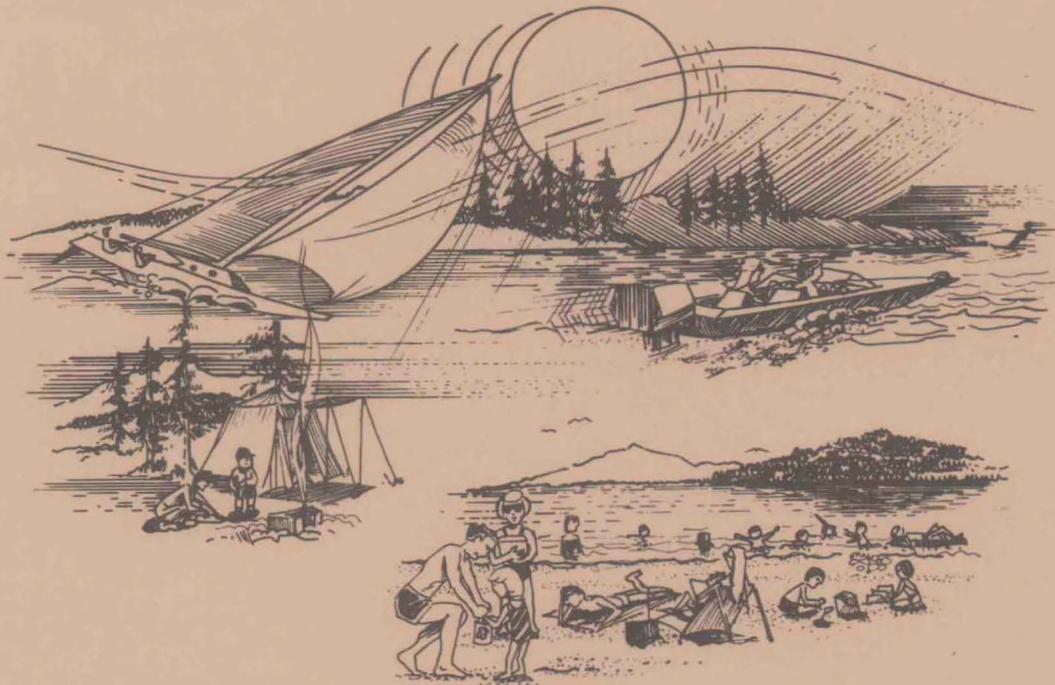


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Human Use Issues at Whiskeytown: Visitor Perceptions of Management and Impacts

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EXECUTIVE SUMMARY

This report looks at visitor response to Park Service management programs and recreation-related environmental impacts at the Whiskeytown Unit of the Whiskeytown-Shasta-Trinity National Recreation Area. Background and past research findings on client/management issues and management of water-based recreation resources, including visitor attitudes toward facility development, amount of regulation, and impacts are presented as a preface to research results at Whiskeytown.

Key Findings:

- * Too few sources of drinking water was a primary facility-related concern, with 60% of Whiskeytown visitors indicating it was a problem.
- * Forty percent of Whiskeytown visitors mentioned inadequate toilet facilities, too few garbage cans, and too few showers were also facility problems.
- * Shoreline visitors were most concerned about drinking water, toilet facilities, and garbage cans.
- * Campground visitors saw as problems a lack of showers (69%), drinking water sources (62%), garbage cans (43%), and toilet facilities (42%).
- * Only 20% of Whiskeytown visitors indicated law enforcement, park staff, and commercial development were a problem. These were primarily visitors at overnight areas.
- * More than half (51%) of Whiskeytown visitors indicated litter on the banks of the lake was a problem.
- * Whiskeytown visitors appear to be fairly tolerant of other visitors. One-third of the visitors said inconsiderate people were a problem.
- * Visitors at overnight locations most often mentioned problems with other visitors, including people being inconsiderate (45%), shouting and yelling (44%), and playing loud radios (32%).

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INTRODUCTION

This is the fourth in a series of reports based on research undertaken by the National Park Service and Oregon State University for the Whiskeytown Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (Figure 1). The research is an outgrowth of a management request to better understand the interaction of people and the riparian system at Whiskeytown. The research project has continued since 1984. Early in the planning stages, Unit managers participated in a nominal group exercise. The purpose of the workshop was to place in priority order the most important human use issues and problems at Whiskeytown. Results of the nominal group exercise were used in formulating research objectives for the Whiskeytown project.

Data collection took place during the summer of 1985 when 3,200 Whiskeytown visitors were contacted at a variety of locations around the lake. Guided by project objectives, results of the survey are contained in a series of five reports. Prior reports in the series include:

- "People, Human Behavior and Water-based Recreation: A Working Bibliography" by Martinson and Field, 1985, OSU/CPSU 85-5. The report focuses on human behavior at water-based recreation locations and includes references describing recreationists, water-based recreation locations, visitor perceptions of water resources and management of water-based recreation areas.

- "Recreation Places: A Description of Recreation Sites at Whiskeytown" by Stark et al., 1986, OSU/CPSU 86-3. This report provides a description of the physical, social, and managerial characteristics of the 16 Whiskeytown locations around which the research effort was organized. Sites reflect the variety of physical settings, activities, and levels of management and development found at Whiskeytown Unit.

- "Whiskeytown--An Overview of the Visitor and the Recreation Resource" by Lee et al., 1986, OSU/CPSU 86-8. This report describes current recreation use at the Whiskeytown Unit.

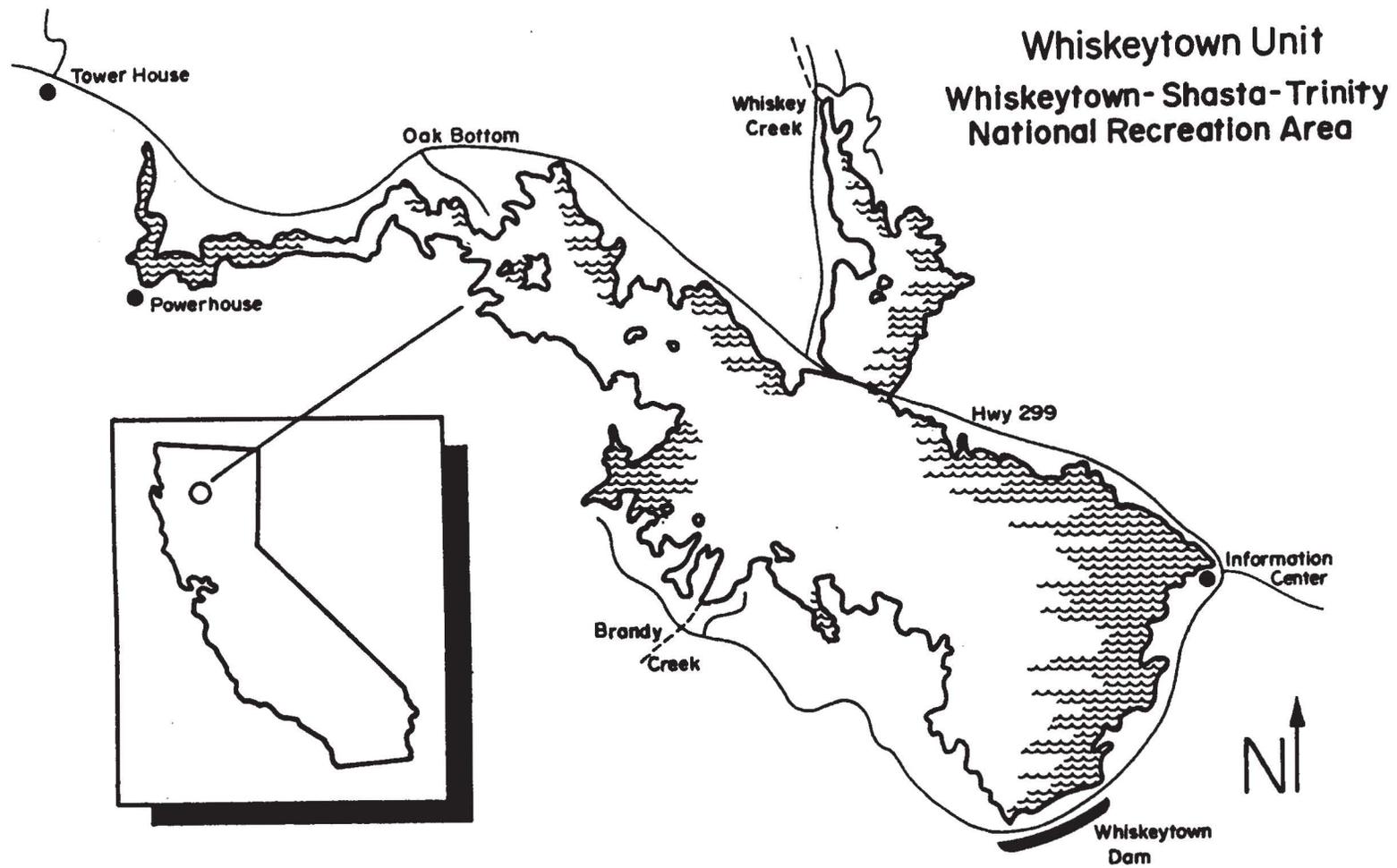


FIGURE 1. LOCATION OF WHISKEYTOWN UNIT, WHISKEYTOWN-SHASTA-TRINITY NATIONAL RECREATION AREA.

The fifth and final report will discuss carrying capacity issues at Whiskeytown.

Objectives

Results presented here focus on visitor response to Park Service management programs and recreation-related environmental impacts. Results of the nominal group exercise described earlier cited visitor protection as one of the top two management issues identified by Whiskeytown managers, and it was important to learn about visitor satisfaction with existing regulation and enforcement programs at Whiskeytown. In addition, visitor expectations of available facilities and activities were also identified as an important human use issue as were visitor perceptions of environmental and social impacts associated with recreation activity at Whiskeytown. These topics form the basis of the current report and provide insights for park managers on the protection of the area's resources.

The report is organized as follows. Background is provided on the client/management interaction question. Research has shown, for example, that the client's definition and perception of a problem may be considerably different from management. An overview on management of water-based recreation resources is provided along with results of past research on visitor attitudes toward facility development, amount of regulation, and environmental and social impacts on primarily rivers and lakes. These past findings form a useful framework from which to examine results found at Whiskeytown.

The remainder of the report describes the attitudes of Whiskeytown visitors toward management of the area, including levels of facility

development at selected sites on Whiskeytown, and environmental and social impacts resulting from recreation use at sites on Whiskeytown Lake. A final section describes how Whiskeytown managers might use information presented here in meeting the needs of visitors while maintaining environmental quality.

Background

Management and Clientele Perceptions

of Resource Problems

A rationale often given for the need to have objective information on outdoor recreationists is that perceptions of recreation managers may differ from those of visitors. This fact has been documented by studies on visitors and managers and their respective perceptions of recreation impacts such as litter, human waste, excessive noise, and conflicts between recreationists as well as preferences for area management. Results of studies on impacts have been very consistent: managers are much more sensitive to impacts than visitors (see Downing and Clark, 1979; Peterson, 1974; Lucas, 1979). Studies of differences in attitudes and preferences for area management among visitors and managers have been conducted in wilderness areas (Hendee and Harris, 1970) and in developed campgrounds (Clark et al., 1971). Wilderness managers surveyed overestimated visitor support for facility development and the occurrence of "purist" attitudes (e.g., many visitors did not object to using helicopters for management purposes while managers thought they would). Managers also expected strong opinions from visitors who were actually neutral or had no opinion on many management issues. Managers of developed campgrounds tended to overestimate visitor opposition to increased area

development. Researchers and others have speculated on why these differences in perception exist. What is important is that they do occur. In part, differences reported can be found within the cultural context of the respective parties visiting and managing the area. Management approaches the various resource issues from a perspective of resource managers, operating within the guidelines and policies of their agency and with an orientation and expectation toward the customer they serve. This is their work. Clients, however, view the resource as a recreation venue, a place to enjoy the outdoors with friend and family. Neither perception can necessarily be considered "correct" but it is important to note the different contexts in which perceptions are formed to minimize conflict and enhance resource management goals. It is in this light that managers look for objective measures of visitor attitudes, preferences, and perceptions.

Managing Water Resources

Much of the research that has been done on managing water resources for recreation has focused on rivers. Studies of visitor attitudes toward river management issues include McAvoy's (1982) study of the management techniques preferred by recreational watercraft users and landowners on a state river in Minnesota. He found that users favored management actions that would preserve the resource such as adopting a carry-in/carry-out litter policy, limiting craft size, surface speed, and the number and use of access points. Most users were not willing to limit their times or areas of use. Dawson et al.'s (1982) survey of river users and landowners along the Upper Delaware Scenic and Recreational River found somewhat similar results. Boaters favored regulation to decrease litter, restrict camping to designated locations,

prohibit motors and limit the number of public access points. Management actions supported by boaters and landowners represented less restrictive management actions that would help alleviate problems experienced by both groups such as providing information, increased law enforcement and actions to control litter. Utter et al. (1979) studied river user preferences for use allocation and rationing techniques on the Middle Fork of the Salmon River in Idaho. They found differences in technique preferences among commercial floaters and private floaters although the preferred techniques of all groups were consistent with the systems under which each had been operating, i.e., the outfitters' advance reservation (and pricing) system for commercial users and the Forest Service's lottery for the private users. Knopf and Lime's (1984) summary of results of the 45-river National River Recreation Study included visitor responses to various management practices, environmental impacts seen by visitors, and other management problems. They also found that various user groups hold differing views on management practices. As an example they cite a 1978 study in the Kings River in California where there was significant ($p < 0.01$) disagreement between outfitted and nonoutfitted users on the appropriateness of 11 management actions. Nonoutfitted users were consistently more opposed to management strategies, particularly those that called for direct regulation of behavior such as assigning camping spots, assigning launch times, and limiting the number of people per group. They suggest that it is important to assess the relative acceptability of various management alternatives. If support for an intended action is weak, alternative remedies showing greater public acceptance should be considered.

Facility development. Studies of visitor preferences for facilities at water-based recreation sites are few, and have focused primarily on the availability of restrooms, drinking water sources, and garbage cans. Sixty to 70 percent of boaters surveyed on the Upper Delaware River suggested these were problems (Dawson et al., 1982). Results of the National Rivers Study included information on visitor support for developing short hiking trails at points on the river and providing campsites at put-in and take-out points on the Kings River in California (Knopf and Lime, 1984).

In his summary of research findings on campground visitors' preferences for facilities, Manning (1986) suggests that visitors tend to respond favorably to the facilities they find. This was reflected in the overall high levels of satisfaction reported by visitors at the study areas. A similar study of river recreationists (McCool and Utter, 1981) found that preferences for river allocation and rationing systems seemed to be related to the river management systems under which visitors had previously operated. These findings suggest visitors react very specifically to the conditions of a site and their expectations for the facilities found at a site.

Amount of regulation. A related concern discussed in this report is that of visitor perceptions of the amount of regulation appropriate at recreation areas such as Whiskeytown. How much regulation is needed? A study by Hammitt et al. (1982) of river recreationists on three southern Appalachian rivers focused on the degree to which river recreationists felt that management was needed to control user conflicts, use density, and environmental impacts and their corresponding support for management strategies. Results indicated that among visitors, the greater the perceived need for management action, the

greater the support for management strategies. If visitors do not perceive a problem exists, the less likely they are to support actions designed to deal with that particular problem. Based on their findings, Hammitt et al. (1982) suggest that before resource managers decide to implement a particular management strategy, they should first identify the degree to which users perceive the existence of river use problems and the need for control. Whether or not visitors will support various management alternatives depends in part on their perception that a problem in fact exists.

In a study of whitewater boaters on 13 western river segments, Schomaker (1983) found that these risk-taking floaters were not opposed to regulations relating to safety such as requiring first-aid equipment and posting signs warning of hazards. However, if safety measures meant that managers would be more visible on the river, floaters did object to them. Schomaker suggests that use regulations should be the minimum necessary to achieve safety objectives, an idea shared by Lucas (1982).

Environmental and social impacts. Though many studies have documented the impacts of recreational use on the environment, few have focused on the perceptions of visitors of those impacts. Findings of these studies suggest that visitors rarely complain about site conditions and usually rate environmental conditions of recreation sites as good or better. Litter appears to be the only exception and was mentioned by floaters on the Pine River in Michigan even more often than the more evident streambank erosion (Solomon and Hansen, 1972). Hammit and McDonald (1983) surveyed floaters on several southeastern rivers concerning their experience with river floating and perceptions of five environmental impacts. Past experience was positively

related to perceptions of impacts, though a great majority of floaters, even those with much experience, failed to notice or report any of the five impacts studied.

Concern for social impacts caused by other recreationists has become more and more evident as the concept of carrying capacity has been applied to outdoor recreation. In trying to identify appropriate levels of recreation use, managers and researchers have expanded their concern for environmental impacts to include consideration of the social environment and the quality of recreation experiences. How do visitors react to crowding, excessive noise, dogs running loose, and other behaviors of nearby recreationists? For information on past research on the impacts of crowding and visitor behavior relating to water-based recreation, see the Whiskeytown report "Carrying Capacity Issues at Whiskeytown," forthcoming.

Visitors appear to have definite attitudes about management of resource-based recreation areas. Some of these concerns such as those related to safety and sanitation may be somewhat unique to water-based areas while others such as litter are a common concern for recreationists. It is not enough for managers to simply determine and implement management strategies relating to visitor use. Visitor support for management alternatives may largely depend on their perceptions of problems and the need for regulation.

FINDINGS

Visitors at 16 locations around Whiskeytown Lake responded to questions on facility development, environmental and social impacts, and park management issues. They were asked to evaluate a list of items as being a problem or issue at the place where they were recreating. (See Figure 2 for a map of locations.) The 16 interview sites were combined into seven location groups—beach areas, shoreline areas, campground areas, boat launching areas, the powerhouse area, and the Tower House historic area. Research findings are reported as facilities issues, regulation issues, environmental impacts, and social impacts. Responses are presented for Whiskeytown visitors as a whole and by location groups. Only those items seen as being a problem by 25 percent or more of Whiskeytown visitors are presented here. A complete listing of visitor responses is found in the Appendix.

Facilities

Too few sources of drinking water was the primary facility-related concern for Whiskeytown visitors in general, with 60 percent indicating this was a problem. Other problems mentioned by nearly 40 percent of all visitors were inadequate toilet facilities (39%), too few garbage cans (36%), and too few showers (35%) (Table 1).

Visitors at the seven locations at Whiskeytown placed differing emphasis on facility issues. As one might expect, shoreline visitors in particular were concerned about drinking water (65%) as well as inadequate toilet facilities (52%) and too few garbage cans (40%). Shoreline visitors are

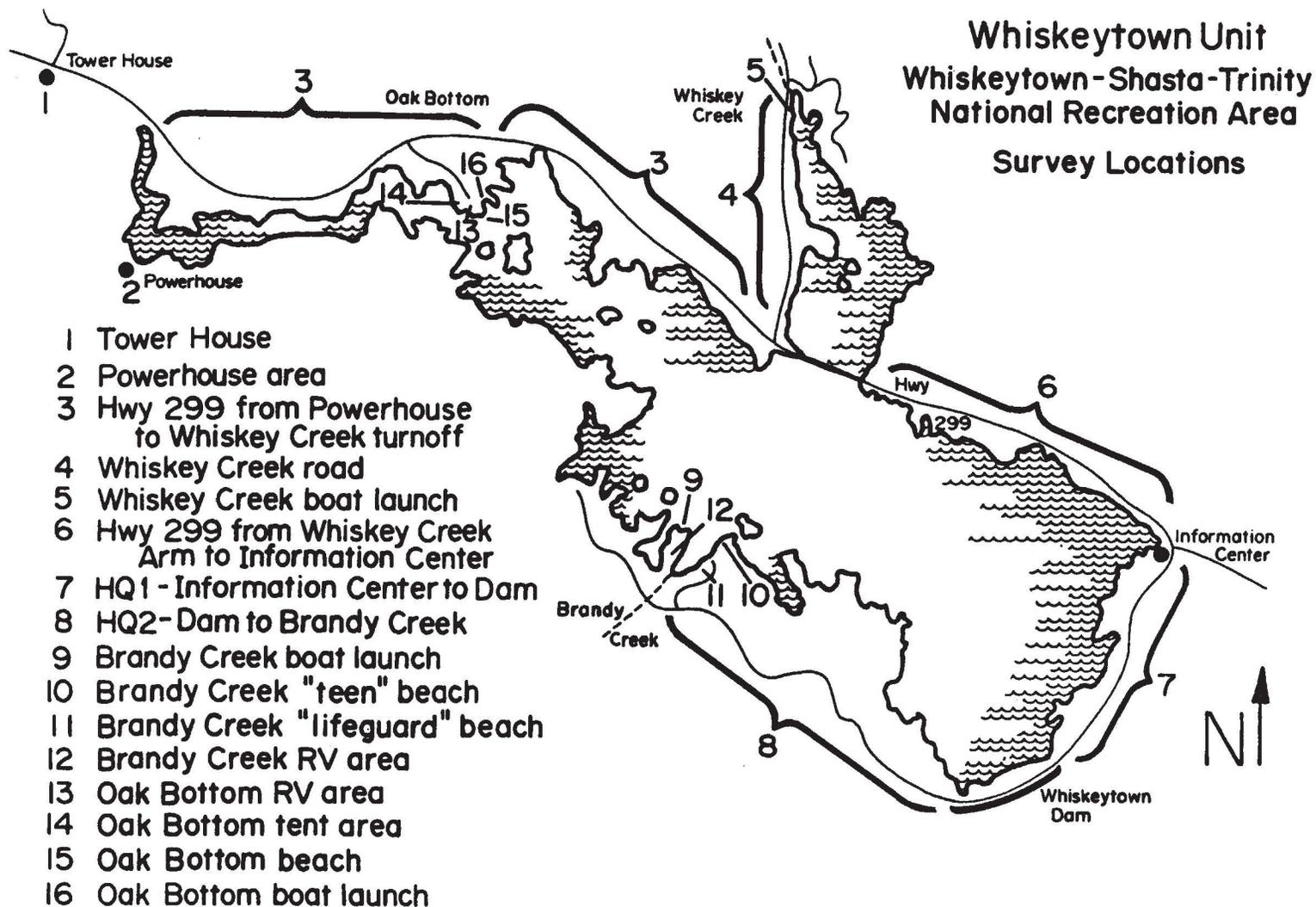


FIGURE 2. SIXTEEN SURVEY LOCATIONS, WHISKEYTOWN, SUMMER 1985.

Table 1. Problems encountered by 25% or more of Whiskeytown visitors.

FACILITY MANAGEMENT

All areas

- . too few drinking water sources (60%)
- . inadequate toilet facilities (39%)
- . too few garbage cans (36%)
- . too few showers (36%)

Beach areas

- . too few drinking water sources (60%)
- . too few garbage cans (33%)
- . inadequate toilet facilities (28%)

Shoreline areas

- . too few drinking water sources (65%)
- . inadequate toilet facilities (52%)
- . too few garbage cans (40%)

Campground areas

- . too few showers (69%)
- . too few drinking water sources (62%)
- . too few garbage cans (43%)
- . inadequate toilet facilities (42%)

Boat launching areas

- . too few drinking water sources (49%)
- . too few showers (39%)
- . too few garbage cans (28%)
- . inadequate toilet facilities (25%)

Powerhouse area

- . too few drinking water sources (58%)
- . inadequate toilet facilities (40%)
- . not enough garbage cans (38%)
- . too few showers (25%)

Tower House area

- . too few drinking water sources (63%)
- . inadequate toilet facilities (45%)
- . too few garbage cans (34%)

Table 1. Continued.

REGULATION/MANAGEMENT ISSUES

Campground areas

- . too little law enforcement (26%)

ENVIRONMENTAL IMPACTS

All areas

- . litter on banks (52%)
- . litter in lake (39%)
- . insect bites (35%)
- . erosion of the shoreline (29%)

Beach areas

- . litter on banks (51%)
- . litter in lake (41%)
- . insect bites (29%)

Shoreline areas

- . litter on banks (63%)
- . litter in lake (48%)
- . erosion of the shoreline (40%)
- . insect bites (33%)

Campground areas

- . litter on banks (45%)
- . insect bites (45%)
- . litter in lake (34%)
- . obstructions on the lake (26%)

Boat launching areas

- . litter on banks (43%)
- . litter in lake (35%)
- . insect bites (29%)
- . erosion of the shoreline (28%)
- . obstructions on the lake (27%)

Powerhouse area

- . litter on banks (58%)
- . insect bites (50%)
- . litter in lake (36%)
- . erosion of the shoreline (31%)

Table 1. Continued.

Tower House area

- . insect bites (34%)
- . litter on banks (29%)

SOCIAL IMPACTS

All areas

- . motorized boats on the lake (31%)
- . people shouting and yelling (28%)
- . people playing loud radios (25%)

Beach areas

- . people playing loud radios (34%)
- . people being inconsiderate (32%)
- . people shouting and yelling (32%)
- . people drinking (25%)

Shoreline areas

- . motorized boats on the lake (45%)
- . people being inconsiderate (28%)

Campground areas

- . people being inconsiderate (45%)
- . people shouting and yelling (44%)
- . people playing loud radios (32%)
- . dogs and other animals (27%)
- . people drinking (26%)

Boat launching area

- . people being inconsiderate (37%)
- . motorized boats on the lake (36%)
- . people shouting and yelling (28%)
- . people drinking (27%)
- . people playing loud radios (26%)
- . dogs and other animals (26%)

Powerhouse area

- . motorized boats on the lake (34%)
 - . people being inconsiderate (28%)
-

primarily local residents who live within 20 miles of Whiskeytown and visit the Lake fairly often. They most often come with family and/or friends and stay for several hours.

Visitors contacted at the powerhouse were likewise concerned about a lack of drinking water sources (58%), inadequate toilet facilities (40%), and a lack of garbage cans (38%). These visitors are also local residents taking multiple trips to the lake, though almost 40 percent of those contacted were first-time visitors. Like shoreline visitors, those visiting the powerhouse area did so in groups of family and friends and spent a day or less in the area.

The concerns of Tower House visitors were also primarily with drinking water sources (63%), inadequate toilet facilities, and too few garbage cans (34%). Consistent with park management goals, the Tower House is becoming a major tourist attraction for Whiskeytown. More than half of the visitors contacted there were from outside the local area. Unlike shoreline and powerhouse users, the majority of visitors at the Tower House were first-time visitors to Whiskeytown. They too came primarily with family and friends and were day users, though a quarter of those contacted indicated their visit to Whiskeytown was part of a major vacation.

Visitors at boat launching sites at Whiskeytown also saw a lack of drinking water sources as being a problem (49%). They also mentioned too few showers (39%) too few garbage cans (28%) and inadequate toilet facilities (25%). More than half the visitors at these sites were local residents. The majority had visited Whiskeytown before, though 38 percent were first-time visitors. More than half came with a family group to spend a day or less at the lake.

Beach users similarly expressed concern with a lack of drinking water sources (60%), and, to a lesser extent too few garbage cans (33%) and inadequate toilet facilities (28%). The majority of beach users were local residents, fairly equally split between first-time and repeat visitors. They came primarily with families to spend part of or all day at Whiskeytown.

Campground visitors were most concerned with too few showers (69%), as well as drinking water (62%), garbage cans (43%) and toilet facilities (42%). Visitors at these sites tended not to be local residents and more than 80 percent were first-time visitors to Whiskeytown. Similar to visitors at other locations, they came primarily as families. Almost two-thirds of these visitors were visiting as part of a vacation and an additional third were weekend visitors.

Regulations

While more than 80 percent of all Whiskeytown visitors indicated that law enforcement, park staff, and commercial development were not a problem, visitors at the overnight areas were most concerned about these issues. These primarily nonlocal first-time visitors indicated that too little law enforcement available to afford protection and security (26%) and not enough park staff available to answer questions (22%) were problems at their particular location. Responses from visitors at the other locations showed little consistency in their perceptions of these issues.

Environmental Impacts

More than half (51%) of all visitors contacted at Whiskeytown indicated that litter on the banks of the lake was a problem. Besides litter on the

ground, close to 40 percent indicated that litter in the lake was also a problem. Other items mentioned were insect bites (35%), shoreline erosion (29%) obstructions on the lake (24%), and vandalism (21%). Water pollution, bad weather, muddy water, and airplanes flying overhead were each seen as problems by less than 16 percent of all Whiskeytown visitors.

Looking at specific locations at Whiskeytown produced somewhat varying results. Among the six location groups identified, shoreline users were most concerned about litter. Sixty-three percent indicated that litter on the bank was a problem and almost 50 percent were concerned about litter in the lake. These visitors were primarily local residents who frequently visit the area for a day or even simply a few hours. Not surprisingly, these visitors were also concerned about erosion of the shoreline (40%). With the exception of insect bites mentioned as a problem by 33 percent of shoreline visitors, other environmental impacts including vandalism, water pollution, and obstructions on the lake, were a concern for fewer than one-fifth of shoreline visitors.

Visitors contacted in the powerhouse area, which includes a fairly substantial amount of shoreline, were also concerned about litter on the bank (60%) and in the lake (36%). These too were primarily local residents visiting with family groups. Insect bites (50%), shoreline erosion (31%), obstructions on the lake (24%), and vandalism (23%) were also identified as problems by powerhouse area visitors.

Campground area visitors were equally concerned about bank litter (45%) and insect bites (45%). These visitors were primarily California residents from outside the local area who were visiting Whiskeytown for the first time as part of a vacation or weekend outing. Other problems for these camping area visitors included litter and obstructions in the lake (34% and 26%,

respectively), vandalism (24%), and shoreline erosion (21%).

Half of the visitors contacted at beach areas indicated litter on the banks was a problem in the area. Litter in the lake (41%), insect bites (29%), water pollution (21%), erosion (21%), and vandalism (21%) were also mentioned. Local visitors made up half of this group and almost half of them were repeat visitors to Whiskeytown. They came primarily in family groups and spent a day or less in the area.

Visitors at Whiskeytown boat launching sites are similar to beach visitors in residence, past visitation to the area, and length of stay. They too were concerned about litter on banks (43%), litter in the lake (35%), insect bites (29%), and shoreline erosion (28%), and obstructions on the lake (27%).

Tower House area visitors mentioned problems with environmental impacts similar to visitors at other Whiskeytown locations. Their main concerns were insect bites (34%), bank erosion (29%) and lake litter (21%). Almost half of these visitors were visiting Whiskeytown for the first time and came primarily from the local area and northern California.

Social Impacts

Whiskeytown visitors in general appear to be fairly tolerant of impacts caused by other visitors, such as people shouting, playing radios, and engaging in other types of activities. One-third of all visitors contacted indicated that inconsiderate people were a problem. Other related issues mentioned by 20 to 30 percent of visitors included motorized boats on the lake, people shouting and yelling, playing loud radios and drinking; and the presence of dogs and other animals. Issues of less concern, mentioned by

fewer than 10 percent of visitors, were off-road vehicles in the area, an injured group member, and people fishing nearby.

Among group locations, visitors contacted at overnight areas most often mentioned problems with other visitors, such as people being inconsiderate (45%), shouting and yelling (44%), and playing loud radios (32%). Of lesser concern were the presence of dogs and other animals (27%) and people drinking (26%). These were primarily vacationing nonlocal family groups visiting Whiskeytown for the first time.

Visitors contacted at Whiskeytown shoreline areas mentioned motorized boats on the lake (45%), inconsiderate people (28%), dogs and other animals (22%), and people shouting and yelling (22%) as problems. Powerhouse area visitors also mentioned motorized boats (34%) as well as inconsiderate people (28%), people shouting and yelling (21%), playing loud radios (21%), and dogs and other animals (21%). More than half the visitors at both these areas were local residents and repeat visitors to Whiskeytown. Both groups were primarily day-users coming to the area with family and friends.

Visitors at Whiskeytown beach areas appeared to be fairly tolerant of others even though they were sometimes confronted with crowded situations. Only about a third of visitors contacted in these areas indicated people playing loud radios (34%), being inconsiderate (32%), and shouting and yelling (32%) were problems. These visitors were mostly local residents who had visited Whiskeytown before. They were there with family and/or friends and spent a day or less in the area.

Tower House visitors, consisting primarily of nonlocal Californians visiting Whiskeytown for the first time while on vacation, were even less critical of others. Fifteen percent or fewer of these visitors were concerned

with social impacts, mentioning only dogs and other animals (15%), and people playing loud radios (14%).

Visitors interviewed at boat launching areas indicated that inconsiderate people (37%), motorized boats on the lake (36%), people shouting and yelling (28%), drinking (27%), playing loud radios (28%), and dogs and other animals (26%), were social impact concerns in these areas. More than half of those expressing such concerns were local residents and close to 60 percent came as family groups. Two-thirds had visited the area before and stayed for a day or less.

IMPLICATIONS FOR MANAGERS

It has been suggested that the success of any visitor management program depends, in part, on the extent to which visitors perceive the existence of problems (Hammit et al. 1982). Issues expressed by users at Whiskeytown suggest several considerations for managing the area.

A lack of drinking water was a primary concern for visitors at all interview sites at Whiskeytown. This is not surprising given the summer temperatures at the lake and lack of shade at some of the beach and shoreline areas. With that in mind, provision of additional drinking water sources should be a consideration in managing the area. However, since that would be a major undertaking, interpretive information should encourage Whiskeytown visitors to bring plenty of liquids with them, particularly those frequenting the more remote shoreline areas around the lake as well as provide information on the locations of existing drinking water sources. Since shoreline visitors were most often local residents from Redding and other nearby cities, local radio stations and newspapers might be persuaded to present public service announcements encouraging those visiting Whiskeytown to come prepared.

Too few showers was a problem for a large majority of visitors interviewed at Whiskeytown's three overnight areas. There are presently no showers in any of the three campground areas, although there are cold showers at nearby beaches. Showers are more important to visitors staying multiple days at Whiskeytown as opposed to those staying for the day or even a few hours. Possible solutions to this problem include construction of showers in or near overnight areas or convert existing cold showers to hot and cold. Either

solution would be expensive, although it would cost less to convert existing facilities than to build new ones.

Visitors at less developed sites such as shoreline areas and the Tower House indicated that inadequate toilet facilities was a problem. It would likely not be feasible to provide toilet facilities at all areas frequented by Whiskeytown visitors, but it would be helpful to provide additional portable toilets at shoreline sites and at the Tower House. Too few garbage cans was the other facility-related problem mentioned by Whiskeytown visitors, particularly those at shoreline and overnight areas. Garbage cans are presently provided at many of the shoreline areas and it may be necessary to re-evaluate the distribution of garbage cans and provide additional cans in these areas.

Litter seems to be a common problem at water-based recreation areas. Surveys of river users have found litter in the river and on the banks to be a significant problem (see Knopf and Lime 1984, Dawson et al. 1982). Whiskeytown visitors expressed similar concerns. Litter on the banks, seen as a problem by virtually half of visitors at all sites, was particularly a concern along shoreline and beach areas. Litter in the lake was mentioned as a problem by at least one-third of visitors contacted. These findings may imply one or more of the following: (1) not enough garbage cans; (2) poor distribution of garbage cans; (3) garbage cans not being emptied often enough; (4) visitors not using available garbage cans; or (5) trash being scattered by animals. The cause(s) of the littering problem will vary in different locations at Whiskeytown. Steps to determine the probable cause(s) might include:

(1) Talk to maintenance people who empty garbage cans to find out how often the cans are emptied, how full they are, and whether animals are tipping them over. From this managers could determine if the cans need to be emptied more often, if additional cans are needed at sites with cans already present, or if cans are not being used and could be put to better use elsewhere.

(2) Do an informal on-site survey of areas where littering is a particularly noticeable problem --i.e., shoreline and beach areas to see if the existing numbers of cans are adequate, whether visitors are using available garbage cans, and to determine if there are sites that lack needed garbage cans. Once the cause(s) of the littering problem have been determined, there are several approaches managers might take to deal with it. These include providing additional garbage cans, emptying cans more often, enforcing fines for littering, and educating visitors as to the unsightly and harmful effects of litter using signs and interpretive information. It might be appropriate to include local media and business organizations in an education program given the large numbers of local residents using Whiskeytown. Because so many of those contacted said litter was a problem, visitors would likely be supportive of management strategies implemented to deal with litter.

Insect bites were a problem for a surprisingly large number of visitors, particularly in the overnight and powerhouse areas. Park staff are probably aware of this problem and other than pointing it out, it will not be addressed here.

Erosion of the shoreline was a concern for a relatively large number of visitors contacted at shoreline areas, boat launching sites, and in the powerhouse area. Waves from passing motorboats constantly washing against the

shoreline can cause considerable erosion. Visitors using shoreline areas may also contribute to erosion by trampling vegetation and dislodging rocks and soil when walking along shorelines and landing boats. An assessment needs to be made of the extent of the erosion problem along the shoreline after which appropriate steps can be taken to deal with the problem. It may be necessary to temporarily close off severely eroded shoreline areas to facilitate recovery. Boaters should be made aware of the problem and encouraged to slow down near the shorelines to decrease wave damage. Other alternative solutions include spreading out visitor use along shorelines to avoid further erosion on heavily used sites, concentrating use to "sacrifice" selected areas, reducing impacts on others, hardening heavily used sites (e.g. building rock walls, etc.) to decrease erosion, and providing information to visitors on the erosion problem and what they can do to help minimize it.

Whiskeytown visitors appear to be fairly tolerant of the activities and behavior of others. With the exception of one or two issues, fewer than one-third of visitors contacted at Whiskeytown had problems with other visitors. Visitors in overnight areas had the most trouble with people being inconsiderate, shouting and yelling, and playing radios. This problem is partly due to the fact that people in these areas are more confined than at other sites. These disturbances often occur in the evening or at night when people are trying to sleep and others are bothering them. Contributing to this problem in overnight areas might be a lack of enforcement of a curfew or "quiet-hour" policy, visitors being unaware of or ignoring "quiet-hour" policies, and an over-filled campground. Steps should be taken to make overnight visitors aware of "quiet-hour" policies and such regulations should

be strictly enforced. Planting additional screening vegetation where possible to separate visitors and buffer the noise might also be helpful. Overnight areas should not be allowed to fill beyond capacity.

Motorized boats on the lake were a concern for a fairly large number of shoreline users. Waves caused by boats wash up on the shore and disturb people swimming or sun bathing. Noise and the actual presence of boats might also contribute to the problem for shoreline users wanting solitude. Enforcement of wake and speed limits on the lake may decrease the wave problem, though shore users are often found in areas where there are no restrictions on boat speed. The noise and the presence of boats is a more difficult issue to resolve. Increased education of boaters to the presence and concerns of people along shorelines and beaches is an indirect management approach that could result in boaters behaving with more consideration of others.

Congestion at boat launching areas may lead to instances of people being inconsiderate. Managers must stress common courtesy and waiting for one's turn to launch in these heavily used areas.

Visitors had few concerns with the amount of regulation and law enforcement at Whiskeytown. There was no consistent pattern of responses and the only problem mentioned by more than one-quarter of visitors in any area was the concern of visitors in overnight areas that there was too little law enforcement. This may reflect a lack of enforcement of campground rules and visitor's dislike of people being disruptive in the evening and at night. Managers should monitor this situation and increase enforcement activities if warranted.

Our purpose here has been to describe how visitors to Whiskeytown view recreation impact and management issues at various locations in the area and to suggest how managers might use this information in formulating and implementing management strategies to deal with them. Research has shown that support for management varies among visitors and it is virtually impossible to satisfy everyone. It is important to remember, however, that the extent to which visitors view something as being a problem will effect their support for strategies designed to deal with it. Managers can benefit from knowledge of visitors' perceptions of problems and can use this information in designing workable solutions.

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APPENDIX

Visitor Responses to Management Issues

Table A1. Visitors' perceptions of facility development at Whiskeytown setting locations.

	Beach Areas ^a		Shoreline Areas ^b		Camping Areas ^c	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Too few garbage cans	141 (33.1%) ^e	285 (66.9%) ^e	261 (40.3%) ^e	386 (59.7%) ^e	186 (42.8%) ^e	249 (57.2%)
. Too few drinking water sources	256 (59.9)	171 (40.1)	422 (65.1)	226 (34.9)	269 (62.1)	164 (37.9)
. Inadequate toilet facilities	121 (28.1)	310 (71.9)	336 (51.7)	314 (48.3)	180 (42.0)	249 (58.0)
. Too many signs	17 (4.0)	413 (96.0)	23 (3.5)	625 (96.5)	9 (2.1)	420 (97.9)
. Too few showers	101 (23.7)	325 (76.3)	156 (24.4)	483 (75.6)	297 (69.4)	131 (30.6)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.1. Visitors' perceptions of facility development at Whiskeytown setting locations (Continued).

	Boat Launches ^d		Powerhouse Area		Tower House Area	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Too few garbage cans	125 (28.5%) ^e	314 (71.3%) ^e	56 (38.1%) ^e	91 (61.9%) ^e	43 (33.6%) ^e	85 (66.4%) ^e
. Too few drinking water sources	213 (48.6)	225 (51.4)	87 (58.4)	62 (41.6)	80 (63.0)	47 (37.0)
. Inadequate toilet facilities	125 (28.5)	313 (71.5)	59 (40.0)	87 (59.6)	58 (45.0)	71 (55.0)
. Too many signs	21 (4.8)	417 (95.2)	7 (4.9)	137 (95.1)	3 (2.4)	121 (97.6)
. Too few showers	171 (39.2)	265 (60.8)	35 (25.0)	105 (75.0)	20 (16.7)	100 (83.3)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.2. Visitors' perceptions of park management issues at Whiskeytown setting locations.

	Beach Areas ^a		Shoreline Areas ^b		Camping Areas ^c	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Too few rules and regulations	37 (8.7%) ^e	388 (91.3%) ^e	62 (9.6%) ^e	583 (90.4%) ^e	52 (12.3%) ^e	372 (87.7%) ^e
. Too many rules and regulations	42 (9.9)	383 (90.1)	73 (16.8)	361 (83.2)	44 (10.3)	383 (89.7)
. Too much law enforcement	40 (9.4)	386 (90.6)	90 (13.9)	556 (86.1)	27 (6.3)	399 (93.7)
. Too little law enforcement	65 (15.3)	360 (84.7)	125 (19.5)	516 (80.5)	111 (26.1)	315 (73.9)
. Not enough park staff to answer questions	49 (11.5)	378 (88.5)	85 (13.2)	561 (86.8)	92 (21.6)	334 (78.4)
. Enjoyable encounter with park staff	22 (5.1)	406 (94.9)	51 (7.9)	594 (92.1)	37 (8.7)	387 (91.3)
. Utility poles and lines	23 (5.4)	405 (94.6)	43 (6.7)	596 (93.3)	19 (4.5)	408 (95.5)
. Too many commercial establishments	12 (2.8)	415 (97.2)	22 (3.4)	623 (96.6)	13 (3.0)	415 (97.0)
. Roads within sight	19 (4.4)	410 (95.6)	106 (16.4)	542 (83.6)	31 (7.2)	397 (92.8)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.2. Visitors' perceptions of park management issues at Whiskeytown setting locations (Continued).

	<u>Boat Launches^d</u>		<u>Powerhouse Area</u>		<u>Tower House Area</u>	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Too few rules and regulations	44 (10.2) ^e	387 (89.8) ^e	14 (9.6) ^e	132 (94.4) ^e	6 (4.8) ^e	118 (95.2) ^e
. Too many rules and regulations	13 (8.9)	133 (91.1)	92 (14.3)	552 (85.7)	11 (8.9)	113 (91.1)
. Too much law enforcement	50 (11.5)	384 (88.5)	14 (9.7)	130 (90.3)	5 (4.0)	119 (96.0)
. Too little law enforcement	92 (21.3)	339 (78.7)	27 (81.5)	119 (18.5)	14 (11.6)	107 (88.4)
. Not enough park staff to answer questions	74 (16.9)	365 (83.1)	21 (14.4)	125 (85.6)	20 (16.3)	103 (83.7)
. Unenjoyable encounter with park staff	38 (8.7)	399 (91.3)	8 (5.6)	136 (94.4)	6 (4.8)	119 (95.2)
. Utility poles and lines	30 (6.9)	405 (93.1)	18 (12.6)	125 (87.4)	8 (6.5)	115 (93.5)
. Too many commercial establishments	8 (1.8)	427 (98.2)	3 (2.1)	142 (97.9)	3 (2.4)	122 (97.6)
. Roads within sight	27 (6.2) ^f	411 (93.8)	14 (9.7)	131 (90.3)	14 (11.6)	107 (88.4)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.3. Visitors' perceptions of environmental impacts at Whiskeytown setting locations.

	Beach Areas ^a		Shoreline Areas ^b		Camping Areas ^c	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Erosion of shoreline	86 (20.6%) ^e	332 (79.4%) ^e	257 (40.2%) ^e	382 (59.8%) ^e	98 (23.0%) ^e	328 (77.0%) ^e
. Litter in lake	175 (41.5%) ^e	247 (58.5)	308 (48.5)	327 (51.5)	146 (34.3)	280 (65.7)
. Litter on banks	219 (51.5)	210 (48.9)	408 (62.6)	244 (37.4)	193 (45.1)	237 (54.9)
. Vandalism	84 (20.2)	331 (79.8)	118 (18.5)	518 (81.5)	101 (23.9)	321 (76.1)
. Muddy water	83 (19.4)	344 (80.6)	71 (11.0)	573 (89.0)	43 (10.1)	383 (89.9)
. Water pollution	92 (21.5)	335 (78.5)	112 (17.3)	537 (82.7)	44 (10.4)	380 (89.6)
. Airplanes flying overhead	27 (6.3)	401 (93.7)	47 (7.3)	596 (92.7)	23 (5.3)	407 (94.7)
. Obstructions on the lake	63 (14.9)	360 (85.1)	187 (29.0)	458 (71.0)	109 (25.8)	314 (74.2)
. Bad weather	57 (13.3)	369 (86.6)	55 (8.5)	589 (91.5)	91 (21.2)	339 (78.8)
. Insect bites	123 (28.8)	304 (71.2)	217 (33.5)	430 (66.5)	193 (45.0)	236 (55.0)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.3. Visitors' perceptions of environmental impacts at Whiskeytown setting locations (Continued).

	Boat Launches ^d		Powerhouse Area		Tower House Area	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. Erosion of shoreline	124 (28.5%) ^e	311 (71.5%) ^e	44 (31.0%) ^e	98 (69.0%) ^e	20 (16.4%) ^e	102 (83.6%) ^e
. Litter in lake	152 (35.1)	281 (64.9)	53 (36.3)	93 (63.7)	24 (20.8)	94 (79.7)
. Litter on banks	188 (42.9)	250 (57.1)	86 (57.7)	63 (42.3)	37 (29.1)	90 (70.9)
. Vandalism	100 (22.9)	336 (77.1)	33 (22.9)	111 (77.1)	18 (15.1)	101 (84.9)
. Muddy water	39 (8.9)	399 (91.1)	26 (17.9)	119 (82.1)	8 (6.6)	104 (93.4)
. Water pollution	56 (12.8)	383 (87.2)	26 (18.1)	118 (81.9)	15 (12.2)	108 (87.8)
. Airplanes flying overhead	23 (5.3)	412 (94.7)	8 (5.5)	137 (94.5)	5 (4.0)	119 (96.0)
. Obstructions on the lake	121 (27.3)	316 (72.3)	34 (23.9)	108 (76.1)	17 (13.9)	105 (86.1)
. Bad weather	82 (18.7)	356 (81.3)	21 (14.4)	125 (85.6)	6 (4.9)	116 (95.1)
. Insect bites	127 (29.0)	311 (71.0)	72 (49.7)	73 (50.3)	43 (34.1)	83 (65.9)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.4. Visitors' perceptions of social impacts at various Whiskeytown setting locations.

	Beach Areas ^a		Shoreline Areas ^b		Camping Areas ^c	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. ORV's in the area	29 (6.8%) ^e	398 (93.2%) ^e	36 (8.3%) ^e	400 (91.7%) ^e	25 (5.9%) ^e	400 (94.1%) ^e
. People shouting and yelling	135 (31.6)	292 (68.4)	140 (21.6)	509 (78.4)	190 (44.1)	241 (55.9)
. People being inconsiderate	138 (32.2)	291 (67.8)	183 (28.2)	466 (71.8)	197 (45.5)	236 (54.5)
. People drinking	107 (25.1)	320 (74.9)	131 (20.1)	521 (79.9)	110 (25.7)	318 (74.3)
. Motorized boats on lake	88 (20.5)	342 (79.5)	298 (45.4)	358 (54.6)	93 (21.8)	334 (78.2)
. People playing loud radios	145 (33.8)	284 (66.2)	104 (16.1)	542 (83.9)	138 (32.3)	289 (67.7)
. People fishing	16 (3.7)	413 (96.3)	24 (3.7)	624 (96.3)	7 (1.6)	421 (98.4)
. Dogs, other animals	83 (19.4)	346 (80.6)	141 (21.8)	507 (78.2)	114 (26.7)	313 (73.3)
. Someone in group injured	17 (4.0)	412 (96.0)	48 (7.4)	599 (92.6)	25 (5.9)	424 (19.2)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.

Table A.4. Visitors' perceptions of social impacts at various Whiskeytown setting locations (Continued).

	Boat Launches ^d		Powerhouse Area		Tower House Area	
	Problem	Not a Problem	Problem	Not a Problem	Problem	Not a Problem
. ORV's in the area	36 (8.3%) ^e	400 (91.7%) ^e	12 (8.2%) ^e	134 (91.8%) ^e	8 (96.4%) ^e	117 (93.6%) ^e
. People shouting and yelling	121 (27.6)	318 (72.4)	31 (21.1)	116 (78.9)	14 (16.2)	111 (88.8)
. People being inconsiderate	163 (37.2)	275 (62.8)	41 (27.7)	107 (72.3)	14 (11.3)	110 (88.7)
. People drinking	119 (27.2)	319 (72.8)	18 (12.3)	128 (87.7)	11 (8.9)	113 (91.1)
. Motorized boats on lake	157 (35.6)	284 (64.4)	50 (34.0)	97 (66.0)	14 (11.3)	110 (88.7)
. People playing loud radios	113 (25.9)	324 (74.1)	30 (21.0)	113 (79.0)	17 (13.6)	108 (86.4)
. People fishing	19 (4.3)	419 (95.7)	9 (6.1)	138 (93.9)	3 (2.4)	120 (97.6)
. Dogs, other animals	116 (26.5)	322 (73.5)	31 (21.1)	116 (78.9)	19 (15.3)	105 (84.7)
. Someone in group injured	16 (3.7)	421 (96.3)	4 (2.8)	139 (97.2)	7 (5.6)	117 (94.4)

^aIncludes Brandy Creek "Teen" beach, Brandy Creek "lifeguard" beach, and Oak Bottom beach.

^bIncludes HQ1, HQ2, Hwy 299 from Whiskey Creek to Info Center, Hwy 299 from Powerhouse to Whiskey Creek, and Whiskey Creek arm shoreline.

^cIncludes Oak Bottom RV campground, Oak Bottom tent campground, and Brandy Creek RV campground.

^dIncludes boat launches at Whiskey Creek, Brandy Creek, and Oak Bottom.

^eFrequency and percentage of respondents.