# Visitor Experiences and Resource Protection at Antelope Island State Park

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The Institute for Outdoor Recreation and Tourism (IORT) conducts a program of research, extension, and teaching for the benefit of the people of Utah, our country, and the world, directed at improving our understanding of the relationships between outdoor recreation and tourism, natural resources management, community economic vitality, and quality of life.

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## **Executive Summary**

This report describes results of a survey of visitors to Antelope Island State Park which was conducted in May-October 1999. The survey was intended to measure visitors' satisfactions, preferences, and concerns regarding their experiences at Antelope Island and management actions taken at the park. Particular attention was paid to experiences in the backcountry areas of the park (i.e., the 80% of Antelope Island located south of the buffalo fence), which are managed to provide limited outdoor recreation opportunities in a setting which preserves many of the natural conditions which prevailed around the Great Salt Lake prior to European-American settlement.

This study was done with the VERP (Visitor Experience and Resource Protection) planning framework in mind. This framework implies that a certain "carrying capacity" exists in recreation settings. However, rather than defining an exact number of recreation visitors, it defines a point or level of impact that beyond which a visit is diminished by social impacts, ecological impacts, etc.

The data was gathered from a survey booklet mailed to persons who had visited Antelope Island during the period of May-October 1999. Addresses were gathered by means of a questionnaire administered to visitors as they left the island at the Syracuse end of the causeway.

The onsite questionnaire provided us with some base line information about a typical Antelope Island visit. The questionnaire suggested that the more developed north end was four times more likely to be visited than any backcountry location. Buffalo Point was the most frequently visited north end location while White Rock Bay backcountry trails was the most frequently visited location south of the buffalo fence. The heaviest use occurred during holidays and weekends. Forty percent of our visitors come from outside of Utah while the majority of those from Utah come from the Wasatch front and other urban counties outside the Wasatch front (primarily Cache County). This suggests that Antelope Island is used primarily by people who want to escape the pressures of living in urban areas. It may also suggest the lack of a statewide awareness of the unique characteristics of Antelope Island.

A stratified random sampling strategy was used for the mail survey in which we over-sampled the backcountry visitors. This was necessary in order to get an adequate number of respondents from the backcountry since it is relatively underused. Our survey respondents were typically collegeeducated males age 30-50, however because of our sampling strategy and the tendency to list a male on the questionnaire, males might be over-represented. The proportion of respondents from the Wasatch front is similar to that in the on-site questionnaire. The proportion of respondents with an education beyond a bachelor's degree is higher than the average for the Wasatch Front population as a whole which is generally consistent with other outdoor recreation surveys. Although the difference was not significant, backcountry uses tended to be slightly younger than those who visited the developed areas. There was however a significant difference in current residences of developed site users vs. backcountry users. The latter were more likely to come from Salt Lake or Davis counties.

The typical visit to the developed areas lasts only a few hours with a party consisting of family

and friends while trail users tend to stay a half to full day and are more likely to be part of an organized group or to come alone. The most popular activity for both areas was wildlife viewing, picnicking, hiking and bird watching. As expected, trail users were primarily hikers, bicyclists or horseback riders with hikers being the most common. Satisfaction levels were high for both areas of the park. Both groups stated that reasons like being in a natural setting, seeing wildlife, being with family and friends, and finding solitude were important in making a trip to Antelope Island. Trail users were more likely to list reasons related to the island's hiking and biking opportunities than developed area users.

In looking at social impacts the study found virtually no carrying capacity problem. The highest reported crowding was from north visitors on weekends. Even then only 39% of visitors felt some degree of crowding. This is one of the lowest crowding frequencies ever recorded. Social impacts may also arise from conflict with other user groups. Our study showed that such incidents are rare on Antelope Island. Only 18% of developed-site users and 22% of trail users reported such conflicts. Half of these reported conflicts were due to depreciative behaviors and not due to activities of specific groups. Few people reported experiencing specific social impacts such as too many people on trails or in campgrounds. Environmental impacts such as soil erosion did receive slightly higher ratings than social impacts.

We also asked respondents to assess the biophysical impacts of recreation, specifically how wildlife is affected. Many of the respondents indicated that they had seen wildlife during their visit. A few reported that they had tried to approach the animal. About one third of the trail users said the animal moved away from their presence. One of the concerns of park managers was whether people were staying on trails and what kind of impact leaving the trail has on vegetation, wildlife, etc. We found that only a small fraction of uses ever left the trail except to make way for other users.

In general visitors expressed strong support for protecting the park's natural resources although knowledge of those resources was not high. A majority of users felt that manages should restrict certain activities to preserve its natural habitat.

We wanted to know how visitors felt about current management practices. A majority of respondents found that current practices were about right. Satisfaction levels were slightly higher for the developed end. North end users did feel there were too few facilities and trail users felt the number of trails was inadequate.

In general we found that Antelope Island visitors want to maintain its natural characteristics. At the present time, there is no carrying capacity problem as far as the average visitor is concerned. However, managers should monitor the amount of conflict and resource damage that does occur. Education can be an effective tool, since many people want to keep it natural but may not be knowledgeable about the resources.

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# Map of Antelope Island State Park



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# Introduction

Antelope Island State Park is a "crown jewel" of the Utah state park system which offers a wide variety of developed and backcountry recreation opportunities within easy reach of the highly populated communities of the Wasatch Front. Located on an island in the Great Salt Lake and reached by a causeway from the Davis County town of Syracuse, the park is less than two hours' drive from the homes of more than 1.5 million people, and attracts nearly 400,000 visitors per year. Most of those visitors take advantage of developed recreation opportunities at the park visitor center, Bridger Bay beach, Buffalo Point restaurant and overlook, bison corrals, a small campground, marina, and interpretive sites along park roads. However, much of the park remains undeveloped, and visitors can hike, bicycle, or ride horseback along trails that pass through a landscape which preserves most of the ecological elements and natural character that were present when the first European-American settlers arrived more than 150 years ago.

For many visitors an especially attractive aspect of Antelope Island is its abundant wildlife populations, including antelope, mountain sheep, coyotes, mule deer, birds of prey, numerous smaller animals, and a bison herd which is probably the park's best-known attraction. The island shoreline and causeway offer opportunities to view the huge flocks of migratory shorebirds and waterfowl for which the Great Salt Lake is a vital stopping place. However, the park is also known for its human history, most notably the Fielding Garr Ranch, established in 1848 and until recently the longest continuously operated agricultural operation in Utah.

The northernmost portion of the island became a state park in the 1960s, and the Utah Division of Parks and Recreation assumed control of the entire island in 1981. Shortly thereafter, however, flooding in the Great Salt Lake made the island inaccessible to recreation visitors. Park management efforts therefore focused on development of the bison herd and maintenance of the island's natural character. After completion of Davis County's causeway, the park reopened to visitation in 1992 and has quickly become one of northern Utah's primary natural attractions.

From 1992 until 1998 visitors were mainly confined to the northern 20% of the island, which contains the park's developed facilities. The only exception was a network of trails leading to a portion of the island's west shore directly south of the "buffalo fence" that bisects the island from southeast to northwest, and periodic special openings of a gravel road leading to Fielding Garr Ranch on the island's southeast shore. In Spring 1999, however, the east shore road was paved and new roadside interpretive sites were added. A lakeside hiker/bicycle/horseback trail was completed linking the north end with the ranch, and a separate hiker-only trail was opened that leads to the top of Frary Peak, the highest point on the island.

While these developments added to the overall attractiveness of Antelope Island State Park, they also presented complications for management of the island. Because development of these new sites would attract people to places which previously were visited only infrequently, officials wanted to keep a close eye on potential impacts on the island's natural resources. In addition, the park's growing popularity coupled with rapid population growth along the Wasatch Front placed additional pressure on Antelope Island as a place where people could escape the urban environment and enjoy visiting a natural setting close to home. The Division of Parks and Recreation's mission is to provide such opportunities, but the park's management also recognized that there can be a point at which the numbers of people, and the types of activities they enjoy, can begin to degrade the natural and historic character that makes the island so attractive.

Accordingly, the Division entered into a Cooperative Agreement with the Institute of Outdoor Recreation and Tourism (IORT) at Utah State University to conduct research that would help identify a balance point between recreation needs and resource protection at Antelope Island. A survey of visitors was conducted between May and October 1999 to assess: who is visiting; what characteristics of the island draw visitors to it; what visitors know about park resources and how those resources might be threatened and/or protected; how visitor experiences are affected by the numbers and types of visitors present; how those experiences are affected by management actions; and visitors' preferences for management approaches.

This report presents the results of that research, with special emphasis placed on visitor experiences and resource protection in the backcountry portions of the island. Originally we also had planned to emphasize experiences of visitors to Fielding Garr Ranch, but that portion of the project was not completed because the ranch was not opened to daily public use in 1999 due to discovery of an archaeological site. In general we found that visitors are highly satisfied with their park experiences. There was remarkably little evidence of the kinds of visitor behavior problems (e.g., crowding, conflicts among user groups) that typically affect highly used recreation settings. We do, however, suggest that park officials continue to monitor social conditions at the park. We also recommend that our results be considered in light of the findings of a separate study, scheduled to begin in 2000, of the biological impacts of recreation use on park wildlife.

# **Theoretical Background**

Nationwide concern over increasing visitor use of natural areas has focused recreation managers' attention on the concept of a recreational "carrying capacity." The National Park Service, which is required by the General Authorities Act of 1978 to identify carrying capacities as part of its general management plans, often employs a planning framework called Visitor Experience and Resource Protection (VERP) to guide decisions about the proper balance between visitor use and protection of the natural qualities of park settings (Manning, Lime & Hof 1996). The mission of the Utah Division of Parks and Recreation does not carry the same burden for resource protection as the federal park system, but due to the unique natural qualities and visitor use pressures confronting Antelope Island State Park, former Manager Tim Smith decided in 1998 to gather the kinds of social and ecological data that guide decisions made using the VERP framework. Our study represented the social datagathering portion of that process. We have used the carrying capacity concept in our study design and

analysis, while recognizing that the Division may choose never to designate a specific carrying capacity for all or part of the park.

The idea of carrying capacity was borrowed from wildlife and range management, where the term refers to the number of animals that can be sustainably maintained in a given habitat. The first suggestion to develop the carrying capacity concept for national park management was made in the mid-1930s (Summer 1936), but the first attempts to rigorously apply the concept occurred as a response to the huge growth in outdoor recreation participation that occurred in the 1960s and early 1970s. Several carrying capacity-based planning and management frameworks have been developed, including VERP, and these have been applied to a wide variety of recreation settings. While the term "carrying capacity" itself has been criticized because it may falsely imply that research can determine a single, fixed amount of use that an area can sustain, most recreation professionals nonetheless agree that it is useful to identify conditions of overuse that can lead to the degradation of natural settings as well as visitor experiences, and to devise management strategies that can avert or mitigate those conditions.

A useful definition of "carrying capacity" in an outdoor recreation context is offered by Shelby and Heberlein (1986): "the level of use beyond which impacts exceed acceptable levels specified by evaluative standards" (p. 13). That is to say, the carrying capacity of a setting is exceeded if the impacts of recreation use reach a level that is greater than visitors and/or managers believe is appropriate for that setting. Beyond that point, it is assumed that the impacts of recreation use will lead to diminished satisfaction among visitors who believe that important characteristics of the setting have been degraded. This approach to carrying capacity is useful because it sets visitors' own evaluations of their experiences as the basis for management decisions, helping to ensure that decisions which may limit recreationists' options are made only when the visitors themselves agree that such action is needed. Furthermore, by using visitors' evaluations as the benchmark rather than a particular (perhaps artificial) number, this approach allows for management actions other than use limits which may mitigate the effects of heavy use.

Shelby and Heberlein (1986) identify four types of carrying capacity, one or more of which may exist for a particular setting: physical, facility, social, and ecological. *Physical* carrying capacity refers to the actual space available for a particular recreation use (e.g., the total area of beach available for sunbathing, volleyball games, etc.). At a setting as large as Antelope Island this is unlikely to be a management concern in the foreseeable future, so it was not considered as part of this analysis. *Facility* carrying capacity involves improvements intended to handle visitor needs, such as picnic tables, campgrounds, or parking spaces. This type of capacity may be an issue at Antelope Island – e.g., there can be a shortage of parking slots at Buffalo Point on busy afternoons – but we did not make it a principal focus of our analysis because usually it can be observed readily by rangers as part of their day-to-day activities.

*Ecological* carrying capacity is concerned with impacts on the ecosystem, i.e., soil, water, plants, and wildlife. This is one of the key issues in the VERP framework, and accordingly one of our objectives was to assess visitors' evaluations of ecological impacts, especially in backcountry areas of

the park. However, evaluative standards for ecological capacity, more so than any other type of capacity, should be set by means of expert judgments as well as – or even instead of – laypersons' observations. Therefore, our findings will be most useful if evaluated in conjunction with those of biological and physical studies of important ecosystem elements (e.g., wildlife disturbance, weed infestation, soil erosion, etc.).

*Social* carrying capacity, which refers to impacts arising from interaction with other visitors that may alter human experiences, is a common focus of social science research in recreation settings, and it is the element of carrying capacity that was most thoroughly explored in our study. Generally, the research emphasis in studying social carrying capacity is on evaluation of perceived crowding, i.e., impacts brought about by the sheer number of persons visiting a recreation setting. However, because perceived crowding is also affected by other sorts of social interactions – e.g., conflicts with other user groups, or depreciative behaviors such as littering or rude behavior – we measured visitors evaluations of those forms of interactions as well.

# Methods

# Survey design

The primary data for this study were gathered by means of a survey booklet mailed to persons who had visited Antelope Island during the period of May-October 1999. The survey instrument was designed to measure the following:

- sociodemographic characteristics of visitors;
- characteristics of Antelope Island visits (location, duration, group size, etc.);
- overall park visitation patterns (frequency, activities, reasons for visiting);

- experience of social impacts (crowding, user group conflicts, depreciative behavior); - attitudes and knowledge about the park and its ecological elements;

- evaluations of resource conditions (soil/plant damage, horse manure, litter, etc.);
- trail users' interactions with park wildlife;
- evaluations of park facilities; and
- evaluations of current management actions and preferences for future management.

The survey included sections intended only to be filled out by persons who had visited the park's backcountry and/or Garr Ranch, as well as sections that were to be filled out by all respondents. A letter on the cover of the survey booklet explained the purpose of the study and outlined how we intended to protect the confidentiality of responses. A copy of the survey instrument is provided in Appendix A.

The survey consisted primarily of categorical choice questions and Likert-type survey items that provided a list of statements or characteristics of interest (e.g., concerns about park resources and facilities) and asked respondents to circle a number associated with their level of agreement or concern about that particular statement or characteristic. In a few cases, open-ended questions were included (e.g., when asking which groups, if any, were responsible for behaviors that diminished their park experiences). A complete listing of responses to open-ended questions, as well as any additional

comments provided, can be found in Appendix B.

Wherever possible, the survey questions and items were ones that had been used in previous studies. This was preferable for two reasons: (1) it meant that the measures had been tested through previous use and/or scientific peer review, and (2) it allowed for comparison of Antelope Island results with those of similar studies elsewhere. For example, the measure used to evaluate perceived crowding was a nine-point scale developed by Heberlein and Vaske (1977) and used in dozens of studies in the U.S. since the 1970s (Shelby, Vaske & Heberlein 1989). Our measure of user group conflict was developed by Shelby, Johnson & Brunson (1991) for a study of Oregon whitewater rivers, and measures of visitors' use of low-impact recreation practices were drawn from a 1996 southern Utah study (Ruehrwein 1998).

An initial version of the survey was developed by the authors, then reviewed by Antelope Island State Park officials to check for logical consistency and to ensure that the questions addressed the issues most important for future management of the park. The version used in the study was revised in response to that review process.

#### Sampling

Because no master list exists of persons who visit Antelope Island State Park, we had to contact visitors on-site in order to build a database of potential survey respondents. Forty days were randomly selected between May 29 and Oct. 31, 1999, with an emphasis on weekends and holidays when most visitation occurs. For each of the 40 days selected, we randomly assigned one of three four-hour time blocks (8 a.m.-noon, noon-4 p.m, or 4 p.m.-8 p.m.) for on-site sampling. During those periods, a pair of researchers set up signs at the Syracuse end of the Antelope Island causeway to alert visitors that a survey was in progress. A brief questionnaire (Appendix C) was administered to one person in each personal vehicle that stopped at the stop sign next to the park entrance station as visitors were leaving the island. People on bicycles who only traveled the length of the causeway but did not go onto the island, and groups such as tour buses or service organizations, were not surveyed. In this manner, we obtained on-site survey responses from 3,973 visitors.

The on-site questionnaire included two questions critical to administration of the longer mailback survey. First, it included a question asking respondents which locations they had visited during their trips. Based on these responses, visitors were divided into two groups: those who had only visited the developed parts of the island north of the buffalo fence, and those who had used the White Rock Bay trails, Frary Peak trail, or Mountain View trail. Second, the on-site questionnaire ended with a brief explanation that a longer survey would be administered, and asking people if they would provide their name and address for that longer survey.

A stratified random sampling strategy was used which emphasized responses from persons who had visited the park's backcountry areas. We felt that responses from that group were most important

because the resource protection issues examined by our study are most important for management of the park's trails. We also knew that the large majority of Antelope Island visitors never leave the developed parts of the park, so we sampled in a way that would ensure a large enough number of responses from trail users. Therefore, each month beginning in June we mailed surveys to every respondent who said they had ventured south of the buffalo fence, along with 65 visitors selected randomly from those who reported that they had visited only the north end. In October, because of lower visitation, surveys were mailed to all persons contacted who provided their names and addresses.

Survey administration used procedures recommended by Dillman (1978). Ten days after each initial mailing, a thank you/reminder postcard was sent to every survey recipient. If a completed survey had not been received within 10 days after the postcard was mailed, the recipient received a second survey along with a formal letter explaining the importance of the survey to state park management.

Surveys were mailed to 570 trail users and 306 north-end visitors, for a total of 876 surveys. Of the 570 backcountry surveys, 324 completed surveys were received and 23 were undeliverable, a 59% response rate. Of the 306 north end surveys mailed, 180 completed surveys were received and 10 other surveys were undeliverable, a 61% response rate. These rates are considered acceptable for mail-back questionnaires (Dillman 1978), therefore no attempt was made to test for non-response bias. After eliminating surveys that had been filled out by park volunteers rather than recreation visitors, we had a total of 499 usable surveys.

# **Results and Discussion**

# **On-site questionnaire results**

The on-site questionnaire was intended primarily as a means for obtaining a sampling frame, and was designed to be filled out quickly so that traffic would not be unduly delayed. Therefore it contained only three questions besides providing a space for a name and address. However, the answers to those three questions — duration of visit, locations visited in the park, and visitors' hometowns — provide some baseline information about the "typical" Antelope Island visitor.

Data obtained from the on-site questionnaire are shown in Table 1. Responses suggest that the principal developed sites on the north end — Buffalo Point, bison corrals, visitor center and Bridger Bay beach — are four times more likely to be visited than any backcountry location. The most frequently visited location was Buffalo Point (62% of all parties reaching the island) while the most frequently visited backcountry location was the White Rock Bay trails (9%). The Lake View trail was the location that was indicated the fewest times, although it is possible that our results underestimate use of that trail since it is accessed from the White Rock Bay group camping area (i.e., some people may have checked off White Rock Bay not knowing the exact name of the trail). In all, 947 parties (24% of the total) visited a backcountry location. A space for "other locations" was provided but rarely used. Responses were: Egg Island Overlook (14 parties), end of causeway (15), drove without stopping (12), Ranger Memorial (3), and boated onto island (1).

An examination of our day-by-day sampling rates suggests that use is heaviest on holiday weekends: Our busiest four-hour sampling periods occurred on Labor Day (268 parties), Memorial Day (257 parties), and Independence Day (211). Saturday sampling periods were the busiest throughout the season, and remained so through Oct. 16 (104 parties encountered). The majority of visitors stayed for a few hours or less, with less than 7% staying overnight.

# Table 1: Data obtained from on-site questionnaires

No.	and pct	. of parties	s visiting	specific	park locations	(N=3.933)	)
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Location	N	Pct.	Location <u>N</u>	Pct.
<b>Buffalo Point</b>	2,455	61.8%	White Rock Bay 794	20.2%
Bison corrals	2,127	54.1%	Mountain View trail 454	11.5%
Visitor Center	2,064	52.5%	White Rock Bay trails 350	8.9%
Bridger Bay beach	2,008	51.1%	Frary Peak trail 320 7.8%	
Marina	1,198	30.4%	Lake View trail 299	7.6%
			Other locations 45 1.2%	

# Number of parties encountered per day, by month

Month	<u># days</u>	<u># surveys</u>	Parties/day
May	2	355	177.5
June	9	674	74.9
July	11	1,180	107.2
August	11	986	89.6
September	5	662	132.4
October	2	116	58.0

# Duration of visit

Length of visit	N	Pct.
A few hours or less	3,103	78.5%
One-half to full day	584	14.9%
Overnight	259	6.6%

# County of origin

County	N	Pct.	<u>County</u>	<u>N</u>	Pct.
Salt Lake	857	21.7%	Morgan	9	0.2%
Davis	854	21.7%	Duchesne	5	0.1%

Weber		406	10.3%	Wasatch	5	0.1%
Utah		89	2.3%	Uintah	4	0.1%
Cache		49	1.2%	Washington	4	0.1%
Tooele		19	0.5%	Carbon	3	0.1%
Box Elder		18	0.5%	San Juan, Iron		2 each
Summit	14	0.4%		Beaver, Daggett, Emery	1 each	
Out of state		1,285	32.6%	Juab, Sanpete, Millard		
Outside U.S.		308	7.8%	Grand, Rich		

Our data suggest that about 40% of visitors to Antelope Island are from outside Utah, including about 8% who live outside the United States. Within Utah, the park is overwhelmingly a Wasatch Front attraction. A total of 56% of those surveyed on-site were from the four Wasatch Front counties (Salt Lake, Davis, Weber, Utah); conversely, only 3.3% of the parties we sampled came from Utah's 25 other counties, and more than one-third of those were from Cache County, which is the most urban of the counties outside the Wasatch Front. The disproportionately low visitation rate from rural Utah may be a reflection of the fact that citizens in non-urban counties can easily find closer alternative places to escape urban routines and engage in outdoor recreation activities, as well as a lack of awareness statewide of the uniqueness of the wildlife viewing and nature study opportunities that Antelope Island offers.

#### Mail survey: Visitor and visit characteristics

Tables 2, 3 and 4 display results of the survey questions that describe the characteristics of Antelope Island visitors and their experiences in the park. Because we used a stratified random sampling strategy for the mail survey in which we over-sampled backcountry visitors, responses from trail users and those who visited only the developed portions of the park are analyzed and presented separately. (NOTE: Our on-site sampling strategy resulted in an over-representation of weekend/holiday visitors, however, we were able to combine results for weekend and weekday visitors because we found no differences in responses based on the contact day, except in perceptions of crowding. Those differences are discussed in the section on Social Impacts.)

Although we received surveys from 324 respondents who had indicated on the on-site questionnaire that they had visited at least one of the park's backcountry trails, only 205 of those persons completed the section of the survey instrument that pertained to trail use. There are at least two possible explanations for this. Some visitors, hurrying to complete the on-site survey so they could continue on their way home, may have hastily checked off locations that they hadn't actually visited. Alternatively, some visitors may have stopped at the White Rock Bay, Frary Peak, or Mountain View trailheads during their visits but not actually used the trails themselves. At any rate, for purposes of this analysis we will only consider respondents to be backcountry visitors if they completed one or more questions about backcountry use. Where we found statistically significant differences in responses between trail users and developed recreationists, these are indicated in the tables with an asterisk. Differences in response frequencies were measured using chi-square analysis (p<.05) and differences in

means using independent-samples t-tests (p<.05).

Our survey respondents (Table 2) typically were college-educated males age 30-50 who grew up in a city or middle-sized town and currently live on the Wasatch Front. The 2:1 ratio of males to females among our respondents is not representative of the overall Antelope Island visitor population, but probably reflects a tendency to list an adult male in the household on the on-site questionnaire. The proportion of the sample from the Wasatch Front is similar to that in the on-site survey. The proportion of respondents with education beyond the bachelor's degree is higher than the average for the Wasatch Front population as a whole, but is generally consistent with outdoor recreation surveys. The proportion of respondents with a rural or small-town

	Developed area	Trail users
	<u>only (N = 294)</u>	(N = 205)
Age		
Under 21 years	1%	3%
21-30 years	11%	14%
31-40 years	18%	27%
41-50 years	27%	29%
51-60 years	21%	15%
61- 70 years	15%	9%
Over 70 years	7%	3%
Sex		
Female	36%	30%
Male	64%	70%
Highest level of education		
Some high school	2%	3%
Completed high school	9%	7%
Some college or tech scho	ool 21%	27%
Jr. college/tech school deg	gree 10%	10%
Bachelor's degree	22%	20%
Some graduate school	11%	12%
Advanced degree	26%	21%
Rural/urban upbringing		
Grew up in rural area	8%	11%
Small town (pop. <5,000)	) 7%	12%
Small city (5,000-50,000)	32%	30%
Large city (>50,000)	28%	22%

# Table 2: Demographic characteristics of respondents

Suburb of large city	25%	25%	
*Location of current residence			
Davis County	20%	31%	
Salt Lake County	21%	26%	
Weber County	12%	13%	
Utah County	2%	4%	
Other northern Utah	4%	3%	
Outside northern Utah	42%	24%	

\*indicates statistically significant difference between trail users and developed-site visitors

	Developed area	Trail users
	only (N = 294)	(N = 205)
*Length of visit		
A few hours or less	60%	42%
A half- to full day	32%	51%
Stayed over at least 1 night	8%	7%
*Recreational group characteristics		
Family and friends	92%	81%
Members of a club	3%	6%
Solo visitor	4%	13%
*Average size of group (persons)	5.5	7.3
Visit partly due to new road? (% yes)	13%	20%
Overall satisfaction with visit		
It was everything I wanted	38%	40%
It was mostly what I wanted	42%	44%
It was somewhat what I wanted	d 16%	14%
Only a few things were as I wa	inted 3%	2%
It was nothing like I wanted	1%	
*Likelihood of making a return visit		
Very likely	52%	70%
Somewhat likely	23%	20%

# Table 3: Characteristics of visits where respondents were contacted

Not very likely	20%	10%	
Unsure	5%	1%	
Timing of visit (% on weekend/h	oliday) 79%	83%	
*Island locations visited during tr	ip		
Buffalo Point	69%	49%	
Visitor center	68%	50%	
Buffalo corrals	63%	44%	
Bridger Bay beach	60%	39%	
Marina	36%	23%	
White Rock Bay trails		51%	
Mountain View trail		42%	
Frary Peak trail		31%	
Lake View trail	7%	23%	

upbringing is smaller than in the principal investigator's recent surveys of Utah residents about nonrecreation topics, but is not unexpected in a study of an urban-proximate recreation setting. Trail users tended to be slightly younger than those who visited only the developed parts of the park, but the difference was not statistically significant. There was a significant difference in the current residences of developed-site and backcountry recreation visitors: The latter were more likely to come from Salt Lake or Davis counties and less likely to be from outside northern Utah.

A typical visit to Antelope Island (Table 3) occurs on a weekend or holiday, and lasts a few hours for persons who visit only the developed areas but a half to full day for trail users. A large majority of parties are made up of family and/or friends, but trail users are more likely to visit as part of an organized group — this is one reason why the average group size for trail users is slightly higher than for other visitors — and they are also more likely to come alone. The paving and opening of the east side road did not figure into most people's decisions to visit, but trail users were more likely to say that the new road had affected their choice, mainly because it offers access to the Frary Peak Trail.

Visitor satisfaction levels were high for both developed-area and backcountry visitors (Table 3), and most people said it was at least somewhat likely that they'd return. For those who did not plan to return, the most common reason was that they live outside the area; 82% of those who said they were *not* likely to return live somewhere other than northern Utah. Other reasons given for not expecting to return included: no need to go back (4 respondents); didn't see any wildlife (3); too many insects (3); lack of shade (2); cost (1); trails were too rocky (1); displeasure with the buffalo corrals (1); not enough to do (1); and didn't enjoy it (1).

Visits by trail users typically include stops at one or more attractions in the developed part of the park. Some 40%-50% of trail users also stopped at one or more of the following locations, which are

also the most popular with all visitors: Buffalo Point, visitor center, buffalo corrals, and Bridger Bay beach. Of the trail locations, the most popular for our respondents were the White Rock Bay trails, followed by the Mountain View trail, Frary Peak trail, and Lake View trail.

Table 4 presents information about visitors' overall Antelope Island visitation patterns. One characteristic of urban-proximate recreation settings in general is that they typically attract a sizeable number of visitors who make frequent (weekly or even daily) trips to the area during the use season (e.g., Shelby *et al.* 1990). This does not appear to be the case at Antelope Island, probably because of the \$7 per vehicle entrance fee. Only 4% of developed-site recreationists and 8% of trail users reported that they visit more than once a month. Conversely, about half of developed-area visitors and one-third of trail users were surveyed on their first trip to the island. Trail users were significantly more likely than other visitors to report making multiple trips to the park each year.

We also asked visitors which activities they enjoy on visits to Antelope Island (Table 4). The most popular activities for both trail users and developed-site recreationists were wildlife viewing, photography, picnicking, hiking, and bird watching. Trail users were significantly more likely to be hikers, bicyclists, or horseback riders, and significantly less likely to participate in saltwater bathing or attending educational programs. Hiking was the most common trail use, while most of the non-hikers were mountain bikers. Only 23 of our respondents had ridden horses in the park.

We cross-tabulated recreation activities against the months when each respondent was contacted, in order to see if there are seasonal changes in how people use Antelope Island (data not shown). The only discernible pattern was a slight tendency for mountain bikers and horseback riders to make up a larger proportion of the visitor population at times other than the hottest months of July and August.

Finally, we asked visitors to rank the importance of different reasons for visiting the park (Table 4). The most important reasons (on a scale of 1 to 4) were ones that have been found to be most important in virtually every recreation study (Manning 1986): scenic beauty, being in a natural setting, seeing wildlife in a natural state, being with family and friends, and finding peace and solitude. These were important to both trail and developed-site users, although the latter ranked "being with family and friends" a little higher. Not surprisingly, trail users were more likely to rank the island's hiking and cycling opportunities as important reasons for visiting the island, and less likely to place importance on the fact that the island provides recreation opportunities close to water, is a good place to swim, and offers a chance to visit historical sites. Unlike many studies of popular recreation settings, our respondents did not place an especially high importance on a visitation tradition ("T ve come here for years"), presumably because the island had been off-limits to visitors from the mid-1980s until 1992. Family traditions and place attachment are likely to become increasingly important reasons for visiting in the future.

# Perceptions of social impacts

Protecting visitor experiences in Antelope Island State Park requires management that can

minimize or mitigate the effects of human uses on the park's social and ecological systems. This section addresses issues related to the social system; the next one addresses ecological issues.

In a typical carrying capacity study, social impacts — i.e., the impacts on the outdoor recreation experience that occur simply due to the presence and behaviors of large numbers of visitors — are the primary concern. These social impacts can include perceptions that a setting is crowded (important because solitude and/or escape from an urbanized setting are important motives for most recreationists); conflicts between user groups such as hikers, horseback riders, and cyclists; and depreciative behaviors such as littering, vandalism, or rude behavior.

Shelby et al. (1989) argue that carry capacity judgments can be made based on the patterns of responses to a single Likert-type scale question about perceived crowding:

9

	<u>1 2</u>	3	4	3	0	/	δ	9		
	Not at all	Slight	ly		Modera	ıtely		Extremely		
	crowded	crowd	ed		crowd	led		crowded		
	Т	able 4: C	)verall A	verall Antelope Island visitation patterns						
			Ð			T	•1			
			Dev	velopec	area	Tra	all users			
*5	c : :,		only	y (N =	<u>294)</u>	<u>(N</u>	= 205)			
*Freque	ency of visits			4.5.1			0.04			
	Several times/mo	nth		4%			8%			
	Several times/yea	r		25%			36%			
	Once a year or le	ess		19%			22%			
	On first visit ever			52%			34%			
Pct. eng	aging in various a	ctivities								
	Viewing wildlife			72%			74%			
	Photography			45%			38%			
	Picnicking			37%			35%			
	*Hiking			36%			62%			
	Bird watching			31%			33%			
	*Saltwater bathin	ıg		29%			18%			
	Exploring historic	sites	24%			28%				
	*Educational pro	grams	19%			12%				
	Sunbathing	0		17%			14%			
	Camping			11%			15%			
	*Mountain biking	r		9%			39%			
	*Road cycling	2		7%			13%			
	Buffalo roundun			7%			10%			
	Roating		3%	170		3%	10/0			
	Doming		570			570				

*How crowded did you feel* \_\_\_\_\_ *area was at the time of your visit?* 

.

*Horseback riding	1%		10%
Importance ratings for reasons to visit			
Scenic beauty	$3.5^{1}$		3.4
Being in a natural setting	3.4		3.5
Seeing wildlife in natural state	3.4	3.4	
*Being with family/friends	3.4		3.1
Peace and solitude	3.3		3.4
*Close to water	2.6		2.3
*Visiting historical sites 2.6		2.3	
*Good place to hike	2.5		3.0
Geology	2.3		2.3
It's near my home	2.2		2.4
*Good place to bike	1.9		2.5
I've come here for years	1.9		2.0
Good place to camp	1.9		1.9
*Good place to swim	1.9		1.6
Good place to sail	1.4		1.3

<sup>1</sup>Mean ratings on scale where 4=very important, 3=important, 2=somewhat important, 1=not important

The authors developed a carrying capacity framework based on the percentage of visitors who circle the number "3" or higher (i.e., who report feeling at least slightly crowded). If 0-35% of visitors feel crowded, the setting is labeled as having "suppressed crowding," where crowding is limited by management or situational factors and it may be appropriate to try to offer a uniquely low-density experience. Crowding levels of 35-50% are "low normal": a problem does not exist at this time, but continued monitoring is recommended. Levels of 50-65% are "high normal": situations which should be watched closely if increased use is expected, so that

managers can anticipate problems before a true crowding problem exists. Settings where crowding levels are above 65% are considered "above capacity": in such places, management actions are necessary to reduce social impacts on experiences, although the authors note that when crowding levels exceed 80% it may be politically impossible to reduce visitor densities to within carrying capacity, so that it may be more appropriate to manage for high-density recreation experiences.

When we administered the Shelby/Vaske/Heberlein scale to Antelope Island visitors, we obtained some of the lowest crowding frequencies ever recorded using this measure (see Table 5 for comparisons with other recreation settings). This is a remarkable finding given that nearly 400,000 visitors came to the park in 1999. On weekends, 39% of visitors to the north end of the island felt some degree of crowding. The percentage fell to 22% on weekdays. Trail users were more likely than developed-site visitors to feel crowded while on the north end (32% vs. 43%), which is expected since backcountry visitors are likely to be seeking a lower-density experience than other recreationists. In the backcountry, 26% reported feeling at least slightly crowded on weekends and 15% on weekdays.

Mountain bikers felt slightly more crowded than other visitors at 31%, compared to 30% for horseback riders and 20% for hikers.

To place our findings into the framework presented by Shelby *et al.* (1989), all sub-groups of Antelope Island visitors are currently experiencing crowding at "low normal" or "suppressed" levels. As noted above, this may seem anomalous given the large number of persons who visit the park each year. However, Shelby and Heberlein (1986) argue that crowding is not purely a function of visitation levels; instead, people are more likely to feel crowded if the densities of people they encountered are greater than the densities they expected. In general, people are more likely to feel crowded at peak use times, when they are competing with other users for scarce resources (e.g., quiet, fish, game, whitewater rapids), and at settings where access is difficult and so people expect to see few other visitors (Shelby *et al.* 1989). In the case of Antelope Island, located within a two-hour drive for at least 1.5 million people, actual visitor densities may be low relative to *expected* densities because the park is so convenient. Most of the visitors are urban residents who grew up in cities or towns, and that also may affect their expectations about visitor densities. The island itself is large enough that it offers opportunities to get away from others even on a busy day. Moreover, the presence of large and easily seen wild animals in a natural setting may serve to enhance the feeling that the island is a wild place (and therefore less crowded) despite its proximity to the Wasatch Front.

#### Table 5: Perceived crowding levels at various sites across the U.S.

97-100%	Weekend whitewater boaters, Deschutes River, Ore.
94%	Anglers, Grand Canyon, Thanksgiving weekend
91%	Waterskiers and anglers, Raystown Lake, Pa., on the lake
85%	Pheasant hunters, public hunting area, Wisconsin, opening day
75%	Salmon anglers, Waimakariri River, New Zealand
72%	Rafters, Grand Canyon, summer
70%	Mountain climbers, Mount McKinley, Alaska
68%	Rock climbers, Seneca Rocks, W.Va.
55%	Bow hunters, Maryland, statewide
53%	Rifle hunters, Maryland, statewide
53%	Backpackers, Mt. Jefferson Wilderness, Ore.
52%	Canoers, Bois Brule River, Wisc.
48%	Pheasant hunters, Wisconsin, late in season
43%	Inner-tubers, Bois Brule River, Wisc.
39%	Backpackers, White Mountain National Forest, N.H.
39%	North end Antelope Island visitors, weekends

32%	Anglers, Grand Canyon, midweek
31%	Mountain bikers, Antelope Island trails
26%	Rafters, Illinois River, Ore., (winter raft trip, difficult access)
22%	North end Antelope Island visitors, weekdays
20%	Hikers, Antelope Island trails
15%	All visitors, Antelope Island trails, weekdays
12%	Deer hunters, Wisconsin (area managed to provide a low-density hunt)

\_\_\_\_\_

Besides perceived crowding, other social impacts relate to the nature and frequency of encounters with different types of users. Social impacts that arise from the presence or activities of other user groups, when they are engaged in the normal actions of persons in such a group, are typically classified as "conflict." Jacob and Schreyer (1980) developed the most commonly used definition of recreation conflict: "goal interference attributed to another's behavior." In other words, conflict is said to occur when the activities of another group or individual detract from one's ability to achieve the goals one has for a recreation experience (solitude, quiet, escape from urban sights and sounds, interaction with family and friends, and so on). For example, conflict between ATV riders and hikers generally has its roots in the ways that motorized vehicle use can interfere with the escape and solitude motives of hikers. Social impacts also can occur if visitors perceive that others are engaged in behaviors that are simply inappropriate for the setting, regardless of whether the perpetrators are part of a different group or not. Such behaviors, which might include littering, speeding, writing graffiti, or rudeness to others, are called "depreciative."

Our survey included a single question that could pertain to either conflict or depreciative behavior, depending on circumstances: "Do you ever feel that the actions of others diminish your enjoyment of an Antelope Island visit?" The question refers to diminished enjoyment rather than goal interference because recreationists often do not think of themselves as looking to achieve "goals" via a recreation experience even if that's really what they're doing (Manning 1986). We then asked how often such incidents occur, and who is responsible for them.

Results of this assessment are shown in Table 6. Such incidents are relatively rare on Antelope Island, as they were reported by just 18% of developed-site visitors and 22% of trail users. For those who did experience such incidents, a majority of both developed-site visitors and trail users said they occur "rarely." A few people said their experiences were diminished by non-recreation activities (causeway construction and brine shrimping). Half of the incidents reported by developed-site visitors were of depreciative behaviors (littering, inconsiderate behavior, small unsupervised children) compared to 24% of those reported by trail users. Trail users were more likely to say their experiences had been diminished by other user groups, particularly horseback riders and bicyclists. Given the relatively low frequency of use by horseback riders, the fact that nine different respondents mentioned their

experiences had been diminished by encounters with horseback riders may be an indicator of a potentially growing user group conflict. Four of the complaints about bicycles were made by horseback riders. The complaints about horses were split roughly evenly between hikers and bicyclists.

Another way to assess social impacts is to ask visitors directly whether they believe that such impacts are a problem at a particular setting. We asked all respondents to rate conditions in the north end of the park — including environmental and facility conditions as well as social conditions — and also asked trail users to rate conditions in the backcountry. The measure in both cases was a five-point Likert-type scale were 1 = no problem and 5 = a big problem.

Results of this analysis are shown in Table 7. All of the ratings are well below the scale midpoint of 3.0, and in no instance did more than 10% of the respondents rate a particular condition as a "4" or "5" (i.e., a moderate to large problem). Among the social conditions listed, the highest ratings for the north end of the island were for people walking off trail, and people with dogs. There were no significant differences between ratings by trail users and developed-site visitors. Ratings for the backcountry portions of the park were, if anything, slightly lower than those for the developed areas. Again, there was a slightly higher tendency to believe that dogs posed a problem, although here the question asked about dogs "not on a leash" — a special concern for managers due to the area's abundant wildlife. There also was a slightly elevated level of concern about horse manure on trails.

Although the difference is not statistically significant, ratings of soil erosion are slightly higher than the ratings for social impacts for both the north end and backcountry. Ratings for

	NORT	TH END ONLY	ſ	TRAIL USE	
	N	Pct.		N	Pct.
Do others' actions ever diminish enjoyment?					
Yes	212	82%		145	78%
No	46	18%		42	22%
How often does this happen?					
Often (more than twice a day)	1	1 2%		1	2%
Sometimes (once or twice a day)	20	) 42%		19	35%
Rarely	27	7 56%		34	63%
*Who is usually responsible?					
Brine shrimpers	3	9%	0		
Construction activities	1	1 3%		0	
Inconsiderate visitors	8	8 25%		6	14%

# Table 6: Reports of conflict or depreciative behavior

7	22%	3	7%
1	3%	1	2%
6	19%	8	19%
0		5	12%
0		1	2%
0		1	2%
0		9	21%
1	3%	3	7%
0		2	5%
0		1	2%
	7 1 6 0 0 0 0 1 0 0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

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trampled vegetation in the north end were also slightly higher than for social impacts. This finding is consistent with research in the Forest Service's urban-proximate wilderness areas just east of the Salt Lake Valley, where visitors were found to be more sensitive to impacts to the biophysical environment than they were to social impacts (Hoss and Brunson, in press).

#### Ecological behaviors, attitudes, and knowledge

Protection of Antelope Island's ecological system is the other key element in protecting the park's natural resources as well as the experiences of its visitors. Assessing the biophysical impacts of outdoor recreation is typically a task for natural scientists who evaluate how visitors' behaviors affect the non-human components of the ecosystem. However, once those impacts are measured, a strategy for safeguarding those ecosystem elements cannot be developed without an understanding of how visitors respond to the biophysical environment. Those responses can be behavioral (e.g., creeping close to a nesting shorebird to take a photograph) or cognitive (e.g., the attitudes and knowledge people have about shorebirds and their sensitivity to disturbance during the nesting season). Our survey contained items designed to measure both types of response. The questions measuring behavioral responses to nature were completed only by visitors to the park's backcountry (Table 8). They consisted of a series of questions about interactions with wildlife, and a set of five Likert-type items asking about the frequency of selected behaviors that may be seen as contrary to accepted minimum-impact behaviors or to the park's rules about staying on trails. Overall, these results suggest that trail users do not see themselves as having very much impact on the natural qualities of the park.

Eighty-four percent of our respondents indicated they had seen wildlife during their visits, mainly bison, birds, antelope, and/or coyotes. To further explore the visitor/wildlife interactions, we asked respondents to pick a particular species they found "most impressive," and to answer additional questions about that species. Twenty-four percent of respondents saw wildlife with young — all of them bison except a lone report of a young antelope. Only 6 people (4%) reported they had tried to approach an animal, but 35% said animals moved away in response to their presence. Of those animals

that moved away, 68% were said to have remained in sight, although usually after having moved more than 100 feet away. We found no differences in responses based on the species that was considered most impressive.

Since the park already requires trail users to remain on the marked trail at all times, it is noteworthy that most visitors reported leaving the trail only rarely (Table 8). Eighty percent or more indicated that they had never left the trail to observe wildlife, avoid mud or debris, or take a shortcut. Slightly more than one-third left the trail to make way for other trail users. The most commonly reported behavior that doesn't fit park rules or minimum-impact guidelines was traveling two or more abreast on trails. When we cross-tabulated responses to this section of the survey with people's backcountry travel modes (hiking, horseback riding, or mountain biking) we found no discernable patterns except in the case of walking two or more abreast. Horseback riders were most likely to engage in this behavior, with 77% reporting that they had done so at least once, compared to 51% of hikers and 34% of mountain bikers.

Cognitive responses to the natural environment can include knowledge about natural systems, as well as attitudes toward the use and protection of those systems. Understanding these responses is important for protection of the natural qualities of recreation settings because protective management actions are more easily achieved if recreation visitors understand the reasons why those actions are being taken as well as the potential consequences of not taking them, and if they believe those actions are important to their continued enjoyment of the setting.

To assess cognitive responses, the survey instrument asked respondents to indicate their agreement or disagreement with a series of six belief statements (i.e., statements about what *is*) and nine attitude statements (i.e., statements about what *should be*) with respect to the natural

North End	Trail
visitors	users
$1.42^{1}$	1.25
1.55	5
1.39	1.35
1.54	1.43
1.56	1.50
1.64	1.65
1.51	1.58
1.74	1.60
1.65	1.79
1.74	1.60
1.86	1.81
	North End <u>visitors</u> 1.42 <sup>1</sup> 1.55 1.39 1.54 1.56 1.64 1.51 1.74 1.65 1.74 1.86

#### Table 7: Respondents' ratings of selected conditions within the park

# Conditions in the *backcountry*

Too many people on the trail	n/a	1.33
Meeting horses on the trail	n/a	1.49
Meeting mountain bikes on the trail	n/a	1.45
Litter	n/a	1.35
Dogs not on a leash	n/a	1.59
Horse manure on the trail	n/a	1.62
People walking off the trail	n/a	1.45
Soil erosion on trails	n/a	1.75
Trampled vegetation	n/a	1.40
<sup>1</sup> Ratings on a scale from 1=no program to 5	=big problem	

		N	Pct.
Reported seeing wildlife during visit		177	84%
Most commonly seen wildlife species			
Bison		129	73%
Birds (various species) 6	9	39%	
Antelope		44	25%
Coyote		26	15%
Rabbit		17	10%
Deer		16	9%
Lizards		7	4%
Snakes		5	3%
Bighorn sheep		3	2%
Other [fox, badger, mice, elk(?!)]		1 each	
Wildlife species considered "most impressive"			
Bison		83	63%
Antelope		14	11%
Birds		12	9%
Coyote		9	7%
Other [rabbit, elk, sheep, fox, badger] 1	2	9%	
Responses of/to "most impressive" species			
Animals that had young 4	0	24%	
Respondent tried to approach animal?	6	4%	
Did animal retreat in response to your presence	? 5	57 35%	
If animal retreated, how far?			
Only a short distance		15	26%
More than 100 ft, but still in sight		24	42%
Out of sight into burrow or hiding place		8 14%	
Out of sight a long distance away		10	18%
Fraguency of departures from minimum impact behavior	rc		

# Table 8: Behavioral responses to the natural ecosystem by trail users

Frequency of departures from minimum-impact behaviors

How often did you?		Never 1	-2 times	<u>3-4 times</u>	Often
Leave the trail to observe wildlife		82%	14%	2%	2%
Leave the trail to avoid mud or debris	80%	19%	<1%	<1%	
Leave the trail to avoid other users		62%	32%	5%	1%

Walk two or more abreast on trails	57%	26%	11%	7%
Take a shortcut off the marked trail	90%	9%	1%	

	Ν	ORTH EN	ND	TRAII	L USERS	
Pct. of agreement with belief statement	Agree	Disagre	<u>e DK</u>	Agree	Disagree	<u> DK</u>
Antelope Island is an important stopping	71%	3%	26%	77%	3%	20%
place for migrating birds						
Antelope Island is home to vegetation 62%	49	% 34%	70	% 5%	26%	
unique to the Great Basin						
*The bison population on Antelope Island has	23%	8%	69%	31%	12% 589	%
a gene found nowhere else in the world						
Wildlife is especially sensitive to human	84%	1%	15%	85%	4%	11%
impact during the birthing season						
Antelope Island is home to a herd of	33%	7%	60%	45%	5%	56%
California bighorn sheep						
*Antelope Island has no snakes	10%	21%	70%	10%	42%	48%
Levels of support/opposition to attitude statements	5	North	end	Trail us	sers	
People should stay on the trails in prime wildlife	- 4	.57 <sup>1</sup>	2	1.43		
habitat						
If I knew my actions in the backcountry harmed		4.5	6	4.4	7	
wildlife, I would change my actions						
*I would support trail closures during the spring		4.4	4	4.1	1	
birthing season						
Keeping Antelope Island as it is would preserve		4.2	5	4.1	1	
valuable open space						
If I saw people doing things that harm the backcou	untry 4	.03	2	4.05		
I would suggest less harmful ways to act						
If backcountry travel is not restricted, the vegetation	on 3	.79	3	3.64		
will be damaged						
We should restrict human activity on the island to		3.5	9	3.40	5	
protect habitat						
Antelope Island should be developed further to ma	ake 2	.61	2	2.68		
it a better tourist attraction						
We don't need to restrict visitors because humans		2.0	4	2.07	7	
and nature don't conflict						

# Table 9: Cognitive responses to Antelope Island's natural ecosystem

<sup>1</sup>Mean level of agreement where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree

resources of Antelope Island. The belief statements were drawn from information provided in interpretive materials found at the Visitor Center. The attitude statements were developed from statements found in various sources, including several from a previous study of minimum-impact recreation practices in southern Utah (Ruehrwein 1998). Table 9 displays results of this analysis.

The belief statements included five true statements and one that was false (Antelope Island has no snakes). Respondents were most likely to know that wildlife are especially sensitive to disturbance during birthing season and that Antelope Island is an important stopover for migratory birds, and least likely to know about the island's bighorn sheep herd and the genetic makeup of its bison herd. The percentage of respondents who answered "don't know" to these statements was generally quite high, ranging as high as 70% for the statements about bison genetics and snakes. Trail users were slightly more likely than developed-site visitors to know about the island's natural resources.

Responses to the attitude statements (Table 9) show that visitors to both the northern and southern portions of the island express strong support for protection of the park's natural resources even if that would place some limitations on human activities. Only two of the statements drew more opposition than support: one which called for further development of the island and one that said there was no need to restrict visitors because wildlife and humans do not come into conflict. There was somewhat higher support for statements that emphasized personal responsibility rather than park-imposed restrictions on use. Interestingly, 75% of those who reported that they personally had left the trail to observe wildlife nonetheless agreed that people should stay on the trail in prime wildlife habitat.

There were no differences in responses from trail users and developed-site visitors except that the latter were more likely to support trail closures during the spring birthing season. However, there was widespread support for spring closures even among trail users — only 9% of trail users disagreed with that statement, while 74% agreed. We did not find differences in support between hikers, mountain bikers, and horseback riders

A separate question asked all respondents the more general question of whether, "in order to preserve the natural setting of Antelope Island, ... Utah State Parks should restrict certain uses or activities on the land?" Sixty-five percent of visitors answered "yes" to that question, 32% said "no" and 3% were unsure, with no significant difference in responses from developed-site visitors and trail users. The question also included a space where respondents could indicate which uses or activities should be restricted. This open-ended approach yielded a long list of potential restrictions from off-highway vehicles to extreme sports to brine shrimping to smoking. Uses or activities that were mentioned by at least three different respondents were: off-highway vehicles (77 respondents); motorized vehicles (45); off-trail travel (29); camping and mountain biking (22 each); anything that disturbs the environment (15); paved roads (14); horses (13); campfires (7); numbers of people (6); alcohol use and jet skis (4 each); commercial activities, large groups, littering, and "anything that makes noise" (3 each).

		NORTH END ONLY				TRAIL USERS		
		Тоо	About	Тоо		Too	About	Тоо
Evaluations of North End management	Little	<u>Right</u>	Much		Little	<u>Right</u>	Much	
Number of facilities	33%	61%	2%		37%	56%	4%	
Number of campsites		20%	66%	2%		19%	68%	5%
*Number of trails		18%	74%	8%		16%	63%	4%
Number of roads		16%	75%	4%		10%	82%	7%
Campfire restrictions		9%	71%	10%		10%	73%	10%
Evaluations of trails management								
Number of trails			n/a			42%	55%	3%
Number of trail signs			n/a			37%	60%	2%
Number of trail patrol people			n/a			30%	62%	4%
Trail maintenance			n/a			15%	77%	6%
Number of roads			n/a			15%	77%	6%
Restrictions on off-trail travel			n/a			13%	68%	17%
Restrictions on overnight use			n/a			11%	69%	15%
Restrictions on visitor use			n/a			9%	74%	14%

# Table 10: Beliefs about the appropriateness of current park management

(Note: percentages do not add up because some respondents wrote in that they were unsure)

\_\_\_\_\_

#### Visitors' evaluations of current park management

Finally, we asked two questions that allowed visitors to evaluate the current level of management emphasis placed on different aspects of Antelope Island. These questions took the form of Likert-type scales where respondents could indicate whether various aspects of the park's current management were "too little," "about right," or "too much." One of these scales was included in the section of the survey pertaining to the north end, and one was included in the section of the survey for backcountry visitors. The results are shown in Table 10.

For each of these evaluations, a majority of respondents said current levels of management emphasis were "about right." However, satisfaction levels appear to be slightly higher for the developed portions of the park than for the backcountry. For the north end of the island, at least two-thirds of visitors are satisfied with the current number of trails, campsites and roads, as well as with the current restrictions on campfires. However, there is less satisfaction with the number of facilities (restrooms, restaurants, etc.) currently being provided. About one-third of visitors believe that too few facilities are now provided. There were no differences in these evaluations between trail users and those who visited only the developed part of the park, except that trail users were more likely to believe there are too few trails. Analysis of visitors' evaluations of backcountry management shows that satisfaction with the trails themselves is lower than satisfaction with the rules associated with the trails. Forty-two percent of trail users believe there should be more trails than are currently provided, 37% believe there should be more trail signs, and 30% believe there should be more people out patrolling the trails. Eighty percent of trail users reported that they had not seen any of the park's volunteer trail patrollers during their visits; of those who had, about 75% said the trail patrol person had spoken with them during their visit.

# **Conclusions and Recommendations**

This report has described results of a survey of recreation visitors to Antelope Island State Park which was designed to obtain information that could be used to guide management strategies designed to balance recreation uses with protection of the island's natural resources. If there is an overall conclusion that can be drawn from our findings, it is that the park is currently in excellent shape. We found surprisingly little evidence of the social impacts that typically are associated with heavy recreation use. Similarly, visitors' reports of their own behaviors with respect to the natural resources of Antelope Island suggest that the ecological impacts of recreation use remain light, although we agree that any conclusions about ecological impacts must be supported by independent observations of visitor behaviors, especially in the backcountry.

Equally important, we found a visitor population who is keenly interested in maintaining the park's ecosystem, especially its wildlife. The opportunity to view wildlife in a natural setting is perhaps the greatest draw of Antelope Island, and visitors want to maintain that opportunity. At the same time, they are at least generally aware of the potential for recreation use to threaten wildlife, and they are willing to accept some restrictions on use if necessary to protect wildlife. Therefore, if biological evaluation finds that recreation use does have a negative effect on wildlife — particularly during the spring when young animals are especially vulnerable to disturbance — it appears that restrictions will be acceptable to Antelope Island visitors. At the same time, we found some preference for voluntary actions rather than manager-imposed restrictions on the primary activities of hiking, cycling, horseback riding, and developed-site wildlife viewing.

It should be emphasized that we found no evidence that any such restrictions are currently needed, either to protect the natural system or to prevent social impacts that could degrade the recreation experiences of Antelope Island visitors. We do urge park managers to continue to monitor social impacts by repeating at periodic intervals those portions of the survey that measure social impacts, e.g., the crowding scale developed by Shelby *et al.* (1989), or the question asking if the actions of others ever diminish visitors' experiences. Probably this can be done without hiring outside assistance because of the simplicity of the measures and the ease of administering surveys at the entrance station or visitor center.

Antelope Island attracts a primarily urban population, with 60% of visitors coming from the four-county Salt Lake metropolitan area and a large number of other visitors from urban centers elsewhere in the United States. Because rapid population growth is projected to continue along the Wasatch Front, as well as in other Western metropolitan areas, the urban nature of the visitor population is unlikely to change. As a result there is continued potential for crowding or other social impacts, underscoring the need to periodically monitor social impacts of recreation use. Another effect is that, because urban residents tend to be somewhat disconnected from natural processes, the Antelope Island visitor population is not highly knowledgeable about the park's ecosystems. Despite excellent interpretation at the park's visitor center, a large number of visitors were unaware of important or unusual facts about island wildlife. Increased educational efforts, including some that may be done off-site, can be valuable in helping visitors become aware of the consequences of human activities on the island's spectacular natural resources.

Our research emphasized the attitudes and behaviors of visitors to the park's backcountry because of the particular interest in how recreation affects wildlife. We found that trail users tend to come to the park more frequently than developed-site visitors and are more likely to be local residents. We also found that this group may be slightly less satisfied with park management than developed-site visitors, primarily because they would like to have greater opportunities to enjoy backcountry hiking, bicycling, and horseback riding in the park. While development of entirely new trails may be a problem due to the ongoing need to protect wildlife, park officials should look for opportunities to increase the length and diversity of trails.

One way in which this might be done would be through the development of short spur trails, especially where they might provide better access to viewpoints or resting places. For example, the Frary Peak trail passes on the level for several hundred yards along the east side of the ridge north of the peak before rising to a point where hikers can see across to the west side of the Great Salt Lake. For many hikers, the temptation to go off-trail for the view may be great. We found a higher-than-desirable incidence of people saying they had left the trail to view wildlife; perhaps one reason is that the trail does not reach the best wildlife-viewing points.

We found a few other areas that may warrant the attention of park managers: the number and distribution of bathroom facilities; the frequency of backcountry patrols; the presence of pets in areas of the park. In general, however, we found high levels of satisfaction not only with the experiences that Antelope Island provides but also with the current levels of management being provided by Utah State Parks and Recreation. Park officials should be justifiably proud of the way that Antelope Island State Park is meeting the needs of the state's recreation public, and should look forward to the opportunities they have to continue providing a high-quality outdoor experience in a unique and highly valued natural setting.

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# **Appendix A: Survey Instrument**

## Section 1

The following questions ask about the visit when we contacted you about this survey.

1. How long was your visit to Antelope Island?

A few hours or less Half to full day \_\_\_Overnight

- 2. Did this year's opening of the southern portion of Antelope Island affect your decision to visit the \_\_\_\_Yes island? \_\_\_\_No
- 3. Please describe the group you visited Antelope Island with
  - \_\_\_\_Family and/or friends
  - \_\_\_\_\_Members of a club or group (Scouts, etc.)
  - \_\_\_Members of an environmental organization (Sierra
    - Club, Audubon Society, etc.)
  - I came alone
- 4. How many people were in your group? \_\_\_\_\_
- 5. Did you get the kind of experience you wanted?
  - YES, it was everything I wanted
  - \_\_\_\_\_YES, it turned out mostly the way I wanted
  - \_\_\_\_\_SOMEWHAT, but there were a few things I wish had gone better
  - \_\_\_\_NO, only a few things turned out as I wanted
  - \_\_\_\_NO, it was nothing like I wanted

6. How likely is it that you will make additional visits to the Island?

- \_\_\_\_Very likely
- Somewhat likely
- \_\_\_\_Not very likely
- \_\_\_\_Not sure

7. If not very likely, please explain why:

8. What places did you visit while at Antelope Island? (Check all that apply)

Visitor's Center	Buffalo Point overlook
Fielding Garr Ranch	Frary Peak tra

- \_\_\_\_Bridger Bay Beach White Rock Bay
- \_\_\_\_Mountain View trail \_\_\_\_Lake View trail

\_\_\_\_Frary Peak trail

- \_\_\_Buffalo Corrals
- Marina
- \_\_\_\_\_White Rock Bay backcountry trails

The next set of questions asks about your overall history of visiting Antelope Island.

- 1. How often do you visit Antelope Island?
  - \_\_\_\_\_This was my first visit
  - \_\_\_\_Once a year or less
  - \_\_\_\_Several times a year
  - \_\_\_\_\_Several times a month
- 2. Which of the following activities do you participate in while visiting Antelope Island? (Check all that apply)

Saltwater bathing
Camping
Mountain biking
Road-cycling
Photography
Boating
Buffalo round-up
programs/activities

**3.** We'd like to learn more about why people enjoy visiting Antelope Island. Please indicate how important the following reasons are *to you personally* for visiting Antelope Island. (Circle the best answer)

	Not Important	Somewhat	Important	Very Important
	Important	Inportant	Important	Important
Being with family and friends	1	2	3	4
) Near my home	1	2	3	4
Being in a natural setting	1	2	3	4
l) Peace and solitude	1	2	3	4
Visiting historical sites	1	2	3	4
) Good place to camp	1	2	3	4
Scenic beauty	1	2	3	4
ı) I've come here for years	1	2	3	4
Close to water	1	2	3	4
) Good place to bike	1	2	3	4
Good place to hike	1	2	3	4
) Seeing wildlife in natural state	1	2	3	4
) Good place to sail	1	2	3	4
ı) Good place to swim	1	2	3	4
Geology	1	2	3	4

4. Do you ever feel the actions of others diminish your enjoyment of an Antelope Island visit?

\_\_\_\_Yes

No, skip to section 2

- 5. How often is your enjoyment of an Antelope Island visit diminished by other user groups?
  - \_Often (more than twice a day)
    - \_Sometimes (once or twice a day)
    - Rarely
- 6. Which user group(s) are usually responsible?

# Section 2

If you visited the north end of Antelope Island (Bridger Beach Bay, Buffalo point overlook, visitor's center, etc) on the visit when we contacted you, please answer the following questions concerning that visit. If not skip to section 3.

1. Did you feel the north end of Antelope Island was crowded? (Circle one)

1 2  Not at all		3 4 Slightly		5	6	7	7 8 9 Extremely		
				Mo	derately				
crowded		crowded		cro	wded	crowded			

2. We'd like to know what you think of conditions on the north end of Antelope Island? Please indicate whether you feel each item is a problem or not by circling the number that best describes how you feel.

No problem	A big problem
------------	---------------

a) <b>T :::::::::::::</b>	1	2	2	4	=
a) Litter	1	2	3	4	5
b) Meeting horses on the trail	1	2	3	4	5
c) Too many hikers on the trail	1	2	3	4	5
d) Too many people at campsites	1	2	3	4	5
e) Horse manure on the trail	1	2	3	4	5
f) People with dogs	1	2	3	4	5
g) Meeting mountain bikers on the trail	1	2	3	4	5
h) Soil erosion on trails	1	2	3	4	5
i) People walking off the trail	1	2	3	4	5
j) Trampled vegetation	1	2	3	4	5
k) Restrooms	1	2	3	4	5

3. We want to know how you feel about the current management practices on the north end of Antelope Island. Please circle the number that <u>best describes</u> how you feel.

	Too little-	a	bout right	Too	much
a) Number of trails	1	2	3	4	5
b) Number of campsites	1	2	3	4	5
c) Number of roads	1	2	3	4	5
l) Number of facilities (restrooms,	1	2	3	4	5

restaurant, etc.)					
e) Campfire restrictions	1	2	3	4	5

# Section 3

If you visited the <u>backcountry</u> (Frary Peak, White Rock Bay loop, Mountain View trail, etc.), on the visit *when we contacted you*, please answer the following questions *concerning that visit*. If not skip to section 4.

1. Please indicate your *primary* mode of travel in the backcountry.

Mountain biking Horseback riding Other, please specify			_Hiking	, premeny	inoue of		une suem	country ,	•		
Horseback ridingOther, please specify Which trail(s) did you travel on during your visit to Antelope Island? Did you feel the Island's backcountry areas were crowded? (Circle one) 1 2 3 4 5 6 7 8 9 Not at all Slightly Moderately Extremely crowded crowded crowded crowded crowded crowded			Mountai	in biking							
Other, please specify Which trail(s) did you travel on during your visit to Antelope Island? Did you feel the Island's backcountry areas were crowded? (Circle one) Did you feel the Island's backcountry areas were crowded? (Circle one) Not at all Slightly Moderately Extremely crowded crowded crowded 4. Do you see any wildlife in the area you visited?Yes Which of the wildlife you saw impressed you the most? (choose only one) Please answer the following questions about the wildlife that impressed you the most. Did they have young?YesNo If they have young?YesNo Did they move away in response to your presence?YesNo If the animal moved away, how for did it/they go? (check one)No they have following duestion about the wilding placeNo they have a volunteer trail patrol person?			Horseb	ack riding	5						
Which trail(s) did you travel on during your visit to Antelope Island?			_Other,	please sp	ecify						•
Did you feel the Island's back country areas were crowded? (Circle one)      1 2 3 4 5 6 7 8 9	2. Wł	nich trail	(s) did y	ou travel	on during	g your vis	sit to Anto	elope Is	sland?		
1       2       3       4       5       6       7       8       9         Not at all Slightly Moderately Extremely crowded crowded         Extremely crowded         Crowded crowded         4. Do you see any wildlife in the area you visited?YesNo         If yes, what animals did you see?         Which of the wildlife you saw impressed you the most? (choose only one)         Please answer the following questions about the wildlife that impressed you the most.         Did they have young?YesNo        YesNo         Did they move away in response to your presence?	3. Did	l you feel	l the Isla	nd's back	country	areas we	re crowd	ed? (C	ircle one)		
Not at all       Slightly       Moderately       Extremely         crowded       crowded       crowded         4. Do you see any wildlife in the area you visited?      Yes      No         If yes, what animals did you see?		1	2	3	4	5	6	7	8	9	
4. Do you see any wildlife in the area you visited?YesNo If yes, what animals did you see?		Not a crowd	t all led	Sligh crowd	tly led	Mo crov	derately wded		Extreme crowded	ely	
Which of the wildlife you saw impressed you the most? (choose only one)	4. Do If y	) you see yes, wha	any wild it anima	llife in the ls did you	area you 1 see?	ı visited?		Yes		No	
<ul> <li>Please answer the following questions about the wildlife that <u>impressed you the most</u>.</li> <li>Did they have young?YesNoNot sure</li> <li>Did you try to approach the animal(s)YesNo</li> <li>Did they move away in response to your presence?YesNo</li> <li>If the animal moved away, how for did it/they go? (check one)Only a short distance (less than 100 feet)More than 100 feet, but still in sightOut of sight into a nearby burrow or hiding placeOut of sight, a long distance away</li> <li>Did you meet a volunteer trail patrol person?Yes have the person?</li></ul>	W	hich of t	he wildli	ife you sa	w impres	ssed you	the most:	? (choo	se only on	e)	•
Did they have young?      YesNoNot sure         Did you try to approach the animal(s)YesNo      No         Did they move away in response to your presence?      YesNo         If the animal moved away, how for did it/they go? (check one)      No        YesNo      No         If the animal moved away, how for did it/they go? (check one)      No        Only a short distance (less than 100 feet)      Nore than 100 feet, but still in sight        Out of sight into a nearby burrow or hiding place      Out of sight, a long distance away         Did you meet a volunteer trail patrol person?      Nore how they they they	5. Ple	ase answ	ver the fo	ollowing q	uestions	about the	e wildlife	that <u>in</u>	pressed y	ou the n	<u>10st</u> .
Did you try to approach the animal(s)      YesNo         Did they move away in response to your presence?      YesNo         If the animal moved away, how for did it/they go? (check one)      Only a short distance (less than 100 feet)        Only a short distance (less than 100 feet)      Out of sight into a nearby burrow or hiding place        Out of sight, a long distance away      Out of sight, a long distance away         Did you meet a volunteer trail patrol person?      No	Die	d they ha	ve youn	g?			Yes		No		Not sure
Did they move away in response to your presence? YesNo If the animal moved away, how for did it/they go? (check one) Only a short distance (less than 100 feet) More than 100 feet, but still in sight Out of sight into a nearby burrow or hiding place Out of sight, a long distance away Did you meet a volunteer trail patrol person?	Die	d you try	to appr	oach the a	nimal(s)		Yes		No		
YesNo If the animal moved away, how for did it/they go? (check one) Only a short distance (less than 100 feet) More than 100 feet, but still in sight Out of sight into a nearby burrow or hiding place Out of sight, a long distance away Did you meet a volunteer trail patrol person?	Die	d they m	ove awa	y in respo	nse to yo	ur presen	nce?				
If the animal moved away, how for did it/they go? (check one)Only a short distance (less than 100 feet)More than 100 feet, but still in sightOut of sight into a nearby burrow or hiding placeOut of sight, a long distance away Did you meet a volunteer trail patrol person?Nor how there there							Yes		No		
<ul> <li>Only a short distance (less than 100 feet)</li> <li>More than 100 feet, but still in sight</li> <li>Out of sight into a nearby burrow or hiding place</li> <li>Out of sight, a long distance away</li> </ul> Did you meet a volunteer trail patrol person?	If t	the anima	al moved	l away, ho	w for did	it/they go	? (check	one)			
<ul> <li> More than 100 feet, but still in sight</li> <li>Out of sight into a nearby burrow or hiding place</li> <li>Out of sight, a long distance away</li> <li>Did you meet a volunteer trail patrol person?</li> </ul>			_Only a	short dist	ance (les	s than 10	0 feet)				
Out of sight into a nearby burrow or hiding place Out of sight, a long distance away . Did you meet a volunteer trail patrol person?			_ More t	han 100 f	eet, but s	still in sig	ht				
Out of sight, a long distance away . Did you meet a volunteer trail patrol person?			Out of si	ight into a	nearby	burrow o	r hiding <sub>I</sub>	place			
. Did you meet a volunteer trail patrol person?			Out of s	sight, a loi	ng distan	ce away					
York a tool tool person.	6 Did	l vou me	et a volu	nteer trai	l natrol r	erson?					
Yes, Diff Loniv Lsaw them.	<b>.</b> DIU	Yes l	hut I only	v I saw th	em.						
Yes, they talked to me.		Yes. f	hev talk	ed to me.							

\_\_\_\_No, I did not meet a patrol person at all.

7. Please circle the number that best describes <u>how often</u> during your Antelope Island visit you engaged in the following practices.

	Never	Sometimes (once or twice)	Often (3 or 4 times)	Very often (5 + times)
Left the trail to observe wildlife	1	2	3	4
)) Left the trail to avoid mud or debris	1	2	3	4
Left the trail to avoid other trail users	1	2	3	4
l) Walked two or more abreast on the trail	1	2	3	4
Took a shortcut off the marked trail	1	2	3	4

8. We'd like to know what you think of conditions in the backcountry of Antelope Island? Please indicate whether you feel each item is a problem or not by circling the number that best describes how you feel.

a) Litter	1	2	3	4	5
b) Meeting horses on the trail	1	2	3	4	5
c) Too many people on the trail	1	2	3	4	5
d) Horse manure on the trail	1	2	3	4	5
e) Soil erosion on trails	1	2	3	4	5
f) Meeting mountain bikers on the trail	1	2	3	4	5
g) People walking off the trail	1	2	3	4	5
h) Trampled vegetation	1	2	3	4	5
i) Dogs not on a leash	1	2	3	4	5

No problem-----A big problem

9. We want to know how you feel about the current management practices in the backcountry of Antelope Island. Please circle the number that <u>best describes</u> how you feel.

## Too little-----Too much

a) Number of trails	1	2	3	4	5
b) Restrictions on overnight use	1	2	3	4	5
c) Number of roads	1	2	3	4	5
d) Restrictions on off trail travel	1	2	3	4	5
e) Restrictions on visitor use	1	2	3	4	5
f) Number of trail signs	1	2	3	4	5
g) Number of trail patrol people	1	2	3	4	5
h) Trail maintenance	1	2	3	4	5

# Section 4

If you visited <u>Garr Ranch</u> on the visit *when we contacted you*, please answer the following questions *concerning that visit*. If not skip to section 5.

1. We'd like to know why people choose to visit Garr Ranch. Please indicate how important each of the following reasons are *to you personally* for visiting Garr Ranch? (Circle the best answer)

	Not Important	Somewhat Important	Important	Very Important
I wanted to get a feel for how people might have lived in the past.	1	2	3	4
b) It's a good place to have a picnic.	1	2	3	4
I was curious to see where the road went.	1	2	3	4
l) The group I was with decided to go.	1	2	3	4
Never been there before and thought I might enjoy it.	1	2	3	4
) I heard about it and wanted to see it.	1	2	3	4
I wanted to learn about history	1	2	3	4

2. What activities did you participate in while at Garr Ranch?

	Self guided tour
	Picnic
	Just walked around and observed historic buildings
	Nature trail
	Read informational brochure
	Other, please specify
3. How 1	nany hours were you at the ranch? hours

4. Did you feel Garr Ranch was crowded? (Circle one)

Not at a	all d	Sligh	ntly ded	Mo	derately wded		Extremely crowded	
1	2	3	4	5	6	7	8	9

5. We'd like to know what you think of conditions at Garr Ranch? Please indicate whether you feel each item is a problem or not by circling the number that best describes how you feel.

No	prob	lem	4	big	pro	blen	n
----	------	-----	---	-----	-----	------	---

a) Litter	1	2	3	4	5
b) Too many people at the site	1	2	3	4	5
c) Damage to historic resources	1	2	3	4	5
d) Soil erosion on nature trail	1	2	3	4	5
e) Uninteresting exhibits	1	2	3	4	5
f) Not enough exhibits/information	1	2	3	4	5
g) Trampled vegetation	1	2	3	4	5

6. We want to know how you feel about the current management practices at <u>Garr Ranch</u>. Please circle the number that <u>best describes</u> how you feel.

a) Number of trails	1	2	3	4	5
c) Number of roads	1	2	3	4	5
d) Number of facilities (restrooms, etc.)	1	2	3	4	5
e) Restrictions on off trail travel	1	2	3	4	5
f) Restrictions on overnight use	1	2	3	4	5
g) Available parking	1	2	3	4	5
h) Interpretive information	1	2	3	4	5

Too little-----Too much

7. Sometimes it is necessary to protect fragile historic resources like the buildings at Garr Ranch. Would you support reducing the number of parking spaces at Garr Ranch?

\_\_\_\_\_Yes, I would support reduced parking at Garr Ranch.

\_\_\_\_\_No, but the current limits are OK.

\_\_\_\_\_No, there should be more parking available

Would you support limitations on access to buildings? \_\_\_\_\_Yes \_\_\_\_\_No \_\_\_\_\_Not sure

8. How did the presence of construction affect your visit? (check one)

\_\_\_\_\_The construction had no affect on my visit.

\_\_\_\_\_The construction was a nuisance, but I still enjoyed my visit.

\_\_\_\_\_The construction made my visit less enjoyable.

9. How did the insects affect your visit?

\_\_\_\_\_The insects did not affect my visit.

\_\_\_\_\_The insects were a nuisance, but I still enjoyed my visit.

\_\_\_\_\_The insects made my visit less enjoyable.

#### Section 5

This section asks questions about human and natural history of Antelope Island along with questions concerning how you feel this resource should be managed.

**1.** In order to preserve the natural setting of Antelope Island, do you feel Utah State Parks should restrict certain uses or activities on the land?

\_\_Yes \_\_\_\_No

If yes, what uses or activities do you feel should be restricted?

**3.** Now, we'd like to find out what our visitors understand about the natural resources on Antelope Island. For each of the following statements please circle the number that <u>best describes</u> your beliefs.

	Agree	Disagree	Don't Know
Antelope Island is an important stopping place for migrating birds.	1	2	3
) Antelope Island is home to vegetation unique to the Great Basin	1	2	3
Antelope Island has no snakes.	1	2	3
l) The bison population on Antelope Island has a gene found nowhere else in the world.	1	2	3
Wildlife is especially sensitive to human impact during the birthing season.	1	2	3
) Antelope Island is home to a herd of California bighorn sheep.	1	2	3

4. We'd also like to know how people think the natural resources on Antelope Island should be managed. For each of the following statements please circle the number that <u>best describes</u> your beliefs.

	Strong	,ly	Northal	S	trongly
	Disagr	ee	neutrai-		Agree
Keeping Antelope Island as it is would preserve valuable open space.	1	2	3	4	5
)) We should restrict human activity on the Island to protect habitat.	1	2	3	4	5
We don't need to restrict visitors because humans and nature don't conflict.	1	2	3	4	5
l) If backcountry travel is not restricted, the vegetation will be damaged.	1	2	3	4	5
People should stay on the trails in prime wildlife habitat.	1	2	3	4	5
f) If I knew my actions in the backcountry harmed wildlife, I would change my actions.	1	2	3	4	5
If I saw people doing things that harm the backcountry, I would suggest less harmful ways for them to act.	1	2	3	4	5
) I would support trail closures during the spring birthing season.	1	2	3	4	5
Antelope Island should be developed further to make it a better tourist attraction.	1	2	3	4	5

# Section 6

Finally, we'd like to know a little about you for an overall profile of Antelope Island visitors. The information will be used for statistical analysis only. Remember that all answers will be kept confidential.

- 1. What is your age? \_\_\_\_Years
- 2. Are you ... Male \_\_\_\_Female
- 3. What is the highest level of education you have completed?
  - \_\_\_\_Some high school
    - \_\_\_\_Completed high school
  - \_\_\_\_Some college or technical school
  - Associate or completed technical school
  - \_\_\_\_Bachelors degree
  - \_\_\_\_Some post graduate work
  - \_\_\_\_Advanced degree
- 4. Which of the following best describes where you spent most of your life? (Check one)
  - \_\_\_\_Rural area
  - \_\_\_\_\_Small town (less than 5,000 people)
  - \_\_\_\_\_Small city (5,000-50,000 people)
  - \_\_\_\_Large city (more than 50,000 people)
  - \_\_\_\_\_Suburb of a large city
- 5. What is your zip code? \_\_\_\_\_

<u>Thank you</u> for taking time to answer our questions. If there is anything else you'd like to tell us about Antelope Island, please use the back of the survey for comments.

# **Appendix B: Onsite questionnaire**

Antelope Island On-Site Survey

Thank you for agreeing to complete this survey. Your responses will provide valuable information for future management.

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City:	State:	Zip code:	
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