A SURVEY OF PARK MANAGERS' PERCEPTIONS OF NONCOMPLIANT VISITOR BEHAVIOR CAUSING RESOURCE DAMAGE IN THE NATIONAL PARK SYSTEM

DARRYLL R. JOHNSON, MARK E. VANDE KAMP, THOMAS C. SWEARINGEN

Technical Report NPS/PNRUW/NRTR-92/07

The National Park Service Cooperative Park Studies Unit (CPSU) at the University of Washington (UW) was established in 1970. The Unit is located in the College of Forest Resources. The purposes of the Unit are: (1) to conduct original research on topics of importance to the management of natural and cultural resources; (2) to encourage and facilitate scientific research in national parks of the Pacific Northwest Region; and (3) to disseminate research results within the management system of the National Park Service.

The National Park Service disseminates results of biological, physical, or social science research through the Natural Resources Technical Report Series. Natural resources inventories and monitoring activities, scientific literature reviews, bibliographies, and proceedings of technical workshops or conferences are also disseminated through this series. Documents in this series usually contain information of a preliminary nature and are prepared primarily for internal use within the National Park Service. This information is not intended for use in open literature.

Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Copies are available from the following:

Denver Service Center (303) 969-2130
Technical Information Center
P.O. Box 25287
Denver, Colorado 80225-0287

A SURVEY OF PARK MANAGERS' PERCEPTIONS OF NONCOMPLIANT VISITOR BEHAVIOR CAUSING RESOURCE DAMAGE IN THE NATIONAL PARK SYSTEM

DARRYLL R. JOHNSON, MARK E. VANDE KAMP, THOMAS C. SWEARINGEN

Technical Report NPS/PNRUW/NRTR-92/07

COOPERATIVE PARK STUDIES UNIT
COLLEGE OF FOREST RESOURCES, AR-10
UNIVERSITY OF WASHINGTON
SEATTLE, WA 98195

August 1994

Subagreement No. 14 to Cooperative Agreement No. CA-9000-8-0007
Deterrence of Noncompliant Visitor Behavior Causing Natural Resource Damage
in the National Park Service

University of Washington and NPS Pacific Northwest Region

This research was supported by the Office of the Associate Director of Natural Resource Management of the National Park Service with the Natural Resource Preservation Program (NRPP) Special Initiative funding.

A Survey of Park Managers' Perceptions of Noncompliant Visitor Behavior Causing Resource Damage in the National Park System

Table of Contents

A Survey of Park Managers' Perceptions of Noncompliant Visitor Behavior Causing Resource Damage in the National Park System

Figures

Figures continued

A Survey of Park Managers' Perceptions of Noncompliant Visitor Behavior Causing Resource Damage in the National Park System

Tables

Tables continued

ACKNOWLEDGMENTS

The following Cooperative Park Studies Unit employees contributed substantially to the success of this project: Stephen Nowers, Natalie Novick, Connie McDermott, and Stephanie Schulz. The final editing and lay-out was done by June Rugh, Stephanie Schulz, and Jane Swanson.

I. INTRODUCTION AND RESEARCH OBJECTIVES

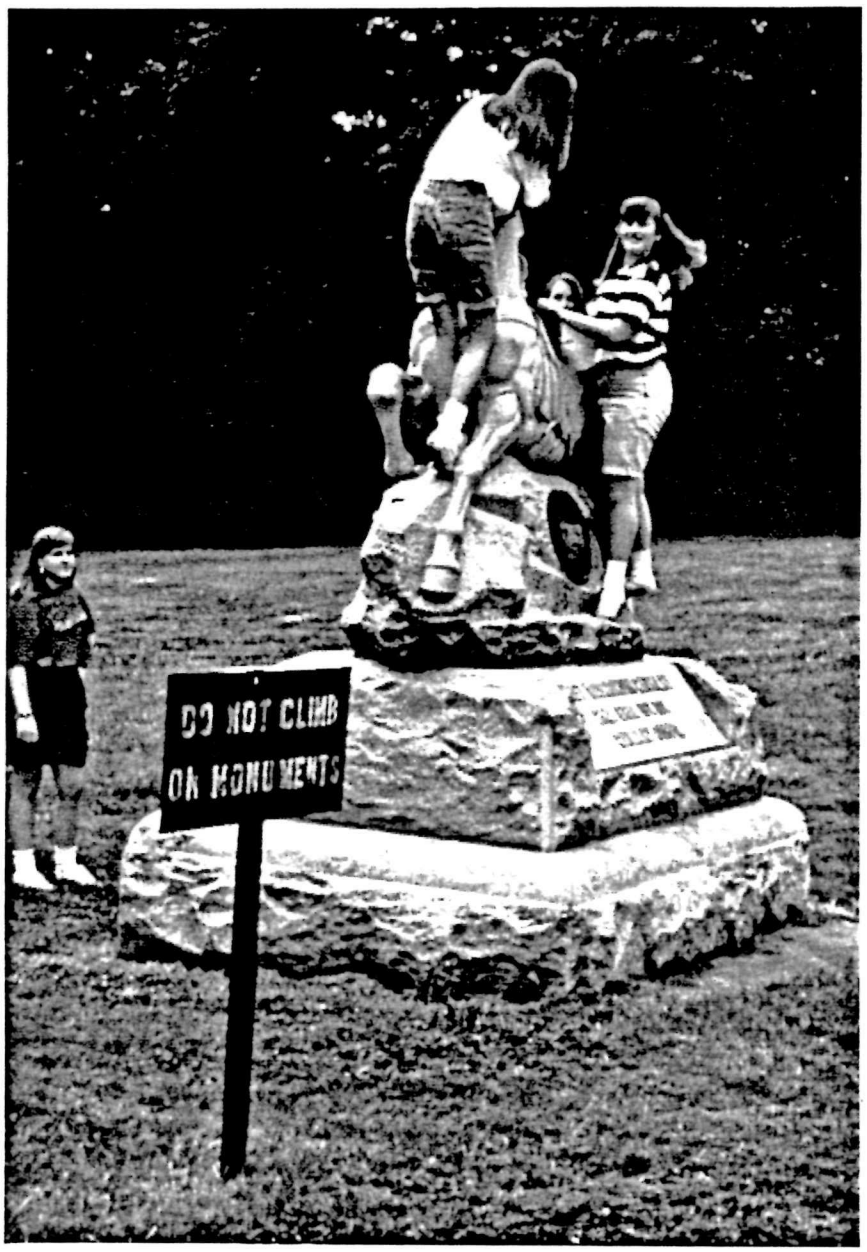
During the past two decades, the growth rate of national park use in the United States has exceeded the national population growth rate, reaching approximately 273 million recreational visits in 1993. As host to millions of people, the National Park Service (NPS) encourages visitors to enjoy park resources. Although providing for visitor enjoyment is clearly an integral part of the NPS mission, high rates of visitation can result in serious damage to park resources.

Considerable impact on national park resources occurs when visitors fail to comply with agency behavioral guidelines designed to minimize impacts on park resources. These acts of noncompliant visitor behavior consist of minor rule violations such as off-trail hiking, collecting natural or cultural objects for souvenirs, feeding wild animals, inappropriate disposal of human waste, and littering. The aggregate effect of these behaviors has significant impact on natural resources. However, for many park visitors, the perceptual link between individual acts and serious, observable damage is tenuous. To the typical day hiker, for example, the impact of a few minutes' off-trail hiking may appear negligible--even in a highly sensitive area. Appendix A develops a more detailed definition of the concept of noncompliant behavior and outlines an applied research approach to study noncompliant behavior in the National Parks.

The magnitude of visitor impacts on the natural and cultural resources of the NPS has not been documented; moreover, little is known about managerial attitudes concerning the appropriateness and effectiveness of different strategies to control resource-damaging visitor behavior. This research is an initial attempt to collect information about the magnitude of resource damage caused by visitor noncompliant behavior and about current managerial practices to prevent such impacts in national parks.

The primary objectives of this survey were:

1) To identify the magnitude and type of natural and cultural resource impacts due to visitor noncompliant behavior throughout the national park system.
2) To describe the types of visitor noncompliant behavior that are damaging national park areas.
3) To describe NPS strategies used to deter noncompliant visitor behavior.
4) To ascertain the perceived effectiveness of attempts to control noncompliant visitor behavior in the NPS.
5) To identify strategies judged appropriate to control noncompliant visitor behavior and, conversely, those control strategies that are believed to be inappropriate by NPS managers.


DO NOT CLIMB
ON MONUMENTS

II. SURVEY RESEARCH DESIGN

Questionnaire Design

A mail survey was selected to gather the information associated with this research. In the process of developing the mail questionnaire, interviews of key resource management personnel were conducted in two major western national parks. The purposes of these interviews were to ensure that data collected during the research had managerial relevance, to solicit suggestions for the type of information to gather, and to gain an understanding of information previously collected. Several resource managers were asked to review a preliminary outline of the mail questionnaire. After several revisions and additional in-house reviews, a final version of the questionnaire was completed (Appendix A).

Questionnaire Administration

Given that the goal of the research was to gather information which would permit an estimate of the overall extent of damage to the national park system, a census of administrative units was taken. All NPS field units administered by a superintendent were included (such units are hereafter referred to as "administrative units"). Each NPS superintendent was contacted by telephone for introduction to the survey and was asked to recommend an individual from their unit most qualified to complete the questionnaire; the questionnaire was to be mailed directly to this individual. Some superintendents asked that the questionnaire be initially sent to them; after examining it themselves, they agreed to pass it on to an appropriate staff person. The questionnaires were mailed to all units during March 1992. Each questionnaire package included an introductory letter explaining the nature of the study and informing the respondents that their superintendent had indicated them as qualified participants in the study. A glossary was included with each questionnaire defining key concepts and terms (Appendix B).

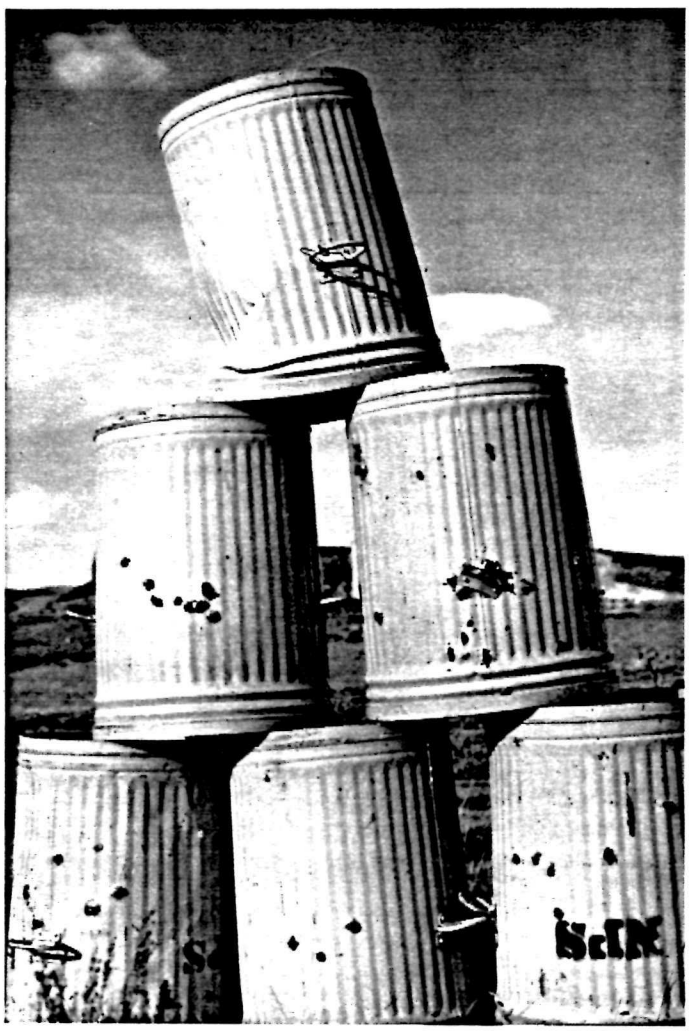
In order to prompt responses, a thank you/reminder letter was sent to all respondents approximately three weeks after the initial mailing. Subsequently, second reminder letters and replacement questionnaires were mailed to remaining nonrespondents. Finally, most individuals who had not responded after nine weeks were contacted by telephone. The data in this report reflect all responses received through August, 1992.

Response Rate

A total of 261 questionnaires were mailed; one unit (Weir Farm) was dropped from the population because the unit was established in January 1992, only three months before the questionnaires were mailed. After all mail procedures were completed, questionnaires were received from 213 administrative units, a response rate of 82 %. Two responses were received after the cut-off date for acceptance. An 82 % response rate was somewhat below what was expected. However, the questionnaire was long and most field units do not have the data requested by the questionnaire readily available. In addition, a somewhat similar survey addressing backcountry resource damage had been administered to some parks only a few months earlier.

Everglades National Park reproduced the questionnaire and submitted three questionnaires representing three of four districts in the park. Similarly, Scott's Bluff National Monument and Agate Fossil Beds--administered as one unit--submitted two questionnaires. Finally, Fort Caroline National Memorial and Timucuan Ecological and Historic Preserve submitted two questionnaires, despite being one administrative unit, as defined by the study methodology. These questionnaires were entered separately in the database, resulting in a population total of 217. This construction of the database results in a slight bias in the computation of some average figures and gives a very small increased weight to responses from the above administrative units.

The figures reported herein understate the system- wide magnitude of resource damage caused by noncompliant behavior to the extent that actual damage may be present in the nonresponding units. Because there is no statistical means of estimating this bias, researchers are reporting these data as representative only of the responding units, and no statistical inferences are intended concerning the extent of system-wide damage. Data representing respondent attitudes concerning effective and appropriate methods to control visitor behavior have the same mathematical limitations as those described previously in this paragraph. However, a much stronger intuitive case can be made for accepting these later figures as reliable system-wide indicators.



Nonrespondents

The following is a list of all units which did not complete a questionnaire for inclusion in this report , which will assist readers in forming their own assessment of the extent to which the quantitative dollar estimates underestimate the magnitude of the damage to resources in the national park service. Several of these units are large, heavily used parks, where damage due to noncompliant visitor behavior is probably extensive.

Antietam National Battlefield
- Antietam National Cemetery
- Monocacy N.B.F.

Assateague Island
Bandelier N.M.
Big Bend N.P.
- Rio Grande Wild and Scenic River

Blue Ridge Parkway
Canyon De Chelly N.M.
Canyonlands N.P.
Cape Krusenstern Monument
- Kobuk Valley N.P.
- Noatak National Preserve

Carlsbad Caverns N.P.
Chesapeake and Ohio Canal N.H.P.
Colorado N.M.
Denali N.P.
Dinosaur N.M.
Fort Fredrica N.M.
Fort Scott N.H.S.
Fort Sumter N.M.
Frederick Law Olmsted N.H.S.
- Longfellow N.H.S.
- John Fitzgerald Kennedy N.H.S.

Great Sand Dunes N.M.
Great Smokey Mountains N.P.
Harpers Ferry N.P.
Home of F.D.R. N.H.S.
- Vanderbilt Mansion
- Eleanor Roosevelt N.H.S.

Independence N.H.P.
- Thaddeus Koscuiszko N.M.
- Edgar Allen Poe
- Gloria D.E.I. (old Swedes) Church N.H.S.

Klondike Gold Rush N.H.P.
Manassas N.B.P.
Mesa Verde N.P.
- Horenweep N.M.
- Yucca House N.M.

Natchez Trace Parkway
- Brices Crossroads
- Tupelo N.B.
- National Battlefield Site
- Natchez Trace N.S. Trail
- Natchez N.H.S.
- Meriweather Lewis Park

National Capital Region East
- Fort Washington Park
- Piscataway Park
- Sewell-Belmont House N.H.S.
- Frederick Douglas N.H.S.
- Oxen Hill Farm
- Keneworth Aquatic Gardens
- Anacoastia
- Capital Hill Park
- Fort Circle Park East

New River Gorge National River
Ninety Six N.H.S.
- Cowpens N.B.

Pictured Rocks National Lakeshore
Pipe Spring National Monument
Point Reyes National Seashore
Richmond N.B.P.
- Maggie L. Walker N.H.S.

Rock Creek Park
Sagamore Hill N.H.S.
Salinas Pueblo Missions N.M.
Springfield Armory N.H.S.
Statue of Liberty N.M.
Virgin Islands N.P.
Walnut Canyon N.M.
- Wupatki N.M.
- Sunset Crater N.M.

War in the Pacific N.H.P.
- American Memorial Park

Whiskeytown, Shasta-Trinity N.R.A.
Yosemite National Park
City of Rock National Reserve
- Hagerman Fossil Beds N.M.

Limitations of the Research

When interpreting the data, this survey has several limitations which should be kept in mind. First, in all surveys it is assumed that respondents give accurate and honest answers to the questions asked. In this case, there is little reason to believe that the survey participants purposely misrepresented the conditions of their respective parks. However, the extent to which respondents had accurate and complete knowledge of the extent of damage in the unit for which they were reporting, and also knowledge of the cost to repair or maintain resources in the face of recurring damage, is unknown. A review of the quality of responses suggests great differences among respondents in the effort extended in providing the data.

Because of the approximately 18% rate of nonresponse, the unknown level of damage at the nonresponding units, and the number of responding units that did not provide quantitative estimates of dollar damage to affected sites, it is not possible to make inferences about the extent of damage to the national park system with mathematically defined confidence intervals. Rational estimates based on intuition can be advanced, assuming the nonresponding units are similar to those that responded, but is important to understand that these estimates are not based on probability sampling. These limitations technically apply to all the survey data, but are probably less relevant to data representing respondents' attitudes and opinions. The responding population is large compared to the intended population, and attitudes and opinions in the nonresponding subpopulation would have to differ greatly from respondents to change the reported distribution of values describing attitude variables to a significant degree.

The respondent population is comprised of people selected by superintendents as most qualified to complete the questionnaire. Had a different method been used to select respondents, it is possible that different results would have been observed. Table 1 presents the demographic characteristics of the respondent population.

To gain some understanding of how the demographic mix of employees affected the survey results, a series of cross-tabulations and other statistical tests were run to test for statistical associations between demographic characteristics of the respondents and the primary variables of interest in the study. At the .05 level of significance, we observed the following effects:

1) interpreters were more apt than rangers to feel that messages implying positive and negative social categories for compliant and noncompliant visitors, respectively (i.e., messages manipulating social affiliation), were appropriate in a hypothetical park scenario;

2) respondents who had ten or more years of work experience at the unit for which they were reporting were more likely to feel that manipulating social affiliation was appropriate than were respondents with shorter tenure;

3) interpreters ranked indirect methods of controlling visitor behavior more favorably than did rangers[1];

4) females were more likely than males to oppose the use of direct enforcement;

5) also, females considered indirect means of controlling noncompliance more effective;

[1]Direct management actions are intended to act immediately on targeted behavior (e.g., to enforce a regulation). Indirect management actions are intended to affect target behavior, but by voluntary persuasion, such as through education.

6) social science graduates were more likely to oppose the use of direct enforcement than respondents with other types of degrees;

7) social science graduates in traditional fields ranked direct means of control more unfavorably than graduates from other academic areas;

8) respondents with degrees in recreation and natural resource-related social science were the group ranking direct means of visitor control most favorably.

Although statistically significant, these relationships are weak, suggesting that substantial changes in the demographic composition of the population would have to occur before very extensive change would be observed in variable values. The strongest relationships observed between attitudes and demographic characteristics were those involving sex and type of college degree [2].

---

[2]The demographic variables analyzed were sex, work assignment (i.e., ranger or interpreter), and type of college degree (i.e., natural science/not natural resource-related); social science/not social science-related); biological/resource-related; social/resource-related. Dependent variables in chi-square analyses included opposition to the use of direct enforcement (should be used/should not be used), and the appropriateness of each persuasive strategy (appropriate/inappropriate). Dependent variables in T-tests and analyses of variance were scores representing appropriateness, effectiveness, and favorability ranking of direct means of control, indirect means of control, and means of control involving site design. Direct means consisted of barriers, closure, direct enforcement, regulatory signs, and direct use quotas. Indirect means were brochures, cinema, exhibits, personal contact, interpretive signs, interpretive talks, newsletters or newspapers, and indirect use quotas. Controls involving site design consisted of improving the quality of existing trails or access routes, construction of visitor facilities, improved landscape or facility design, and rerouting of trails or improved roads.

Table 1. Demographic characteristics of survey respondents.

Sex	Frequency	Percent
Female	39	19
Male	170	81
Missing	8	

Field of study at highest education level	Frequency	Percent
Hard Science-- not resource related	29	15
Social Science	60	30
Social Science/Recreation-- resource related	40	20
Biology/Forestryresource related	57	29
Other area	10	5
Missing	20	

Assignment	N	Percent
Ranger division	64	30
Natural resource management division	17	8
Operations and maintenance	2	1
Interpretation	19	9
Administration	5	3
Ranger and natural resource management	17	8
Ranger and interpretation	13	6
Natural resource management and interpretation	14	7
Ranger, interpretation, and natural resource management	16	8
Other combinations	9	4
Unspecified multiple assignments	34	16
Missing	7	

Years at present unit	Frequency	Percent
0 to 2	60	29
3 to 5	78	37
6 to 9	22	11
10 or more	49	23
Missing	8	

Total years service	Frequency	Percent
0 to 10	53	25
11 to 20	95	45
21 to 30	59	28
More than 30	4	2
Missing	6	

III. SUMMARY OF SURVEY FINDINGS

The results of this system-wide survey demonstrate that visitor noncompliant behavior has caused extensive damage to resources in the national parks of the United States. This survey employed an extensive questionnaire mailed to all NPS administrative units. A response of 82% was achieved. The goals were to gather information regarding managers' perceptions of (1) the magnitude and type of natural and cultural resource impacts due to visitor noncompliant behavior throughout the national park system; (2) the types of visitor noncompliant behavior that damage national park areas; (3) NPS strategies used to deter noncompliant visitor behavior; (4) the perceived effectiveness of attempts to control noncompliant visitor behavior in NPS-managed areas; and (5) strategies judged appropriate by NPS managers to control noncompliant visitor behavior and, conversely, those control strategies deemed inappropriate.

Historical sites were most frequently reported as the most damaged type of site, followed by developed visitor sites, archaeological/paleontological sites, accessible natural attractions, campgrounds and picnic areas. Littering was ranked as the most damaging behavior, followed by damaging the built environment, damaging or defacing cultural or historical objects, collecting paleontological or cultural objects as souvenirs, and off-trail hiking.

Nonreparable resources were reported being destroyed at about two-thirds of the reporting units; 30% reported a seriously damaged site. The authors estimate that the total reparable damage to park resources exceeds 80 million dollars. The annual clean-up costs are estimated to be approximately 18 million dollars.

Unfortunately, the efforts among NPS staff to deter damaging noncompliant behavior are not derived from a widely acknowledged base of scientific information; nor is there agreement among managers on philosophically acceptable and effective means of deterrence. In response to a hypothetical scenario describing an example of off-trail hiking and resource damage, there was widespread disagreement among managers regarding the effectiveness of various deterrent techniques. For example, identical proportions of respondents believed "informal social contact" would be 20% and 80% effective. Approximately 8% of respondents believed threats of fines and citations constituted the best persuasive strategy to use in the above scenario; 41% thought this approach was philosophically inappropriate in a national park.

We conclude that noncompliant visitor behavior is a significant problem and that, lacking organization-wide intervention, this behavior will have increasing negative consequences on natural and cultural resources in the national park system. In some instances, the resources that NPS is charged to protect for human enjoyment are being damaged or destroyed by the rule-violating behavior of those who come to enjoy them. There is no institutionally distributed information base dealing indirectly with appropriate and effective means of deterring this behavior.

Although it is unlikely that all noncompliant behavior can be stopped by any deterrent regime, existing theory and empirical findings suggest that a well-coordinated program of research and information dissemination, coupled with the willingness of managers to act, has the capacity to considerably reduce the resulting damage. Therefore, we recommend that the NPS plan and fund a coordinated applied research effort to provide system-wide guidelines for the deterrence of resource damaging noncompliant behavior and an extension program to disseminate this information and promote its use.

Apart from preserving the cultural and natural heritage of the nation, the costs of this damage are so great that the cost-benefit return from this recommended program should be very favorable.

IV. THE MAGNITUDE OF THE PROBLEM

The negative consequences of noncompliant visitor behavior include damage to nonrenewable natural and cultural resources, public expenditures for specific repairs to park resources, and expenditures incurred annually to clean up and maintain park resources. Consequently, estimating the magnitude of resource damage throughout the park system due to visitor noncompliance requires a variety of approaches.

Respondents were asked to estimate the costs of repairing damage to each of several types of sites present in the units for which they were reporting which had sustained any degree of damage due to noncompliant visitor behavior. There were 16 different site type categories, 10 of which are found in the frontcountry and six in the backcountry (Appendix B). Definitions of each site type were provided in a glossary accompanying each questionnaire (Appendix C). Two general categories ("other") were included for responses not encompassed by the 16 listed site types.

Total Reported Dollar Damage

Of the 217 units in the database, 89% reported reparable damage caused by noncompliant visitor behavior at frontcountry sites[1]. The most frequently reported type of site damaged was the developed site, followed by frontcountry historic sites and frontcountry picnic areas (Table 2). Respondents indicated damages to historic sites totaling 21.6 million dollars in repair costs; for all frontcountry sites reported, the figure was approximately 44.4 million dollars. (Readers are reminded that these figures do not represent total damage to park resources caused by visitor use. Rather, they represent that subset of damage estimated to be caused by noncompliant visitor behavior at responding units.)

For backcountry sites, 25 respondents reported reparable damages to hiking and stock trails totaling about 3.2 million dollars and repair costs for all backcountry sites totaling about 9.1 million dollars. Of the 84 units which have backcountry, 67 (80%) reported reparable damage at some type of site. The total to repair all damage caused by visitor noncompliant behavior (frontcountry and backcountry) reported in the survey was approximately 53.6 million dollars.

In addition to listing costs of repairing damage to park resources, respondents were also asked to estimate annual costs of clean-up or maintenance due to visitor noncompliant behavior (Table 3). The total for all clean-up costs in frontcountry sites was 11.1 million dollars; for all backcountry sites, the total was approximately 1.7 million dollars. Thus, the total reported annual clean-up and maintenance costs reported were 12.8 million dollars.

Because 24% of the sites for which damage was reported included no estimate of repair costs (Table 3), the above estimates of costs to repair and clean up noncompliant visitor-caused damage to park resources must be seen as very conservative. The corresponding figure for annual clean-up costs was 25%. Therefore, in considering the possible extent of system-wide damage, readers should remember that approximately one-fourth of sites which received a questionnaire provided no cost estimates, and that approximately 18% of park units did not respond to the survey. This issue will be addressed later in the conclusion section of the report and estimates of system-wide damage will be presented.

---

[1] **Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.
Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

Table 2. Reparable damage at frontcountry and backcountry sites

FRONTCOUNTRY SITES[1]:	Number of units reporting damaged sites		Repair costs	
	With cost estimate	Without cost estimate	Average per site[2]	Total
Developed sites	127	14	$28,646	$3,638,051
Archeological/ paleontological sites[3]	35	11	$53,663	$1,878,190
Campgrounds	55	11	$69,400	$3,817,000
Commemorative sites	42	7	$38,400	$1,612,801
Historic sites	92	21	$235,336	$21,650,946
Natural attractions	70	25	$91,429	$6,400,000
Picnic areas	79	17	$18,784	$1,483,900
Rest areas/road-side attractions	16	6	$14,642	$234,275
Turnouts	57	15	$30,212	$1,722,100
Trailhead sites	55	10	$21,619	$1,189,050
Other frontcountry sites[4]	21	9	$38,554	$809,625
TOTAL	649	147	$68,468	$44,435,938
BACKCOUNTRY SITES[1]:				
Hiking/stock trails	25	4	$126,032	$3,150,800
Archeological/ paleontological sites	17	10	$93,159	$1,583,700
Camping sites	27	7	$87,615	$2,365,600
Historic sites	11	3	$25,091	$276,000
Scenic overlooks	9	1	$42,556	$383,000
Natural attractions	25	11	$48,308	$1,207,700
Other backcountry sites[5]	9	2	$16,667	$150,000
TOTAL	123	38	$74,120	$9,116,800
ALL SITES	772	185	$69,369	$53,552,738

[1] **Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.
Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

[2] Computed using only those sites for which costs were estimated.

[3] Figures exclude a $10,000,000 cost estimate reported by Kaloka-Honokohau National Historic Park. The repair figure for this unit referred primarily to damage done prior to the area's inclusion in the National Park system. Although significant, such damage is not comparable to the damage caused by visitor noncompliance that this survey was intended to inventory.

[4] Examples of "Other frontcountry sites" include roadsides, lake shores and wells.

[5] Examples of "Other backcountry sites" include glaciers, caves and rookery sites.

Table 3. Maintenance costs at frontcountry and backcountry sites.

FRONTCOUNTRY SITES[1]:	Number of units reporting damaged sites		Repair costs	
	With cost estimate	Without cost estimate	Average per site[2]	Total
Developed sites	126	15	$23,299	$2,935,711
Archeological/ paleontological sites	35	13	$10,123	$354,307
Campgrounds	57	9	$18,333	$1,045,000
Commemorative sites	40	9	$34,115	$1,364,600
Historic sites	87	26	$22,137	$1,925,900
Natural attractions	71	24	$10,750	$763,230
Picnic areas	80	16	$10,267	$821,350
Rest areas/road-side attractions	20	2	$6,171	$123,418
Turnouts	56	16	$15,296	$856,550
Trailhead sites	51	14	$9,233	$470,900
Other frontcountry sites[3]	20	10	$22,165	$443,300
TOTAL	643	154	$17,269	$11,104,266
BACKCOUNTRY SITES[1]:				
Hiking/stock trails	22	7	$20,686	$455,100
Archeological/ paleontological sites	18	9	$14,447	$260,050
Camping sites	30	4	$18,050	$541,500
Historic sites	10	4	$2,880	$28,800
Scenic overlooks	9	1	$13,500	$121,500
Natural attractions	25	11	$6,980	$174,510
Other backcountry sites[4]	9	2	$10,556	$95,000
TOTAL	123	38	$13,630	$1,676,460
ALL SITES	766	192	$16,685	$12,780,726

[1] **Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

[2] Computed using only those sites for which costs were estimated.

[3] Examples of "Other frontcountry sites" include roadsides, lake shores and wells.

[4] Examples of "Other backcountry sites" include glaciers, caves and rookery sites.

Nonrenewable Resource Damage

Although the preceding data are very important measures of the magnitude of resource impacts due to visitor noncompliant behavior, because of the NPS mandate of resource preservation, the extent to which noncompliant visitor behavior adversely impacts nonrenewable resources is of equal or greater relevance. Table 4a summarizes the number of units reporting the presence of various types of sites which have experienced damages to either renewable or nonrenewable resources; Table 4b breaks this category of damage down into reparable and nonreparable types. Of the 217 units, 68% reported damage to nonrenewable resources at one or more type of frontcountry site. Archaeological, paleontological, and historical sites are most frequently reported as having nonreparable damage. It is notable that virtually all types of sites across both frontcountry and backcountry are sustaining some degree of nonrenewable resource damage. Table 4c lists examples of respondents' comments regarding damage to nonrenewable resources in the national parks.

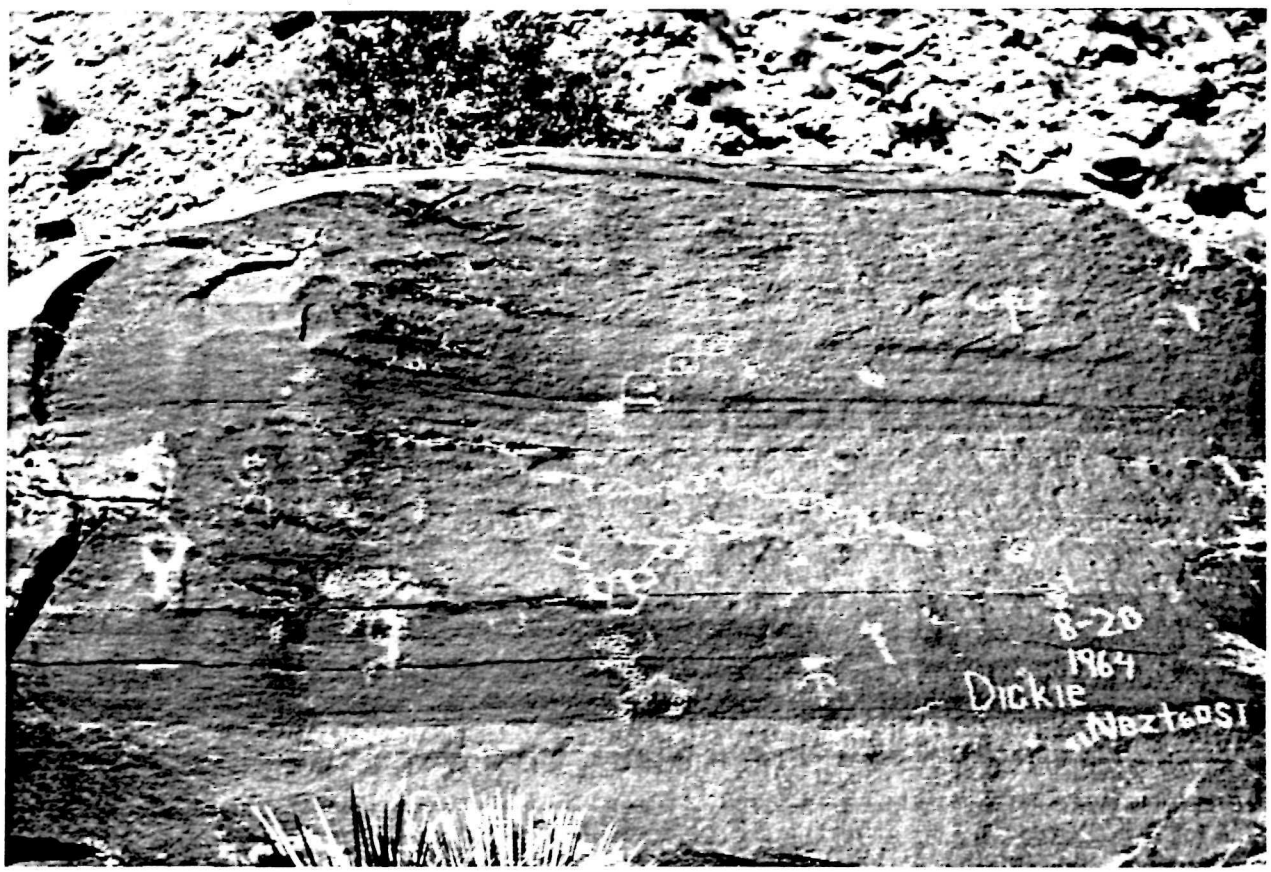


Table 4a. Site presence and site damage at all reporting National Park Service units.

FRONTCOUNTRY SITES[1]:	Site-type is present?			Site-type damaged by noncompliance?		
	Yes	No	Missing	Yes	No	Missing
Developed sites	182	34[5]	1	147	33	2
Archeological/ paleontological sites	155	62	0	92	61	2
Campgrounds	79	137	1	69	10	0
Commemorative	98	119	0	53	45	0
Historic sites	173	44	0	121	49	3
Natural attractions	133	83	1	102	29	2
Picnic areas	155	61	1	99	54	2
Rest areas/roadside attractions	40	175	2	22	17	1
Turnouts	98	117	2	72	26	0
Trailhead sites	123	92	2	66	53	4
Other frontcountry sites[2,3]	na	na	na	34	177	6
BACKCOUNTRY SITES[1]:						
Hiking/stock trails	47	31	6	33	14	0
Archeological/ paleontological sites	76	8	0	47	25	4
Camping sites	49	35	0	35	13	1
Historic sites	44	40	0	21	23	0
Scenic overlooks	36	48	0	10	26	0
Natural attractions	63	21	0	37	24	2
Other backcountry sites[2,4]	na	na	na	14	69	1

[1] **Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.
Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

[2] Other sites were only reported when they were damaged by noncompliance.

[3] Examples of "Other frontcountry sites" include roadsides, lake shores and wells.

[4] Examples of "Other backcountry sites" include glaciers, caves and rookery sites.

[5] Because of misinterpretation or failure to follow instructions some of these units incorrectly report that they have no developed visitor sites. Patterns of response suggest that such units reported damage to developed visitor sites in other sections of the questionnaire.

Table 4b. Prevalence of reparable and nonreparable damage at damaged sites at all reporting National Park Service units.

FRONTCOUNTRY SITES[1]:	Sites have reparable damage?			Sites have nonreparable damage?		
	Yes	No	Missing	Yes	No	Missing
Developed sites	141	6	0	61	85	1
Archeological/ paleontological sites	48	43	1	82	7	3
Campgrounds	66	2	1	28	40	1
Commemorative	49	4	0	22	27	4
Historic sites	113	7	1	81	35	5
Natural attractions	95	6	1	49	52	1
Picnic areas	96	3	0	20	76	3
Rest areas/ roadside attractions	22	0	0	1	21	0
Turnouts	72	0	0	21	50	1
Trailhead sites	65	0	1	10	55	1
Other frontcountry sites[2,3]	30	4	0	14	17	3
BACKCOUNTRY SITES[1]:						
Hiking/stock trails	29	4	0	18	14	1
Archeological/ paleontological sites	27	20	0	43	3	1
Camping sites	34	1	0	13	22	0
Historic sites	14	7	0	17	4	0
Scenic overlooks	10	0	0	4	6	0
Natural attractions	36	1	0	24	13	0
Other backcountry sites[2,4]	11	3	0	3	9	2

[1] **Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.
Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

[2] Other sites were only reported when they were damaged by noncompliance.

[3] Examples of "Other frontcountry sites" include roadsides, lake shores and wells.

[4] Examples of "Other backcountry sites" include glaciers, caves and rookery sites.

Table 4c. Examples of respondents' comments regarding damage to nonrenewable resources in the national parks.

Acadia N.P.
"They aren't making any cobblestones for the seawall any more."
"If falcons do not successfully nest--this is irreparable for the year, and they may not return the following year---a potentially nonrenewable resource."

Arches N. P.
"Damage to cryptobiotic crust and plants (crusts and plants are renewable, but so slow-growing that if destroyed or continually disturbed they may not return--or it may take decades)."

Big South Fork National River and R.A.
"Rock shelters are accessible to day hikers throughout the park. 'Pot hunters' have raped the rock shelters and years of history and pre-history have been lost."

Castillo De San Marcos N.M. and Fort Matanzas N.M.
"Also constant touching and rubbing of historic cannon wears away the carved/cast features, particularly when multiplied by 600,000 - 800,000 persons a year. Unlike, say, civil war cannons, these 200+ year-old Spanish cannons are extremely rare, not just in the United States, but in the entire world."

Chaco Culture N.H.P.
"Displacement of critical and endangered species whose populations in this area are probably too low for recovery. Examples: trogon (bird), jaguar (cat). "

Haleakala N.P.
"Early Hawaiian temples and burial sites are damaged from violators moving rocks and stones from structures. These areas are damaged not from the collecting of rocks but by disturbance of the sites; climbing, making *ahus* (cairns), walking on sites."

Hawaii Volcanoes N.P.
"Steam cracks are altered and associated biotic communities are potentially seriously affected."
"Indiscriminate human wasted disposal impacts microecosystems in water cracks, impacts archeological sites. Improperly tended fires have caused wildland fires in backcountry."

Jefferson National Expansion Memorial N.H.S.
"Noncompliant visitor behavior results in massive graffiti damage to the exterior surfaces of the Gateway Arch legs. Damage is basically confined to the lower ten feet of each leg and at this point in time nonrenewable, in that no known process exists to reproduce the finish that was placed on the exterior shin when it was originally built."

Lassen Volcanic N.P.
"Destruction of geothermal resource through throwing things into pools, damming outflow for bathing, and trampling."

Sitka N.H.P.
"Totem poles are nonrenewable resources in the sense that they are cultural objects and are unique. While new or reproduction poles can be carved, these are not the same."

Petrified Forest N.P.
"Paleontology (petrified wood) sites are the most damaged. Removal of wood is the specific problem. This occurs throughout the park."

Types of Sites Respondents Considered Most Damaged

Respondents were asked to identify the type of sites they considered the first, second and third most damaged at the NPS units for which they were reporting. Historical sites were the most commonly reported as most damaged, followed by developed visitor sites, archaeological/paleontological sites, accessible natural attractions, campgrounds, and picnic areas (Table 5).

Table 5. Site types listed as most damaged, second most damaged and third most damaged by noncompliant visitor behavior.

Site	Most damaged		Second most damaged	Third most damaged
	N	Rank	N	N
Frontcountry historic sites	49	1	19	14
Developed visitor sites	30	2	19	18
Frontcountry archaeological or paleontological sites	27	3	14	17
Natural attractions accessible to day hikers	23	4	23	9
Frontcountry campgrounds	14	5	19	10
Picnic areas	12	6	19	13
Other frontcountry sites	12	6	9	4
Roadside attractions/turnouts	10	8	11	9
Backcountry camping sites	7	9	6	0
Trailhead sites	4	10	6	6
Commemorative sites	4	10	11	7
Rest areas	3	12	2	2
Backcountry archaeological or paleontological sites	2	13	4	6
Hiking or stock trails	2	13	1	4
Backcountry historic sites	2	13	0	1
Backcountry natural attractions	1	16	5	6
Other backcountry sites	1	16	1	1
Backcountry scenic overlooks	0	18	1	0

Another way to approach the ranking of most damaged sites is to consider the extent to which types of sites were listed not only as most damaged, but listed as either most damaged, second most damaged or third most damaged. Table 6, Score 1, presents this ranking, which is scarcely different from the ranking produced by simply listing the perceptions of most damaged site reported in Table 5. Yet another way of thinking about rankings is to control for the prevalence of a given type of site by looking at how high the rankings were, given that a site appeared at the reporting unit. Table 6, Score 2, displays these data. In this instance, it is seen that the highest index of site damage was to "other" frontcountry sites, with frontcountry campgrounds having the second highest damage index.

Table 6. Sites most damaged by noncompliant behavior; composite scoring*

Site	Score 1*	Rank	Score 2*	Rank
Frontcountry historic sites	.89	1	1.12 (n=173)	3
Developed visitor sites	.67	2	.80 (n=182)	6
Frontcountry archeological or paleontological sites	.58	3	.81 (n=155)	5
Natural attractions accessible by road or day hiking trails	.57	4	.93 (n=133)	4
Frontcountry campgrounds	.42	5	1.14 (n=79)	2
Picnic areas	.40	6	.56 (n=155)	9
Roadside attractions/turnouts	.28	7	.62 (n=98)	8
Other frontcountry sites	.27	8	1.71 (n=34)	1
Commemorative sites	.19	9	.42 (n=98)	10
Backcountry camping sites	.15	10	.67 (n=49)	7

* Scoring: 3 points when most damaged, 2 points when second most damaged, 1 point when third most damaged. Score 1 = sum of all points divided by number of units responding (N=217). Score 2 = sum of all points divided by number of sites of that type that are present in the responding units (n varies by site type).

Extent to Which Damage Caused by Noncompliant Visitor Behavior is Considered a Problem

Respondents were asked to provide an assessment of the extent to which they perceived noncompliant visitor behavior damage to be a problem at each site type in the unit for which they were reporting. Tables 7a and 7b summarize these responses by site type for frontcountry and backcountry areas, respectively.

Table 7a. Perceptions of damage caused by noncompliance at **frontcountry sites.**

developed visitor sites

	All sites[1]		Sites damaged by noncompliance	
Value	N	percent	N	percent
It's not a problem	34	19	1	1
It's a slight problem	59	34	59	41
It's a moderate problem	62	35	62	43
It's a serious problem	22	12	22	15
Missing	5		3	
average response[2] = 2.4			average response[2] = 2.7	

archeological or paleontological sites

	All sites[1]		Sites damaged by noncompliance	
Value	N	percent	N	percent
It's not a problem	63	41	1	1
It's a slight problem	31	20	31	34
It's a moderate problem	43	28	43	47
It's a serious problem	16	11	16	18
Missing	2		1	
average response[2] = 2.1			average response[2] = 2.8	

campgrounds

	All sites[1]		Sites damaged by noncompliance	
Value	N	percent	N	percent
It's not a problem	10	13	0	0
It's a slight problem	23	30	23	34
It's a moderate problem	33	42	33	48
It's a serious problem	12	15	12	18
Missing	1		1	
average response[2] = 2.6			average response[2] = 2.8	

[1] Sites not damaged by noncompliance are included in the "It's not a problem" category.
[2] Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.

Table 7a continued.

commemorative sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	47	50	2	4
It's a slight problem	24	25	24	48
It's a moderate problem	18	19	18	36
It's a serious problem	6	6	6	12
Missing	3		3	
average response[2] = 1.8			average response[2] = 2.6	

historic sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	52	32	3	3
It's a slight problem	56	35	56	50
It's a moderate problem	40	25	40	35
It's a serious problem	14	8	14	12
Missing	11		8	
average response[2] = 2.1			average response[2] = 2.6	

accessible natural attractions

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	30	23	1	1
It's a slight problem	33	25	33	33
It's a moderate problem	48	37	48	47
It's a serious problem	19	15	19	19
Missing	3		1	
average response[2] = 2.4			average response[2] = 2.8	

[1] Sites not damaged by noncompliance are included in the "It's not a problem" category.
[2] Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.

Table 7a continued.

picnic areas

Value	All present sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	55	36	1	1
It's a slight problem	53	35	53	54
It's a moderate problem	37	24	37	38
It's a serious problem	7	5	7	7
Missing	3		1	
average response[2] = 2.0			average response[2] = 2.5	

rest areas

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	17	46	0	0
It's a slight problem	14	38	14	70
It's a moderate problem	6	16	6	30
It's a serious problem	0	0	0	0
Missing	3		2	
average response[2] = 1.7			average response[2] = 2.3	

roadside attractions/turnouts

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	26	27	0	0
It's a slight problem	30	32	30	43
It's a moderate problem	31	33	31	45
It's a serious problem	8	8	8	12
Missing	3		3	
average response[2] = 2.2			average response[2] = 2.7	

[1] Sites not damaged by noncompliance are included in the "It's not a problem" category.
[2] Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.

Table 7a continued.

trailhead sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	54	47	1	2
It's a slight problem	35	30	35	55
It's a moderate problem	22	19	22	35
It's a serious problem	5	4	5	8
Missing	7		3	
average response[2] = 1.8			average response[2] = 2.5	

other frontcountry sites[3]

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	na	na	0	0
It's a slight problem	na	na	13	38
It's a moderate problem	na	na	13	38
It's a serious problem	na	na	8	24
Missing	na		0	
average response[2] = na			average response[2] = 2.9	

1 Sites not damaged by noncompliance are included in the "It's not a problem" category.
2 Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.
3 Other frontcountry sites include roadsides, lake shores and wells.

Table 7b. Perceptions of damage caused by noncompliance at **backcountry sites.**

hiking or stock trails

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	14	30	0	0
It's a slight problem	10	21	10	30
It's a moderate problem	15	32	15	46
It's a serious problem	8	17	8	24
Missing	0		0	
average response[2] = 2.4			average response[2] = 2.9	

archeological or paleontological sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	27	38	2	4
It's a slight problem	15	21	15	33
It's a moderate problem	20	28	20	43
It's a serious problem	9	13	9	20
Missing	5		1	
average response[2] = 2.2			average response[2] = 2.8	

camping sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	13	28	0	0
It's a slight problem	6	13	6	18
It's a moderate problem	19	41	19	58
It's a serious problem	8	18	8	24
Missing	3		2	
average response[2] = 2.5			average response[2] = 3.1	

[1] Sites not damaged by noncompliance are included in the "It's not a problem" category.
[2] Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.

Table 7b continued.

historic sites

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	25	58	2	10
It's a slight problem	9	21	9	45
It's a moderate problem	8	19	8	40
It's a serious problem	1	2	1	5
Missing	1		1	
average response[2] = 1.7			average response[2] = 2.4	

scenic overlooks

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	26	72	0	0
It's a slight problem	4	11	4	40
It's a moderate problem	4	11	4	40
It's a serious problem	2	6	2	20
Missing	0		0	
average response[2] = 1.5			average response[2] = 2.8	

natural attractions

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	25	42	1	3
It's a slight problem	13	22	13	37
It's a moderate problem	16	27	16	46
It's a serious problem	5	9	5	14
Missing	4		2	
average response[2] = 2.0			average response[2] = 2.7	

other backcountry sites[3]

Value	All sites[1]		Sites damaged by noncompliance	
	N	percent	N	percent
It's not a problem	na	na	0	0
It's a slight problem	na	na	4	33
It's a moderate problem	na	na	4	33
It's a serious problem	na	na	4	34
Missing	na		2	
average response[2] = na			average response[2] = 3.0	

[1] Sites not damaged by noncompliance are included in the "It's not a problem" category.

[2] Responses coded from "It's not a problem" = 1 to "It's a serious problem" = 4.

[3] Other backcountry sites include glaciers, caves and rookery sites.

Across all frontcountry and backcountry sites, 29% (n=64) of all responding units reported at least one "seriously" damaged site; 65% (n=142) reported at least one site as "moderately damaged." Of the respondents who said the unit for which they were reporting had developed visitor sites, about 47% (n=84) reported moderate or serious damage to these facilities from noncompliant visitor behavior; the corresponding figures for frontcountry archaeological and paleontological sites were 39% (n= 59). Respondents clearly perceived widespread and significant damage to natural and cultural resources throughout the National Park System.

V. TYPES OF VISITOR BEHAVIOR DAMAGING TO PARK RESOURCES

The questionnaire asked respondents to identify those noncompliant visitor behaviors which they considered to be the most destructive at each type of site for which any degree of resource damage was reported. Scores were computed by assigning the most damaging behavior at each site four points, the second most damaging behavior three points, the third most damaging behavior two points and the fourth most damaging behavior one point. Tables 8a and 8b report these perceptions for all frontcountry and backcountry site types. Table 8c displays these data summed across all frontcountry sites, all backcountry sites, and finally, all sites. For all sites, littering is the highest ranked damaging behavior, followed by damaging the built environment, damaging or defacing cultural or historical objects, collecting paleontological or cultural objects as souvenirs, and off-trail hiking. The highest ranking behaviors at frontcountry sites are nearly identical, except off-trail hiking was ranked above souvenir collecting. For backcountry sites, the highest-ranked damaging behavior is collecting paleontological or cultural objects, followed very closely by littering and off-trail hiking. See Appendix B for a definition of each of the behavior types.

Table 8a. Noncompliant behaviors considered most damaging to **frontcountry sites**[1].

developed visitor sites

Behavior	Score*	Rank
Littering	287	1
Damaging or defacing the built environment	235	2
Damaging or defacing cultural or historical objects	126	3
Off-trail hiking	110	4
Damaging or defacing natural objects	96	5

archeological of paleontological sites

Behavior	Score*	Rank
Collecting paleontological or cultural objects as souvenirs	267	1
Damaging or defacing cultural or historical objects	145	2
Off-trail hiking	74	3
Littering	41	4
Collecting natural objects as souvenirs	23	5
Inappropriate off-road driving	23	5

campgrounds

Behavior	Score*	Rank
Damaging or defacing the built environment	114	1
Inappropriate campfires and firewood collection	102	2
Inappropriate camping behavior	83	3
Littering	76	4
Damaging or defacing natural objects	64	5

1 Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site.

Table 8a. Noncompliant behaviors considered most damaging to **frontcountry sites**[1] (continued).

commemorative sites

Behavior	Score*	Rank
Damaging or defacing cultural or historical or historical objects	146	1
Littering	76	2
Damaging or defacing the built environment	46	3
Collecting paleontological or cultural objects as souvenirs	28	4
Off-trail hiking	26	5

historic sites

Behavior	Score*	Rank
Damaging or defacing cultural or historical objects	327	1
Littering	172	2
Collecting paleontological or cultural objects as souvenirs	134	3
Damaging or defacing the built environment	61	4
Off-trail hiking	34	5

natural attractions accessible by road or day hiking trails

Behavior	Score*	Rank
Littering	166	1
Damaging or defacing natural objects	161	2
Off-trail hiking	147	3
Collecting natural objects as souvenirs	83	4
Inappropriate off-road driving	47	5

picnic areas

Behavior	Score*	Rank
Damaging or defacing the built environment	226	1
Littering	226	1
Inappropriate campfires and firewood collection	66	3
Damaging or defacing natural objects	57	4
Minor violations involving wildlife	29	5

rest areas

Behavior	Score*	Rank
Littering	46	1
Damaging or defacing the built environment	43	2
Vandalism/graffiti to unspecified resources	14	3
Inappropriate human waste disposal	7	4
Inappropriate campfires and firewood collection	5	5

1 Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site.

Table 8a. Noncompliant behaviors considered most damaging to **frontcountry sites**[1] (continued).

roadside attractions/ turnouts

Behavior	Score*	Rank
Damaging or defacing the built environment	168	1
Littering	157	2
Damaging or defacing natural objects	38	3
Inappropriate off-road driving	33	4
Off-trail hiking	29	5

trailhead sites

Behavior	Score*	Rank
Littering	135	1
Damaging or defacing the built environment	131	2
Off-trail hiking	58	3
Inappropriate off-road driving	41	4
Inappropriate human waste disposal	27	5

other frontcountry sites

Behavior	Score*	Rank
Littering	48	1
Damaging or defacing the built environment	33	2
Off-trail hiking	22	3
Inappropriate off-road driving	21	4
Damaging or defacing cultural or historical objects	19	5

1 Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site.

Table 8b. Noncompliant behaviors considered most damaging to **backcountry sites**[2].

hiking or stock trails

Behavior	Score*	Rank
Off-trail hiking	55	1
Littering	36	2
Inappropriate livestock use	35	3
Camping in inappropriate sites	24	4
Damaging or defacing natural objects	18	5

archeological or paleontological sites

Behavior	Score*	Rank
Collecting paleontological or cultural objects as souvenirs	140	1
Damaging or defacing cultural or historical objects	69	2
Off-trail hiking	18	3
Damaging or defacing natural objects	14	4
Littering	12	5

campgrounds

Behavior	Score*	Rank
Inappropriate campfires and firewood collection	59	1
Littering	56	2
Inappropriate camping behavior	42	3
Inappropriate human waste disposal	33	4
Camping in inappropriate sites	31	5

historic sites

Behavior	Score*	Rank
Damaging or defacing cultural or historical objects	52	1
Collecting paleontological or cultural objects as souvenirs	41	2
Littering	19	3
Inappropriate campfires and firewood collection	10	4
Inappropriate camping behavior	8	5

2 Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site.

Table 8b. Noncompliant behaviors considered most damaging to **backcountry sites**[2](continued).

scenic overlooks

Behavior	Score*	Rank
Littering	22	1
Off-trail hiking	19	2
Damaging or defacing natural objects	12	3
Visiting in inappropriately sized groups	8	4
Damaging or defacing the built environment	7	5

natural attractions

Behavior	Score*	Rank
Damaging or defacing natural objects	59	1
Littering	52	2
Off-trail hiking	36	3
Inappropriate off-road driving	23	4
Collecting natural objects as souvenirs	16	5

other backcountry sites

Behavior	Score*	Rank
Damaging or defacing natural objects	13	1
Inappropriate human waste disposal	11	2
Littering	10	3
Off-trail hiking	10	3
Inappropriate off-road driving	9	5

2 Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site.

Table 8c. Five types of damage considered most destructive **across all frontcountry sites, all backcountry sites and all sites.**

Five types of damage considered most destructive at **all frontcountry sites**[1].

Behavior	Score*	Rank
Littering	1434	1
Damaging or defacing the built environment	1080	2
Damaging or defacing cultural or historical objects	801	3
Off-trail hiking	558	4
Collecting paleontological or cultural objects as souvenirs	538	5

Five types of damage considered most destructive at **all backcountry sites**[2].

Behavior	Score*	Rank
Collecting paleontological or cultural objects as souvenirs	208	1
Littering	207	2
Off-trail hiking	157	3
Damaging or defacing natural objects	140	4
Damaging or defacing cultural or historical objects	135	5

Five types of damage considered most destructive at **all sites.**

Behavior	Score*	Rank
Littering	1641	1
Damaging or defacing the built environment	1119	2
Damaging or defacing cultural or historical objects	936	3
Collecting paleontological or cultural objects as souvenirs	746	4
Off-trail hiking	715	5

[1]**Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

[2]**Backcountry** - areas designated as backcountry or wilderness not easily accessible to day-hikers.

*Score = 4 points for most damaging, 3 points for second most damaging, 2 points for third most damaging, 1 point for fourth most damaging; summed across all units with each type of site. Summed across all sites.

VI. VISITOR MANAGEMENT STRATEGIES - USE AND EFFECTIVENESS

The administrative units represented in the data base use a variety of strategies to control noncompliant visitor behavior. Ninety-six percent of the respondents said the units for which they were reporting attempted to control frontcountry noncompliance; for units with backcountry, the corresponding figure was 86% (Table 9). Respondents estimated that these efforts controlled an average of 60 % of the potential noncompliance in the frontcountry and 52% in the backcountry (Figures 1a and 1b). Unquestionably, a significant level of noncompliant visitor behavior continues undeterred in the national park system.

Table 9. Control of visitor noncompliance in frontcountry and backcountry areas.

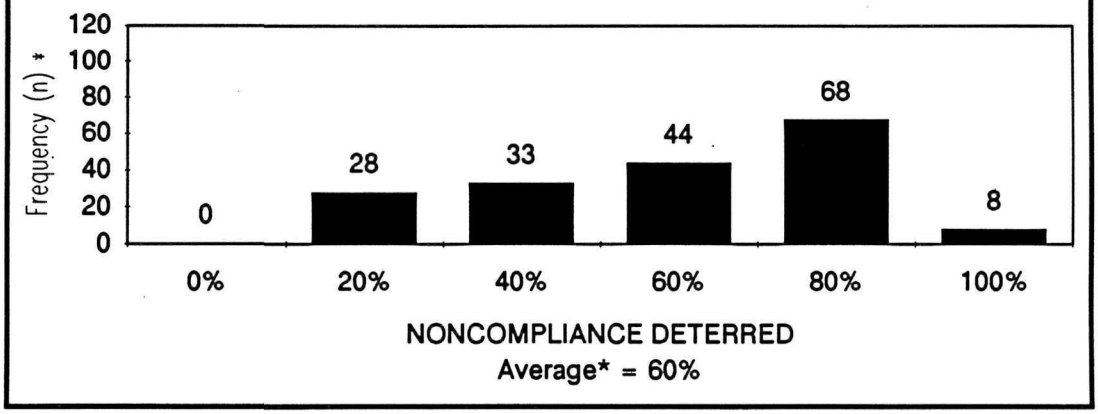
	Unit attempts to control noncompliance?[3]		
	Yes	No	Missing
Frontcountry[1]	185 (96%)	8	24
Backcountry[2]	70 (86%)	11	3

1 Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

2 Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

3 Table includes only the 84 units that have backcountry sites.

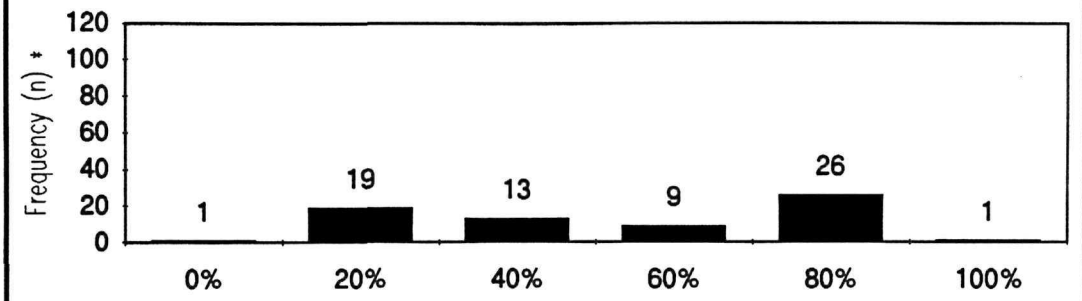
Figure 1a. Estimated effectiveness of current means of control at FRONTCOUNTRY SITES** (indicated by number of respondents selecting each of six deterrence levels).



*Data are missing for 36 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

**Frontcountry: areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

Figure 1b. Estimated effectiveness of current means of control at BACKCOUNTRY SITES** (indicated by number of respondents selecting each of six deterrence levels).



*Data are missing for 17 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

**Backcountry: areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

Most Commonly Used Strategies to Control Noncompliant Visitor Behavior

Survey respondents were asked to identify the three most damaged types of sites at their unit (a total of 510 sites were indicated). These sites could be located in either the frontcountry or backcountry. For each of the site types indicated, participants were also asked to indicate the means of control used to deter noncompliant behavior (See box below for example).

Q-A1 Does your unit of the NPS have developed visitor sites in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-B1** ON PAGE 6
2 YES

Q-A2 Has noncompliant visitor behavior caused damage at developed visitor sites in your unit? (Circle one number)

1 NO --> GO TO **Q-B1** ON PAGE 6
2 YES

Table 10a lists nineteen means of control and the percentages of the sites for which each means of control was used. The most common means of controlling visitor noncompliance at all sites combined (frontcountry and backcountry) was informal personal contact, followed by direct enforcement, regulatory signs, brochures, and barriers.

There were some differences in the means of visitor control used, depending on whether the indicated site was in the frontcountry or backcountry. For example, direct use quotas and brochures were more commonly used at backcountry sites; interpretive signs and barriers were more commonly used in the frontcountry (Table 10a).

Table 10b presents data similar to that in Table 10a for sites listed as most damaged. More control techniques were used at most damaged sites--especially in frontcountry areas.

Table 10a. Use of nineteen means of visitor control at all sites listed as first, second and third most damaged by visitor noncompliance.

Means of control	Percent of **all listed sites** using means of control[1]	Percent of **frontcountry sites** using means of control[2]	Percent of **backcountry sites** using means of control[3]
Informal personal contact	75	75	78
Direct enforcement	73	74	69
Regulatory signs	60	60	57
Brochures	50	47	69
Barriers	45	46	33
Interpretive signs	39	41	26
Interpretive talks	39	40	29
Closure	33	33	33
Restoration	32	31	31
Improving the quality of existing trails or access routes	21	21	28
Newsletters/ Newspapers	21	20	28
Improved landscape or facility design	20	22	8
Exhibits	20	20	22
Construction of visitor facilities	16	17	14
Rerouting trails or roads	10	10	16
Use quotas (direct)	8	6	29
Cinema	5	4	12
Other means	5	4	10
Use quotas (indirect)	3	3	6

[1]A total of 500 sites were listed as being first, second or third most damaged.

[2]A total of 449 frontcountry sites were listed as being first, second or third most damaged. (**Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.)

[3]A total of 51 backcountry sites were listed as being first, second or third most damaged. (**Backcountry** - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.)

Table10b. Use of nineteen means of visitor control at sites listed as most damaged. [1]

Means of Control	Percent of units using each means of control[2]	Percent of units using each means of control at most damaged front-country sites[3]	Percent of units using each means of control at most damaged back-country sites[4]
Informal personal contact	78	77	81
Direct enforcement	75	75	75
Regulatory signs	62	63	56
Brochures	62	60	94
Barriers	54	55	44
Interpretive talks	48	48	44
Interpretive signs	45	46	25
Closure	37	36	50
Restoration	35	35	38
Improving the quality of existing trails or access routes	24	23	31
Exhibits	23	23	25
Newsletters/ Newspapers	18	18	25
Improved landscape or facility design	17	17	13
Construction of visitor facilities	17	16	25
Rerouting trails or roads	9	9	6
Use quotas (direct)	9	7	31
Cinema	7	5	13
Other means	7	6	0
Usequotas (indirect)	3	3	6

[1]A unit was counted as using a means of control if that means of control was used at any site reported as most damaged.

[2]A total of 204 units reported a "most damaged" site.

[3]A total of 188 units reported a frontcountry site as most damaged. (**Frontcountry** - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.)

[4]A total of 16 units reported a backcountry site as most damaged. (**Backcountry** - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.)

Perceived Appropriateness and Effectiveness of Control Strategies to Address Noncompliant Visitor Behavior

Respondents were asked to consider the effectiveness and appropriateness of a variety of visitor control strategies in a hypothetical frontcountry subalpine meadow setting. This hypothetical setting was used to ensure that all survey participants responded to questions about the use of various visitor control strategies under identical conditions and assumptions. Following is the description (from page 45 of the questionnaire):

> The area of concern is Magnificent Meadows, a popular subalpine day hiking area adjacent to the developed visitor facilities in a major western national park. The meadows are located within a 3 hour drive of a major metropolitan area and are visited by about 500,000 people per year. The majority of visitors are upper middle-class, White Americans, but growing numbers of Asian, Hispanic, and Black Americans are visiting the park. In addition, the proportion of foreign visitors is growing from the current level of 6 percent.
>
> The Magnificent Meadows are crossed by a system of paved and unpaved trails. The typical day hiker can walk away from the visitor center for about three miles then loop back through several alternate routes to the developed facilities. The first one-half of the trail system is paved and the balance is not.
>
> Decades of use have resulted in a maze of informal (social) trails caused by people who shortcut designated trails, walk to scenic vistas that are not accessible on the designated trails, and so forth. These trails are inconsistent with the Agency's mission of preserving a nearly natural ecological condition. Many of them are eyesores, barren of vegetation and subject to erosion. Although signs are posted to identify the official trails, the distinction between the official and social trails is sometimes difficult to make, particularly in areas far from the visitor center.
>
> It is estimated that to completely rehabilitate the damaged areas would require three to six million dollars and several years' work. Many of the park staff feel that to undertake such a program without a corresponding program to reduce off-trail hiking would constitute only a short-term fix of the problem. However, controversy has arisen concerning the means by which visitor behavior should be controlled. Until now, the park staff has attempted to keep visitors on the official trails by using a variety of control strategies. Although these strategies have been somewhat effective, an unacceptable level of off-trail hiking has persisted. The park staff members do not agree on the means of control that should be included in the new program so as to best control this persistent level of noncompliance.

The following definitions were placed directly before the questions concerning effectiveness and appropriateness of visitor control strategies (from pages 46 and 47 of the questionnaire):

> IMPORTANT: Effectiveness is defined as the percentage of noncompliant behavior that would be deterred. If a means of control was not at all effective it would deter 0% of noncompliance; if it was completely effective it would deter 100% of noncompliance. Consider the deterrent effect of each means of control if it were instituted in a manner like that commonly used in the national parks. Do NOT consider appropriateness when making your estimates.
>
> IMPORTANT: Appropriateness is defined as the extent to which a means of control is acceptable, given the broad philosophical principles concerning park management and the specific NPS mandate of management for visitor enjoyment. Consider the appropriateness of each means of control if it were instituted in a manner like that commonly used in the national parks. Do NOT consider issues of effectiveness or cost when answering this question.

Table 11 and Figures 2a through 2r present data summarizing respondents' opinions of the effectiveness and appropriateness of visitor control strategies based on the "Magnificent Meadows" description. Respondents thought closure would be the most effective strategy in deterring noncompliant behavior, followed by rerouting trails or roads, direct enforcement, and improving the quality of existing trails. Visitor control techniques listed as appropriate by the most respondents were informal personal contact, direct enforcement, interpretive signs, talks, site restoration, and brochures. Techniques seen as appropriate by the fewest number of respondents were use quotas and construction of visitor facilities.

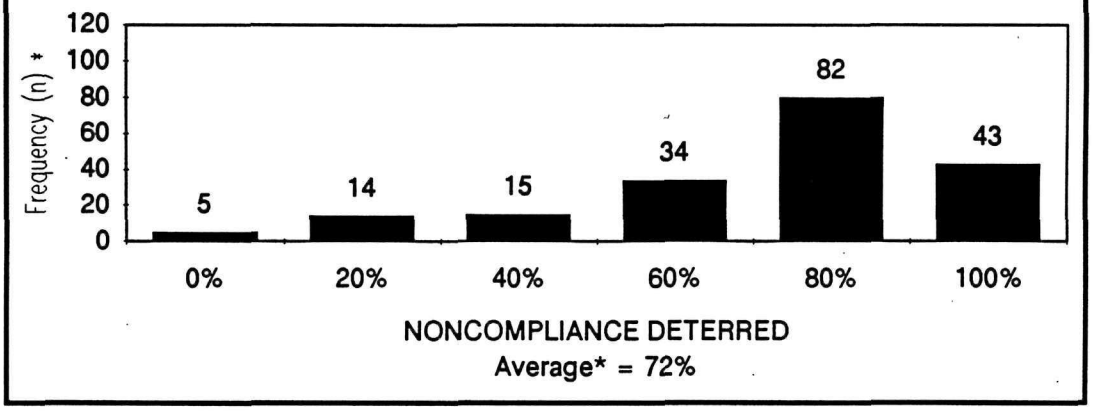
Table 11. Appropriateness of eighteen means of visitor control as applied to Magnificent Meadows scenario.

Means of control	Percent of respondents judging as appropriate [1]	Appropriateness ranking
Informal personal contact	87	1
Direct enforcement	84	2
Interpretive signs	83	3
Interpretive talks	82	4
Restoration	81	5
Brochures	81	5
Improving the quality of existing trails or access routes	79	7
Barriers	75	8
Regulatory signs	74	9
Rerouting trails or roads	71	10
Improved landscape or facility design	64	11
Exhibits	62	12
Closure	61	13
Newsletters/Newspapers	61	13
Cinema	53	15
Use quotas (indirect)	37	16
Use quotas (direct)	32	17
Construction of visitor facilities	22	18

[1]Data were missing for 21 of the 217 respondents (N = 196).

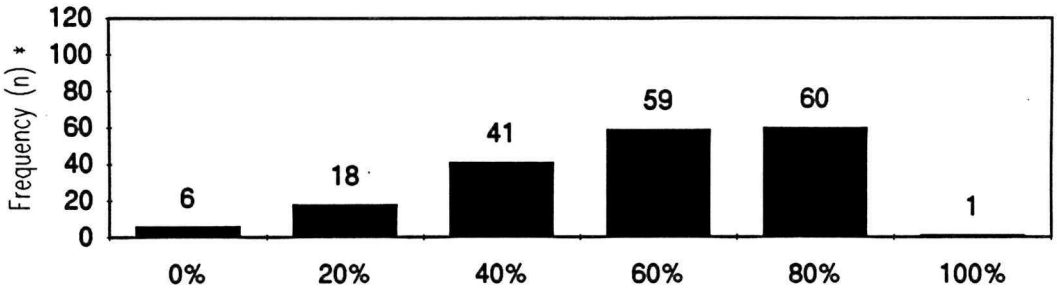
The most interesting observations from the questions pertaining to effectiveness relate to the diverse perceptions of effectiveness across all of the means of control. With respect to the most effectively perceived means of control (closure), 65% of the respondents thought this means would control 80% to 100% of the noncompliance, while 18% believed it would control from 0% to 40%. Nearly the same percentage (21%) of survey participants thought that informal personal contact would be 20% effective and 80% effective. This lack of consensus regarding the effectiveness of means of controlling noncompliant behavior underscores the fact that little scientific knowledge is available to guide NPS employees making such decisions.

Figure 2a. Estimated effectiveness of CLOSURE in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



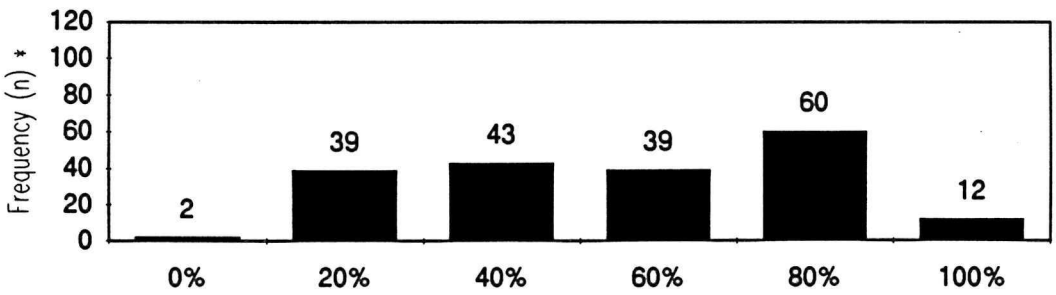
*Data are missing for 26 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2b. Estimated effectiveness of REROUTING TRAILS OR ROADS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



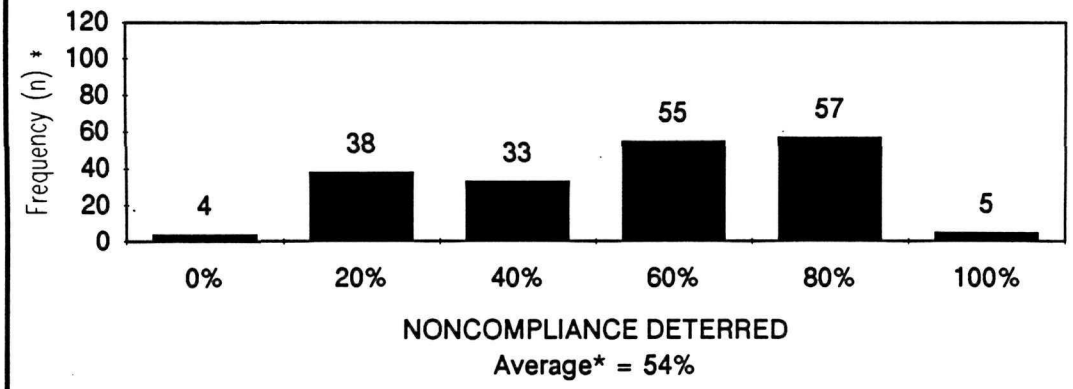
*Data are missing for 32 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2c. Estimated effectiveness of DIRECT ENFORCEMENT in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



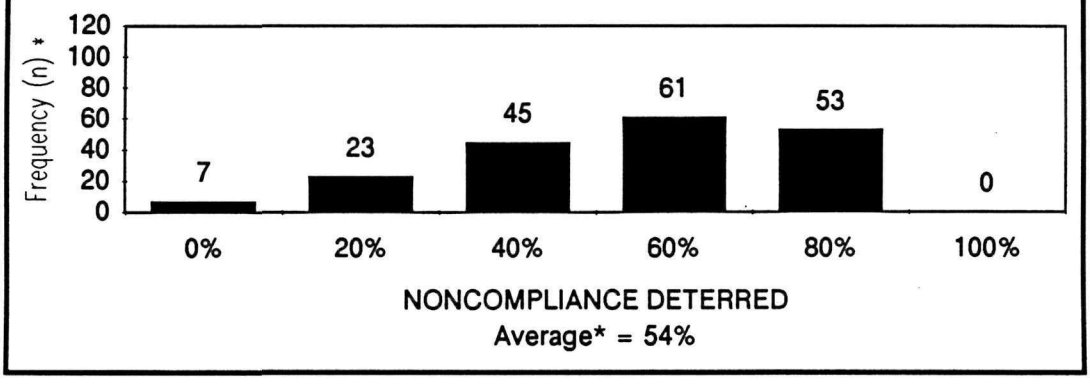
*Data are missing for 22 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2d. Estimated effectiveness of BARRIERS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



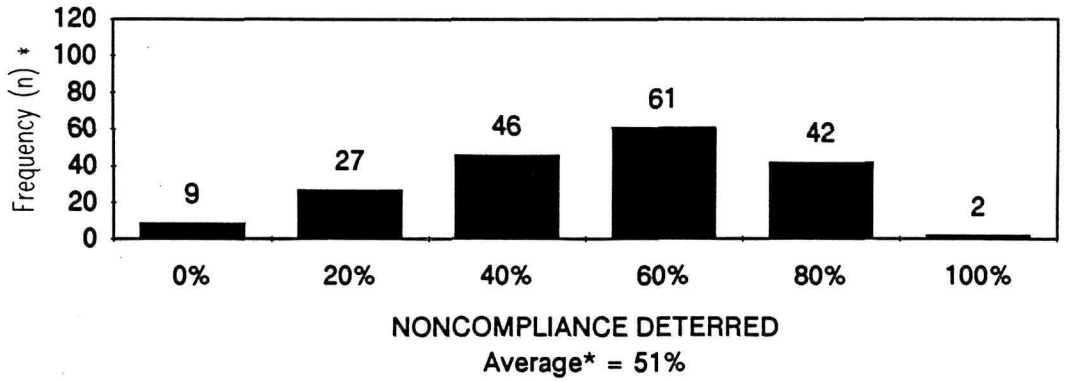
*Data are missing for 25 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2e. Estimated effectiveness of IMPROVING THE QUALITY OF EXISTING TRAILS OR ACCESS ROUTES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



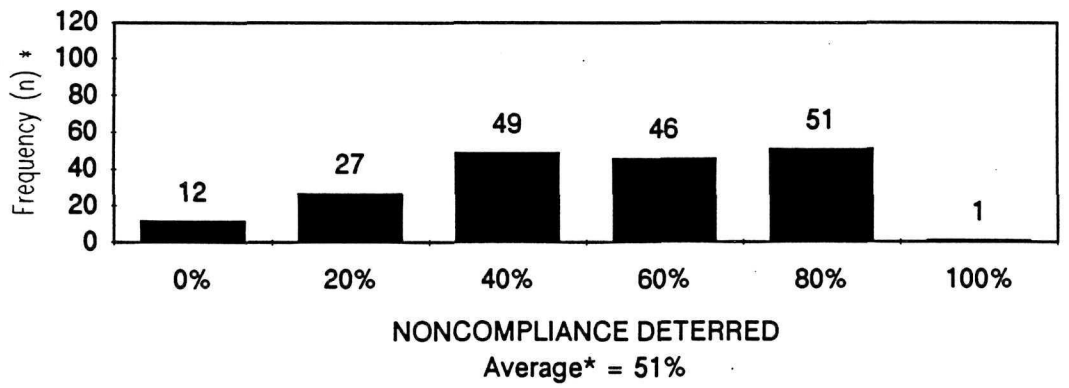
*Data are missing for 28 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2f. Estimated effectiveness of RESTORATION in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



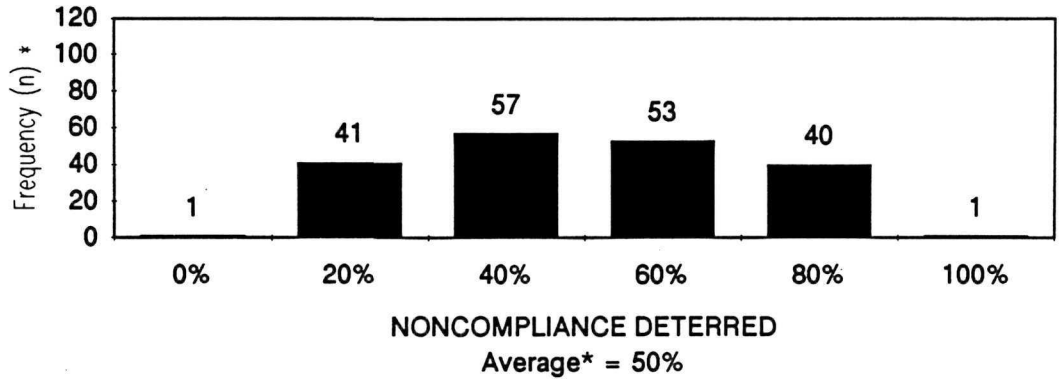
*Data are missing for 30 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2g. Estimated effectiveness of IMPROVED LANDSCAPE OR FACILITY DESIGN in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



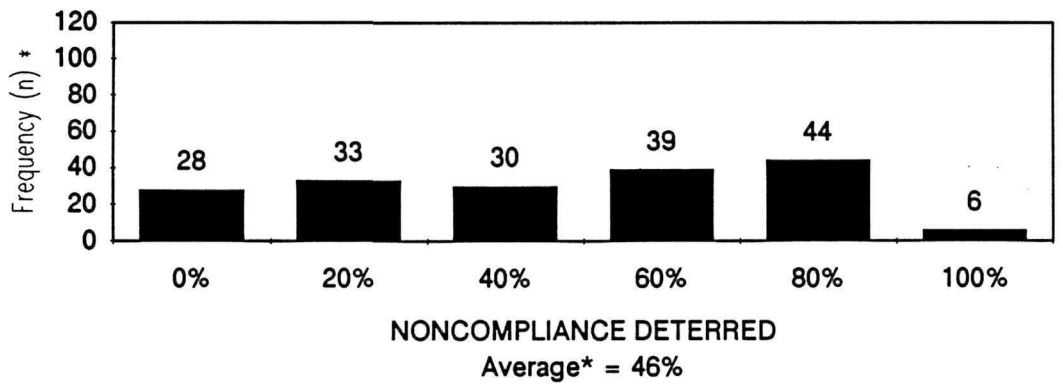
*Data are missing for 31 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2h. Estimated effectiveness of INFORMAL PERSONAL CONTACT in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



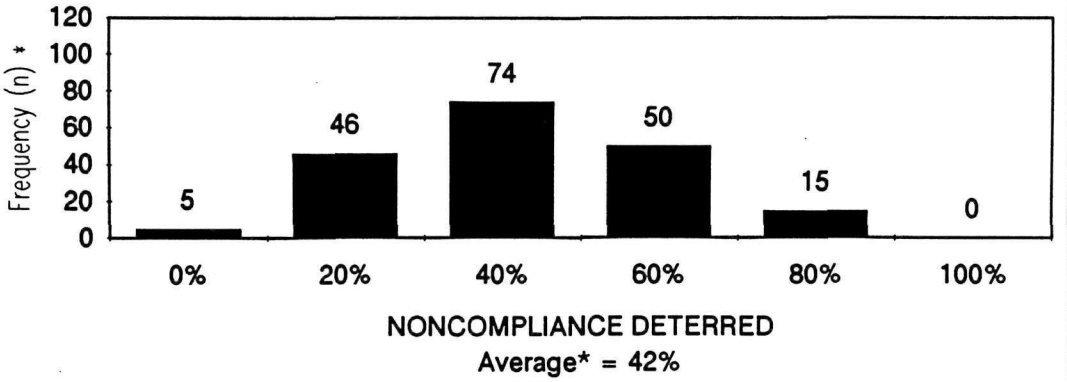
*Data are missing for 24 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2i. Estimated effectiveness of USE QUOTA (DIRECT) in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



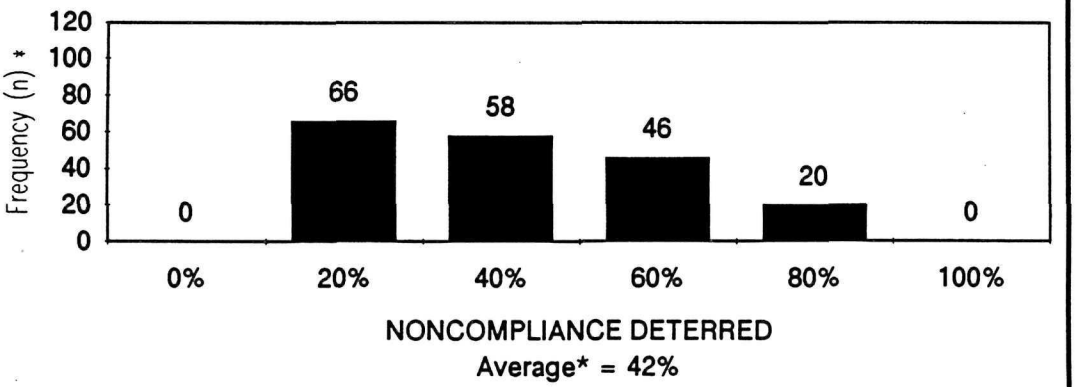
*Data are missing for 37 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2j. Estimated effectiveness of REGULATORY SIGNS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



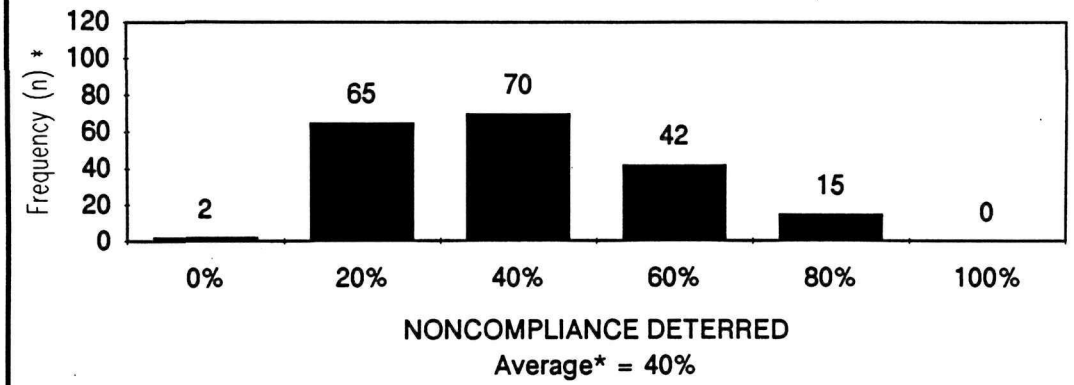
*Data are missing for 27 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2k. Estimated effectiveness of INTERPRETIVE TALKS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



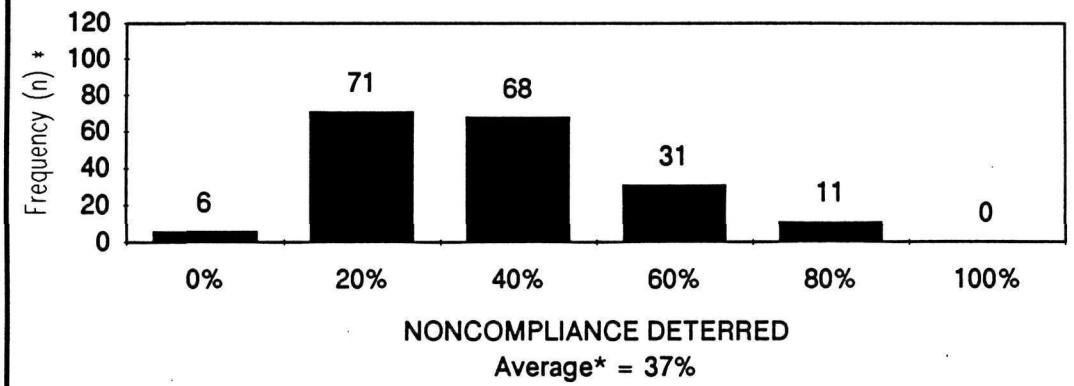
*Data are missing for 27 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2l. Estimated effectiveness of INTERPRETIVE SIGNS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



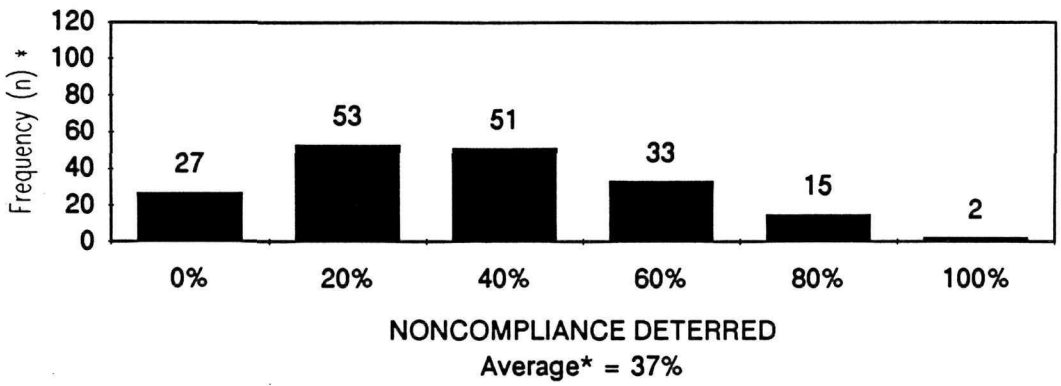
*Data are missing for 23 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2m. Estimated effectiveness of EXHIBITS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



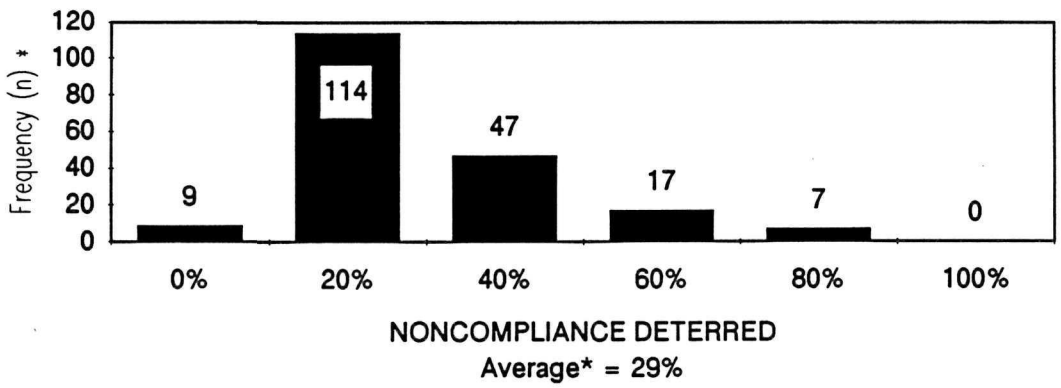
*Data are missing for 30 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2n. Estimated effectiveness of USE QUOTAS (INDIRECT) in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



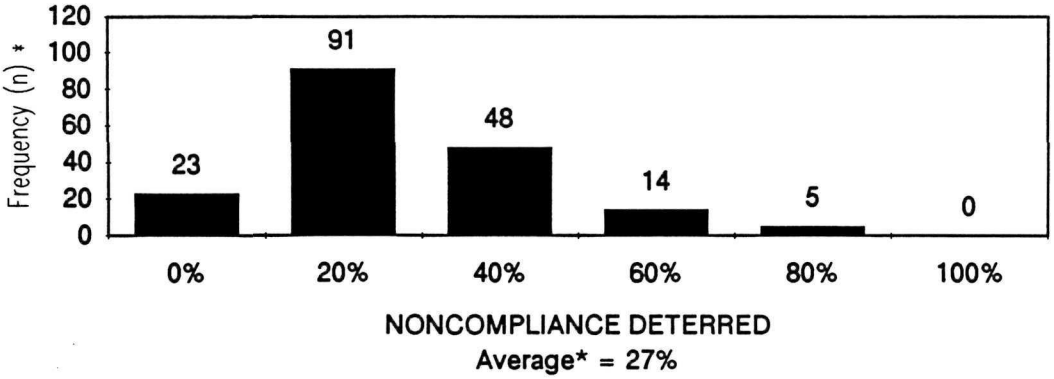
*Data are missing for 36 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2o. Estimated effectiveness of BROCHURES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



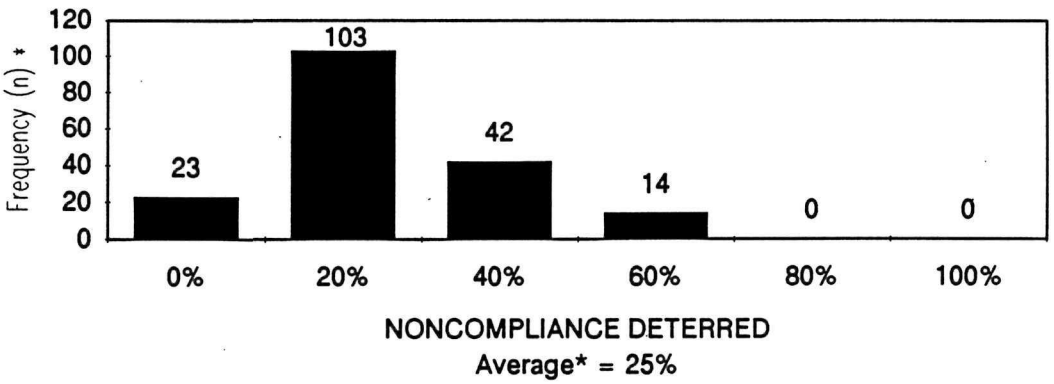
*Data are missing for 23 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2p. Estimated effectiveness of NEWSLETTERS/NEWSPAPERS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



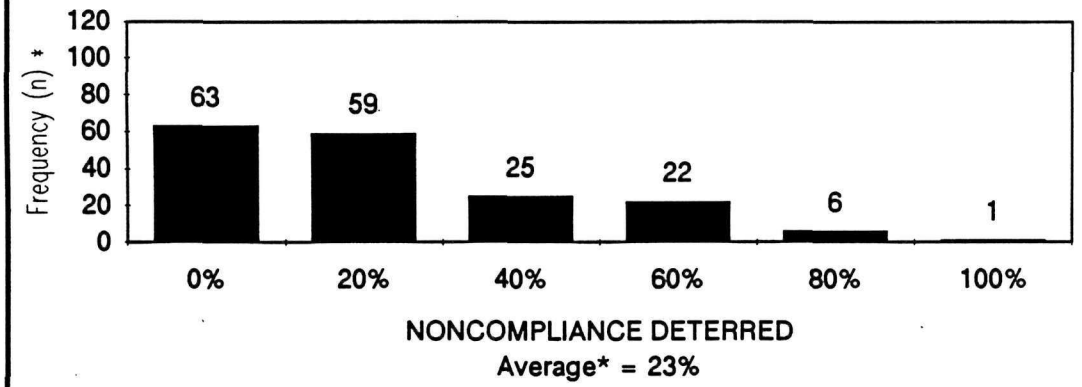
*Data are missing for 36 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2q. Estimated effectiveness of CINEMA in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



*Data are missing for 35 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 2r. Estimated effectiveness of CONSTRUCTION OF VISITOR FACILITIES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



*Data are missing for 41 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Perceived "Best" Ways to Control Noncompliant Visitor Behavior

In reality, resource managers must consider both effectiveness and appropriateness in decisions concerning the control of noncompliant visitor behavior. Thus, a third ranking was compiled based on respondents opinions of the best strategies, where "best" was defined as combining both effective and appropriate criteria in the hypothetical situation presented as "Magnificent Meadows." As might be predicted, given the results in the previous figures, respondents had diverse opinions concerning the "best" way to control the noncompliant visitor described in Magnificent Meadows (Table 12a). "Improving the quality of existing trails or access routes" received the most support (34 out of 211 or 16%) as the best means of control, but 49% did not list it in the top five. Of the 19 means of controlling noncompliant behavior, 15 were selected by at least one respondent as being the best way to control noncompliant behavior in Magnificent Meadows.

Table 12b shows the rank of control strategies based on a score which was computed by awarding 5 points each time a means of visitor control was listed as best, four points for second best and so on down to one point when a means of control was listed as fifth best, and then summed across all respondents.

Table 12a. Means of visitor control listed as "best" to "fifth best" for application in Magnificent Meadows scenario.

Means of control	Best (N)	Second best (N)	Third best (N)	Fourth best (N)	Fifth best (N)
Improving the quality of existing trails or access routes	34	30	15	19	10
Improved landscape or facility design	29	18	16	11	5
Informal personal contact	27	12	16	19	23
Closure	22	10	7	7	16
Rerouting trails or roads	22	27	17	14	16
Barriers	20	21	18	17	16
Direct enforcement	19	17	25	12	26
Restoration	8	18	19	16	14
Use quotas (direct)	7	5	2	8	4
Interpretive signs	6	12	20	27	20
Interpretive talks	6	12	12	18	14
Regulatory signs	4	11	22	17	15
Other means	3	1	0	0	1
Cinema	1	2	2	0	2
Exhibits	1	0	8	9	7
Brochures	0	7	3	10	15
Construction of visitor facilities	0	1	2	1	0
Newsletters/ Newspapers	0	2	2	3	2
Use quotas (indirect)	0	3	3	1	3

Table 12b. Means of control considered best for application in Magnificent Meadows scenario; composite scoring.

Means of control	Composite score*
Improving the quality of existing trails or access routes	383
Rerouting trails or roads	313
Informal personal contact	292
Improved landscape or facility design	292
Barriers	288
Direct enforcement	288
Restoration	215
Interpretive signs	212
Closure	201
Regulatory signs	179
Interpretive talks	164
Use quotas (direct)	81
Brochure	72
Exhibits	54
Use quotas (indirect)	26
Newsletters/Newspapers	22
Cinema	21
Construction of visitor facilities	12

* Score - 5 points for best, 4 points for second best, 3 points for third best, 2 points for fourth best, and 1 point for fifth best, and summed across all respondents. Data were missing for 6 of 217 respondents. Thus N = 211.

Perceived Appropriateness and Effectiveness of Persuasive Strategies to address Noncompliant Visitor Behavior

Finally, a series of questions measured opinions concerning the appropriateness of persuasive strategies that might be directed toward visitors to the Magnificent Meadows. Ninety-four percent of the respondents believed that appeals to intrinsic values pertaining to the special values that park resources have was an appropriate strategy; on the other hand, 59% thought threats of citations or fines were appropriate, and 57% said messages manipulating social affiliations were appropriate (Table 13).

It is important to note the substantial extent of disagreement pertaining to persuasive strategies. In the context of Magnificent Meadows, with explicit reference to "broad philosophical principles concerning management, and the specific NPS mandate of management for visitor enjoyment", 40% percent or more of respondents believed that messages emphasizing Agency authority, threats of citations or fines, and messages manipulating social affiliations were inappropriate.

Table 13. Appropriateness of six persuasive strategies as applied to Magnificent Meadows scenario.

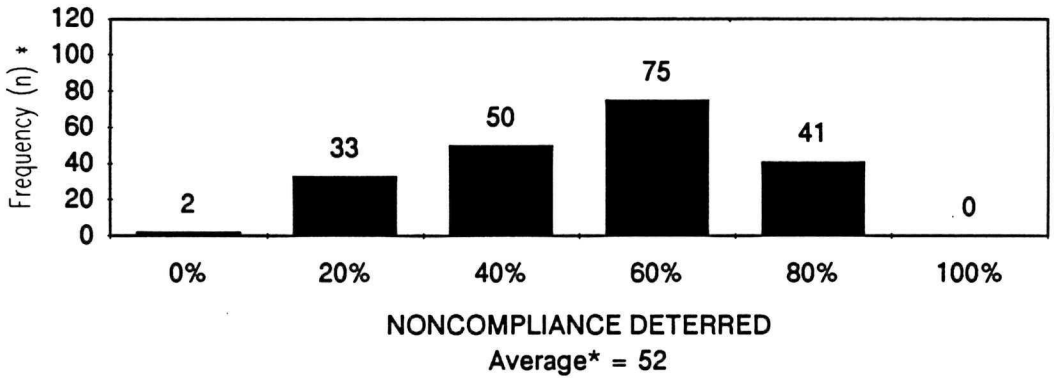
Persuasive strategy	Percent of respondents judging as appropriate [1]	Appropriateness ranking
Appeals to intrinsic values	94	1
Messages emphasizing resource value to humankind	83	2
Direct commands	68	3
Messages emphasizing agency authority	60	4
Threats of citations or fines	59	5
Messages manipulating social affiliations	58	6

[1]Data were missing for 12 of the 217 respondents (N = 205).

Figures 3a through 3f display respondents' opinions regarding the percentage of noncompliance that would be deterred if each of the six persuasive strategies were instituted in Magnificent Meadows in a manner such as is commonly used in the national parks. Appeals to the intrinsic values of park resources, and messages emphasizing resource values to humankind, were thought to be the most effective persuasive strategies. Threats of citations or fines, messages emphasizing Agency authority, and messages manipulating social affiliations were seen as less effective.

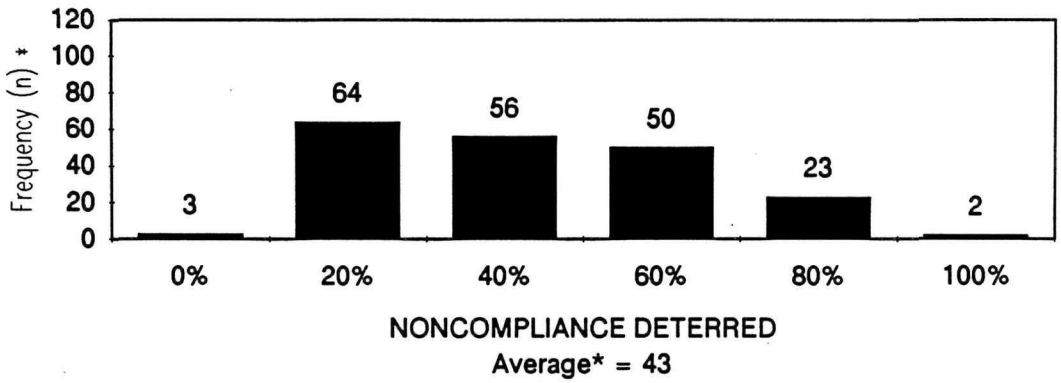
There was substantial disagreement regarding the anticipated effectiveness of each of the persuasive strategies. For example, 17% of the respondents thought that appeals to the intrinsic values of park resources would be from zero to approximately 20% effective, while 21% thought this approach would be about 80% effective. Regarding the effectiveness of threats of citations or fines, 38% of the survey participants believed this strategy would deter between zero and approximately 20% of noncompliant behavior in Magnificent Meadows, while 31% thought this strategy would deter between approximately 60% and 100%

Figure 3a. Estimated effectiveness of APPEALS TO INTRINSIC VALUES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



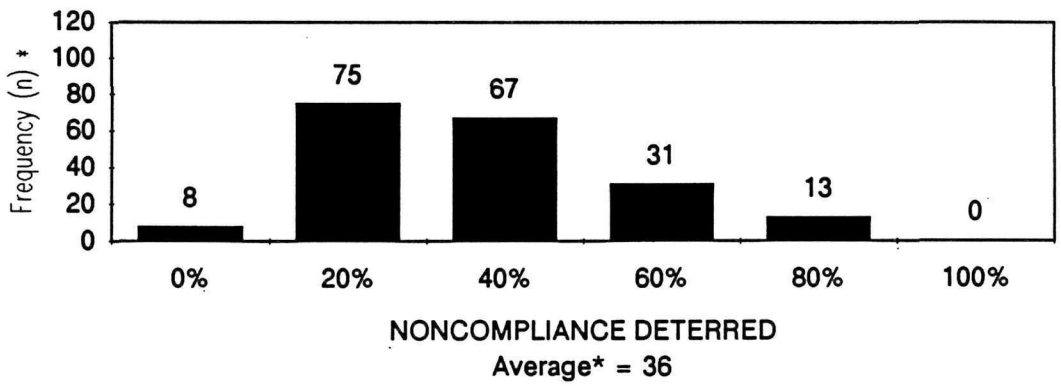
*Data are missing for 16 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 3b. Estimated effectiveness of DIRECT COMMANDS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



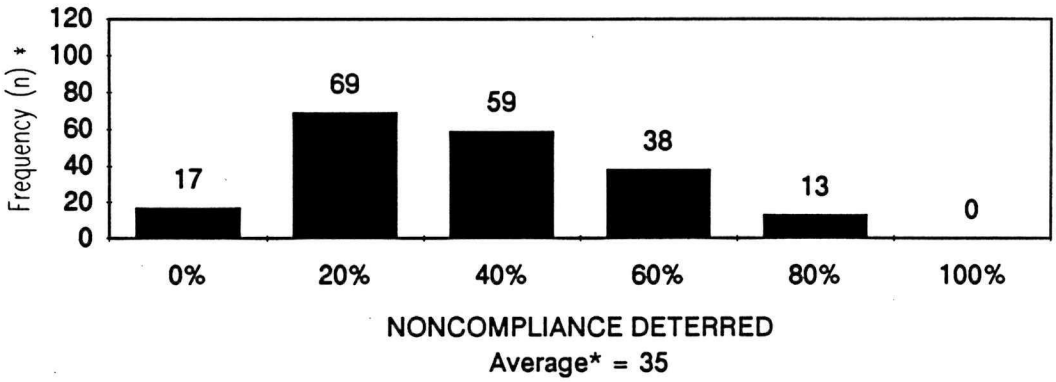
*Data are missing for 19 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 3c. Estimated effectiveness of MESSAGES EMPHASIZING AGENCY AUTHORITY in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



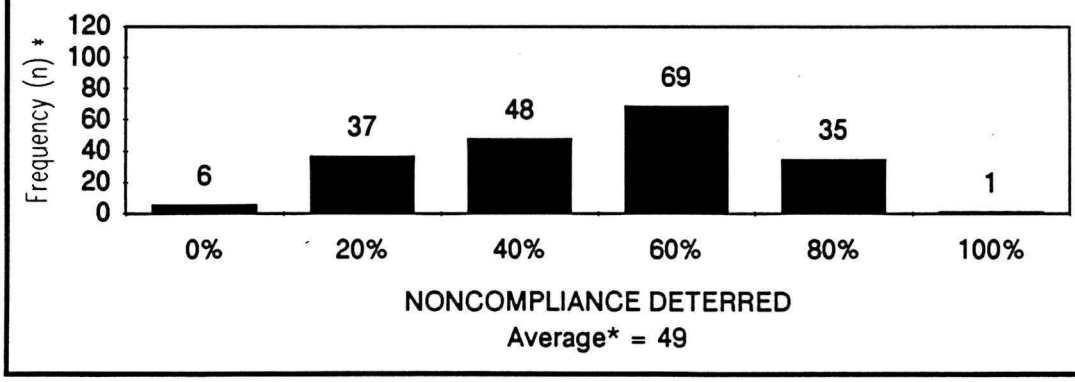
*Data are missing for 23 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 3d. Estimated effectiveness of MESSAGES MANIPULATING SOCIAL AFFILIATIONS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



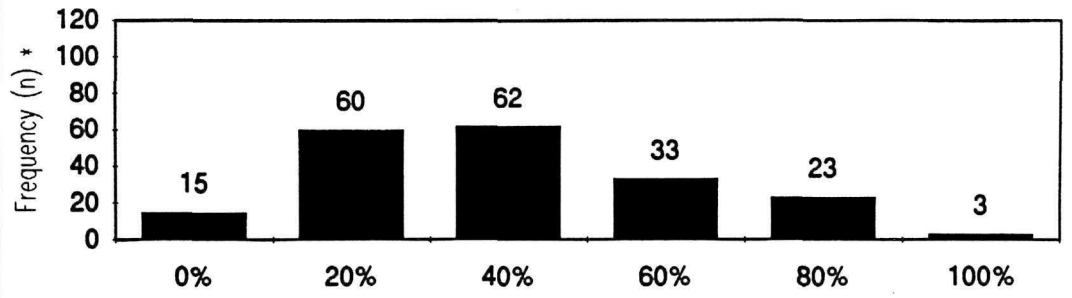
*Data are missing for 21 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 3e.Estimated effectiveness of MESSAGES EMPHASIZING RESOURCE VALUE TO HUMANKIND in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).

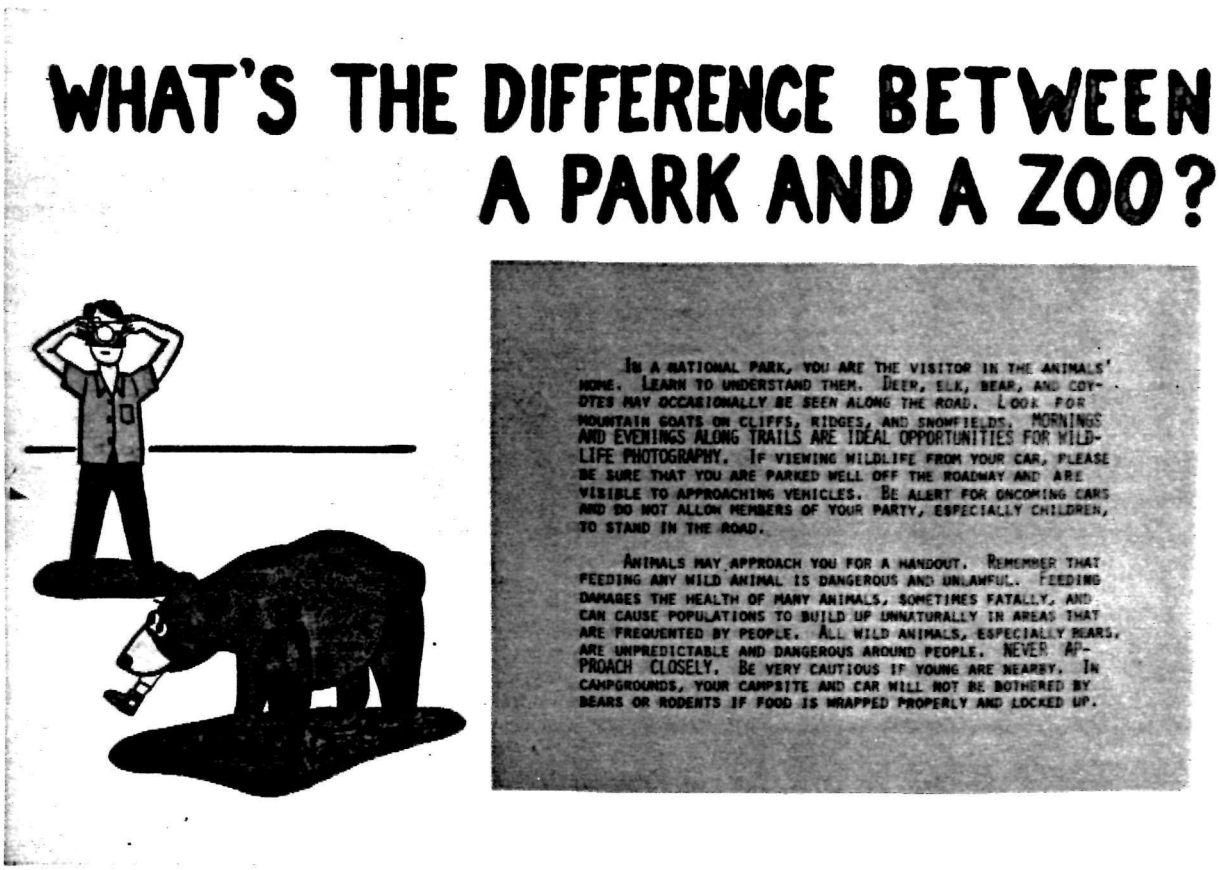


*Data are missing for 21 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.

Figure 3f. Estimated effectiveness of THREATS OF CITATIONS OR FINES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



*Data are missing for 21 respondents who either failed to answer the question or answered by writing in percentages other than those given. The average percentage includes the written-in estimates.



When asked to rank the six types of messages given both effectiveness and appropriateness criteria, 52% ranked appeals to intrinsic values of the resources as best and 24% ranked it second best (Table 14a). Messages emphasizing resource value to humankind were ranked as best by 18% of the respondents; 29% ranked this type of message second best. Table 14b presents the ranking of the six persuasive strategies where six points was awarded when a strategy was listed as best, sequentially, to one point being awarded for a strategy being listed as sixth best. Clearly, the strongest consensus emerges concerning the opinion that appeals emphasizing the intrinsic value of the resources is the best or second best approach to designing persuasive strategies to deter noncompliant behavior, followed, to a lesser degree, by support for messages emphasizing resource values to humankind. However, the general level of consensus was low. Each of the six strategies received at least minimal support as either the best strategy or the sixth best strategy (Table 14a). Regarding direct commands, very similar numbers of respondents ranked this strategy in each of the six cells. Seventeen percent ranked threats of citations or fines as the best or second best persuasive strategy for use in Magnificent Meadows; 37% ranked it as sixth or as last place; 43% believe such messages should not be used at all. Opinions regarding messages manipulating social affiliation were similarly diverse.

Table 14a. Persuasive strategies listed as "best" to "sixth best" for application in Magnificent Meadows scenario.

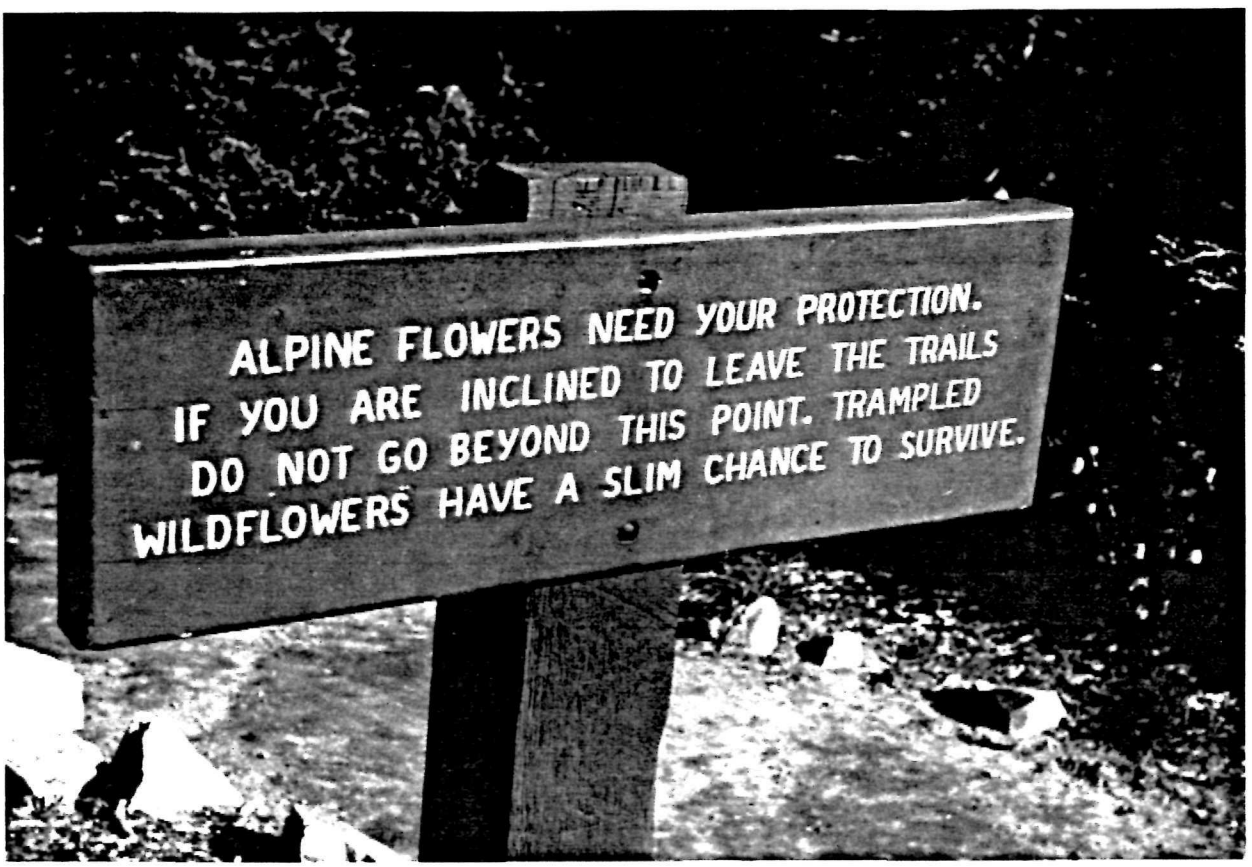
Persuasive strategy	Best (N) [1]	Second best (N)	Third best (N)	Fourth best (N)	Fifth best (N)	Sixth best (N)
Appeals to intrinsic values	107	48	24	16	4	6
Messages emphasizing resource value to humankind	38	58	35	31	27	14
Direct commands	26	37	32	39	41	29
Threats of citations or fines	16	19	26	21	43	76
Messages emphasizing agency authority	13	20	36	65	43	26
Messages manipulating social affiliation	4	22	50	30	44	51

[1]Data were missing for 13 of 217 respondents. Thus N = 204.

Table 14b. Persuasive strategies considered best for application in Magnificent Meadows scenario; composite scoring.

Persuasive strategy	Composite score*
Appeals to intrinsic values	1023
Messages emphasizing resource value to humankind	809
Direct commands	682
Messages emphasizing agency authority	620
Messages manipulating social affiliations	554
Threats of citations or fines.	516

* Score - 6 points for best, 5 points for second best, 4 points for third best, 3 points for fourth best, 2 points for fifth best and 1 point for sixth best, then summed across all respondents.



Attitudes Toward Direct Enforcement

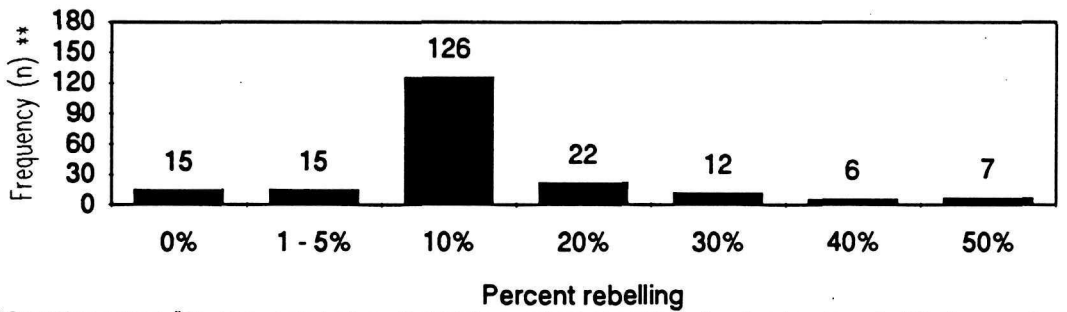
Part 3 of the questionnaire asked about support for two specific approaches to deterring noncompliant behavior--direct enforcement with fines and citations to achieve resource protection, and the use of fear appeals to increase risk perception among park visitors in situations where visitors might be endangered in frontcountry settings or areas of the backcountry easily accessible to day hikers (see following page). The overwhelming majority of respondents (87%) supported use of direct enforcement; 81% supported the use of fear appeals.

The widespread support of direct enforcement is somewhat surprising, given the previously cited results indicating that 43% of respondents felt that the use of threats of fines and citations were inappropriate persuasive strategies to deter noncompliant behavior in the hypothetical Magnificent Meadows. Perhaps some people accept direct enforcement through citations, but oppose communication strategies involving more blatant threats as a deterrent technique. It is also possible that some feel that the use of citations and fines are acceptable in the frontcountry, but not in the situation and circumstances described in Magnificent Meadows.

Opinions Concerning Reverse Effects Associated with Direct Enforcement and Use of Fear Appeals

Eighty-five percent of the respondents believed that direct enforcement would cause 10% or more of park visitors to rebel, and thereby increase noncompliance (Figure 4a). Approximately 15% thought that this amount would be approximately 20% or more. With regard to fear appeals, 83% of visitors believed that fear appeals would increase the target behavior by about 10% or more because of the thrill of risk; 9% thought the target behavior would increase by approximately 20% or more (Figure 4b).

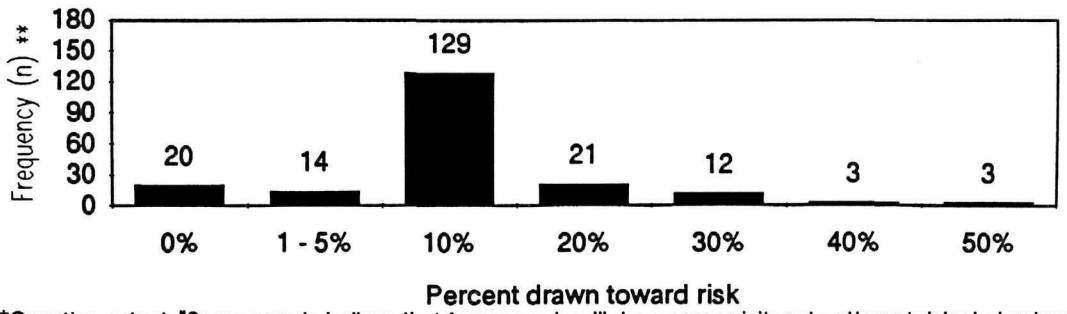
Figure 4a. Estimated percentage of park visitors who would rebel against direct enforcement* (indicated by number of respondents selecting each of seven percentage levels)



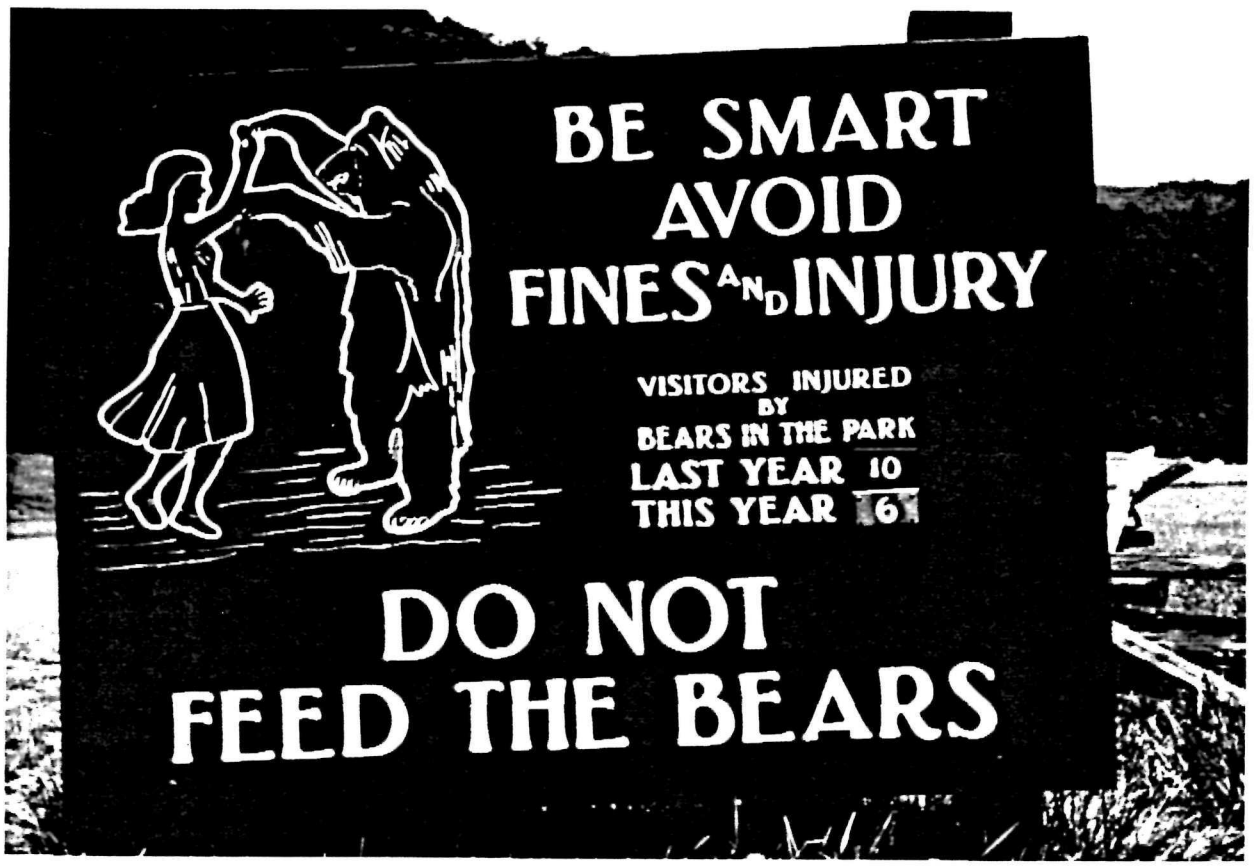
*Question asked, "Some people believe that visitors will rebel against direct enforcement. What percentage of visitors do you think react in this way?"

**Two respondents who wrote 15% and 12 others with missing data are not included in this table.

Figure 4b. Estimated percentage of park visitors who would react to fear appeals by being drawn to attempt the risky behavior* (indicated by number of respondents selecting each of seven percentage levels).



*Question asked, "Some people believe that fear appeals will draw some visitors to attempt risky behaviors. What percentage of visitors do you think react in this way?"
**Data were missing for 15 respondents.



VII. SUMMARY AND CONCLUSIONS

The survey results conclusively demonstrate that visitor noncompliant behavior has caused extensive damage to resources in the national park system. Although 18% of the administrative units did not respond and quantitative estimates of amounts of money to repair approximately one-fourth of the sites listed as damaged were not given, 53.5 million dollars of damage was identified. Assuming that the damage in the nonresponding units occurred at the same level as in those units responding, and that the damage at sites where damage was reported but no cost estimate was provided occurred at the same rate as where cost estimates were provided, the total reparable damage in the national park system exceeds 80 million dollars. Nonrenewable resources were reported as being destroyed at about two-thirds of the reporting units. Sixty-five percent of the units report at least one moderately damaged site and 29% report a seriously damaged site. The annual cost of just cleaning up after noncompliant behavior was estimated to be approximately 12 million dollars at the reporting sites. Adjusting this figure as above, the revised estimate is approximately 18.8 million for clean-up costs.

Historical sites were most often reported to be the most damaged type of site, followed by developed visitor sites, archaeological/paleontological sites, accessible natural attractions, campgrounds, and picnic areas. Littering was ranked as the most damaging behavior, followed by damaging the built environment, damaging or defacing cultural or historical objects, collecting paleontological or cultural objects as souvenirs, and off-trail hiking.

Although almost all units attempt to control noncompliant visitor behavior, these efforts are estimated to deter only about 60% of such behavior in the frontcountry and 52% in the backcountry. Clearly, a substantial amount of damage caused by noncompliant visitor behavior--to both renewable and nonrenewable resources--will continue. If unabated, this damage will eventually reach crisis proportions in some units at some point in the next century.

Unfortunately, the efforts among NPS staff to deter damaging noncompliant behavior are not derived from a widely acknowledged base of scientific information; nor is there agreement on philosophically acceptable means of deterrence, given the mandate of the agency. In the hypothetical "Magnificent Meadows" scenario, for example, there was widespread disagreement among respondents concerning the effectiveness of informal personal contact (identical proportions of respondents believed it to be 20% and 80% effective, respectively), despite widespread agreement concerning its appropriateness as a means to deter noncompliant visitor behavior. Given the specific NPS mandate of management for visitor enjoyment, forty percent or more of respondents believed that messages emphasizing agency authority, threats of citations or fines, and messages manipulating social affiliations were inappropriate. Yet 17% of respondents believed threats of fines and citations constituted the best persuasive strategy to use in Magnificent Meadows.

These data demonstrate that one of the first steps in designing a coordinated approach to deterring noncompliant visitor behavior in the national park system is organizational agreement on acceptable means and strategies. This agreement will most likely be reached only if accompanied by research in the national parks which examines the relationship between various deterrent approaches and the quality of visitor experiences.

We are led to the conclusion that noncompliant visitor behavior is a significant problem which, without organization-wide intervention, will have increasing negative consequences on natural and cultural resources in the national park system. In some instances, the very resources that the NPS is charged to protect for human enjoyment are being consumed by the rule violations of those who come to enjoy them.

There is no institutionally distributed information base dealing directly with appropriate and effective means of deterring this behavior in national park environments. The authors hope that the literature review and synthesis accompanying this report will be a step in this direction, but more work is needed. The current status quo of noncompliant behavior intervention is inadequate to make concrete recommendations for holistic control strategies throughout the national park system, making an in-house research and technology transfer program essential.

Although it is unlikely that all damage-producing noncompliant behavior can be stopped at most sites, the authors' research at Mount Rainier National Park and the companion report (literature review) to this document suggest that a well-coordinated program of research and information dissemination to park staff dealing with noncompliant behavior, coupled with the willingness of managers to act, has the capacity to reduce the incidence of this damage considerably. Failure to initiate such programs condemns park resources to continued abuse and destruction and the eventual loss, not only of some of the resources, but of the visitor experiences such resources provide.

Given the widespread occurrence of noncompliant behavior, and the reasonable probability that research findings at one location should have at least limited generalizability to other similar types of sites and across agency boundaries, this problem presents an excellent opportunity for leadership on the part of the NPS Washington Office and the National Biological Survey in both designing a national research agenda and establishing technology transfer programs. We, therefore, recommend that appropriate divisions of the Washington NPS Office with the National Biological Survey plan and fund a coordinated research program designed to provide system-wide guidelines for the deterrence of damaging noncompliant visitor behavior and, subsequently, an information dissemination program to promote the use of this information. Considering the system-wide magnitude of repair and clean-up costs necessitated by noncompliant behavior, such a research program promises a very favorable cost-benefit return.

APPENDIX A
AN APPLIED RESEARCH APPROACH TO DEVELOP STRATEGIES TO DETER NONCOMPLIANT VISITOR BEHAVIOR IN THE NATIONAL PARKS

AN APPLIED RESEARCH APPROACH TO DEVELOP STRATEGIES TO DETER NONCOMPLIANT VISITOR BEHAVIOR IN THE NATIONAL PARKS[1]

DARRYLL R. JOHNSON MARK E. VANDE KAMP

COOPERATIVE PARK STUDIES UNIT
COLLEGE OF FOREST RESOURCES, AR-10
UNIVERSITY OF WASHINGTON
SEATTLE, WA 98195

[1] This manuscipt was written for submission to a peer-reviewed journal.

Introduction

The data reported in the main body of this report make it clear that visitor-caused damage to resources is a major problem in the National Park system. Unfortunately, a recent review of the academic literature found very little information that was both directly related to this problem and that indicated reliable means of addressing it (Vande Kamp et al., 1994). There are three primary reasons for this situation: (1) much of the research and writing is guided by overly broad, imprecisely defined, or scientifically inappropriate conceptualizations of the dependent variable (usually labeled "depreciative behavior" or "vandalism"); (2) definitions of the dependent variable vary from study to study; and (3) most research is driven by narrowly defined theory or conceptual models focused on **why** various intervention approaches may work rather than inclusive experiments empirically demonstrating **what** approaches reduce visitor-caused damage. This appendix briefly discusses these issues and presents an alternative approach for applied research.

Conceptualization Of The Problem Behavior

Imprecise or scientifically inappropriate conceptualizations. In some writing related to visitor-caused resource damage, the dependent variable is labeled "vandalism." In the extreme, (e.g., Bennett, 1968) such articles give sensational accounts of damage and misconduct in U.S. parks and forests that are referred to as "vandalism." Vandals, punks, thieves and litterbugs are postulated to be destroying the nation's heritage. Bennett displays pictures of dead eagles, littered areas, robbed archeological sites, graffiti, arson and in-park riots; all said to be examples of outdoor hooliganism. In response, he offers a multi-pronged program to stop this "hooliganism" including support for population planning.

In the leisure, recreation and environmental management literature, the focus is frequently upon the concept of "depreciative behavior." Although often left undefined, this label generally refers to behavior that damages or detracts from the enjoyment of resources (e. g., Campbell et al., 1968; Clark et al., 1971). Depending on the writer, such acts may or may not violate formal (i.e., written and enforceable) rules of conduct. Presumably, the definition rests entirely on the idea that, in the judgment of either managers or those doing the research, some visitor actions have adverse impacts.

These conceptions of "vandalism" and "depreciative behavior" do not lend themselves to scientific operationalization because each definition can not be anchored in widely known and communicated rules of conduct. In addition, the category of behaviors defined by each is so broad that it includes behavior ranging from archeological theft, to campground violations, to littering, which may have different and multiple causes. Such overly broad categories of behavior (ranging from trivial to very serious offenses) are unlikely to lead to research that effectively tests theoretically derived hypotheses or develops deterrent measures.

Defining the problem as *noncompliant behavior*. Based on extensive discussion with park managers concerning the most pervasive and persistent types of visitor-caused park resource damage, our research is oriented toward a class of behaviors that includes off-trail hiking, feeding animals, souvenir collection of flowers or rocks, camping out of designated areas, littering, graffiti (e.g. "Mary loves Harry"), throwing rocks into pools, taking pets into forbidden areas, playing music too loud, inappropriate disposal of human waste, and other minor rule violations. These acts are referred to as noncompliant behavior. Noncompliant behavior violates formally established guidelines for visitor behavior, but any one instance may have an insignificant negative impact. In the aggregate, however, noncompliant behavior can have extremely adverse impacts, as strongly supported by the data presented in this report.

We postulate that noncompliant behaviors are not usually accompanied by willful malicious intent to deface or destroy. For example, consider a couple on their honeymoon throwing a coin in a spring-fed pool, an overweight older man short-cutting a switch back after hiking three miles up a steep trail, a visitor from Argentina walking off-trail to photograph a scenic vista, a young urban woman feeding peanuts to chipmunks, a child picking a wild flower, or children playing on a historic cannon.

Importantly, however, we argue that the conceptualization of the dependent variable in the study of noncompliant behavior should not a priori exclude behaviors based on the states of mind of social actors. Such states of mind include awareness of impact, ignorance of rules, awareness of consequences, intent to harm etc. Neither should the utilization of a particular theory exclude sub-populations of visitors (or types of acts) based upon attitudes or other values. Instead, the states of mind of noncompliant actors, at the time of the damaging behavior, should be considered empirical questions of interest that represent potential independent variables associated with noncompliant behavior.

We assume that most people are potential rule violators in outdoor recreation settings--just as most people to some degree, or at some time, violate traffic and pedestrian laws, expectations and rules in the work-place, or other minor rules and regulations. We do not assume that awareness of consequences of individual acts explains most of the variance in noncompliant behavior. Few, if any, people fully comply with all the myriad rules they encounter every day. Thus, most people contribute to socially defined negative impact, either inside or outside natural resource management contexts. For example, how many readers can honestly say they have not exceeded speed limits or other traffic laws, taken pencils or other office supplies home from work, or otherwise failed to comply with some other minor regulation? In the first instance, most people are aware that speeding increases the probability of their own and others' deaths or injuries. In the second, most people realize that the aggregate sum of office supply thefts can total very relevant sums. Yet, under certain circumstances otherwise law-abiding and well-adjusted adults choose to drive over the speed limits or accumulate drawers full of office pencils.

Adverse impacts of noncompliant behavior. In outdoor recreation and natural resource management settings, the adverse impacts of noncompliant behavior can be classified into at least four categories (Johnson & Swearingen, 1991): (1) irreparable damage to non-renewable natural or cultural resources, including deleterious impacts to park ecosystems or their components (e.g., adverse impacts upon animal behavior); (2) unacceptably large public expenditures to repair the damage to renewable resources or capital investments; (3) unwarranted risks to the safety of others, including persons engaging in rule violations; and (4) intangible consequences upon the recreation experiences of others, including those experiences predicated upon a pristine physical environment. This report deals directly with irreparable damage to non-renewable resources, the cost of reparable damage to renewable resources and "clean-up" costs associated with some types noncompliant behavior (e.g., picking up litter).

Examples of resource damage of concern include: physical impact to soils and vegetation (caused by activities such as off-trail hiking and camping in inappropriate sites); removal of natural and cultural objects as souvenirs; damage to the natural environment, damage to cultural or historical objects and to the built environment (caused by graffiti or other inappropriate behavior such as climbing on historic cannons); negative or potential impact on park ecosystems (caused by inappropriate disposal of human waste, pet violations, minor harvest regulations, inappropriate campfires or firewood collection etc.).

Summary. Noncompliant behavior is defined as any minor violation of formally established guidelines for behavior that have been created and communicated by an organization with legitimate authority to do so. Excluded are criminal acts such as major acts of vandalism, looting archeological sites for profit and other serious law-breaking activity. Noncompliant behavior in many instances can result in citations, but fines and other sanctions are minimal to moderate.

The noncompliant behaviors of primary interest in this survey are those that damage renewable or nonrenewable resources, or that require an unacceptably expensive response from the managing organization. The states of mind of individual actors are not defining criteria of noncompliant behavior but are, rather, potential independent variables of interest in tests of hypotheses related to causes of noncompliant behavior in future research.

The Role of Theory

The literature reviewed by Vande Kamp et al. (1994) and research by the Cooperative Park Studies Unit, suggest that the causes of noncompliant behavior vary with individual subjects and result from a complex interaction of individual factors, the social and cultural context and the physical environment. The range of factors that can affect noncompliance is evident in a review of the littering research (Robinson, 1976) in which littering was found to be related to demographic, attitudinal, social-situational and environmental variables. Further, researchers have begun to recognize that the causes of a single individual's behavior may also vary from time to time, place to place, and from behavior to behavior (Ross and Nisbett, 1991). That is, reasons for subject X's noncompliance may vary from site to site, within and between agency boundaries, by type of noncompliant behavior, by the type of social group accompanying subject X, by other dimensions of the immediate social environment, by characteristics of the sites and other physical variables, and by subjects X's personal traits which include personality, other social-psychological factors, and biological traits.

The complex causes of noncompliance have profound implications for the use of theory in applied research design. The conventional use of theory in the scientific process is to adopt a theoretical perspective that provides a paradigm (concepts, logically interrelated propositions and guidelines for appropriate methodology) from which hypotheses predicting variance in the dependent variable are deduced for empirical test. After controlled observation and measurement of both independent and dependent variables, null hypotheses are tested using statistical tests of significance. With regard to noncompliant behavior, two examples discussed below illustrate how adoption of such an approach can be problematic.

Common limitations of the conventional use of theory. Gramann and Vander Stoep (1987) provide an example of a research article that, given the framework in which it was constructed, contributes to our understanding of noncompliance. However, by relying on a single conceptual model of noncompliance, Gramann and Vander Stoep consider only a small subset of the full range of independent variables that could be related to the phenomenon. They discuss protection of natural resources from depreciative visitor activity (they also use the label *rule violations*) by presenting a taxonomy of six types of damaging activities based on six types of normative violations. The definitions of these damaging activities (except for "willful" behavior) presume that visitor compliance is primarily explained by norms of reciprocity and social responsibility.

A taxonomy of this type is as valuable as it is inclusive. Possible explanations of rule violations that fall outside Gramann and Vander Stoep's taxonomy include: visitors may ascribe to

different norms; visitors may know the rules and understand the consequences of noncompliance, but believe the social benefit of compliance is less than the personal benefit of noncompliance; noncompliant behavior may occur out of habit; or noncompliance may result when people imitate the actions of others. The possibility that these, or any other, explanations have validity, and might be used to generate effective interventions is not explored in Gramann and Vander Stoep's presentation. Unfortunately, such limitations are common. Most or all research that uses theory in a conventional way limits consideration of independent variables to those that are encompassed in the theoretical perspective that is adopted.

The conventional adoption of a single conceptual model is even more problematic when the model includes inappropriate definitions of the dependent variable. For example, Namba and Dustin (1992) attempt to clarify the definition of depreciative behavior by proposing that depreciative behavior and vandalism fall on a continuum where the concepts are differentiated by criteria of intent, awareness of consequences, and responsibility. The critical distinction between vandalism and depreciative behavior is whether the actor knows better.

> "Individuals who engage in depreciative behavior are unaware of the consequences of their actions. Otherwise, they would behave differently....People who behave depreciatively do so because they are uninformed about the consequences of their actions."

A presumed cause of the behavior is implicit in this definition of depreciative behavior, making circular reasoning inevitable and rendering the definition useless as a scientific concept. Study of depreciative behavior (by this definition) would only involve acts where people do not understand the adverse consequences of their behavior. If they were informed of these consequences and continued to engage in the behavior, then it would be vandalism regardless of how trivial the impact. Two people engaging in identical behavior (e.g., throwing coins in pool, feeding chipmunks) would be committing either vandalism or depreciative behavior based upon their knowledge of consequences. Objective measurement of this distinction is impossible, and it introduces conceptual confusion that would hinder the conceptual and practical progress of research.

An alternate role for theory in applied research. In response to the problems associated with the conventional use of theory we suggest that applied researchers seeking to limit visitor-caused resource damage employ a different research approach that has four primary distinguishing characteristics: (1) the dependent variable is the behavior causing the damage -- no psychological mechanisms are assumed in the definition of the dependent variable; (2) the only interventions tested (i.e., independent variables) are those that managers can manipulate; (3) there is a willingness to test interventions when the mechanisms underlying those interventions are not known; and (4) rather than adopting a single theoretical viewpoint, researchers draw from as many theories as possible in searching for interventions to be tested.

This approach is similar to that of a medical doctor who surveys a range of possible drugs or other treatment when presented with a sick patient. The doctor may have little or no knowledge of the exact mechanism by which some of these treatments work, but is willing to select a treatment based on a mixture of theoretical understanding and experience. If the first treatment is ineffective, a secondary course of action is selected. Any analysis of the reasons why a treatment succeeds or fails is left until the patient is cured.

To push the analogy further, there is a place in both medicine and in the human dimensions of resource management for theoretically driven research. Ideally, we would like to

know exactly why and how an antibiotic treatment works in the elimination of biological infection. We would also like to know exactly why people break rules in some situations and in other situations follow them. Such knowledge increases the likelihood that we can select effective interventions in a variety of contexts.

Theoretical research can also introduce innovative treatments or interventions. Just as theoretically driven research on genetic mechanisms holds promise for treating many previously intractable diseases, theoretically driven research on noncompliance may suggest new interventions that will effectively deter intractable types of noncompliance. Unfortunately, the complexity and cost of theoretical research (in medicine or natural resource management) are such that we can't afford to wait for this knowledge before taking some action. Consequently, intervention strategies demonstrated empirically to be effective should be used as long as their application does not interfere with the overall objectives sought in the situation. In the case of medicine, these overall objectives pertain to the health and well being of the patient. In the case of National Park Service resource and visitor management, these objectives relate to the mandate of the Service to protect resources and provide for visitor enjoyment.

Finally, in both medicine and resource management, the results of application can feed back into theoretical research and development by demonstrating unexplained patterns that bear further examination. Theories of immunity advanced because Pasteur noticed and exploited the fact that patients with cowpox were later immune to the similar, but more deadly smallpox. Who can say what theories of noncompliance may arise in the course of intervention development?

A Case Example at Mt. Rainier National Park

By focusing on deterrence of damaging behavior and defining the dependent variable in terms of the presence or absence of this behavior, it is possible to empirically test interventions without holistic theoretical explanations for their success or failure.

For example, in the Paradise Meadows of Mt. Rainier National a series of field experiments revealed that a trail-side sign threatening a fine was about twice as effective as a cluster of three signs of equal effectiveness (Johnson and Swearingen, 1986; Swearingen and Johnson, 1988; Johnson and Swearingen, 1992). The three less effective sign texts were: (1) STAY ON THE PAVED TRAILS AND PRESERVE THE MEADOW; (2) DO NOT-TREAD, MOSEY, HOP, TRAMPLE, STEP, PLOD, TIP TOE, TROT, TRAIPSE MEANDER, CREEP, PRANCE, AMBLE, JOG, TRUDGE MARCH, STOMP, TODDLE, JUMP, STUMBLE, TROD, SPRINT, OR WALK ON THE PLANTS; AND (3) a symbolic international red circle and cross-hatch design over a hiker's profile with the message, NO OFF-TRAIL HIKING. These three signs were in turn significantly more effective than a sign which stated: NO HIKING--MEADOW REPAIRS and a sign that contained only the symbolic crosshatch described above. It was also found that the presence of a uniformed interpreter at or near the observation site reduced off-trail hiking significantly, even in the presence of signs and that signs still had a differential effect in the presence of the uniformed employee. In the control condition, about 6% of visitors walked off-trail at the observation sites; in the presence of the most effective sign about 1.8% walked off-trail without the uniformed employee present and the combination of the presence of the employee and four of signs effectively eliminated off-trail hiking.

It was concluded that trail-side signs were powerful deterrents to off-trail hiking and that effectiveness varied substantially with text. Because the impact of widespread utilization of signs threatening a fine upon visitor leisure experiences was not known, caution was urged in their adoption and research on their impact on visitor satisfaction was recommended. In an accompanying visitor survey, visitor data strongly suggested that encounters with uniformed

employees did not have a detrimental effect on visitor experiences. Thus, it was recommended that uniformed volunteers circulate in the Paradise Meadows.

Several points can be made about this research and its utilization by NPS management. First, significant knowledge was gained concerning the differential use of on-site strategies to deter off-trail hiking without a priori classification of the behavior by its presumed causes. Second, no information was gathered to directly test **why** the treatments were differentially effective, nor was such needed for subsequent implementation of most of the findings. Park managers' concerns were primarily that resource damaging behavior be deterred, and that this deterrence should not unacceptably impact visitor satisfaction. Knowledge of the exact psychological mechanisms by which the treatments changed behavior was desirable but not essential, provided the NPS mandate was not violated. One finding that does require further study is the overall effect on visitor experiences of signs which threaten fines for noncompliance. Because this intervention may have significant implications for the NPS mandate, it is necessary to gain a better understanding of why it works and what effects it has on visitor experiences before it can be applied without great caution.

Third, the design of the research was to test the effectiveness of various strategies for deterring the noncompliant behavior that was causing the unacceptable resource damage. This interest in intervention is evident in almost all dimensions of the work, including the decision to work with deterrent strategies at or near the point of noncompliance, the choice of the dependent variable as off-trail hiking, the selection of independent variables (all being strategies usable by management to directly influence the resource damaging behavior), the focus on understanding the small percentage of visitors who break the rules rather than the majority who fully comply [1], and the choice of field experimental methods.

The study data also included several notable patterns that might be investigated and lead to development of theory concerning noncompliance. For example, a strikingly disproportionate number of large Asian tour groups were observed walking off the assigned trails. Possible reasons for this pattern include cultural differences, ignorance of rules due to language barriers, the behavior of the tour-group leaders, and simple group-size effects (larger groups were found to be more likely to walk off-trail). Future studies designed to test these hypotheses and build a theoretical understanding of this subset of noncompliance could prove very useful, and probably would not have been suggested without the observations made in this very applied study.

Overview

The applied approach described here for researching noncompliant behavior differs from that reported in much of the literature. This approach is driven at the most general level by the NPS mandate to preserve natural and cultural resources and to provide for visitor enjoyment of the same. Its primary goal is intervention; consequently the total research design is oriented toward discovering methods that allow park managers to avoid unacceptable outcomes. The following seven points provide the outline of this research approach.

(1) The primary goal is to prevent unacceptable impact to park resources, the adverse impact that some visitors' behavior can have upon the experiences of others, and other managerially defined undesirable outcomes.

(2) Corollary to the first point, the research focus is upon noncompliant visitor behavior directly associated with unacceptable outcomes as dependent variables.

(3) Corollary to the first two points, independent variables selected for study must be under the control of management and be hypothesized to substantially deter damaging behavior. [2]

(4) Researchers should be willing to test interventions when the mechanisms underlying those interventions are not clear. For example, anecdotal and empirical evidence suggests that the presence of a uniformed park employee effectively deters noncompliance and should be considered a promising intervention despite the fact that the exact mechanism responsible for the effect is unclear.

(5) It is assumed that resource-damaging behavior has multiple causes and that single theories fail to explain the broad spectrum of this behavior. Thus, rather than adopting a single theoretical viewpoint, researchers should consider as many theories as possible in searching for interventions to be tested.

(6) It is **not** assumed that all explanations of non-conforming behavior can be logically derived from the explanation of behavior that does conform to park rules (Johnson & Swearingen, 1991). Consequently, the primary interest is the behavior of those visitors associated with management problems and the deterrence of that behavior. [3] This sixth factor is very important. Assume, for example, that the research focus is upon all behavior at a site of noncompliance, and that 95% of all persons who pass by this site comply with behavior guidelines. Assume also that the visitors are a homogenous population, and that all 95% comply because they are aware that noncompliance damages the environment, and they want to help in preserving the natural order. For the sake of the example, assume that the 5% noncompliance is caused by myriad other factors and that all except a tiny minority of people are aware that, in the aggregate, noncompliant behavior results in adverse impact. Thus, prosocial theory postulating the causal effect of helping norms would explain 95% of the behavior at this site (unbelievably successful from a social science perspective) and almost none of the noncompliant behavior. More importantly, an intervention program emphasizing education pertaining to resource damage, laced with appeals to preservation values would have minimal effects on noncompliance rates. [4]

(7) Few if any control measures are likely to be 100% effective. Virtually all control measures require some type of financial investment and many may have trade-offs with other park management objectives. Thus, appropriate management intervention balances statements defining minimal acceptable impact with the appropriate array of deterrent techniques necessary to reach that condition. For this reason, interdisciplinary research teams are usually essential where impacts to biological resources are being considered. Social scientists can experimentally test various deterrent strategies' effectiveness on target noncompliant behavior. Biological information is necessary to determine the linkage between levels of visitor noncompliance and given levels of adverse impact. Management must then make value decisions regarding the minimally acceptable level of adverse impact at specific sites while also considering its mandate to manage for visitor enjoyment.

As applied researchers, we have constant contact with the problems of park managers and the writings of theoretical researchers. We feel that the approach we have outlined above can help us and other applied researchers better fulfill the dual mandate of the National Park Service.

Notes

1. Although they were not the primary focus of the research, some attention was also paid to the reasons people had for not off-trail hiking. Visitor values pertaining to resource preservation, attitudes toward resource protection, attitudes toward the authority of NPS, etc. were studied in a companion survey. The tenuous nature of the attitude/behavior relationship is well documented (see Greenwald, 1989), and the results obtained in the survey were consistent with a weak relationship between these attitudes and values and the dependent variable (off-trail hiking). In retrospect, the investigation of this relationship appears misdirected because even if a strong causal relationship had been observed its management implications would have been limited because visitor attitudes are not directly controllable. (For example, should management require a license to enter parks which certifies that holders have certain resource preservation values, positive attitudes toward the authority of the NPS, perceive resource damage like those socialized by NPS organizational culture etc.?)

2. Accordingly, methodologies are utilized that are best suited to test hypotheses pertaining to the effect of independent variables that are under the control of management, and which are directly connected to resource damage or other management defined problems. Selection of research sites is oriented toward those physical locations where unacceptable damage is occurring. The research methodology of choice is the field experiment. The dependent variable is defined as the problem behavior; the independent variables are possible intervention strategies.

3. In comparison, Gramann and Vander Stoep (1987) argue that resource protection is prosocial behavior and imply that behavior supporting resource protection can be explained by prosocial theory. Behavior resulting in resource damage is seen as a violation of helping norms and conformity is seen as a result of moral obligations, desires to please others, or rewards and punishments. Rewards and punishment are not strictly seen as prosocial behavior because of the presence of external motivation. Nonetheless,... "for populations without a well-developed set of moral standards (for example, children) tangible incentives or punishments may be especially important in promoting prosocial behavior."

We agree that prosocial theory explains some compliance to institutionalized rules (norms). However, we assert that the causes for resource damaging behavior, and other visitor caused undesirable outcomes, are far more complex than violations of helping norms and desires to please others, even among adult populations. Prosocial theory, therefore, by itself is probably inadequate as a theoretical basis for designing intervention strategies in most situations where visitor-caused resource damage is occurring in national park settings

4. This is not to imply that NPS should abandon its program of education and appeals to preservation values in its visitor management programs. Such programs probably have long term positive impacts and statistically significant short term effects. Nonetheless, the unacceptable resource damage presented in this report suggests that current extensive efforts at education and moral appeals are not sufficient to preserve park resources.

Literature Cited

Bennett, Joseph W. 1968. *Vandals wild.* Bennett Publishing Company. Portland, OR.

Campbell, Frederick L., John C. Hendee, & Roger Clark. 1968. Law and order in public parks. *Parks and Recreation, 3*(12), 28-31 & 51-55.

Clark, Roger N., John C. Hendee, and Frederick L. Campbell. 1971. Values, behavior, and conflict in modern camping culture. *Journal of Leisure Research, 3*(3), 143-159.

Gramann, James H. & Gail A. Vander Stoep. 1987. Prosocial behavior theory and natural resource protection: A conceptual synthesis. *Journal of Environmental Management, 24,* 247-257.

Greenwald, Anthony G. 1989. *Why are attitudes important?* In: A. Pratkanis, S. Breckler, and A. Greenwald (eds.), Attitude structure and function. Lawrence Erlbaum Associates. Hillsdale, New Jersey.

Johnson, Darryll R. & Thomas C. Swearingen. 1991. *Deterrence of non-compliant visitor behavior causing natural resource damage in the national park system.* A proposal for FY91 NRPP special initiative funding. NPS CPSU, College of Forest Resources, University of Washington, Seattle.

Johnson, Darryll R. & Thomas C. Swearingen. 1992. *The effectiveness of selected trailside sign texts in deterring off-trail hiking, Paradise Meadows, Mount Rainier National Park.* In: C. Christensen and D. Johnson (eds.), Proceedings of the International Symposium on Vandalism: *April 20-22, 1988.* USFS - PNW Forest and Range Experiment Station, Seattle.

Namba, Richard & Daniel Dustin. 1992. *Towards new definitions of depreciative behavior and vandalism.* In: C. Christensen and D. Johnson (eds.), Proceedings of the International Symposium on Vandalism: *April 20-22, 1988.* USFS - PNW Forest and Range Experiment Station, Seattle.

Robinson, Stuart N. 1976. Littering behavior in public places. *Environment and Behavior, 8*(3), 363-384.

Ross, Lee & Richard E. Nisbett. 1991. *The person and the situation: Perspectives of social psychology.* McGraw-Hill. New York.

Swearingen, Thomas C. & Darryll R. Johnson. 1988. *An analysis of off-trail hiking in response to selected social control techniques at Paradise Meadows, Mount Rainier National Park.* NPS CPSU, College of Forest Resources, University of Washington, Seattle.

Vande Kamp, Mark E., Darryll R. Johnson, & Thomas C. Swearingen. 1994. *Deterring minor acts of noncompliance: A literature review.* USDI, National Park Service Technical Report NPS/PNRUW/NRTR-92/08.

APPENDIX B
QUESTIONNAIRE

VISITOR NONCOMPLIANCE QUESTIONNAIRE

National Park Service
Cooperative Park Studies Unit
College of Forest Resources AR-10
University of Washington
Seattle, Washington 98195

United States Department of the Interior

NATIONAL PARK SERVICE
P.O. Box 37127
Washington, D.C. 20013-7127

IN REPLY REFER TO:
N4615(490)

Memorandum

To: Survey Respondents

From: Associate Director, Natural Resources

Subject: Visitor Noncompliance Questionnaire

The National Park Service will face many challenges as it enters the 21st century. Among the greatest of these will be upholding our mandates to protect resources while also managing for visitor enjoyment. More visitors and more diverse types of visitors will require that we have a more sophisticated understanding of the intricate association between visitor behavior and resource protection.

To that end, the Natural Resources Preservation Program (NRPP) has funded the Cooperative Park Studies Unit (CPSU) at the University of Washington to administer this survey. The knowledge gained from this research will provide an inventory of the kind and type of damage caused to park resources by noncompliant visitor behavior, an accounting of how parks respond to this behavior, and a measure of how successful they are in deterring it.

The results will be valuable in evaluating the seriousness of problems throughout the National Park System.

Your careful response is vital to the accuracy of the survey data. Please take the time to complete and return your questionnaire to the CPSU, which, upon completion of the project, will circulate the results throughout the National Park Service.

Thank you for your assistance.

J. Eugene Hester

Attachment

INTRODUCTION

The primary purpose of this questionnaire is to inventory the extent to which noncompliant visitor behavior has caused damage to the resources of the National Park System.

Noncompliant visitor behaviors are defined as minor rule violations or failures to comply with minimum impact guidelines. Examples are given in the glossary and include: off-trail hiking, souvenir collection of plants and rocks, feeding of wild animals, littering, etc. Minor acts of vandalism, such as name carving in picnic tables are also considered noncompliant behavior for the purposes of this project. However, vandalism where substantial resource damage is caused by a single act is not included. Similarly, damage to park resources motivated by obvious criminal intent (poaching, large scale artifact theft) is also excluded from this study.

The adverse impacts of noncompliant behavior can be grouped into four categories: (1) irreparable damage to nonrenewable resources, (2) damage to, or removal of, renewable resources such that public expenditures are necessary either to repair or replace resources, (3) unwarranted risks to the safety of others, including those persons engaging in rule violations, and (4) intangible negative consequences to the recreation experiences of others, particularly those experiences predicated upon a pristine environment. This questionnaire is concerned with the first two types of impacts, damage to nonrenewable and renewable resources. It is important to note that some resource damage occurs when visitors are complying with rules and guidelines, but that such damage is not to be included in this questionnaire. *Only when damage results from noncompliance is it to be considered in answering this questionnaire.*

Some park units may have problems with acts of visitor noncompliance that do not directly damage park resources. Such acts might include traffic violations, public nudity, or public intoxication. These problems should not be inventoried in the main body of the questionnaire but should be described in Part 5 of Section C.

Many of the questions in this questionnaire concern damage to specified types of sites (definitions of these site-types are found in the Glossary). These site-types have been classed into two categories: (1) sites in frontcountry areas and in areas considered backcountry or wilderness but easily accessible to day hikers, and (2) sites in backcountry or wilderness areas not easily accessible to day hikers. (**Frontcountry** is used here as a general term describing all NPS areas not designated as backcountry or wilderness.) Because many of the site types are found in only a few NPS units, most of you will be instructed to skip through much of the questionnaire. As a consequence, the time needed to finish the questionnaire will usually be short -- probably an hour or even less.

For those of you, however, who are stationed at larger parks with a diversity of site types, the questionnaire will take considerably longer. You may have to consult with others to accurately answer some questions. Therefore, you may want to finish the questionnaire in more than one sitting.

The questionnaire is organized into four sections. Please be sure you read and understand the instructions at the beginning of each section and then answer each question as completely as possible.

Thank you for your cooperation. The information you provide on this questionnaire is vital to our understanding of visitor noncompliance and to the eventual control of the damage it causes.

If you have any questions or problems with this questionnaire, please call the University of Washington Cooperative Park Studies Unit at (206) 685-7404 and ask for Darryll Johnson.

INSTRUCTIONS - SECTION A

For this questionnaire we define noncompliant visitor behaviors as minor rule violations or failures to comply with minimum impact guidelines. Before continuing please be sure you have read the full definition of noncompliant behavior given in the introduction on the previous page. Examples of many noncompliant behaviors are also given in the glossary.

Section A is an inventory of the damage that noncompliant visitor behaviors have caused to resources in your NPS unit. This inventory is organized into two parts and each part is made up of questions concerning damage to various types of sites (site types are defined in the removable glossary included with this questionnaire). Below and on the next page is a completed example of the sequence of questions you will be asked about each site type. This particular sequence concerns damage in a backcountry or wilderness site not easily accessible to day hikers and was therefore drawn from Part 2 of Section A.

Example Question-Section A

Q-X1 Does your unit of the NPS have **natural attractions** in backcountry or wilderness areas not easily accessible to day hikers (i.e., areas defined by notable natural features that draw backcountry or wilderness visitors)? (Circle one number)

1 NO --> GO TO **Q-Y1**
(2) YES

Q-X2 Has noncompliant visitor behavior caused damage at natural attractions in your unit? (Circle one number)

1 NO --> GO TO **Q-Y1**
(2) YES

Q-X3 If you answered YES to **Q-X2**, please use the space below to describe the natural attractions that have been damaged. (If extra space is needed, use supplemental pages.)

The natural attraction damaged is a cave located near one of the more popular backcountry trails in the park. Rangers estimate that as many as 500 overnight backcountry visitors enter the cave each year. Most hikers detour off the trail to look into the cave and despite current prohibitions, a large area just inside the cave mouth has been a popular place for hikers to eat their noon meal. During storms some people sleep in the cave.

Q-X4 Are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-X7**
(2) YES

Q-X5 Please use the space below to describe the repairable damage at natural attractions caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Despite prohibitions on entering the cave, litter in the form of plastic bags, food wrappers, etc. accumulates every year. Many visitors have flashlights so the litter is frequently distributed deep into the cave. Last year, five large garbage bags of litter were removed from the cave. In addition, human waste is a problem, but this has been somewhat reduced in recent years through educational efforts and signs. Finally, several informal (social) trails have been created leading to the cave mouth. These trails are barren of vegetation and subject to erosion.

Q-X6 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$ 100,000 ESTIMATED COST TO REPAIR DAMAGE AT NATURAL ATTRACTIONS
(e.g., Full cost of replanting vegetation.)

$ 3,000 ESTIMATED ANNUAL COST TO CLEAN UP NATURAL ATTRACTIONS
(e.g., Yearly cost of program to clean up litter.)

Q-X7 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-X9**
(2) YES

Q-X8 Please use the space below to describe the damages to nonrenewable resources at natural attractions in your unit. (If extra space is needed, use supplemental pages.)

The scraps of food and other organic matter left deep within the cave (including human solid waste and urine) by visitors has significantly altered the ecology of the cave, even in the most remote locations some 300 feet from the mouth. Annual clean-ups cannot eliminate this impact and even if all human use was eliminated no one knows how long it might take to establish an "undisturbed" cave ecology. One troglobitic species, a rare isopod, has disappeared from the cave while some other troglobites seem to be increasing.

Q-X9 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at natural attractions. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1 LITTERING
2 OFF-TRAIL HIKING
3 INAPPROPRIATE HUMAN WASTE DISPOSAL
4 NONE

Q-X10 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at natural attractions is a problem at your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
(3) IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Feel free to refer to this example while completing Section A.

Please turn the page.

***** **IMPORTANT** *****

1. To properly complete this questionnaire it is very important that you **first read the included removable glossary.**

2. Please do not include suspected damage in this questionnaire. Damage should be documented or should be a subject of consensus among the staff at your unit.

3. For each site type you are asked to estimate two types of costs. The first is the cost of repairs such as fixing broken facilities or replanting damaged vegetation. The second is the *annual* cost of recurrent clean-up (e.g., costs associated with the collection of litter). Please write down the best estimates that you can quickly make, and do not include the costs of preventing further damage (e.g., enforcement costs, erection of barriers) in your estimates.

4. If any of your answers require that you attach supplemental pages, please indicate which answers are continued and clearly label each continuation with the appropriate question number.

****

SECTION A, PART 1: SITES IN FRONTCOUNTRY AREAS AND IN AREAS CONSIDERED BACKCOUNTRY OR WILDERNESS BUT ACCESSIBLE TO DAY HIKERS

Q-A1 Does your unit of the NPS have **developed visitor sites** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-B1** ON PAGE 6
2 YES

Q-A2 Has noncompliant visitor behavior caused damage at developed visitor sites in your unit? (Circle one number)

1 NO --> GO TO **Q-B1** ON PAGE 6
2 YES

Q-A3 If you answered YES to **Q-A2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-A6**
2 YES

Q-A4 Please use the space below to describe the repairable damage at developed sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-A5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT DEVELOPED SITES
(*e.g., Full cost of replanting vegetation.*)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP DEVELOPED SITES
(*e.g., Yearly cost of program to clean up litter.*)

Q-A6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-A8**
2 YES

Q-A7 Please use the space below to describe the damages to nonrenewable resources at developed sites in your unit. (If extra space is needed, use supplemental pages.)

Q-A8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at developed visitor sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-A9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at developed visitor sites is a problem at your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-B1 Does your unit of the NPS have **archeological or paleontological sites** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-C1** ON PAGE 8
2 YES

Q-B2 Has noncompliant visitor behavior caused damage at archeological or paleontological sites in your unit? (Circle one number)

1 NO --> GO TO **Q-C1** ON PAGE 8
2 YES

Q-B3 If you answered YES to **Q-B2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-B6**
2 YES

Q-B4 Please use the space below to describe the repairable damage at archeological or paleontological sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-B5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT ARCHEOLOGICAL OR PALEONTOLOGICAL SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP ARCHEOLOGICAL OR PALEONTOLOGICAL SITES
(e.g., Yearly cost of program to clean up litter.)

Q-B6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-B8**
2 YES

Q-B7 Please use the space below to describe the damages to nonrenewable resources at archeological or paleontological sites in your unit. (If extra space is needed, use supplemental pages.)

Q-B8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at archeological or paleontological sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-B9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at archeological or paleontological sites is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-C1 Does your unit of the NPS have **campgrounds** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-D1** ON PAGE 10
2 YES

Q-C2 Has noncompliant visitor behavior caused damage at campgrounds in your unit? (Circle one number)

1 NO --> GO TO **Q-D1** ON PAGE 10
2 YES

Q-C3 If you answered YES to **Q-C2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-C6**
2 YES

Q-C4 Please use the space below to describe the repairable damage at campgrounds caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-C5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT CAMPGROUNDS
(*e.g., Full cost of replanting vegetation.*)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP CAMPGROUNDS
(*e.g., Yearly cost of program to clean up litter.*)

Q-C6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-C8**
2 YES

Q-C7 Please use the space below to describe the damages to nonrenewable resources at campgrounds in your unit. (If extra space is needed, use supplemental pages.)

Q-C8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at campgrounds. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-C9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at campgrounds is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-D1 Does your unit of the NPS have **commemorative sites** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-E1** ON PAGE 12
2 YES

Q-D2 Has noncompliant visitor behavior caused damage at commemorative sites in your unit? (Circle one number)

1 NO --> GO TO **Q-E1** ON PAGE 12
2 YES

Q-D3 If you answered YES to **Q-D2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-D6**
2 YES

Q-D4 Please use the space below to describe the repairable damage at commemorative sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-D5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT COMMEMORATIVE SITES
(*e.g., Full cost of replanting vegetation.*)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP COMMEMORATIVE SITES
(*e.g., Yearly cost of program to clean up litter.*)

Q-D6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-D8**
2 YES

Q-D7 Please use the space below to describe the damages to nonrenewable resources at commemorative sites in your unit. (If extra space is needed, use supplemental pages.)

Q-D8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at commemorative sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-D9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at commemorative sites is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-E1 Does your unit of the NPS have **historic sites** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-F1** ON PAGE 14
2 YES

Q-E2 Has noncompliant visitor behavior caused damage at historic sites in your unit? (Circle one number)

1 NO --> GO TO **Q-F1** ON PAGE 14
2 YES

Q-E3 If you answered YES to **Q-E2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-E6**
2 YES

Q-E4 Please use the space below to describe the repairable damage at historic sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-E5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT HISTORIC SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP HISTORIC SITES
(e.g., Yearly cost of program to clean up litter.)

Q-E6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-E8**
2 YES

Q-E7 Please use the space below to describe the damages to nonrenewable resources at historic sites in your unit. (If extra space is needed, use supplemental pages.)

Q-E8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at historic sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-E9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at historic sites is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-F1 Does your unit of the NPS have **natural attractions accessible by road or day hiking trails** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-G1** ON PAGE 16
2 YES

Q-F2 Has noncompliant visitor behavior caused damage at natural attractions accessible by road or day hiking trails in your unit? (Circle one number)

1 NO --> GO TO **Q-G1** ON PAGE 16
2 YES

Q-F3 If you answered YES to **Q-F2**, please use the space below to describe the natural attractions that have been damaged. (If extra space is needed, use supplemental pages.)

Q-F4 Are any or all of the damages caused by visitor noncompliance repairable? (Circle one number)

1 NO --> GO TO **Q-F7**
2 YES

Q-F5 Please use the space below to describe the repairable damage at accessible natural attractions caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-F6 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT NATURAL ATTRACTIONS ACCESSIBLE BY ROAD OR DAY HIKING TRAILS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP NATURAL ATTRACTIONS ACCESSIBLE BY ROAD OR DAY HIKING TRAILS
(e.g., Yearly cost of program to clean up litter.)

Q-F7 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-F9**
2 YES

Q-F8 Please use the space below to describe the damages to nonrenewable resources at accessible natural attractions in your unit. (If extra space is needed, use supplemental pages.)

Q-F9 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at accessible natural attractions. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-F10 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at accessible natural attractions is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-G1 Does your unit of the NPS have **picnic areas** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-H1** ON PAGE 18
2 YES

Q-G2 Has noncompliant visitor behavior caused damage at picnic areas in your unit? (Circle one number)

1 NO --> GO TO **Q-H1** ON PAGE 18
2 YES

Q-G3 If you answered YES to **Q-G2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-G6**
2 YES

Q-G4 Please use the space below to describe the repairable damage at picnic areas caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-G5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT PICNIC AREAS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP PICNIC AREAS
(e.g., Yearly cost of program to clean up litter.)

Q-G6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-G8**
2 YES

Q-G7 Please use the space below to describe the damages to nonrenewable resources at picnic areas in your unit. (If extra space is needed, use supplemental pages.)

Q-G8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at picnic areas. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-G9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at picnic areas is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-H1 Does your unit of the NPS have **rest areas** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-I1** ON PAGE 20
2 YES

Q-H2 Has noncompliant visitor behavior caused damage at rest areas in your unit? (Circle one number)

1 NO --> GO TO **Q-I1** ON PAGE 20
2 YES

Q-H3 If you answered YES to **Q-H2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-H6**
2 YES

Q-H4 Please use the space below to describe the repairable damage at rest areas caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-H5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT REST AREAS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP REST AREAS
(e.g., Yearly cost of program to clean up litter.)

Q-H6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-H8**
2 YES

Q-H7 Please use the space below to describe the damages to nonrenewable resources at rest areas in your unit. (If extra space is needed, use supplemental pages.)

Q-H8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at rest areas. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-H9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at rest areas is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-I1 Does your unit of the NPS have **roadside attractions/turnouts** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-J1** ON PAGE 22
2 YES

Q-I2 Has noncompliant visitor behavior caused damage at roadside attractions/turnouts in your unit? (Circle one number)

1 NO --> GO TO **Q-J1** ON PAGE 22
2 YES

Q-I3 If you answered YES to **Q-I2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-I6**
2 YES

Q-I4 Please use the space below to describe the repairable damage at roadside attractions/turnouts caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-I5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT ROADSIDE ATTRACTIONS/TURNOUTS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP ROADSIDE ATTRACTIONS/TURNOUTS
(e.g., Yearly cost of program to clean up litter.)

Q-I6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-I8**
2 YES

Q-I7 Please use the space below to describe the damages to nonrenewable resources at roadside attractions/turnouts in your unit. (If extra space is needed, use supplemental pages.)

Q-I8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at roadside attractions/turnouts. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-I9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at roadside attractions/turnouts is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-J1 Does your unit of the NPS have **trailhead sites** in frontcountry areas or in backcountry or wilderness areas easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-K1** ON PAGE 24
2 YES

Q-J2 Has noncompliant visitor behavior caused damage at trailhead sites in your unit? (Circle one number)

1 NO --> GO TO **Q-K1** ON PAGE 24
2 YES

Q-J3 If you answered YES to **Q-J2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-J6**
2 YES

Q-J4 Please use the space below to describe the repairable damage at trailhead sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-J5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT TRAILHEAD SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP TRAILHEAD SITES
(e.g., Yearly cost of program to clean up litter.)

Q-J6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-J8**
2 YES

Q-J7 Please use the space below to describe the damages to nonrenewable resources at trailhead sites in your unit. (If extra space is needed, use supplemental pages.)

Q-J8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at trailhead sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-J9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at trailhead sites is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-K1 Does your unit of the NPS have **other** frontcountry or easily accessible backcountry or wilderness sites in which noncompliant visitor behavior has caused damage? (i.e., sites not already described above.) (Circle one number)

1 NO --> GO TO **Q-L1** ON PAGE **25**
2 YES

Q-K2 If you answered YES to **Q-K1**, please use the space below to describe the other kinds of sites that have been damaged.

Q-K3 Are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-K6**
2 YES

Q-K4 Please use the space below to describe the repairable damage at these other sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-K5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT OTHER SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP OTHER SITES
(e.g., Yearly cost of program to clean up litter.)

Q-K6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-K8**
2 YES

Q-K7 Please use the space below to describe the damages to nonrenewable resources at these other sites in your unit. (If extra space is needed, use supplemental pages.)

Q-K8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at these other sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-K9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at these other sites is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-L1 Does your unit of the NPS attempt to control visitor noncompliance in frontcountry or easily accessible backcountry areas by using any of the means of control listed on page 3-4 of the glossary? (Circle one number)

1 NO --> GO TO SECTION A, PART 2 ON PAGE 26
2 YES

Q-L2 Across all frontcountry and easily accessible backcountry areas, approximately what percentage of noncompliance do you think is deterred (i.e., eliminated) by the means of control used in your unit? (If the means of control are not at all effective they deter 0% of noncompliance; If they are completely effective they deter 100% of noncompliance.) Please circle the response below that best matches your answer.

0% 20% 40% 60% 80% 100%

PERCENTAGE OF NONCOMPLIANCE DETERRED

SECTION A, PART 2: BACKCOUNTRY AND WILDERNESS AREAS THAT ARE NOT EASILY ACCESSIBLE TO DAY HIKERS

Please consult the glossary for definitions of the site types. Remember, all questions pertain to the unit of the NPS where you are now working, and only to impacts caused by noncompliant visitor behavior.

Q-M1

DOES YOUR UNIT OF THE NPS CONTAIN BACKCOUNTRY OR WILDERNESS AREAS THAT ARE NOT EASILY ACCESSIBLE TO DAY HIKERS? (Circle one number)

1 NO --> GO TO SECTION B ON PAGE 40
2 YES

Q-N1 Does your unit of the NPS have **hiking or stock trails** in backcountry or wilderness areas not easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-O1** ON PAGE 28
2 YES

Q-N2 Has noncompliant visitor behavior caused damage along hiking or stock trails in your unit? (Circle one number)

1 NO --> GO TO **Q-O1** ON PAGE 28
2 YES

Q-N3 If you answered YES to **Q-N2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-N6**
2 YES

Q-N4 Please use the space below to describe the repairable damage along hiking or stock trails caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-N5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE ALONG HIKING OR STOCK TRAILS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP HIKING OR STOCK TRAILS
(e.g., Yearly cost of program to clean up litter.)

Q-N6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-N8**
2 YES

Q-N7 Please use the space below to describe the nonrenewable resource damage along hiking or stock trails in your unit. (If extra space is needed, use supplemental pages.)

Q-N8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage along hiking or stock trails. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-N9 Which one of the following statements best describes your perception of the extent to which damage along hiking or stock trails caused by noncompliant behavior is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-O1 Does your unit of the NPS have **archeological or paleontological sites** in backcountry or wilderness areas? (Circle one number)

1 NO --> GO TO **Q-P1** ON PAGE 30
2 YES

Q-O2 Has noncompliant visitor behavior caused damage at archeological or paleontological sites in your unit? (Circle one number)

1 NO --> GO TO **Q-P1** ON PAGE 30
2 YES

Q-O3 If you answered YES to **Q-O2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-O6**
2 YES

Q-O4 Please use the space below to describe the repairable damage at archeological or paleontological sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-O5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT ARCHEOLOGICAL OR PALEONTOLOGICAL SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP ARCHEOLOGICAL OR PALEONTOLOGICAL SITES
(e.g., Yearly cost of program to clean up litter.)

Q-O6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-O8**
2 YES

Q-O7 Please use the space below to describe the damages to nonrenewable resources at archeological or paleontological sites in your unit. (If extra space is needed, use supplemental pages.)

Q-O8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at archeological or paleontological sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-O9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at archeological or paleontological sites is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-P1 Does your unit of the NPS have **camping sites** in backcountry or wilderness areas not easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-Q1** ON PAGE 32
2 YES

Q-P2 Has noncompliant visitor behavior caused damage at camping sites in your unit? (Circle one number)

1 NO --> GO TO **Q-Q1** ON PAGE 32
2 YES

Q-P3 If you answered YES to **Q-P2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-P6**
2 YES

Q-P4 Please use the space below to describe the repairable damage at camping sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-P5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT CAMPING SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP CAMPING SITES
(e.g., Yearly cost of program to clean up litter.)

Q-P6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-P8**
2 YES

Q-P7 Please use the space below to describe the damages to nonrenewable resources at camping sites in your unit. (If extra space is needed, use supplemental pages.)

Q-P8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at camping sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-P9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at camping sites is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-Q1 Does your unit of the NPS have **historic sites** in backcountry or wilderness areas not easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-R1** ON PAGE 34
2 YES

Q-Q2 Has noncompliant visitor behavior caused damage at historic sites in your unit? (Circle one number)

1 NO --> GO TO **Q-R1** ON PAGE 34
2 YES

Q-Q3 If you answered YES to **Q-Q2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-Q6**
2 YES

Q-Q4 Please use the space below to describe the repairable damage at historic sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-Q5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT HISTORIC SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP HISTORIC SITES
(e.g., Yearly cost of program to clean up litter.)

Q-Q6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-Q8**
2 YES

Q-Q7 Please use the space below to describe the damages to nonrenewable resources at historic sites in your unit. (If extra space is needed, use supplemental pages.)

Q-Q8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at historic sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-Q9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at historic sites is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-R1 Does your unit of the NPS have **scenic overlooks** in backcountry or wilderness areas not easily accessible to day hikers? (Circle one number)

1 NO --> GO TO **Q-S1** ON PAGE 36
2 YES

Q-R2 Has noncompliant visitor behavior caused damage at scenic overlooks in your unit? (Circle one number)

1 NO --> GO TO **Q-S1** ON PAGE 36
2 YES

Q-R3 If you answered YES to **Q-R2**, are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-R6**
2 YES

Q-R4 Please use the space below to describe the repairable damage at scenic overlooks caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-R5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT SCENIC OVERLOOKS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP SCENIC OVERLOOKS
(e.g., Yearly cost of program to clean up litter.)

Q-R6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-R8**
2 YES

Q-R7 Please use the space below to describe the damages to nonrenewable resources at scenic overlooks in your unit. (If extra space is needed, use supplemental pages.)

Q-R8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at scenic overlooks. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-R9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at scenic overlooks is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-S1 Does your unit of the NPS have **natural attractions** in backcountry or wilderness areas not easily accessible to day hikers (i.e., areas defined by notable natural features that draw backcountry or wilderness visitors)? (Circle one number)

1 NO --> GO TO **Q-T1** ON PAGE 38
2 YES

Q-S2 Has noncompliant visitor behavior caused damage at natural attractions in your unit? (Circle one number)

1 NO --> GO TO **Q-T1** ON PAGE 38
2 YES

Q-S3 If you answered YES to **Q-S2**, please use the space below to describe the natural attractions that have been damaged.

Q-S4 Are any or all of the damages caused by visitor noncompliance repairable? (Circle one number)

1 NO --> GO TO **Q-S7**
2 YES

Q-S5 Please use the space below to describe the repairable damage at natural attractions caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-S6 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT NATURAL ATTRACTIONS
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP NATURAL ATTRACTIONS
(e.g., Yearly cost of program to clean up litter.)

Q-S7 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-S9**
2 YES

Q-S8 Please use the space below to describe the damages to nonrenewable resources at natural attractions in your unit. (If extra space is needed, use supplemental pages.)

Q-S9 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at natural attractions. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-S10 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at natural attractions is a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-T1 Does your unit of the NPS have **other** backcountry or wilderness sites in which noncompliant visitor behavior has caused damage? (i.e., sites not not already described above.) (Circle one number)

1 NO --> GO TO **Q-U1** ON PAGE **39**
2 YES

Q-T2 If you answered YES to **Q-T1**, please use the space below to describe the other kinds of sites that have been damaged.

Q-T3 Are any or all of these damages repairable? (Circle one number)

1 NO --> GO TO **Q-T6**
2 YES

Q-T4 Please use the space below to describe the repairable damage at these other sites caused by noncompliant visitor behavior in your unit. (If extra space is needed, use supplemental pages.)

Q-T5 How much do you estimate it would cost to repair this damage? (Remember, do not include costs of preventing further damage.)

$_____ ESTIMATED COST TO REPAIR DAMAGE AT OTHER SITES
(e.g., Full cost of replanting vegetation.)

$_____ ESTIMATED ANNUAL COST TO CLEAN UP OTHER SITES
(e.g., Yearly cost of program to clean up litter.)

Q-T6 Are any or all of these damages to nonrenewable resources? (Circle one number)

1 NO --> GO TO **Q-T8**
2 YES

Q-T7 Please use the space below to describe the damages to nonrenewable resources at these other sites in your unit. (If extra space is needed, use supplemental pages.)

Q-T8 Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at these other sites. Start with the type of behavior which has had the most destructive impact then sequentially list up to four types of behavior. If four types of behavior are not present, list those that are present and write "NONE" in the remaining blanks.

1_____
2_____
3_____
4_____

Q-T9 Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at these other sites is a problem in your unit (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

Q-U1 Does your unit of the NPS attempt to control visitor noncompliance in backcountry or wilderness areas not easily accessible to day-hikers by using any of the means of control listed on page 3-4 of the glossary? (Circle one number)

1 NO --> GO TO SECTION B ON PAGE 40
2 YES

Q-U2 Across all wilderness or backcountry areas not easily accessible to day-hikers, approximately what percentage of noncompliance do you think is deterred (i.e., eliminated) by the means of control used in your unit? (If the means of control are not at all effective they deter 0% of noncompliance; If they are completely effective they deter 100% of noncompliance.) Please circle the response below that best matches your answer.

0% 20% 40% 60% 80% 100%

PERCENTAGE OF NONCOMPLIANCE DETERRED

INSTRUCTIONS-SECTION B

In Section A you described the resource damages caused by noncompliant visitor behavior at a variety of site-types in your NPS unit. In this Section we are asking that you select the three most damaged types of sites and rank them from most to least seriously damaged.

For your convenience, the types of sites included in Section A are listed in the box below. From this list you should first select the site types you consider to be the first, second, and third most damaged in your unit, and then place the numbers corresponding to those sites in the appropriate boxes in Q-A1, Q-B1, and Q-C1. If your unit has only two, or even just one type of damaged site(s) you should write "none" in the box(es) specifying the third, or second and third most damaged sites. After indicating the most damaged sites please return to Q-A2 to answer some further questions concerning each of the site-types you list as most damaged.

Sites in Frontcountry Areas and in Areas Considered Backcountry or Wilderness but easily Accessible to Day Hikers

1) Archaeological or Paleontological Sites
2) Campgrounds
3) Commemorative Sites
4) Developed Visitor Sites
5) Historic Sites
6) Natural Attractions Accessible to Day Hikers
7) Picnic Areas
8) Rest Areas
9) Roadside Attractions/Turnouts
10) Trailhead Sites
11) Other Sites Not Listed

Backcountry or Wilderness Sites that are not easily Accessible by Day Hikers

12) Archaeological or Paleontological Sites
13) Camping Sites
14) Hiking or Stock Trails
15) Historic Sites
16) Scenic Overlooks
17) Natural Attractions
18) Other Sites Not Listed

An example of a correctly completed set of questions for this section is provided on the next page.

EXAMPLE QUESTION-SECTION B

In the question below, the respondent believed that the type of site most seriously damaged by noncompliant visitor behavior in their unit was CAMPGROUNDS. Accordingly, the number 2 was written in the box. The unit attempts to deter damage at campgrounds by brochures, informal personal contact, and interpretive signs. The numbers designating these approaches are appropriately circled. Finally, in the last three questions the respondent describes the site, the significance of its damage, and other

---

Q-X1 What type of site is most damaged by noncompliant visitor behavior in your unit of the National Park System. (Please insert the number of the appropriate type of site from the list provided on page 40 in the box below.)

[2] TYPE OF SITE MOST DAMAGED BY NONCOMPLIANT BEHAVIOR

Q-X2 Which of these means of control does management of your unit use to deter the noncompliant behavior causing damage at the type of site you listed in **Q-X1**. (Please circle the numbers of all that apply; See the glossary for definitions of these means of control.)

1 Barriers
(2) Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
(9) Informal Personal Contact
10 Improved Landscape or Facility Design
(11) Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)
19 Other Means (Please specify below)

_____

Q-X3 Please use the space below to specifically describe the site(s) you consider to be the most seriously damaged type of site in your unit.

The most damaged site in the unit is a popular campground near the Logan river. The campground has 50 sites, 20 for tents only and 30 suitable for camper-trailers.

Q-X4 Why is the damage at this site significant?

The damage at this site has primarily involved destruction of vegetation. In turn, this has lead to increases in erosion that is making rehabilitation very difficult. In effect, the impacts create a vicious circle of erosion, vegetation loss, and spreading of visitor use and damage to attractive unimpacted areas.

Q-X5 Is there any other information about the site(s) that you feel is relevant to the control of visitor noncompliance?

Control efforts have been minimally effective. Informal contact by Rangers suggests that many people appear genuinely unaware of regulations, even when they have had opportunities to read signs or brochures. The administration is considering implementing a program of observation by volunteers who would reside at the campground and make personal contact with campers.

PLEASE TURN THE PAGE AND COMPLETE SECTION B

SECTION B

Q-A1 What type of site is most damaged by noncompliant visitor behavior in your unit of the National Park System. (Please insert the number of the appropriate type of site from the list provided on page 40 in the box below.)

☐ TYPE OF SITE MOST DAMAGED BY NONCOMPLIANT BEHAVIOR

Q-A2 Which of these means of control does management of your unit use to deter the noncompliant behavior causing damage at the type of site you listed in **Q-A1**. (Please circle the numbers of all that apply; See the glossary for definitions of these means of control.)

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)
19 Other Means (Please specify below)

_____

Q-A3 Please use the space below to specifically describe the site(s) you consider to be the most seriously damaged type of site in your unit. (If extra space is needed, use supplemental pages.)

Q-A4 Why is the damage at this site significant?

Q-A5 Is there any other information about the site(s) that you feel is relevant to the control of visitor noncompliance?

Q-B1 What type of site is second most damaged by noncompliant visitor behavior in your unit of the National Park System. (Please insert the number of the appropriate type of site from the list provided on page 40 in the box below.)

☐ TYPE OF SITE SECOND MOST DAMAGED BY NONCOMPLIANT BEHAVIOR

Q-B2 Which of these means of control does management of your unit use to deter the noncompliant behavior causing damage at the type of site you listed in **Q-B1**. (Please circle the numbers of all that apply; See the glossary for definitions of these means of control.)

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)
19 Other Means (Please specify below)

_____

Q-B3 Please use the space below to specifically describe the site(s) you consider to be the most seriously damaged type of site in your unit. *(If extra space is needed, use supplemental pages.)*

Q-B4 Why is the damage at this site significant?

Q-B5 Is there any other information about the site(s) that you feel is relevant to the control of visitor noncompliance?

Q-C1 What type of site is third most damaged by noncompliant visitor behavior in your unit of the National Park System. (Please insert the number of the appropriate type of site from the list provided on page 40 in the box below.)

☐ TYPE OF SITE THIRD MOST DAMAGED BY NONCOMPLIANT BEHAVIOR

Q-C2 Which of these means of control does management of your unit use to deter the noncompliant behavior causing damage at the type of site you listed in **Q-C1**. (Please circle the numbers of all that apply; See the glossary for definitions of these means of control.)

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)
19 Other Means (Please specify below)

_____

Q-C3 Please use the space below to specifically describe the site(s) you consider to be the most seriously damaged type of site in your unit. (If extra space is needed, use supplemental pages.)

Q-C4 Why is the damage at this site significant?

Q-C5 Is there any other information about the site(s) that you feel is relevant to the control of visitor noncompliance?

INSTRUCTIONS - SECTION C

This section of the questionnaire asks what you consider to be the most appropriate and effective strategies to control visitor noncompliance. In order to provide all respondents with a common ground for the evaluation of these strategies, you are being asked to consider a specific situation in which visitor noncompliance is causing damage to NPS resources. This situation is described below.

As you read this description, imagine that you are in charge of all programs attempting to control visitor noncompliance and thereby decrease damage to the resource. Try to imagine programs that you think would be appropriate and effective.

The area of concern is Magnificent Meadows, a popular sub-alpine day hiking area adjacent to the developed visitor facilities in a major western national park. The meadows are located within a 3 hour drive of a major metropolitan area and are visited by about 500,000 people per year. The majority of visitors are upper middle-class, White Americans, but growing numbers of Asian, Hispanic, and Black Americans are visiting the park. In addition, the proportion of foreign visitors is growing from the current level of 6 percent.

The Magnificent Meadows are crossed by a system of paved and unpaved trails. The typical day hiker can walk away from the visitor center for about three miles then loop back through several alternate routes to the developed facilities. The first one-half of the trail system is paved and the balance is not.

Decades of use have resulted in a maze of informal (social) trails caused by people who shortcut designated trails, walk to scenic vistas that are not accessible on the designated trails, and so forth. These trails are inconsistent with the Agency's mission of preserving a nearly natural ecological condition. Many of them are eyesores, barren of vegetation and subject to erosion. Although signs are posted to identify the official trails, the distinction between the official and social trails is sometimes difficult to make, particularly in areas far from the visitor center.

It is estimated that to completely rehabilitate the damaged areas would require three to six million dollars and several years work. Many on the park staff feel that to undertake such a program without a corresponding program to reduce off-trail hiking would constitute only a short-term fix of the problem. However, controversy has arisen concerning the means by which visitor behavior should be controlled. Until now, the park staff has attempted to keep visitors on the official trails by using a variety of control strategies. Although these strategies have been somewhat effective, an unacceptable level of off-trail hiking has persisted. The park staff members do not agree on the means of control that should be included in the new program so as to best control this persistent level of noncompliance.

After you have read this description and thought about what you might do to reduce noncompliance, please answer the questions starting on the next page. Be sure to consult the glossary for definitions of the various means of controlling noncompliant visitor behavior.

Part 1

For this first question of Section C please imagine applying each means of visitor control listed below to the problems in Magnificent Meadows (See the glossary for definitions of these means of control). Consider how **appropriate** each means of control would be.

IMPORTANT: Appropriateness is defined as the extent to which a means of control is acceptable, given the broad philosophical principles concerning park management and the specific NPS mandate of management for visitor enjoyment. Consider the appropriateness of each means of control if it were instituted in a manner like that commonly used in the national parks. Do NOT consider issues of effectiveness or cost when answering this question.

Q-A1 Which of the 18 means of visitor control listed below are **appropriate** for use in Magnificent Meadows? (Please indicate them by circling the numbers below.)

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)

Q-A2 If you feel that any of the means of control are not appropriate for use in Magnificent Meadows, please explain why. (If extra space is needed, use supplemental pages.)

For this second question of Part 1 please imagine, once again, the application of each means of visitor control to the problems in Magnificent Meadows. However, for this question please consider how effectively each means would deter noncompliance.

IMPORTANT: Effectiveness is defined as the percentage of noncompliant behavior that would be deterred. If a means of control was not at all effective it would deter 0% of noncompliance; If it was completely effective it would deter 100% of noncompliance. Consider the deterrent effect of each means of control if it were instituted in a manner like that commonly used in the national parks. Do NOT consider appropriateness when making your estimates.

Remember to consult the glossary for full definitions of the different means of control.

Q-B Please estimate the approximate percentage of noncompliance each means of visitor control would deter if it were applied to Magnificent Meadows. (Circle the response that best matches your answer.)

		PERCENTAGE OF NONCOMPLIANCE DETERRED					
Q-B1	Barriers	0%	20%	40%	60%	80%	100%
Q-B2	Brochures	0%	20%	40%	60%	80%	100%
Q-B3	Cinema	0%	20%	40%	60%	80%	100%
Q-B4	Closure	0%	20%	40%	60%	80%	100%
Q-B5	Improving the Quality of Existing Trails or Access Routes	0%	20%	40%	60%	80%	100%
Q-B6	Construction of Visitor Facilities	0%	20%	40%	60%	80%	100%
Q-B7	Direct Enforcement	0%	20%	40%	60%	80%	100%
Q-B8	Exhibits	0%	20%	40%	60%	80%	100%
Q-B9	Informal Personal Contact	0%	20%	40%	60%	80%	100%

PERCENTAGE OF NONCOMPLIANCE DETERRED

Please estimate the approximate percentage of noncompliance each means of visitor control would deter if it were applied to Magnificent Meadows. (Circle the response that best matches your answer.)

		PERCENTAGE OF NONCOMPLIANCE DETERRED					
Q-B10	Improved Landscape or Facility Design	0%	20%	40%	60%	80%	100%
Q-B11	Interpretive Signs	0%	20%	40%	60%	80%	100%
Q-B12	Interpretive Talks	0%	20%	40%	60%	80%	100%
Q-B13	Newsletters/Newspapers	0%	20%	40%	60%	80%	100%
Q-B14	Regulatory Signs	0%	20%	40%	60%	80%	100%
Q-B15	Rerouting Trails or Roads	0%	20%	40%	60%	80%	100%
Q-B16	Restoration	0%	20%	40%	60%	80%	100%
Q-B17	Use Quotas (Direct)	0%	20%	40%	60%	80%	100%
Q-B18	Use Quotas (Indirect)	0%	20%	40%	60%	80%	100%
Q-B19	Other Means (Please Specify _____)	0%	20%	40%	60%	80%	100%

PERCENTAGE OF NONCOMPLIANCE DETERRED

Please continue on the next page.

In this third question of Part 1 we ask that you consider both how appropriate, and how effective each means of visitor control would be for use in Magnificent Meadows.

As you consider the various means of visitor control, remember:

Appropriateness is defined as the extent to which a means of control is acceptable, given the broad philosophical principles concerning park management and the specific NPS mandate of management for visitor enjoyment.

Effectiveness is defined as the percentage of noncompliant behavior that would be deterred.

Q-C Please imagine the application of each means of control listed below to the problems in Magnificent Meadows then select the five you feel would be most **appropriate and effective** (That is, select the 5 **best** means of control). Select five even if you think the last few are relatively poor means of control.

Note: Because you should consider both appropriateness and effectiveness in selecting the best means of control, the means you select may not be those you rated as most effective in Q-B.

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)
19 Other Means (Please specify below)

_____

After selecting the five best means of control, rank them from Best to Fifth Best by placing their numbers in the boxes below.

☐ Best Means of Control

☐ Second Best Means of Control

☐ Third Best Means of Control

☐ Fourth Best Means of Control

☐ Fifth Best Means of Control

Part 2

Several different persuasive strategies can be used in signs, exhibits, and other modes of communication with visitors. In Part 2 of this section we describe 6 different persuasive strategies and ask that you imagine their application to Magnificent Meadows.

1. **Appeals to intrinsic values**: Messages emphasizing that visitors should comply with rules because failing to do so will damage resources that have some special value in their own right. These messages usually emphasize information about the resource, be it a natural or historical feature. For example, "By staying on the paved trail you preserve the beauty of this fragile alpine meadow."

2. **Direct commands**: Messages that specify regulations and expected behavior with no attempts to justify or explain the regulation. For example, "Off-trail hiking is prohibited".

3. **Messages emphasizing Agency authority**: Messages that bolster, and/or take advantage of, the legitimacy of the NPS as a governing body of the parks. For example, "The National Park Service was created to protect the resources of the National Parks. Do your part by hiking only on the paved trails."

4. **Messages manipulating social affiliations**: Messages that imply positive or negative social categories for persons acting in specified ways. For example, "Be a part of the ecological honor society -- hike only on the paved trails."

5. **Messages emphasizing resource value to humankind**: These messages explain that visitors should comply with rules so that future visitors can enjoy the benefits of the resource. For example, "Hike only on the paved trails so that your grandchildren may know the beauty of this place."

6. **Threats of citations or fines**: Messages spelling out that the Park Service write citations imposing punishment on visitors who do not comply with rules. These messages may or may not be combined with an enforcement program to actually impose such punishments. For example, "Off-trail hikers may be fined."

In the first question of Part 2 we ask that you consider how appropriate the various persuasive strategies listed above would be for application in Magnificent Meadows.

As you consider the persuasive strategies, remember: **Appropriateness is defined as the extent to which a means of control is acceptable, given the broad philosophical principles concerning park management and the specific NPS mandate of management for visitor enjoyment.**

Q-D1 Which of the six persuasive strategies described above are **appropriate** for use in Magnificent Meadows? (Please indicate it/them by marking an X in the appropriate boxes below.)

☐	Appeals to intrinsic values	☐	Messages manipulating social affiliations
☐	Direct commands	☐	Messages emphasizing resource value to humankind
☐	Messages emphasizing Agency authority	☐	Threats of citations or fines

Q-D2 If you feel any of the strategies are not appropriate please explain why. (If extra space is needed, use supplemental pages.)

In the second question of Part 2 we ask that you consider how effectively each persuasive strategy would deter noncompliance in Magnificent Meadows.

As you consider the various persuasive strategies, remember: **Consider the effect of each persuasive strategy if it were instituted in a manner like that commonly used in the national parks. Do NOT consider appropriateness when making your estimates.**

See the box on page 50 for full definitions of the different persuasive strategies.

Q-E Please estimate the approximate percentage of noncompliance each persuasive strategy would deter if it were applied to Magnificent Meadows. (Circle the response that best matches your answer.)

		PERCENTAGE OF NONCOMPLIANCE DETERRED					
Q-E1	Appeals to Intrinsic Values	0%	20%	40%	60%	80%	100%
Q-E2	Direct Commands	0%	20%	40%	60%	80%	100%
Q-E3	Messages Emphasizing Agency Authority	0%	20%	40%	60%	80%	100%
Q-E4	Messages Manipulating Social Affiliation	0%	20%	40%	60%	80%	100%
Q-E5	Messages Emphasizing Resource Value to Humankind	0%	20%	40%	60%	80%	100%
Q-E6	Threats of Citations or Fines (Consider the effect of the threats alone, with no visible enforcement agents.)	0%	20%	40%	60%	80%	100%
		PERCENTAGE OF NONCOMPLIANCE DETERRED					

In this last question of Part 2 we ask that you consider both the appropriateness and effectiveness of each persuasive strategy as applied to Magnificent Meadows.

Remember, **appropriateness is the extent to which a means of control is acceptable, given the broad philosophical principles concerning park management and the specific NPS mandate of management for visitor enjoyment, and effectiveness is the extent to which noncompliant behavior would be deterred.**

1. **Appeals to intrinsic values**: Messages emphasizing that visitors should comply with rules because failing to do so will damage resources that have some special value in their own right. These messages usually emphasize information about the resource, be it a natural or historical feature. For example, "By staying on the paved trail you preserve the beauty of this fragile alpine meadow."

2. **Direct commands**: Messages that specify regulations and expected behavior with no attempts to justify or explain the regulation. For example, "Off-trail hiking is prohibited".

3. **Messages emphasizing Agency authority**: Messages that bolster, and/or take advantage of, the legitimacy of the NPS as a governing body of the parks. For example, "The National Park Service was created to protect the resources of the National Parks. Do your part by hiking only on the paved trails."

4. **Messages manipulating social affiliations**: Messages that imply positive or negative social categories for persons acting in specified ways. For example, "Be a part of the ecological honor society -- hike only on the paved trails."

5. **Messages emphasizing resource value to humankind**: These messages explain that visitors should comply with rules so that future visitors can enjoy the benefits of the resource. For example, "Hike only on the paved trails so that your grandchildren may know the beauty of this place."

6. **Threats of citations or fines**: Messages spelling out that the Park Service write citations imposing punishment on visitors who do not comply with rules. These messages may or may not be combined with an enforcement program to actually impose such punishments. For example, "Off-trail hikers may be fined."

Q-F1 Please rank all six persuasive strategies from best to sixth best considering both their appropriateness and effectiveness when applied to Magnificent Meadows. Make your rankings by placing the number for each strategy listed above in the appropriate box below.

☐	Best Persuasive Strategy	☐	Fourth Best Persuasive Strategy
☐	Second Best Persuasive Strategy	☐	Fifth Best Persuasive Strategy
☐	Third Best Persuasive Strategy	☐	Sixth Best Persuasive Strategy

Part 3

In Part 3 of this section we are particularly interested in your thoughts concerning two specific means of visitor control.

One means of decreasing damage to NPS resources caused by visitor noncompliance is through a program of **direct enforcement**. In such a program personnel are deployed specifically to observe visitor behavior and to deter noncompliance by issuing citations or fines. Please consider the use of this control technique in all types of frontcountry areas and in backcountry or wilderness areas that are easily accessible to day hikers.

Q-G1 Is direct enforcement a technique that should be used in frontcountry or accessible backcountry areas where noncompliance is typically a problem? (Circle one number)

1 NO
2 YES

Q-G2 What effect (if any) is direct enforcement likely to have on the recreational experience of NPS visitors?

Q-G3 Some people believe that direct enforcement programs can actually increase noncompliance because some visitors will rebel against the control attempts. Approximately what percentage of all visitors do you think react to direct enforcement in this way? (Circle the response that best matches your answer.)

0%	10%	20%	30%	40%	More Than 50%

One of the adverse impacts of noncompliant behavior discussed in the introduction was unwarranted risks to the safety of the noncompliant actor and/or other bystanders. Such risks may arise when visitors climb or walk in dangerous areas, approach dangerous wild animals, throw stones or other objects, etc. One strategy to deter risky behavior is the use of messages and presentations designed to instill fear in the viewer by pointing out the risks involved (fear appeals). For example, films or slide-shows may show the types of accidents that can occur because of noncompliance and may give figures for the number of injuries, or even deaths, that have already resulted. Or, in a less extreme example, unsafe areas may be marked by signs showing a falling figure and warning of cliffs with loose rock.

Q-H1 Are fear appeals a strategy that should be used when noncompliance endangers park visitors? (Circle one number)

1 NO
2 YES

Q-H2 What effect (if any) are fear appeals likely to have on the recreational experience of the visitor?

Q-H3 Some people believe that fear appeals can actually increase noncompliance because the thrill of danger will draw some visitors to attempt the risky behavior. Approximately what percentage of all visitors do you think react to fear appeals in this way? (Circle the response that best matches your answer.)

0%	10%	20%	30%	40%	More Than 50%

Part 4

Earlier in section C you considered the appropriateness of the means of visitor control and persuasive strategies listed below when applied to frontcountry areas and backcountry areas that are easily accessible to day hikers (referred to below as **frontcountry**). In Part 4 of this section we would like you to consider the appropriateness of these techniques when applied in backcountry or wilderness areas not easily accessible to day hikers (referred to below as **backcountry**).

Means of Visitor Control

1 Barriers
2 Brochures
3 Cinema
4 Closure
5 Improving the Quality of Existing Trails or Access Routes
6 Construction of Visitor Facilities
7 Direct Enforcement
8 Exhibits
9 Informal Personal Contact
10 Improved Landscape or Facility Design
11 Interpretive Signs
12 Interpretive Talks
13 Newsletters/Newspapers
14 Regulatory Signs
15 Rerouting Trails or Roads
16 Restoration
17 Use Quotas (Direct)
18 Use Quotas (Indirect)

Persuasive Strategies

1 Appeals to intrinsic values
2 Direct commands
3 Messages emphasizing Agency authority
4 Messages manipulating social affiliations
5 Messages emphasizing resource value to humankind
6 Threats of citations or fines

Q-I1 Apart from the recognition that permanent facilities are rarely constructed in backcountry areas, do you you feel that the means of control and persuasive strategies listed above are equally appropriate or inappropriate for use in frontcountry and backcountry areas? In other words, does the application of these methods to frontcountry vs. backcountry make any difference in how appropriate you feel they are? (Circle one number)

1 APPROPRIATENESS CHANGES FROM FRONTCOUNTRY TO BACKCOUNTRY
2 FRONTCOUNTRY VS. BACKCOUNTRY IS NOT RELEVANT TO APPROPRIATENESS

Q-I2 If you circled answer "1" for **Q-I1**, please use the space below to describe how and why the appropriateness of visitor controls varies in frontcountry vs. backcountry. (If extra space is needed, use supplemental pages.)

Part 5

You may recall from the introduction that some noncompliant behaviors can have negative impacts without directly damaging park resources. For example, public nudity or public intoxication may negatively impact some visitors' recreational experiences, or traffic violations may threaten visitor safety. These final questions in Section C concerns such noncompliant behaviors.

Q-J1 Does your unit of the NPS have problems with noncompliant visitor behaviors that do not directly damage park resources? (Circle one number)

1 NO --> GO TO SECTION D ON PAGE 57
2 YES

Q-J2 Please use the space below to describe the noncompliant acts that pose a problem in your unit but do not directly damage park resources. (If extra space is needed, use supplemental pages.)

Q-J3 Which one of the following statements best describes your perception of the extent to which noncompliant behaviors that do not directly damage park resources are a problem in your unit. (Circle one number)

1 IT'S NOT A PROBLEM
2 IT'S A SLIGHT PROBLEM
3 IT'S A MODERATE PROBLEM
4 IT'S A SERIOUS PROBLEM

INSTRUCTIONS - SECTION D

Please fill out the following information concerning your current location and work assignment.

Q-A In what division of park management is your current work assignment? (In response to this question, please indicate your primary work role since some NPS personnel may be formally classified in a job category which does not reflect their current work responsibilities.)

1 Ranger Division
2 Natural Resource Management Division
3 Operations and Maintenance
4 Interpretation Division
5 Administration
6 Multiple Assignments (Please specify _____)

Q-B In what region is your NPS unit located?

1 Alaska
2 Western
3 Rocky Mountain
4 North Atlantic
5 National Capitol
6 Pacific Northwest
7 Southwest
8 Midwest
9 Mid Atlantic
10 Southeast

Q-C How many years of service have you completed at this NPS location?

_____ years

Q-D How many total years of service have you completed with the National Park Service?

_____ years

Q-E In what type of NPS unit is your current assignment? (The fourth category, National Historical Sites, should be interpreted to mean all Historical Sites, Military Parks, National Battlefields, Historical Parks, etc.)

1 National Park
2 National Recreational Area
3 National Preserve
4 National Parkway
5 National Monument
6 National Historical Site
7 National Lakeshore or Seashore
8 Other (Specify _____)

(You may circle more than one type of unit if your assignment includes combinations of the above.)

Q-F1 What is the highest educational level you have attained? (Circle one number.)

1 Grade or Elementary School
2 Some High School
3 High School Diploma
4 Some Business or Technical School
5 Some College
6 College Graduate
7 Some Graduate Work
8 Doctoral or Professional Degree

Q-F2 If you circled number 4 or greater in Q-F1, what was your field of study or training at the highest level of schooling? (Please specify below.)

_____

Q-G Are you female or male?

1 Female
2 Male

APPENDIX C
GLOSSARY OF TERMS

APPENDIX D
STATISTICAL APPENDIX

GLOSSARY

To accompany: **VISITOR NONCOMPLIANCE QUESTIONNAIRE**

CONTENTS

This glossary is intended as a reference for use with the *Visitor Noncompliance Questionnaire* and is organized into three sections. The first and second sections are for use in filling out Section A of the questionnaire. They define, respectively, sites in which damage due to noncompliance may occur and types of noncompliant visitor behavior. The third section is for use in Sections B and C of the questionnaire. It defines various means of controlling noncompliant visitor behavior.

TYPES OF SITES WHERE DAMAGE MAY BE CAUSED BY NONCOMPLIANT VISITOR BEHAVIOR

Part 1: Frontcountry areas and areas considered backcountry or wilderness but easily accessible to day-hikers

ARCHEOLOGICAL OR PALEONTOLOGICAL SITES: Locations containing remains or relics of pre-historic peoples, or fossilized remains of animals or plants.

CAMPGROUNDS: Areas not in backcountry or wilderness that were specifically developed for overnight camping.

COMMEMORATIVE SITES: Specific locations within a larger defined NPS unit intended to commemorate an event, person, etc. These sites typically are characterized by the presence of monuments, statues, plaques, and tombstones.

DEVELOPED VISITOR SITES: Areas characterized by a concentration of visitor services such as restaurants, visitor centers, lodging facilities, etc. Campgrounds in or near these areas *are* considered discrete units. Picnic areas that are an integral part of developed sites are *not* considered separate entities.

HISTORIC SITES: Facilities and areas of human occupation that were inhabited in historic times and that are preserved in accordance with the NPS mandate. Historical buildings and objects are to be considered discrete entities even when located in or near developed visitor sites.

NATURAL ATTRACTIONS ACCESSIBLE BY DAY HIKING TRAILS: Areas defined by notable natural features that are frequently or easily used by day visitors. These areas usually represent popular destinations within a particular NPS unit (e.g., sub-alpine meadows, forests, waterfalls, etc.).

PICNIC AREAS: Discrete areas designated as outdoor eating places.

REST AREAS: Facilities providing rest rooms and parking that were specifically developed to provide temporary relief from driving fatigue.

ROADSIDE ATTRACTIONS/TURNOUTS: Locations less than 1/4 mile from roaded access that are of primary interest to visitors. This type of site includes exceptional trees, scenic views, unusual geologic formations, waterfalls, etc. Rest areas that are an integral part of roadside attractions/turnouts are not considered separate entities.

TRAILHEAD SITES: Areas of beginning access to hiking trails.

Part 2: Backcountry and wilderness areas that are not easily accessible to day-hikers.

ARCHEOLOGICAL OR PALEONTOLOGICAL SITES: Except for their location in backcountry or wilderness areas, these sites are identical to those defined in Part 1.

CAMPING SITES: Formally specified areas for overnight camping and sites not formally designated but accepted as appropriate.

HIKING OR STOCK TRAILS: Corridors constructed or maintained for visitor use in backcountry or wilderness areas.

HISTORIC SITES: Identical to historic sites above except for their location in backcountry or wilderness.

SCENIC OVERLOOKS: Sites where exceptional views of the surrounding landscape are possible.

NATURAL ATTRACTIONS: Areas defined by notable natural features that draw backcountry or wilderness visitors. Such features include caves, waterfalls, meadows, etc.

TYPES OF NONCOMPLIANT VISITOR BEHAVIOR

CAMPING IN INAPPROPRIATE SITES: Camping outside of designated areas where such activity is prohibited or expressly discouraged.

COLLECTING NATURAL OBJECTS AS SOUVENIRS: Incidental removal of small quantities of rock, pumice, wildflowers, antlers, etc. as mementos. This category does not include theft of objects holding significant financial, scientific, or intrinsic value.

COLLECTING PALEONTOLOGICAL OR CULTURAL OBJECTS AS SOUVENIRS: Incidental removal of artifacts as mementos. This category does not include theft of objects holding significant financial, historical, or intrinsic value. One example would be a visitor who during an otherwise appropriate visit keeps an old bottle found on the surface of the ground.

DAMAGING OR DEFACING CULTURAL OR HISTORICAL OBJECTS: Prohibited or expressly discouraged acts that damage cultural or historical objects. This category includes writing of graffiti or painting on historical buildings or objects, climbing on statues, cannons etc., carving initials, and any other such damaging actions.

DAMAGING OR DEFACING NATURAL OBJECTS: Prohibited or expressly discouraged acts that damage natural objects. This category includes carving initials into trees, breaking rocks, writing or painting on rocks, throwing coins or objects into hot springs, etc.

DAMAGING OR DEFACING THE BUILT ENVIRONMENT: Prohibited or expressly discouraged acts that damage facilities constructed in the current period.

MINOR VIOLATIONS INVOLVING WILDLIFE: Prohibited or expressly discouraged acts that adversely impact park wildlife. This category includes feeding of animals, disturbing young animals, approaching animals too closely so as to view or photograph them, etc.

INAPPROPRIATE CAMPFIRES AND FIREWOOD COLLECTION: Prohibited or expressly discouraged acts that involve campfires or wood collection and that damage park resources.

INAPPROPRIATE CAMPING BEHAVIOR: Prohibited or expressly discouraged acts associated with camping that damage park resources. Exceptions from this category are actions involving fires or firewood collection. This category includes such actions as inappropriate disposal of soapy water, hanging lanterns against trees, etc.

INAPPROPRIATE HUMAN WASTE DISPOSAL: Prohibited or expressly discouraged acts that involve human waste disposal and that damage park resources.

INAPPROPRIATE LIVESTOCK USE: Prohibited or expressly discouraged acts that involve the use of livestock in ways that damage park resources.

INAPPROPRIATE MOTOR BOAT USE: Prohibited or expressly discouraged acts that involve the use of motorized boats in ways that damage park resources.

INAPPROPRIATE MOUNTAIN BICYCLE USE: Prohibited or expressly discouraged acts that involve the use of mountain bicycles in ways that damage park resources.

INAPPROPRIATE OFF-ROAD DRIVING: Driving motor vehicles off roads into areas where they are prohibited. This category includes acts ranging from pulling off the road to park inappropriately to off-road joy-riding.

LITTERING: Inappropriate disposal of rubbish or trash that creates an unsightly environment.

MINOR FISHING VIOLATIONS: Lesser infringements of fishing laws in which there is no clear criminal intent. Examples might be exceeding the catch limit by a very small number, keeping fish barely out of the size limit, inappropriate disposal of fish entrails, not immediately unhooking fish in the presence of a bear, etc.

MINOR HUNTING/TRAPPING VIOLATIONS: Lesser infringements of hunting or trapping laws, when such infringements lack clear criminal intent and occur in units of the National Park System where hunting and trapping are legal.

OFF-TRAIL HIKING: Departing trails where such behavior is prohibited or expressly discouraged.

PET VIOLATIONS: Bringing pets into NPS units in any manner that is contrary to stated policy.

VISITING IN INAPPROPRIATELY SIZED GROUPS: Visiting in groups that are larger than limits set by park policy.

MEANS OF CONTROLLING NONCOMPLIANT VISITOR BEHAVIOR

BARRIERS: Anything purposely placed so as to prevent passage of visitors to areas where resource damage could occur. Barriers commonly include fences, yellow polypropylene rope, natural objects such as fallen trees or rocks, etc.

BROCHURES: Small unbound pamphlets used to inform or educate visitors. This category does not include park newsletters or newspapers.

CINEMA: Motion pictures shown at visitor centers, evening programs, etc. This category includes mechanized slide shows with recorded narration but does not include slide shows that are narrated by naturalists.

CLOSURE: Administrative elimination of visitor access for the purpose of preventing unacceptable impact. Includes both temporary and permanent closure.

IMPROVING THE QUALITY OF EXISTING TRAILS OR ACCESS ROUTES: Modification of access routes with the purpose of allowing equal or increased visitor use while minimizing resource damage. Examples are paving trails, clarifying trail borders, installing stairs on steep inclines, etc.

CONSTRUCTION OF VISITOR FACILITIES: Installation of facilities to accommodate visitor behavior that would otherwise cause resource damage. Examples include provision of benches, rest areas with shade, or toilets.

DIRECT ENFORCEMENT: Deployment of NPS personnel for the primary purpose of compelling visitor observance of regulations.

EXHIBITS: Three dimensional displays, dioramas, etc. used to inform or educate visitors. Usually created by interpreters in visitor centers, museums and other constructed visitor attractions.

INFORMAL PERSONAL CONTACT: Unstructured face-to-face interaction between NPS employees and visitors wherein the subject of noncompliant behavior or resource damage may be discussed incidental to other primary contexts of conversation, or similar interactions following chance encounters with visitors engaging in noncompliant behavior. This category differs from direct enforcement in that the primary role of the NPS employee is not enforcement.

IMPROVED LANDSCAPE OR FACILITY DESIGN: Changes in the lay-out of trails and other visitor facilities so as to accommodate the natural movement of people around the site and thereby reduce the potential for resource damage. Improvement of trail routes so as to include a desirable view is an example of this category. This category is separate from construction that improves existing facilities without changing their layout.

INTERPRETIVE SIGNS: Publicly displayed boards, plaques, etc. intended primarily to educate or inform visitors. Such signs contain somewhat long or complex messages interpreting the resource but may be used completely or incidentally to convey facts about resource degradation and/or expected behavior. These signs are typically located at points of visitor concentration such as trailheads, other entry locations to visitor attractions, or at points adjacent to visitor attractions themselves.

INTERPRETIVE TALKS: Scheduled presentations intended to educate or inform visitors in which an interpreter delivers prepared remarks to a visitor audience. This category includes narrated slide shows.

NEWSLETTERS/NEWSPAPERS: Publications regularly printed for the general benefit of visitors to a specific NPS unit. Park newspapers typically contain informative articles about visitor attractions, current management issues or controversies, stories about park history and personnel, etc.

REGULATORY SIGNS: Publicly displayed boards, placards, etc. that convey a brief message directly expressing appropriate behavior. Regulatory signs may simply state a command (e.g., NO HIKING), or they may include an altruistic appeal, a threat of sanctions (e.g., fines) to be imposed by the agency, or an explication of threats to personal safety that could result from noncompliance with the sign message.

REROUTING TRAILS OR ROADS: Reconstruction and relocation of routes that previously provided access to a vulnerable resource in order to make visitor access more difficult and thereby reduce resource degradation. This category differs from improved landscape or facility design because the route is redirected to restrict rather than to facilitate access to resources.

REHABILITATION: Repairing the impacted resource or facility so as to discourage further degradation. Examples of this category are keeping walls freshly painted to discourage graffiti, promptly removing litter to discourage further littering, and replanting or promptly reseeding damaged vegetation, etc.

USE QUOTAS (DIRECT): Rationing visitor use by establishing party size limits and absolute visitation ceilings during any given time period.

USE QUOTAS (INDIRECT): Purposeful reduction of visitor access by not changing or upgrading the constructed facilities associated with visitor use. Examples are curtailment of parking opportunities, restrictions on overnight lodging and camping facilities, failure to maintain roads and bridges, etc.

Summary of responses concerning **developed visitor sites** in frontcountry areas.

QUESTION	RESULT		
Q-A1: Does your unit have **developed visitor sites** in frontcountry areas?	Number present: 182/217	Percent present: 84	
Q-A2: Has noncompliant visitor behavior caused damage at **developed visitor sites** in your unit?	Number damaged: 147/182	Percent damaged: 81	
Q-A3: If you answered YES to **Q-A2**, are any or all of these damages reparable?	Number with reparable damage: 141/182	Percent with reparable damage: 78	
Q-A4: Please describe the reparable damage at **developed visitor sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing the built environment	84
	2	Littering	77
	3	Off trail hiking	38
	4	Inappropriate off-road driving	26
	5	Damaging or defacing natural objects	21
Q-A5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $3,638,051	Average cost per site reporting: $28,646	
Q-A5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $2,935,711	Average annual cost per site reporting: $23,299	
Q-A6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 61/182	Percent with damage to nonrenewable resources: 34	

Summary of responses concerning **developed visitor sites** in frontcountry areas (continued).

QUESTION	RESULT		
Q-A7: Please describe the damages to nonrenewable resources at **developed visitor sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing cultural or historical objects	27
	2	Damaging or defacing natural objects	16
	3	Collecting paleontological or cultural objects as souvenirs	13
	4	Collecting natural objects as souvenirs	12
	5	Unspecified damage to/impact on natural resources	6
Q-A8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **developed visitor sites**.	Five behaviors considered most destructive		Score*
	1	Littering	287
	2	Damaging or defacing the built environment	235
	3	Damaging or defacing cultural or historical objects	126
	4	Off-trail hiking	110
	5	Damaging or defacing natural objects	96
Q-A9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **developed visitor sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	1
	It's a slight problem	59	41
	It's a moderate problem	62	43
	It's a serious problem	22	15
	Missing	3	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **archeological or paleontological sites** in frontcountry areas.

QUESTION	RESULT		
Q-B1: Does your unit have **archeological or paleontological sites** in frontcountry areas?	Number present: 155/217	Percent present: 71	
Q-B2: Has noncompliant visitor behavior caused damage at **archeological or paleontological sites** in your unit?	Number damaged: 92/155	Percent damaged: 59	
Q-B3: If you answered YES to **Q-B2**, are any or all of these damages reparable?	Number with reparable damage: 48/155	Percent with reparable damage: 31	
Q-B4: Please describe the reparable damage at **archeological or paleontological sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing cultural or historical objects	19
	2	Littering	13
	3	Off-trail hiking	8
	4	Vandalism/graffiti to unspecified resources	6
	5	2 forms tied	5
Q-B5, part 1: How much do you estimate it would cost to repair this damage?[1]	Total reported cost: $11,878,190	Average cost per site reporting: $53,663	
Q-B5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $354,307	Average annual cost per site reporting: $10,123	
Q-B6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 82/155	Percent with damage to nonrenewable resources: 53	

[1] Figures exclude a $10,000,000 cost estimate reported by Kaloka-Honokohau National Historic Park. The repair figure for this unit referred primarily to damage done prior to the area's inclusion in the National Park system. Although significant, such damage is not comparable to the damage caused by visitor noncompliance that this survey was intended to inventory.

Summary of responses concerning **archeological or paleontological sites** in frontcountry areas (continued).

QUESTION	RESULT		
Q-B7: Please describe the damages to nonrenewable resources at **archeological or paleontological sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting paleontological or cultural objects as souvenirs	55
	2	Damaging or defacing cultural or historical objects	40
	3	Excavating/digging for artifacts	14
	4	Collecting natural objects as souvenirs	8
	5	2 forms tied	7
Q-B8: Using the glossary of non-compliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **archeological or paleontological sites.**	Five behaviors considered most destructive		Score*
	1	Collecting paleontological or cultural objects as souvenirs	267
	2	Damaging or defacing cultural or historical objects	145
	3	Off-trail hiking	74
	4	Littering	41
	5	2 forms tied	23

Q-B9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **archeological or paleontological sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	1
	It's a slight problem	31	34
	It's a moderate problem	43	47
	It's a serious problem	16	18
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **campgrounds** in frontcountry areas.

QUESTION	RESULT		
Q-C1: Does your unit have **campgrounds** in frontcountry areas?	Number present: 79/217	Percent present: 36	
Q-C2: Has noncompliant visitor behavior caused damage at **campgrounds** in your unit?	Number damaged: 69/79	Percent damaged: 87	
Q-C3: If you answered YES to **Q-C2**, are any or all of these damages reparable?	Number with reparable damage: 66/79	Percent with reparable damage: 84	
Q-C4: Please describe the reparable damage at **campgrounds** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing the built environment	46
	2	Littering	39
	3	Inappropriate campfires and firewood collection	33
	4	Damaging or defacing natural objects	12
	5	2 forms tied	11
Q-C5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $3,817,000	Average cost per site reporting: $69,400	
Q-C5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $1,045,000	Average annual cost per site reporting: $18,333	
Q-C6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 28/79	Percent with damage to nonrenewable resources: 35	

Summary of responses concerning **campgrounds** in frontcountry areas (continued).

QUESTION	RESULT		
Q-C7: Please describe the damage to nonrenewable resources at **campgrounds** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	9
	2	Inappropriate campfires and firewood collection	6
	3	Unspecified damage to/impact on natural resources	4
	3	Inappropriate camping behavior	4
	4	2 forms tied	3
Q-C8: Using the glossary of non-compliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **campgrounds**.	Five behaviors considered most destructive		Score*
	1	Damaging or defacing the built environment	114
	2	Inappropriate campfires and firewood collection	102
	3	Inappropriate camping behavior	83
	4	Littering	76
	5	Damaging or defacing natural objects	64
Q-C9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **campgrounds** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	23	34
	It's a moderate problem	33	48
	It's a serious problem	12	18
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **commemorative sites** in frontcountry areas.

QUESTION	RESULT		
Q-D1: Does your unit have **commemorative sites** in frontcountry areas?	Number present: 98/217	Percent present: 45	
Q-D2: Has noncompliant visitor behavior caused damage at **commemorative sites** in your unit?	Number damaged: 53/98	Percent damaged: 54	
Q-D3: If you answered YES to **Q-D2**, are any or all of these damages reparable?	Number with reparable damage: 49/98	Percent with reparable damage: 50	
Q-D4: Please describe the reparable damage at **commemorative sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing cultural or historical objects	31
	2	Littering	16
	3	Damaging or defacing the built environment	13
	4	Off-trail hiking	7
	5	2 forms tied	5
Q-D5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,612,801	Average cost per site reporting: $38,400	
Q-D5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $1,364,600	Average annual cost per site reporting: $34,115	
Q-D6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 22/98	Percent with damage to nonrenewable resources: 22	

Summary of responses concerning **commemorative sites** in frontcountry areas (continued).

QUESTION	RESULT		
Q-D7: Please describe the damages to nonrenewable resources at developed **commemorative sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing cultural or historical objects	16
	2	Collecting paleontological or cultural objects as souvenirs	6
	3	Damaging or defacing natural objects	3
	4	Inappropriate off-road driving	2
	4	Off-trail hiking	2
Q-D8: Using the glossary of non-compliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **commemorative sites.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing cultural or historical or historical objects	146
	2	Littering	76
	3	Damaging or defacing the built environment	46
	4	Collecting paleontological or cultural objects as souvenirs	28
	5	Off-trail hiking	26

Q-D9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **commemorative sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	2	4
	It's a slight problem	24	48
	It's a moderate problem	18	36
	It's a serious problem	6	12
	Missing	3	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **historic sites** in frontcountry areas.

QUESTION	RESULT		
Q-E1: Does your unit have **historic sites** in frontcountry areas?	Number present: 173/217	Percent present: 80	
Q-E2: Has noncompliant visitor behavior caused damage at **historic sites** in your unit?	Number damaged: 121/173	Percent damaged: 70	
Q-E3: If you answered YES to **Q-E2**, are any or all of these damages reparable?	Number with reparable damage: 113/173	Percent with reparable damage: 65	
Q-E4: Please describe the reparable damage at **historic sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing cultural or historical objects	65
	2	Littering	39
	3	Damaging or defacing the built environment	18
	4	Vandalism/graffiti to unspecified resources	15
	5	Off-trail hiking	11
Q-E5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $21,650,946	Average cost per site reporting: $235,336	
Q-E5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $1,925,900	Average annual cost per site reporting: $22,137	
Q-E6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 81/173	Percent with damage to nonrenewable resources: 47	

Summary of responses concerning **historic sites** in frontcountry areas (continued).

QUESTION	RESULT		
Q-E7: Please describe the damages to nonrenewable resources at **historic sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing cultural or historical objects	50
	2	Collecting paleontological or cultural objects as souvenirs	32
	3	Damaging or defacing natural objects	3
	3	Inappropriate livestock use	3
	3	Off-trail hiking	3
Q-E8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **historic sites.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing cultural or historical objects	327
	2	Littering	172
	3	Collecting paleontological or cultural objects as souvenirs	134
	4	Damaging or defacing the built environment	61
	5	Off-trail hiking	34

Q-E9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **historic sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	3	3
	It's a slight problem	56	50
	It's a moderate problem	40	35
	It's a serious problem	14	12
	Missing	8	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **natural attractions accessible by road or day hiking trails** in frontcountry areas.

QUESTION	RESULT		
Q-F1: Does your unit have **natural attractions accessible by road or day hiking trails** in frontcountry areas?	Number present: 133/217	Percent present: 61	
Q-F2: Has noncompliant visitor behavior caused damage at **natural attractions accessible by road or day hiking trails** in your unit?	Number damaged: 102/133	Percent damaged: 77	
Q-F3: If you answered YES to **Q-F2**, are any or all of these damages reparable?	Number with reparable damage: 95/133	Percent with reparable damage: 71	
Q-F4: Please describe the reparable damage at **natural attractions accessible by road or day hiking trails** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	45
	2	Off-trail hiking	36
	3	Damaging or defacing natural objects	31
	4	Collecting natural objects as souvenirs	17
	5	2 forms tied	15
Q-F5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $6,400,000	Average cost per site reporting: $91,429	
Q-F5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $763,230	Average annual cost per site reporting: $10,750	
Q-F6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 49/133	Percent with damage to nonrenewable resources: 37	

Summary of responses concerning **natural attractions accessible by road or day hiking trails** in frontcountry areas (continued).

QUESTION	RESULT		
Q-F7: Please describe the damages to nonrenewable resources at **natural attractions accessible by road or day hiking trails** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	29
	2	Collecting natural objects as souvenirs	15
	3	Off-trail hiking	4
	4	6 forms tied	3
Q-F8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **natural attractions accessible by road or day hiking trails.**	Five behaviors considered most destructive		Score*
	1	Littering	166
	2	Damaging or defacing natural objects	161
	3	Off-trail hiking	147
	4	Collecting natural objects as souvenirs	83
	5	Inappropriate off-road driving	47
Q-F9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **natural attractions accessible by road or day hiking trails** problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	1
	It's a slight problem	33	
	It's a moderate problem	48	47
	It's a serious problem	19	
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **picnic areas** in frontcountry areas.

QUESTION	RESULT		
Q-G1: Does your unit have **picnic areas** in frontcountry areas?	Number present: 155/217	Percent present: 71	
Q-G2: Has noncompliant visitor behavior caused damage at **picnic areas** in your unit?	Number damaged: 99/155	Percent damaged: 64	
Q-G3: If you answered YES to **Q-G2**, are any or all of these damages reparable?	Number with reparable damage: 96/155	Percent with reparable damage: 62	
Q-G4: Please describe the reparable damage at **picnic areas** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing the built environment	72
	2	Littering	68
	3	Inappropriate campfires and firewood collection	16
	4	Off-trail hiking	14
	4	Damaging or defacing natural objects	14
Q-G5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,483,900	Average cost per site reporting: $18,784	
Q-G5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $821,350	Average annual cost per site reporting: $10,267	
Q-G6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 20/155	Percent with damage to nonrenewable resources: 13	

Summary of responses concerning **picnic areas** in frontcountry areas (continued).

QUESTION	RESULT		
Q-G7: Please describe the damage to nonrenewable resources at **picnic areas** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	6
	2	Unspecified damage to/impact on natural resources	5
	3	Minor violations involving wildlife	4
	4	Collecting paleontological or cultural objects as souvenirs	3
	5	2 forms tied	2
Q-G8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **picnic areas.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing the built environment	226
	1	Littering	226
	3	Inappropriate campfires and firewood collection	66
	4	Damaging or defacing natural objects	57
	5	Minor violations involving wildlife	29

Q-G9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **picnic areas** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	1
	It's a slight problem	53	54
	It's a moderate problem	37	38
	It's a serious problem	7	7
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **rest areas** in frontcountry areas.

QUESTION	RESULT		
Q-H1: Does your unit have **rest areas** in frontcountry areas?	Number present: 40/217	Percent present: 18	
Q-H2: Has noncompliant visitor behavior caused damage at **rest areas** in your unit?	Number damaged: 22/40	Percent damaged: 55	
Q-H3: If you answered YES to **Q-H2**, are any or all of these damages reparable?	Number with reparable damage: 22/40	Percent with reparable damage: 55	
Q-H4: Please describe the reparable damage at **rest areas** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing the built environment	13
	1	Littering	13
	3	Vandalism/graffiti to unspecified resources	5
	4	Inappropriate human waste disposal	4
	5	9 forms tied	1
Q-H5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $234,275	Average cost per site reporting: $14,642	
Q-H5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $123,418	Average annual cost per site reporting: $6,171	
Q-H6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 1/40	Percent with damage to nonrenewable resources: 3	

Summary of responses concerning **rest areas** in frontcountry areas (continued).

QUESTION	RESULT		
Q-H7: Please describe the damages to nonrenewable resources at **rest areas** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting natural objects as souvenirs	1
	1	Collecting paleontological or cultural objects as souvenirs	1
Q-H8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **rest areas.**	Five behaviors considered most destructive		Score*
	1	Littering	46
	2	Damaging or defacing the built environment	43
	3	Vandalism/graffiti to unspecified resources	14
	4	Inappropriate human waste disposal	7
	5	Inappropriate campfires and firewood collection	5

Q-H9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **rest areas** is a problem at your unit. (question *answered only for sites with damage*)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	14	70
	It's a moderate problem	6	30
	It's a serious problem	0	0
	Missing	2	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **roadside attractions/turnouts** in frontcountry areas.

QUESTION	RESULT		
Q-I1: Does your unit have **roadside attractions/turnouts** in frontcountry areas?	Number present: 98/217	Percent present: 45	
Q-I2: Has noncompliant visitor behavior caused damage at **roadside attractions/turnouts** in your unit?	Number damaged: 72/98	Percent damaged: 73	
Q-I3: If you answered YES to **Q-I2**, are any or all of these damages reparable?	Number with reparable damage: 72/98	Percent with reparable damage: 73	
Q-I4: Please describe the reparable damage at **roadside attractions/turnouts** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	48
	2	Damaging or defacing the built environment	46
	3	Off-trail hiking	12
	4	Damaging or defacing natural objects	11
	4	Inappropriate off-road driving	11
Q-I5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,722,100	Average cost per site reporting: $30,212	
Q-I5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $856,550	Average annual cost per site reporting: $15,296	
Q-I6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 21/98	Percent with damage to nonrenewable resources: 21	

Summary of responses concerning **roadside attractions/turnouts** in frontcountry areas (continued).

QUESTION	RESULT		
Q-17: Please describe the damages to nonrenewable resources at **roadside attractions/turnouts** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	7
	2	Unspecified damage to/impact on natural resources	4
	3	Collecting natural objects as souvenirs	3
	3	Damaging or defacing cultural or historical objects	3
	3	Off-trail hiking	3
Q-18: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **roadside attractions/turnouts.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing the built environment	168
	2	Littering	157
	3	Damaging or defacing natural objects	38
	4	Inappropriate off-road driving	33
	5	Off-trail hiking	29

Q-19: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **roadside attractions/turnouts** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	30	43
	It's a moderate problem	31	45
	It's a serious problem	8	12
	Missing	3	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **trailhead sites** in frontcountry areas.

QUESTION	RESULT		
Q-J1: Does your unit have **trailhead sites** in frontcountry areas?	Number present: 123/217	Percent present: 57	
Q-J2: Has noncompliant visitor behavior caused damage at **trailhead sites** in your unit?	Number damaged: 66/123	Percent damaged: 54	
Q-J3: If you answered YES to **Q-J2**, are any or all of these damages reparable?	Number with reparable damage: 65/123	Percent with reparable damage: 53	
Q-J4: Please describe the reparable damage at **trailhead sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	41
	2	Damaging or defacing the built environment	37
	3	Off-trail hiking	18
	4	Inappropriate human waste disposal	14
	5	Inappropriate off-road driving	11
Q-J5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,189,050	Average cost per site reporting: $21,619	
Q-J5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $470,900	Average annual cost per site reporting: $9,233	
Q-J6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 10/123	Percent with damage to nonrenewable resources: 8	

Summary of responses concerning **trailhead sites** in frontcountry areas (continued).

QUESTION	RESULT		
Q-J7: Please describe the damages to nonrenewable resources at **trailhead sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	5
	2	Collecting paleontological or cultural objects as souvenirs	3
	2	Unspecified damage to/impact on natural resources	3
	4	Minor violations involving wildlife	2
	5	2 forms tied	1
Q-J8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **trailhead sites.**	Five behaviors considered most destructive		Score*
	1	Littering	135
	2	Damaging or defacing the built environment	131
	3	Off-trail hiking	58
	4	Inappropriate off-road driving	41
	5	Inappropriate human waste disposal	27
Q-J9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **trailhead sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	2
	It's a slight problem	35	55
	It's a moderate problem	22	35
	It's a serious problem	5	8
	Missing	3	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **other frontcountry sites**[1].

QUESTION	RESULT		
Q-K1: Has noncompliant visitor behavior caused damage at **other frontcountry sites** in your unit?	Number damaged: 34/34	Percent damaged: 100	
Q-K3: If you answered YES to **Q-K2**, are any or all of these damages reparable?	Number with reparable damage: 30/34	Percent with reparable damage: 88	
Q-K4: Please describe the reparable damage at **other frontcountry sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing the built environment	11
	1	Littering	11
	3	Inappropriate off-road driving	8
	4	Damaging or defacing natural objects	5
	4	Off trail-hiking	5
Q-K5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $809,625	Average cost per site reporting: $38,554	
Q-K5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $443,300	Average annual cost per site reporting: $22,165	
Q-K6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 14/34	Percent with damage to nonrenewable resources: 41	

[1] Examples of "Other frontcountry sites" include roadsides, lake shores and wells.

Summary of responses concerning **other frontcountry sites** (continued).

QUESTION	RESULT		
Q-K7: Please describe the damages to nonrenewable resources at **other frontcountry sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting paleontological or cultural objects	4
	1	Damaging or defacing cultural or historical objects	4
	3	Damaging or defacing natural objects	3
	4	5 forms tied	1
Q-K8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **other frontcountry sites.**	Five behaviors considered most destructive		Score*
	1	Littering	48
	2	Damaging or defacing the built environment	33
	3	Off-trail hiking	22
	4	Inappropriate off-road driving	21
	5	Damaging or defacing cultural or historical objects	19

Q-K9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **other frontcountry sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	13	38
	It's a moderate problem	13	38
	It's a serious problem	8	24
	Missing	0	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Section A, Q-L1. Does your unit attempt to control visitor noncompliance in frontcountry or easily accessible backcountry areas by using any of the means of control listed on page 3-4 of the glossary?

Response	Frequency	Percent
No	8	4
Yes	185	96
Missing	24	

Section A, Q-L2. Across all frontcountry and easily accessible backcountry areas, approximately what percentage of noncompliance do you think is deterred by the means of control used in your unit?

Mean	Standard Deviation	N	Minimum	Maximum
59.51	23.28	182	20	100

Section A, Q-M1. Does your unit of the NPS contain backcountry or wilderness areas that are not easily accessible to day hikers?

Response	Frequency	Percent
No	124	60
Yes	84	40
Missing	9	

Summary of responses concerning **hiking or stock trails** in backcountry areas.

QUESTION	RESULT		
Q-N1: Does your unit have **hiking or stock trails** in backcountry areas?	Number present: 47/217	Percent present: 22	
Q-N2: Has noncompliant visitor behavior caused damage at **hiking or stock trails** in your unit?	Number damaged:. 33/47	Percent damaged: 70	
Q-N3: If you answered YES to **Q-N2**, are any or all of these damages reparable?	Number with reparable damage: 29/47	Percent with reparable damage: 62	
Q-N4: Please describe the reparable damage at **hiking or stock trails** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Off-trail hiking	17
	2	Littering	14
	3	Inappropriate livestock use	7
	4	Camping in inappropriate sites	6
	4	Inappropriate human waste disposal	6
Q-N5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $3,150,800	Average cost per site reporting: $126,032	
Q-N5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $455,100	Average annual cost per site reporting: $20,686	
Q-N6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 18/47	Percent with damage to nonrenewable resources: 38	

Summary of responses concerning **hiking or stock trails** in backcountry areas (continued).

QUESTION	RESULT		
Q-N7: Please describe the damages to nonrenewable resources at **hiking or stock trails** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	5
	2	Collecting paleontological or cultural objects as souvenirs	3
	2	Damaging or defacing cultural or historical objects	3
	2	Inappropriate livestock use	3
	2	Off-trail hiking	3
Q-N8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **hiking or stock trails**.	Five behaviors considered most destructive		Score*
	1	Off-trail hiking	55
	2	Littering	36
	3	Inappropriate livestock use	35
	4	Camping in inappropriate sites	24
	5	Damaging or defacing natural objects	18
Q-N9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **hiking or stock trails** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	10	30
	It's a moderate problem	15	46
	It's a serious problem	8	24
	Missing	0	

* *Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when* third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **archeological or paleontological sites** in backcountry areas.

QUESTION	RESULT		
Q-O1: Does your unit have **archeological or paleontological sites** in backcountry areas?	Number present: 76/217	Percent present: 35	
Q-O2: Has noncompliant visitor behavior caused damage at **archeological or paleontological sites** in your unit?	Number damaged: 47/76	Percent damaged: 62	
Q-O3: If you answered YES to **Q-O2**, are any or all of these damages reparable?	Number with reparable damage: 27/76	Percent with reparable damage: 36	
Q-O4: Please describe the reparable damage at **archeological or paleontological sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing cultural or historical objects	10
	1	Littering	10
	3	Excavating/digging for artifacts	6
	4	Off-trail hiking	4
	5	2 forms tied	3
Q-O5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,583,700	Average cost per site reporting: $93,159	
Q-O5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $260,050	Average annual cost per site reporting: $14,447	
Q-O6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 43/76	Percent with damage to nonrenewable resources: 57	

Summary of responses concerning **archeological or paleontological sites** in backcountry areas (continued).

QUESTION	RESULT		
Q-07: Please describe the damage to nonrenewable resources at **archeological or paleontological sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting paleontological or cultural objects as souvenirs	31
	2	Damaging or defacing cultural or historical objects	19
	3	Excavating/digging for artifacts	7
	4	Collecting natural objects as souvenirs	3
	5	Damaging or defacing natural objects	3
Q-08: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **archeological or paleontological sites**	Five behaviors considered most destructive		Score*
	1	Collecting paleontological or cultural objects as souvenirs	140
	2	Damaging or defacing cultural or historical objects	69
	3	Off-trail hiking	18
	4	Damaging or defacing natural objects	14
	5	Littering	12
Q-09: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **archeological or paleontological sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	2	4
	It's a slight problem	15	33
	It's a moderate problem	20	43
	It's a serious problem	9	20
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **camping sites** in backcountry areas.

QUESTION	RESULT		
Q-P1: Does your unit have **camping sites** in backcountry areas?	Number present: 49/217	Percent present: 23	
Q-P2: Has noncompliant visitor behavior caused damage at **camping sites** in your unit?	Number damaged: 35/49	Percent damaged: 71	
Q-P3: If you answered YES to **Q-P2**, are any or all of these damages reparable?	Number with reparable damage: 34/49	Percent with reparable damage: 69	
Q-P4: Please describe the reparable damage at **camping sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	20
	2	Inappropriate campfires and firewood collection	16
	3	Inappropriate human waste disposal	11
	4	Camping in inappropriate sites	10
	4	Inappropriate camping behavior	10
Q-P5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $2,365,600	Average cost per site reporting: $87,615	
Q-P5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $541,500	Average annual cost per site reporting: $18,050	
Q-P6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 13/49	Percent with damage to nonrenewable resources: 27	

Summary of responses concerning **camping sites** in backcountry areas (continued).

QUESTION	RESULT		
Q-P7: Please describe the damages to nonrenewable resources at **camping sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	6
	2	Inappropriate campfires and firewood collection	4
	3	Unspecified damage to/impact on natural resources	3
	4	Inappropriate human waste disposal	2
	5	6 forms tied	1
Q-P8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **camping sites.**	Five behaviors considered most destructive		Score*
	1	Inappropriate campfires and firewood collection	59
	2	Littering	56
	3	Inappropriate camping behavior	42
	4	Inappropriate human waste disposal	33
	5	Camping in inappropriate sites	31

Q-P9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **camping sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	6	18
	It's a moderate problem	19	58
	It's a serious problem	8	24
	Missing	2	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **historic sites** in backcountry areas.

QUESTION	RESULT		
Q-Q1: Does your unit have **historic sites** in backcountry areas?	Number present: 44/217	Percent present: 20	
Q-Q2: Has noncompliant visitor behavior caused damage at **historic sites** in your unit?	Number damaged: 21/44	Percent damaged: 48	
Q-Q3: If you answered YES to **Q-Q2**, are any or all of these damages reparable?	Number with reparable damage: 14/44	Percent with reparable damage: 32	
Q-Q4: Please describe the reparable damage at **historic sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Damaging or defacing cultural or historical objects	10
	2	Littering	6
	3	Inappropriate campfires and firewood collection	3
	4	5 forms tied	2
Q-Q5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $276,000	Average cost per site reporting: $25,091	
Q-Q5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $28,800	Average annual cost per site reporting: $2,880	
Q-Q6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 17/44	Percent with damage to nonrenewable resources: 39	

Summary of responses concerning **historic sites** in backcountry areas (continued).

QUESTION	RESULT		
Q-Q7: Please describe the damage to nonrenewable resources at **historic sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting paleontological or cultural objects as souvenirs	9
	1	Damaging or defacing cultural or historical objects	9
	3	Inappropriate campfires and firewood collection	3
	4	Camping in inappropriate sites	2
	5	2 forms tied	1
Q-Q8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **historic sites.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing cultural or historical objects	52
	2	Collecting paleontological or cultural objects as souvenirs	41
	3	Littering	19
	4	Inappropriate campfires and firewood collection	10
	5	Inappropriate camping behavior	8
Q-Q9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **historic sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	2	10
	It's a slight problem	9	45
	It's a moderate problem	8	40
	It's a serious problem	1	5
	Missing	1	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **scenic overlooks** in backcountry areas.

QUESTION	RESULT		
Q-R1: Does your unit have **scenic overlooks** in backcountry areas?	Number present: 36/217	Percent present: 17	
Q-R2: Has noncompliant visitor behavior caused damage at **scenic overlooks** in your unit?	Number damaged: 10/36	Percent damaged: 28	
Q-R3: If you answered YES to **Q-R2**, are any or all of these damages reparable?	Number with reparable damage: 10/36	Percent with reparable damage: 28	
Q-R4: Please describe the reparable damage at **scenic overlooks** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	6
	2	Off-trail hiking	4
	3	Inappropriate human waste disposal	3
	4	5 forms tied	2
Q-R5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $383,000	Average cost per site reporting: $42,556	
Q-R5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $121,500	Average annual cost per site reporting: $13,500	
Q-R6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 4/36	Percent with damage to nonrenewable resources: 11	

Summary of responses concerning **scenic overlooks** in backcountry areas (continued).

QUESTION	RESULT		
Q-R7: Please describe the damages to nonrenewable resources at **scenic overlooks** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	3
	2	Unspecified damage to/impact on natural resources	1
Q-R8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **scenic overlooks.**	Five behaviors considered most destructive		Score*
	1	Littering	22
	2	Off-trail hiking	19
	3	Damaging or defacing natural objects	12
	4	Visiting in inappropriately sized groups	8
	5	Damaging or defacing the built environment	7

Q-R9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **scenic overlooks** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	4	40
	It's a moderate problem	4	40
	It's a serious problem	2	20
	Missing	0	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **natural attractions** in backcountry areas.

QUESTION	RESULT		
Q-S1: Does your unit have **natural attractions** in backcountry areas?	Number present: 63/217	Percent present: 29	
Q-S2: Has noncompliant visitor behavior caused damage at **natural attractions** in your unit?	Number damaged: 37/63	Percent damaged: 59	
Q-S3: If you answered YES to **Q-S2**, are any or all of these damages reparable?	Number with reparable damage: 36/63	Percent with reparable damage: 57	
Q-S4: Please describe the reparable damage at **natural attractions** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Littering	14
	2	Damaging or defacing natural objects	8
	3	Off-trail hiking	7
	4	3 forms tied	5
Q-S5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $1,207,700	Average cost per site reporting: $48,308	
Q-S5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $174,510	Average annual cost per site reporting: $6,980	
Q-S6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 24/63	Percent with damage to nonrenewable resources: 38	

Summary of responses concerning **natural attractions** in backcountry areas (continued).

QUESTION	RESULT		
Q-S7: Please describe the damages to nonrenewable resources at **natural attractions** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Damaging or defacing natural objects	10
	2	Collecting natural objects as souvenirs	4
	3	6 forms tied	2
Q-S8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **natural attractions.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing natural objects	59
	2	Littering	52
	3	Off-trail hiking	36
	4	Inappropriate off-road driving	23
	5	Collecting natural objects as souvenirs	16

Q-S9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **natural attractions** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	1	3
	It's a slight problem	13	37
	It's a moderate problem	16	46
	It's a serious problem	5	14
	Missing	2	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Summary of responses concerning **other backcountry sites**[1].

QUESTION	RESULT		
Q-T1: Does your unit have **other backcountry sites?**	Number present: 14/217	Percent present: 7	
Q-T2: Has noncompliant visitor behavior caused damage at **other backcountry sites** in your unit?	Number damaged: 14/14	Percent damaged: 100	
Q-T3: If you answered YES to **Q-T2**, are any or all of these damages reparable?	Number with reparable damage: 11/14	Percent with reparable damage: 79	
Q-T4: Please describe the reparable damage at **other backcountry sites** caused by noncompliant visitor behavior in your unit.	Five most frequently mentioned forms of damage		Frequency
	1	Inappropriate human waste disposal	4
	2	Inappropriate campfires and firewood collection	3
	2	Littering	3
	4	Off-trail hiking	2
	5	8 forms tied	1
Q-T5, part 1: How much do you estimate it would cost to repair this damage?	Total reported cost: $150,000	Average cost per site reporting: $16,667	
Q-T5, part 2: How much do you estimate it would cost annually to clean up?	Total annual cost: $95,000	Average annual cost per site reporting: $10,556	
Q-T6: Are any or all of these damages to nonrenewable resources?	Number with damage to nonrenewable resources: 3/14	Percent with damage to nonrenewable resources: 21	

[1] Examples of "Other backcountry sites" include glaciers, caves and rookery sites.

Summary of responses concerning **other backcountry sites** (continued)

QUESTION	RESULT		
Q-T7: Please describe the damages to nonrenewable resources at **other backcountry sites** in your unit.	Five most frequently mentioned forms of damage to nonrenewable resources		Frequency
	1	Collecting paleontological or cultural objects as souvenirs	2
	2	Damaging or defacing cultural or historical objects	1
	2	Damaging or defacing natural objects	1
	2	Minor violations involving wildlife	1
Q-T8: Using the glossary of noncompliant visitor behaviors, please rank the four most destructive types of noncompliant behavior that have caused damage at **other backcountry sites.**	Five behaviors considered most destructive		Score*
	1	Damaging or defacing natural objects	13
	2	Inappropriate human waste disposal	11
	3	Littering	10
	3	Off-trail hiking	10
	5	Inappropriate off-road driving	9

Q-T9: Which one of the following statements best describes your perception of the extent to which damage caused by noncompliant behavior at **other backcountry sites** is a problem at your unit. (question answered only for sites with damage)	Response	Frequency	Percent
	It's not a problem	0	0
	It's a slight problem	4	33
	It's a moderate problem	4	33
	It's a serious problem	4	34
	Missing	2	

* Scoring: 4 points when most destructive, 3 points when second most destructive, 2 points when third most destructive, and 1 point when fourth most destructive.

Section A, Q-U1. Does your unit attempt to control visitor noncompliance in wilderness areas not easily accessible to day-hikers by using any of the means of control listed on page 3-4 of the glossary?

Response	Frequency	Percent
No	11	14
Yes	70	86
Missing	3	

Section A, Q-U2. Across all wilderness or backcountry areas not easily accessible to day-hikers, approximately what percentage of noncompliance do you think is deterred by the means of control used in your unit?

Mean	Standard Deviation	N	Minimum	Maximum
52.46	26.37	69	0	100

Section B, Q-A1, Q-B1, Q-C1. What type of site is most, second most and third most damaged by noncompliant visitor behavior at your unit?

Site	Most damaged		Second most damaged	Third most damaged
	N	Rank	N	N
Frontcountry historic sites	49	1	19	14
Developed visitor sites	30	2	19	18
Frontcountry archaeological or paleontological sites	27	3	14	17
Natural attractions accessible to day hikers	23	4	23	9
Frontcountry campgrounds	14	5	19	10
Picnic areas	12	6	19	13
Other frontcountry sites	12	6	9	4
Roadside attractions/turnouts	10	8	11	9
Backcountry camping sites	7	9	6	0
Trailhead sites	4	10	6	6
Commemorative sites	4	10	11	7
Rest areas	3	12	2	2
Backcountry archaeological or paleontological sites	2	13	4	6
Hiking or stock trails	2	13	1	4
Backcountry historic sites	2	13	0	1
Backcountry natural attractions	1	16	5	6
Other backcountry sites	1	16	1	1
Backcountry scenic overlooks	0	18	1	0

Section B, Q-A2, Q-B2, Q-C2. What means of control does management of your unit use to deter the noncompliant behavior causing damage at the type of site you listed in Q-A1 (Q-B1, Q-C1)?

Means of control	Percent of **all listed sites** using means of control[1]	Percent of **frontcountry sites** using means of control[2]	Percent of **backcountry sites** using means of control[3]
Informal personal contact	75	75	78
Direct enforcement	73	74	69
Regulatory signs	60	60	57
Brochures	50	47	69
Barriers	45	46	33
Interpretive signs	39	41	26
Interpretive talks	39	40	29
Closure	33	33	33
Restoration	31	31	31
Improving the quality of existing trails or access routes	21	21	28
Newsletters/ Newspapers	21	20	28
Improved Landscape or Facility Design	20	22	8
Exhibits	20	20	22
Construction of Visitor Facilities	16	17	14
Rerouting Trails or Roads	10	10	16
Use Quotas (Direct)	8	6	29
Cinema	5	4	12
Other Means	5	4	10
Use Quotas (Indirect)	3	3	6

[1]A total of 500 sites were listed as being first, second or third most damaged.

[2]A total of 449 frontcountry sites were listed as being first, second or third most damaged- (Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.)

[3]A total of 51 backcountry sites were listed as being first, second or third most damaged- (Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.)

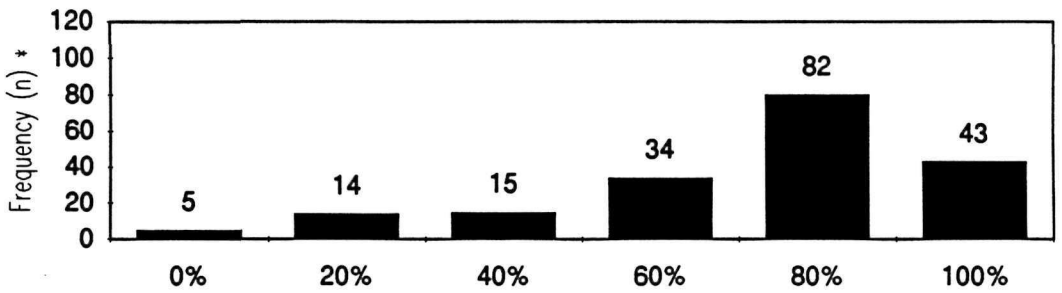
Section C, Q-A1. Which of the 18 means of visitor control are appropriate for use in Magnificent Meadows?

Means of control	Percent of respondents judging as appropriate [1]	Appropriateness ranking
Informal personal contact	87	1
Direct Enforcement	84	2
Interpretive Signs	83	3
Interpretive Talks	82	4
Restoration	81	5
Brochures	81	5
Improving the Quality of Existing Trails or Access Routes	79	7
Barriers	75	8
Regulatory Signs	74	9
Rerouting Trails or Roads	71	10
Improved Landscape or Facility Design	64	11
Exhibits	62	12
Closure	61	13
Newsletters/Newspapers	61	13
Cinema	53	15
Use Quotas (Indirect)	37	16
Use Quotas (Direct)	32	17
Construction of Visitor Facilities	22	18

[1]Data were missing for 21 of the 217 respondents. Thus N = 196.

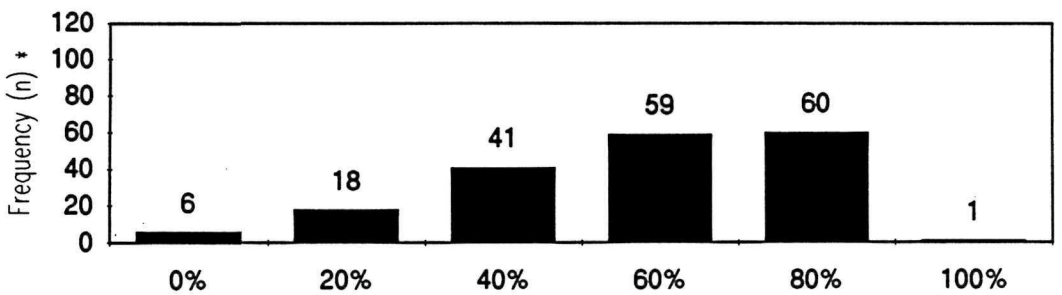
Section C, Q-B. Please estimate the approximate percentage of noncompliance each **means of visitor control** would deter if it were applied to Magnificent Meadows.

Estimated effectiveness of CLOSURE in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



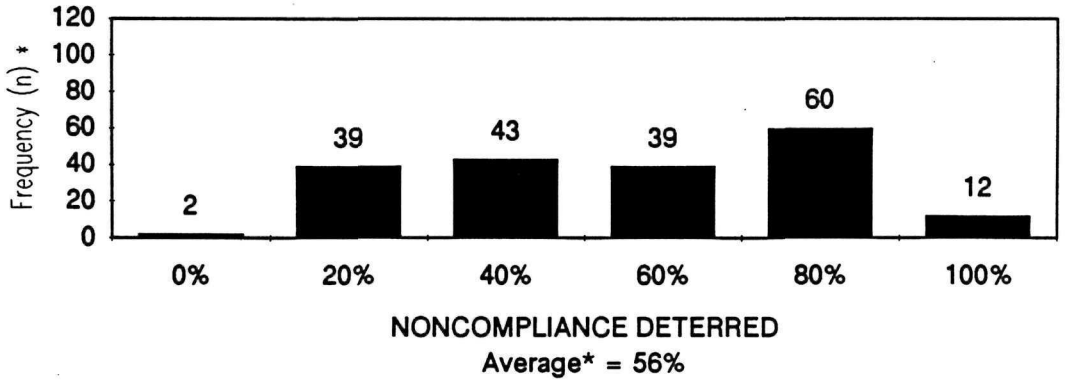
Average* = 72%

Estimated effectiveness of REROUTING TRIALS OR ROADS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



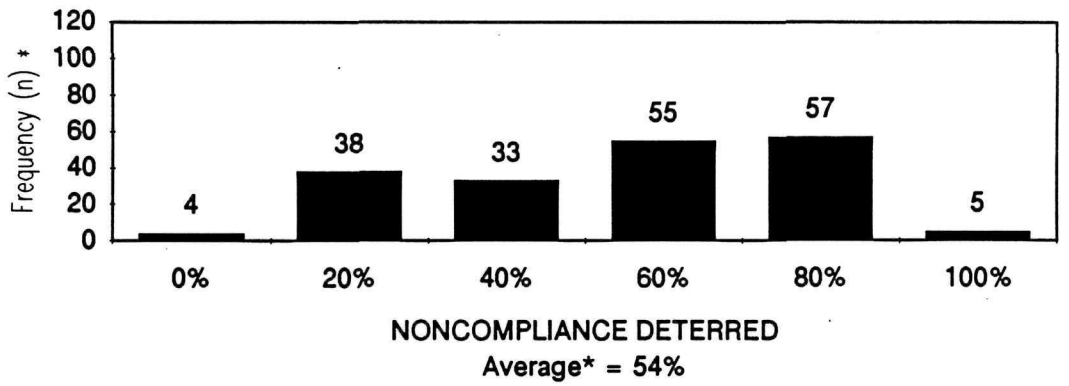
Average* = 57%

Estimated effectiveness of DIRECT ENFORCEMENT in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



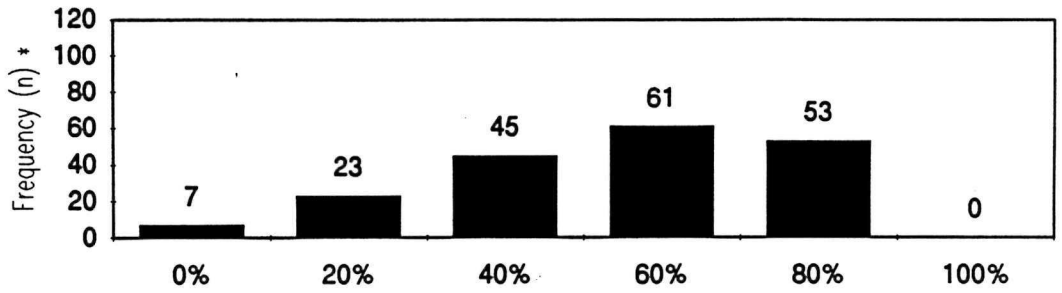
Average* = 56%

Estimated effectiveness of BARRIERS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



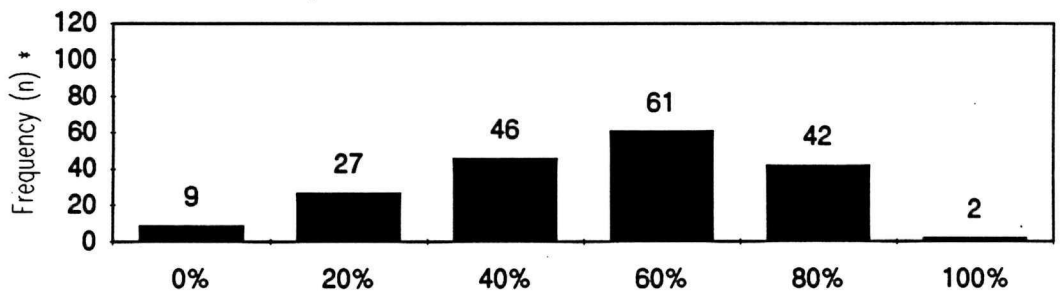
Average* = 54%

Estimated effectiveness of IMPROVING THE QUALITY OF EXISTING TRAILS OR ACCESS ROUTES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



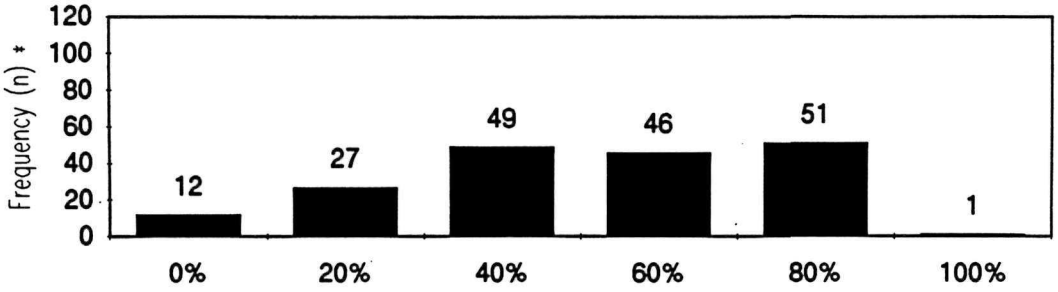
NONCOMPLIANCE DETERRED
Average* = 54%

Estimated effectiveness of RESTORATION in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



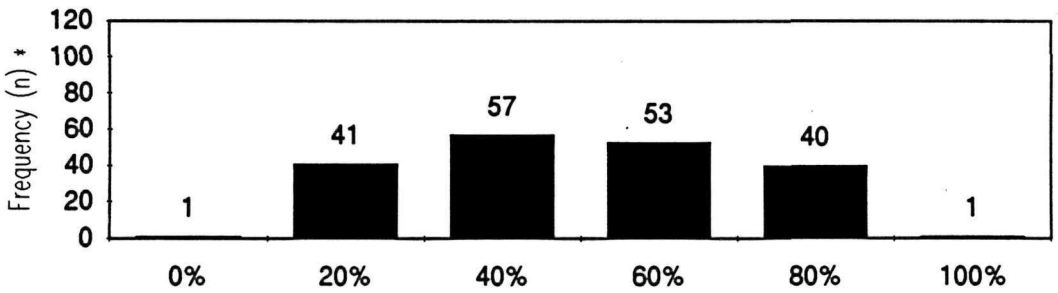
NONCOMPLIANCE DETERRED
Average* = 51%

Estimated effectiveness of IMPROVED LANDSCAPE OR FACILITY DESIGN in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



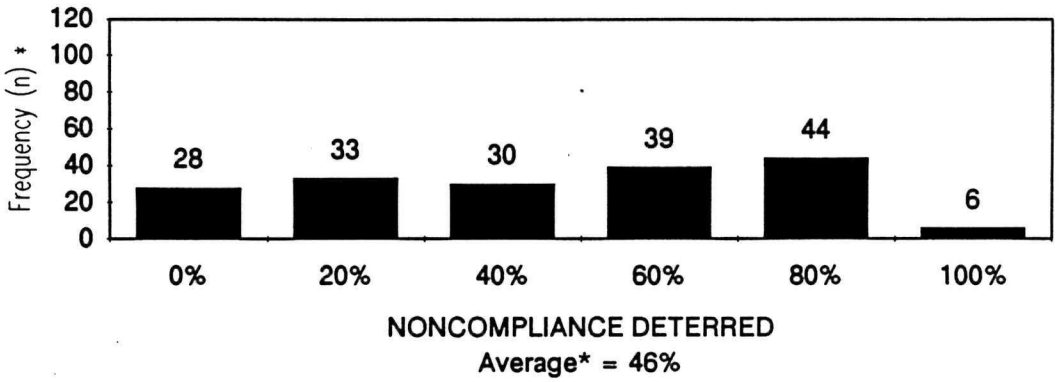
Average* = 51%

Estimated effectiveness of INFORMAL PERSONAL CONTACT in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).

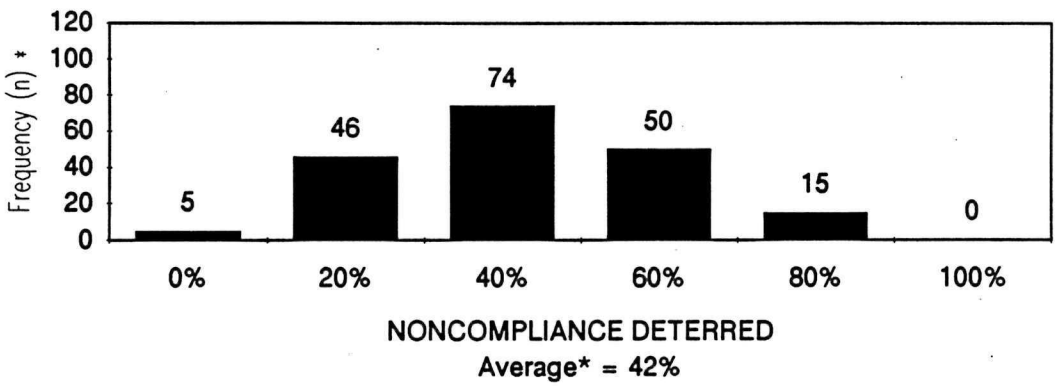


Average* = 50%

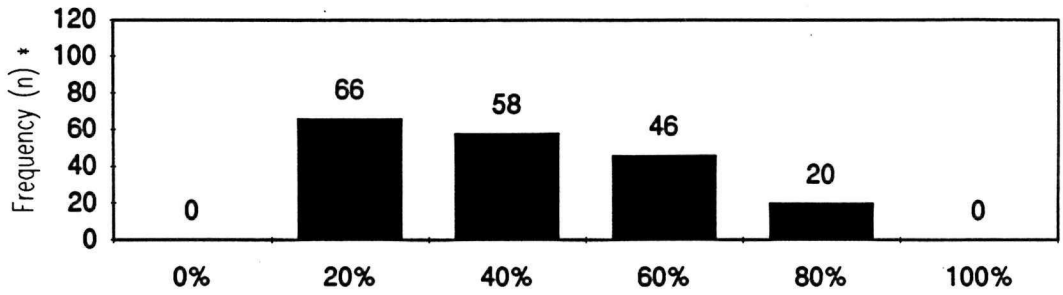
Estimated effectiveness of USE QUOTA (DIRECT) in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Estimated effectiveness of REGULATORY SIGNS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).

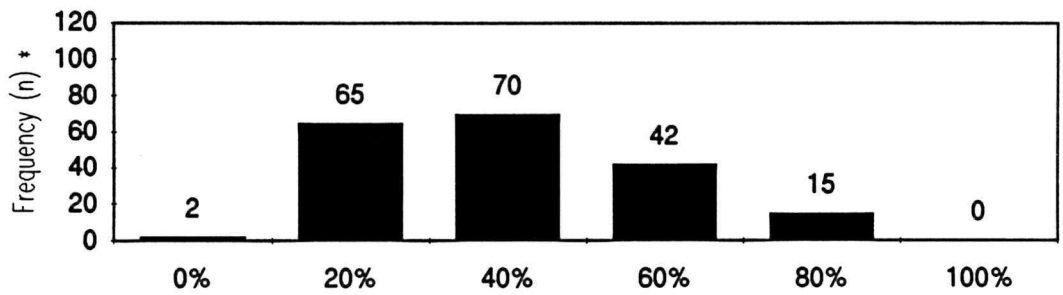


Estimated effectiveness of INTERPRETIVE TALKS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



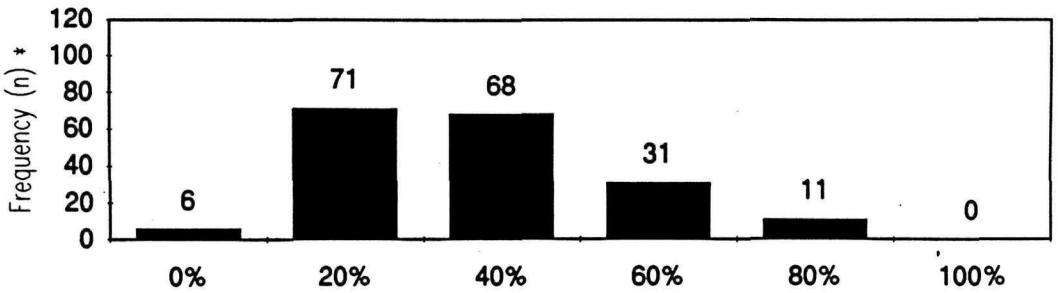
Average* = 42%

Estimated effectiveness of INTERPRETIVE SIGNS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).

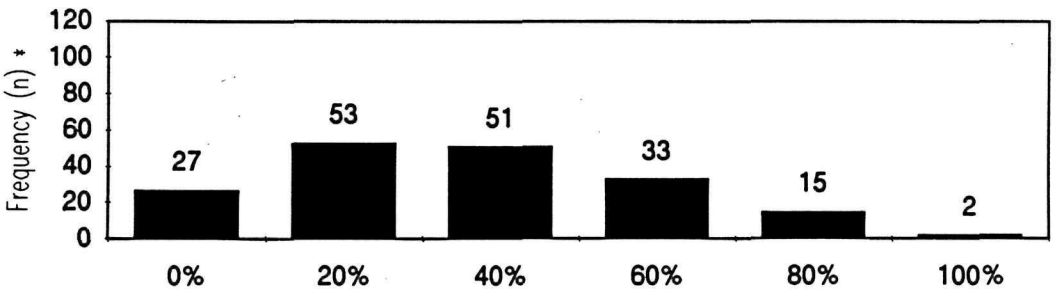


Average* = 40%

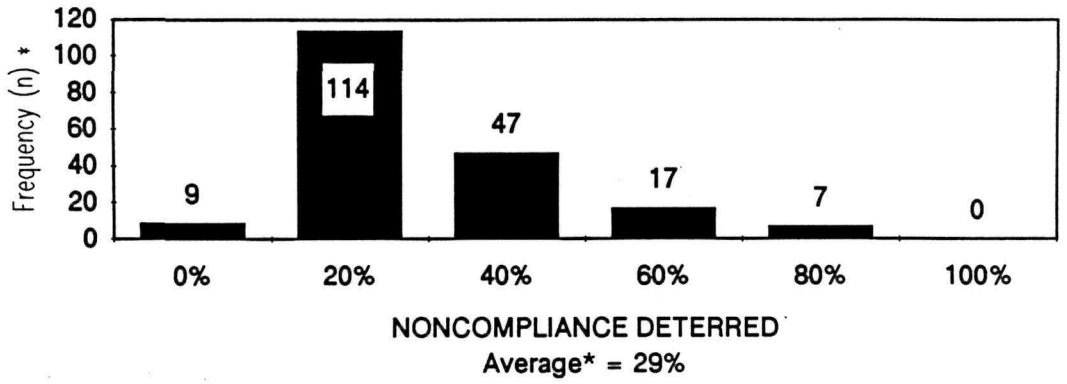
Estimated effectiveness of EXHIBITS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Estimated effectiveness of USE QUOTAS (INDIRECT) in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).

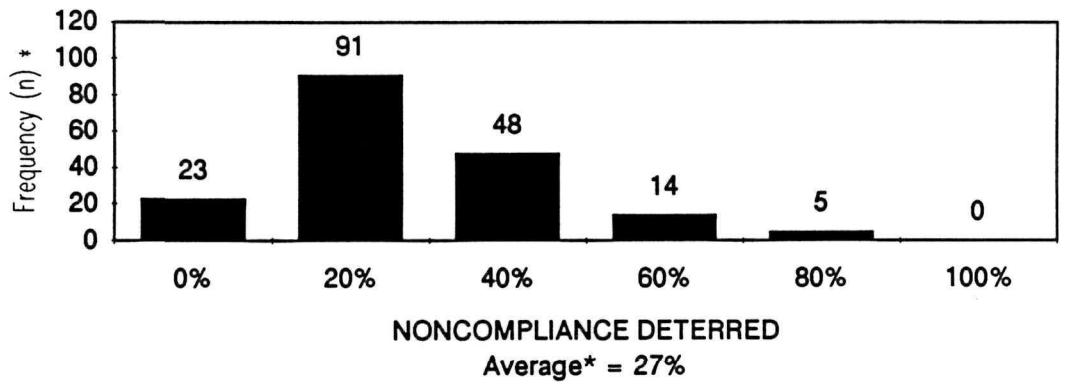


Estimated effectiveness of BROCHURES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



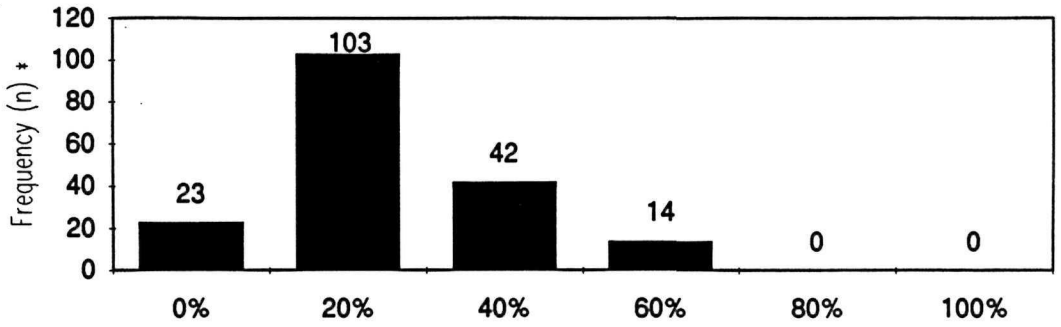
Average* = 29%

Estimated effectiveness of NEWSLETTERS/NEWSPAPERS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



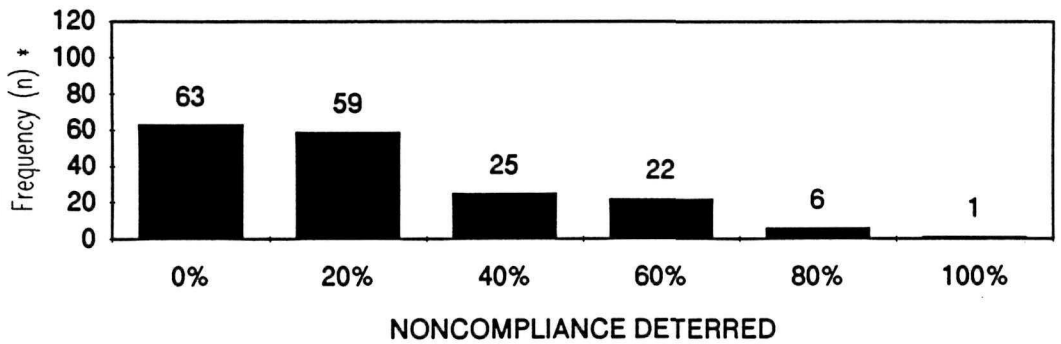
Average* = 27%

Estimated effectiveness of CINEMA in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Average* = 25%

Estimated effectiveness of CONSTRUCTION OF VISITOR FACILITIES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Average* = 23%

Section C, Q-C. Please select and rank order the five best means of visitor control.

Means of Control	Best (N)	Second Best (N)	Third Best (N)	Fourth Best (N)	Fifth Best (N)
Improving the Quality of Existing Trails or Access Routes	34	30	15	19	10
Improved Landscape or Facility Design	29	18	16	11	5
Informal Personal Contact	27	12	16	19	23
Closure	22	10	7	7	16
Rerouting Trails or Roads	22	27	17	14	16
Barriers	20	21	18	17	16
Direct Enforcement	19	17	25	12	26
Restoration	8	18	19	16	14
Use Quotas (Direct)	7	5	2	8	4
Interpretive Signs	6	12	20	27	20
Interpretive Talks	6	12	12	18	14
Regulatory Signs	4	11	22	17	15
Other means	3	1	0	0	1
Cinema	1	2	2	0	2
Exhibits	1	0	8	9	7
Brochures	0	7	3	10	15
Construction of Visitor Facilities	0	1	2	1	0
Newsletters/ Newspapers	0	2	2	3	2
Use Quotas (Indirect)	0	3	3	1	3

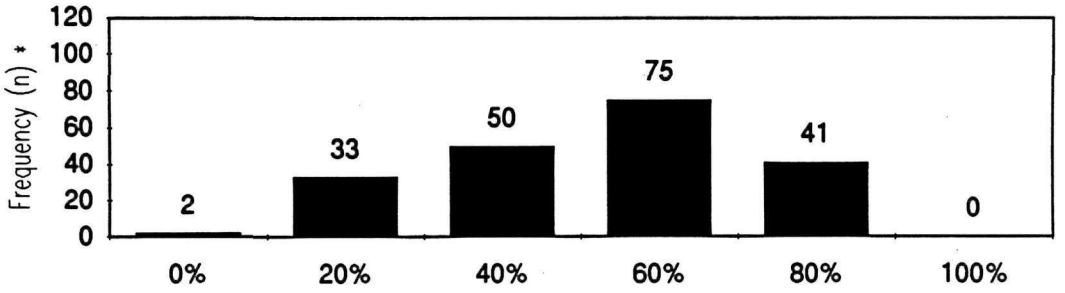
Section C, Q-D1. Which of the six persuasive strategies are appropriate for use in Magnificent Meadows?

Persuasive Strategy	Percent of respondents judging as appropriate [1]	Appropriate Ranking
Appeals to intrinsic values	94	1
Messages emphasizing resource value to humankind	83	2
Direct commands	68	3
Messages emphasizing Agency authority	60	4
Threats of citations or fines	59	5
Messages manipulating social affiliations	58	6

[1] Data were missing for 12 of the 217 respondents. Thus N = 205.

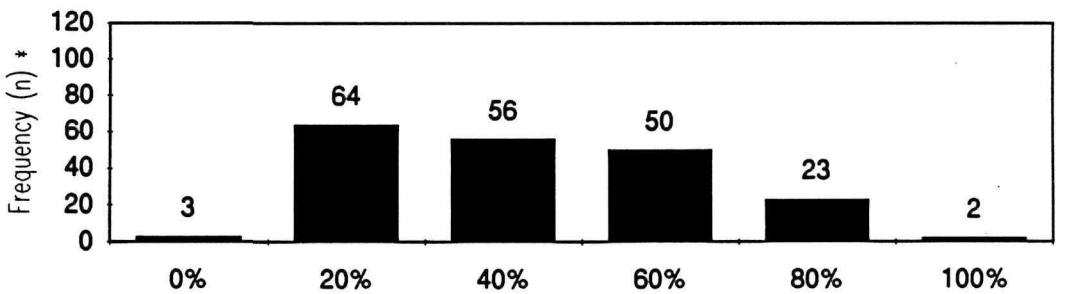
Section C, Q-E. Please estimate the approximate percentage of noncompliance each **persuasive strategy** would deter if it were applied to Magnificent Meadows.

Estimated effectiveness of APPEALS TO INTRINSIC VALUES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



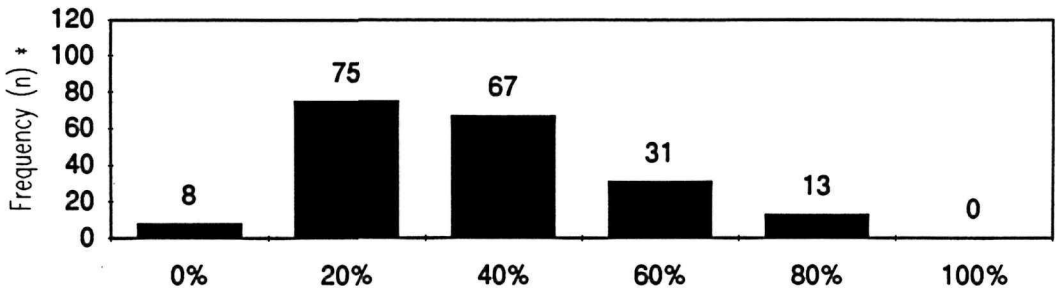
Average* = 52

Estimated effectiveness of DIRECT COMMANDS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



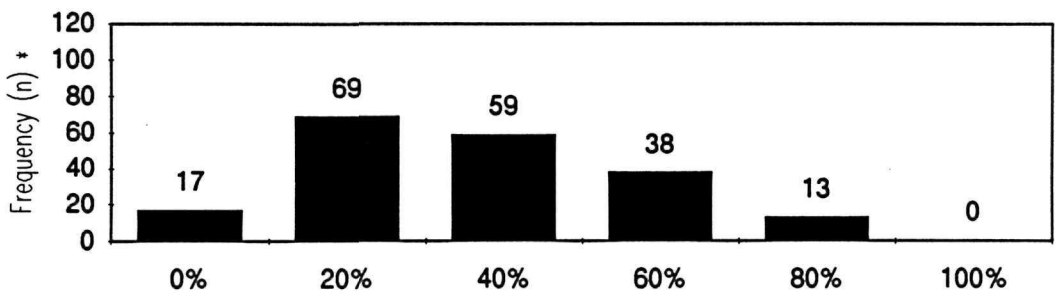
Average* = 43

Estimated effectiveness of MESSAGES EMPHASIZING AGENCY AUTHORITY in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



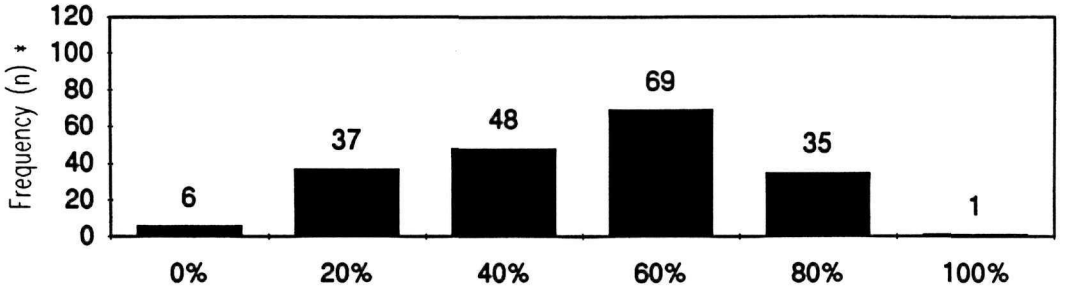
Average* = 36

Estimated effectiveness of MESSAGES MANIPULATING SOCIAL AFFILIATIONS in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



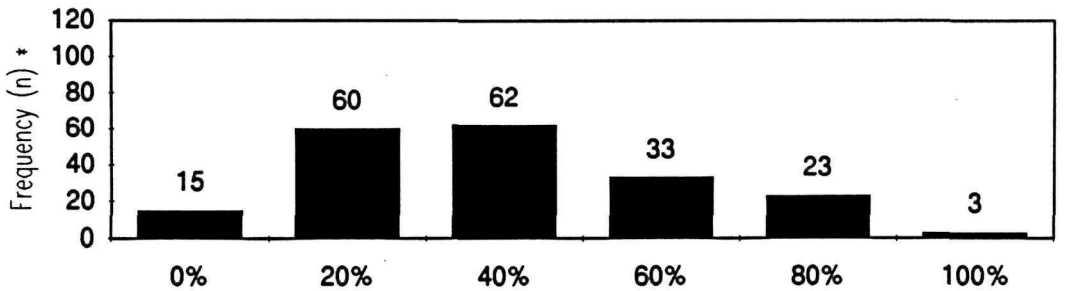
Average* = 35

Estimated effectiveness of MESSAGES EMPHASIZING RESOURCE VALUE TO HUMANKIND in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Average* = 49

Estimated effectiveness of THREATS OF CITATIONS OR FINES in Magnificent Meadows (indicated by number of respondents selecting each of six deterrence levels).



Average* = 40

Section C, Q-F. Please rank order the six persuasive strategies.

Persuasive Strategy	Best (N) [1]	Second Best (N)	Third Best (N)	Fourth Best (N)	Fifth Best (N)	Sixth Best (N)
Appeals to Intrinsic Values	107	48	24	16	4	6
Messages Emphasizing Resource Value to Humankind	38	58	35	31	27	14
Direct Commands	26	37	32	39	41	29
Threats of Citations or Fines	16	19	26	21	43	76
Messages Emphasizing Agency Authority	13	20	36	65	43	26
Messages Manipulating Social Affiliation	4	22	50	30	44	51

[1]Data were missing for 13 of 217 respondents. Thus N = 204.

Section C, Q-G1. Is direct enforcement a technique that should be used in frontcountry and accessible backcountry areas where noncompliance is typically a problem?

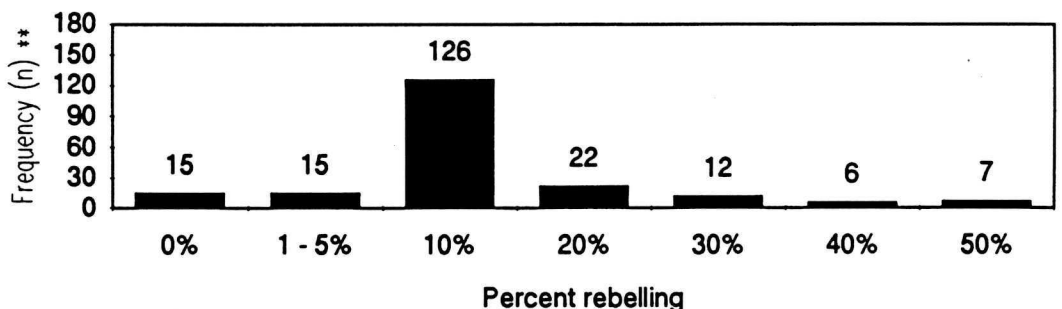
Response	Frequency	Percent
No	14	7
Yes	188	93
Missing	15	

Section C, Q-G2. What effect (if any) is direct enforcement likely to have on the recreational experience of NPS visitors?

Comment	N
Would have a positive impact on most visitors	58
Would create a negative experience only for persons breaking rules	37
Would have a negative impact/Would be bad for public relations	28
Direct enforcement is generally effective	24
Might have a negative effect on some visitors	17
Effect depends on how enforcement is carried out	17
Other comments	74

Section C, Q-G3. What percentage of visitors will rebel against direct enforcement?

Estimated percentage of park visitors who would rebel against direct enforcement* (indicated by number of respondents selecting each of seven percentage levels)



*Question asked, "Some people believe that visitors will rebel against direct enforcement. What percentage of visitors do you think react in this way?"

**Two respondents who wrote 15% and 12 others with missing data are not included in this table.

Section C, Q-H1. Are fear appeals a strategy that should be used when noncompliance endangers park visitors?

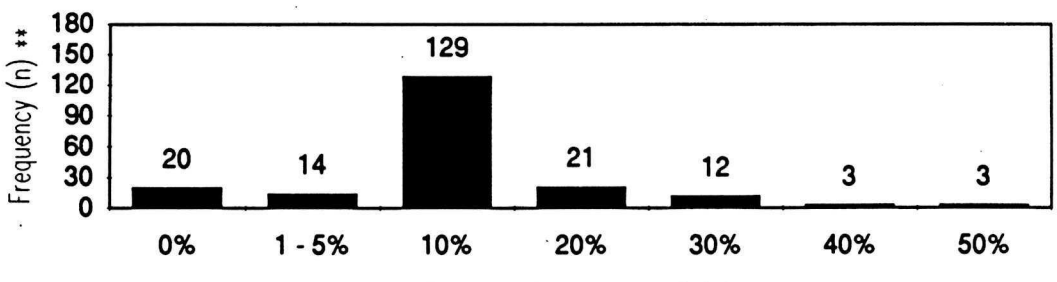
Response	Frequency	Valid Percent
No	39	19
Yes	163	81
Missing	15	

Section C, Q-H2. What effect (if any) are fear appeals likely to have on the recreation experience of the visitor?

Comment	N
Will enhance experience by preventing accidents	95
Will have no effect on experience	24
Fear appeals can act as a challenge to visitors	18
Would have a negative impact/Would be bad for public relations	16
Other comments	35

Section C, Q-H3. Some people believe that fear appeals can actually increase noncompliance because the thrill of danger will draw some visitors to attempt the risky behavior. Approximately what percentage of all visitors do you think react to fear appeals in this way?

Estimated percentage of park visitors who would react to fear appeals by being drawn to attempt the risky behavior* (indicated by number of respondents selecting each of seven percentage levels).



*Question asked, "Some people believe that fear appeals will draw some visitors to attempt risky behaviors. What percentage of visitors do you think react in this way?"

**Data were missing for 15 respondents.

Section C, Q-I1. Does the appropriateness of the means of visitor control and persuasive strategies change from frontcountry[1] to backcountry[2]?

Response	N	Percent
No difference in appropriateness	118	61
Appropriateness changes	77	39
Missing	22	

[1]Frontcountry - areas not designated backcountry and wilderness, and areas of backcountry or wilderness easily accessible to day-hikers.

[2]Backcountry - areas designated as backcountry or wilderness that are not easily accessible to day-hikers.

Section C, Q-I2. Why does the appropriateness of visitor controls vary from frontcountry to backcountry?

Response	N
There is a different type of visitor in backcountry	54
Some controls and strategies negatively impact wilderness experience/ are not appropriate in the backcountry	37
Different methods are more effective in the backcountry	16
Some controls and strategies are not feasible/practical/they're too expensive	10
other	6

Section C, Q-J1. Does your unit of the NPS have problems with noncompliant visitor behaviors that do not directly damage park resources?

Response	Frequency	Percent
No	75	37
Yes	128	63
Missing	14	

Section C, Q-J2. Please use the space below to describe the noncompliant acts that pose a problem in your unit but do not directly damage park resources.

Noncompliant Acts	Frequency
Alcohol/alcohol related problems	69
Traffic violations	59
Disorderly conduct/excessive noise	34
Nudity/public sex	24
Drugs/drug related problems	18
Use culturally inappropriate to the site	13
General crime	12
Other (six different noncompliant acts)	total of 26

Section C, Q-J3. Which of the following statements best describes your perception of the extent to which noncompliant behaviors that do not directly damage park resources are a problem in you unit.

Response	Frequency	Percent
It's a problem	3	2
It's a slight problem	48	38
It's a moderate problem	60	47
It's a serious problem	17	13
Missing	89	

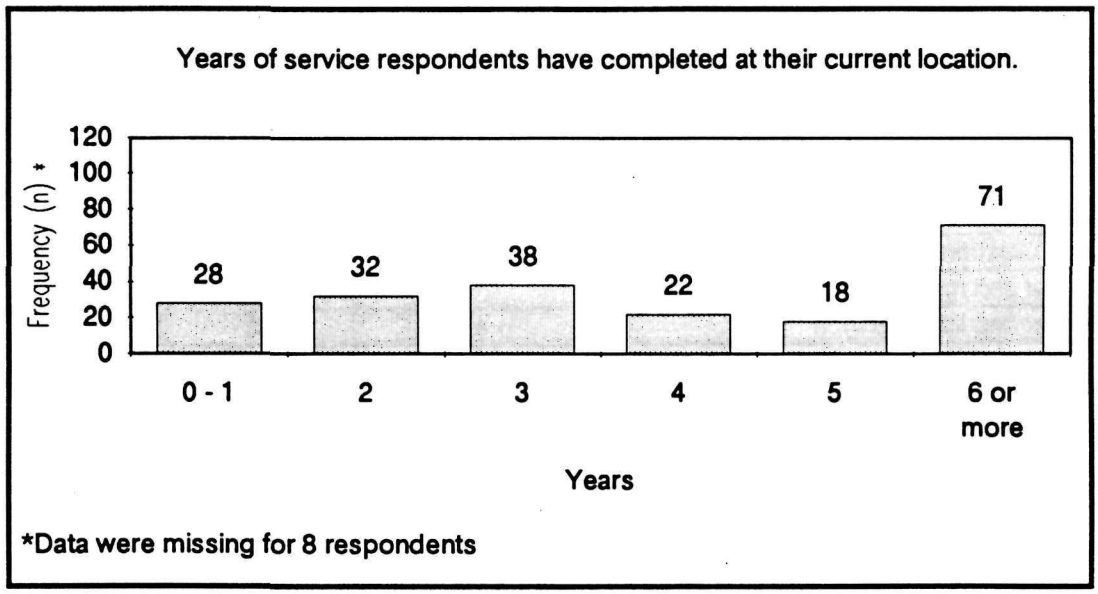
Section D, Q-A. In what division of park management is your current work assignment? (In response to this question, please indicate your primary work role since some NPS personnel may be formally classified in a job category which does not reflect their current work responsibilities.)

Assignment	N	Percent
Ranger division	64	30
Natural resource management division	17	8
Operations and maintenance	2	1
Interpretation	19	9
Administration	5	3
Ranger and natural resource management	17	8
Ranger and interpretation	13	6
Natural resource management and interpretation	14	7
Ranger, interpretation, and natural resource management	16	8
Other combinations	9	4
Unspecified multiple assignments	34	16
Missing	7	

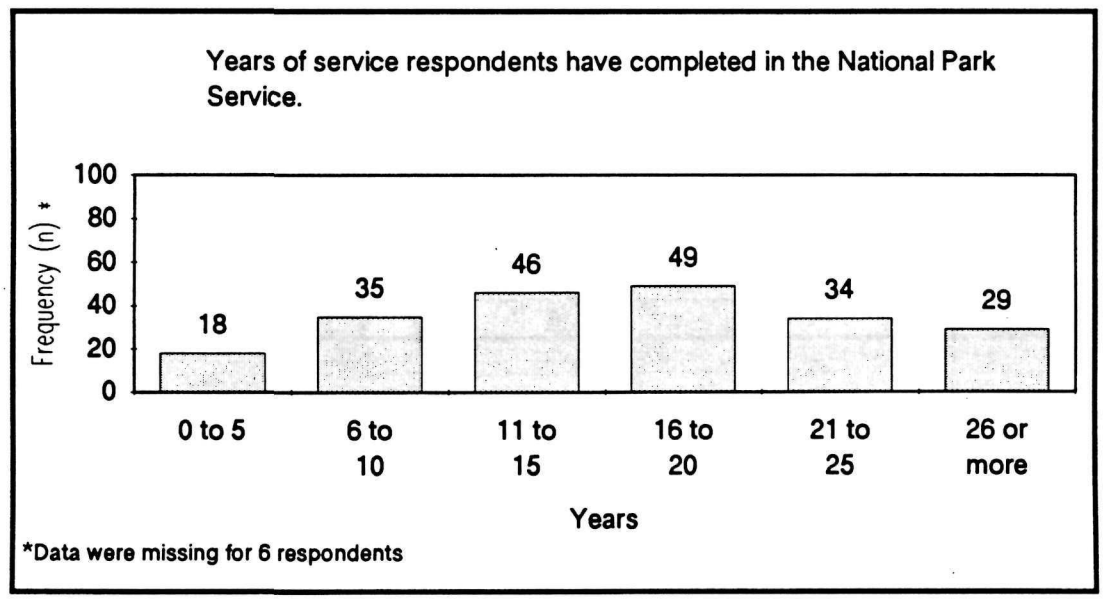
Section D, Q-B. In what region is your NPS unit located?

Region	Frequency	Percent
Alaska	8	4
Western	29	14
Rocky Mountain	28	13
North Atlantic	23	11
National Capitol	5	2
Pacific Northwest	13	6
Southwest	26	12
Midwest	26	12
Mid Atlantic	16	8
Southeast	39	18
Missing	4	

Section D, Q-C. How many years of service have you completed at this NPS location?



Section D, Q-D. How many total years of service have you completed with the National Park Service?



Section D, Q-E. In what type of NPS unit is your current assignment?

First type of NPS unit listed by respondent.

Value Label	Frequency	Percent
National Park	42	20
National Recreational Area	14	7
National Preserve	5	2
National Parkway	3	1
National Monument	45	21
National Historical Site	67	31
National Lakeshore or Seashore	10	5
Other	27	13
Missing	4	

Second type of NPS unit listed by respondent.

Value Label	Frequency	Percent
National Park	0	0
National Recreational Area	1	5
National Preserve	4	21
National Parkway	0	0
National Monument	3	16
National Historical Site	8	42
National Lakeshore or Seashore	0	0
Other	3	16
Missing	198	

Third type of NPS unit listed by respondent.

Value Label	Frequency	Percent
National Park	0	0
National Recreational Area	0	0
National Preserve	0	0
National Parkway	0	0
National Monument	1	20
National Historical Site	1	20
National Lakeshore or Seashore	2	40
Other	1	20
Missing	212	

Section D, Q-F1. What is the highest educational level you have attained?

Level	Frequency	Percent
High School Diploma	2	1
Some Business or Technical School	3	1
Some College	21	10
College Graduate	109	52
Some Graduate Work	59	28
Doctoral or Professional Degree	17	8
Missing	6	

Section D, Q-F2. What was your field of study or training at the highest educational level of schooling?

Field of study	Frequency	Percent
Hard Science-- not resource related	29	15
Social Science	60	30
Social Science/Recreation-- resource related	40	20
Biology/Forestryresource related	57	29
Other area	10	5
Missing	20	

Section D, Q-G. Are you female or male?

Sex	Frequency	Percent
Female	39	19
Male	170	81
Missing	8	

As most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS D-67 August 1994