

The National Park Service Comprehensive Survey of the American Public

Managing Non- Native Plants and Animals in the National Park System: Analysis of Public Opinion

Technical Report

Frederic I. Solop, Ph.D.
Kristi K. Hagen, M.A., M.A.
David Ostergren, Ph.D.
Northern Arizona University

July 2004



NPS SOCIAL
SCIENCE PROGRAM

SOCIAL RESEARCH LABORATORY
NORTHERN ARIZONA UNIVERSITY



EXECUTIVE SUMMARY¹

This report is the final in a series of topical reports prepared by Northern Arizona University's Social Research Laboratory based on the 2000 *National Park Service Comprehensive Survey of the American Public*. The purpose of this report is to describe public opinion on the management of non- native plants and animals in units of the National Park System.

Between February 21, 2000 and May 21, 2000 the Social Research Laboratory interviewed adult members of 3,515 households in the United States. The sample represented all seven administrative regions of the National Park Service.

Major findings include:

- Although there was some regional variation, public opinion on how to manage non- native plants and animals in the National Park System was almost evenly split between those who favored removing non- native species and those who supported leaving them in the parks.
- People who had visited parks were somewhat more likely than non- visitors to think that non- native plants should be removed, but visitors and non- visitors did not differ significantly in their opinions about removing non- native animals.
- Sixty- five percent of respondents favored managing non- native plants and animals in the same way. Those who supported removing plants from parks also favored removing non- native animals, and those who supported leaving non- native plants also supported leaving non- native animals in parks.
- Older respondents were less likely to support removal of non- native plants and animals than were younger respondents, and those with higher education and income levels were more likely to favor removal.

¹The authors and the National Park Service Social Science Program are indebted to five technical reviewers for their significant input into this report.

I. INTRODUCTION

A. Preface

The National Park Service (NPS) commissioned the Social Research Laboratory at Northern Arizona University to conduct the *2000 National Park Service Comprehensive Survey of the American Public*. The survey included both visitors and non- visitors to units of the National Park System.

Survey data were obtained through telephone interviews with adult members of 3,515 households in the United States, providing representative data for all seven administrative regions of the National Park Service. Data collection was completed between February 21, 2000 and May 21, 2000. (Refer to the appendix for a complete description of the methodology.)

A visitor was defined as an individual who had entered a National Park System unit during the 24 months prior to being contacted for the survey and who was able to accurately identify the unit entered. All respondents who had not visited a park within this period, or who could not accurately name the unit they reported visiting, were categorized as non- visitors. Overall, 32 percent of respondents had visited a unit during the 24 months preceding the survey and could accurately name that park.

Findings described in previous reports detailed the demographic characteristics of National Park System visitors and non- visitors, identified differences in motivations, interests, and attitudes held by these two groups toward the National Park Service and the National Park System, and provided a detailed understanding of the trips visitors made to National Park System units.

This topical report describes public opinion toward management of non- native plants and animals in the National Park System. It is the final report in a series prepared by Northern Arizona University's Social Research Laboratory and complements data presented in the *NPS Comprehensive Survey of the American Public National Technical Report* (June 2001, <http://www.nature.nps.gov/socialscience/products.htm>). The topical reports include:

- Seven regional technical reports
- Attitudes towards fees and the Recreation Fee Demonstration Program
- Ethnic and racial diversity of visitors and non- visitors
- Public opinion on management of non- native plants and animals in parks

B. Background

Over time, non- native plants and animals have been introduced into National Park System units both intentionally and unintentionally. Non- native species can affect natural ecosystems in parks through broad ecosystem degradation (e.g., overgrazing, disrupting species richness, creating unnatural habitats) or by out- competing native species, at times extirpating them from parks and reducing their populations throughout their ranges. National Park Service managers face the choice of leaving non- native plants and animals alone or controlling them using such measures as pesticide application, mechanical removal, or biological control. The consequences of implementing any of these actions may create new problems.

Research presented in this report describes public opinion on management of non- native species in parks. This information contributes to the inputs that need to be considered by managers as they decide how best to handle this complex issue. As stated in the *Management Plan: Meeting the Invasive Species Challenge*,² a successful strategy to address non- native species depends on the public's understanding and acceptance of the actions needed to protect native plants and animals. When managers are aware of the public's perception of non- native species management, they can weigh the expectations of the public as they choose the timing, extent, and strategy for management. In addition, managers can design information strategies to address public concerns in cases where the management strategy has the potential to affect visitor experiences (e.g., through degradation of a scenic view or closing of an area for treatment). The *2000 National Park Service Comprehensive Survey of the American Public* is the first effort by the NPS to systematically describe national public opinion on managing non- native species that have invaded parks.

C. Report Goals

The purpose of this report is to provide a concise description and analysis of American public opinion on managing non- native plants and animals in the National Park System. Specifically, the following questions are examined:

- What is the public's opinion about allowing or removing non- native plants in parks?
- What is the public's opinion about allowing or removing non- native animals in parks?
- Is public opinion on how to manage non- native species related to visiting National Park System units or to such factors as age, education, and income?

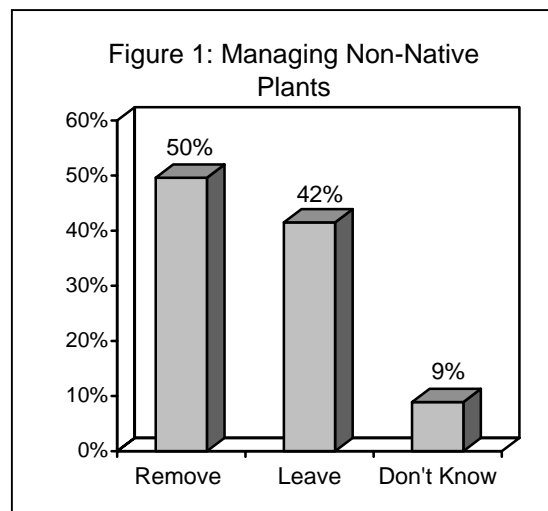
²National Invasive Species Council, 2001.

II. RESULTS

All respondents were asked their opinions about two resource management issues faced by NPS managers: should non- native plants and animals be allowed to remain in National Park System units or should they be removed? Possible responses to these questions included “remove the non- native plants (or animals),” “leave non- native plants (or animals) alone,” and “don’t know.” (Refer to the appendix for the full text of the questions.)

A. Opinions on Managing Non- Native Plants

Respondents were first asked which management alternative for plants came closest to their own point of view: removing non- native plants from the National Park System or letting them remain. By a modest margin, those interviewed chose removing the plants (50%) rather than leaving them in parks (42%) (Figure 1). Nine percent had no opinion. This difference is statistically significant. (See the appendix for a discussion of statistical significance.)



When examining responses across the seven National Park Service administrative regions, people living in the Midwest Region were significantly more likely to support removing non- native plant species than retaining them (55% vs. 37%). This also was true of respondents living in the National Capital Region (51% vs. 38%). In the remaining five regions, public opinion was split, with no statistically significant trend toward either management alternative (Table 1).

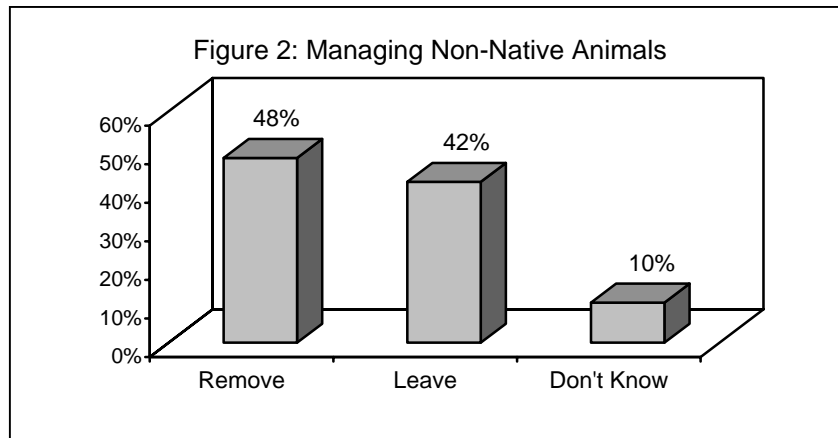
Table 1:
Opinions on Managing Non- Native Plants by NPS Region

	NCR	NER	SER	MWR	IMR	PWR	AKR
Remove Plants	51%	48%	46%	55%	46%	49%	44%
Leave Plants Alone	38%	43%	43%	37%	45%	42%	47%
Don't Know	12%	9%	11%	8%	9%	9%	10%
Total N	494	469	490	492	511	532	501

Note: NCR=National Capital Region; NER=Northeast Region; SER=Southeast Region; MWR=Midwest Region; IMR=Intermountain Region; PWR=Pacific West Region; AKR=Alaska Region.

B. Opinions on Managing Non- Native Animals

In addition to soliciting opinions about plants, respondents were asked about their preferences for managing non- native animals in the National Park System. About half of those surveyed (48%) preferred removing these animals from parks, while 42 percent preferred to leave them alone. Ten percent replied “don’t know” (Figure 2). This difference is also statistically significant.



An examination of responses by region revealed three significant trends (Table 2). The majority of respondents living in the National Capital (52%), Midwest (51%), and Northeast (51%) regions supported the removal option for non- native animals. In contrast, in the Alaska, Intermountain, Southeast, and Pacific West regions the differences between those supporting removal and non-removal were not significant statistically.

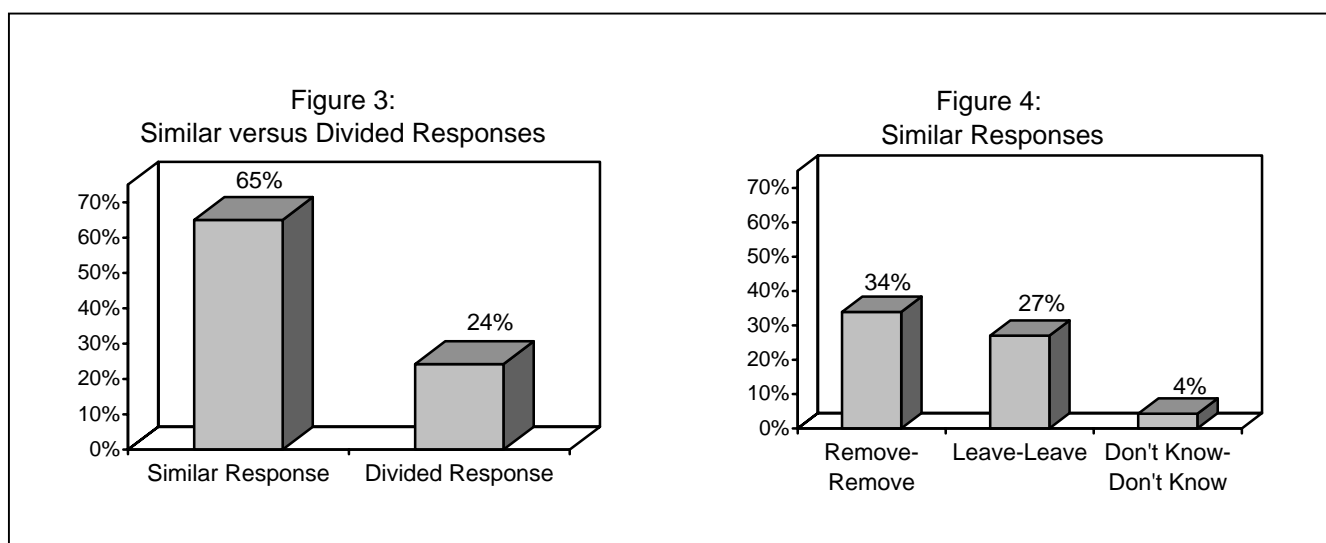
Table 2:
Opinions on Managing Non- Native Animals by NPS Region

	NCR	NER	SER	MWR	IMR	PWR	AKR
Remove Animals	52%	51%	45%	51%	44%	46%	41%
Leave Animals Alone	34%	40%	44%	39%	46%	41%	48%
Don't Know	14%	9%	11%	10%	10%	13%	11%
Total N	494	465	482	486	511	526	500

Note: NCR=National Capital Region; NER=Northeast Region; SER=Southeast Region; MWR=Midwest Region; IMR=Intermountain Region; PWR=Pacific West Region; AKR=Alaska Region.

C. Comparing Responses to Both Questions

Answers to the questions about non- native plants and animals were examined to determine if people responded identically to both items. Overall, 65 percent of respondents answered the two questions the same way, while 24 percent divided their responses by selecting “removal” for one question and “leave alone” for the other (Figure 3). In particular, Figure 4 shows that 34 percent favored removing both non- native plants and animals, while 27 percent chose the “leave alone” policy for both. Four percent answered “don’t know” to both questions. This pattern suggests that most respondents viewed the two issues similarly.

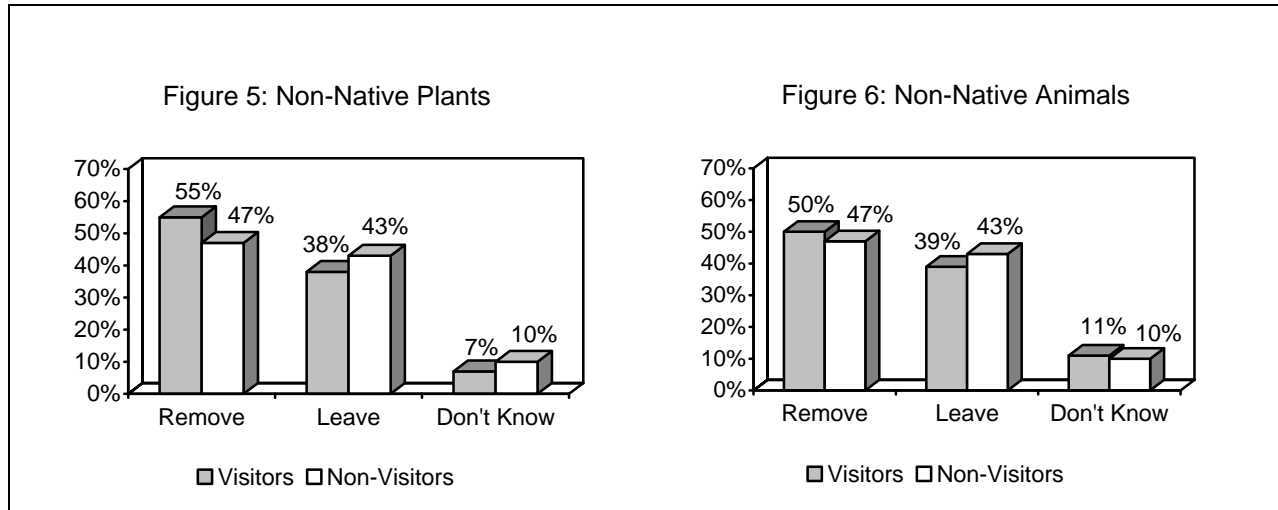


D. Comparing Visitors and Non- Visitors

According to the 2000 NPS Comprehensive Survey of the American Public Technical Report, 32 percent of adult Americans had visited a National Park System unit within the two years prior to the survey. In previous reports, visitation experience proved significant in understanding differences in opinions. Therefore, responses to the questions about managing non- native species were analyzed by respondents’ status as visitors or non- visitors to parks.

Figure 5 shows that park visitors were significantly more likely to support removal of non- native plants than were non- visitors (55% vs. 47%). However, less difference occurred between visitors and non- visitors on how best to manage non- native animals (Figure 6). Fifty percent of visitors supported removing these animals from parks, compared to 47 percent of non- visitors. This is not a statistically significant difference.

In the case of non- native plants, the association between park visitation and opinions does not necessarily indicate that going to National Park System units leads to support for removal. It is possible that causation is in the opposite direction: people who favor non- native plant removal may be more likely to visit national parks. Also, as the following analysis illustrates, other factors are related to these opinions besides visitation experience.



E. Associations with Age, Income, and Education

In addition to the analysis of visitation experience, Table 3 presents associations between opinions and three sociodemographic characteristics: age, household income, and education. The Cramer's *V* reported in the table measures the strength of the relationship between opinions and these factors. Values for Cramer's *V* range from 1 (a perfect relationship) to 0 (no relationship at all). The larger the value, the stronger is the association between the variables. Another statistic presented in Table 3 is the measure of statistical significance. The *p* value reflects the confidence that the relationships observed in the table are not the product of chance, but reflect the views of the population sampled. A *p* value of less than .05 generally indicates that a relationship is unlikely to be the result of chance alone (i.e., it is statistically significant).

**Table 3:
Opinion by Visitor Status, Age, Income, and Education**

	<i>Non-Native Plants</i>			<i>Non-Native Animals</i>		
	<i>Remove</i>	<i>Leave</i>	<i>DK</i>	<i>Remove</i>	<i>Leave</i>	<i>DK</i>
Visitor Status	Cramer's V= .07, <i>p</i> < 0.001			Cramer's V= .04, <i>p</i> = 0.06		
Visitor	55%	38%	7%	50%	39%	11%
Non-Visitor	47%	43%	10%	47%	43%	10%
Age	Cramer's V= .09, <i>p</i> < 0.001			Cramer's V=.06, <i>p</i> < 0.001		
18-34	52%	43%	5%	48%	45%	7%
35-59	53%	38%	9%	50%	40%	10%
60+	42%	46%	12%	44%	42%	14%
Income	Cramer's V= .06, <i>p</i> = 0.001			Cramer's V= .07, <i>p</i> < 0.001		
< \$20k	48%	45%	7%	45%	48%	7%
\$20k - \$49,999	50%	44%	6%	48%	42%	10%
\$50k - \$99,999	56%	38%	6%	53%	40%	7%
\$100k +	59%	32%	9%	55%	36%	9%
Education	Cramer's V= .09, <i>p</i> < 0.001			Cramer's V= .09, <i>p</i> < 0.001		
< HS Degree	36%	51%	13%	36%	54%	10%
HS Degree	46%	44%	10%	47%	45%	8%
Some College	51%	43%	6%	47%	44%	9%
College Degree	53%	40%	7%	51%	38%	11%

Note: DK=Don't Know.

All relationships between opinions and age, income, and education had *p* values of less than .05. This indicates that these associations are unlikely to be the product of chance. However, the Cramer's *V* for each relationship is small, ranging from .06 to .09. It can be concluded that associations likely exist in the American population between these sociodemographic characteristics and opinions about managing non- native species in parks, but these relationships are relatively weak. Although older respondents were more likely to be undecided than younger ones, those who expressed an opinion were somewhat less likely to support removing non- native species than were younger people, and respondents with higher levels of education and income were somewhat more likely to favor removal.

As stated previously, more park visitors than non- visitors believed that non- native plants should be removed, but no significant association existed between visitation experience and opinions about managing non- native animals.

III. CONCLUSION

Even though the National Park System contains a class of lands where protection of natural processes is paramount, the American public was divided in its opinion on whether to remove non- native plants and animals from parks or leave them alone. This finding is consistent with the statement in the *National Management Plan: Meeting the Invasive Species Challenge*³ that public awareness of the problems produced by non- native species is low.

The *NPS Comprehensive Survey of the American Public* was the first study to investigate general public opinion about non- native species management in the national parks. However, it has left important questions unaddressed. It did not determine respondents' knowledge of the purposes of the National Park System, nor did it investigate the public's understanding of the effects of non- native species on native plants and animals and on ecosystems. This includes awareness of the differences between individuals of a species and populations with respect to species survival and ecosystem dynamics. The content of interpretive information viewed by respondents who had visited parks was also undetermined, as was the effectiveness of education in informing people about management alternatives. Finally, the survey did not identify specific animals or plants that might be removed or describe the management actions to accomplish this. Both of these likely play an important role in shaping public opinion. The NPS needs research on all of these issues if it is to improve its understanding of people's opinions about the management of non- native species and be able to explain the reasons for controlling them in parks and surrounding areas.

The *Comprehensive Survey of the American Public* does provide park managers with an awareness of the importance of educating visitors and the public at large about non- native species. One step toward accomplishing this is to integrate science education components into proposals and plans to protect park resources by removing non- native plants and animals.

³Invasive Species Council, op. cit.

APPENDIX

A. Overview

The National Park Service commissioned the Social Research Laboratory at Northern Arizona University to conduct the agency's first comprehensive survey of the American public. Findings from this survey are reported in the *2000 National Park Service Comprehensive Survey of the American Public Technical Report*. Survey data were collected from a random sample of respondents to provide a national perspective on people's relationships with the National Park Service and National Park System units. Two datasets were developed from the collected information. These included a national set reflecting attitudes, opinions, and behaviors of the adult population of the United States and a regional dataset that allowed for comparisons of information across the seven National Park Service administrative regions. For purposes of this research, a park visitor was defined as an individual who had entered a unit of the system during the 24 months prior to being contacted for the survey and who was able to accurately identify that unit. Park names were verified against a list provided by the NPS. National Park Service employees and members of their immediate families were screened out of the survey.

Survey data were obtained by interviewing adult members of 3,515 households in the United States. Respondents were randomly chosen within the households using the most-recent-birthday method of respondent selection. The original sample frame was purchased from Genesys Marketing Systems of Fort Washington, Pennsylvania. The sample frame was constructed using standard Random Digit Dialing procedures and purged for nonworking telephones and business lines. Data collection was completed between February 21, 2000 and May 21, 2000.

B. Survey Questions on Non- Native Species

The question about removing or retaining non- native plants in parks was prefaced by the following introduction:

“There are plants growing in parks that are not naturally found within the boundaries of those parks. Removing the plants can be expensive, but leaving the plants alone could result in other native plants being harmed. Which of the following options comes closest to your own point of view—park managers should remove these plants, or park managers should leave these plants alone?”

Respondents could choose from the following options in answering this question: “remove the non- native plants,” “leave the non- native plants alone,” or “don't know.”

The question about removing or retaining non- native animals was introduced as follows:

“There are animals living in parks that are not naturally found within the boundaries of those parks. Removing the animals can be expensive, but leaving the animals alone could result in other animals and native plants being harmed. Which of the following options comes closest to your own point of

view—park managers should remove these animals, or park managers should leave these animals alone?”

Similar to the plant question, respondents could choose from “remove the non- native animals,” “leave the non- native animals alone,” or “don’t know” options.

C. Survey Limitations

All survey research statistics are subject to sampling error as well as non- sampling error, such as survey design flaws, reporting errors, data processing mistakes, and under- coverage of particular populations. The Social Research Laboratory has taken steps to minimize errors by implementing quality control and editing procedures to reduce errors made by respondents, interviewers, and coders. Ratio- estimation to independent age- gender- race- ethnicity population controls partially corrects for bias attributable to survey under- coverage. However, biases in the estimates are unavoidable when missed people have characteristics different from those of interviewed people in the same age- gender- race- ethnicity group.

Table A- 1 reports completion rates for the survey in each of the seven National Park Service administrative regions. Completion rates for this survey ranged from 73 percent to 95 percent. These figures are substantial for a survey of this scope and magnitude and suggest high reliability of survey results. Tables A- 2 and A- 3 report the number of unweighted and weighted surveys completed for each dataset. Weighted survey totals were derived after the ratio- estimation model was applied to the data. Because different ratio- estimation models have been applied to the national and regional datasets, the total number of weighted cases varies between the two datasets.

Table A- 1: Completion Rates								
	NCR	NER	SER	MWR	IMR	PWR	AKR	Average
Completion Rates	73%	85%	90%	86%	90%	95%	95%	88%

Table A- 2: National Data Set	
	National
Unweighted	3515
Weighted	3515

Table A- 3: Regional Data Sets							
	NCR	NER	SER	MWR	IMR	PWR	AKR
Unweighted	500	501	501	501	502	502	508
Weighted	511	485	510	505	517	503	509

For this survey, a comprehensive list of National Park System units was provided by the NPS and used to verify that respondents actually visited a unit within the past two years. Fourteen parks were inadvertently omitted from this list. These missing units were determined to be low-visitation sites. The impact of their omission is insignificant to the larger goal of determining the proportion of the American public that had visited a National Park System unit within the previous two years. In addition, a small number of places listed by respondents were later determined to be park headquarters or offices. Thirteen respondents out of 3,515 named these as the location of their last visit. The impact of their classification as visitors is also insignificant to the larger goals of the research project.

Finally, because this was a survey of U.S. households, the results did not include the viewpoints of international tourists who make up a relatively large proportion of visitors to some national parks.

D. Statistical Significance

The margin of error associated with national-level data in this study is +/- 1.7 percent at a 95 percent confidence level. The margin of error associated with data from each of the National Park Service administrative regions is +/- 4.5 percent at a 95 percent confidence level. "Margin of error" is a statistical term that describes the probable difference between interviewing everyone in a given population and interviewing a sample drawn from that population. The percentages obtained in telephone surveys are estimates of what the percentage would be if the entire population had been surveyed. Thus, if 50 percent of those in the sample are found to agree with a particular statement and the associated margin of error is +/- 4.5 percent, the actual percentage of agreement in the population from which the sample is drawn would be between 45.5 percent and 54.5 percent (50% +/- 4.5%). The 95 percent confidence level means that this +/- 4.5 percent margin of error would occur in 95 out of 100 samples of this size drawn. Sampling error increases as sample size is reduced. This must be kept in mind when comparing the responses of subgroups within the sample (e.g., visitors *vs.* non-visitors or residents of only one region). Smaller numbers of respondents on any question translate into higher margins of error.

About the NPS Social Science Program

The role and functions of the NPS Social Science Program are to: provide leadership and direction to the social science activities of the NPS; coordinate social science activities with other programs of the NPS; act as liaison with the USGS Biological Resources Division and other federal agencies on social science activities; provide technical support to parks, park clusters, support offices, and regional offices; and support a program of applied social science research related to national research needs of the NPS.

For more information contact:

Dr. Jim Gramann

Visiting Chief Social Scientist

National Park Service

1849 C Street, NW (2300)

Washington, DC 20240

Telephone: (202) 513-7189

Email: James_Gramann@partner.nps.gov

Web Site: <http://www.nature.nps.gov/socialscience>

