oregon State University, Corvallis, Oregon.
- Vander Stoep, G. A., and J. Gramann. 1987. The effect of verbal appeals and incentives on depreciative behavior among youthful park visitors. *Journal of Leisure Research* 19:69-83.

James Gramann is a professor at Texas A&M University. He teaches and does research on the social dimensions of protected-area management. He can be reached at the Department of Recreation, Park and Tourism Sciences, Texas A&M University, College Station, TX 7 7843-2261; 409-845-4920; Fax 409-845-0446; e-mail: jgramann@rpts.tamu.edu.