

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



Final Report
Spring 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 operator).
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 lakeshore.
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 operator).
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's 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 spring of 2000, the Cooperative Park Studies Program (CPSP) at the University of Minnesota conducted the second 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 spring users at Glen Canyon NRA were gathered through the use of an onsite survey, group log, and mail-back 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 mail-back questionnaire. A total of 298 visitors completed the onsite survey, of which 268 were selected to be mailed a questionnaire. Of the 268 questionnaires that were mailed, 61 percent were returned.

Respondents (individuals who returned a mail-back questionnaire), and nonrespondents (individuals who did not return a mail-back questionnaire) were evaluated using selected variables from the onsite survey to determine nonresponse bias. Overall, respondents and nonrespondents were more similar than different. There was one statistically significant difference. Respondents were older than nonrespondents. The mean age of respondents was 47.4 compared to the mean age of nonrespondents, 42.3.

Visitor data were analyzed for all mail-back questionnaires completed and returned by 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 personal watercraft 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 only made up 17 percent of the spring sample. They were an average of 50 years old. Seventy-three percent of PWC operators were male. They were mostly from Colorado, Arizona, and Utah, with only four other states represented. Thirty-nine percent had completed college, and eight percent were in the process of or had received an advanced degree. Seventy-six percent had incomes of \$40,000 or more. Groups of PWC operators tended to be slightly larger than groups of non PWC operators. Groups of PWC operators had a mean size of 4.7 individuals. Most PWC operators were repeat visitors to

Glen Canyon NRA. The median number of nights groups spent in the area was 3. The median is a more accurate measure of the number of nights visitors spent in Glen Canyon NRA than the mean due to outliers, a small number of individuals who reported spending a large number of nights in the area. The most common activities PWC operators reported participating in were motor boating, fishing, camping at shoreline campsites, hiking Lake Powell side canyons, and swimming.

Many PWC operators were associated with houseboat use. Slightly more than one-third reported using a houseboat as their primary vessel. The most popular areas for PWC operators to visit were the zones that include Wahweap, Hite, Warm Creek, Padre Bay, Rainbow Bridge, and Bullfrog and Halls marinas. Visiting Glen Canyon NRA was the primary purpose behind most PWC operators visit to the area. The top ranked experiences PWC operators wanted during their visit were to enjoy the scenery of Lake Powell, to be with members of their group, to experience nature, to do something with their family, and to be with people who enjoy the same things they do.

Non PWC operators made up the majority, 83 percent, of the spring sample. The average age of non PWC operators was 47.2. There were more males, 61 percent, than females. Most non PWC operators were from Colorado, Arizona, or Utah with a small percentage of visitors representing 15 other states. Twenty-six percent had graduated from college, and 29 percent were in the process of or had completed an advanced degree. Seventy-seven percent had incomes of more than \$40,000. Groups of non PWC operators tended to be slightly smaller than PWC operators. Groups of non PWC operators had a mean size of 3.6 individuals. Most non PWC operators were repeat visitors to Glen Canyon NRA. The median number of nights groups spent in the area was 3. The median is a more accurate measure of the number of nights visitors spent in Glen Canyon NRA than the mean due to outliers, a small number of individuals who reported spending a large number of nights in the area. The most common activities non PWC operators reported participating in were motor boating, fishing, camping at shoreline sites, camping at developed campsites, and hiking Lake Powell side canyons.

About half of non PWC operators used a powerboat as their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that that include Wahweap, Hite, Rainbow Bridge, Antelope Island, and Warm Creek. Fewer non PWC operators than PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit to the area. Sixty-five percent said Glen Canyon NRA was the primary purpose of their visit, and 28 percent said it was one of several important things they planned on doing during their time in the area. The top ranked experiences non PWC operators wanted during their visit were to enjoy the scenery of Lake Powell, to experience nature, to get away from the usual demands of life, to do something with their family, and to be close to nature.

Overall, Glen Canyon was the primary purpose for most respondents' visit to the area. Although a majority in both comparison groups stated that visiting Glen Canyon NRA was "the primary purpose of my visit to the area" more PWCs compared to non PWCs noted that visiting the area was their primary purpose. Most respondents were repeat

visitors to Glen Canyon NRA. More than two-thirds of respondents stated that they had visited Glen Canyon previously. Slightly less than one-third stated that this was their first visit to Glen Canyon NRA. PWC operators visited the area more often than did non PWC operators. There was a bimodal distribution for both groups with a large number of respondents visiting for the first time, and a large number reporting over 50 visits to the area. The mean number of visits for PWC operators was 34.2 and the mean for non PWC operators 31.8. The median number of visits was 12 for PWC operators and 5 for non PWC operators. The majority of respondents stated that they spent between one and six nights in the area. The median is a more accurate measure of the number of nights visitors spent in Glen Canyon NRA than the mean due to outliers, a small number of individuals who reported spending a large number of nights in the area. The median number of nights spent in the area by PWCs was 3. The median number of nights spent in the area by non PWCs was also 3. Lake Powell and in campgrounds were the two most popular place to spend nights. Slightly more than one-third of all respondents stated that they spent nights on Lake Powell, and one-third of respondents stated that they spent nights in a campground. PWC operators were more likely to spend their nights on Lake Powell, with one-half of PWC operators reporting that they spent nights on Lake Powell compared to one-third of non PWCs.

Family and friends were the most common group type of respondents. Most groups contacted in Glen Canyon NRA had between two and four people. Groups with PWCs tended to be slightly larger than groups without PWCs , although PWC groups were smaller than similar groups visiting during the summer. The majority of groups did not bring pets. Of the groups with PWCs, one-quarter brought dogs. Of groups without PWCs, slightly less than one-fifth brought dogs on their visit to Glen Canyon NRA.

Slightly less than two-thirds of respondents were male. Compared to non PWC operators, a higher percentage of PWC operators were male. PWC operators tended to be slightly older than non PWC operators, a difference from other study seasons where the reverse was true.

Half of all respondents had finished college. Compared to PWC operators, more non PWC operators had completed or are pursuing post graduate education. Three quarters of all respondents had incomes of at least \$40,000 in 1999. Almost all respondents, 99 percent, reported that they are white.

Respondents represent 20 different states, however most come from Colorado, Arizona, and Utah.

Activity participation was varied, however the focus was on water and camping activities. Overall, the most popular activities at Glen Canyon NRA were motor boating, fishing, camping at shoreline campsites, hiking Lake Powell side canyons, and camping at developed campsites at the main marina locations.

The most prevalent watercraft type was a powerboat. Two-thirds of all groups had powerboats with them. Slightly more than one-quarter of groups had a houseboat with them.

Only 17 percent of respondents reported operating a PWC. Of those, over half had taken a class on PWC operation and safety. Slightly less than two-thirds of PWC operators reported using a gas dock to refuel. Slightly more than half of PWC operators reported using facilities at landings for human waste disposal, and half used a support vessel.

Zone 1, the location of Wahweap marina, received the highest level of use overall and within the subgroups of PWC operators and non PWC operators. Zone 13, the location of Hite marina received the second highest level of overall use. Zone 6, the location of Rainbow Bridge, received the third highest level of overall use. PWC operators also used zone 11, the location of Bullfrog and Halls marinas, at the same use level as zone 6.

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. The majority of visitors were interested in enjoying the scenery of Lake Powell, experiencing nature, getting away from the usual demands of life, experiencing natural quiet, doing something with their family, being close to nature, and relaxing physically. There were several significant differences found between PWC operators and non PWC operators. PWC operators were more likely than were non PWC operators to desire being with people who enjoy the same things they do, being with members of their group, feeling healthier, and thinking about their personal values.

Natural areas provide a myriad of opportunities for visitors to gain psychological and physiological benefits. 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. In order to evaluate visitor benefits, visitors were asked to what level they were able to achieve desired experiences. For the most part, respondents reported being able to achieve desired experiences. The only exception was learning about the natural history of the area. There were no significant differences in experience attainment found between PWC operators and non PWC operators.

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. Situations rated as most problematic were litter on beaches and shoreline, unsafe operation of personal watercraft, people being inconsiderate, finding beach campsite, too many personal watercraft on the lake, unsafe operation of motorized boats, boats closer to my boat than I like, and conflicts with PWCs on lake. At least 22 percent or more of respondents rated these situations as a moderate to very serious problem. No significant differences were found between PWC operators and non PWC operators. Visitors were

also asked whether or not they observed unsafe boating practices during their visit, and whether or not they felt safe. PWC operators were more likely to report that they had observed unsafe boating practices. Most visitors, 97 percent, felt safe during their visit.

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. The majority of respondents, 87 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 campsite) had acceptable numbers of watercraft. There were no significant differences between PWC operators and non PWC operators regarding the acceptability of watercraft numbers.

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. The management actions supported or strongly supported by at least two-thirds of total sample were: to provide more information to visitors about appropriate behavior, aggressively enforce safety rules and regulations on lake, provide visitors with natural history information about the area, and use management controls to prevent damage to the environment by visitors. Over half of the total sample opposed or strongly opposed prohibiting motorized watercraft on the lake, prohibiting non-motorized watercraft on the lake, and limiting the number of non-motorized watercraft allowed on the lake at any one time. Significant differences were found between PWC operators and non PWC operators for two potential management actions. PWC operators were more likely to oppose prohibiting PWCs on the lake than were non PWC operators. Non PWC operators were more likely to oppose prohibiting non-motorized watercraft on the lake than were PWC operators.

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. Overall, visitors were satisfied with the quality of services at Glen Canyon NRA. When asked about their overall experience, the majority stated that they were satisfied. There was one significant difference between PWC operators and non PWC operators. PWC operators were less likely to be satisfied with the concessionaire retail stores than were 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. Visitors enjoyed their visit to Glen Canyon NRA. The majority of respondents, over 90 percent, agreed or strongly agreed with the statements overall, I was satisfied with my most recent trip to Glen Crayon and I enjoyed my time on Lake Powell. There was one significant difference found between PWC operators and other visitors. PWC operators were more likely to agree with the statement I thought the area and its surroundings were in good condition, than were non PWC operators.

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 operators and non PWC operators did not demonstrate much difference in their activity style. They only differed slightly in terms of the types of activities they preferred to engage in, and these differences might not cause conflict between the groups. Some activities, however, such as fishing and PWC use, may come into conflict if both types of users are trying to pursue different activities in the same physical place. A higher percentage of PWC operators engaged in motor boating, fishing, and camping at lake shorelines.

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 had made to Glen Canyon NRA in the past. A higher percentage of PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit than did non PWC operators. Also, PWC operators stayed slightly longer than did non PWC operators.

Mode of experience can be assessed by desired experiences of Glen Canyon NRA visitors. There were some significant differences between PWC operators and non PWC operators in terms of the experiences that they desired. PWC operators tended to rate the experiences of being with people who enjoy the same things they do, being with members of their group, feeling healthier, and thinking about their personal values as more important than did non PWC operators.

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. PWC operators were more likely to observe unsafe operation of watercraft than were non PWC operators. Crowding was not an issue for either group, and there were only two significant differences between the groups in terms of their support for various management actions. Unsurprisingly, PWC operators were less likely to support prohibiting PWC use than were non PWC operators, although neither group showed strong support for this option. PWC operators were more likely to support prohibiting non-motorized vessels than were non PWC operators, but neither group showed strong support for this option either.

Differences between the groups were very small and it appears there is not much conflict occurring between PWC operators and non PWC operators at Glen Canyon NRA during the spring use period. In fact, there were some interesting differences between this and the other two use periods. In terms of visitor opinions and perceptions, spring appears to be the most homogeneous of all use seasons and has the least conflict occurring between PWC and non PWC operators. Management actions to address potential conflict could still be utilized to protect high quality experiences and the attainment of desired benefits, particularly with the expectation that use levels in the area, even during this season, will continue to rise. Generally acceptable management actions that address conflict include providing more information to visitors about appropriate behavior, aggressively enforcing safety rules and regulations, providing visitors with natural history information about the area, and using management controls to prevent damage to the environment by visitors. The most opposed measures by both groups include prohibiting motorized watercraft on the lake, prohibiting non-motorized watercraft on the lake, limiting the number of non-motorized watercraft allowed on the lake at any one time, and prohibiting drinking alcoholic beverages 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 the recreation area 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 over 1,800 miles of shoreline because of the numerous 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 spring of 2000, the Cooperative Park Studies Program (CPSP) at the University of Minnesota administered the second of three onsite surveys to Glen Canyon NRA visitors. The onsite survey was distributed by trained CPSP interviewers between March 17, 2000 and March 30, 2000. The onsite survey collected basic demographic information from visitors and allowed them the opportunity to indicate whether or not they were willing to fill out a mail-back questionnaire. The mail-back questionnaire was sent to randomly selected visitors who had indicated a willingness to participate in the study. 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 socio-economic 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 March 17, 2000 and March 30, 2000. The survey instrument and methods used by the CPSP interviewer 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 onsite at Glen Canyon NRA. 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 survey after their trip. 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 a longer, more in depth survey (Appendix C) was mailed to the visitors who had indicated a willingness to participate in the mail-back questionnaire on the onsite survey. This questionnaire collected information such as activities visitors participated in while at Glen Canyon NRA, the importance of experiences to visitors and how well they were able to attain them, information about visitors' use of watercraft, situations visitors experienced at Glen Canyon NRA, visitors' support of selected management actions, visitors' satisfaction with services offered at Glen Canyon NRA, visitors' feelings about their trip to Glen Canyon NRA, and demographic information.

Distribution of the onsite survey and group log occurred from March 17, 2000 through March 30, 2000. To obtain responses from all 13 zones (Appendix D) of Glen Canyon NRA (Fig.1, page 5), CPSP interviewers contacted visitors at four locations within Glen Canyon NRA—Wahweap, Bullfrog, Halls, and Hite marinas. CPSP interviewer 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 be representative of 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 time 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 non-respondents were used to obtain a high response rate. A reminder letter was sent along with a second survey and postage paid envelope two weeks after the original mailing. A second reminder letter along with a third survey and postage paid envelope was sent to each non-respondent two weeks after the first reminder.

The CPSP collected 298 onsite surveys during the spring sampling period. Of the surveys collected, 268 visitors indicated a willingness to fill out the mail-back survey and were sent the mail-back survey. Of those sampled, 164 returned the mail-back survey for a response rate of 61 percent. This number of responses is large enough to make statistically valid analysis of the data.

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.

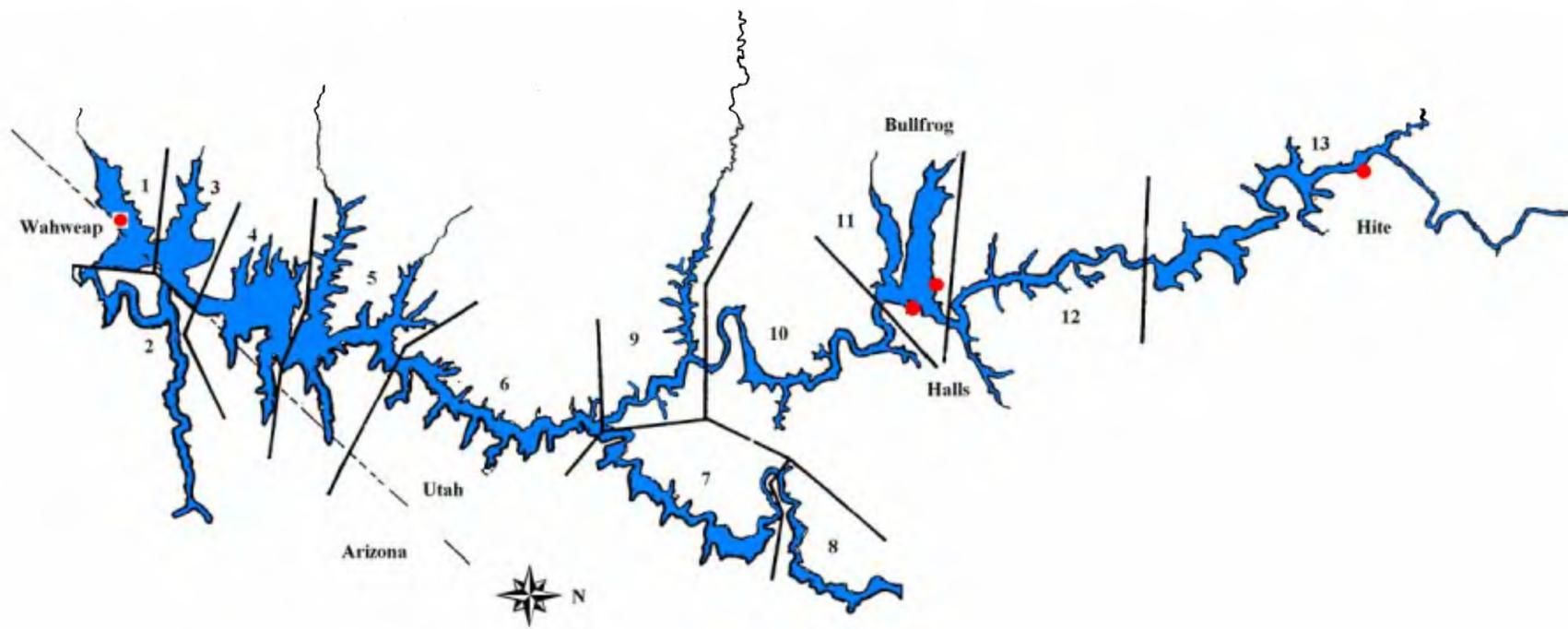
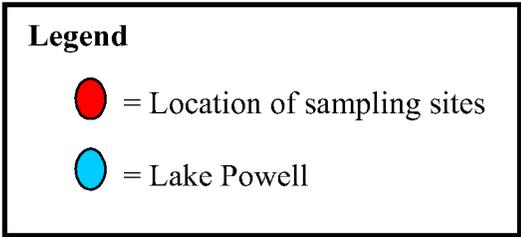


Figure 1. Sampling locations at Glen Canyon National Recreation Area.



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 referenced 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. No significant differences were found between the two groups in the number of previous visits to Glen Canyon NRA, the number of nights they spent at Glen Canyon NRA, or where they spent nights during their visit to Glen Canyon NRA (Table A.1, Table A.2, and Table A.3).

Of visitors who returned the mail-back questionnaire, 69 percent reported that visiting Glen Canyon National Recreation Area was "the primary purpose of my visit to the area" compared to 63 percent of visitors who did not return the mail-back questionnaire (Table A.4). Twenty-five percent of visitors who returned the mail-back questionnaire reported that visiting Glen Canyon National Recreation area was "one of several important things I planned to do during my visit to the area" compared to 29 percent of visitors who did not return the mail-back questionnaire.

No significant differences were found between the gender breakdowns of the two groups (Table A.5). Of those who returned the mail-back questionnaire, 63 percent were male and 37 percent were female compared to 71 percent male and 29 percent female of those who did not return the mail-back questionnaire.

Visitors who returned the mail-back questionnaire were significantly older than visitors who did not return the questionnaire. Those who returned the survey had a mean age of 47.4 and a median age of 49 compared to visitors who did not return the mail-back questionnaire who had a mean age of 42.3 and a median age of 42 (Table A.6).

Visitors who returned and who did not return the mail-back questionnaire shared very similar breakdowns in terms of their state of residence. Colorado, Arizona, Utah and California were the highest represented states, in that order, for both groups (Table A.7).

Because the responses from visitors who returned and who did not return the mail-back questionnaire are similar in almost all areas, we can assume that the results from the spring season are representative of spring 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 the mail-back questionnaire.

Number of previous visits	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
First Visit	50	31	40	39
2-5 previous visits	30	19	25	24
6-10 previous visits	18	11	6	6
11-20 previous visits	12	8	8	8
21-30 previous visits	10	6	3	3
31-50 previous visits	7	4	4	4
more than 50 previous visits	32	20	18	17
Total	159	99*	104	101*

Source: Onsite survey, Question 1.

Returned questionnaire:	Mean number of visits: 31.8	Median number of visits: 5
Did not return questionnaire:	Mean number of visits: 22.9	Median number of visits: 3

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

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

Number of nights	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
1	27	18	14	15
2	36	24	26	28
3	14	9	13	14
4	9	6	5	5
5	20	13	8	9
6	7	5	2	2
7	17	11	10	11
8	3	2	1	1
9	--	--	--	--
10	4	3	2	2
11	--	--	1	1
12	--	--	--	--
13	--	--	--	--
14	1	1	--	--
15 or more	11	7	12	13
Total	149	99*	94	101*

Source: Onsite survey, Question 2.

Returned questionnaire: Mean number of nights: 4.1 Median number of nights: 3
 Did not return questionnaire: Mean number of nights: 4.0 Median number of nights: 3

*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 the mail-back questionnaire.

Where visitors spent nights	Returned questionnaire			Did not return questionnaire		
	N	Percent*	Percent**	N	Percent*	Percent**
On Lake Powell	56	33	36	27	25	27
In a campground	52	30	33	41	37	41
In an area hotel/motel	38	22	24	23	21	23
Did not spend night	7	4	5	7	6	7
At home	3	2	2	4	4	4
Other	15	9	9	8	7	8
Total	171	100	109	110	100	110

Source: Onsite survey, Question 2.

*Based on number of *responses*

**Based on number of *respondents* (Returned survey N=480; Did not return survey N=94); study participants could give more than one response.

Table A.4. Respondents' plan for visiting Glen Canyon NRA, by visitors who *did* and visitors who *did not* return the 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	109	69	64	63
One of several important things I planned to do during my visit to the area	40	25	30	29
Something I decided to do <u>after</u> arriving in the area	10	6	8	8
Total	159	100	102	100

Source: Onsite survey, Question 3

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

Gender	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
Male	103	63	75	71
Female	61	37	30	29
Total	164	100	105	100

Source: Onsite survey, Question 5.

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

Respondent age	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
16-19	6	4	6	6
20-24	12	7	6	6
25-29	8	5	5	5
30-34	8	5	14	13
35-39	12	7	14	13
40-44	16	10	16	15
45-49	29	18	9	9
50-54	20	12	10	10
55-59	10	6	10	10
60-64	14	9	11	11
65-69	16	10	2	2
70 or older	11	7	1	1
Total	162	100	104	101*

Source: Onsite survey, Question 5.

Returned questionnaire**: Mean age: 47.4 Median age: 49
 Did not return questionnaire**: Mean age: 42.3 Median age: 42

*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 the mail-back questionnaire.

State of residence	Returned questionnaire		Did not return questionnaire	
	N	Percent	N	Percent
Colorado	55	34	33	34
Arizona	33	20	26	27
Utah	25	15	14	14
California	7	4	3	3
Minnesota	6	4	1	1
Michigan	5	3	--	--
Montana	4	2	1	1
Ohio	4	2	1	1
New Mexico	3	2	3	3
Alaska	3	2	1	1
Iowa	3	2	1	1
Idaho	3	2	1	1
Nevada	2	1	--	--
Oregon	2	1	3	3
Illinois	2	1	3	3
Missouri	1	1	--	--
Washington	1	1	--	--
New York	1	1	--	--
Pennsylvania	1	1	1	1
Wisconsin	1	1	--	--
Florida	--	--	1	1
Wyoming	--	--	2	2
Texas	--	--	1	1
Virginia	--	--	1	1
Total	162	100	97	99*

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 all respondents are given as well as statistics comparing PWC operators to all non PWC operators.

Visitor data were analyzed for all completed and returned mail-back questionnaires. Two user groups, *personal watercraft operators* and *non personal 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. Sixty-eight percent of respondents stated that they had visited Glen Canyon previously (Table B.1). Forty-nine percent had visited more than five times. Thirty-one percent stated that this was their first visit to Glen Canyon NRA.

We also compared the sub-groups of those operating personal watercraft and non PWC operators visiting Glen Canyon NRA. First time visitors made up 24 percent of the PWC operators and 33 percent of the non PWC operators. Twelve 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 34.2 and the median visit number is 12. The mean visit number of non PWC operators is 31.8 and the median visit number is 5. The high mean visit numbers is explained by a bimodal distribution of respondents.

The majority of respondents (75 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 8.6 and the median number of nights was 3. The mean number of nights spent in the area by PWC operators was 7.6 and the median number of nights spent in the area by PWC operators was 3. The mean number of nights spent in the area by non PWC operators was 9.0 and the median number of nights spent in the area by non PWC operators was 3.

Lake Powell and in campgrounds were the two most popular place to spend nights. Thirty-six percent of respondents stated that they spent nights on Lake Powell, and 33 percent of respondents stated that they spent nights in a campground (Table B.3). Half of PWC operators (50 percent) spent nights on Lake Powell compared to 32 percent of non PWC operators.

Glen Canyon was the primary purpose for most respondents' visit to the area. The majority of respondents (69 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 PWC operators (88 percent) compared to non PWC operators (65 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 (91 percent) stated that they were in a group made up of family and friends (Table B.5). Both personal watercraft and non PWC operators traveled with family and friends.

Most groups (73 percent) contacted in Glen Canyon NRA had between two and four people, with the mean number of people being 3.8 and the median number of people being 2 (Table B.6). Groups with personal watercraft tended to be slightly larger than non personal watercraft groups. Groups with personal watercraft had a mean of 4.7 people and a median of 3 people. Non personal watercraft groups had a mean of 3.6 people and a median of 2 people.

The majority of groups did not bring pets. Nineteen percent of the groups reported that their group brought dogs along (Table B.7). Of the groups with personal watercraft, 25 percent brought dogs. Of non personal watercraft groups, 18 percent brought dogs on their visit to Glen Canyon NRA.

Compared to non PWC operators, PWC operators were more likely to participate in fishing and motor boating. Non PWC operators were more likely to camp at developed campsites than PWC operators. Other activities listed by respondents can be found in Appendix G. Some examples include visiting the Glen Canyon Dam, rafting Cataract Canyon, and rock hounding.

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	50	31	6	24	42	33
2-5 previous visits	30	19	3	12	26	20
6-10 previous visits	18	11	3	12	14	11
11-20 previous visits	12	8	3	12	8	6
21-30 previous visits	10	6	3	12	7	6
31-50 previous visits	7	4	--	--	7	6
Over 50 previous visits	32	20	7	28	24	19
Total	159	99*	25	100	128	101*

Source: Onsite survey, Question 1.

Total sample:	Mean number of visits: 31.8	Median number of visits: 5
PWC operators:	Mean number of visits: 34.2	Median number of visits: 12
Non PWC operators:	Mean number of visits: 31.8	Median number of visits: 5

* 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	27	18	6	23	20	17
2	36	24	6	23	29	25
3	14	9	2	8	12	10
4	9	6	1	4	6	5
5	20	13	3	11	16	14
6	7	5	1	4	6	5
7	17	11	2	8	15	13
8	3	2	2	8	1	1
9	--	--	--	--	--	--
10	4	3	2	8	2	2
11	--	--	--	--	--	--
12	--	--	--	--	--	--
13	--	--	--	--	--	--
14	1	1	--	--	1	1
15 or more	11	7	1	4	10	9
Total	149	99*	26	101*	118	102*

Source: Onsite survey, Question 2.

All respondents:	Mean number of nights: 8.6	Median number of nights: 3
PWC Operators:	Mean number of nights: 7.6	Median number of nights: 3
Non PWC operators:	Mean number of nights: 9.0	Median number of nights: 3

*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	56	33	36	13	46	50	40	29	32
In a campground	52	30	33	8	29	31	43	31	35
In an area Hotel/Motel	38	22	24	5	18	19	33	24	27
Did not spend night	7	4	5	--	--	--	6	4	5
At Home	3	2	2	1	4	4	2	2	2
Other	15	9	10	1	4	4	13	10	11
Total	171	100	--	28	101***	--	137	100	--

Source: Onsite survey, Question 2.

*Based on number of *responses*

**Based on number of *respondents* (Total sample N= 156; PWC operators N= 26; Non PWC operators N= 124); study participants could give more than one response.

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

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	109	69	21	88	84	65
One of several important things I planned to do during my visit to the area	40	25	3	12	36	28
Something I decided to do <u>after</u> arriving in the area	10	6	--	--	9	7
Total	159	100	24	100	129	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	148	91	22	92	126	91
Alone	11	7	1	4	10	7
Tour	2	1	--	--	2	1
Business	1	1	--	--	1	1
Other	1	1	1	4	--	--
Total	163	101*	24	100	139	100

Source: Group log.

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

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	12	7	2	8	10	7
2	73	45	10	42	63	46
3	22	14	2	8	20	14
4	23	14	2	8	21	15
5	5	3	1	4	4	3
6-10	21	13	5	21	16	12
11-15	2	1	1	4	1	1
16 or more	4	3	1	4	3	2
Total	162	100	24	99*	138	100

Source: Group Log.

All groups:	Mean number of people: 3.8	Median number of people: 2
PWC groups:	Mean number of people: 4.7	Median number of people: 3
Non PWC groups:	Mean number of people: 3.6	Median number of people: 2

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

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	134	81	18	75	116	82
Dog	31	19	6	25	25	18
Cat	2	1	--	--	2	1
Total	167	101*	24	100	143	101*

Source: Group Log

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

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***
Motor boating	78	12	48	17	14	65	58	12	45
Fishing	62	10	38	16	13	62	42	9	33
Camping at shoreline campsites	55	9	34	13	11	50	42	9	33
Hiking Lake Powell side canyons	45	7	28	7	6	27	36	8	28
Camping at developed campsites (main marina locations)	45	7	28	3	3	12	41	9	33
Hiking in front-country	38	6	24	5	4	19	33	7	26
Wildlife watching	35	6	22	3	3	12	31	6	24
Using a personal watercraft	32	5	20	26	22	100	4	1	3
Swimming	30	5	19	7	6	27	21	4	16
Visiting archaeological sites	30	5	19	5	4	19	24	5	19
Bird watching	25	4	16	2	2	8	22	5	17
Tour boat ride	25	4	16	1	1	4	24	5	19
Hiking in back-country	23	4	14	3	3	12	19	4	15
Paddling (canoe or kayak)	20	3	12	0	0	0	20	4	16
Participating in water sports	16	3	10	5	4	19	9	2	7
Camping at primitive sites in the back-country	16	3	10	3	3	12	11	2	9
Driving (Burr Trail, Hole in the Rock Road)	13	2	8	1	1	4	12	3	9
Mountain biking	5	1	3	--	--	--	5	1	4
Sailing	2	<1	1	--	--	--	2	<1	1
Hunting	1	<1	1	--	--	--	1	<1	1
Other****	31	5	19	2	2	8	25	5	19
Total	627	101***	--	119	102***	--	482	101***	--

Source: Mail-back survey, Question 1.

*Based on number of *responses*

**Based on number of *respondents* (Total sample N= 161; PWC operators N= 26; Non PWC operators N= 129); 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.

☐ 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 or not 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 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 best fit the needs of visitors to Glen Canyon NRA.

The most common primary watercraft used by respondents during their visit to Glen Canyon NRA, (46 percent) was a powerboat (Table C.1). Thirty-five percent of PWC operators stated that a houseboat was their primary watercraft compared to 14 percent of non PWC operators. Thirty-one percent of PWC operators stated that a powerboat was their primary watercraft compared to 49 percent of non PWC operators. Twenty-seven percent of PWC operators stated that personal watercraft were their primary watercraft compared to 2 percent of non PWC operators. This 2 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.

Most respondents used their own watercraft. The majority of respondents (57 percent) (Table C.2), reported that they owned the primary watercraft that they used during their visit to Glen Canyon NRA. Seventeen percent stated that they rented the primary watercraft that they used during their visit to Glen Canyon NRA.

Overall, of the groups visiting Glen Canyon who used watercraft, 66 percent (Table C.3), had powerboats with them, 26 percent had houseboats with them, and 22 percent had personal watercraft. Most groups only had one of any given type of watercraft with the exception of kayaks, which averaged more than 5 per group.

Of all groups traveling on Lake Powell with houseboats, 14 percent had PWCs with them (Table C.4). Of all groups traveling on Lake Powell with powerboats, 14 percent had PWCs with them (Table C.5).

The majority of respondents (70 percent) (Table C.6) had not taken a class in personal watercraft safety and use. Fifty-eight percent of PWC operators stated that they had taken a class in personal watercraft safety and use compared to 24 percent of non PWC operators.

Seventeen percent of respondents stated that they operated a personal watercraft during their visit to Glen Canyon NRA (Table C.7). Of those, 65 percent stated that they used their own personal watercraft, 19 percent stated that they rented a personal watercraft, and 15 percent used a friend's personal watercraft (Table C.8). All rentals were from the concessionaire, Aramark (Table C.9).

Sixty-two percent of PWC operators used the gas dock to refuel (Table C.10). Only 4 percent used a gas can on the water to refuel their personal watercraft.

Half or more of PWC operators stated that they used facilities provided at landings (54 percent) or a marine toilet aboard a support vessel (50 percent) (Table C.11). Twenty-seven percent stated that they carried a portable toilet, and 4 percent stated that they used "other" methods of waste disposal.

Table C.1. Primary watercraft used by Glen Canyon National Recreation Area visitors.

Type of vessel	Total sample		PWC operators		Non PWC operators	
	N	Percent	N	Percent	N	Percent
Powerboat	65	46	8	31	57	49
Houseboat	25	18	9	35	16	14
Kayak	12	8	--	--	12	10
Personal Watercraft	9	6	7	27	2	2
Canoe	3	2	1	4	2	2
Sailboat	1	1	--	--	1	1
Other*	28	20	1	4	27	23
Total	143	101**	26	101**	117	101**

Source: Mail-back survey, Question 3.

* Responses in the other category include: tour boat and rowboat

** 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	78	57	18	69	60	55
Co-own/ Multiple owner	9	7	1	4	8	7
Rent houseboat from concessionaire	14	10	5	19	9	8
Rent powerboat from concessionaire	7	5	1	4	6	6
Rent from local company in town	3	2	--	--	3	3
Other*	25	18	1	4	24	22
Total	136	99**	26	100	110	101**

Source: Mail-back Questionnaire, Question 4.

*Responses in the other category include: 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	70	1.1	53	66	13	1.1	30	57	57	1.1	66	68
Houseboat	27	1.1	21	26	6	1	14	26	21	1.1	24	25
Personal Watercraft	23	1.8	18	22	23	1.8	54	100	--	--	--	--
Kayak	4	5.5	3	4	--	--	--	--	4	5.5	5	5
Canoe	2	1.5	2	2	1	2.0	2	4	1	1.0	1	1
Raft (motor)	1	2.0	1	1	--	--	--	--	1	2.0	1	1
Raft (no motor)	1	3.0	1	1	--	--	--	--	1	3	1	1
Sailboat	1	1.0	1	1	--	--	--	--	1	1.0	1	1
Other	1	1.0	1	1	--	--	--	--	1	1.0	1	1
Total	130	--	101****	--	43	--	100	--	87	--	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= 106; PWC groups N= 23; Non PWC groups N= 83); 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	23	14
Did not have PWC	142	86
Total	165	100

Source: Group Log.

Table C.5. Powerboaters traveling with PWCs

Powerboaters with PWCs	N	Percent
Had PWC	23	14
Did not have PWC	142	86
Total	165	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	108	70	11	42	97	76
Yes	46	30	15	58	31	24
Total	154	100	26	100	128	100

Source: Mail-back survey, Question 5.

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

Operated personal watercraft	Total sample	
	N	Percent
No	132	83
Yes	26	17
Total	158	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	17	65
A rental personal watercraft	5	19
A friend's personal watercraft	4	15
Total	26	99*

Source: Mail-back survey, Question 6b.

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

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	--	--
From concessionaire	5	100
Total	5	100

Source: Mail-back survey, Question 6b.

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

Refueling method	PWC operators		
	N	Percent*	Percent**
Gas dock	16	40	62
Purchased fuel in the area	8	20	31
Did not refuel personal watercraft	6	15	23
Brought own fuel from home	4	10	15
Gas station	3	8	12
Gas can on shore	2	5	8
Gas can on the water	1	3	4
Total	40	101***	--

Source: Mail-back survey, Question 6c.

*Based on number of *responses*

**Based on number of *respondents* (PWC operators N= 26); study participants could give more than one response.

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

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

Waste disposal method	PWC operators		
	N	Percent*	Percent**
Use facilities provided at landings	14	35	54
Use a marine toilet aboard a support vessel	13	33	50
Carry a portable toilet***	7	18	27
Use floating restrooms provided on Lake Powell	5	13	19
Other method of waste disposal****	1	3	4
Total	40	102*****	--

Source: Mail-back survey, Question 6d.

*Based on number of *responses*

**Based on number of *respondents* (PWC operators N=26); study participants could give more than one response.

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

**** Other methods include: Burying waste above high water mark.

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

Most groups spent the majority of their time in one or more of four zones (Table C.12) Fifty-four percent of groups primarily visited zone 1 (Wahweap area) and 24 percent visited zone 13 (Hite area). All other zones received 11 percent or less of primary visitation. Figure 2 (page 28) illustrates the level of primary zone use of all groups on Lake Powell during the spring sampling period.

The two zones where groups with personal watercraft spent most of their time were zone 1 (Wahweap area) with 44 percent of groups and zone 13 (Hite area) with 28 percent of groups (Figure 3, page 28).

The two zones where other groups spent most of their time were zone 1 (Wahweap area) with 56 percent of groups and zone 13 (Hite area) with 23 percent of groups (Figure 4, page 28). Extremely low use in the middle portion of the lake may be attributable to bad weather and snow that occurred there during the sampling period.

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	63	43	54	8	35	44	55	45	56
2	10	7	9	1	4	6	9	7	9
3	12	8	10	2	9	11	10	8	10
4	4	3	3	2	9	11	2	2	2
5	2	1	2	--	--	--	2	2	2
6	13	9	11	2	9	11	11	9	11
7	--	--	--	--	--	--	--	--	--
8	--	--	--	--	--	--	--	--	--
9	--	--	--	--	--	--	--	--	--
10	4	3	3	1	4	6	3	3	3
11	6	4	5	2	9	11	4	3	4
12	3	2	3	--	--	--	3	3	3
13	28	19	24	5	22	28	23	19	23
Total	145	99***	--	23	101***	--	122	101***	--

Source: Group Log.

*Based on number of *responses*

**Based on number of *respondents* (All groups N= 117, PWC groups N= 18; Non PWC groups N= 99); study participants could give more than one response.

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

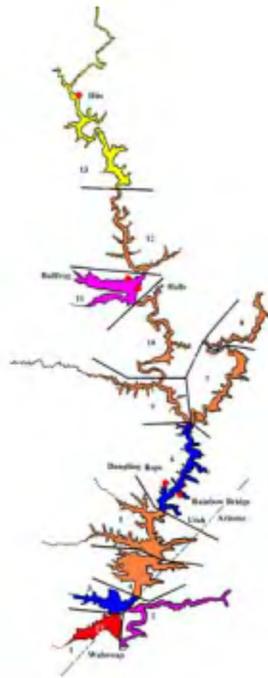


Figure 2. Use by all Groups

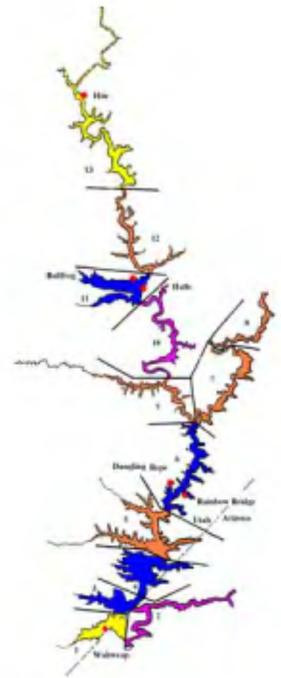


Figure 3. Use by PWCs

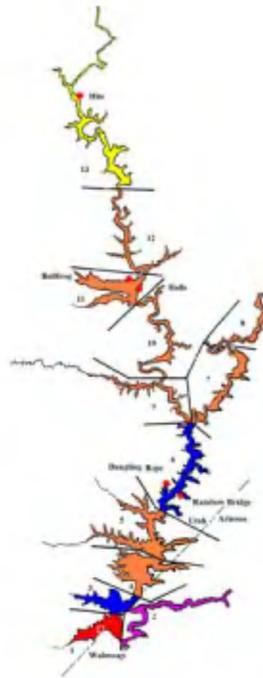
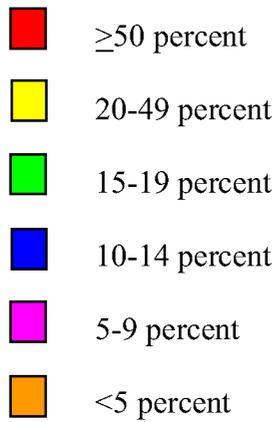


Figure 4. Use by Non PWCs

D. Visitor Characteristics

Demographic data were evaluated to determine potential differences between user groups. Of the total sample, 63 percent were male and 37 percent were female (Table D.1). Gender for both PWC operators and non PWC operators were similar to the total respondent gender breakdown. Seventy-three percent of PWC operators were male and 27 percent were female. Sixty-one percent of non PWC operators were male and 39 percent were female.

The mean age for visitors is 47.8 years old (Table D.2). There is no significant difference in the mean ages of PWC operators, 50.0 years old, and non PWC operators, 47.2 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. Twenty states are represented and all but New York and Pennsylvania are western or mid-western states (Table D.3). More than half of respondents (69 percent) were from Utah, Arizona, and Colorado. Colorado had 34 percent of respondents, Arizona had 20 percent of respondents, and Utah had 15 percent of respondents making these three states the most highly represented. It is interesting to note that of the 20 states represented by respondents to the mail-back survey, PWC operators account for only seven (Colorado, Arizona, Utah, Montana, New Mexico, Idaho, and Wisconsin).

More than half of the total sample have a college degree or beyond (Table D.4). Twenty-eight percent of respondents stated that they are college graduates, 9 percent stated that they have completed some graduate school, and 17 percent stated that they have a masters, doctoral, or professional degree. There were some small differences between PWC operators and non PWC operators. Thirty-nine percent of PWC operators stated they had some college, business, or trade school compared to 33 percent of non PWC operators. Thirty-nine percent of PWC operators stated they were college graduates compared to 26 percent of non PWC operators. Only 8 percent of PWC operators stated that they had completed some graduate school or held masters, doctoral or professional degrees compared to 29 percent of non PWC operators.

Seventy-six percent of respondents stated that they had incomes of \$40,000 or more (Table D.5).

Survey respondents were very homogeneous with respect to ethnicity and race (Tables D.6 and D.7). Only 3 percent identified their ethnicity as Hispanic or Latino and 99 percent of respondents identified their race as white.

Table D.1. Gender of respondents.

Gender	Total sample		PWC operators		Non PWC operators	
	N	Percent	N	Percent	N	Percent
Male	103	63	19	73	81	61
Female	61	37	7	27	51	39
Total	164	100	26	100	132	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	6	4	1	4	5	4
20-24	12	7	1	4	10	8
25-29	8	5	--	--	8	6
30-34	8	5	3	13	4	3
35-39	12	7	2	8	10	8
40-44	16	10	1	4	14	11
45-49	29	18	6	25	22	17
50-54	20	12	4	17	16	12
55-59	10	6	2	8	8	6
60-64	14	9	1	4	12	9
65-69	16	10	1	4	15	11
70 or older	11	7	2	8	7	5
Total	162	100	24	99*	131	100

Source: Mail-back survey, Question 16.

Total sample: Mean age: 47.8 Median age: 49
PWC operators: Mean age: 50.0 Median age: 49
Non PWC operators: Mean age: 47.2 Median age: 49

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

Table D.3. Permanent residence of respondents.

State of residence	Total sample		PWC operators		Non PWC operators	
	N	Percent	N	Percent	N	Percent
Colorado	55	34	11	42	43	33
Arizona	33	20	8	31	24	19
Utah	25	15	3	12	21	16
California	7	4	--	--	7	5
Minnesota	6	4	--	--	6	5
Michigan	5	3	--	--	4	3
Montana	4	3	1	4	3	2
Ohio	4	3	--	--	4	3
New Mexico	3	2	1	4	2	2
Alaska	3	2	--	--	3	2
Iowa	3	2	--	--	3	2
Idaho	3	2	1	4	1	1
Nevada	2	1	--	--	2	2
Oregon	2	1	--	--	2	2
Illinois	2	1	--	--	2	2
Missouri	1	1	--	--	1	1
Washington	1	1	--	--	1	1
New York	1	1	--	--	--	--
Pennsylvania	1	1	--	--	1	1
Wisconsin	1	1	1	4	--	--
Total	162	102*	26	101*	130	102*

Source: Onsite survey.

*Percent does not add to 100 percent 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	2	8	--	--
High school graduate or GED	18	11	2	8	15	12
Some college, business, or trade school	53	33	10	39	42	33
College graduate	45	28	10	39	34	26
Some graduate school	14	9	1	4	12	9
Masters, doctoral or professional degree	28	17	1	4	26	20
Total	161	100	26	102*	129	100

Source: Mail-back survey, Question 17.

*Percent does not add to 100 percent 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	7	5	--	--	7	6
\$15,000 to \$24,999	9	6	3	12	6	5
\$25,000 to \$39,999	19	13	3	12	14	12
\$40,000 to \$64,999	49	33	9	36	39	33
\$65,000 or more	64	43	10	40	52	44
Total	148	100	25	100	118	100

Source: Mail-back survey, Question 18.

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

Ethnicity	Total sample	
	N	Percent
Not Hispanic or Latino	115	3
Hispanic or Latino	4	97
Total	119	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	148	99
American Indian or Alaska Native	2	1
Asian	--	--
Black or African American	--	--
Native Hawaiian or other Pacific Islander	--	--
Total	150	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 nor important, 4= important, and 5= very important.

More than 80 percent of visitors rated "to enjoy the scenery of Lake Powell (mean 4.6)," "to experience nature (mean 4.4)," "to get away from the usual demands of life (mean 4.3)," "to experience natural quiet (mean 4.2)," "to do something with my family (mean 4.2)," "to be close to nature (mean 4.2)," and "to relax physically (mean 4.2)," as important or very important experiences (Table E.1). More than 60 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 PWC operators and other visitors for "to be with people who enjoy the same things I do" with PWC operators having a mean of 4.4 and non PWC operators having a mean of 3.8, "to be with members of my group" with PWC operators having a mean of 4.5 and non PWC operators having a mean of 3.6, "to feel healthier" with PWC operators having a mean of 4.0 and non PWC operators having a mean of 3.6, and "to think about my personal values" with PWC operators having a mean of 4.0 and non PWC operators having a mean of 3.5. 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 participating in ceremonies, prayers, and peace.

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

Experience*	Total sample							PWC operators and Non PWC operators			
	Percent of respondents by response category**							PWC operators		Non PWC operators	
	N	Mean	1	2	3	4	5	N	Mean	N	Mean
To enjoy the scenery of Lake Powell	154	4.6	2	--	4	28	66	26	4.8	128	4.5
To experience nature	139	4.4	2	1	6	40	50	24	4.4	115	4.3
To get away from the usual demands of life	142	4.3	4	1	11	29	56	26	4.3	116	4.3
To experience natural quiet	139	4.2	3	2	12	42	42	23	4.3	116	4.1
To do something with my family	142	4.2	6	4	10	22	58	25	4.4	117	4.2
To be close to nature	140	4.2	4	1	11	39	44	23	4.3	117	4.2
To relax physically	141	4.2	2	4	13	40	41	24	4.3	117	4.1
To be with people who enjoy same things I do	141	3.9	4	10	15	33	38	25	4.4	116	3.8
To be away from other people	136	3.9	4	7	19	37	33	23	4.2	113	3.8
To experience solitude	133	3.9	4	7	20	35	34	22	4.1	111	3.9
To experience an undeveloped lake	135	3.8	8	7	18	34	33	23	3.8	112	3.7
To be with members of my group	136	3.8	7	10	21	24	38	24	4.5	112	3.6
To be on my own	137	3.7	9	10	17	31	33	24	3.5	113	3.7
To participate in recreational activities	140	3.7	7	9	19	33	32	25	3.7	115	3.7
To learn about the natural history of the area	144	3.7	6	2	29	41	23	22	3.8	122	3.7
To experience new and different things	143	3.7	6	8	26	36	25	24	3.6	119	3.7
To feel healthier	138	3.7	7	6	28	33	27	23	4.0	115	3.6
To use my own equipment	138	3.6	11	12	16	28	34	24	3.8	114	3.6
To stargaze	135	3.6	10	10	21	33	26	22	3.7	113	3.5
To think about my personal values	135	3.6	6	7	38	23	27	23	4.0	112	3.5

Table E.1 Continued

Experience*	Total Sample							PWC operators and Non PWC operators			
	N	Mean	Percent of respondents by response category**					PWC operators		Non PWC operators	
			1	2	3	4	5	N	Mean	N	Mean
To get exercise	139	3.6	6	9	24	40	22	22	3.6	117	3.6
To learn about the cultural history of the area	143	3.5	8	6	33	35	19	23	3.7	120	3.5
To have thrills and excitement	138	3.5	8	9	36	21	26	24	3.7	114	3.4
To test my skills and abilities	135	3.3	10	14	33	23	20	22	3.2	113	3.3
To challenge myself	135	3.1	15	10	39	19	18	23	3.2	112	3.1
To be creative by doing something such as sketching, painting, taking photographs	133	3.0	16	18	37	14	16	23	2.7	110	3.0
To share my skill and knowledge with others	135	2.9	14	22	35	17	12	23	3.2	112	2.9
To meet new people	141	2.7	21	26	29	14	10	23	2.6	118	2.7
To participate in ranger-led activities	134	2.1	37	25	32	5	2	22	2.2	112	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 nor important, 4=important, 5=very important.

☐ 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 (where 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. For the most part, respondents reported being able to achieve desired experiences (mean scores were all >3) with the exception of to learn about the natural history of the area (mean score 2.9) (Table F.1). There were no significant differences in experience attainment between PWC 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*	Total sample						PWC operators and Non PWC operators			
	N	Mean	Percent of respondents by response category**				PWC operators		Non PWC respondents	
			1	2	3	4	N	Mean	N	Mean
To be with members of my group	78	3.8	--	3	14	83	17	3.9	61	3.8
To learn about the cultural history of the area	66	3.8	12	23	39	26	8	2.4	58	2.8
To use my own equipment	77	3.7	1	5	20	74	16	3.6	61	3.7
To do something with my family	101	3.7	4	4	14	78	18	3.6	83	3.7
To be with people who enjoy same things I do	91	3.6	--	6	25	69	18	3.7	73	3.6
To enjoy the scenery of Lake Powell	128	3.6	--	6	24	70	21	3.8	107	3.6
To get away from the usual demands of life	107	3.6	--	7	32	62	19	3.7	88	3.5
To participate in recreational activities	82	3.5	--	6	39	55	13	3.6	69	3.5
To stargaze	74	3.4	3	11	28	58	12	3.7	62	3.4
To be close to nature	103	3.4	--	8	46	47	15	3.5	88	3.4
To relax physically	102	3.4	2	10	39	49	17	3.4	85	3.4
To experience nature	113	3.3	--	12	43	45	18	3.4	95	3.3
To have thrills and excitement	58	3.3	--	16	40	45	11	3.6	47	3.2
To be on my own	75	3.2	3	12	51	35	14	3.1	61	3.2
To meet new people	31	3.2	7	13	32	48	4	3.5	27	3.2
To experience new and different things	77	3.2	5	14	34	47	9	3.6	68	3.2
To think about my personal values	58	3.2	5	14	33	48	13	3.2	45	3.2

Table F.1 Continued

Experience*	Total Sample						PWC operators and Non PWC operators			
			Percent of respondents by response category**				PWC operators		Non PWC respondents	
	N	Mean**	1	2	3	4	N	Mean**	N	Mean**
To be creative by doing something such as sketching, painting, taking photographs	35	3.2	9	9	40	43	3	3.3	32	3.2
To get exercise	78	3.2	3	14	49	35	10	3.2	68	3.2
To share my skill and knowledge with others	130	3.2	--	18	41	41	7	2.7	27	3.4
To feel healthier	73	3.2	3	15	43	40	13	3.5	60	3.1
To experience an undeveloped lake	79	3.1	6	17	38	39	12	3.0	67	3.1
To experience natural quiet	104	3.1	5	20	34	41	16	3.2	88	3.1
To participate in ranger-led activities	7	3.1	14	14	14	57	0	0.0	7	3.1
To challenge myself	43	3.1	5	16	42	37	6	3.0	37	3.1
To experience solitude	79	3.1	9	14	38	39	13	3.2	66	3.1
To test my skills and abilities	53	3.0	4	26	32	38	8	2.6	45	3.1
To be away from other people	83	3.0	10	18	35	37	15	3.3	68	2.9
To learn about the natural history of the area	82	2.9	7	24	40	28	10	2.6	72	2.9

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. In all cases except litter on beaches and shoreline, more than 50 percent of respondents indicated that the situations they experienced were not a problem (Table G.1). Situations rated as most problematic were litter on beaches and shoreline, unsafe operation of personal watercraft, people being inconsiderate, finding beach campsite, too many personal watercraft on the lake, unsafe operation of motorized boats, boats closer to my boat than I like, and conflicts with PWC operators on lake. At least 22 percent or more of respondents rated these situations as a moderate to very serious problem. Although these were the most problematic situations, it should be noted that the highest mean rating was only 2.1 for litter on beaches and shoreline, and unsafe operation of personal watercraft. No significant differences were found between PWC operators and non PWC operators. Other situations listed by respondents can be found in Appendix G. Some examples include issues with personal watercraft, dirty restrooms, and pet dogs.

In answer to the question, did you observe any unsafe boating practices on your most recent visit to Glen Canyon NRA? Eighty percent of respondents stated seeing no unsafe boating practices (Table G.2). It is interesting to note that 35 percent of PWC operators stated that they did see unsafe boating practices, compared to 16 percent of non PWC operators. Unsafe boating practices reported by respondents can be found in Appendix G. Some examples include boats traveling too fast and unsafe operation of personal watercraft.

In answer to the question, did you feel safe on your most recent visit to Glen Canyon NRA? Ninety-seven percent of respondents stated that they did feel safe during their visit (Table G.3). Reasons for not feeling safe can be found in Appendix G. One example is "no ranger or lake personnel visible."

Table G.1. Situations respondents may have experienced while visiting Glen Canyon National Recreation Area.

Situation*	Total Sample							PWC operators and non PWC operators			
	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**
Litter on beaches and shoreline	136	2.1	42	27	16	10	6	25	2.0	108	2.2
Unsafe operation of personal watercraft	127	2.1	56	12	11	11	10	24	2.1	99	2.1
People being inconsiderate	138	2.0	49	23	12	11	6	25	2.2	109	2.0
Finding beach campsite	111	1.9	56	14	20	8	3	23	1.8	84	2.0
Too many personal watercraft on the lake	133	1.9	59	16	10	6	10	25	1.9	104	2.0
Unsafe operation of motorized boats	125	1.8	58	21	12	5	5	24	2.0	97	1.7
Boats closer to my boat than I like	132	1.8	63	12	14	6	5	25	2.0	103	1.8
Conflicts with personal watercraft operators on lake	129	1.8	65	12	9	7	8	26	1.4	99	1.9
Evidence of pets and their droppings	139	1.7	64	18	9	4	5	26	1.6	109	1.7
Finding an unoccupied campsite	130	1.6	68	14	12	5	1	25	1.6	100	1.6
Too much noise on the lake	139	1.6	62	22	11	4	1	26	1.6	109	1.7
Adequate floating toilet facilities on lake	107	1.6	72	12	4	10	2	21	1.8	82	1.6
Sufficient navigational aids on Lake Powell	121	1.5	67	17	13	1	2	23	1.6	94	1.5
Too many motorized boats on the lake	137	1.5	70	15	10	3	2	25	1.8	108	1.5
Conflicts with others for beach space	129	1.5	68	20	10	1	1	25	1.3	100	1.5
Adequate toilet facilities at landings	131	1.5	78	12	3	2	5	25	1.7	102	1.4
Poor water quality	124	1.4	70	19	8	2	1	25	1.4	96	1.5
Too many commercial tour boats	127	1.4	75	17	5	0	3	23	1.4	100	1.4
Human waste on shore or in water	124	1.4	73	16	5	5	1	25	1.6	95	1.4
Confusion about rules and regulations	130	1.4	79	7	10	2	2	26	1.2	100	1.5

Table G.1 Continued

Situation*	Total sample							PWC operators and non PWC operators			
	Percent of respondents by response category**							PWC operators		Non PWC operators	
	N	Mean**	No problem	Slight problem	Moderate problem	Serious problem	Very serious problem	N	Mean**	N	Mean**
Too much light at the marinas at night	117	1.4	81	8	7	3	1	20	1.2	92	1.4
Lack of National Park Service presence on the lake	127	1.4	80	8	8	2	2	24	1.5	99	1.4
Evidence of livestock	121	1.3	84	9	5	1	1	22	1.1	95	1.3
Noise from airplanes	131	1.3	84	10	4	2	1	24	1.2	103	1.3
Too much light on lake at night	123	1.2	87	7	5	1	1	22	1.1	97	1.3
Evidence of mining operations	121	1.2	91	6	2	1	1	24	1.2	93	1.2
Enough ranger-led activities	87	1.2	90	6	3	--	1	14	1.0	70	1.2

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.

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	123	80	17	65	104	84
Yes	30	20	9	35	20	16
Total	153	100	26	100	124	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	150	97	26	100	121	96
No	5	3	--	--	5	4
Total	155	100	26	100	126	100

Source: Mail-back survey, Question 10.

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, 87 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 campsite) had acceptable numbers of watercraft based on a score of four or higher (Table H.1). For those who stated there were unacceptable numbers of watercraft, the reason most often given for unacceptable numbers of watercraft on the lake surface was the type of watercraft. The reason most often given for unacceptable numbers of watercraft on the lakeshore was a combination of number, type, and something else. The reason most often given for unacceptable numbers of watercraft at fueling docks, boat landings and campsites was the number of watercraft. There were no significant differences between PWC operators and non PWC operators regarding the acceptability of watercraft numbers (Tables H.2 and H.3). In all cases, the mean scores from the two groups were 5.3 or higher.

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**							If respondent circled 1,2, or 3: reasons for unacceptable encounters.				
			Very Unacceptable			Very Acceptable				N	Number of watercraft	Type of watercraft	Something else	Number, type, and something else
			1	2	3	4	5	6	7					
On the lake surface	122	5.6	6	1	6	11	17	17	43	12	17	59	--	25
On the lake shore	127	5.5	6	2	2	14	17	22	37	10	30	20	--	50
At fueling docks	83	5.5	7	--	6	10	19	21	37	8	50	13	--	38
At boat landings	111	5.4	5	1	5	14	23	18	34	9	44	11	11	33
While at campsite	94	5.3	9	--	3	16	18	18	36	10	50	40	10	--

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**							If respondent circled 1,2, or 3: reasons for unacceptable encounters.				
			Very Unacceptable			Very Acceptable				N	Number of watercraft	Type of watercraft	Something else	Number, type, and something else
			1	2	3	4	5	6	7					
On the lake surface	24	5.7	4	4	4	8	17	13	50	2	--	50	--	50
On the lake shore	23	5.4	4	4	--	26	13	13	39	1	--	--	--	100
At boat landings	20	5.4	5	--	10	15	10	25	35	3	--	33	--	67
While at campsite	18	5.4	--	--	6	28	22	11	33	1	--	100	--	--
At fueling docks	18	5.4	6	--	11	11	11	22	39	3	33	33	--	33

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.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**							If respondent circled 1,2, or 3: reasons for unacceptable encounters.				
			Very Unacceptable			Very Acceptable				N	Number of watercraft	Type of watercraft	Something else	Number, type, and something else
			1	2	3	4	5	6	7					
On the lake shore	100	5.6	5	1	3	12	18	25	36	8	25	25	--	50
On the lake surface	94	5.5	5	--	6	12	17	19	40	9	11	67	--	22
At boat landings	87	5.5	3	1	3	15	26	17	33	5	--	40	20	40
At fueling docks	61	5.5	7	--	5	10	21	20	38	4	50	--	--	50
While at campsite	72	5.4	10	--	3	14	17	21	36	8	50	38	13	--

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.

I. Management Actions

An understanding of visitors' management preferences can aid the development of management actions that address issues of PWC use, protect the resource, and provide 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).

The management actions supported or strongly supported by at least two-thirds of total sample were to provide more information to visitors about appropriate behavior, aggressively enforce safety rules and regulations on lake, provide visitors with natural history information about the area, and use management controls to prevent damage to the environment by visitors (Table I.1). At least 65 percent of the total sample opposed or strongly opposed prohibiting motorized watercraft on the lake, prohibiting non-motorized watercraft on the lake, and limiting the number of non-motorized watercraft allowed on the lake at any one time.

Significant differences were found between PWC operators and non PWC operators on two potential management actions, to prohibit personal watercraft on the lake, and to prohibit non-motorized watercraft on the lake. PWC operators opposed prohibiting personal watercraft more strongly, mean score 1.9, than did non PWC operators, mean score 2.6. PWC operators supported prohibiting non-motorized watercraft more strongly, mean score 2.2, than did non PWC operators, mean score 1.7. Other management actions proposed by visitors can be found in Appendix G. Some examples include providing direction signs on Lake Powell (including no wake signs), educating visitors about boat safety, and providing litter pick-up locations.

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 non PWC operators			
	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	145	3.9	4	3	19	48	26	25	3.8	117	3.9
Aggressively enforce safety rules and regulations on lake	146	3.8	3	7	21	40	28	25	4.0	118	3.8
Provide visitors with natural history information about the area	150	3.8	2	--	33	49	17	25	3.8	121	3.8
Use management controls to prevent damage to the environment by visitors	147	3.8	3	8	21	43	25	25	3.6	119	3.8
Provide more park rangers on the lake to educate visitors about appropriate behavior.	147	3.6	5	10	29	33	23	25	3.5	119	3.6
Provide more toilet facilities at landings	147	3.6	3	4	41	36	16	26	3.6	118	3.6
Establish “off-limit” zones to protect sensitive resources	145	3.5	14	10	16	35	25	25	3.2	117	3.6
Restrict personal watercraft use to designated areas only	146	3.4	14	15	19	24	28	25	3.1	118	3.5
Use management controls to prevent conflicts between lake users	146	3.3	10	6	34	42	9	25	3.2	118	3.4
Require visitors to learn about appropriate behavior on the lake (e.g., watch a short video presentation)	144	3.2	11	16	31	24	17	25	3.4	117	3.2
Limit number of personal watercraft allowed on lake at any one time	146	3.1	13	19	27	23	18	25	2.8	118	3.2
Restrict further facility development and expansion	145	3.1	15	21	23	25	17	25	2.8	117	3.2

Table I.1 Continued

Management Action*	Total sample							PWC operators and non PWC operators			
	Percent of respondents by response category**							PWC operators		Non PWC operators	
	N	Mean	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support	N	Mean	N	Mean
Zone the waters to provide specific uses at specific places	144	3.0	16	18	26	29	10	25	2.6	116	3.1
Limit number of boats allowed on lake	143	2.9	19	18	33	19	12	25	2.9	115	2.9
Limit number of motorized watercraft allowed on lake at any one time	146	2.9	17	23	28	20	12	25	2.8	118	2.9
Limit number of houseboats allowed on lake at any one time	147	2.9	16	16	36	20	12	25	3.0	119	3.0
Improve public access to the lake	144	2.9	15	23	29	21	12	25	3.0	116	2.9
Expand the number of marina slips	147	2.9	16	18	35	19	11	26	3.2	118	2.9
Close area to pets	146	2.7	24	22	29	13	12	25	2.5	118	2.7
Restrict number of people using lake at any one time	147	2.5	21	29	31	14	4	26	2.5	118	2.5
Limit number of people <i>per group</i> allowed on lake	146	2.5	20	30	32	14	4	26	2.7	117	2.5
Prohibit drinking alcoholic beverages on the lake	148	2.5	32	25	21	12	11	26	2.5	119	2.5
Prohibit personal watercraft on the lake	148	2.4	30	26	26	8	10	26	1.9	119	2.6
Limit number of non-motorized watercraft allowed on lake at any one time	145	2.1	33	32	25	9	1	25	2.2	117	2.1
Prohibit non-motorized watercraft on the lake	147	1.8	51	24	22	2	1	25	2.2	119	1.7
Prohibit motorized watercraft on the lake	147	1.8	52	25	19	2	2	25	1.6	119	1.8

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=problem, 3=neither support nor oppose, 4=support, 5=strongly support.

■ 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 where 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 (61 percent) stated that they were satisfied (Table J.1). At least 69 percent of the total sample were satisfied or somewhat satisfied with visitor information, exhibits and other educational material, concessionaire retail stores, and facilities within the area. Park ranger-led activities received the lowest rating with a mean score of 3.7. However, it is worth noting that 59 percent of respondents stated they were neither satisfied nor dissatisfied with ranger-led activities, no respondents indicated that they were dissatisfied, and only 5 percent stated that they were somewhat dissatisfied. The only significant difference between PWC operators and non PWC operators was found in concessionaire retail stores, with personal watercraft mean score 3.7, and non PWC operators mean score 4.2. Other activities and services suggested by respondents can be found in Appendix G. Some examples include providing showers at the marinas and boater education.

Visitors were asked to rate their level of agreement with a number of statements about Glen Canyon NRA. Items were rated by respondents on a scale where 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 (94 percent) agreed or strongly agreed with the statement, overall, I was satisfied with my most recent trip to Glen Crayon (Table J.2). Likewise, 92 percent of all respondents agreed or strongly agreed with the statement, I enjoyed my time on Lake Powell. Eighty-even percent agreed or strongly agreed with the statement, I thought the area and its surroundings were in good condition, and 85 percent agreed or strongly agreed with the statement, I enjoyed the natural quiet. Statements most highly disagreed with were, "the trip was not worth the money it cost" (85 percent strongly disagreed or disagreed), and "I did not have the kind of experience I was looking for" (79 percent strongly disagreed or disagreed). The only significant difference found between PWC operators and other visitors was with the statement "I thought the area and its surroundings were in good condition". PWC operators had a mean score of 4.3 compared to non PWC operators' mean score of 4.0.

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 non PWC operators			
	N	Mean	Percent of Respondents by Response Category**					N	Mean	N	Mean
			Dissatisfied	Somewhat dissatisfied	Neither dissatisfied nor satisfied	Somewhat satisfied	Satisfied				
Overall quality of services	140	4.4	--	5	14	20	61	24	4.3	114	4.4
Visitor information	129	4.2	1	5	23	13	57	20	4.3	107	4.2
Exhibits and other educational material	123	4.1	1	8	23	20	49	20	3.9	101	4.1
Concessionaire retail stores	117	4.1	3	4	24	20	50	23	3.7	92	4.2
Facilities within the area	138	4.1	3	7	19	17	54	25	3.9	111	4.2
National Park Service employee assistance	95	4.0	4	4	33	10	50	15	3.9	78	4.0
Concessionaire assistance	99	4.0	2	7	29	15	47	20	4.0	77	4.0
Concessionaire lodging	86	3.9	1	7	35	14	43	15	3.7	69	4.0
Concessionaire food service	101	3.8	2	14	28	19	38	16	3.9	83	3.7
Park ranger-led activities	73	3.7	3	--	59	6	33	14	3.3	57	3.7

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.

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

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 non PWC operators			
	Percent of Respondents by Response Category**							PWC operators		Non PWC operators	
	N	Mean	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	N	Mean	N	Mean
Overall, I was satisfied with my most recent trip to Glen Canyon	154	4.5	--	3	3	41	53	26	4.6	125	4.4
I enjoyed my time on Lake Powell	155	4.5	1	--	7	31	61	26	4.6	126	4.5
I enjoyed the natural quiet	152	4.2	1	3	11	43	42	26	4.4	122	4.2
I thought the area and its surroundings were in good condition	154	4.1	1	5	7	62	25	26	4.3	124	4.0
My camping experience was improved by the quality of the night sky	147	3.9	2	4	26	35	33	26	4.2	117	3.9
I enjoyed the interpretive programs	135	3.1	2	2	86	5	4	25	3.2	109	3.1
The lighting at the marinas positively affected my visit	145	2.7	15	19	56	7	3	25	2.7	117	2.6
The presence of personal watercraft interfered with the quality of my boating experience	139	2.6	22	27	30	12	9	24	2.4	112	2.7
I avoided parts of the lake because there were too many boats there	148	2.3	30	31	24	9	6	26	2.3	119	2.3
I stayed off the lake during certain parts of the day because there were too many boats on the lake	144	2.1	29	38	31	3	1	25	2.0	116	2.1
I did not have the kind of experience I was looking for	151	1.9	40	39	9	10	2	26	1.8	122	2.0
The trip was not worth the money it cost	149	1.7	49	36	9	5	1	26	1.5	120	1.8

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.

■ 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. Over half (53 percent) of the respondents offered open-ended comments about their visit to Glen Canyon NRA (Table K.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 Lake Powell. 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	87	53
No	77	47
Total	164	100

Source: Mail-back survey, Question 20

Discussion and Recommendations

Findings of the second phase of the three-part visitor study at Glen Canyon NRA allow managers, planners, and others to better understand the characteristics and perspectives of spring visitors. In addition to providing basic demographic information, the study gives insight into visitor motives for visiting, 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 only made up 17 percent of the spring sample. They were an average of 50 years old. Seventy-three percent of PWC operators were male. They were mostly from Colorado, Arizona, and Utah, with only four other states represented. Thirty-nine percent had completed college, and eight percent were in the process of or had received an advanced degree. Seventy-six percent had incomes of \$40,000 or more. Groups of PWC operators tended to be slightly larger than non PWC operators. Groups of PWC operators had a mean size of 4.7 individuals. Most PWC operators were repeat visitors to Glen Canyon NRA. The median number of nights groups spent in the area was 3. The median is a more accurate measure of the number of nights visitors spent in Glen Canyon NRA than the mean due to outliers, a small number of individuals who reported spending a large number of nights in the area. The most common activities PWC operators reported participating in were motor boating, fishing, camping at shoreline campsites, hiking Lake Powell side canyons, and swimming.

Many PWC operators were associated with houseboat use. Slightly more than one-third reported using a houseboat as their primary vessel. The most popular areas for PWC operators to visit were the zones that include Wahweap, Hite, Warm Creek, Padre Bay, Rainbow Bridge, and Bullfrog and Halls marinas. Visiting Glen Canyon NRA was the primary purpose behind most PWC operator's visit to the area. The most highly rated experiences PWC operators desired achieving during their visit were to enjoy the scenery of Lake Powell, to be with members of their group, to experience nature, to do something with their family, and to be with people who enjoy the same things they do.

Non PWC operators made up the majority, 83 percent, of the spring sample. The average age for non PWC operators was 47.2. There were more males (61 percent) than females. Most non PWC operators were from Colorado, Arizona, or Utah with a small percentage of visitors representing 15 other states. Twenty-six percent had graduated from college, and 29 percent were in the process of or had completed an advanced degree. Seventy-seven percent had incomes of more than \$40,000. Groups of non PWC operators tended to be slightly smaller than PWC operators. Groups of non PWC operators had a mean size of 2 individuals. Most non PWC operators were repeat visitors to Glen Canyon NRA. The median number of nights groups spent in the area was 3. The median is a more accurate measure of the number of nights visitors spent in Glen Canyon NRA than the mean due to outliers, a small number of individuals who reported spending a large number of nights in the area. The most common activities non PWC operators reported

participating in were motor boating, fishing, camping at shoreline sites, camping at developed campsites, and hiking Lake Powell side canyons.

About half of non PWC operators used a powerboat as their primary vessel. The most popular areas for them to visit on Lake Powell were the zones that include Wahweap, Hite, Rainbow Bridge, Antelope Island, and Warm Creek. Fewer non PWC operators than PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit to the area. Sixty-five percent said Glen Canyon NRA was the primary purpose of their visit, and 28 percent said it was one of several important things they planned on doing. The most highly rated experiences non PWC operators desired achieving during their visit were to enjoy the scenery of Lake Powell, to experience nature, to get away from the usual demands of life, to do something with their family, and to be close to nature.

Analysis of visitor data indicated that there were some statistically significant differences between personal watercraft and non PWC operators. There were some differences in demographics, activity participation, perceptions of safety, 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 fishing, camping at shoreline campsites, participating in water sports, and motorboating. Non PWC operators are more likely to camp at developed locations. These differences in activity styles between personal watercraft and non PWC operators will not necessarily result in 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 towards visiting the area and the number of visits they have made to Glen Canyon NRA in the past. 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. A higher percent of PWC operators compared to non PWC operators reported that visiting Glen Canyon NRA was the primary purpose of their visit to the area. PWC operators compared to non PWC operators had a much higher median number of previous visits to the area, although PWC operators had similar mean scores. Both groups have a fairly substantial population of individuals who reported numerous (over 50) visits. Place attachment to Lake Powell by these individuals will likely be very high, although overall it appears that PWC operators may have a slightly stronger sense of attachment to the area.

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 that there were four significantly different desired experiences between the two subgroups. PWC operators attached a higher degree of importance than did non PWC operators to the experiences of being with people who enjoy the same things they do, being with members of their group, feeling healthier, and thinking about their personal values.

Lifestyle tolerance refers to the degree of acceptance people have toward others who are different from themselves. 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 PWC operators were more likely to observe unsafe operation of watercraft than were non PWC operators. There were no significant differences in visitors’ perception of crowding. Non PWC operators were significantly more likely to support the management action of prohibiting PWC use on the lake. PWC operators were significantly more likely to support the management option of prohibiting non-motorized use on the lake. Although there were significant differences in these two categories it should be noted that neither group supported these actions. Differences between groups were found in their level of opposition, not approval.

Given that differences between the groups were generally slight, it appears that there is not much direct conflict occurring between personal watercraft and non PWC operators at Glen Canyon NRA during the spring use period. There are still some potential areas for conflict that could be addressed by management to further reduce the possibility of conflict and ensure the opportunity for visitors to obtain high quality experiences and the attainment of desired benefits. Management actions that met with some level of approval from both groups that address issues of possible conflict include providing visitors with more information about appropriate behavior, aggressively enforcing safety rules and regulations on the lake, using management controls to prevent damage to the

environment by visitors, providing more park rangers on the lake to educate visitors about appropriate behavior, establishing “off-limit” zones to protect sensitive resources, restricting PWC use to designated areas only, using management controls to prevent conflicts between lake users, and requiring visitors to learn about appropriate behavior on the lake (such as watching a short video presentation).

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, Don. 2000. *Mail and Internet Surveys: The Tailored Design Method*. New York, NY: J. Wiley and Sons.

Jacob, G., and Schreyer, R. 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*)

Houseboat Powerboat
 Personal watercraft Sailboat
 Canoe Kayak
 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

- e. 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)

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

Service Quality	Dissatisfied	Somewhat Dissatisfied	Neither Dissatisfied nor satisfied	Somewhat Satisfied	Satisfied	Did not Use/Don't know
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*)

Feelings about trip	Strongly Disagree	Disagree	Neither disagree nor agree	Agree	Strongly Agree
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

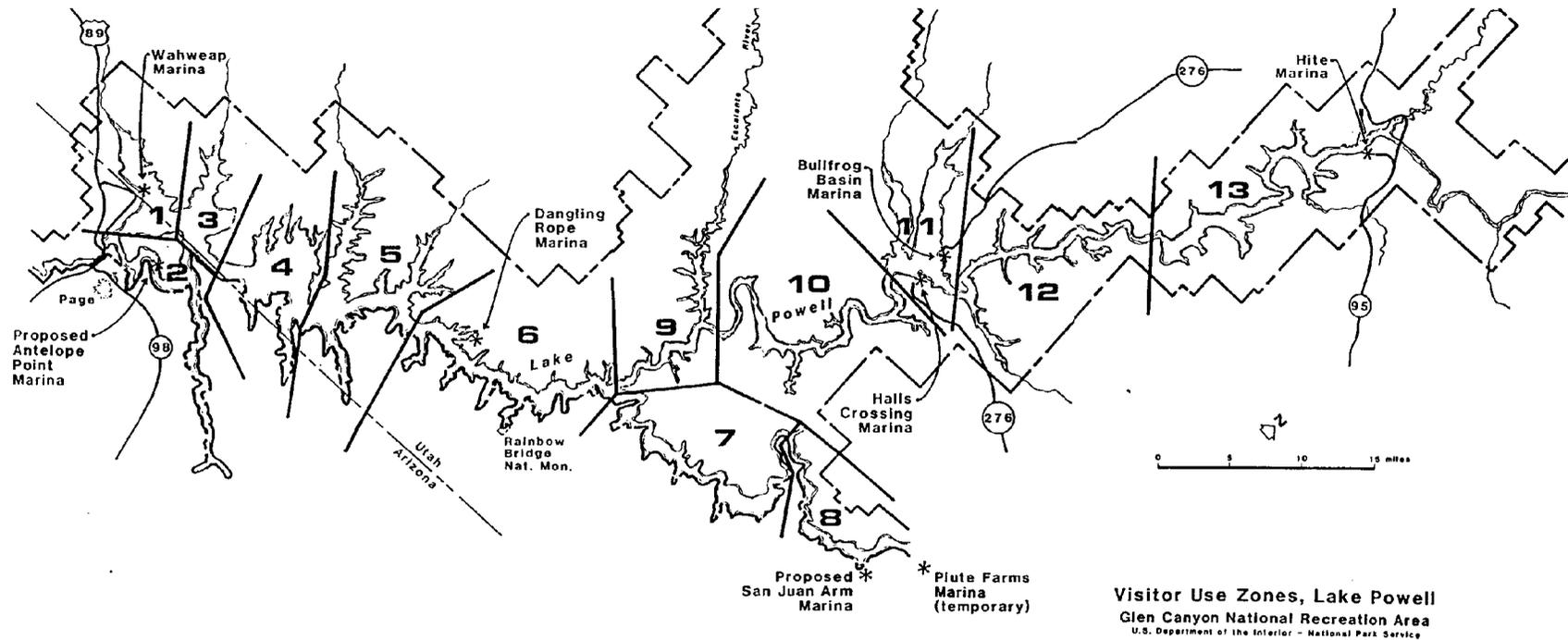
If you want more information about this study, contact the University of Minnesota Cooperative Park Studies Program, 115 Green Hall, 1530 Cleveland Avenue North, St. Paul, MN 55108-1027, 612-624-3699.

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



- 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

Spring Sampling Plan

Spring Sampling Plan

2000 Spring Sampling Plan

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		3/15	3/16	3/17 Hite	3/19 Hite	3/20 Bullfrog
3/20 Bullfrog	3/21 Halls	3/22 Halls	3/23	3/24	3/25	3/26 Wahweap
3/27 Wahweap	3/28 Wahweap	3/29 Wahweap	3/30 Wahweap	3/31		

Appendix F

Cover Letter Included With Mail-Back Survey

March, 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 spring 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

March, 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

April, 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):

Houseboating

Whitewater rafting cataract canyon

Sitting in the sunshine

People watching

Spend time with our dogs

Camping at primitive sites at the main marina location.

Sightseeing.

Viewing scenic areas.

Rockhounding

Stargazing

Visiting Antelope Canyon

Spring cleaning houseboat

Elderhostel

Relaxing

Visiting Glen Canyon Dam

Float trip to Lee's ferry

Other experiences respondents reported (question 2):

To be with our dogs

Ceremonies, prayers, peace.

Other situations respondents reported (question 7):

Not enough campsites

That big dam that is flooding such an awesome canyon is a big problem!

Worst problem is dogs- not on leash, not cleaned up after. Should not be welcome.

Turn down the music, get rid of the dogs, and have someone there to enforce it (very loud music all night long).

Dogs were not on leashes.

Noise from generators.

Restrooms at marina's need better service (paper towels, soap, cleaning).

There was a lot of garbage at our campsite. The dumpster was too full. The bathroom was very dirty.

In camp restrooms not cleaned the week we visited. They were filthy!

Campground with hook-ups would not accept golden age passport, so we staid in camp with no electricity.

Marina restroom facilities (Wahweap) need serious attention/upgrading.

Laws differ from Arizona to Utah and when on the lake you don't know when your in Arizona and when your in Utah.

VHF seems inoperable in most canyons. No weather, no transmissions/reception using houseboat VHF.

Defacing of natural rock formations.

Boats driving at high speed in narrow side canyons with limited visibility.

Marina congestion at launch ramps.

Floating facilities do not pump well enough for larger boats.

The smokestacks were really ugly.

More restrooms on all lakes and trash cans.

Unsafe boating practices witnessed by respondents (question 9):

Overloaded boats (8-10 people) without life jackets worn on children.

Drinking and boating.

Large motorized boats came close to shore and fished by our campsite.

Some boaters don't have clue how to navigate any lake or take command in bad weather!

Almost hit by a houseboat at Bullfrog launching area.

Rental powerboat and houseboat slammed shoreline to park boat. Were at a good speed before hitting shoreline. Much alcohol involved.

Houseboat (rental) crashed into beach at high speed. Dangerous wake for our boat. Sandy beaches, Page.

Children and teenagers operating unsafely and speeding and/or cutting across our wake. They don't know what they are doing and don't pay attention. Also they come closer than 150 feet of other boats, don't look where they are going.

99 percent of boaters do not know the rules of navigation. Name a place.

Boaters trying to make it into marina during unsafe wind conditions.

Boats on wrong side of lake while traveling.

Boats travel too close on lake surface. I wonder if rental boats are provided with simple rules and courtesies before they go out.

Boats driving at high speed at night heading into marina.

Too fast for conditions.

Parking lot problem. People leave boat trailers in parking spaces all summer so they have a place to park on their occasional visits.

Wake less speed in marina not observed.

Too fast within no wake zone.

Other coming too close or cutting across bow.

Rental boat operators not knowing how to operate a boat. No experience.

Lee's ferry- power boats ignored no wake zone.

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

The wind was blowing bad.

No ranger or lake personnel visible. Looked run down. Campers parked wherever (Hite).

Rattlesnakes

Other management actions suggested by respondents:

(I) don't feel good about these questions. I feel they're set up to get the answers that NPS needs to complete their agenda for congress to accomplish their needs, regardless of how we really feel. "Been there, done this."

Get rid of Glen Canyon Dam!

I would strongly support removing the lake and restoring damaged area.

Provide litter pick-up points because the shore is a dump.

Cut national forces by 50% and allow private concessionaires to provide services.

Put direction signs to different canyons on the lake and develop map with names of canyons.

Safety awareness, Park use awareness and law enforcement.

Review Aramark gas pricing on lake. Highest in nation.

Educate lake users! Many are first time users and do not comprehend beach courtesy or craft safety rules.

5 mph wake less buoys posted at mouths of narrow or small side canyons.

I think one should be licensed to operate a boat.

Limit the number of rental houseboats.

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

Self-serve laundromat.

Yes, don't do any more development at Hite. Please leave it like it is. Give us one semi-developed area to use.

Coin operated solar heated showers at Hite Marina

Restaurant at Hite or Halls, not just hotdogs.

Boat Services.

Service where folks could hire someone to take them up some of the canyons to camp, hike, etc. for a period of time. That way you might be able to alleviate crowding. P.S. guide would return and pick them up.

Better roads/no fees to get in "our" recreation area!

Need a hiking or walking trail from campground at Wahweap.

Better RV camping facilities. Bullfrog needs increased number of slips! RV sites with electric and water. Cleaner upgrade.

Designate areas for rockhounding.

Nicer RV facilities, more RV parks.

Showers at Marinas.

Showers at the marina.

Coastguard auxiliary safety courses at the marinas.

Courtesy coast guard boat checks.

Keep more campsites open.

Group tours- not the tour boats (smaller boats) to see ruins and camp in group camps with good facilities.

Affordable lodging at the lake is necessary (during high season).

Pizza delivery for the entire lake.

Propane should be available at marina to refill houseboat containers. Need a ranger visitor center in addition to Dam site- like Grand Canyon- need some nature walks and bird watching experiences. Need more security guards at marina. Theft is a problem.

Showers at slip area, updated restrooms.

How about posting more fishing info at the fishing dock.

I'm not sure if you offer biking trails.

Wahweap marina needs showers and new restroom facilities, Halls, Bullfrog, and Hite need showers.

Boat education for boat rental operators.

Volleyball area, safe kids playground, softball area.

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 believe more rules and more interference from Park Service will make the place less enjoyable. The area at Hite seems to managed well as is. Most campers there seem respectful of space and area. We have enjoyed many trips there.

Confusion on fees, if I camp does it include trailer boat and 2 vehicles, to get there 2 vehicles required.

Need more boat ramps and campsites.

40 years I've been using Lake Powell- retired park ranger and manager. I am a conservationist and I believe in quality experience for everyone. NPS is taking that away by development caused by revenue greed and power. My experience was at Hite. I see NPS is doing much development. We have used the area ever since Lake Powell was developed. Sorry to see what their intent is. Another high fee area is being developed. There is nothing wrong with the way it is right now. Those people that use the area enjoy it now. People are becoming aware of human waste problem. I did not see anyone abuse the human waste problem. As long as there is free use of the dump station. At Hite this is the last primitive camping on the lake. "Should not be developed like" the Page area, it really is nice now and gives those that enjoy using their self-contained campers a chance to have that real outdoor experience, using their equipment. Leave it like it is, charge a small fee of about 3 dollars a day to offset operation costs, etc. NPS staff about right at this time. We don't want to be led by control and set programs. 90% of users are people who fish some hiking, most or all using their equipment with outdoor experience. I am a user about 50 days per year- NPS has increased fees, I like what they have done (to the) Page area, however Hite is the last of the good old camping areas, leave it like it is. Attitude! Rangers has changed, we now have ATF, FBI, CIA attitude, need for public relation training "verable judo really works (?)" There is another way to enforce the law. I was a good enforcement officer and trained others.

(About questions 15-19 on the mail-back survey)

This should not be any part of this questionnaire, users are users. I have a good education and are a use. My education has no influence on my use of Glen Canyon. Again, what difference (question 18), I have lots of money and good equipment, if I was broke I would find a way to use the Hite area. If you expand and develop, charge higher fees those that can't afford will never see the area. I don't want to see a special price tag for specific ethnic people, it's wrong.

Drain the lake.

A most excellent trip through cataract canyon. Kudos to the ranger who met us on the lake. He displayed a courteous manner and good judgment even after half our crew mooned him. Already planning on coming back next spring.

Get rid of the damn dam!

I travel down Cataract Canyon to the Hite marina via kayak and raft. There is a very considerable impact on the canyon as it progresses from a river to a lake. It was March and few users were encountered.

I participated in a kayak/raft trip through Cataract Canyon and spent a minimal amount of time possible on Lake Powell, we came for the experience, not the lake.

We went early in the season and had an ideal time- we had the river almost to ourselves. It was fantastic.

Wake after wake screwing up our little boat anchoring for fishing in the inlet where we camped and fished from driving full speed right up to the no-wake marker next to Farley's. We are environmentally sensitive users. We hate the litter, torn up bulletin boards, un-maintained and vandalized fee tubes (are you charging fees on N shore or not?). We think draining the lake is the most idiotic/unrealistic proposal ever.

Thank you for the opportunity to share my thoughts and feelings with you.

We'll be back! (Probably during "off-season")

Some played boom boxes 'til 2:30 am, extremely noisy rude bunch there.

One of the main reasons for visiting Lake Powell is to spend time with our dogs. Any limitations on pets will detract from our stay. We will end up recreating elsewhere with our pets.

No more facility development at Hite marina.

Marina and fueling docks are in horrible shape! Soap was not available in restrooms for entire visit. You attract a lot of people and must provide adequate services- like parking, docks, restrooms (note: not plush or luxurious- just adequate and basic). Consider improving access at Hite to spread the population over the lake.

Stopped for 3-hour kayak trip at Hite marina. Saw no rangers. Saw lots of campers. Saw lots of trash around campers. Off season for motorized boats, but I'm still cautious that they won't see my kayak. Overall impression of Hite was dirty and somewhat run down-maybe overused. Camper set up wherever, no designated spots it seemed. My problem with motorized craft is the danger they present to me as a kayaker and their impact concerning pollution to the water, and the fact they allow boaters to bring more potential litter to remote locations where it would be difficult to monitor their actions because of the lack of rangers. The visitor to park personnel ratio was lacking. I could see how the area could have the potential to be trashed and abused.

Snowed out!

My husband and I were snowed out so our seven-day trip became a three-day trip. While we were disappointed with the turn of the weather, we will try again because it is a beautiful area. We were somewhat amazed at how poorly we, Americans, take care of such a natural beauty (trash and litter).

Lets put service back in the "Park Service" and not allow them to just act like police. Clean campgrounds. Provide litter patrol. Have the "Park Service" just help folks enjoy the lake.

It isn't necessary or fun to be "mooned" by rafters coming down the river. Also, some of them are quite rude after docking the rafts at the dock. As an adult I can tolerate some of their rude behavior but for people with young children witnessing people urinating in the lake or being nude in the shallow water can be offensive. Safety and courtesy need to be of great importance. There needs to be stronger consequences to those littering and contaminating the beaches and water. I would like to see alcohol banned in the area. We love Lake Powell and the surrounding area. We would like to see the general public who visit there be more appreciative of its beauty and work harder to keep it clean. Once again I think there has to be stronger consequences for those who drink and operate boats and those who litter!

Don't shut this lake down- it's a wonderful experience- cut out the alcohol and your problems will diminish in half- at least! Isn't Utah a dry state anyway?

The three days we were in Glen Canyon there was heavy winds and snow. We decided not to rent a boat and stayed at a campsite and the marina lodge.

How about more boat docks around the area: Stanton creek (this really isn't too hard), Farley canyon. Park pass and camping fees are getting harder for people with fixed incomes to pay.

People go to the lake to have fun, relax, and enjoy themselves. It is the USA and people have the right to relax how they want to. Don't add any more regulations, just enforce the ones you have now. Take care of the trash and the litterbugs.

In five visits to Powell I encountered gun users who owned and operated semi and full automatic weapons on the lake. Each instance was reported including boat registration numbers. Many boat users have no idea how far from another boat they should be and have no concerns for how fast they travel in canyons.

You shouldn't rent pontoons in March because of the inadequate weather conditions at that time of the year such as snow when you are trying to catch fish. Also, better serviced pontoon boats for the price.

The Glen Canyon area is a beautiful place to visit. I loved the power and majesty of it all. However, an off season visit permitted quiet and no hassles. We were in an RV, wanted to be near the lake. Only one loop open in the campground. It is being improved, I know, but from being there in 1985 until now, not much has changed. Give us some space. After all, we came to be near beauty and not smell neighbor's smoky fire or listen to a

generator. Put in a camp host to oversee late arrivals. Many come after dark and left without paying full time. Tour groups are coming in. Our parks are going to have to be full time on gaining admittance to the parks.

The lake is wonderful- the lake is never crowded and most people are very happy and nice. I have never seen any problems with any watercraft, we are on the lake a lot.

This last trip was not representative of most of our trips because of the time of year and water was cold to participate in use of our houseboat and personal watercraft.

We visit the lake at least one weekend per month. Most of the time we enjoy our visits with very little problems. However there have been times when discourteous visitors have spoiled our fun. I strongly encourage each visitor/rental boats to go through an orientation process on appropriate behavior.

It is the most beautiful National Park in the country and is being used by the appropriate amount of people. Because of its location, significant growth will be naturally limited.

I think that everyone involved in the management of the Glen Canyon National Recreation Area are doing a wonderful job in a very delicate and beautiful place. Please keep up the good work!

I loved our houseboating to be able to camp in remote sites and have absolute quiet and starts. No people all day. These experiences are becoming so rare that I feel our Park Service protects the Endangered Species of human beings as much as endangered wilderness. Thank you for our mutual support.

We have visited 9 years in a row during the last week of March. It has been a wonderful experience each year. Our only complaint has been a large number of breakdowns in our rented houseboats. It appears that at this time of year they have not been carefully serviced.

Affordable houseboat renting would be a plus.

Thoroughly enjoyed our visit. Because of the time of year (off-season) we were there, we could really enjoy the "peace" provided by the lake. The scenery was fantastic. I do feel, however, that going by non-motorized boat rather than tour boat would have made the trip breathtaking. My one negative- our tour boat "captain" let a passenger drive the boat for 1/2 hour on return trip, I felt uncomfortable with that situation.

I really enjoyed our short visit to see the Rainbow Bridge. It was not at all crowded on the lake the day we were there- I guess March is a good time to see it! I would have loved to see that canyon before it was flooded. I think restricting numbers of people and watercraft is a good idea.

Visited during the off-season and this obviously explains why we saw so few other boats. I can't speak to whether facilities are adequate during busier periods.

Don't drain the lake.

Since we were just passing through and spent only one night at GLCA NRA, I cannot answer many of these questions. In general, I prefer natural and quiet places.

Watercraft, A licensed operator requirement.

We have been using Lake Powell for more than twelve years. It is a beautiful lake. It should be respected and kept clean by all that use it. Education is probably the best way to achieve this. Require people to watch a video, read a pamphlet- something before you turn them loose on the lake. Give everyone large garbage bags to return to the marina. People who take more responsibility and "ownership" of a place like Lake Powell will take care of it and love their experience.

Lack of control over the parking lots! I believe it wrong for people to occupy a parking spot all summer with their boat trailer thus preventing occasional visitors from finding a parking space. We think ARA is doing a great job in all aspects of their operation. We are objective about this.

Lake Powell is awesome! We have been visiting since I was 3 years old. I've watched it become what it is- and I have no problems! Try not to wreck a good thing just because of a few whiners and trouble makers (tell them to get a life). Management is good if it is not overkill!

We live 1 hour from Lake Powell, on each of our visits there we have a great time. Yes, there sometimes is high boat traffic, however we living close have the option of not visiting on higher traffic weekends or holidays. We love Lake Powell and it is one reason we live where we do! It is absolutely awesome! We need to defend the multiple uses there, boating, camping, hiking, biking, etc., etc., etc.

Very poorly designed questions, too long, too many choices. Questions seemed slanted toward restricting use. The weekend we visited Lake Powell was an "off season" weekend, thus this questionnaire is useless regarding overuse. I feel this questionnaire was written with an agenda in mind. The questions were designed to produce preconceived results! The first two surveys sent me went unanswered because survey is poorly constructed! A typical example of Govt. waist [sic] and poor effort. If as your letter states, few questionnaires were sent out and all are important, why was survey done during "off season." Touchy, feely, "Agenda" buzzwords (undeveloped, scenery, personal values, close to nature, solitude, usual demands of life (from question 2, mail-back survey)). Agenda words (poor water quality, unsafe, much noise, personal watercraft, livestock, mining operations, lack of National Park Service (from question 7, mail-back survey))! Look at the number of times restrict, limit, prohibit are used- Lake Natizies [sic], Zone:1, Off limit:1, Restrict: 3, Limit: 6, Require: 1, Aggressively enforce: 1,

Prohibit: 4, Provide: 1. Where is the word freedom used (from question 11, mail-back survey)? Your obvious agenda is against personal watercraft and boats. What if my ethnicity is Irish, Asian, etc. Why is Hispanic singled out (question 19, mail-back survey).

Many of the questions center around number of people/boats on the lake. We were visiting March 23-25. Nobody was on the lake yet, therefore no problems there.

If the questions of race, gender, age are discriminatory as the liberal "politically correct" thinkers, leaders, etc., claim we should not be asked such questions. This (what is your gender?) is a loaded question and should be discontinued. This survey is overly intrusive in the effort to fine tune.

The entry permit system for vehicles should be revised to allow people to bring in different vehicles without having an annual pass for each one. A permit system tied to the person instead of vehicle might work- still just allowing one vehicle in area per visit. Bathroom facilities at marina are extremely inadequate considering the daily visitation here. Should have showers- help cut down on gray water in lake.

We were visiting in March- very nice and peaceful. I believe that if I was filling out survey after visit in the summer I would be circling #5 (question 7, mail-back survey) on many of these same questions.

The most saddening element was the refuse and litter along the shore line. As it was not yet the season all comments regarding the number of boats are irrelevant to my visit, I enjoyed unusual emptiness and quiet. Judging from the number of boats at the marina this will not always be the case.

This was my second trip to Lake Powell. The first was thirty years ago, and we camped and boated on the lake. This time we came for only two days and we wanted to see Rainbow Bridge.

I think there needs to be more competition in the provision of such fee services as tour boats, boat rental to make the publicly owned facilities available to people with moderate incomes. Don't let the "zanies" force removal of the dam and lake. It's a natural treasure.

Not being allowed to have my camera in its carry case on the dam tour seemed a bit excessive security.

Enjoyed my total trip. Rangers were great and very helpful. Our national park is kept beautiful thanks to you and peoples cooperation.

This trip we did not spend any time on lake so many questions do not apply for this trip. Were just passing through the area and enjoyed the beautiful lake from our RV camp spot.

Everyone at the marina was great. We brought our two dogs in the houseboat with us and had an amazing time! Thanks.

It is my favorite place to visit.

We have enjoyed Lake Powell much more since buying our own houseboat and boating in the off season.

Its not broken, so don't try to fix it.

A serious need for proof of boating experience for anyone renting any watercraft, or a class must be taken.

We attended a 5 day Elderhostel program at the Wahweap Lodge, facilities were excellent- walked the paved trail to the Utah border, rested in a couple of the convenient picnic areas and went down to the lakeshore. Visited and toured the Glen Canyon dam. Sat at viewpoint with binoculars and scope enjoying the landscape. Took boat tour to Rainbow bridge. Became interested in the Navajo culture, history of Glen Canyon (mostly Powell), archaeology and native plants of the area, then drove home through Zion. The whole area is exquisite! Loved it.

People should be more responsible when they drink. Let us know who's what where when working. Try to be fair to all race, please. We'll all get along well.

Great place, keep standards high, safety, environment.

The more involvement and restriction by NPS the more problems. I am really surprised you would give all NPS campgrounds to concessionaires. Had a loud, loud drunk camping by us and the concessionaire could do nothing. The NPS just appeared to be driving around endlessly the marina loop- should get out of car and talk to people, etc. We ended up at Lake Powell by default. The area we wanted to hike was not available. As I mentioned before, I am surprised the NPS would give up its campgrounds to concessions. Although the concession staff was nice, they did not have authority to do anything on federal land. It appeared NPS law enforcement just drove in loops. Up the hill, down the hill- not getting out of the vehicle to talk to people. I don't lake developed areas such as Lake Powell and, never got on the lake because how much it costs. I have worked for NPS for 18 years and am glad I am not assigned to Lake Powell.

We were at the lake at a time when there were very few other watercraft, so I really don't feel qualified to give an opinion on these matters. My guess is the summer months see excessive use of the lake and I would be in favor of limiting the number of boats and limiting the use of alcohol.

Our visit was in participation of an Elderhostel. Not being involved during the "season" I saw no excessive crowding of facilities or lake- there were more than enough accommodations to satisfy our group and those we blended in among.

I just toured the dam and spent all my time at the Grand Canyon. I would like to go back and do a houseboat trip on Lake Powell.

Stop asking questions about "ethnicity" and "race" Those aspects are irrelevant!

We just spent an hour at Glen Canyon Dam. It was a beautiful place. Well maintained and staffed. We really enjoyed our guide. She is extremely articulate and has a thorough knowledge of the dam. She is so enthusiastic about whatever she does. We thoroughly enjoyed our raft float down to Lee's Ferry.

We would like to stay longer and do more.

Extremely high dock prices for fuel. Seemed outrageous- \$2.20 gal.

I support closing the lake in the future to restore the natural environment.

Floating toilet facilities are too scarce and very poorly attended a real disgrace to be presented for use and not able to use because of being so dirty. I think it's a crying shame that they don't manage the fish habitat better and let people put fish in the lake that are not lake fish like striped bass you let that sorry person of yours do that was a crime.

Design of floating toilet does not allow for proper flushing.

Draining the lake is too radical. I did not like the lake just after my first visit 16 years ago. However, after really experiencing being on the lake I have changed my opinion. I can see why a movement to drain the lake if that individual had never truly experienced the lake. I now oppose any action to do away with Lake Powell.

Appendix I

Comments Specific to Personal Watercraft

Comments Specific to Personal Watercraft

From other situations:

Personal watercraft should be restricted to certain areas.

Too many underage children operating jet-skis, ignorant parents, nasty conflicts have occurred.

The operation of personal watercraft in the canyons is becoming very dangerous!

From observed unsafe boating practices:

Jet skis and water skiers show no respect for other boaters or campers.

High speed jet skis close to dock and ramp at Hite.

PWC especially, too close, too fast. Sometimes bass fisherman- too close, too fast.

Fish boat came way too close to personal watercraft driver.

Large powerboat, high speed, close to other boats. Coming into Dangling Rope and Halls Marina PWCs towing skiers coming very close to my houseboat.

Inconsiderate PWC use, cutting off my direction of travel Halls Marina (lake, not in marina).

We were moored with our powerboat in a small cove, 2 jet skis came into the cove, rode over our mooring lines twice and left under full power while still within a few feet of our boat. Happened too fast to get registration numbers.

Personal watercraft cutting across my wake around the Lone Rock area.

Personal watercraft close to camped boats.

Bow riding. Jet ski cutting in front of houseboat.

Jet skis with kids.

Jet Skis

From suggested management actions:

Restrict personal watercraft to set speed limit in backs of coves.

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

I was there in March so there were very few people. I think a ban on all personal watercraft would be sad. They are the best way to see some parts of the reservoir.

Get rid of personal watercraft, they are noisy, dirty and dangerous!

Please restrict PWC to certain areas- Bullfrog, Halls, Padre, Good Hope- and certain hours, and restrict usage to those 16-18 with instruction, 18+ o.k.

Inconsiderate PWC users who are either oblivious or unknowing of rules of wakes, distances etc. Disrupting of peace and quiet in small coves and campsites. Waste pump out facilities need expansion and improvement. Large wake heavy cruisers are too much on the narrow lake with steep shores. Wakes are very disruptive to others enjoyment.

Strongly suggest limiting personal watercraft. People should definitely have thorough instructions before taking over a boat. Have seen many foreign people operating both jet-skis and houseboats unsafely. Looked like the first time they were on one, scary to people like us who live here and are always on the lake.

I feel safe on the lake because I do not go out there on holidays or weekends. Week days only. Age limit for PWC should be 18 in Arizona like Utah does. Train all boat owners and PWC drivers on the rules. Ticket offenders.

There is enough room on this lake for everybody. Compared to the crowds of non-boaters at the Grand Canyon, Lake Powell is under crowded. I have the following suggestions: Showers and better toilets at the marina; safety/courtesy courses and enforcement, especially for PWC's; no wake zones around the lake other than marinas (selected canyons for example); don't drain it!

Personal watercraft create a very noisy environment- they are loud and run in packs- they disturb the peaceful serenity. They are like ants on the water, they do not respect any other vessel. You should limit the number of boats and their speed in narrow canyons, i.e. Rainbow Bridge- what a zoo!

Lake user education is most important. Rental houseboat operators are often rude or careless or not thinking. More enforcement, required course for personal watercraft operation, published courtesy rules, etc. would help.

This is one of the most beautiful places on earth. Most of the people who we have met on the lake respect the environment we are sharing. Those who do not need to be dealt with firmly. When prosecution is in order (drunk boating, reckless boating, defacing, and littering) it should be followed through. Personal watercraft are not a problem because they are on the lake. They are a problem because people use them irresponsibly. We have

seen unattended children driving on them, failure to observe wake less area near others who are in the area, and the noise pollutes the tranquil back canyons.

Jet skis and personal watercraft pose a real problem for the Lake Powell area as well as other lakes and rivers. I'm surprised more of them aren't killed! Because of their typical operation.

We had a truly wonderful time at the GLCA NRA. I realize we were there in March/April which obviously is a quiet time, but it is easy to see that the sheer numbers of personal watercraft, boats, and houseboats could be a major problem. I would recommend a tight control and/or restrictions on personal watercraft and recreational boating, i.e. water-skiing, para-sailing, etc. There should be designated areas and hours for these types of activities.