

Visitor Use at Glen Canyon National Recreation Area, Comparison of Personal Watercraft Users and Nonusers



Final Report
Summer 2000 Data Collection
Submitted to:
Glen Canyon National Recreation Area

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Definitions

Group	Individuals traveling together.
Group Log	Brief form filled out by the interviewer to collect information about the group.
Mail-Back Survey	Survey sent to a sample of individual members of each group contacted during the onsite interviewing process.
Mean	A measure of the center of the data set. Popularly known as the arithmetic <i>average</i> ; the sum of the observations in the set divided by the number of observations. Means have a leveling effect. They tell nothing about variations or extreme values that may act to skew the data.
Median	The number in the data set where one-half of the numbers are at or below it and one-half above it. It is often a better statistic than the mean when the population is skewed by extreme values. Indicators of a population skewed by extreme values include a high standard deviation or a large difference between the mean and median.
Non-Personal Watercraft Operators	Respondents who reported that they did not operate a personal watercraft. A subgroup in this report compared to personal watercraft operators (see definition of personal watercraft operators).
N (Number)	Number of respondents. The total N may vary from table to table because not all visitors that responded to the onsite or mail-back surveys answered every question.
Onsite Survey	Visitors were contacted onsite at several locations in Glen Canyon. The interviewer completed the group log and visitors were asked to fill out a short survey about their trip. Respondents had the opportunity to indicate whether they were willing or unwilling to fill out a mail-back questionnaire about their experiences at the Glen Canyon NRA.
Percent	Percentage; proportion of, or ratio.

Personal Watercraft (PWC)	Small, highly maneuverable watercraft usually capable of holding one or two riders and using an inboard motor to run a water jet pump for propulsion.
Personal Watercraft Operators	Respondents who indicated that they used a personal watercraft. A subgroup in this report compared to other respondents (see definition of non personal watercraft operators).
Respondents	Individual visitors who completed and returned a mail-back survey.
Significantly Different	Subgroups of the total sample (e.g., personal watercraft operators versus other respondents) were tested for statistically significant differences using t-tests. Only significant differences at the .05 level were reported.
Significance Level Significant at the .05 Level (i.e., $p \leq 0.5$)	Probability of a Type-I error (rejecting null hypothesis when it is true). Throughout this report, a .05 significance level was used as criteria for testing null hypothesis that subgroup means of the total sample are equal. A .05 significance level assumes that we are correctly accepting a null hypothesis 95 percent of the time and risk rejecting it only 5 percent of the time. That is, there is a 95 percent probability that two subgroups really differ, or less than a 5 percent probability that the apparent difference is due to chance.
Total Sample	Total number of respondents (total N).
Zones	Visitor use areas at Glen Canyon National Recreation Area dividing the total area into 13 geographic parts.

Executive Summary

During the summer of 2000, the Cooperative Park Studies Program (CPSP) at the University of Minnesota conducted the third phase of a three-part project to gather information about visitors to Glen Canyon National Recreation Area (NRA). The study sought to provide information to managers about visitors' perceptions of Glen Canyon NRA, including information about (a) conflicts between personal watercraft (PWC) and non-PWC operators, (b) experiences and benefits from using the area, (c) management in the area, and (d) satisfaction with their trips. This study provides the information needed by managers at Glen Canyon NRA to institute specific strategies and actions to address potential visitor conflicts and related issues.

Data about summer users at Glen Canyon NRA were gathered through the use of an onsite survey, group log, and mailback questionnaire. Initial visitor contacts were made at the time of the onsite survey and group log, which was administered at selected points at the Wahweap, Bullfrog, Halls, and Hite locations at Glen Canyon NRA. Individuals indicating an interest in participating in the study were sent a mailback questionnaire. A total of 639 visitors completed the onsite survey, of which 304 were randomly selected to be mailed a copy. Of the 304 questionnaires mailed, 63 percent were returned.

Respondents (individuals who returned a mailback questionnaire), and nonrespondents (individuals who did not return a mailback questionnaire) were evaluated using selected variables from the onsite survey to determine nonresponse bias. Overall, respondents and nonrespondents were more similar than different. There were, however, some statistically significant differences. Respondents had visited Glen Canyon more frequently than nonrespondents. Respondents had made an average of 30 visits to nonrespondents average of 18. However, the median, the number in the data set where half the numbers are at or below it and half above it, number of visits is a more accurate account of trip frequency because the mean number of trips was skewed by a few respondents who reported visiting Glen Canyon NRA often. The median number of visits for respondents was nine. The median number of visits for nonrespondents was five. Respondents were more likely to report that visiting Glen Canyon was the primary purpose of their visit compared to nonrespondents. Finally, respondents were older than nonrespondents. The mean age of respondents was 42.1 compared to the mean age of nonrespondents, 34.9.

Visitor data were analyzed for all mailback questionnaires completed and returned by randomly selected visitors. Questionnaires were sent to individuals who were willing to fill out a questionnaire about their experience at Glen Canyon NRA. Two user groups, personal watercraft (PWC) operators and non-PWC operators, were evaluated to determine whether statistically significant differences existed between them. Understanding the potentially different characteristics, motives, perceptions, and opinions of PWC operators and non-PWC operators can help managers develop effective methods to reduce potential visitor conflicts at Glen Canyon NRA. PWC operators were identified as respondents who indicated that they

had operated a PWC. Non-PWC operators were identified as respondents who indicated they had not operated a PWC.

PWC operators made up half the summer sample, and were an average of 38 years old. There was a fairly even gender breakdown among PWC operators, 55 percent were male and 45 percent were female. Most were from Utah, Colorado, or Arizona. Almost half were college graduates, and 72 percent had incomes of \$40,000 or more. They tended to travel in large groups with a mean size of nine, made up primarily of family and friends. Most were repeat visitors to Glen Canyon NRA. Their visits to the area lasted an average of five nights. Most spent some time overnight on Lake Powell. The activities they participated in most frequently were water oriented and included swimming, motorboating, camping at shoreline sites, participating in watersports, fishing, and using a PWC.

Many PWC operators also were associated with houseboat use. Slightly more than one-third reported that a houseboat was their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that include Wahweap, Bullfrog, and Halls marinas. Visiting Glen Canyon was the primary purpose for more than 80 percent of them. Experiences they wanted to have while visiting Glen Canyon NRA included doing something with their family, enjoying the scenery of Lake Powell, getting away from the usual demands of life, being with members of their group, being with people who enjoy the same things they do, experiencing nature, relaxing physically, experiencing natural quiet, participating in recreational activities, being close to nature and using their own equipment.

Non-PWC operators made up half the summer sample, and were an average of 44 years old. There were more males (65 percent) than females (35 percent). As with PWC operators most were from Utah, Colorado, or Arizona. Slightly more than half were college graduates, and 79 percent had incomes of \$40,000 or more. Group sizes were slightly smaller than those of PWC operators with a mean size of six people, made up primarily of family and friends. Most were repeat visitors to Glen Canyon NRA. Their visits to the area lasted an average of seven nights per visit. Most spent nights on Lake Powell or in a campground. The activities they participated in most frequently were motorboating, swimming, and camping at shoreline campsites.

Most non-PWC operators traveled by powerboat, with 75 percent reporting that a powerboat was their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that include Wahweap marina, Rainbow Bridge, Bullfrog and Halls marinas and the Defiance House ruins. Visiting Glen Canyon was the primary purpose for 90 percent of them. Glen Canyon NRA experiences important to them during their visit to the area included enjoying the scenery of Lake Powell, getting away from the usual demands of life, doing something with their family, being with members of their group, experiencing nature, being with people who enjoy the same things they do, participating in recreational activities, and relaxing physically.

Compared to PWC operators a higher percentage of non-PWC operators noted that visiting the area was the primary purpose of their visit. Most respondents were repeat visitors to Glen Canyon NRA. PWC operators made an average of 37 visits to non-PWC operators average of 23. The median number of visits is a more accurate account of trip frequency because the mean number of trips was skewed by a few respondents who reported visiting Glen Canyon NRA many times. The median number of visits was ten for PWC operators and nine for non-PWC operators. PWC operators and non-PWC operators spent a similar length of time in the area during their visits. The mean number of nights spent in the area by PWC operators was 5.1 compared to 6.5 for non-PWC operators. Nearly two-thirds of the respondents spent their nights on Lake Powell and about a third stated that they spent nights in a campground.

Most groups were made up of family and friends. Groups with PWCs tended to be larger (nine people) than groups without PWCs (six people). Most groups did not bring pets with them.

Of the total sample, 61 percent were male and 39 percent were female. Gender for non-PWC operators was similar to the total respondent gender breakdown. However, PWC operators had a slightly more even gender make-up with 55 percent male and 45 percent female. PWC operators were younger than non-PWC operators; the mean age of personal watercraft operators was 38.4 years old, whereas the mean age of non-PWC operators was 44.5 years old.

PWC and non-PWC operators were similar with respect to education, household income, ethnicity, and race. Almost half the total sample had a college degree or beyond. Seventy-four percent of respondents stated that they received a total household income before taxes of \$40,000 or more in 1999. Only 3 percent identified their ethnicity as Hispanic or Latino and 97 percent of respondents identified their race as white.

Eighteen states were represented by visitors to Glen Canyon NRA, however, the majority of respondents were from either Utah, Colorado, or Arizona.

Not surprisingly the most common primary watercraft used by respondents during their visit to Glen Canyon NRA was powerboats. The second most common primary watercraft was houseboats. It is common for houseboats on Lake Powell to bring personal watercraft on their trips. Of all groups traveling on Lake Powell with houseboats, 44 percent had PWCs with them. Half of all respondents stated that they operated a personal watercraft during their visit to Glen Canyon NRA.

Nearly three-quarters of all respondents had not taken a class in personal watercraft safety and use. However, PWC operators were more likely to have taken a class in personal watercraft safety and use compared to non-PWC operators. To refuel PWCs slightly more than half the PWC operators used the gas dock. About half reported that they purchased fuel in the area and a third reported that they brought fuel from home. Concerning disposal of human waste,

more than half the personal watercraft operators stated that they used a marine toilet aboard a support vessel or that they used facilities provided at landings.

Distribution around Lake Powell was concentrated in the zones containing the portal areas of Wahweap, Bullfrog, Halls, and adjacent zones, as well the zone containing Rainbow Bridge and Dangling Rope marina. Twenty-four percent of groups primarily visited the Bullfrog and Halls area, 23 percent visited the Wahweap area, 17 percent visited the Defiance House Ruin area, and 15 percent visited the Rainbow Bridge area. Other zones had 10 percent or less of total visitation. PWC operators were more likely to recreate the Wahweap, Bullfrog, and Halls portal areas than other areas. The zone containing Wahweap marina received 30 percent of PWC use, and the zone including Bullfrog and Halls marinas received 28 percent of PWC use.

An understanding of visitors' motives for visiting a recreation resource is important to helping managers provide opportunities for visitors to attain the experiences they desire. To obtain a clearer awareness of visitors' motives for visiting Glen Canyon NRA, respondents were asked to look over a list of 29 possible experiences they may have had while visiting the area and rate how important each experience was to them. A common set of experiences was rated as important to very important by both PWC and non-PWC operators. The core set of important experiences included enjoying the scenery of Lake Powell, doing something with my family, getting away from the usual demands of life, being with members of my group, being with people who enjoy the same things I do, experiencing nature, participating in recreational activities, and relaxing physically.

Natural areas provide a myriad of opportunities for visitors to gain psychological and physiological benefits. In fact, the opportunity to reap such benefits is one of the most valuable contributions recreational lands make to improving the well-being of visitors as well as the society in which we live. Whether benefits are personal, societal, economic, or environmental, the positive impact of both onsite and offsite benefits are an important consideration when developing management plans that effectively serve visitors, surrounding communities, and the environment. To ascertain the benefits derived from respondents' visits to Glen Canyon NRA, study participants were asked to rate how well they were able to attain the experiences that were important or very important to them. For the most part experiences respondents had rated as either important or very important were at least moderately attained, indicating that respondents benefitted from their trips to Glen Canyon NRA. However, there were some differences in attainment between PWC and non-PWC operators. Experiences attained only somewhat to moderately for non-PWC operators included: being on my own, learning about the cultural history of the area, learning about the natural history of the area, participating in ranger-led activities, being away from other people, experiencing solitude, and meeting new people. PWC operators reported attaining only somewhat to moderately the experience of meeting new people.

Problems visitors experience during their visits can diminish the quality of their experiences and hinder the attainment of benefits they may otherwise have gained. To assess the existence

of potential problems at Glen Canyon NRA, respondents evaluated 27 possible situations they may have experienced on their most recent trip to Glen Canyon NRA. Overall, study participants encountered few problems during their visit. The most problematic situations were finding beach campsites, finding an unoccupied campsite, litter on beaches and shoreline, people being inconsiderate, unsafe operation of personal watercraft, and boats closer to my boat than I like. Non-PWC operators rated people being inconsiderate, unsafe operation of personal watercraft, too many personal watercraft on the lake, boats closer to my boat than I like, and noise from airplanes significantly higher than PWC operators. Visitors were also asked whether they observed unsafe boating practices on Lake Powell, and whether they felt safe during their visit. Non-PWC operators were more likely to report observations of unsafe behavior and were less likely to feel safe than were PWC operators.

It is important to recognize that different types of visitors may have different perceptions of crowding and that their perceptions are often based on the types of experiences they seek. As recreational use of natural areas increases, crowding has the potential to impede the attainment of visitors' desired experiences, particularly for visitors seeking solitude. Perceptions of feeling crowded can lead to changes in visitor behavior and use patterns. For example, visitors may choose to recreate at a site during seasons when use is not as intense. For some visitors, crowding may interfere with their recreational goals to the point where they select alternative sites to pursue their desired experiences. Displacement becomes problematic when suitable substitutes are difficult to find or are simply unavailable. To determine sites of potential crowding at Glen Canyon NRA, study participants were asked to evaluate the acceptability of their encounters at five locations within the area. Using a 7-point scale (1=very unacceptable, 7=very acceptable), respondents rated the acceptability of encounters with people or watercraft for each location they had visited. Acceptability ratings for all respondents ranged from 4.9 for boat landings to 5.3 for on the lake surface, on the lake shore, and at campsites. Compared to PWC operators, non-PWC operators reported significantly lower ratings for the acceptability of their encounters at campsites demonstrating more sensitivity to encounters with others at campsites.

How Glen Canyon chooses to manage for PWC use will influence visitor experiences for years to come. An understanding of visitors' management preferences can aid the development of a management strategy that protects the resource and provides quality recreational opportunities. Respondents' level of support or opposition for specific actions at Glen Canyon NRA was determined by examining their responses to 25 possible management actions. More than three-quarters of the respondents supported providing visitors with more information appropriate behavior. More than three-quarters of the total sample opposed or strongly opposed restrictive actions such as prohibiting motorized watercraft on the lake, prohibiting nonmotorized watercraft on the lake, and prohibiting personal watercraft on the lake. Sixty percent or more of the total sample opposed or strongly opposed limiting the number of people per group allowed on the lake, restricting the number of people using the lake at any one time, limiting the number of nonmotorized watercraft allowed on the lake at any one time, and limiting the number of motorized watercraft allowed on the lake at any one time. PWC

operators indicated stronger opposition than did non-PWC operators to restricting personal watercraft use to designated areas only, zoning the waters to provide specific uses at specific places, limiting the number of personal watercraft allowed on the lake at any one time, and prohibiting personal watercraft on the lake.

Visitor feedback regarding satisfaction with their experiences is important to evaluating how well visitors perceive their needs are being met. Additionally, this information can help determine visitors' satisfaction with their visits and how well they were able to attain their desired experiences and receive the associated benefits. Respondents had the opportunity to express their satisfaction with the quality of ten different services provided at Glen Canyon NRA. Most respondents (63 percent) reported they were satisfied with the overall quality of services in Glen Canyon NRA. With the exception of concessionaire lodging, park ranger-led activities, and concessionaire assistance, all respondents were at least somewhat satisfied with the services they received. There were no statistically significant differences between personal watercraft operators and non-PWC operators.

Study participants also were asked to evaluate a list of 12 statements about their most recent trip to Glen Canyon NRA and to indicate the extent to which they agreed or disagreed with each statement. More than 95 percent of all respondents agreed or strongly agreed that they enjoyed their time on Lake Powell and were satisfied with their most recent trip to Glen Canyon NRA. There were significant differences between PWC and non-PWC operators on a number of statements. PWC operators had a higher level of agreement with the statements about enjoying the natural quiet, and camping experience improved by the quality of the night sky than did non-PWC operators. Although non-PWC operators rated enjoyment of the interpretive programs, the presence of personal watercraft interfered with the quality of boating experience, staying off the lake during certain parts of the day because there were too many boats on the lake, and not having the kind of experience I was looking for, significantly higher than PWC operators, it is important to note that both groups generally disagreed with these statements.

To understand what these study results mean for managers, that is how they relate to conflict over the use of PWCs and possible management actions that might address this issue at Glen Canyon NRA, it is important to understand what components go into creating conflict. Four components have been identified as possible sources of conflict. They are differences in activity style, resource specificity, mode of experience, and lifestyle tolerance (Jacob and Schreyer 1980). Levels of potential conflict can be assessed by looking for differences between PWC operators and non-PWC operators in these four categories.

PWC and non-PWC operators differed significantly in the types of activities in which they preferred to engage. Not all these differences would necessarily cause conflict, although some activities such as fishing and using a PWC, may come into conflict if they are both trying to pursue their different activities in the same physical space.

Resource specificity refers to the level of value a visitor holds for a specific resource, in this case Lake Powell. Value can be assessed by examining visitors' motives for visiting the area, and the number of visits they have made to Glen Canyon NRA in the past. The majority of both PWC and non-PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit to the area. Moreover, both had a relatively high median number of previous visits, indicating that place attachment to Lake Powell is high. Both groups, PWC and non-PWC operators, hold a strong sense of attachment to Lake Powell, and may be more likely to come into conflict when they share this important resource.

Mode of experience can be assessed by desired experiences of Glen Canyon NRA visitors. The only significantly different experience was to do something with my family, and it was rated by both groups as being important to very important.

Lifestyle tolerance is more difficult to determine. However, data on safety, crowding, visitor support of management actions, and verbatim comments can be used to ascertain visitors' sensitivity to other resource users. Non-PWC operators were slightly more likely to observe unsafe operation of watercraft than were PWC operators, and they were more likely not to feel safe than were PWC operators. There was one significant difference in visitors' perception of crowding, non-PWC operators thought the number of watercraft at campsites was less acceptable than did non-PWC operators. Non-PWC operators were also significantly more likely to support management actions such as restricting PWC use to designated areas only, zoning the waters to provide specific uses at specific places, limiting the number of PWCs allowed on the lake at any one time, and prohibiting PWCs on the lake. Taken as a whole this indicates that non-PWC operators may be slightly less tolerant of PWC operators than the reverse and may therefore be more sensitive to conflict with PWC operators.

Given that differences between the groups were generally slight, it appears that there is not much conflict occurring between PWC and non-PWC operators at Glen Canyon NRA during the summer use period. There are still some potential areas for conflict that could be addressed by management to reduce the possibility of conflict further and to ensure the opportunity to obtain high quality experiences and the attainment of desired benefits by visitors to the area. Management controls to prevent conflicts between PWC and non-PWC operators such as restricting or limiting PWC use to specific areas may be appropriate. These actions might be particularly appropriate in zones with low overall use and high potential for providing solitude opportunities. Other generally acceptable management actions that address conflict include providing more information to visitors about appropriate behavior and aggressively enforcing safety rules and regulations on the lake.

Background

Glen Canyon National Recreation Area (NRA) is located in northern Arizona and southern Utah along the Colorado River. The centerpiece of Glen Canyon NRA is Lake Powell, a 186-mile long reservoir created when the Colorado River was dammed near Page, Arizona. The Glen Canyon Dam creates hydroelectric power and stores water as part of the Colorado River Compact, an agreement on the division of the water in the Colorado River among the states of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. The dam itself is a major attraction of Glen Canyon NRA. Lake Powell has more than 1,800 miles of shoreline because of the many side canyons off the main canyon. A variety of recreational opportunities exist on and around the lake. For example, kayaking, riding a tour boat, power boating, sailing, using personal watercraft, water skiing, and fishing are among the many water sports visitors enjoy. Opportunities also exist for hiking in the surrounding canyon areas. Visitors can enjoy a range of camping opportunities from remote and undeveloped campsites to fully developed campgrounds. Finally, visitors to the area can see archeologically and culturally significant sites such as Rainbow Bridge, a site of spiritual importance for American Indians, and the tallest natural bridge in the United States.

During the summer of 2000, the Cooperative Park Studies Program (CPSP) at the University of Minnesota administered the last of three onsite surveys to Glen Canyon NRA visitors. The onsite survey was distributed by trained CPSP interviewers between May 22, 2000 and June 7, 2000. The onsite survey collected basic demographic information from visitors and allowed them the opportunity to indicate whether they were willing to fill out a mail-back questionnaire. The mail-back questionnaire was sent to randomly selected visitors who had indicated that they were willing to participate. The questionnaire was sent after visitors had completed their trip to the Glen Canyon area. The survey instrument and data analysis represent a cooperative effort between the National Park Service (NPS), the University of Minnesota's CPSP, and the staff at Glen Canyon NRA.

Purpose of the Study

Data collected from this visitor study will provide useful information to management about their visitors and will provide input that will help managers plan for and manage personal watercraft use in Glen Canyon NRA. The study looks at all visitors using the resource, as well as looking specifically at the population of visitors who operated and those who did not operate personal watercraft during their visit to the area.

The NPS prohibits the use of personal watercraft unless it is deemed appropriate for a specific park based on: (a) the enabling legislation of the park, (b) the park's resources and values, (c) other visitor uses, and (d) the overall management objectives of the park. The complete final rule for personal watercraft management in National Park units can be found in volume 55 of the 2000 Federal Register.

Results from this visitor use study can help Glen Canyon NRA managers determine whether personal watercraft use is appropriate for the area. Topics addressed by this study include:

1. The characteristics of respondents' visits (e.g., length of stay, group type and size, activities at Glen Canyon NRA, watercraft use).
2. Who the visitors are in terms of their socioeconomic background (e.g., age, gender, education, income, ethnicity and race, residence, past experience at Glen Canyon NRA).
3. The types of watercraft people are using during their visit and information about personal watercraft operators.
4. Why people visit Glen Canyon NRA and what benefits they seek.
5. What problems visitors experience at Glen Canyon NRA.
6. Opinions visitors have concerning the management of Glen Canyon NRA.
7. How satisfied visitors are with their visit to Glen Canyon NRA.

Study Methods

The population of interest was individuals visiting Glen Canyon NRA between May 22, 2000, and June 7, 2000. The survey instrument and methods used by the CPSP interviewers closely followed Dillman's Mail and Internet Surveys: The Tailored Design Method (2000). This methodology has been shown to increase response rates, improve accuracy, and reduce costs and burden hours.

The study was conducted in two parts. In the first part, a short onsite visitor survey (Appendix A) and group log (Appendix B) were completed. The onsite survey was filled out by visitors and collected basic information such as the number of times visitors had been to Glen Canyon NRA, where visitors spent nights at Glen Canyon NRA, visitors' purpose for visiting Glen Canyon NRA, visitors' gender and age, and whether or not they would be willing to fill out a mail-back questionnaire after their trip. The onsite survey was voluntary and took no more than five minutes to complete. The group log was filled out by the interviewer and collected information about the group type, the zones in Glen Canyon NRA where the group spent the majority of their time, the number of people in the group, the type of group, the type and number of watercraft used during the group's trip, and the number and types of pets traveling with the group. In the second part of the study a longer, more in-depth questionnaire (Appendix C) was mailed to a random sample of those visitors who had indicated a willingness to fill out and return the mail-back questionnaire. This questionnaire collected information such as activities they participated in while at Glen Canyon NRA, recreation experiences important to them and how well they were able to attain them, information about their use of watercraft, problems they may have experienced at Glen Canyon NRA, as well as their support of selected management actions to address problems, visitors' satisfaction with services offered at Glen Canyon NRA, their feelings about their trip to Glen Canyon NRA, and demographic information.

Distribution of the onsite survey and group log occurred from May 22, 2000, through June 7, 2000. To obtain responses from all 13 zones (Appendix D) of Glen Canyon NRA (Fig.1), CPSP interviewers contacted visitors at four locations within Glen Canyon NRA—Wahweap, Bullfrog, Halls, and Hite marinas. CPSP interviewers sampled several sites at each of the four locations including boat launches, picnic areas, marinas, boat rental areas, and campgrounds. Interview locations were selected so that use data collected would represent the entire area. Surveys were distributed at these locations throughout the week, including both weekends and weekdays. Visitors were contacted during randomly chosen morning, afternoon, and evening periods. This strategy was important to selecting a representative sample of visitors.

To begin an interview, the interviewer approached the first visitor spotted during the sampling period. The visitor was asked to participate. If they said "yes," they were given the onsite survey to complete. After they completed the onsite survey, the interviewer filled out the group log for their group. If they said "no," the interviewer thanked them for their time and approached the next visitor.

Two weeks after the initial contact, the visitor was mailed a cover letter (Appendix F) explaining the study along with the mail-back questionnaire and a postage-paid return envelope. Follow-up procedures with nonrespondents were used to obtain a high response rate. A reminder letter was sent along with a second questionnaire and postage paid return envelope two weeks after the original mailing. A second reminder letter along with a third questionnaire and postage-paid return envelope was sent to each nonrespondent two weeks after the first reminder.

The CPSP collected 639 onsite surveys during the summer sampling period. Of the 304 randomly selected visitors sent the mail-back questionnaire, 191 returned it for a response rate of 63 percent. This response rate is large enough for statistically valid data analysis.

The completed survey forms were keypunched professionally and the data set was uploaded to a personal computer for analysis. Data were analyzed using the Statistical Program for the Social Sciences (SPSS/PC+). Basic descriptive statistics, frequency distributions, and selected cross tabulations were computed for selected variables.

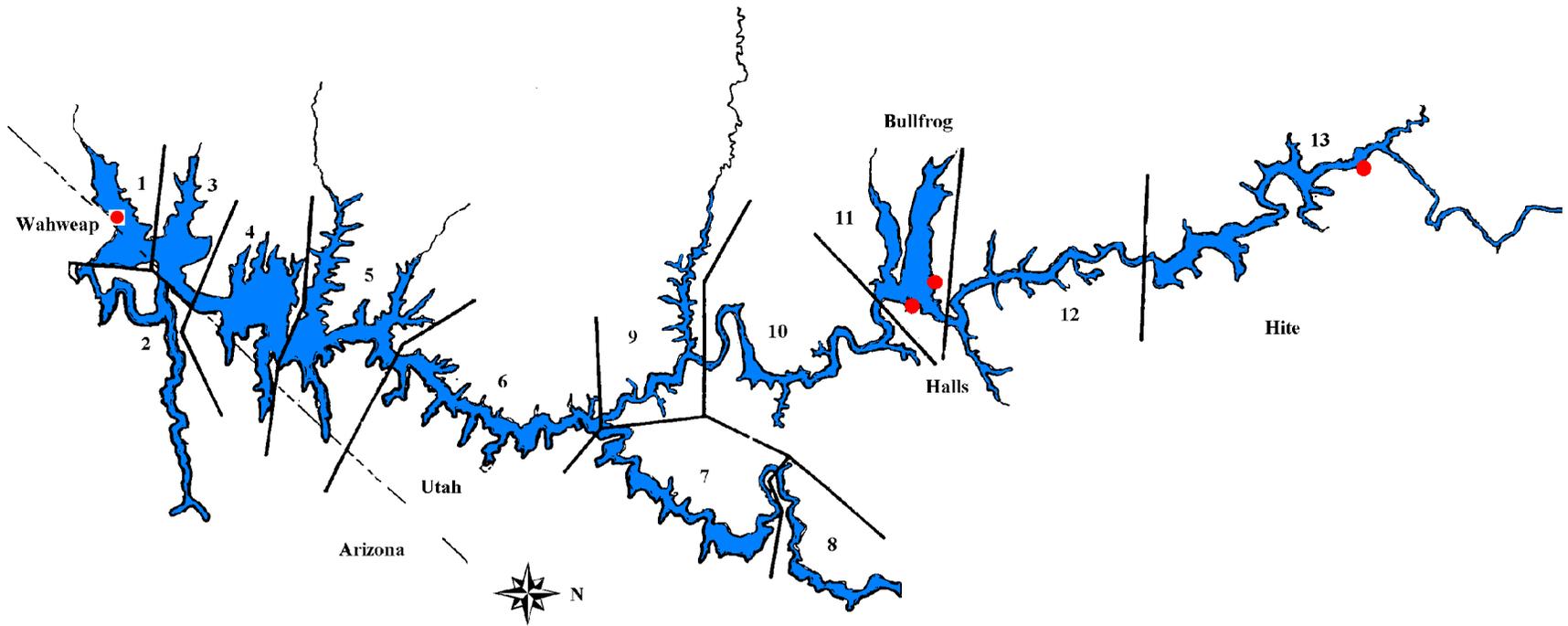
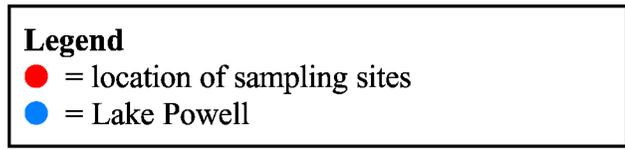


Figure 1. Sampling locations at Glen Canyon National Recreation Area.



Selected Study Results

This section describes: (a) visitors filling out the mail-back visitor survey, (b) respondents' visit to Glen Canyon, (c) watercraft use at Glen Canyon NRA, (d) characteristics of visitors to Glen Canyon NRA, (e) visitors' motives for visiting Glen Canyon NRA, (f) benefits visitors received by visiting Glen Canyon NRA, (g) problems visitors experienced during their visit, (h) crowding conditions at specific locations within Glen Canyon NRA, (i) perceptions of management actions to address problems, and (j) services provided and visitors' overall experience at Glen Canyon NRA. Tables referred to in this section can be found directly after descriptive text.

A. Comparisons of Respondents and Nonrespondents

Selected variables from the onsite survey were examined to determine whether statistically significant differences exist between *respondents*, those individuals who returned a mail-back questionnaire, and *nonrespondents*, those individuals who did not. A significant difference was found between the two groups in the number of previous visits to Glen Canyon NRA. Visitors who returned the mail-back questionnaire had a mean of 30.1 visits compared to those who did not return the questionnaire whose mean number of visits was 17.6 (Table A.1). There were no significant differences between the two groups in the number of nights they spent at Glen Canyon NRA (Table A.2), or where they spent nights during their visit to Glen Canyon NRA (Table A.3).

Of visitors who returned the mail-back questionnaire, 85 percent reported that visiting Glen Canyon NRA was "the primary purpose of my visit to the area" compared to 74 percent of visitors who did not return the mail-back questionnaire (Table A.4). Twelve percent of visitors who returned the mail-back questionnaire reported that visiting Glen Canyon NRA was "one of several important things I planned to do during my visit to the area" compared to 19 percent of visitors who did not return the mail-back questionnaire.

No significant differences were found between the gender breakdown of the two groups (Table A.5). Of those who returned the mail-back questionnaire, 60 percent were male and 40 percent were female compared to 63 percent male and 37 percent female of those who did not return the mail-back questionnaire.

Visitors who returned the mail-back questionnaire were older than visitors who did not return the questionnaire. Those who returned the questionnaire had a mean age of 42.1 and a median age of 41 compared to visitors who did not return the mail-back questionnaire who had a mean age of 34.9 and a median age of 33 (Table A.6).

Utah, Colorado, and Arizona were the three highest represented states in both groups of visitors (Table A.7). Of those who returned the questionnaire, 36 percent were from Utah, 25 percent were from Colorado, and 24 percent were from Arizona. Of those who did not return

the questionnaire, 38 percent were from Utah, 21 percent were from Colorado, and 20 percent were from Arizona.

Since the responses from visitors who returned and who did not return the mail-back questionnaire are similar in most areas, it is assumed that the results from the summer season represent summer visitors to Glen Canyon NRA.

Table A.1. Number of previous visits to Glen Canyon NRA, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Number of previous visits	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
First visit	39	20	31	28
2-5 previous visits	41	22	26	23
6-10 previous visits	25	13	11	10
11-20 previous visits	29	15	13	12
21-30 previous visits	13	7	11	10
31-50 previous visits	13	7	11	10
More than 50 previous visits	31	16	9	8
Total	191	100	112	101*

Source: Onsite survey, Question 1.

Returned questionnaire **:	Mean number of visits: 30.1	Median number of visits: 9
Did not return questionnaire **:	Mean number of visits: 17.6	Median number of visits: 5

* Percent does not add to 100 percent due to rounding error.

** Differences between groups are statistically significant at the $p < 0.05$ level.

Table A.2. Nights spent in Glen Canyon NRA area on this trip, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Number of nights	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
1	9	5	5	5
2	34	19	15	14
3	36	20	21	19
4	24	13	22	20
5	13	7	10	9
6	19	10	5	5
7	12	7	10	9
8	4	2	6	6
9	3	2	2	2
10	2	1	2	2
11	1	1	--	--
12	2	1	--	--
13	--	--	--	--
14	1	1	3	2
15 or more	10	6	2	2
unspecified	13	7	7	6
Total	183	102*	110	102*

Source: Onsite survey, Question 2.

Returned questionnaire : Mean number of nights: 5.7 Median number of nights: 4
 Did not return questionnaire: Mean number of nights: 5.0 Median number of nights: 4

*Percent does not add to 100 percent due to rounding error.

Table A.3. Where visitors spent their nights while in Glen Canyon area on this trip, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Where visitors spent nights	Returned questionnaire			Did not return questionnaire		
	N	Percent*	Percent**	N	Percent*	Percent**
On Lake Powell	115	55	61	60	44	54
In a campground	64	31	34	58	43	52
In an area hotel/motel	21	10	11	13	10	12
Did not spend night	4	2	2	2	2	2
At home	2	1	1	--	--	--
Other	2	1	1	2	2	2
Total	208	100	--	135	101***	--

Source: Onsite survey, Question 2.

*Based on number of *responses*

**Based on number of *respondents* (returned N=188; did not return N=112); study participants could give more than one response.

***Percent does not add to 100 percent due to rounding error.

Table A.4. Respondents' plan for visiting Glen Canyon NRA, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Plan for visiting Glen Canyon NRA	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
The primary purpose of my visit to the area	161	85	82	74
One of several important things I planned to do during my visit to the area	23	12	21	19
Something I decided to do <u>after</u> arriving in the area	5	3	8	7
Total	189	100	111	100

Source: Onsite survey, Question 3.

Table A.5. Gender of respondents, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Gender	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
Male	113	60	71	63
Female	77	40	42	37
Total	190	100	113	100

Source: Onsite survey, Question 4.

Table A.6. Age of respondents, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

Respondent age	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
16-19	3	2	8	7
20-24	13	7	23	20
25-29	17	9	14	12
30-34	25	13	18	16
35-39	29	15	13	12
40-44	27	14	9	8
45-49	26	14	13	12
50-54	15	8	8	7
55-59	11	6	3	3
60-64	10	5	2	2
65-69	5	3	--	--
70 or older	8	4	2	2
Total	189	100	113	101*

Source: Onsite survey, Question 5.

Returned questionnaire **: Mean age: 42.1 Median age: 41
 Did not return questionnaire **: Mean age: 34.9 Median age: 33

*Percent does not add to 100 percent due to rounding error.

** Differences between groups are statistically significant at the $p < 0.05$ level.

Table A.7. Permanent residence of respondents, by visitors who *did* and visitors who *did not* return mail-back questionnaire.

State of residence	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
Utah	69	36	43	38
Colorado	48	25	24	21
Arizona	45	24	22	20
California	7	4	7	6
New Mexico	3	2	3	3
Nevada	3	2	1	1
Texas	3	2	1	1
Florida	2	1	--	--
New York	2	1	1	1
Alaska	1	1	--	--
Iowa	1	<1	--	--
Idaho	1	<1	2	2
Illinois	1	<1	--	--
Louisiana	1	<1	--	--
Minnesota	1	<1	--	--
Oklahoma	1	<1	--	--
Washington	1	<1	--	--
Wisconsin	1	<1	--	--
South Dakota	--	--	1	1
Oregon	--	--	2	2
Alabama	--	--	1	1
Arkansas	--	--	1	1
Indiana	--	--	1	1
Kansas	--	--	1	1
Wyoming	--	--	2	2
Total	189	100	113	102*

Source: Onsite survey.

*Percent does not add to 100 percent due to rounding error.

B. Trip Characteristics

In this section, and in all the following sections, overall statistics for the total sample are given as well as statistics comparing personal watercraft operators to nonpersonal watercraft operators.

Visitor data were analyzed for all mail-back questionnaires completed and returned. Two user groups, *personal watercraft operators* and *nonpersonal watercraft operators*, were evaluated to determine whether statistically significant differences existed between these subgroups. Understanding the potentially different characteristics, motives, perceptions, and opinions of PWC and non-PWC operators can help managers develop an effective plan to reduce visitor conflicts at Glen Canyon NRA and aid in long-range planning.

Most respondents were repeat visitors to Glen Canyon NRA. Eighty percent of respondents stated that they had visited Glen Canyon previously (Table B.1). Fifty-eight percent had visited more than five times. Twenty percent stated that this was their first visit to Glen Canyon NRA.

We also compared the subgroups of those operating PWCs and those not operating PWCs visiting Glen Canyon NRA. First time visitors made up 17 percent of the personal watercraft operators and 23 percent of the non-PWC operators. Twenty-five percent of PWC operators stated that they had visited Glen Canyon NRA previously between two and five times and 20 percent of non-PWC operators stated that they had visited Glen Canyon NRA previously between two and five times. The mean visit number of PWC operators is 36.8 and the median visit number is 10. The mean visit number of non-PWC operators is 23.2 and the median visit number is 9. The high mean visit numbers can be explained by outliers, a few respondents stating that they had visited Glen Canyon many times.

The majority of respondents (74 percent) stated that they spent between one and six nights in the area (Table B.2). The mean number of nights spent in the area was 5.7 and the median number of nights was 4. The mean number of nights spent in the area by PWC operators was 5.1 and the median number of nights spent in the area was 4. The mean number of nights spent in the area by non-PWC operators was 6.5 and the median number of nights spent in the area was 4.

Lake Powell and in campgrounds were the two most popular places to spend nights. Sixty-one percent of respondents stated that they spent nights on Lake Powell, and 34 percent of respondents stated that they spent nights in a campground (Table B.3). Seventy-three percent of PWC operators spent nights on Lake Powell compared to 51 percent of non-PWC operators.

Glen Canyon was the primary purpose for most respondents' visit to the area. The majority of respondents (85 percent) stated that visiting Glen Canyon NRA was "the primary purpose of

my visit to the area" (Table B.4). Although a majority in both comparison groups stated that visiting Glen Canyon NRA was "the primary purpose of my visit to the area" a higher percentage of non-PWC operators (90 percent) compared to PWC operators (84 percent) noted that visiting the area was their primary purpose.

Family and friends were the most common group type of respondents. The majority of groups (96 percent) stated that they were in a group made up of family and friends (Table B.5). Ninety-five percent or more of groups traveling with PWCs and groups that did not have PWCs, stated that they were in a group made up of family and friends.

More than half the groups (56 percent) contacted in Glen Canyon NRA had between one and five people, with the mean number of people being 6.7 and the median number of people being 5 (Table B.6). Groups with PWCs tended to be larger than groups without PWCs. Groups with PWCs had a mean of 9.4 people and a median of 8 people. Groups without PWCs had a mean of 5.7 people and a median of 4 people.

The majority of groups (83 percent) did not bring pets (Table B.7). Seventeen percent of the groups reported that their group brought dogs along. Of the groups with PWCs, 18 percent brought dogs. Of groups without PWCs, 17 percent brought dogs on their visit to Glen Canyon NRA.

Activity participation was varied, but the focus was on water and camping activities. Overall, the most popular activities at Glen Canyon NRA were swimming, motor boating, camping at shoreline campsites, participating in water sports, fishing, and using a PWC with 47 percent or more of the total sample participating in these activities (Table B.8).

Overall PWC operators compared to non-PWC operators were more likely to swim, fish, and participate in watersports. On the other hand non-PWC operators were more likely than PWC operators to bird watch, take tour boat rides, and camp at primitive backcountry sites.

Table B.1. Number of previous visits to Glen Canyon NRA.

Number of previous visits	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
First Time	39	20	16	17	21	23
2-5 previous visits	41	22	23	25	18	20
6-10 previous visits	25	13	12	13	11	12
11-20 previous visits	29	15	12	13	16	18
21-30 previous visits	13	7	4	4	9	10
31-50 previous visits	13	7	7	8	6	7
More than 50 previous visits	31	16	19	20	10	11
Total	191	100	93	100	91	101*

Source: Onsite survey, Question 1.

Total sample:	Mean number of visits: 30.1	Median number of visits: 9
PWC operators:	Mean number of visits: 36.8	Median number of visits: 10
Non-PWC operators:	Mean number of visits: 23.2	Median number of visits: 9

* Percent does not add to 100 percent due to rounding error.

Table B.2. Nights spent in Glen Canyon area on this trip.

Number of nights	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
1	9	5	2	2	6	7
2	34	19	15	17	18	21
3	36	20	19	21	16	18
4	24	13	17	19	7	8
5	13	7	4	4	9	10
6	19	10	9	10	8	9
7	12	7	8	9	4	5
8	4	2	4	4	0	0
9	3	2	1	1	2	2
10	2	1	1	1	1	1
11	1	1	0	0	1	1
12	2	1	0	0	2	2
13	0	0	0	0	0	0
14	1	1	0	0	1	1
15 or more	10	6	3	3	7	8
Unspecified Nights	13	7	7	8	5	6
Total	183	102*	90	99*	87	99*

Source: Onsite survey, Question 2.

Total Sample:	Mean number of nights: 5.7	Median number of nights: 4
PWC Operators:	Mean number of nights: 5.1	Median number of nights: 4
Non-PWC Operators:	Mean number of nights: 6.5	Median number of nights: 4

*Percent does not add to 100 percent due to rounding error.

Table B.3. Where visitors spent their nights while in Glen Canyon area on this trip.

Where visitors spent nights	Total sample			PWC operators			Non-PWC operators		
	N	Percent*	Percent**	N	Percent*	Percent**	N	Percent*	Percent**
On Lake Powell	115	55	61	67	67	73	45	45	51
In a campground	64	31	34	25	25	27	35	35	39
In an area hotel/motel	21	10	11	4	4	4	17	17	19
Did not spend night	4	2	2	1	1	1	2	2	2
At Home	2	1	1	1	1	1	1	1	1
Other	2	1	1	2	2	2	0	0	0
Total	208	100	--	100	100	--	100	100	--

Source: Onsite survey, Question 2.

*Based on number of *responses*

**Based on number of *respondents* (Total sample N=188 ; PWC operators N=92 ; Non-PWC operators N=89); study participants could give more than one response.

Table B.4. Respondents' plan for visiting Glen Canyon NRA.

Plan for visiting Glen Canyon NRA	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
The primary purpose of my visit to the area	16	85	77	84	81	90
One of several important things I planned to do during my visit to the area	23	12	11	12	8	9
Something I decided to do <u>after</u> arriving in the area	5	3	4	4	1	1
Total	189	100	92	100	90	100

Source: Onsite survey, Question 3.

Table B.5. Group type of Glen Canyon NRA visitors.

Group Type	All groups		PWC groups		Non-PWC groups	
	N	Percent	N	Percent	N	Percent
Family and friends	451	96	121	98	330	95
Alone	16	3	2	2	14	4
Other	3	1	0	0	3	1
Business	1	<1	0	0	1	<1
Tour	1	<1	0	0	1	<1
Total	472	100	123	100	349	100

Source: Group log.

Table B.6. Group size of Glen Canyon NRA visitors.

Number of people	All groups		PWC groups		Non-PWC groups	
	N	Percent	N	Percent	N	Percent
1	15	3	1	1	14	4
2	107	23	12	10	95	27
3	45	10	4	3	41	12
4	58	12	14	11	44	13
5	39	8	10	8	29	8
6-10	117	25	42	34	75	21
11-15	57	12	21	17	36	10
16 or more	35	7	19	15	16	5
Total	473	100	123	99*	350	100

Source: Group log.

All groups:	Mean number of people: 6.7	Median number of people: 5
PWC groups**:	Mean number of people: 9.4	Median number of people: 8
Non-PWC groups**:	Mean number of people: 5.7	Median number of people: 4

*Percent does not add to 100 percent due to rounding error.

**Differences between groups are statistically significant at the $p < 0.05$ level.

Table B.7. Pets brought to Glen Canyon NRA by groups.

Type of pet	All groups		PWC groups		Non PWC groups	
	N	Percent	N	Percent	N	Percent
None	394	83	101	82	293	83
Dog	83	17	22	18	61	17
Total	477	100	123	100	354	100

Source: Group Log.

Table B.8. Activities respondents participated in while at Glen Canyon NRA.

Activity	Total sample			PWC operators			Non-PWC operators		
	N	Percent*	Percent**	N	Percent*	Percent**	N	Percent*	Percent**
Swimming	156	16	83	84	16	91	69	15	77
Motor boating	146	15	77	70	13	76	71	16	79
Camping at shoreline campsites	116	12	61	63	12	69	50	11	56
Participating in water sports	101	10	53	59	11	64	42	9	47
Fishing	96	10	51	54	10	59	38	8	42
Using a personal watercraft	88	9	47	73	14	79	15	3	17
Hiking Lake Powell side canyons	62	6	33	31	6	34	30	7	33
Visiting archaeological sites	53	5	28	27	5	29	25	6	28
Camping at developed campsites (main marina locations)	48	5	25	22	4	24	24	5	27
Wildlife watching	30	3	16	12	2	13	17	4	19
Bird watching	19	2	10	5	1	5	14	3	16
Hiking in front-country	16	2	9	9	2	10	7	2	8
Tour boat ride	16	2	9	1	<1	1	14	3	16
Hiking in back-country	13	1	7	4	1	4	9	2	10
Camping at primitive sites in the back-country	11	1	6	2	<1	2	9	2	10
Driving (Burr Trail, Hole in the Rock Road)	9	1	5	3	1	3	6	1	7
Sailing	4	<1	2	1	<1	1	3	1	3
Paddling (canoe or kayak)	4	<1	2	3	1	3	1	<1	1
Mountain biking	1	<1	1	0	0	0	1	<1	1
Other****	16	2	9	8	2	9	7	2	8
Total	1005	102***	--	531	101***	--	452	100	--

Source: Mail-back survey, Question 1.

*Based on number of *responses*

**Based on number of *respondents* (Total sample N=189 ; PWC operators N=92 ; Non-PWC operators N=90); study participants could give more than one response.

***Percent does not add to 100 percent due to rounding error.

****Responses in other category are found in Appendix G.

Bold face = differences between groups are statistically significant at the p<0.05 level.

C. Watercraft Use at Glen Canyon National Recreation Area

Visitors were asked about the primary type of watercraft they used during their visit to Glen Canyon NRA, ownership of the primary watercraft, different types of watercraft they used during their visit, and whether they had taken a class in PWC operation and safety. If respondents indicated that they operated a PWC they were also asked about refueling methods, human waste, and human waste disposal. Finally visitor groups were asked to identify which zones they frequented while on Lake Powell. This information is important to managers because it indicates the nature of watercraft use on Lake Powell and addresses overall use by zone occurring on Lake Powell. With this information, managers can fine tune management actions to fit best the needs of visitors to Glen Canyon NRA.

The most common primary watercraft used by respondents during their visit to Glen Canyon NRA (58 percent) was a powerboat (Table C.1). Forty-one percent of personal watercraft operators stated that a powerboat was their primary watercraft compared to 75 percent of non-PWC operators. Thirty-five percent of personal watercraft operators stated that a houseboat was their primary watercraft compared to 10 percent of non-PWC operators. Twenty-two percent of personal watercraft operators stated that personal watercraft was their primary watercraft compared to 3 percent of non-PWC operators. This 3 percent may be explained by confusion in a small number of respondents over the definition of personal watercraft and whether or not it includes multiple types of personally owned vessels.

The majority of respondents (66 percent) (Table C.2), reported they owned the primary watercraft they used during their visit to Glen Canyon NRA. Twelve percent stated they rented the primary watercraft they used during their visit to Glen Canyon NRA.

Overall, of the groups visiting Glen Canyon who used watercraft, 84 percent had powerboats with them, 32 percent had personal watercraft with them, and 29 percent had houseboats (Table C.3). Fewer groups with personal watercraft brought powerboats (66 percent) compared to groups without personal watercraft (93 percent). More groups with personal watercraft had houseboats (36 percent) compared to groups without personal watercraft (26 percent). Most groups only had one of any given type of watercraft with the exception of kayaks, personal watercraft, and inflatable toys, which averaged two per group.

Bringing personal watercraft on their trips is common for houseboat users on Lake Powell. Of all groups traveling on Lake Powell with houseboats, 44 percent had PWCs with them (Table C.4). Of all groups traveling on Lake Powell with powerboats, 25 percent had PWCs with them (Table C.5).

The majority of respondents (74 percent) (Table C.6), had not taken a class in personal watercraft safety and use. Thirty-two percent of personal watercraft operators stated they had taken a class in personal watercraft safety and use compared to 19 percent of non-PWC operators.

Half of all respondents stated that they operated a personal watercraft during their visit to Glen Canyon NRA (Table C.7). Of those, 60 percent stated they used their own personal watercraft, 31 percent used a friend's personal watercraft, and 9 percent stated that they rented a personal watercraft (Table C.8). Sixty-three percent of the rentals were from town and 37 percent were from the concessionaire, Aramark (Table C.9).

Fifty-one percent of personal watercraft operators used the gas dock to refuel (Table C.10). Forty-seven percent reported that they purchased fuel in the area and 33 percent reported they brought fuel from home.

Concerning disposal of human waste, half or more of the personal watercraft operators stated that they used a marine toilet aboard a support vessel (54 percent) or facilities provided at landings (52 percent) (Table C.11). Nearly a third (29 percent) used the floating restrooms on Lake Powell, and nearly a quarter (22 percent) carried a portable toilet with them.

Table C.1. Primary watercraft used by Glen Canyon NRA respondents.

Type of vessel	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Powerboat	106	58	37	41	67	75
Houseboat	41	23	32	35	9	10
Personal Watercraft	23	13	20	22	3	3
Canoe	1	1	1	1	0	0
Sailboat	1	1	0	0	1	1
Kayak	1	1	0	0	1	1
Other*	9	5	1	1	8	9
Total	182	102**	91	100	89	99**

Source: Mail-back survey, Question 3.

* Responses in the other category include: tour boat, 12 foot fishing boat, and pontoon with full enclosure.

** Percent does not add to 100 percent due to rounding error.

Table C.2. Ownership of primary watercraft used by Glen Canyon NRA respondents.

Ownership	Total sample		PWC operators		Non PWC operators	
	N	Percent	N	Percent	N	Percent
Owned by respondent	118	66	54	59	63	73
Co-own/ Multiple owner	18	10	14	15	4	5
Rent houseboat from concessionaire	12	7	9	10	3	4
Rent powerboat from concessionaire	6	3	1	1	4	5
Rent from local company in town	4	2	3	3	1	1
Other*	22	12	11	12	11	13
Total	180	100	92	100	86	101**

Source: Mail-back Questionnaire, Question 4.

*Responses in the other category include: time share and friend's boat.

**Percent does not add to 100 percent due to rounding error.

Table C.3. Overall watercraft use by boat type by Glen Canyon NRA groups.

Vessel type	All groups				PWC groups				Non-PWC groups			
	N	Mean*	Percent**	Percent***	N	Mean*	Percent**	Percent***	N	Mean*	Percent**	Percent***
Powerboat	324	1.3	56	84	81	1.5	32	66	243	1.2	74	93
Personal watercraft	123	2.1	21	32	123	2.1	49	100	0	0	0	0
Houseboat	113	1.1	20	29	44	1.1	18	36	69	1.0	21	26
Kayak	4	2.3	1	1	1	2.0	<1	1	3	2.3	1	1
Other	4	1.0	1	1	0	0	0	0	4	1.0	1	2
Inflatable toys	3	2.0	1	1	1	4.0	<1	1	2	1.0	1	1
Raft (motor)	3	1.7	1	1	0	0	0	0	3	1.7	1	1
Sailboat	3	1.0	1	1	1	1.0	<1	1	2	1.0	1	1
Raft (no motor)	1	1.0	<1	<1	0	0	0	0	1	1.0	<1	<1
Total	578	--	102****	--	251	--	100	--	327	--	100	--

Source: Group Log.

*Indicates mean number of watercraft by type per group.

**Based on number of *watercraft*

***Based on number of *groups with watercraft* (Total sample N=385 ; PWC groups N=123 ; Non-PWC groups N=262); groups could have more than one watercraft.

****Percent does not add to 100 percent due to rounding error.

Table C.4. Houseboaters traveling with PWCs.

Houseboaters with PWCs	N	Percent
Had PWC	44	39
Did not have PWC	69	61
Total	113	100

Source: Group log.

Table C.5. Powerboaters traveling with PWCs.

Powerboaters with PWCs	N	Percent
Had PWC	81	25
Did not have PWC	243	75
Total	324	100

Source: Group log.

Table C.6. Glen Canyon NRA visitors' participation in personal watercraft safety/instruction class.

Taken class	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
No	137	74	63	68	72	81
Yes	47	26	30	32	17	19
Total	184	100	93	100	89	100

Source: Mail-back survey, Question 5.

Bold face = differences between groups are statistically significant at the $p < 0.05$ level.

Table C.7. Glen Canyon NRA visitors operation of personal watercraft, by *total sample*.

Operated personal watercraft	Total sample	
	N	Percent
Yes	93	50
No	91	50
Total	184	100

Source: Mail-back survey, Question 6a.

Table C.8. Ownership of personal watercraft by personal watercraft operators on Lake Powell, by *personal watercraft operators*.

Personal watercraft ownership	PWC operators	
	N	Percent
Your own personal watercraft	54	60
A friend's personal watercraft	28	31
A rental personal watercraft	8	9
Total	90	100

Source: Mail-back survey, Question 6b.

Table C.9. Where personal watercraft operators on Lake Powell rented personal watercraft, by *personal watercraft operators*.

Personal watercraft rental	PWC operators	
	N	Percent
From town	5	63
From concessionaire	3	37
Total	8	100

Source: Mail-back survey, Question 6b.

Table C.10. Personal watercraft refueling method used by PWC operators on Lake Powell, by *PWC operators*.

Refueling method	PWC operators		
	N	Percent*	Percent**
Gas dock	46	27	51
Purchased fuel in the area	43	25	47
Brought own fuel from home	30	18	33
Gas can on shore	19	11	21
Gas station	17	10	19
Gas can on the water	11	6	12
Did not refuel personal watercraft	5	3	6
Total	171	100	--

Source: Mail-back survey, Question 6c.

*Based on number of *responses*

**Based on number of *respondents* (PWC operators N=91); study participants could give more than one response.

Table C.11. Human waste disposal by PWC operators on Lake Powell, by *PWC operators*.

Waste disposal method	PWC operators		
	N	Percent*	Percent**
Use a marine toilet aboard a support vessel	49	33	54
Use facilities provided at landings	47	32	52
Use floating restrooms provided on Lake Powell	26	17	29
Carry a portable toilet***	20	13	22
Other method of waste disposal****	7	5	8
Total	149	100	--

Source: Mail-back survey, Question 6d.

*Based on number of *responses*

**Based on number of *respondents* (PWC operators N=90); study participants could give more than one response.

***Portable toilets include such things as sealing coffee cans and PVC piping.

****Other methods include: Burying

Twenty-four percent of groups primarily visited zone 11 (Bullfrog and Halls area) (Table C.12), 23 percent visited zone 1 (Wahweap area), 17 percent visited zone 12 (Defiance House Ruin area), and 15 percent visited zone 6 (Rainbow Bridge area). All other zones received 10 percent or less of primary visitation. Figure 2 graphically displays this distribution.

The zones where groups with *personal watercraft* spent most of their time were zone 1 (Wahweap area) with 30 percent of groups and zone 11 (Bullfrog and Halls area) with 28 percent of groups spending time in this zone. Figure 3 graphically displays this distribution.

The zones where groups without personal watercraft spent most of their time were zone 11 (Bullfrog and Halls area) with 22 percent of groups, zone 1 (Wahweap area) with 20 percent of groups, zone 6 (Rainbow Bridge area) with 18 percent of groups, and zone 12 (Defiance House Ruin area) with 18 percent of groups. Figure 4 graphically displays this distribution.

Zone 8 had the highest percent of groups sampled with personal watercraft as a percent of overall sample use (100 percent) (table C.13). For example, the single group sampled in zone 8 had personal watercraft with them. This high percentage is due to low overall use in this zone. Zones 3, 1, 9, 10, 7, 4, 11, 12, and 5 all had a high percentage (20 percent or more) of personal watercraft use as a percent of overall use.

Table C.12. Lake Powell zones where Glen Canyon NRA groups spent the majority of their time.

Zone	All groups			PWC groups			Non-PWC groups		
	N	Percent*	Percent**	N	Percent*	Percent**	N	Percent*	Percent**
1	93	17	23	34	23	30	59	15	20
2	31	6	8	5	3	4	26	7	9
3	37	7	9	15	10	13	22	6	8
4	23	4	6	6	4	5	17	4	6
5	20	4	5	4	3	4	16	4	6
6	59	11	15	8	5	7	51	13	18
7	14	3	4	4	3	4	10	3	4
8	1	<1	<1	1	1	1	0	0	0
9	42	8	10	13	9	11	29	7	10
10	27	5	7	8	5	7	19	5	7
11	95	18	24	32	22	28	63	16	22
12	67	12	17	14	10	12	53	14	18
13	32	6	8	3	2	3	29	7	10
Total	541	101***	--	147	100	--	394	101***	--

Source: Group log.

*Based on number of *responses*

**Based on number of *respondents* (All groups N=403 , PWC groups N=114 ; Non-PWC groups N=289); study participants could give more than one response.

***Percent does not add to 100 percent due to rounding error.

Table C.13. Lake Powell zones where PWC groups spent the majority of their time, expressed as a percentage of total groups, by *PWC groups*.

Zone	N	PWC groups	
		Percent*	Percent**
1	34	23	30
2	5	3	4
3	15	10	13
4	6	4	5
5	4	3	4
6	8	5	7
7	4	3	4
8	1	1	1
9	13	9	11
10	8	5	7
11	32	22	28
12	14	10	12
13	3	2	3
Total	147	100	--

Source: Group log.

*Based on number of *responses*

**Based on number of *respondents* (PWC groups N=114); study participants could give more than one response.

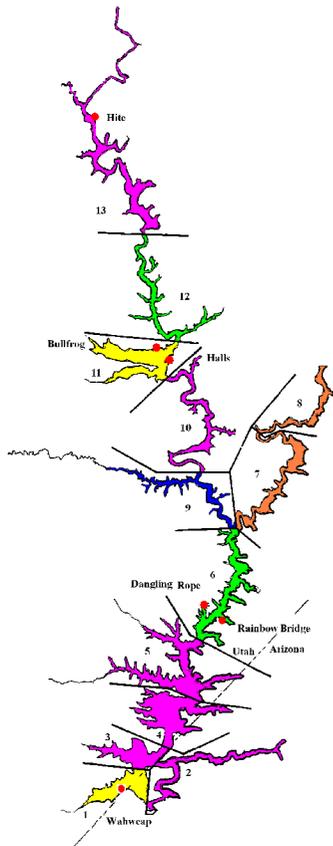


Figure 2. Use by all respondents.

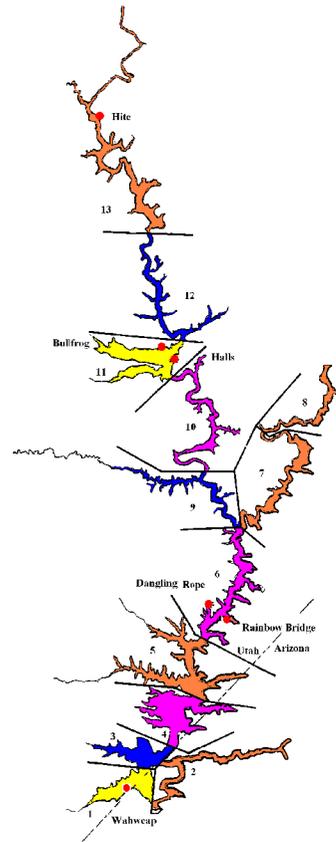


Figure 3. Use by PWCs.

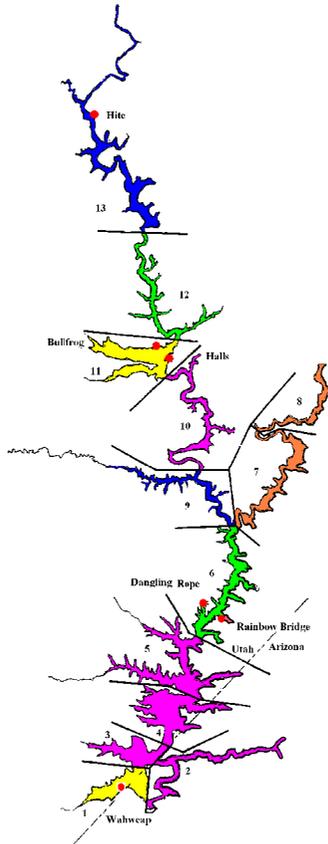
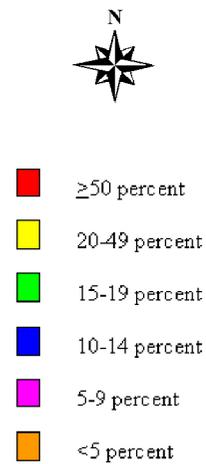


Figure 4. Use by non-PWCs.



D. Visitor Characteristics

Demographic data were evaluated to determine potential differences between user groups. Of the total sample, 61 percent were male and 39 percent were female (Table D.1). Gender for both personal watercraft operators and non-PWC operators were similar to the total respondent gender breakdown. Fifty-five percent of personal watercraft operators were male and 45 percent were female. Sixty-five percent of non-PWC operators were male and 35 percent were female.

The mean age for visitors is 41.7 years old (Table D.2). There is a significant difference in the mean ages of personal watercraft operators, 38.4 years old, and non-PWC operators, 44.5 years old.

In the onsite survey, respondents were asked to submit the ZIP Code of their mailing address. The ZIP Code was used to group respondents by state. Eighteen states are represented and all but New York, Florida, and Louisiana are western or Midwestern states (Table D.3). The majority of respondents (85 percent) were from Utah, Colorado, and Arizona. Utah had 36 percent of respondents, Colorado had 25 percent of respondents, and Arizona had 24 percent of respondents making these three states the most highly represented.

Almost half the total sample (49 percent) has a college degree or beyond (Table D.4). Twenty-seven percent of respondents stated that they are college graduates, 8 percent stated that they have completed some graduate school, and 14 percent stated that they have a Master, doctoral, or professional degree. Differences between personal watercraft operators and non-PWC operators were small.

Seventy-four percent of respondents stated that they received a total household income before taxes of 40,000 dollars or more in 1999 (Table D.5).

Survey respondents were very homogeneous with respect to ethnicity and race. Only 3 percent identified their ethnicity as Hispanic or Latino (Table D.6) and 97 percent of respondents identified their race as white (Table D.7).

Table D.1. Gender of respondents.

Gender	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Male	116	61	51	55	59	65
Female	75	39	42	45	32	35
Total	191	100	93	100	91	100

Source: Mail-back survey, Question 15.

Table D.2. Age of respondents.

Respondent age	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
16-19	3	2	2	2	1	1
20-24	13	7	10	11	3	3
25-29	17	9	10	11	7	8
30-34	25	13	15	17	9	10
35-39	29	15	12	13	15	17
40-44	27	14	13	14	14	15
45-49	26	14	12	13	13	14
50-54	15	8	6	7	9	10
55-59	11	6	4	4	6	7
60-64	10	5	3	3	6	7
65-69	5	3	0	0	4	4
70 or older	8	4	4	4	4	4
Total	189	100	91	99*	91	100

Source: Mail-back survey, Question 16.

Total sample:	Mean age: 41.7	Median age: 41
PWC operators**:	Mean age: 38.4	Median age: 38
Non-PWC operators**:	Mean age: 44.5	Median age: 44

*Percent does not add to 100 percent due to rounding error.

**Differences between groups are statistically significant at the $p < 0.05$ level.

Table D.3. Permanent residence of respondents.

State of residence	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Utah	69	36	35	38	33	36
Colorado	48	25	28	30	19	21
Arizona	45	24	19	20	23	25
California	7	4	3	3	4	4
New Mexico	3	2	1	1	2	2
Nevada	3	2	1	1	2	2
Texas	3	2	0	0	3	3
Florida	2	1	1	1	1	1
New York	2	1	1	1	1	1
Alaska	1	<1	1	1	0	0
Iowa	1	<1	0	0	1	1
Idaho	1	<1	1	1	0	0
Illinois	1	<1	0	0	0	0
Louisiana	1	<1	0	0	0	0
Minnesota	1	<1	1	1	0	0
Oklahoma	1	<1	0	0	1	1
Washington	1	<1	1	1	0	0
Wisconsin	1	<1	0	0	1	1
Total	191	100	93	99*	91	98*

Source: Onsite survey.

*Percent does not add to 100% due to rounding error.

Table D.4. Response to “What is the highest level of education you have completed?”

Education level	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Some high-school	3	2	0	0	2	2
High school graduate or GED	25	13	12	13	12	13
Some college, business, or trade school	71	37	39	42	30	33
College graduate	51	27	24	26	26	29
Some graduate school	15	8	6	7	9	10
Masters, doctoral or professional degree	26	14	12	13	12	13
Total	19	101*	93	101*	91	100

Source: Mail-back survey, Question 17.

*Percent does not add to 100% due to rounding error.

Table D.5. Response to “What was your total household income (before taxes) last year?”

Income level	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Less than \$15,000	9	5	6	7	3	4
\$15,000 to \$24,999	13	7	7	8	6	7
\$25,000 to \$39,999	23	13	12	13	8	10
\$40,000 to \$64,999	45	25	22	24	23	28
\$65,000 or more	88	49	43	48	42	51
Total	178	99*	90	100	82	100

Source: Mail-back survey, Question 18.

*Percent does not add to 100% due to rounding error.

Table D.6. Response to “In what ethnicity would you place yourself?” by *total sample*.

Ethnicity	Total sample	
	N	Percent
Not Hispanic or Latino	119	97
Hispanic or Latino	3	3
Total	122	100

Source: Mail-back survey, Question 19.

Table D.7. Response to “In what race would you place yourself?” by *total sample*.

Race	Total sample	
	N	Percent
White	176	97
American Indian or Alaska Native	2	1
Asian	2	1
Native Hawaiian or other Pacific Islander	1	1
Black or African American	0	0
Total	181	100

Source: Mail-back survey, Question 19.

E. Visitor Motives

An understanding of visitors' motives for visiting a recreation resource is important to helping managers provide opportunities for visitors to attain the experiences they desire. To obtain a clearer awareness of visitors' motives for visiting Glen Canyon NRA, respondents were asked to look over a list of 29 possible experiences they may have had while visiting the area. Respondents were asked to rate the importance of possible experiences on a scale of 1 through 5, where 1= very unimportant, 2= unimportant, 3= neither unimportant or important, 4= important, and 5= very important.

Eighty percent or more of the visitors rated "to enjoy the scenery of Lake Powell" (mean 4.5), "to do something with my family"(mean 4.4), "to get away from the usual demands of life" (mean 4.4), "to be with members of my group" (mean 4.2), "to be with people who enjoy the same things I do" (mean 4.2), and to "experience nature (mean 4.1) as important or very important experiences (Table E.1). Sixty-five percent of visitors rated "to participate in ranger-led activities" (mean 2.1) as unimportant or very unimportant. Significant differences were found in desired experiences between personal watercraft operators and other visitors for "to do something with my family" with personal watercraft operators having a mean of 4.7 and non-PWC operators having a mean of 4.2. One experience, which can also be found in Appendix G, listed by respondents in addition to those found in the mail-back survey question was visiting the dam.

Table E.1. Response to “Indicate how important each experience was to you on your most recent visit to the area.”

Experience*	N	Mean	Total sample					PWC operators and those who did not operate PWCs			
			Percent of respondents by response category**					PWC operators		Non-PWC operators	
			1	2	3	4	5	N	Mean	N	Mean
To enjoy the scenery of Lake Powell	184	4.5	4	0	3	23	70	93	4.5	90	4.6
To do something with my family	179	4.4	6	2	7	14	71	88	4.7	90	4.2
To get away from the usual demands of life	178	4.4	2	2	6	32	59	91	4.5	86	4.4
To be with members of my group	171	4.2	4	5	13	28	52	87	4.3	83	4.1
To be with people who enjoy same things I do	177	4.2	4	3	13	33	47	90	4.3	86	4.0
To experience nature	176	4.1	3	5	11	40	42	87	4.2	88	4.1
To experience natural quiet	178	4.0	3	5	17	43	33	88	4.0	89	3.9
To participate in recreational activities	175	4.0	4	8	11	37	40	88	4.0	86	4.0
To relax physically	181	4.0	3	4	14	43	36	91	4.1	89	4.0
To be close to nature	173	3.9	3	5	18	45	30	88	4.0	84	3.9
To use my own equipment	177	3.8	8	8	14	37	34	88	4.0	88	3.7
To have thrills and excitement	177	3.8	6	3	27	35	31	90	3.9	86	3.7
To stargaze	178	3.7	5	10	23	42	22	89	3.8	88	3.6
To be away from other people	173	3.7	5	11	22	36	25	87	3.7	85	3.7
To feel healthier	175	3.7	4	3	32	37	24	89	3.9	85	3.6
To experience solitude	172	3.6	5	8	31	36	22	86	3.5	85	3.7
To experience an undeveloped lake	168	3.5	7	14	29	29	22	83	3.5	84	3.4
To experience new and different things	174	3.5	5	12	25	41	17	89	3.5	84	3.5
To think about my personal values	175	3.5	5	11	36	30	18	87	3.4	87	3.5
To get exercise	179	3.5	6	10	30	38	17	90	3.5	88	3.5
To learn about the cultural history of the area	175	3.4	5	11	31	40	10	87	3.3	87	3.4
To be on my own	177	3.3	9	20	26	30	11	88	3.3	87	3.2
To test my skills and abilities	176	3.2	6	18	36	31	17	89	3.1	86	3.3
To share my skill and knowledge with others	176	3.2	8	12	47	22	9	87	3.2	86	3.1
To challenge myself	174	3.1	8	18	40	23	11	87	3.1	84	3.1
To be creative by doing something such as sketching, painting, taking photographs	169	2.8	18	21	34	18	8	85	2.7	83	2.8
To meet new people	175	2.6	21	26	35	13	6	88	2.6	86	2.5
To participate in ranger-led activities	174	2.1	35	30	31	3	1	88	2.0	85	2.1

Source: Mail-back survey, Question 2.

*Rank ordered by mean importance scores for total sample respondents.

** Responses based on a 5-point scale: 1=very unimportant, 2=unimportant, 3=neither unimportant or important, 4=important, 5=very important.

Bold face = differences between groups are statistically significant at the $p < 0.05$ level.

F. Visitor Benefits

Natural areas provide a myriad of opportunities for visitors to gain psychological and physiological benefits. In fact, the opportunity to reap such benefits is one of the most valuable contributions recreational lands make to improve the well-being of visitors as well as the society in which we live. Whether benefits are personal, societal, economic, or environmental, the positive impact of both onsite and offsite benefits are an important consideration when developing management plans that effectively serve visitors, surrounding communities, and the environment.

To ascertain the benefits respondents derived from their visits to Glen Canyon NRA, they were asked to rate, for the experiences they indicated were either important or very important, along a 4-point scale (1=did not attain, 2=somewhat attained, 3=moderately attained, and 4=totally attained), how well they were able to attain the experiences they desired.

Most desired experiences were reported by respondents as attained, mean score 3.1 or higher, indicating that, overall, visitors were benefitting from their visit to Glen Canyon NRA. Those experiences receiving a low level of attainment, mean score less than 3.0, as reported by respondents were, "to meet new people" (mean 2.7), "to experience solitude" (mean 2.9), "to be away from other people" (mean 2.9), "to participate in ranger-led activities" (mean 2.9), "to learn about the natural history of the area" (mean 2.9), "to learn about the cultural history of the area" (mean 2.9), and "to be on my own" (mean 2.9) (Table F.1). There were no significant differences in experience attainment found between personal watercraft operators and non-PWC operators.

Table F.1. Response to “... for each experience for which you circled either a 4 or 5, please indicate how much you were able to attain each of those experiences.”

Experience*	N	Mean	Total sample				PWC operators and those who did not operate PWCs			
			Percent of respondents by response category**				PWC operators		Non-PWC operators	
			1	2	3	4	N	Mean	N	Mean
To be with members of my group	117	3.9	0	0	14	86	63	3.8	53	3.9
To do something with my family	133	3.8	1	3	14	83	71	3.8	62	3.7
To be with people who enjoy same things I do	126	3.8	0	4	17	79	63	3.8	62	3.7
To enjoy the scenery of Lake Powell	150	3.8	0	3	15	83	73	3.8	76	3.8
To use my own equipment	112	3.7	0	7	17	76	56	3.7	56	3.6
To stargaze	95	3.7	1	4	22	73	50	3.7	45	3.6
To participate in recreational activities	123	3.6	0	7	29	64	62	3.6	60	3.5
To be close to nature	112	3.5	0	5	45	50	57	3.5	54	3.4
To get away from the usual demands of life	141	3.5	1	6	31	61	73	3.6	67	3.5
To have thrills and excitement	100	3.5	0	6	38	56	55	3.5	44	3.5
To experience nature	123	3.4	1	12	37	50	59	3.4	63	3.3
To test my skills and abilities	57	3.4	0	7	51	42	24	3.3	33	3.4
To think about my personal values	70	3.4	1	4	47	47	32	3.4	38	3.4
To get exercise	86	3.4	1	9	42	48	44	3.3	42	3.4
To share my skill and knowledge with others	46	3.4	0	4	52	44	20	3.4	26	3.4
To feel healthier	90	3.4	0	13	37	50	45	3.4	45	3.4
To be creative by doing something such as sketching, painting, taking photographs	38	3.3	0	13	42	45	17	3.2	21	3.4
To relax physically	122	3.3	2	7	46	45	62	3.4	59	3.3
To experience an undeveloped lake	78	3.2	3	21	33	44	37	3.1	41	3.2
To experience new and different things	83	3.2	2	16	43	39	42	3.1	40	3.2
To challenge myself	52	3.2	0	14	56	31	26	3.2	26	3.1
To experience natural quiet	117	3.1	5	23	33	33	61	3.1	56	3.0
To be on my own	69	2.9	4	23	42	42	32	3.1	37	2.9
To learn about the cultural history of the area	72	2.9	6	25	44	44	28	3.1	44	2.8
To learn about the natural history of the area	83	2.9	4	24	51	51	35	3.0	47	2.8
To participate in ranger-led activities	7	2.9	29	0	29	29	1	4.0	6	2.7
To be away from other people	94	2.9	10	20	39	39	48	3.0	46	2.8
To experience solitude	87	2.9	10	24	30	30	39	3.1	48	2.8
To meet new people	104	2.7	13	26	42	42	50	2.7	51	2.7

Source: Mail-back survey, Question 2.

*Rank ordered by mean attainment scores of total sample.

**Responses based on a 4 point scale: 1=did not attain, 2=somewhat attained, 3=moderately attained, 4=totally attained.

G. Potential Problems

Problems visitors experience during their visits can diminish the quality of their experiences and hinder the attainment of benefits they may otherwise have gained. To assess the existence of potential problems at Glen Canyon NRA, respondents evaluated 23 possible situations they may have experienced on their most recent trip to the area. Study participants used a 5-point scale (1=no problem, 2=slight problem, 3=moderate problem, 4=serious problem, 5=very serious problem) to rate each situation.

Overall, respondents did not experience many problematic situations during their visit. Situations rated as most problematic with more than a quarter of respondents stating that the situation was a moderate to very serious problem were “finding beach campsite” (mean 2.1), “finding an unoccupied campsite” (mean 2.0), “litter on beaches and shoreline” (mean 2.0), “people being inconsiderate” (mean 2.0), “unsafe operation of personal watercraft” (mean 2.0), and “boats closer to my boat than I like” (mean 1.9) (Table G.1). A number of significant differences were found between personal watercraft operators and non-PWC operators. Differences were found in the situations “people being inconsiderate,” “unsafe operation of personal watercraft,” “too many personal watercraft on the lake,” “boats closer to my boat than I like,” and “noise from airplanes.” In all these cases personal watercraft operators rated the situation as less problematic than did non-PWC operators. Other situations listed by respondents can be found in appendix G. Some examples include issues with personal watercraft, rental houseboat operators, and bad behavior at campgrounds.

In addition to the list of possible situations they may have experienced, visitors were also asked whether or not they observed unsafe boating practices, and whether or not they felt safe during their visit. In answer to the question “Did you observe any unsafe boating practices on your most recent visit to Glen Canyon NRA?” Thirty-five percent of respondents stated seeing unsafe boating practices (Table G.2). Fewer personal watercraft operators reported seeing unsafe boating practices than did non-PWC operators. Unsafe boating practices reported by respondents can be found in appendix G.

In answer to the question “Did you feel safe on your most recent visit to Glen Canyon NRA?” Ninety-two percent of respondents stated that they did feel safe during their visit (Table G.3). There was a significant difference between personal watercraft operators and non-PWC operators, with 3 percent of personal watercraft operators reporting feeling unsafe compared to 13 percent of other visitors. Reasons for not feeling safe can be found in appendix G.

Table G.1. Situations respondents may have experienced while visiting Glen Canyon NRA.

Situation*	Total sample							PWC operators and those who did not operate PWCs			
	N	Mean	Percent of respondents by response category**					PWC operators		Non-PWC operators	
			No Problem	Slight Problem	Moderate Problem	Serious Problem	Very Serious Problem	N	Mean	N	Mean
Finding beach campsite	166	2.1	42	22	23	9	4	89	2.1	72	2.2
Finding an unoccupied campsite	165	2.0	50	22	18	6	5	83	2.0	76	2.0
Litter on beaches and shoreline	180	2.0	43	27	21	3	6	91	2.0	83	2.1
People being inconsiderate	180	2.0	46	26	17	5	7	89	1.8	86	2.3
Unsafe operation of personal watercraft	181	2.0	51	19	17	6	8	91	1.7	84	2.4
Too many personal watercraft on the lake	180	1.9	57	18	13	3	8	92	1.5	82	2.3
Boats closer to my boat than I like	179	1.9	54	20	15	7	5	91	1.7	82	2.1
Poor water quality	168	1.7	60	19	16	4	3	85	1.8	78	1.7
Unsafe operation of motorized boats	181	1.7	59	24	12	2	3	91	1.6	84	1.8
Too much noise on the lake	185	1.7	59	27	6	5	3	91	1.6	88	1.8
Conflicts with personal watercraft operators on lake	179	1.7	67	15	9	5	5	92	1.4	81	2.0
Evidence of pets and their droppings	181	1.7	59	24	6	6	5	91	1.7	58	1.9
Adequate floating toilet facilities on lake	157	1.7	66	13	12	5	4	77	1.7	75	1.7
Too many motorized boats on the lake	181	1.6	61	23	11	2	3	92	1.6	83	1.7
Human waste on shore or in water	171	1.6	71	16	6	1	6	86	1.5	80	1.7
Sufficient navigational aids on Lake Powell	171	1.5	71	19	6	2	3	88	1.5	77	1.4
Conflicts with others for beach space	177	1.5	69	15	10	4	2	89	1.4	82	1.7
Adequate toilet facilities at landings	179	1.5	72	16	7	4	3	88	1.5	85	1.5
Confusion about rules and regulations	176	1.5	70	18	7	3	2	91	1.5	79	1.6
Lack of National Park Service presence on the lake	172	1.5	75	10	9	4	2	87	1.4	79	1.6
Too many commercial tour boats	180	1.4	81	8	7	3	2	89	1.3	84	1.4
Evidence of livestock	174	1.3	84	8	5	1	3	88	1.2	80	1.5
Too much light on lake at night	179	1.2	91	6	1	2	1	91	1.1	82	1.2
Noise from airplanes	180	1.2	90	6	3	1	1	90	1.1	84	1.3
Too much light at the marinas at night	171	1.1	92	5	2	0	1	87	1.1	78	1.1
Evidence of mining operations	170	1.1	95	3	1	1	1	86	1.1	78	1.1
Enough ranger-led activities	127	1.1	94	2	3	1	1	64	1.2	60	1.1

Source: Mail-back survey, Question 7.

*Rank ordered by mean scores of total sample.

**Responses based on a 5-point scale: 1=no problem, 2=slight problem, 3=moderate problem, 4=serious problem, 5=very serious problem.

Bold face = differences between groups are statistically significant at the p<0.05 level.

Table G.2. Response to: “Did you observe any unsafe boating practices on your most recent visit to Glen Canyon National Recreation Area?”

Observed unsafe boating practices	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
No	122	65	65	70	51	57
Yes	67	35	28	30	38	43
Total	189	100	93	100	89	100

Source: Mail-back survey, Question 9.

Table G.3. Response to: “Did you feel safe on your most recent visit to Glen Canyon National Recreation Area?”

Felt safe	Total sample		PWC operators		Non-PWC operators	
	N	Percent	N	Percent	N	Percent
Yes	174	92	90	97	77	87
No	15	8	3	3	12	13
Total	189	100	93	100	89	100

Source: Mail-back survey, Question 10.

Bold face = differences between groups are statistically significant at the $p < 0.05$ level.

H. Crowding at Specific Locations

It is important to recognize that different types of visitors may have different perceptions of crowding and that their perceptions are often based on the types of experiences they seek. As recreational use of natural areas increases, crowding has the potential to impede the attainment of visitors' desired experiences, particularly for visitors seeking solitude. Perceptions of feeling crowded can lead to changes in visitor behavior and use patterns. For example, visitors may choose to recreate at a site during seasons when use is not as intense. For some visitors, crowding may interfere with their recreational goals to the point where they select alternative sites to pursue their desired experiences. Displacement becomes problematic when suitable substitutes are difficult to find or are simply unavailable.

To determine sites of potential crowding at Glen Canyon NRA, study participants were asked to evaluate the acceptability of their encounters at five locations within the area. Using a 7-point scale (1=very unacceptable, 7=very acceptable), respondents rated the acceptability of encounters with watercraft for each location they had visited. Respondents who stated that they encountered an unacceptable number of watercraft were then asked to provide the reasons for unacceptable encounters. These reasons could be the number of watercraft, the type of watercraft, something else, or a combination of the three.

The majority of respondents, 74 percent or more in all locations, indicated that all the listed locations (on the lake surface, on the lake shore, at fueling docks, at boat landings, while at a campsite) had acceptable numbers of watercraft based on a score of 4.9 or higher (Table H.1). For those who stated there were unacceptable numbers of watercraft, the reason most often given was the number of watercraft, except for at boat landings where they type of watercraft was indicated as the largest problem. There was a significant difference between personal watercraft operators and non-PWC operators regarding the acceptability of watercraft numbers at campsites with personal watercraft operators having a mean score of 5.6 (Table H.2) and non-PWC operators having a mean score of 4.9 (Table H.3).

Table H.1 Acceptability of the number of watercraft at various locations while visiting Glen Canyon NRA, by *total sample*.

Location*	N	Mean	Percent of respondents by acceptability of watercraft numbers**							N	If respondent circled 1, 2, or 3: Reasons for unacceptable encounters			
			Very unacceptable			Very acceptable					Number of watercraft	Type of watercraft	Something else	Number, type, and something else
			1	2	3	4	5	6	7					
On the lake surface	175	5.3	2	2	5	17	25	25	24	14	21	21	7	50
On the lake shore	167	5.3	1	4	5	16	28	23	23	16	63	0	0	38
While at campsite	149	5.3	3	3	7	15	24	16	31	17	41	6	12	41
At fueling Docks	137	5.1	4	8	8	10	21	21	28	23	78	4	9	9
At boat landings	163	4.9	4	5	12	15	26	17	22	30	0	60	20	20
Other	13	4.5	31	0	0	15	0	15	39	4	25	0	25	50

Source: Mail-back survey, Question 8.

*Rank ordered by mean scores of total sample.

**Responses based on a 7-point scale: 1= very unacceptable through 7= very acceptable.

Table H.2. Acceptability of the number of watercraft at various locations while visiting Glen Canyon NRA, by *PWC operators*.

Location*	N	Mean	Percent of respondents by acceptability of watercraft numbers**							N	If respondent circled 1, 2, or 3: Reasons for unacceptable encounters			
			Very unacceptable			Very acceptable					Number of watercraft	Type of watercraft	Something else	Number, type, and something else
			1	2	3	4	5	6	7					
While at campsite	75	5.6	0	4	7	12	20	21	36	8	63	0	13	25
On the lake surface	88	5.5	0	1	3	15	35	19	26	4	50	25	25	0
On the lake shore	84	5.4	0	4	6	13	32	20	25	8	100	0	0	0
At fueling Docks	72	5.1	1	11	7	10	26	15	29	13	85	0	0	15
At boat landings	82	4.8	2	9	15	11	27	13	23	18	0	61	11	28
Other	4	5.3	25	0	0	0	0	25	50	1	100	0	0	0

Source: Mail-back survey, Question 8.

*Rank ordered by mean scores of total sample.

**Responses based on a 7-point scale: 1= very unacceptable through 7= very acceptable.

Bold face = differences between PWC operators and non-PWC operators are statistically significant at the p<0.05 level.

Table H.3. Acceptability of the number of watercraft at various locations while visiting Glen Canyon NRA, by *non-PWC operators*.

Location*	N	Mean	Percent of respondents by acceptability of watercraft numbers**							N	If respondent circled 1, 2, or 3: Reasons for unacceptable encounters			
			Very unacceptable			Very acceptable					Number of watercraft	Type of watercraft	Something else	Number, type, and something else
On the lake surface	81	5.2	5	3	6	19	15	31	22	10	10	20	0	70
On the lake shore	77	5.2	3	4	4	18	25	26	21	7	14	9	0	86
At fueling Docks	59	5.2	7	3	7	12	17	28	28	9	67	11	22	0
At boat landings	76	4.9	7	3	7	20	25	20	20	11	0	55	36	9
While at campsite	70	4.9	7	3	9	17	30	10	24	9	22	11	11	56
Other	8	4.3	38	0	0	13	0	13	38	3	0	0	33	67

Source: Mail-back survey, Question 8.

*Rank ordered by mean scores of total sample.

**Responses based on a 7-point scale: 1= very unacceptable through 7= very acceptable.

Bold face = differences between PWC operators and non-PWC operators are statistically significant at the $p < 0.05$ level

I. Management Actions

An understanding of visitors' management preferences can aid the development of management actions that address issues of PWC use, protects the resource, and provides quality recreational opportunities. Respondents level of support or opposition for 26 specific actions at Glen Canyon NRA was determined by examining their responses as rated on a 5-point scale (1=strongly oppose, 2=oppose, 3=neither oppose nor support, 4=support, 5=strongly support).

More than 75 percent of respondents supported the management action to provide more information to visitors about appropriate behavior. The management actions supported or strongly supported by at least half the total sample were to “aggressively enforce safety rules and regulations on lake,” “provide visitors with natural history information about the area,” “use management controls to prevent damage to the environment by visitors,” “provide more toilet facilities at landings,” “provide more park rangers on the lake to educate visitors about appropriate behavior,” and to “establish ‘off-limit’ zones to protect sensitive resources” (Table I.1). More than three-quarters of the total sample opposed or strongly opposed “prohibiting motorized watercraft on the lake,” “prohibiting nonmotorized watercraft on the lake,” and “prohibiting personal watercraft on the lake.” Sixty percent or more of the total sample opposed or strongly opposed “limiting the number of people per group allowed on the lake,” “restricting the number of people using the lake at any one time,” “limiting the number of nonmotorized watercraft allowed on the lake at any one time,” and “limiting the number of motorized watercraft allowed on the lake at any one time.”

Significant differences were found between personal watercraft operators and non-PWC operators concerning four potential management actions, to “restrict personal watercraft use to designated areas only,” “to zone the waters to provide specific uses at specific places,” “to limit the number of personal watercraft allowed on the lake at any one time,” and to “prohibit personal watercraft on the lake.” Compared to non-PWC operators, personal watercraft operators indicated stronger opposition to these possible management actions. Other management actions proposed by visitors can be found in appendix G.

Table I.1. Response to: “Given the conditions in the Glen Canyon National Recreation Area, to what extent do you ‘oppose’ or ‘support’ each of the following possible management actions.”

Management action*	Total sample							PWC operators and those who did not operate PWCs			
	N	Mean	Percent of respondents by response category**					PWC operators		Non-PWC operators	
			Strongly Oppose	Oppose	Neither support nor oppose	Support	Strongly Support	N	Mean	N	Mean
Provide more information to visitors about appropriate behavior	186	4	3	3	19	43	33	91	3.9	90	4.1
Aggressively enforce safety rules and regulations on lake	185	3.7	5	7	22	41	24	90	3.7	90	3.8
Provide visitors with natural history information about the area	184	3.7	2	3	34	46	16	91	3.7	88	3.7
Use management controls to prevent damage to the environment by visitors	184	3.7	7	5	22	42	24	91	3.7	88	3.8
Provide more toilet facilities at landings	183	3.7	2	3	32	44	19	91	3.8	87	3.7
Provide more park rangers on the lake to educate visitors about appropriate behavior	185	3.6	5	7	30	40	18	90	3.5	90	3.7
Improve public access to the lake	184	3.3	11	18	24	27	21	90	3.3	89	3.3
Expand the number of marina slips	185	3.3	7	12	38	29	15	91	3.4	89	3.2
Use management controls to prevent conflicts between lake users	181	3.3	6	12	39	35	9	91	3.2	85	3.5
Establish “off-limit” zones to protect sensitive resources	184	3.2	17	11	19	37	16	90	3.3	99	3.3
Require visitors to learn about appropriate behavior on the lake (e.g., watch a short video presentation)	181	3.0	13	20	32	22	13	90	2.9	87	3.2
Prohibit drinking alcoholic beverages on the lake	185	2.8	31	17	14	15	23	91	2.7	89	3.0
Restrict personal watercraft use to designated areas only	183	2.7	31	20	12	19	19	89	2.2	89	3.3

Table I.1 Continued.

Management action*	Total sample							PWC operators and those who did not operate PWCs			
	N	Mean	Percent of respondents by response category**					PWC operators		Non-PWC operators	
			Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support	N	Mean	N	Mean
Restrict further facility development and expansion	184	2.7	19	24	33	17	7	90	2.6	89	2.7
Close area to pets	186	2.7	24	18	32	15	11	91	2.6	90	2.9
Zone the waters to provide specific uses at specific places	184	2.6	31	20	19	21	10	90	2.4	89	2.8
Limit number of personal watercraft allowed on lake at any one time	186	2.5	34	19	18	17	11	91	2.1	90	2.9
Limit number of boats allowed on lake	181	2.4	31	27	21	16	6	88	2.3	88	2.4
Limit number of houseboats allowed on lake at any one time	184	2.4	33	23	24	14	6	91	2.2	88	2.5
Limit number of motorized watercraft allowed on lake at any one time	184	2.3	35	25	22	14	4	91	2.1	88	2.4
Limit number of nonmotorized watercraft allowed on lake at any one time	185	2.0	41	28	25	5	2	91	2.0	89	2
Restrict number of people using lake at any one time	185	2.0	40	30	20	10	1	91	2.0	89	2
Limit number of people <i>per group</i> allowed on lake	185	2.0	42	30	17	9	3	91	1.9	89	2
Prohibit personal watercraft on the lake	185	1.9	52	24	14	4	5	91	1.5	89	2.3
Prohibit nonmotorized watercraft on the lake	184	1.7	52	32	11	3	2	90	1.7	89	1.7
Prohibit motorized watercraft on the lake	184	1.4	70	21	9	1	0	91	1.4	89	1.5

Source: Mail-back survey, Question 11.

*Rank ordered by mean scores of total sample.

**Responses based on a 5-point scale: 1=strongly oppose, 2=oppose, 3=neither support or oppose, 4=support, 5=strongly support.

Bold face = differences between groups are statistically significant at the $p < 0.05$ level.

J. Service Quality and Visitor Satisfaction

Visitor feedback regarding satisfaction with their experiences and their ideas regarding services that they would like to see offered at Glen Canyon NRA is important to evaluating how well visitors perceive their needs are being met. Additionally, this information can help determine visitors' satisfaction with their visits and how well they were able to attain their desired experiences and receive the associated benefits.

Respondents were asked to rate their satisfaction with the services provided at Glen Canyon NRA. Items were rated by respondents on a scale from 1= dissatisfied, 2= somewhat dissatisfied, 3= neither dissatisfied nor satisfied, 4= somewhat satisfied, 5= satisfied. Overall, visitors were satisfied with the quality of services at Glen Canyon NRA. When asked about their overall experience the majority (63 percent) stated that they were satisfied (Table J.1). With the exception of "concessionaire lodging," "park-ranger led activities," and "concessionaire assistance," all services received a mean score of at least 4.0 (somewhat satisfied). There were no statistically significant differences between personal watercraft operators and non-PWC operators. Other activities and services suggested by respondents can be found in appendix G.

Visitors were asked to rate their level of agreement with a number of statements about Glen Canyon NRA. Items were ranked by respondents on a scale from 1= strongly disagree, 2= disagree, 3= neither disagree nor agree, 4= agree, 5= strongly agree. Visitors enjoyed their visit to Glen Canyon NRA. The majority of respondents (98 percent) agreed or strongly agreed with the statement, "I enjoyed my time on Lake Powell" (Table J.2). Likewise, 96 percent of all respondents agreed or strongly agreed with the statement, "Overall, I was satisfied with my most recent trip to Glen Canyon." Seventy-seven percent or more agreed or strongly agreed with the statements "I enjoyed the natural quiet," "my camping experience was improved by the quality of the night sky," and "I thought the area and its surroundings were in good condition." More than 80 percent of respondents disagreed or strongly disagreed with the statements "I did not have the kind of experience I was looking for," and "the trip was not worth the money it cost."

Statistically significant differences were found between personal watercraft operators and other visitors for six of the statements. Personal watercraft operators had higher mean scores for the statements "I enjoyed the natural quiet" and "my camping experience was improved by the quality of the night sky." Personal watercraft operators had lower mean scores for the statements "I enjoyed the interpretive programs," "the presence of personal watercraft interfered with the quality of my boating experience," "I stayed off the lake during certain parts of the day because there were too many boats on the lake," and "I did not have the kind of experience I was looking for."

Table J.1. Response to “How satisfied were you with the quality of the services provided for you at Glen Canyon National Recreation Area.”

Service*	Total sample							PWC operators and those who did not operate PWCs					
	N	Mean	Percent of respondents by response category**					N	Mean	PWC operators		Non-PWC operators	
			Dissatisfied	Somewhat dissatisfied	Neither dissatisfied nor satisfied	Somewhat satisfied	Satisfied			N	Mean	N	Mean
Overall quality of services	179	4.4	0	9	7	21	63	86	4.4	88	4.3		
Visitor information	152	4.3	1	6	20	13	60	71	4.2	76	4.3		
Facilities within the area	171	4.2	3	7	14	18	59	84	4.2	82	4.2		
Exhibits and other educational material	146	4.1	1	7	27	14	51	68	3.9	74	4.1		
Concessionaire retail stores	160	4.1	3	9	18	19	53	73	4.1	82	4.1		
National Park Service employee assistance	120	4.1	3	7	22	11	58	57	4.2	60	4.1		
Concessionaire food service	143	4.0	5	13	15	17	50	65	4.0	73	4.0		
Concessionaire lodging	112	3.9	5	8	30	12	46	47	3.9	60	3.8		
Park ranger-led activities	87	3.9	3	5	37	7	48	39	3.8	46	4.0		
Concessionaire assistance	135	3.9	2	13	26	15	47	66	3.9	66	4.0		

Source: Mail-back survey, Question 12.

*Rank ordered by mean score of total sample.

**Responses based on a 5-point scale: 1=dissatisfied, 2=somewhat dissatisfied, 3=neither dissatisfied nor satisfied, 4=somewhat satisfied, 5=satisfied.

Table J.2. Extent to which respondents agreed with statements about their most recent visit to Glen Canyon NRA.

Statement*	Total sample							PWC operators and those who did not operate PWCs			
	N	Mean	Percent of respondents by response category**					PWC operators	Non-PWC operators		
			Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	N	Mean	N	Mean
I enjoyed my time on Lake Powell	187	4.6	0	1	1	31	67	92	4.7	90	4.6
Overall, I was satisfied with my most recent trip to Glen Canyon	187	4.5	1	1	2	39	57	92	4.6	90	4.4
I enjoyed the natural quiet	186	4.1	1	5	10	53	31	92	4.2	89	3.9
My camping experience was improved by the quality of the night sky	183	4.1	0	2	21	39	38	89	4.3	89	4.0
I thought the area and its surroundings were in good condition	184	4.0	1	6	8	63	22	90	3.9	89	4.1
I enjoyed the interpretive programs	170	3.1	1	1	85	11	2	85	3.1	80	3.2
I avoided parts of the lake because there were too many boats there	186	2.7	22	28	20	23	8	92	2.6	89	2.8
The lighting at the marinas positively affected my visit	185	2.7	17	15	55	7	6	92	2.7	88	2.7
The presence of personal watercraft interfered with the quality of my boating experience	184	2.4	29	30	22	9	10	91	2.0	88	2.8
I stayed off the lake during certain parts of the day because there were too many boats on the lake	185	2.0	34	40	18	6	2	91	1.9	89	2.2
The trip was not worth the money it cost	185	1.9	43	40	11	4	3	91	1.8	89	1.9
I did not have the kind of experience I was looking for	184	1.7	50	39	4	7	1	92	1.6	87	1.9

Source: Mail-back survey, Question 14.

*Rank ordered by mean scores of total sample.

**Responses based on a 5-point scale: 1=strongly disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=strongly agree.

Bold face = differences between groups are statistically significant at the $p < 0.05$ level.

K. Open-ended Comments

Study participants were asked to offer comments about their visit, or suggestions about managing Glen Canyon NRA. More than half (56 percent) the respondents offered open-ended comments about their visit to Glen Canyon NRA (Table I.1). While this is anecdotal information, it gives managers insight into other aspects of visitors' perceptions and opinions. Comments ranged from simple to comprehensive and include suggestions about services and management, complimentary statements about visitors' experiences, and opinions about situations on the lake. Appendix H lists verbatim comments made by respondents on the mail-back survey.

Table K.1. Open-ended comments.

Open-ended Comments	Total sample	
	N	Percent
Yes	107	56
No	84	44
Total	191	100

Source: Mail-back survey, Question 20.

Discussion and Recommendations

Findings of the third phase of the three-part visitor study at Glen Canyon NRA allow managers, planners, and others to understand the characteristics and perspectives of summer visitors better. In addition to providing basic demographic information, the study gives insight into visitor motives, benefits derived from experiences at the NRA, potential problems, perceptions of crowding, degree of support for specific management actions, and general visitor satisfaction. Without such information, decisions affecting future management of Glen Canyon NRA would be based primarily on speculation of visitor experiences and opinions.

Comparisons were conducted between two groups of visitors to Glen Canyon NRA, PWC operators and non-PWC operators. PWC operators made up half the summer sample, and were an average of 38 years old. There was a fairly even gender breakdown among PWC operators, 55 percent were male and 45 percent were female. Most were from Utah, Colorado, or Arizona. Almost half were college graduates, and 72 percent had incomes of \$40,000 or more. They tended to travel in large groups with a mean size of nine, made up primarily of family and friends. Most were repeat visitors to the Glen Canyon NRA. Their visits to the area lasted an average of five nights. Most spent some time overnight on Lake Powell. The activities they participated in most frequently were water oriented and included swimming, motorboating, camping at shoreline sites, participating in watersports, fishing, and using a PWC.

Many PWC operators also were associated with houseboat use. Slightly more than one-third reported that a houseboat was their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that include Wahweap, Bullfrog, and Halls marinas. Visiting Glen Canyon was the primary purpose for more than 80 percent of them. Experiences they wanted to have while visiting Glen Canyon NRA included doing something with their family, enjoying the scenery of Lake Powell, getting away from the usual demands of life, being with members of their group, being with people who enjoy the same things they do, experiencing nature, relaxing physically, experiencing natural quiet, participating in recreational activities, being close to nature and using their own equipment.

Non-PWC operators made up half the summer sample, and were an average of 44 years old. There were more males (65 percent) than females (35 percent). As with PWC operators most were from Utah, Colorado, or Arizona. Slightly more than half were college graduates, and 79 percent had incomes of \$40,000 or more. Group sizes were slightly smaller than those of PWC operators with a mean size of six people, made up primarily of family and friends. Most were repeat visitors to Glen Canyon NRA. Their visits to the area are slightly longer than PWC operators, lasting an average of seven nights. Most spent nights on Lake Powell or in a campground. The activities they participated in most frequently were motorboating, swimming, and camping at shoreline campsites.

Most non-PWC operators traveled by powerboat, with 75 percent reporting that a powerboat was their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that include Wahweap marina, Rainbow Bridge, Bullfrog and Halls marinas and the Defiance House ruins. Visiting Glen Canyon was the primary purpose for 90 percent of them. Glen Canyon NRA experiences important to them during their visit to the area included enjoying the scenery of Lake Powell, getting away from the usual demands of life, doing something with their family, being with members of their group, experiencing nature, being with people who enjoy the same things they do, participating in recreational activities, and relaxing physically.

Analysis of visitor data indicated that there were some statistically significant differences between PWC and non-PWC operators. There were some significant differences in demographics, activity participation, situations experienced, perceptions of safety, perceptions of crowding, and support of various management actions to address problems. Identifying and evaluating these differences can help managers understand the scope of potential and real conflict occurring at Glen Canyon and can provide them a basis with which to institute various management actions designed to reduce and manage conflict between these two groups at Glen Canyon NRA.

Conflict can be simply defined as real or perceived goal blocking caused by the behavior of others. Four components have been identified as possible sources of conflict. They are differences in activity style, resource specificity, mode of experience, and lifestyle tolerance (Jacob and Schreyer 1980). Levels of potential conflict can be assessed by looking for differences between PWC operators and non-PWC operators in these four categories.

Activity style refers to differences in activity participation and method of pursuing an activity. Conflict could arise if these activities were perceived as being exclusive of each other and were occurring in the same geographic location. For example a PWC operator who is seeking thrills and performing stunts on PWCs may interfere with the ability of an angler to stalk fish. The angler's goal of catching fish would be blocked. Compared to non-PWC operators, PWC operators are more likely to engage in activities such as swimming, participating in watersports, fishing, and using a personal watercraft. Non-PWC operators, though, are more likely than PWC operators to bird watch, ride the tour boat, and camp at primitive back country sites. Not all these differences in activity participation would necessarily cause conflict.

Resource specificity refers to the level of value a visitor holds to a specific resource, in this case Lake Powell. Conflict could arise if both subgroups have a high level of place attachment to Lake Powell and its surrounding environs. If the subgroups are different in terms of their activity style, mode of experience, and have low lifestyle tolerance, this could result in competition for the resource. Resource specificity can be assessed by two factors, the importance of visitors' motives toward visiting the area and the number of visits they have made to Glen Canyon NRA in the past. The majority of both PWC and non-PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit to the area,

and both had a relatively high median number of previous visits, indicating that place attachment to Lake Powell may be high. If both groups hold a strong sense of attachment to Lake Powell and that attachment is based on different reasons, they may be more likely to come into conflict because they have to share or compete for an important resource.

Mode of experience refers to the types of experiences visitors desire during their visit to Glen Canyon NRA and can be assessed by the level of importance respondents ascribed to those experiences. Experiences that are exclusive of each other have the potential of causing conflict if those experiences are sought after in the same geographic location. For example, if a PWC operator is desirous of achieving the experience “to be on my own” and a houseboat operator is trying to achieve the experience “to meet new people” and they are camped in the same area, there is the potential for conflict. Visitor data indicated the only significantly different desired experience between the two subgroups was “to do something with my family,” and it was rated by both groups as important to very important. This makes it unlikely that the mode of experience between the two groups differs enough to create conflict.

Lifestyle tolerance refers to the degree of acceptance an individual has toward people who are different from one another. In this case that would mean people who have different activity styles and modes of experience. Data on safety, crowding, and visitor support of management actions can be used to determine respondents’ sensitivity to other resource users. For example, a non-PWC operator who has never had direct contact with PWC operators and strongly supports management that would ban PWCs from the area, is probably indicative of low lifestyle tolerance. Visitor data indicated that non-PWC operators were slightly more likely to observe unsafe operation of watercraft than were PWC operators, and they were more likely to feel unsafe than were PWC operators. There was one significant difference in visitors’ perception of crowding, non-PWC operators thought the number of watercraft at campsites was less acceptable than did PWC operators. Non-PWC operators were also significantly more likely to support management actions such as restricting PWC use to designated areas only, zoning the waters to provide specific uses at specific places, limiting the number of PWCs allowed on the lake at any one time, and prohibiting PWCs on the lake. Taken as a whole, this indicates that non-PWC operators may be slightly less tolerant of PWC operators than the reverse and may therefore be more sensitive to conflict with PWC operators.

Given that differences between the groups were generally slight, it appears that there is not much direct conflict occurring between PWC and non-PWC operators at Glen Canyon NRA during the summer use period. There are still some potential areas for conflict that could be addressed by management to reduce further the possibility of conflict and ensure the opportunity for visitors to obtain high quality experiences and the attainment of desired benefits. Management controls to prevent conflicts between PWC and non-PWC operators such as restricting or limiting PWC use to specific areas may be appropriate. These actions might be particularly appropriate in zones with low overall use and high potential for providing solitude opportunities such as the western portion of zone 9 (Escalante River) and zone 8 (San Juan River). Other generally acceptable management actions that address conflict

include providing more information to visitors about appropriate behavior and aggressively enforcing safety rules and regulations on the lake. These actions would address some of the safety concerns expressed by visitors such as the unsafe operation of PWCs, which was among the highest ranked problems at Glen Canyon.

Growing numbers of recreationists along with the evolution of new outdoor recreation equipment will continue to challenge managers and planners as they seek to protect biophysical resources while providing opportunities for quality visitor experiences. At Glen Canyon NRA, study results show that respondents reported few problems and were generally satisfied with their experiences and the condition of the surroundings at Lake Powell. However, to ensure that current levels of satisfaction are maintained for future visitors, close attention should be given to strategies designed to minimize conflict so that Glen Canyon NRA can continue to provide a range of recreational opportunities for visitors that will result in diverse and valuable benefits to visitors, society, and the environment.

Literature Cited

- Dillman, D. 2000. *Mail and Internet Surveys: The Tailored Design Method*. New York: J. Wiley and Sons
- Jacob, G., and R. Schreyer. 1980. Conflict in outdoor recreation: A theoretical perspective. *Journal of Leisure Research* 12, 368-80.

Appendix A

Onsite Survey



Glen Canyon National Recreation Area Visitor Survey

Date: _____

Location: _____

Group # _____ Individual # _____

Thank you for visiting Glen Canyon National Recreation Area! Your willingness to complete this form is appreciated. Your feedback will provide us with important information and will be used to enhance visitor services and improve resources management in the area.

Name (please print): _____

Permanent mailing address: _____

City: _____ State: _____ ZIP Code: _____

1. Approximately how many times (*ever*) have you visited Glen Canyon National Recreation Area?

____ Total number of visits (*including this visit*)

2. While visiting the Glen Canyon area on this trip how many nights did you spend?

____ I did not spend any nights in the Glen Canyon area

____ On Lake Powell ____ In a campground ____ In an area hotel/motel ____ at home ____ other
(specify):

3. Visiting Glen Canyon National Recreation Area is (*check one*)

____ The primary purpose of my visit to the area

____ One of several important things I planned to do during my visit to the area

____ Something I decided to do *after* arriving in the area.

4. What is your gender? ____ Female ____ Male

5. What is your age? _____ years

6. We would like to know more about your visit to Glen Canyon National Recreation Area. Would you be willing to fill out a mailback questionnaire about your experience while visiting the Glen Canyon area? Your involvement is voluntary. Completing the questionnaire will take less than 20 minutes and the results will be completely confidential.

____ Yes, I am willing to complete a mailback questionnaire.

____ No

Thank you!

Appendix B

Group Log



Glen Canyon National

 Recreation Area Visitor Survey
Group Log

Group #:

completed cards from group:

Date: _____ Location of contact: _____

Launch date: _____ Launch site: _____

ZONE(s) where spent most of time on lake (show group the map and ask them to point out the location):

1 2 3 4 5 6 7 8 9 10 11 12 13

Number of people in party: _____ people

Type of group: ___ Alone ___ Family and friends ___ Business ___ Tour ___ Other

Type and Number of watercraft used on this trip (enter number by each type of watercraft)

___ No watercraft used during visit

___ Houseboat	___ Canoe
___ Powerboat	___ Kayak
___ Personal watercraft	___ Sailboat
___ Raft (motor)	___ Inflatable toys
___ Raft (no motor)	___ Other (specify):

Number and type of pets traveling with group: _____ Number of pets. Type of Pets: _____

Notes:

Appendix C

Mail-Back Survey



Glen Canyon National Recreation Area 1999-2000 Visitor Survey

OMB # #1024-0224 (NPS99-024)
Expires: 5/31/01

Survey # _____

Date Contacted in the Recreation Area _____

Dear visitor,

Thank you for agreeing to share your opinions about your most recent visit to Glen Canyon National Recreation Area! This study is being conducted as a joint effort between the University of Minnesota and the National Park Service. Your feedback will provide us with important information and will be used to enhance visitor services and improve resources management at Glen Canyon National Recreation. For more information about Glen Canyon National Recreation Area, please visit the web site at www.nps.gov/glca or contact the office at (520) 608-6200.



About Your Trip to Glen Canyon National Recreation Area

1. Please look at the list of activities below. Place a check next to the primary activities you spent time doing during your most recent visit to Glen Canyon National Recreation Area (*check all that apply*).

- | | |
|--|--|
| <input type="checkbox"/> Hiking in front-country | <input type="checkbox"/> Sailing |
| <input type="checkbox"/> Hiking in back-country | <input type="checkbox"/> Paddling (canoe or kayak) |
| <input type="checkbox"/> Hiking Lake Powell side canyons | <input type="checkbox"/> Using a personal watercraft |
| <input type="checkbox"/> Camping at developed campsites
(main marina locations) | <input type="checkbox"/> Participating in water sports |
| <input type="checkbox"/> Camping at shoreline campsites | <input type="checkbox"/> Swimming |
| <input type="checkbox"/> Camping at primitive sites in the back-country | <input type="checkbox"/> Mountain Biking |
| <input type="checkbox"/> Fishing | <input type="checkbox"/> Driving (Burr Trail, Hole in the Rock Road) |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Visiting archaeological sites |
| <input type="checkbox"/> Tour boat ride | <input type="checkbox"/> Bird watching |
| <input type="checkbox"/> Motor boating | <input type="checkbox"/> Wildlife watching |
| | <input type="checkbox"/> Other (please list) _____ |

Reasons for Your Visit to Glen Canyon National Recreation Area

2. Below is a list of possible experiences visitors may have while visiting the Glen Canyon National Recreation Area. Please look over the list of possible experiences. After you have looked over the list, indicate how important each experience was to you on your most recent visit to the area. Then, *for each experience for which you circled either a 4 or 5*, please indicate how much you were able to attain each of those experiences.

Experience	Very Unimportant	Unimportant	Neither Unimportant Nor Important	Important	Very Important	Did not Attain	Somewhat Attained	Moderately Attained	Totally Attained
To be on my own	1	2	3	4	5	1	2	3	4
To use my equipment	1	2	3	4	5	1	2	3	4
To experience an undeveloped lake	1	2	3	4	5	1	2	3	4
To experience nature	1	2	3	4	5	1	2	3	4
To experience natural quiet	1	2	3	4	5	1	2	3	4
To do something with my family	1	2	3	4	5	1	2	3	4
To be with members of my group	1	2	3	4	5	1	2	3	4
To be with people who enjoy same things I do	1	2	3	4	5	1	2	3	4
To meet new people	1	2	3	4	5	1	2	3	4
To participate in recreational activities	1	2	3	4	5	1	2	3	4
To learn about the cultural history of the area	1	2	3	4	5	1	2	3	4
To learn about the natural history of the area	1	2	3	4	5	1	2	3	4
To participate in ranger-led activities	1	2	3	4	5	1	2	3	4
To experience new and different things	1	2	3	4	5	1	2	3	4
To test my skills and abilities	1	2	3	4	5	1	2	3	4
To stargaze	1	2	3	4	5	1	2	3	4
To enjoy the scenery of Lake Powell	1	2	3	4	5	1	2	3	4
To think about my personal values	1	2	3	4	5	1	2	3	4
To be close to nature	1	2	3	4	5	1	2	3	4
To challenge myself	1	2	3	4	5	1	2	3	4
To be creative by doing something such as sketching, painting, taking photographs	1	2	3	4	5	1	2	3	4
To get exercise	1	2	3	4	5	1	2	3	4
To be away from other people	1	2	3	4	5	1	2	3	4
To relax physically	1	2	3	4	5	1	2	3	4
To experience solitude	1	2	3	4	5	1	2	3	4
To get away from the usual demands of life	1	2	3	4	5	1	2	3	4
To have thrills and excitement	1	2	3	4	5	1	2	3	4
To share my skill and knowledge with others	1	2	3	4	5	1	2	3	4
To feel healthier	1	2	3	4	5	1	2	3	4

Other (specify): _____

About Your Watercraft Use

3. During your most recent visit to Glen Canyon National Recreation Area, what was your primary method of travel while on the water? (*Check one.*)

- | | |
|---|------------------------------------|
| <input type="checkbox"/> Houseboat | <input type="checkbox"/> Powerboat |
| <input type="checkbox"/> Personal watercraft | <input type="checkbox"/> Sailboat |
| <input type="checkbox"/> Canoe | <input type="checkbox"/> Kayak |
| <input type="checkbox"/> Other (describe) _____ | |

4. Did you own or rent the watercraft you used for your primary method of travel? (*Check one.*)

- Own
 Co-own/multiple owner
 Rent from local company in town
 Rent houseboat from concessionaire
 Rent powerboat from concessionaire
 Other (specify): _____

5. Have you ever taken a class in personal watercraft operation and safety?

- Yes
 No

6. On your most recent trip to the Glen Canyon National Recreation Area:

a. Did you operate a personal watercraft?

- No (**if no GO TO QUESTION 7**)
 Yes

b. Did you use:

- your own personal watercraft
 a friend's personal watercraft
 a rental personal watercraft
 from town
 from concessionaire

c. What method did you use for refueling your personal watercraft? (*Check all that apply.*)

- did not refuel personal watercraft
 brought own fuel from home
 purchased fuel in the area
 gas dock
 gas station
 gas can on the water
 gas can on shore

d. As a personal watercraft user how did you dispose of human waste while on the water? (*check all that apply*)

- Use a marine toilet aboard a support vessel
 Use facilities provided at landings
 Use floating restrooms provided on Lake Powell
 Carry a portable toilet
 Other method of waste disposal, please specify _____

Situations Experienced in the Area

7. This question concerns possible situations you may have experienced while visiting Glen Canyon National Recreation Area. Please evaluate each situation below. (Circle one number that best describes how much of a problem, if any, you found each to be.)

Situation	No Problem	Slight Problem	Moderate Problem	Serious Problem	Very Serious Problem	Don't Know
Finding an unoccupied campsite	1	2	3	4	5	6
Finding beach campsite	1	2	3	4	5	6
Litter on beaches and shoreline	1	2	3	4	5	6
Poor water quality	1	2	3	4	5	6
Sufficient navigational aids on Lake Powell	1	2	3	4	5	6
People being inconsiderate	1	2	3	4	5	6
Too many motorized boats on the lake	1	2	3	4	5	6
Too many personal watercraft on the lake	1	2	3	4	5	6
Too many commercial tour boats	1	2	3	4	5	6
Unsafe operation of motorized boats	1	2	3	4	5	6
Unsafe operation of personal watercraft	1	2	3	4	5	6
Boats closer to my boat than I like	1	2	3	4	5	6
Too much noise on the lake	1	2	3	4	5	6
Conflicts with others for beach space	1	2	3	4	5	6
Conflicts with personal watercraft operators on lake	1	2	3	4	5	6
Evidence of pets and their droppings	1	2	3	4	5	6
Adequate toilet facilities at landings	1	2	3	4	5	6
Adequate floating toilet facilities on lake	1	2	3	4	5	6
Human waste on lake shore or in water	1	2	3	4	5	6
Confusion about rules and regulations	1	2	3	4	5	6
Too much light on the lake at night	1	2	3	4	5	6
Too much light at the marinas at night	1	2	3	4	5	6
Evidence of livestock	1	2	3	4	5	6
Evidence of mining operations	1	2	3	4	5	6
Lack of National Park Service presence on the lake	1	2	3	4	5	6
Enough ranger-led activities	1	2	3	4	5	6
Noise from airplanes	1	2	3	4	5	6
Other things (please specify) _____						

8. We would like to know how you felt about seeing different numbers of watercraft at various locations during your most recent visit to Glen Canyon. Complete columns A and B for each location you visited in Glen Canyon. If you don't recall how you felt, circle "0" in column A. If you did not visit the location, circle "no" in the second column, and go to the next location.

LOCATION	Did you visit the location? <i>(circle one)</i>	COLUMN A							Don't recall	COLUMN B If you circled 1, 2, or 3 in Column A, what made you feel this way?
		In general, how acceptable was the number of watercraft you saw?								
		Very Unacceptable			Very Acceptable					
On the lake surface	yes	1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):
	no <i>(go to next location)</i>									
On the lake shore	yes	1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):
	no <i>(go to next location)</i>									
At boat landings	yes	1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):
	no <i>(go to next location)</i>									
While at campsite	yes	1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):
	no <i>(go to next location)</i>									
At fueling docks	yes	1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):
	no <i>(go to next location)</i>									
Other (specify):		1	2	3	4	5	6	7	0	____ number of watercraft ____ type of watercraft ____ something else (specify):

9. Did you observe any unsafe boating practices on your most recent visit to Glen Canyon National Recreation Area?

___ No

___ Yes, please briefly describe the unsafe activity and where it occurred:

10. Did you feel safe on your most recent visit to Glen Canyon National Recreation Area?

___ Yes

___ No, please briefly describe why and where you felt a concern for your safety:

Management Actions

11. Given the conditions in the Glen Canyon National Recreation Area, to what extent do you “oppose” or “support” each of the following possible management actions? (*Circle one number for each action.*)

Management Actions	Strongly Oppose	Oppose	Neither oppose nor support	Support	Strongly Support
Zone the waters to provide specific uses at specific places	1	2	3	4	5
Establish "off-limit" zones to protect sensitive resources	1	2	3	4	5
Restrict personal watercraft use to designated areas only	1	2	3	4	5
Limit number of boats allowed on lake	1	2	3	4	5
Limit number of motorized watercraft allowed on lake at any one time	1	2	3	4	5
Limit number of non-motorized watercraft allowed on lake at any one time	1	2	3	4	5
Limit number of personal watercraft allowed on lake at any one time	1	2	3	4	5
Limit number of houseboats allowed on lake at any one time	1	2	3	4	5
Restrict number of people using lake at any one time	1	2	3	4	5
Limit number of people <i>per group</i> allowed on lake	1	2	3	4	5
Improve public access to the lake	1	2	3	4	5
Expand the number of marina slips	1	2	3	4	5
Restrict further facility development and expansion	1	2	3	4	5
Provide more information to visitors about appropriate behavior	1	2	3	4	5
Provide more park rangers on the lake to educate visitors about appropriate behavior	1	2	3	4	5
Require visitors to learn about appropriate behavior on the lake (e.g., watch a short video presentation)	1	2	3	4	5
Aggressively enforce safety rules and regulations on lake	1	2	3	4	5
Provide visitors with natural history information about the area	1	2	3	4	5
Prohibit non-motorized watercraft on the lake	1	2	3	4	5
Prohibit motorized watercraft on the lake	1	2	3	4	5
Prohibit personal watercraft on the lake	1	2	3	4	5
Use management controls to prevent conflicts between lake users	1	2	3	4	5
Use management controls to prevent damage to the environment by visitors	1	2	3	4	5
Prohibit drinking alcoholic beverages on the lake	1	2	3	4	5
Provide more toilet facilities at landings	1	2	3	4	5
Close area to pets	1	2	3	4	5

Other things (please specify): _____

Service Quality and Visitor Satisfaction

12. How satisfied were you with the quality of the services provided for you at Glen Canyon National Recreation Area? (Circle one number for each item.)

	Dissatisfied	Somewhat dissatisfied	Neither dissatisfied nor satisfied	Somewhat dissatisfied	Satisfied	Did not use/don't know
Service Quality						
Visitor information	1	2	3	4	5	6
Exhibits and other educational materials	1	2	3	4	5	6
Concessionaire food service	1	2	3	4	5	6
Concessionaire lodging	1	2	3	4	5	6
Concessionaire retail stores	1	2	3	4	5	6
Facilities within the area	1	2	3	4	5	6
Park ranger-led activities	1	2	3	4	5	6
National Park Service employee assistance	1	2	3	4	5	6
Concessionaire assistance	1	2	3	4	5	6
Overall quality of services	1	2	3	4	5	6

13. Are there activities or services you think should be offered at Glen Canyon National Recreation Area that currently are not offered (*please describe*)?

Feelings About Your Most Recent Visit to Glen Canyon National Recreation Area

14. To what extent do you “disagree” or “agree” with the following statements about your most recent trip to Glen Canyon National Recreation Area? (Circle one number for each statement.)

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Feelings about trip					
I enjoyed my time on Lake Powell	1	2	3	4	5
I did not have the kind of experience I was looking for	1	2	3	4	5
I avoided parts of the lake because there were too many boats there	1	2	3	4	5
I enjoyed the natural quiet	1	2	3	4	5
I enjoyed the interpretive programs	1	2	3	4	5
I thought the area and its surroundings were in good condition	1	2	3	4	5
My camping experience was improved by the quality of the night sky	1	2	3	4	5
The presence of personal watercraft interfered with the quality of my boating experience	1	2	3	4	5
The trip was not worth the money it cost	1	2	3	4	5
The lighting at the marinas positively affected my visit	1	2	3	4	5
I stayed off the lake during parts of the day because there were too many boats on the lake	1	2	3	4	5
Overall, I was satisfied with my most recent trip to Glen Canyon	1	2	3	4	5

About You

15. What is your gender? Female Male

16. What is your age? _____ years

17. What is the highest level of education you have completed? (check one)

- 8th grade or less
- Some high school
- High school graduate or GED
- Some college, business or trade school
- College graduate
- Some graduate school
- Masters, doctoral or professional degree

18. What was your total household income (before taxes) last year?

- Less than \$15,000
- \$15,000 to \$24,999
- \$25,000 to \$39,999
- \$40,000 to \$64,999
- \$65,000 or more

19. In what ethnicity and race would you place yourself?

Ethnicity Hispanic or Latino
 Not Hispanic or Latino

Race American Indian or Alaska Native
 Asian
 Black or African American
 Native Hawaiian or other Pacific Islander
 White

20. Any other comments about your visit to Glen Canyon National Recreation Area or suggestions about managing the area are welcomed. Please use the space below to write your comments.

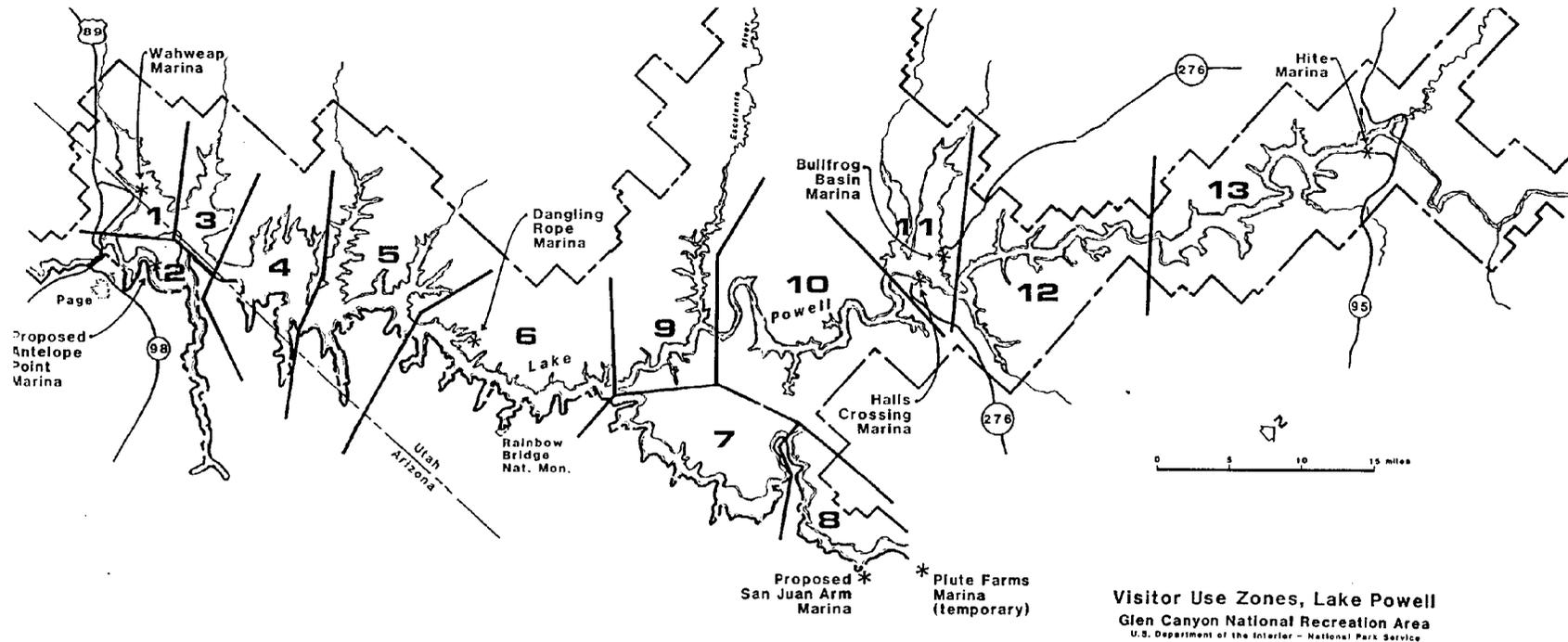
Thank you for your help!

Please return this questionnaire using the prepaid, self-addressed envelope provided. If you want more information about this study, contact the University of Minnesota Cooperative Park Studies Program, 115 Green Hall, 1530 Cleveland Avenue North, St. Paul, MN 55108-1027, 612-624-3699.

16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by the National Park Service to improve resource management and planning and better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The information you provide will be anonymous. Please do not put your name or that of any member of your group on the questionnaire. Data collected through visitor surveys may be disclosed to the Department of Justice when relevant to litigation, or to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting a violation of law. Public reporting burden for this form is estimated to average 20 minutes per respondent. Direct comments regarding the burden estimate or any other aspect of this form to the Office of Information and Regulatory Affairs of OMB, Attention Desk Officer for the Interior Department, Paperwork Reduction Project 1024-0224 (NPS99-024), and to the Information Collection Clearance Officer, WASO APC, Accountability and Audits Team, National Park Service, 1849 C Street, N.W., Washington, D.C. 20240. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Appendix D
Glen Canyon Zones

Glen Canyon Zones



Visitor Use Zones, Lake Powell
Glen Canyon National Recreation Area
 U.S. Department of the Interior - National Park Service

- Zone 1:** Wahweap Bay, Wahweap Marina, Lone Rock.
- Zone 2:** Glen Canyon Dam, Carl Hayden Visitor Center, Antelope Island.
- Zone 3:** Crosby Canyon, Warm Creek Bay, Castle Rock.
- Zone 4:** Padre Bay, Gunsight Butte, Crossing of the Fathers.
- Zone 5:** Last Chance Bay, Rock Creek Bay, Gregory Butte.
- Zone 6:** Dangling Rope Marina, Rainbow Bridge, Cathedral Canyon.
- Zone 7:** San Juan Arm, Bald Rock Canyon, Piute Canyon

- Zone 8:** Nokai Canyon, Copper Canyon, Old Piute Farms Marina
- Zone 9:** Cottonwood Canyon, Hole-in-the-Rock, Escalante River.
- Zone 10:** The Rincon, Iceberg Canyon, Slick Rock Canyon.
- Zone 11:** Bullfrog Marina, Halls Crossing Marina, Stanton Creek.
- Zone 12:** Defiance House Ruin, Forgotten Canyon, Knowles Canyon.
- Zone 13:** Hite Marina, Farley Canyon, Dirty Devil River, Colorado River.

Appendix E
Summer Sampling Plan

Summer Sampling Plan

2000 Summer Sampling Plan

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		5/25 Wahweap	5/26 Wahweap	5/27 Wahweap	5/28 Wahweap	5/29
5/30	5/31 Bullfrog	6/1	6/2 Bullfrog AM Halls PM	6/3 Bullfrog	6/4 Bullfrog	6/5 Halls
6/6 Halls Hite	6/7 Halls Hite					

Appendix F

Cover Letter Included With Mail-Back Survey

June, 2000

Dear Glen Canyon National Recreation Area Visitor,

We need your help! National Park Service managers are currently gathering data about types of use at Glen Canyon National Recreation Area. What they learn from this data will be used to better provide for your needs. During your visit to Glen Canyon this fall you agreed to participate in a survey. Your opinions, as a visitor, will provide park managers with valuable information that will improve resource management and visitor services at Glen Canyon National Recreation Area.

Enclosed is the questionnaire we said we'd send you soon after your visit. Please complete and return this questionnaire in the pre-paid, self-addressed envelope provided as soon as possible.

Your participation is important and it will take less than 15 minutes of your time to fill out the questionnaire. This is your opportunity to offer your opinions and comments about your experience at Glen Canyon National Recreation Area and how the area should be managed. Of course, this survey is *voluntary and your confidentiality will be maintained*.

If you have any questions about the questionnaire, please feel free to contact us at the address shown on the letterhead, by phone, or by email.

Thank you for your help!

Sincerely,

Dorothy H. Anderson Ph.D.
Professor
(612) 624-2721
danderso@forestry.umn.edu

E. B. James
Research Assistant
(612) 624-4280
jame0136@tc.umn.edu

June, 2000

Dear Glen Canyon National Recreation Area Visitor,

Two weeks ago you received a questionnaire from the University of Minnesota asking you to offer your opinions and comments concerning your experiences in and opinions about Glen Canyon National Recreation Area.

So far we have not received your completed questionnaire. Because we've contacted a small number of visitors for this study, we need to receive as many completed questionnaires as possible. Your input is extremely important. In the event that you did not receive the first questionnaire or no longer have it, another questionnaire is enclosed. Please complete and mail this questionnaire at your earliest convenience. It will not take more than 15 minutes of your time.

This is an opportunity for you to offer your opinions and comments about resource management and visitor services the Recreation Area. Of course, this survey is *voluntary and your confidentiality will be maintained*.

We know the holiday season is a busy time for everyone. We really appreciate you taking time out of your busy schedule to respond to this questionnaire.

If you have any questions, please feel free to contact me at the address shown on the letterhead or by phone.

Thank you for your help!

Sincerely,

Dorothy H. Anderson Ph.D.
Professor
(612) 624-2721
danderso@forestry.umn.edu

E. B. James
Research Assistant
(612) 624-4280
jame0136@tc.umn.edu

July, 2000

Dear Glen Canyon National Recreation Area Visitor,

Two weeks ago you received a second questionnaire from the University of Minnesota asking you to offer your opinions and comments concerning your experiences in and opinions about Glen Canyon National Recreation Area.

We still have not received your completed questionnaire. Because we've contacted a small number of visitors for this study, we need to receive as many completed questionnaires as possible. Your input is extremely important. In the event that you no longer have a questionnaire, another is enclosed. Please complete and mail this questionnaire at your earliest convenience. It will not take more than 15 minutes of your time.

This is an opportunity for you to offer your opinions and comments about resource management and visitor services the Recreation Area. Of course, this survey is *voluntary and your confidentiality will be maintained*.

We really appreciate you taking time out of your busy schedule to respond to this questionnaire.

If you have any questions, please feel free to contact me at the address shown on the letterhead or by phone.

Thank you for your help!

Sincerely,

Dorothy H. Anderson Ph.D.
Professor
(612) 624-2721
danderso@forestry.umn.edu

E. B. James
Research Assistant
(612) 624-4280
jame0136@tc.umn.edu

Appendix G

Other Open-ended Responses to the Mail-Back Survey; Questions Concerning Activities, Experiences, Situations, Unsafe Behavior, Feeling Safe, Management Actions, and Suggested Activities and Services

Open-ended Responses to the Mail-Back Survey; Questions Concerning Activities, Experiences, Situations, Unsafe Behavior, Feeling Safe, Management Actions, and Suggested Activities and Services

Other activities respondents participated in (question 1):

Quiet reflection.

Wake boarding.

Motorcycle riding.

Relaxing.

Houseboating.

4 wheel trails.

Driving other trails.

Enjoying peace and quiet when I could find it.

Other experiences respondents reported (question 2):

Visiting the Dam

To stay out of the sand-blown wind

This is somewhat difficult as we have been visiting Lake Powell for the past 30 years. Each year is different.

Other situations respondents reported (question 7):

Not enough room at Lone Rock Beach. The beach access should be expanded to the North.

Too many houseboats with generators running all night and bright lights. Way too many houseboats.

We had a search and rescue chopper with a spotlight coming up and down beaches at Warm Creek- very annoying, about 9:00 pm. PWC's speeding too close to kids in water swimming.

Not enough dock space.

Inconsiderate rental houseboat operators. Seem to lack skills and/or experience operating boats.

There is more problems with waste on the beaches from pets than humans. It seems like there are way too many dogs on boats and at the beaches.

We had a wonderful time, but Friday night of Memorial weekend was so loud until 3:00 am- the rest of the nights were much better- But that's how holiday weekends are-right? Saturday night started out rowdy- but I heard they shut down the party about 11:00 or 12:00- Bravo!

Other campsites get very noisy. They stay up all night blasting their music and completely drunk.

Should be regulations about music at campsites at night. Several episodes of other campers blasting music late into night (till 2-3 am in one instance). My suggestion: No blasting music and must turn music off after 11 pm.

Too many fees- I pay Federal taxes and I understand that surplus exists!

Too many checkpoints coming into the park.

Floating toilets are very nice. Thanks!

Need to keep livestock away from Burr's trail camping. Large amount of livestock waste on beaches and in water as the water came up.

Need better cell phone service.

More of the tips of rocks below the water surface a definite hazard; especially late afternoon.

I used to work for the Forest Service cleaning campgrounds. We had to clean all our restrooms every day! My family spent a week in the campgrounds at Bullfrog, we only saw the restrooms cleaned once. Garbage and aluminum cans were always full. Need more receptacles. You definitely need showers in the campgrounds.

Private houseboat exchange from one week to another. Not enough space for the exchange.

Like all campsites, late comers, lots of noise from drunk, stupid, and over zealous yuppies who think that only they exist....more police action would help, especially at 15\$ per night!

Serious problem with adequate and working sewer pump stations on lake especially at Hite marina. For Boat Owners.

Gas docks and courtesy docks too small for current boating population. Dangerous!

More toilets on lake would be great.

Seeing more litter than the years before.

I have never been to a lake that I had to walk through poop. The shoreline was awful with stinking foam and chunks of poo (Bullfrog bay primitive area).

Very serious problem with others that are drinking heavily (Lone Rock Area)!!! Walking through our campsite until 3 am. Being very loud and music very loud until 12:00. Beautiful place but not good for families.

Unsafe boating practices witnessed by respondents (question 9):

Near Bullfrog Marina. Boats running too fast in narrows. Congested watersports area (White Canyon). Boat drivers not understanding the “rules of the road”- cutting blind corners on the left.

High speed of a very limited number of other boats in narrow side canyon (not a real problem).

Total lack of boating laws and knowledge.

We went to Rainbow Bridge and some guy pulled his water-skier right in front of our boat and we almost hit the skier.

Another houseboat almost ran into ours. If we had not turned aside there would have been a collision. People not observing No Wake Zone.

People speeding through buoy field creating wakes. Rental boats rushing to cut in front of our boat in no wake zone came dangerously close to us.

Boat operator going too fast based on their experience and the conditions.

Erratic operation of rental houseboats.

Following too close.

A boat came cruising around the corner at dusk with no lights- almost ran over two girls swimming in the water with glo-sticks on. Too fast and no lights.

Speeding in wakeless areas.

People driving drunk.

Fast speed in no wake swimming area.

Water skiing in narrow channels.

My understanding is that boats are supposed to pass on the right- many boat drivers didn't seem to know this. Also a couple of times were going faster than “no wake speed” in marinas and ignored our suggestions/requests to slow down.

A man driving a newer boat passed between my boat and the shore at high speed. I had slowed to wake less speed because of how close I was to parked boats.

Boats travel at too high speed in the canyons- there were a few close calls. Swimming in the canyons is difficult because of constant high wake from boats speeding by.

Too many large (40-60 foot) boats with big (huge) wakes.

People do not avoid you boat if you have a flag up. Causing problems.

Young lads (approx. 10) using watercraft at marinas. Not knowing rules. Right of ways, etc.

Sandy beach area: North east Bullfrog Bay. Several boats failed to yield to boat with skiers or wake boarders behind. High speeds.

A couple of speed boats too close to houseboat for no reason.

Boats moving in too close and too fast even while towing a skier (child skier)!

Watercraft/no lights at night anchor in middle of large bay.

Driving too close and too fast next to our houseboat.

Occasionally people would get too close to each other (on the lake), esp. in the marina area. Many boats and very rough.

In the narrows- we were stopped towards side. Flag up. Our children were swimming close to the boat. A large boat came within 25 feet of us.

A number (9-10) young people were on a powerboat and had obviously been drinking. They were very unsafe drivers for the boat. Dirty Devil River.

Following too closely, cutting you off.

People going too fast in wakeless zones. Mostly at Bullfrog Marina.

2 boats speeding through "no wake."

Children riding on bow of speed boat. Skiing without flag.

Too close to down skiers.

Verbatim responses to "did you feel safe on your most recent visit to Glen Canyon National Recreation Area?"

Wahweap Bay makes me nervous when I'm on the water.

A couple of youth groups (with leaders) were camped on a beach (East side of Antelope Island). One afternoon a few families and a group of mostly single men arrived. When their music became very loud, someone politely asked if they would mind turning it down a little for the evening. They declined so the petitioner left. For the rest of the evening until 4 am they consumed a lot of alcohol and persisted with loud music and partying. But they also shouted out many vulgarities and repeated threats to come over and cause violence. Many people did not sleep much and were in substantial fear for their and other's safety. We left in the morning.

Too much drinking by other campers.

Lots of drunk young kids passing through our camp all night.

Too many people, including my host who did not have any idea how to operate a houseboat, especially wind conditions and towing other watercraft.

Boaters need to be kept informed when winds are to pick up!

People playing with firearms.

Law enforcement is virtually non-existent after 5 pm. Never have seen a ranger on patrol in the evening or night in 20 years of boating on Lake Powell. As a result many people show total lack of respect for laws, regulations and safety. Example: Shots fired (not firecrackers) in four different places this summer. Loud houseboat ALL night long. Who is going to stop them?

We've learned to always be on the watch for inconsiderate idiots.

Not at night at our own campsite at Lone Rock. Not safe- especially for families.

Amount of people drinking excessive amounts of alcohol at night. Frequently disturbed by drunk campers in our campground.

Other management actions suggested by respondents:

More beach areas for large groups

Check all boats for sanitary disposal units at launch ramps.

Too many rules would make it an uncomfortable stay.

Aggressively enforce safety and time rules of marinas.

Be more strict on the porta-potty rule- they need to see it or write a ticket. Most people just keep it unused on the boat to avoid a ticket. This is crucial! Also bio-degradable soap and shampoo's.

More shower facilities.

Limit hours of ATV use at est.[sic] beaches (ie Lone Rock). No ATV motorcycles after 10 pm.

Increase ranger presence on party weekends.

The NPS has too much presence on the lake.

Provide areas for pets and require visitors to learn about cleaning up after pets.

Showers made more available.

The corp. who is making the big profit on our park lands should start thinking about conveniences to the consumer rather than greed and more profit!

More floating bathrooms in San Juan.

Raise the age to qualify to rent houseboats and powerboats. Houseboats are becoming floating frat houses.

Charge a usage fee large enough for managed campsites and clean up in most used areas.

More rangers, but ones who are willing to help not to pester. Most rangers are there to prevent bad things from happening, but they do it in some mean ways. I go there every other week and every time I am bothered with a thousand questions alcohol, boats, skis, camp and always almost get a ticket for no reason.

Verbatim suggestions by respondents about activities and services that should be offered at Glen Canyon:

Cautionary signs at beach camp areas about extremely soft sands.

They need a dock at Stateline for houseboats only.

There needs to be more of a presence of Park Rangers on the lake- also so they may be able to assist when trouble does arise.

Maybe patrol populated beaches at night for those disturbing the peace, etc.

Wahweap should add more permanent slips for rent at thirty feet length.

Shuttle-bus route with pick-up sites.

Maybe another marina store and gas dock, and maybe a shower or clean-up area around docks, also maybe a café or snack Bar down closer to dock.

More RV and modern facilities.

Education and strong enforcement about litter and human waste. People defecate everywhere. Its gross and destructive.

I think the area could be maintained better, it seems to be held together with paper clips and pens.

Night activities.

Safe houseboat training classes more than a tape.

Better facilities at Hite would be nice.

Provide mini restaurant at Dangling Rope (sit down style).

We would love to have para-sailing offered.

Long lines at retail store- need to expand! Gas is ridiculously expensive at dock stations. All assistance from employees was very courteous, very helpful. They do a great job.

Children activities- kids ages say 6-12 games and movies, crafts, scavenger hunt etc. once or twice a week at a set time in the evenings.

More commercial enterprises.

Put lake level and water quality on Internet and post at landings.

Rental video tape guide programs for hiking to various sites in side canyons that could be viewed at marinas or taken on houseboats outlining time/provisions/details.

Free showers in campground.

Provide locations of floating dump stations. Locations of ranger stations, ship to shore contact with rangers, telephone numbers.

National Park Campground at Bullfrog- very poor conditions. Too expensive for services provided (restrooms not clean).

More services, food, retail.

You could use a sprucing up to your marina stores.

Better pump-out facilities for houseboats- better equipment more accessible.

Star maps.

We need a pool, you can't use Wahweap pool unless you stay there.

Should be more access to the lake other than the 4 launching ramps. Should be better amenities, such as hotels and stores.

More pump stations (manual)- e.g. San Juan area.

Shade and picnic tables.

Shop for the people who like to fish and not just tear up the water on their boats.

Appendix H

Open-ended Responses to Question 20 of the Mail-Back Survey

Open-ended responses to question 20 of the mail-back survey:

I visited the area for the 1st time & would do so again. I recommended the area to relatives living in Arizona. The survey appears to be biased against public use of the lake—I hope this is not so. The two most impressive things we saw were the natural bridge and the dam—as well as the whole lake experience.

I use Lake Powell for boating & fishing in spring & fall. Summer months are too crowded for enjoyable boat camping. I normally use the lake from the dam up to Rainbow Bridge. It is common to see houseboats cruising the main channel on the wrong side or even out of the channel. I was hailed by a French couple in a rental boat. They asked me “Where is Rainbow Bridge?” We were out of the channel in Face Canyon. They had no map or compass. Don’t the rental people try to get some info to the renters? Most of the rental boats & houseboats seem to have no knowledge of rules & regs. concerning boating or navigation.

The tone of this questionnaire appears to be getting supporting data to eventually restrict use of the lake by one means or another. I don’t think this should be done very severely!

Too many restrictions by Rangers, not able to visit or party much with friend or others we had met on the beach, and the only way to escape from this is to find some place private away from crowded areas. I really enjoyed the lake and beach while I was there. But there are way too many police and rangers at beaches and on the highways!

I find it inappropriate to charge at \$10.00 fee for each boat when there were no improved facilities for boats (launch ramp, courtesy dock, trailer parking, etc.) at Lone Rock. I paid \$20.00 for both my boat and PWC at Lone Rock fee station and had to launch on a sandy beach. What’s the point of paying for a service and not getting anything in return.

As a first time visitor, I enjoyed the expanse of Lake Powell, surrounding natural beauty & excellent freeway/roads. Would encourage more recreational facilities in the Arizona sector.

Boaters need more education re: sanitation, waste disposal, water safety, boating “rules of the road.” Campsites are frequently contaminated with feces. More aggressive measures needed. We love the lake. Generally people are nice. Generally camps are free of trash with the above exception.

Keep it enjoyable but don’t over commercialize area or you’ll destroy it.

I love Lake Powel over all the years my experience has been excellent! With a few minor exceptions.

It was the best part of a 10 day trip.

Excellent time! Great facilities. It was hot though.

My wife and I have passed the U.S.C.G. boat handling course.

Glen Canyon is one of the cleanest areas I've ever been to. After camping at Glen Canyon, I will probably never go to Lake Mead again. I'd rather travel 278 miles to an area with no glass or trash, than travel 38 miles to the garbage, glass and trash at Lake Mead. I will be back to Glen Canyon again, what a pleasure.

The campgrounds are very nice & well taken care of. One thing that was kind of a disappointment was that you can't have campfires. Maybe you could make deep pits so its not a risk for a fire.

My husband and I stayed 2 nights at the lodge & took a tour boat to Rainbow bridge. We had a great time & will come back again!

Educating people on boating rules and regulations.

At stateline there is a sign that says 30 minute docking. It should be enforced.

More areas like Lone Rock Beach should be developed to reduce the pressure at Lone Rock, and provide alternatives for RV campers.

Lake Powell is a wonderful place—which many can enjoy! Please don't drain it. Thank you.

It is obvious to me this survey wishes to restrict # of boats on the lake. The problem with Lake Powell is the fees we pay to Government and the lack of improvements we receive. We were promised improvements, all we had seen is more park Rangers, burning gas & spending our money. Lets keep our promise, improve the lake, camping, docks at rock shore lines, to spread the people. Floating restrooms and many more.

I feel there are too many houseboats, listening to generators at night is not enjoyable at all. Many houseboaters will park right along side of you which takes away from going to the lake for family fun.

Don't limit access to the lake!

We love spending time at Lake Powell—our favorite family get-away location!

We do not support the draining of Lake Powell. Glen Canyon has been changed if not ruined by the waters of the lake. The city of Page & the Navajo Nation greatly benefit from the dam & lake. It could be a disaster if they were to drain it. The damage has already been done & I hope it is possible to move forward w/ the dam in place.

1. portapotty floating dumps great idea. Well designed. 2. Overall, we love going to Lake, but usually go to Padre Bay, Warm Creek is too close so it gets crowded & you get a less experienced type of visitor.

The marinas need management. No one was there to enforce dock times, no wake zones, etc. The day we left we had to keep our 65 ft houseboat waiting for dock space for over 2 hours in the wind. Another houseboat sat at the dock for the entire time even though the dock time is supposed to be 30 min max.

I do not feel that banning or restricting either boats or personal watercraft will accomplish anything except reducing revenue to the area. I feel the best solution is to have park rangers enforce current rules & regulations. I also believe that there needs to be separate docks for houseboats to load & unload.

Do not drain the lake!

What a beautiful place. I wish I could have walked under or around Rainbow Bridge to see the other side and surrounding area. I do not wish to offend the beliefs of some of the American Indians, but, not sharing those beliefs, I would like the freedom to better enjoy and photograph such a place in a respectful manner.

Wahweap Marina has 3 problems: 1. inadequate supply of electricity to houseboats on outer docks O and P during height of summer heat to handle all electrical needs. 2. Low water pressure to dock P during busy summer afternoon time. 3. No supply of fresh water to slips in winter months even though slip leases agree to supply all utilities.

We entered to continue visiting the area as we have over the past 20 years. Its beautiful and well kept and filled with history.

You could use better restroom facilities and more permanent slips.

The fuel dock at Wahweap needs to be repaired. It needs new rubber bumpers and has nails exposed.

Keep up the good work! I really enjoy Lake Powell! And 93.3 station a mixture of music.

Not enough parking! Had to walk 1-1/2 miles back to the marina after park truck & trailer. Enforce rules for everyone.

Again—more enforcement of personal waste. We had 3 rangers stop to see if we had a portapotty, but not one actually saw it. But good job overall—thanks!

I think education is the power to clean and protect Lake Powell. A mandatory annual orientation of facilities/ways to protect/clean/and be courteous at the lake would greatly increase this goal. Even to give this orientation to (1) person in a group would be extremely helpful. In addition a pamphlet at the park entrance when the entry fee is paid would be a positive item.

The rangers that came around to the campsites were very nice! Too many people crammed in one campground. Campground too close to marinas, hotels, development, etc. The area is so

beautiful. Please gear any development towards more primitive usage (i.e., not more boats, hotels, stores, etc.).

I thought that a busy holiday weekend the lake would be crowded. But it wasn't a very, very clean lake. Very nice.

We've been coming to lake Powel for over 30 yrs—its always a wonderful trip with growth I think things are kept up very well. Thanks!

Expand launch & parking. Add other launch ramps north of stateline & add more parking.

Work on some control on insects in campgrounds spec. (ants everywhere). would like to see more R.V. spaces, & shower facilities. Had a great time love Powell—hope to go 6 times this summer.

Word up to the rangers. Good job at Lone Rock.

I really think drinking should be banned. After a night of the other campers parties, there were bottles and cans all around the beach and in the water. Our neighbors had three or four big bags of empty cans, that they left behind and the rangers had to clean up.

People being to loud at night especially after midnight. It was a great trip, but hard to sleep at night with all the noise. Warm showers would be nice, we would pay!

Do not drain it!!!

I was very impressed w/ the new facilities at the beach line—the sand was clean—handing out trash bags was a good idea.

I think a lot of the “improvements” that have been made are unnecessary. The lake and beaches should be left alone for people to enjoy the way they have in the past. If it is made to be too civilized it defeats the reason most people go there: to get away—if people want civilized they can stay in town.

I feel like the area is not maintained like it should be—roads n parking, slips, toilet all seem to need attention in certain areas.

Somehow provided shaded areas on the beach.

Kill the crows they wouldn't leave us alone.

Authorities should be more persistent in checking overnight boaters/campers for a portable toilet in order to prevent people from defecating on land.

We all had a great time! Beautiful place—will visit again.

I think it would be nice if the rangers enforced a noise limit on the campgrounds. It would also be helpful to have more areas to load & unload the boats.

Great place! Please shoot anyone who wants to drain it.

More access to the lake is needed. Public lands & lakes should be open, not restricted.

Camp host at Hall's Crossing Tent Site was very kind and helpful in spite of her husband's medical emergency.

Improve fish size.

Allow at least 1 if not more competitors to ARA.

It was wonderful. Spent two days at lodge—very enjoyable; good food & great room & fine service. Also spent time camping in personal craft. Had a great time, will do again. Thanks.

Should never be drained!

Need tamarisk control!

I don't agree with limiting # of boats. I do agree with fees at the gate. The new pump stations & restrooms have made a huge difference. The provided garbage bags at the marinas made a big difference I think.

I would like to have had more people working registers at the Bullfrog Marina Store during the day. We stood in line forever.

The one thing that frustrates us is the lack of direction at the launch ramp. There were a lot of boaters cutting in line, including a few marina vehicles. We were also frustrated by the number of people loading rental houseboats on the launch ramp docs, taking up a lot of space for extended periods of time. There were no rangers on the launch ramp when we put in or took out and it was very disorganized—free for all so to speak.

More educational materials. More guideline/rules/regs for people. More control over activities that are destructive to the environment.

It was my 1st time to Lake Powell & it was beautiful. (1421)

Just something antibacterial to wash your hands with in the portapotties. I had fun, it was very relaxing.

Summer hours should be a little later (till dark) at marinas food store/other&gas/food stores. They close at 8 pm too early in summer.

The surprise checkpoints set up just prior to entering the park are terrible deterrent to people wanting to come and visit the facility.

My dad brought me to Lake Powell to enjoy nature & water sports. Now I am doing same with my kids. We love Lake Powell.

Good lake. Don't drain it try to control the large boats (30-40'). Thanks.

Promote programs to remove visitor drawings on areas where actual petroglyphs exist. Post and enforce fines for visitors who do any marking of natural areas. Require violators to remove these types of things and require violators to periodically view video programs on preservation.

People always need more education & awareness & positive reinforcement for respect for the area. People dumping waste in the Lake should be punishable by death.

Try to keep livestock away from Buris Trail camping areas. They left a lot of livestock waste on the beaches in the camping areas and as the water came up it would go into the water.

We loved it we will be back.

More toilets floating. Better grocery stores at Bullfrog Hall & Hite. Better prices for gasoline. Control people who drink & operate boats.

Keep the area undeveloped. We traveled to the San Juan to get away from others. More development means more access!

I have been going to Lake Powell since the age of 10 and have been around boats my whole life. I can see how educational & safety tips about boating to those new to boating or to Lake Powell would be helpful. The lake will continue to become more crowded and someday limitations may be needed to preserve the type of experience it is now. Overall I think it is still a great experience and the Park Service is doing a good job.

I have been going to this area since 1978. Have seen many improvements. One of the most important was providing pump out stations at various locations on the lake. There has been great improvement at the marina pump out for private houseboats. There needs to be an improvement for the private houseboat weekly exchange area with access to shore vehicles. Overall the experience at Lake Powell has always been great. Hope to continue the enjoyment of its beauty.

In our campground cigarette butts kept surfacing from the sand. Please note camping areas should be raked after being visited. Plus on windy days there was nothing to do but try to shield yourself from the wind until shower time. A small theater or library would be nice.

More buoys to mark areas where rocks are close to surface of water.

The Park Service entry fees for vehicles & boats is a rip-off. What did the money provide? We paid for our campsite, food, fuel, etc. while at the lake. It is just another government tax that offers nothing in return.

The trip was very nice (hot but nice). The park ranger was the bad experience, and at the fuel dock at Dangling Rope should have a place for people traveling with pets but other than that we had a very nice, peaceful time. Please don't change anything!

Please consider a second group to provide competition on mechanical repairs for boats/houseboats while on the lake. Thanks, it's a great place!

Thanks

The dump station at Halls Crossing was not working properly. They should be maintained and in working order, so people will not dump in other areas. As we have seen where it has been done.

This is one of the most beautiful & awe-inspiring places in our nation & feel that most people feel the same way & treat it with respect & love it the way my wife & I do. Lake Powell is a great & essential asset to this country. We want to come back often.

Mark major rocks in pathways of boats with some kind of buoy.

Keep this place beautiful. We will be back.

My husband and I started answering this questionnaire together but I guess he started to get angry, we were actually glad to get home, we traveled quite a bit and between camp sites and motels, things just aren't what they used to be, noisy inconsiderate people everywhere.

We are coming back!!

We've noticed a lot of news about a group who is trying to drain the lake. We are very much against their idea to do such a thing! It's crazy to think it would benefit anyone! The local Indian tribes would be out of jobs, Calif. would be out of very needed electricity, the animals in the area would not have much of a water supply left, besides boaters like us would not have the fishing source. We eat lots of Striped Bass & count on the lake for our supply!

Too few restroom facilities available & were very dirty! More programs for kids would be welcomed.

It was our first trip. It was difficult to find out where to dump waste water from houseboat. No clear marina map (at Hite Marina).

Our houseboat is at Hite Marina—we moved it from Bullfrog to get away from crowds—so most of your questions do not apply to Hite Marina.

We have been going to Powell for 10+ years. The past three years we have seen a steady decline on the lake. The family atmosphere is leaving, being replaced by boat loads of partiers. We have seen it all. The facilities are tired looking, run down, and not customer friendly. Management needs to make improvements in April, Oct.... not in June, July! It's like they are surprised by visitors in May. Poor facilities mgmt.

Affordable lodging at Hite Marina would lower number of campers in canyon areas and north part of lake.

It is great that toilets have been put on the shores at different locations. Mainly at Hite. The public pump out station needs to be replaced as it was an old one from Dangling Rope area. Last year 1999 we waited for 3hrs in 104°_heat for repairs and was denied use of the pump out station at the marina (when it was not in use by anyone). We were told we could use it for 40.00 an hour...we ask why when we are paying 175.00 a month for a buoy fee. Very bad deal.

They usually urinate in the water. I once saw a guy defecating off the stern of their craft. I believe this type of lake user is largely responsible for shitting on the beaches.

It has been my experience that rangers will do almost anything to keep from issuing a citation. Too much paperwork they say.

Appendix I

Comments Specific to Personal Watercraft

Comments Specific to Personal Watercraft

From: Other Situations

The Park Rangers at Rainbow Bridge in a no wake zone. Chasing a jet skier that was not running away, but was not wearing a PFD but had it with him. The officer, we felt, was in the wrong.

Personal watercrafters liked to ride the wakes of the tour boats- witnessed some risky use of craft chasing the wakes.

From: Observed unsafe boating practices

Near Collision of boat and PWC in Cascade Canyon

A jet ski cut in front of us once.

PWC too close to my boat. This occurred in a side canyon.

We observed a lot of unsafe personal watercraft activity all over the lake but mostly in Cottonwood canyon mile marker 65- we lost our anchorage twice due to their waves and antics.

Very crowded with boats pulling skiers, PWC's zooming in and out of coves where kids are swimming.

With a wave runner-around Antelope Island. We had a knee boarder in the water had our flag up, they came very close to him and they were going way too fast, they looked too young to be alone on a wave runner- could not control it very well.

Travel wrong direction, against traffic flow. Jet ski cut across wake 80' behind boat. Failure to observe wake less zone speeds.

We frequently observed people not observing wake less speeds in the marina. We also had wave runners driving in close to the beach where our kids were swimming, not paying attention and going too fast.

Personal watercraft and powerboats going way too fast in confined canyons. Very inconsiderate to camped boater.

P/W kid almost ran over swimmer 1 incident.

Numerous times while fishing. Powerboats/PWC's would buzz by within 10-15 feet at full speed. Causing dangerous (very) wake that pushed our boat into rock walls.

Boats and noisy, obnoxious, water polluting personal watercraft in the narrows of canyons.

Someone on ski doo following very close to skier.

Personal watercraft following too close. Not keeping distances. Drinking beer and operating a boat.

Drunk college age students (huge number) with jet skis- they even rented houseboats.

Personal watercraft riding boat wakes. Powerboats in canyons (blind corners) visited by tour boats.

Personal watercrafts cutting in front of boats houseboat and other personal watercrafters.

Some boats and jet skis making wake too close to other boats and ours.

Jet boats in small canyons.

Jet skis operated by idiots...including many underage either physically or mentally. Particularly high speed in narrow canyons. Should be banned from all narrow canyons, or better yet, banned from the whole lake. The quality of Lake Powell experience would increase by a factor of 10 if they were gone.

Personal watercraft too close to skiers.

Boats and PWC coming too close to other boats (us).

Lack of respect for “no wake” zones. Rental houseboat operators! People at high speeds within 100’ of other vessels. Jet ski zipping around my houseboat while trying to pump-out at Forgotten Canyon’s floating station.

Young kids on jet skis.

Wake jumping by personal watercraft- wave runners- Too close when pulling skiers and/or tube.

Personal watercraft riding unsafe while people skiing; riding next to boat while traveling (20 feet) away.

Jet skis- too many in narrow canyons, flying around- no consideration for close proximity of boats, not paying attention to other boats in water.

Too many jet skis operating unsafe and driving too fast by while I’m fishing.

Personal watercraft too close to shoreline and other boats.

Lack of life vest usage of PWC! Lake patrol did ticket individual.

A personal watercraft was out of control and the operator had no control. The ski slipped up on to some rocks and almost sank around warm creek.

From: "Did you feel safe on your most recent trip to GLCA?"

Felt intimidated by groups of personal watercraft users who were harassing us.

At night, too many partiers. Swimming w/o jackets, jet skiing w/o lights. Scary!

From: Suggested Management Actions

Maybe limit PWC's to two per houseboat.

Too many houseboats! Too many PWC's!

From: Activities and Services That Should Be Offered at Glen Canyon

Personal watercraft rental prices too much, also gas prices.

From: Open-ended Responses to Question 20 of the Mail-Back Survey

I think use of jet ski water craft should be limited.

This was our 4th trip to the area—the first in 1989 the last in 1999 before this trip. Each time we see what the area has lost—due to the amount of personal watercraft (re) jet skis. You no longer can explore in the quiet wonderment of adventure. There is no quiet—there is no quiet reflection—out of a 12 day trip we had 3 good days—not a good percentage.

Any boating or use of personal watercraft restrictions should not be implemented.

I think first time boaters should be required to complete a training & safety course, just like personal watercraft operators.

We love using our kayaks but would enjoy it more if there were areas we could go without having to deal with personal water craft. We would really like to see speed limits in the canyons. It would lower the noise level and make it safer for non-motorized craft and swimmers.

Get rid of the personal watercraft!! Get rid of houseboats!! keep the off road trails open to street licensed vehicles only.

Jet skis and water quality. We anchored in a beautiful little out of the way slot canyon off Dace Canyon this year. During the day we had 20 or more jet skis whip in then turn around when they

saw us. I spoke with one of them the next day and found out why our little canyon was so popular. It was where they usually stopped to go to the bathroom...which explains the fecal material in the sand at the head of the bay and also the toilet paper laying about and the smell. We left the next day. We would not have dared swim there. I wonder how many more out of the way places are being used this way?

Enforce the regulations on the books with more law enforcement. Do away with personal watercraft. Houseboats need to be limited. There are just too many of them. Even with 2000 miles of coastline, there is only so much room for safe camping without overcrowding which detracts from the Lake Powell experience. Numbers not as important as impact. Two people in kayaks are much more user friendly than two people on jet-skis.