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Lee's Ferry Carrying Capacity Study

Final Report

National Park Service
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INTRODUCTION

Background

Lee's Ferry in northern Arizona is a significant resource within Glen Canyon National Recreation Area (NRA), administered by the National Park Service (NPS). This unique 15-mile stretch of the Colorado River upstream from Lee's Ferry, with its spectacular, massive Navajo Sandstone cliffs, is the only remaining component of the now almost completely inundated Glen Canyon. The river receives some of the most intensive recreational use in the state of Arizona. Commercial day-trip rafting and fishing are the principal uses of the area, which is known throughout the state and nationally for its scenic environment, historic features, and "blue-ribbon" trout fishery.

Use by the visiting public has expanded greatly in recent years and in the process the mix of recreational uses has also changed. In 1985 there were ~~7,546~~ day-use rafters. In 1989 this use had expanded to 28,115 visitors, with 257 boats and 5,600 people travelling downstream to Lee's Ferry in the peak month of July alone. In 1991 the number of rafters floating the river in July had increased to 6,600.

Meanwhile, fishing--the dominant use in 1985--has grown moderately from 14,000 fishermen to 17,200 fishermen annually. In 1985, when live bait was legal, bank fishing predominated and was concentrated in the immediate vicinity of Lee's Ferry. Today, fishing from boats or shoreline points accessible only by boat predominates, and this has had the effect of dispersing use and making the river channel and flow regime even more important to the successful management of this recreation activity.

These trends have led to a potential conflict between recreation uses that were formerly more spatially separated and to a situation where use of the river channel may be a determinant of recreation quality for both uses. The increased visitor use has also led to physical impacts evident at campsites and day use beaches such as trash, human waste, fire scars,

vegetation damage, soil disturbance, trailing, unnatural numbers of pests and insects, and site modification.

These concerns led resource managers at Glen Canyon NRA to request that Northern Arizona University conduct research to evaluate the recreation carrying capacity of this river section; and in particular, to determine what effects changes in river flow management might have on this capacity. The research was to include quantifying physical impacts and gathering baseline data on site condition using a method which could be duplicated over time. Research results can be used in designing river management strategies to minimize impacts to the resource while also minimizing negative consequences upon visitor enjoyment of the area.

The purpose of this project was to assess the impacts of flow level on the recreation carrying capacity of the Colorado River within Glen Canyon National Recreation Area. Specific objectives included:

1. Collect baseline data on physical site condition using impact indicators and based on type of site use.
2. Describe user perceptions of river experiences including issues of crowding, conflict, and flow.
3. Determine the effect of flow on river recreation experiences.
4. Identify user perceptions of possible river management activities.
5. Provide recommendations for river management strategies based on study results.

The study was designed within a recreation carrying capacity framework but utilizes the reformulated view of the traditional method, the Limits of Acceptable Change framework developed by Stankey et al (1985). Much of the biophysical research is based on prior studies conducted at Glen Canyon N.R.A.

Carrying Capacity Framework

The fact that impacts occur as a result of recreation use has been well documented. Impacts can include both physical impacts to the resource such as erosion, loss of vegetation, or water pollution caused by trampling, campsite location, or livestock use (Hammitt and Cole 1987, Cole 1989) , or social impacts such as conflict among visitors or perceptions of crowding (Gramman 1982, Graefe et al. 1984, Shelby et al. 1989). As recreation demand for wildland resources continues to increase both physical and social impacts will likely continue to occur.

As a result of expanding recreation demand and a limited supply of resources, resource managers are faced with making decisions about allocating resources in such a manner to provide for quality recreation experiences while ensuring that unacceptable damage to resources do not occur. Carrying capacity is a resource allocation framework that has long been used by wildlife and range managers and more recently by recreation resource managers to deal with resource impacts.

The long-established wildlife and range management concept of carrying capacity, the number of animals in a given habitat (Dasmann 1964), began to receive renewed attention by recreation researchers in the 1950s and 1960s due to rapidly expanding recreation participation patterns. Wagar (1964) suggested that increasing numbers of visitors affect the quality of the recreation experience as well as impact the environmental resources in an area.

Social carrying capacity, the focus of this project, is often difficult to assess because it deals with impacts on the visitor's recreation experience. Social carrying capacity is based on human values and attitudes which cannot be directly manipulated by managers. An area of research that has proven useful to managers concerned with social carrying capacity and the establishment of appropriate levels of recreation use is perceived crowding.

Perceived crowding is one way visitors evaluate social capacities (Shelby and Colvin 1981). "Crowding" is a subjective term used to define a specific density or number of people in a specified area. An individual's psychological determination of a crowd is based on his/her definition of the appropriate number of people in a certain situation (Shelby and Heberlein 1986). For example, 500 people at a concert in the park may not be defined as crowded, but 500 people around a small alpine lake probably would be. Depending on the normative definition of the situation, people can feel crowded regardless of the amount of physical space available.

Shelby and Heberlein (1986) suggested crowding can be used to approximate an evaluative standard for appropriate levels of use, an indirect means of assessing social carrying capacity. Comparing data from 22 different studies that utilized the same single measure of crowding, the authors propose a "one-third two-thirds" rule, suggesting that social carrying capacity has probably been exceeded if more than two-thirds of visitors feel crowded. If fewer than one-third feel crowded, the area is probably below carrying capacity. When perceived crowding falls between these two thresholds, no determination can be made using this standard. We used this method to look at crowding and carrying capacity at a National Park Service-managed reservoir in northern California (Lee et al. 1990). We found the "one-third two-thirds" rule provided a fairly reliable measure of carrying capacity when used in conjunction with other measures of crowding and carrying capacity. It was useful to managers in evaluating the potential carrying capacities among specific recreation locations within the management unit.

A number of frameworks for managing recreation impacts have evolved from the traditional model of carrying capacity due to concern about the utility of focusing management on regulating user numbers, which may have little to do with controlling impacts. Many ecological impact studies have shown that most of the total impact to a site is caused under fairly low impact

levels and within the first few uses (Cole 1981). Use intensity is often less important in explaining impact than user behavior, season of use or fragility of the resource (Cole 1981; Kuss 1986). The traditional carrying capacity concept implies an incorrect cause and effect relationship between amount of use a site receives and subsequent impact. In reality, managing to restrict numbers of users to prevent ecological impacts would require extremely low visitation levels, which may not be acceptable to the public.

Sociological studies have also questioned the credibility of managing for numbers of users. Although many of the early studies of users' perceptions of crowding in wilderness areas revealed preferences for low numbers of encounters and greater affinity toward solitude (Shelby 1981), more recent studies remind us that recreation lands are used by many different people, seeking varied and often conflicting experience preferences (Hammit 1988). What may be acceptable encounter levels for one person, may be considered too high for another.

The Limits of Acceptable Change (LAC) System proposed by Stankey and others (1985), provides an alternative way of looking at carrying capacity. Incorporating natural resource, sociopolitical factors, and managerial factors, LAC focuses on managing by identifying desired resource conditions and formulating management action alternatives to achieve these conditions. Management attention shifts from defining maximum use levels to "identifying desired conditions and managing use levels and/or other management parameters so that impacts do not exceed these conditions" (Hendee et al. 1990).

The final chapter of this report, recommended applications of study results, is organized in a format consistent with the Limits of Acceptable Change process currently being used by NPS managers at Glen Canyon NRA.

Flow and Recreation Quality

The impact of streamflow on recreation quality has been the subject of a number of studies using a variety of methods. Shelby et al. (1992) recently presented a summary of what is known about the relations between flow level and recreation. Streamflow can directly affect water-dependent activities such as fishing and boating as well as indirectly affect water-enhanced activities such as camping along a stream or hiking to view a waterfall. The authors suggest that, while critical flow levels differ across rivers and activities, there appears to be a nonlinear relation of recreation to flow for activities directly affected by water flow such as boating and fishing. Recreation quality increases with flow to a point, but decreases for further increases in flow.

Shelby et al. (1992) describe a number of different methods used to study the relationship between flow and recreation. These include studies that rely primarily on expert judgment vs. user perceptions. User judgments have been assessed using surveys employing photographically-depicted flow levels and controlled flows where experiences of participants during managed flows are recorded. Studies of visitors to Aravaipa Canyon Wilderness in Arizona (Moore et al. 1990), the Gulkana River in Alaska (Shelby et al. 1990), and two rivers in Montana (Duffield et al. 1991) used this approach, as does this study. In each of the three studies visitors generally preferred average flow levels over lower and higher flows.

We used a method similar to that used in the three studies described above to study the impact of flow level on river recreation experiences in Glen Canyon N.R.A. This method is discussed in detail in the next chapter.

History of Impacts Research at Glen Canyon N.R.A.

In 1980, the Division of Natural Resource Management performed a Code-a-Site inventory of the campsites located along

this stretch of the river. At this time, no designated campsites existed and users, primarily anglers, were allowed to camp anywhere they desired. The inventory described the qualitative characteristics of the sites, but the data recorded did not provide managers with a quantitative method to evaluate site condition.

In 1981, Dr. Steven Carothers assessed the extent of recreation impacts on Colorado River beaches in Glen Canyon (Carothers et al. 1981). Since minimum impact camping methods were seldom practiced, Carothers discovered that beaches were strewn with trash and human waste and mottled with fire scars.

Prior to the construction of Glen Canyon Dam, spring floods scoured and cleansed the beaches so that impacts from recreation use were less noticeable. Since the completion of the dam, water releases have been regulated by the Bureau of Reclamation and flows have rarely been higher than 35,000 cubic feet per second (cfs).¹

Carothers et al. (1981) recommended that designated campsites be established with pit toilets and fire grates to minimize human impacts. Carothers also suggested that anglers who practiced minimum impact camping techniques be allowed to camp outside of designated areas provided they carry out human waste, trash and ashes.

In 1982, the Lees Ferry upriver Recreation Planning Team drafted an Upriver Recreation Plan and Environmental Assessment for Lees Ferry, Glen Canyon National Recreation Area. Three management alternatives were explored: a) Develop campsites with facilities and require their use (Preferred Alternative); b)

¹Due to unexpected amounts of spring runoff, flows in 1983 reached highs of 92,000 cfs.

Develop campsites with facilities plus allow minimum impact camping; and c) No action.²

The Planning Team determined that "the installation of toilets and fireplaces for up to 50 campsites and requiring that camping be allowed only in these developed campsites would be in the best interest of both the park visitor and the short and long term goals of the National Park Service" (USDI National Park Service 1982). Approximately 45 campsites were established at 15 locations.

In 1985, photos of the campsites were taken. No other monitoring activities were employed to determine if the management actions taken in 1982 actually reduced human impacts of trash, human waste and fire scars.

Kearsley and Warren (1992) assessed the effects of constant 5,000 cfs flows, constant 15,000 cfs flows, and fluctuating flows, with highs of 30,000 cfs, on access to and mooring quality at day use beaches and campsites along the Glen Canyon stretch of river. They concluded that regardless of flow level, at constant flows, access to all beaches was fair to good. Mooring quality was also good. They also concluded that none of the beaches were campable at flows greater than 15,000 cfs. They did not report specifically on the fluctuating flow regime.

The 1991 survey was designed to evaluate the condition of the campsites, illegal campsites and day use beaches upriver from Lees Ferry. The purpose of the survey was to establish baseline data on site condition using a quantitative method that could be duplicated over time. Comparison of site impact indexes and site condition classes from one survey to another will aid managers in determining change in campsite condition.

²Upriver Recreation Plan and Environmental Assessment for Lees Ferry, Glen Canyon National Recreation Area, USDI, National Park Service, Glen Canyon National Recreation Area, 1982.

METHODS

Study Area

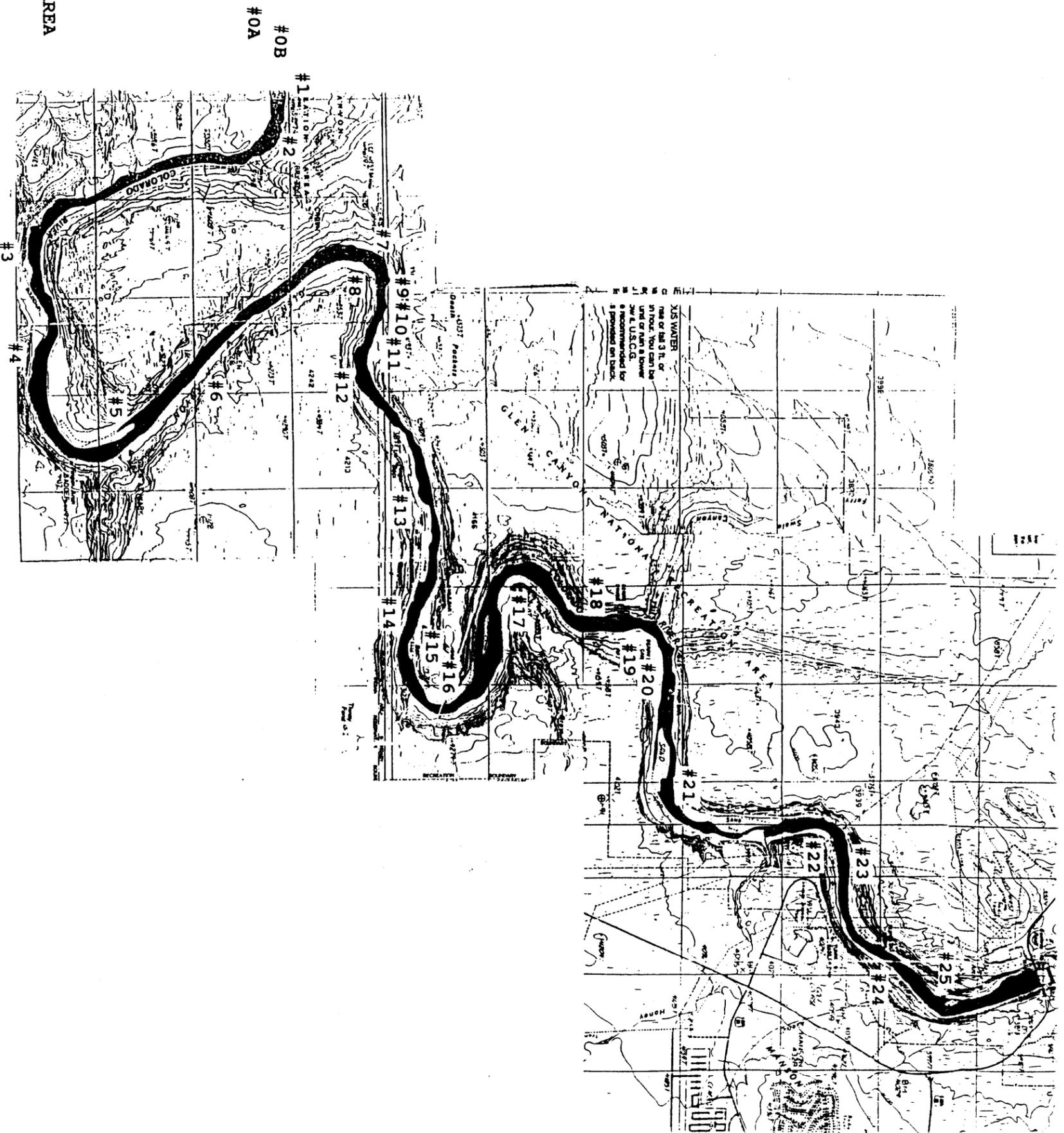
The study area included the 15-mile segment of "free flowing" Colorado River within Glen Canyon National Recreation Area. The river flows from the Glen Canyon Dam tailwaters downstream to Lees Ferry, the easternmost boundary of Grand Canyon National Park. Fishing and rafting are the primary recreation activities occurring on the river. There is also some hiking and waterfowl hunting. Visitors also camp and picnic in the area and evidences of use are found in the form of litter, human waste, campfire scars and trails. Forty-nine such use areas were selected for the biophysical impact survey (see Figure 1).

Anglers fish a number of sites along the river including walk-in shoreline sites near the Lees Ferry boat launch and upstream sites accessible only by boat. Both fly and lure anglers fish the river on shore and from boats and with and without commercial fishing guides. Anglers wishing to stay overnight can camp upriver at a number of designated campsites (shown in Figure 1), use the Park Service campground near Lee's Ferry, or a variety of Park Service and commercial lodging facilities at Marble Canyon, Page, or Wahweap Marina. In addition to the dock at Lees Ferry there are fish cleaning stations, restrooms, parking lots for vehicles and boat trailers.

ARA Leisure Services is the National Park Service concessioner which provides float trips from the dam to Lees Ferry through their Wilderness River Adventures Company. Trips run during March and April on an "as available" schedule and seven days a week from May through September. Trips are either half-day or full-day trips. The trip includes stops to view petroglyphs and for lunch (on day trips) (shown on Figure 1). After pullout at Lees Ferry, rafters are driven back to Page or

to Grand Canyon N. P., depending on the tour being offered. Rafter use is concentrated at these stopping points where, over the course of a use season, up to 30,000 visitors can impact the area.

This study was designed to look at both the physical and social impacts of visitor use of the river corridor and the impact of flow level on recreation. The study design included two major components: biophysical impacts and social impacts. Different methods were used for each study component and are described separately.



Biophysical Inventory

During a reconnaissance trip upriver in March 1991, 25 sites were identified for the survey. Within many of the sites several distinct use areas were present. Each distinct use area was considered a separate site. The 25 main sites were numbered in consecutive order beginning at Lees Ferry and continuing upriver to the dam. Separate use areas within main sites were designed by adding an alpha suffix to the number. For example, sites 9A, 9B, 9C, etc. are individual campsites within site #9. A total of 49 sites were surveyed, including 27 day use sites, 15 campsites, and 7 illegal campsites (Figure 0, see Appendix A for a list of sites names).

Park personnel, including Lenore Grover and Robert Weber with help from Rory Gauthier, Robert Feit, Richard Harris and Dorothy Tinkler, performed the survey during June and July 1991. A 17-foot inflatable Achilles with a 55 hp motor was used to access the majority of the sites.

Upon approaching a site, photos of the access and mooring were taken from the boat using a 35mm camera with a 28mm wide angle lens and Kodachrome color slide film. Roll number, photo number, direction of photo, and description of photo were recorded in a photo log.

Photo points were established at each site making every effort to locate the point near a key feature such as a large rock or tree to facilitate location of the point for future surveys. A site photo was taken from the photo point and a photo of the photo point was taken with park personnel standing on the spot facing in the direction of the site. Appropriate photo information was recorded in the photo log. Photos of some of the campsites, taken in 1985, were brought into the field and attempts were made to duplicate these photos whenever possible so that change in site condition could be assessed by comparing 1991 photos with those taken six years earlier.

After site photos were taken, one person filled out the data sheets as described in detail in Appendix A and another person sketched a diagram of the site. Diagrams were oriented with North at the top of the page and included the location of the photo point.

In the office site locations were plotted on a map of the river comprised of a 7.5 minute Lees Ferry Quadrangle, a 7.5 minute Ferry Swale Quadrangle, and a 7.5 minute Page Quadrangle. Slide film was developed and one 4x6-inch print was produced from each slide. Slides and prints were labelled and placed in archival quality plastic sheets in a three-ring binder currently kept by the Division of Resource Management at Glen Canyon N.R.A.

Mathematical calculations for camp area, barren core, distance to river, distance to nearest toilet, site impact values, and site impact indexes were performed using a calculator and results recorded on data sheets. **Impact values** were calculated for each of the eight impact indicators by multiplying the rating by the factor weighting value. The rating, assigned in the field as described in Appendix A, reflects the condition of the site with regard to the specific impact indicator. The **factor weighting value** is a weighting value assigned by managers to denote the importance of the impact indicator. Traditionally, higher factor weighting values (FWV) were assigned to impacts that were more lasting and biophysically detrimental to the site, as opposed to just being aesthetically displeasing to the eye (Cole 1989). In this study, importance was defined by the effort it would take to ameliorate the site of the specific impact. The greater the effort, the higher FWV was given for a specific impact. For example, the trash impact indicator has a lower FWV than trails because trash can be easily removed from the site and trail revegetation would involve much more work.

The eight **impact values** for the site were summed to calculate the **site impact index** and site impact indexes were used to classify a site into one of four **condition classes** ranging

from lightly to severely impacted. The lowest value the site impact index could be was 18 and the highest was 72. If the site impact index was a value from 18 to 28, the site was considered to be **lightly impacted**. If the site impact index was 29 to 45, the site was considered **moderately impacted**. If the site impact index was 46 and 61, the site was considered **heavily impacted**, and if the value was 62 to 72, the site was considered **severely impacted**.

Other office tasks included placing data sheets in archival quality plastic sleeves and adding them to the three-ring binder containing the associated site slides and prints. Data from the data sheets were put into a dBase III data file using an IBM personal computer and results were displayed graphically using Harvard Graphics software.

Visitor Survey

This research focused on two visitor populations: day-use rafters and anglers. Visitor surveys were designed to examine the characteristics and river experiences related to crowding, conflict, and flow level of these two visitor subpopulations. Information acquisition objectives included:

- (1) identify demographic characteristics of the two study subpopulations;
- (2) identify numbers of other users encountered by the two subpopulations and their reactions to encounters;
- (3) identify the angler subpopulations' perceptions of the impact of river flow levels on the quality of their fishing experience;
- (4) identify the river trip characteristics of the two study subpopulations; and
- (5) identify the two study subpopulations' perceptions of management of the river.

Data were gathered at three different river flow level conditions: low flow (5,000 cfs), medium flow(15,000 cfs), and high fluctuating flows (up to 30,000 cfs).³ This facilitated assessment of the impacts of flow level on river experiences.

Sampling Plan

The sampling design used to select individuals was a stratified clustering scheme used to draw a sample from the population of recreationists during the sampling period, April 15 to July 28, 1991. Stratification was used to partition the sampling period into three river flow levels--low, medium, and high fluctuating flows. The sample size collected within each stratum was in part a function of estimates of the total population (the number of individuals on the river), both anglers and day-use rafters, of that stratum. The sampling period was further divided by day into clusters of elements. Each cluster (day) consists of visitors beginning raft trips on the river and/or anglers on the river. Sample clusters were randomly selected and visitors taking river trips and/or anglers were interviewed during those days. The first individual interviewed each day was selected at random and every nth individual was interviewed thereafter. The amount of interviewing to be done during each flow level was roughly equivalent so that comparisons could be made among anglers and rafters for the three flows.

The sampling strategy is based on the assumption that a degree of sampling precision (accuracy of population estimates) is required for any statistic that may be used for management decisions. This value was established as a $\pm 5\%$ for a true-false type question with 95% confidence when the occurrence of these

³Research flows were provided as part of the Grand Canyon Environmental Impact Studies. Initiated in June 1990 and continuing through July 1991, the research flow releases allowed researchers to study specific, known flow releases, and their effects on the resources of Glen Canyon and Grand Canyon.

values was assumed to be .50/.50 in the population, assuming a random sample. In order to meet this objective, a sample size of 1000 was selected with a sample of approximately 333 visitors (153 anglers and 180 rafters) being selected from each of the three flow level strata.

Several problems arose during sampling that made it impossible to obtain an equal number of anglers and rafters from each of the three research flow periods. There were fewer anglers on the river than expected during the high flow period and some confusion over the exact dates when flow levels occurred, resulting in fewer anglers being surveyed during the high flow period. The final sample included 353 anglers (184 low flow, 156 medium flow, and 113 high flow) and 593 rafters (191 low flow, 189 medium flow, and 213 high flow) for a total sample size of 946 visitors. Steps were taken during the analysis to compensate for unequal numbers of respondents for each flow level. These procedures are discussed in the Data Analysis section.

Study Plan

The field data collection period included April-July, 1991 to correspond with research flow levels and was conducted in two phases. Phase one involved an initial on-site face-to-face contact with Glen Canyon rafters and anglers selected to participate in the survey. On-site interviews were conducted at the raft launching point at the base of Glen Canyon dam (rafters) and at the boat ramp accessing upriver fishing locations and the accessible shoreline areas near the boat ramp (anglers).

Interviews were conducted at the raft launching point and Lees Ferry boat ramp during three 1-week time periods during the summer:

May 21-26, 1991	Medium flow period
July 8 - 11, July 21-25, 1991	High fluctuating flow period
July 12-14, July 26-28, 1991	Low flow period

During the on-site phase, initial data on group size and composition were collected along with each participant's name and address. Names and addresses were gathered solely for the purpose of sending subsequent follow-up reminders to those who did not return the mailback questionnaire. Upon completion of the mailing procedures, the name and address files were destroyed and the permanent data were anonymous.

Phase two involved giving willing participants a postage-paid mail-back questionnaire, the primary data gathering instrument, to be filled out either during or at the conclusion of their rafting or fishing trip on the river. Drop boxes were provided near the boat launch ramp at Lee's Ferry, which is also the raft trip take-out point giving participants the opportunity to drop off the questionnaire on-site or return it by mail.

Efforts were made to achieve a maximum response rate for the mailback questionnaire. This was accomplished by sending follow-up materials to respondents to solicit and encourage return of completed mail-back questionnaires. The following were used:

- a. If the mail-back questionnaire was not returned within 2-3 weeks'time, a reminder postcard was sent.
- b. If there was no response to the reminder postcard, a second follow-up letter and replacement questionnaire were sent.
- c. If there was still no response, a third and final follow-up letter and replacement questionnaire were sent.

These efforts resulted in 739 of the 946 questionnaires distributed being returned, a response rate of 78 percent.

Data Analysis

Two types of data analyses were used to meet the objectives of this portion of the study. The first analysis involved the use of descriptive statistics to characterize the angler and rafter groups according to use and user characteristics, their

experiences on the river, opinions toward river management and anglers' perceptions of the impact river flow level on fishing quality. The second analysis investigated the impact of flow level on visitor experiences using analysis of variance and chi-square statistics to look for differences in selected variables among flow levels. Angler and rafter responses were analyzed separately in both analyses. All data were entered onto a microcomputer and analyzed with microcomputer-based statistical software.

To compensate for the unequal sample sizes among the three flow levels for both anglers and rafters, survey data were weighted as part of the analysis process. Weights were computed to equalize responses among the three flow levels. Separate weights were calculated for anglers and rafters and used in all analyses. The n's reported in the tables and figures are the unweighted sample size and the percentages and means presented are weighted values.

A note of caution is warranted. A primary objective of the study was to assess the impact of river flow level on visitor experiences. To meet this objective, the sample of anglers and rafters was drawn during the research flow levels and subsequently weighted for analysis. Consequently, these data reflect a somewhat artificial condition at Glen Canyon N.R.A. because of the research flows and may not accurately represent all anglers and rafters who use the river during nonresearch flow periods. Care should be taken in generalizing the results of the survey to the entire summer population of river users. The results do, however, represent visitors to the river during the research flow periods. These flows represent a range of managed flow options which could be realized in the future. In that light, results can be used in the selection of future management options.

RESULTS

Results are presented in two sections: biophysical impacts and social impacts. Results are presented in tabular, graphic, and narrative format. Following this section is a conclusions and implications section that includes suggestions as to how managers might use these results.

Biophysical Impacts

Site Description

Of the 49 sites surveyed, 27 of the sites were day use only, 15 were designated campsites and 7 were illegal satellite campsites associated with the designated camps.

Present Use Restriction

The majority of the day use sites were used exclusively by anglers, 19 sites (70%). Six (22%) of the day use sites were used by a combination of either anglers and rafters or anglers and hikers. Only two (7%) of the 27 day use sites were used predominantly by rafters.

Twelve (80%) of the campsites were considered to be used primarily by anglers and three (20%) were used by both anglers and hikers (Ropes Trail Camps). One day float trip rafters do not use the designated campsites.

The illegal satellite campsites, usually found on the lower benches below the upper bench designated campsites were used solely by anglers, 7 sites (100%).

Use Concentration

Day use sites had the most varied types of use areas. Ten sites (37.04%) had use concentrated on the beach, five sites (18.52%) had use concentrated within the Tamarisk, four sites (14.81%) on the lower bench, two (7.41%) on the upper bench, one (3.7%) on both the beach and gravel bar, one (3.7%) on the beach

and lower bench, two (7.41%) on the beach and within the Tamarisk, one (3.7%) within the Tamarisk and on the upper bench, and one (3.7%) on the beach and the upper bench.

Of the campsites, only one (6.7%) had use concentrated within the Tamarisk, three (20%) had use concentrated on the lower bench, and 11 (73.33%) had use concentrated on the upper bench. The majority of the campsite use areas are therefore unaffected by river flows.

Four (57.14%) of the illegal satellite sites had use located on the lower bench, two (28.57%) on the upper bench, and one (14.29%) on the beach and lower bench.

Attractions

The day use sites had the greatest variety of attractions associated with the sites. One site (4%) offered both fishing and a rapid, eight (30%) were near spawning bars, one (4%) was near the launch ramp and dock, four (15%) were associated with cultural sites, one (4%) was near a natural attraction and a good fishing spot, four (15%) were near natural attractions, one (4%) offered just fishing, two (7%) had nice beaches, and three (11%) had no observable attractions.

Twelve (80%) of the designated campsites were considered attractions in themselves, but three (20%) were also located near spawning bars.

All of the illegal campsites were considered to have the adjacent designated campsites as an attraction, but two (29%) of the illegal sites were also near spawning bars.

Percent Vegetation

Percent Vegetation Cover	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
1% - 25%	37.04%	40.00%	71.43%
26% - 50%	25.93%	33.33%	14.29%
51% - 75%	25.93%	6.67%	14.29%
76% - 100%	11.11%	20.00%	0.00%

Distance, Core to River

<u>Distance (ft.)</u>	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0 - 25	40.74%	0.00%	0.00%
26 - 50	25.93%	13.33%	57.14%
51 - 100	14.81%	26.67%	28.57%
101 - 150	7.41%	40.00%	28.57%
151 - 200	3.70%	13.33%	0.00%
>200	7.41%	6.67%	0.00%

Vertical Climb

<u>Vertical Climb (ft.)</u>	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
<1	11.11%	0.00%	0.00%
1 - 5	55.56%	6.67%	28.57%
6 - 10	25.93%	13.33%	42.86%
11 - 20	7.41%	26.67%	0.00%
21 - 30	0.00%	33.33%	0.00%
31 - 40	0.00%	20.00%	28.57%

Capacity: # of People

<u># of People able to camp</u>	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0	3.70%	0.00%	0.00%
1 - 5	18.52%	33.33%	0.00%
6 - 10	18.52%	33.33%	85.71%
11 - 20	22.22%	26.67%	14.29%
21 - 30	18.52%	6.70%	0.00%
31 - 40	7.41%	0.00%	0.00%
41 - 50	11.11%	0.00%	0.00%

Number of Boats Able to Moor

<u>Number of Boats</u>	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0	7.41%	0.00%	85.71%
1 - 3	18.52%	53.33%	14.29%
4 - 10	48.15%	46.67%	0.00%
11 - 15	14.81%	0.00%	0.00%
16 - 25	11.11%	0.00%	0.00%

Access

Access	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
Cobble Bar	18.52%	26.67%	71.43%
Large Rocks	11.11%	20.00%	42.86%
Shallow	33.33%	33.33%	28.57%
Sandy	18.52%	6.70%	0.00%
Deep Water	40.74%	33.33%	0.00%

percentages do not equal 100,
since access could be more than
one description.

Toilets Present

Toilets?	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
YES	14.81%	100%	100% (near)
NO	85.19%	0%	0%

Distance to Toilets

Distance to Nearest Toilet (ft.)	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0 - 25	3.70%	26.67%	0.00%
26 - 100	3.70%	37.04%	57.14%
101 - 500	0.00%	6.70%	42.86%
501 - 1,000	3.70%	0.00%	0.00%
1,001- 5,000	51.85%	0.00%	0.00%
5,001-10,000	18.52%	0.00%	0.00%
>10,000	18.52%	0.00%	0.00%

Fire Grates

All fifteen campsites had fire grates on site. None of the day use sites nor the illegal campsites had fire grates on site.

Grazing Impacts

None of the campsites nor any of the illegal satellite campsites exhibited signs of grazing. Four (15%) of the day use sites had cow manure present on site and four (15%) had grazed

vegetation on site. These sites were located on the Navajo side of the river, within the first seven miles upriver from Lees Ferry.

Evidence of Beaver Activity

There were signs of beaver activity on ten (37%) of the day use sites. Signs included tracks, gnawed vegetation, gnawed NPS signs, and a beaver dam. There were no signs of beaver activity at any of the campsites or illegal campsites.

Camp or Day Use Area

Use Area (sq.ft.)	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0 - 500	3.70%	6.70%	0.00%
501 - 1000	14.81%	33.33%	85.71%
1001 - 5000	33.33%	60.00%	14.29%
5001 - 10000	18.52%	0.00%	0.00%
10001 - 15000	14.81%	0.00%	0.00%
15001 - 20000	11.11%	0.00%	0.00%
>20000	3.70%	0.00%	0.00%

Percent Barren Core

Percent of Use Area which is Barren Core	<u>Day Use</u>	<u>Campsite</u>	<u>Illegal Camp</u>
0	3.70%	0.00%	0.00%
1 - 25	48.15%	40.00%	0.00%
26 - 50	14.81%	6.70%	42.86%
51 - 75	11.11%	20.00%	14.29%
76 - 100	22.22%	33.33%	42.86%

Impact Indicators

Eight impact indicators were used to determine site condition. Figure 2 shows the percentage of all 49 sites that were lightly impacted, moderately impacted, heavily impacted and severely impacted with respect to each of the eight impact indicators.

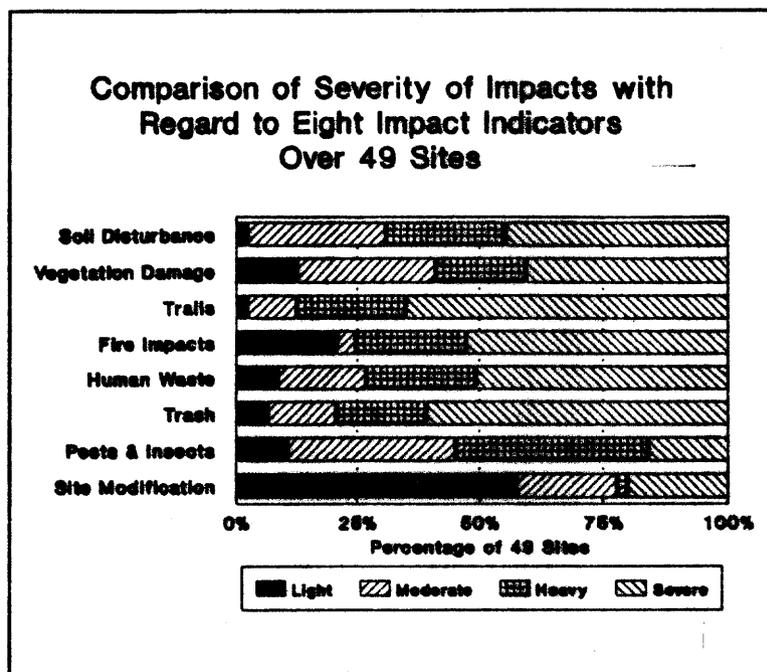


FIGURE 1.

Impact Indicator	Light	Moderate	Heavy	Severe
Soil Disturbance	2.04%	28.57%	24.49%	44.90%
Vegetation Damage	12.24%	28.57%	18.37%	40.82%
Trails	2.04%	10.20%	22.45%	65.31%
Fire Impacts	20.41%	4.08%	22.45%	53.06%
Human Waste	8.16%	18.37%	22.45%	51.02%
Trash	6.12%	14.29%	18.37%	61.22%
Pests & Insects	10.20%	34.69%	38.78%	16.33%
Site Modification	57.14%	20.41%	2.04%	20.41%

The majority of the sites were lightly impacted with respect to site modification, but most severely impacted with respect to trash and trails.

Soil Disturbance

Site soils were examined and cases of compaction, loosening, and erosion of soils were documented.

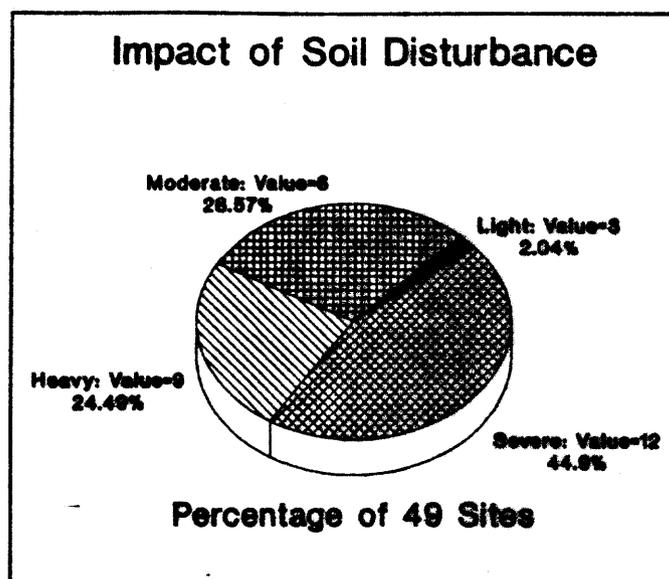


FIGURE 2.

Figure 2 shows that only one site (2%) out of the 49 sites was lightly impacted with respect to soil disturbance. Fourteen sites (29%) were moderately impacted, 12 sites (24%) were heavily impacted, and 22 sites (45%) were severely impacted.

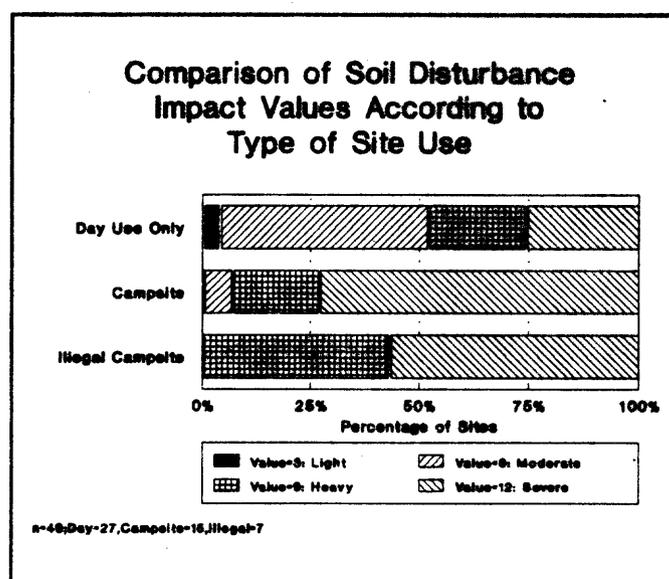


FIGURE 3.

By separating sites into day use areas, campsites and illegal campsites, Figure 3 shows that the sites most heavily impacted with respect to soil disturbance are campsites and illegal camps. Ninety-three percent of the campsites and 100% of the illegal camps were heavily to severely impacted. Only 48% of the day use sites were heavily to severely impacted.

Vegetation Damage

On-site vegetation damage was examined and cases of trampling, cutting, carvings, exposed roots and reduced vigor were documented.

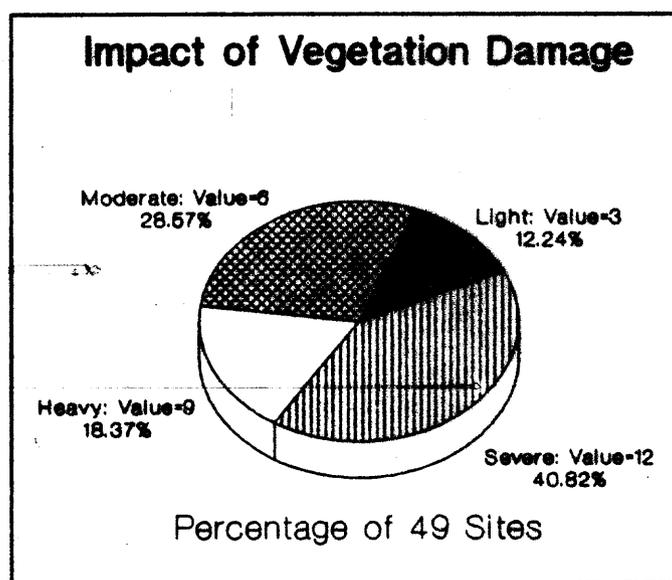


FIGURE 4.

Figure 4 shows that only six sites (12%) were lightly impacted with respect to vegetation damage. Fourteen sites (29%) were moderately impacted, 9 sites (18%) were heavily impacted and 20 sites (41%) were severely impacted.

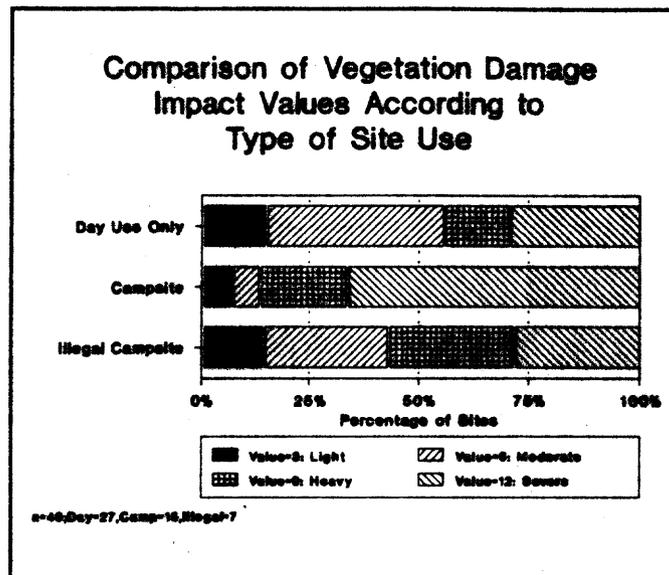


FIGURE 5.

By separating sites into day use areas, campsites and illegal campsites, Figure 5 shows that the sites most heavily impacted with respect to vegetation damage are the campsites. Ninety-six percent of the campsites were heavily to severely impacted while 57% of the illegal campsites and 44% of the day use sites were heavily to severely impacted.

Trails

For each site, the number of trails from the site to another site, from the site to the toilet, from the site to an attraction and from the site to the mooring were counted and average trail width was documented.

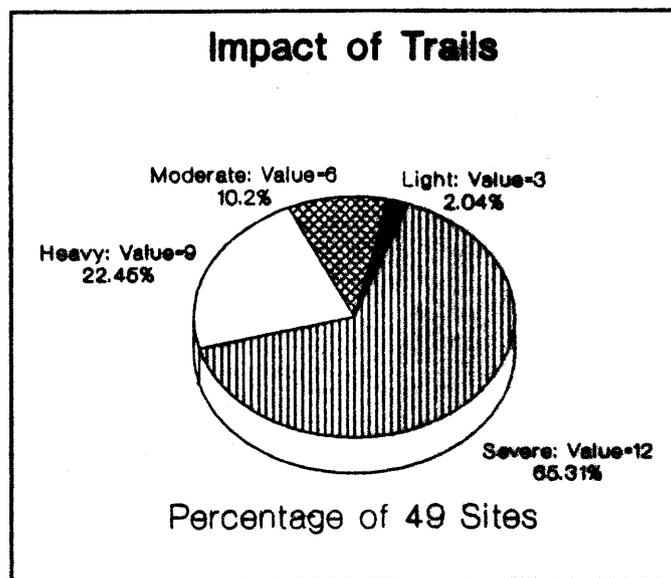


FIGURE 6.

Figure 6 shows that only one site (2%) was lightly impacted with respect to trails. Five sites (10%) were moderately impacted, 11 sites (22%) were heavily impacted and 32 sites (65%) were severely impacted.

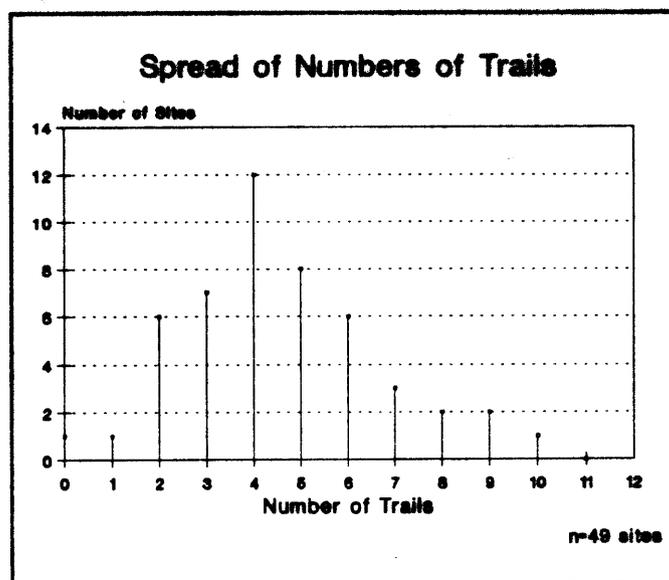


FIGURE 7.

Figure 7 shows that the average number of trails over 49 sites was four. All sites with greater than three trails were considered severely impacted with respect to trails.

By separating sites into day use areas, campsites and illegal campsites, Figure 8 shows that all site types are heavily impacted with regard to triling. All of the illegal campsites were heavily to severely impacted, and 93% of the designated campsites and 81% of the day use areas were heavily to severely impacted.

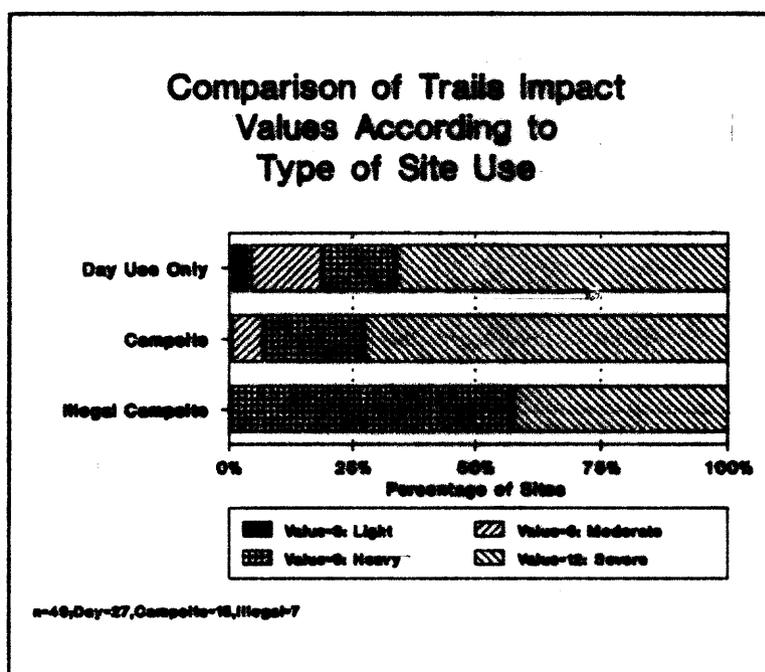


FIGURE 8.

Fire Impacts

Sites were examined for fire impacts including illegal fire rings, fire stains, ash across site, burned vegetation, and stained rocks.

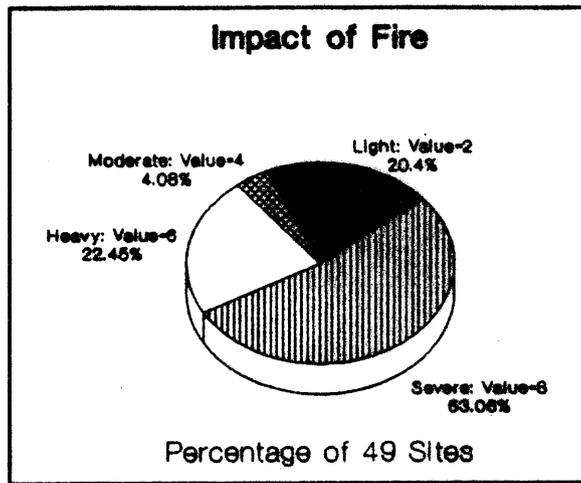


FIGURE 9.

Figure 9 shows that 10 sites (20%) were only lightly impacted with regard to fire impacts. Two sites (4%) were moderately impacted, 11 sites (22%) were heavily impacted but 26 sites (53%) were severely impacted.

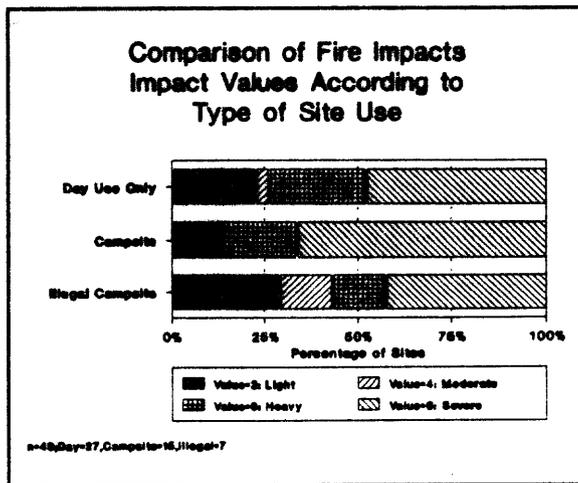


FIGURE 10.

By separating sites into day use areas, campsites and illegal campsites, Figure 10 shows that 74% of the day use sites, 87% of the campsites, and 57% of the illegal campsites were heavily to severely impacted with respect to fire impacts.

Human Waste

For each site, piles of toilet paper, piles of fecal matter, and number of areas where the odor of urine was strong were counted.

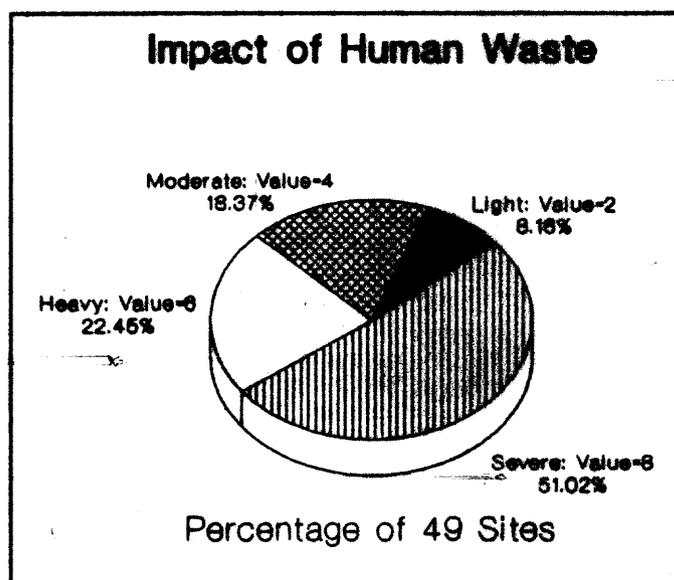


FIGURE 11.

Figure 11 shows that only four sites (8%) were lightly impacted with respect to human waste. Nine sites (18%) were moderately impacted, 11 sites (22%) were heavily impacted, but 25 sites (51%) were severely impacted.

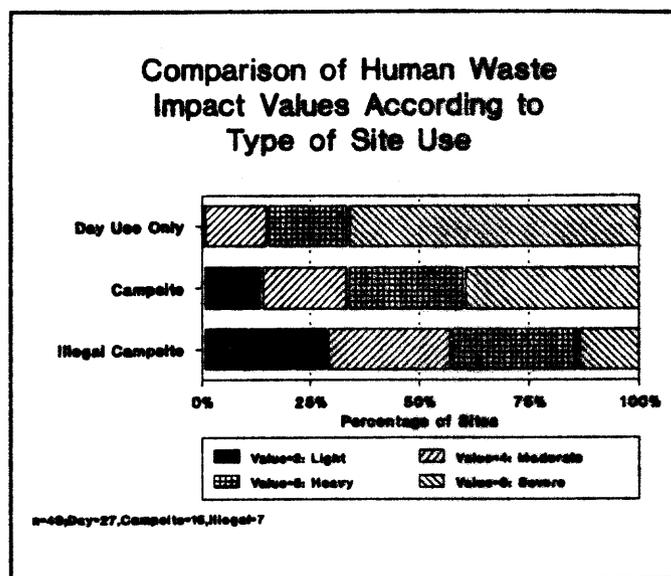


FIGURE 12.

By separating sites into day use areas, designated campsites, and illegal campsites, Figure 12 shows that day use sites were the most heavily impacted with respect to human waste. This result seems logical since only 2 out of the 27 day use sites have toilet facilities. Eight-five percent of the day use sites, 67% of the designated campsites, and 43% of the illegal campsites were heavily to severely impacted.

Trash

For each site, number of pieces of small and number of pieces of large trash strewn across site or located in fire grates were counted.

Figure 13 shows that only 3 sites (6%) were lightly impacted with respect to trash. Seven sites (14%) were moderately impacted, 9 sites (18%) were heavily impacted, but 30 sites (61%) were severely impacted.

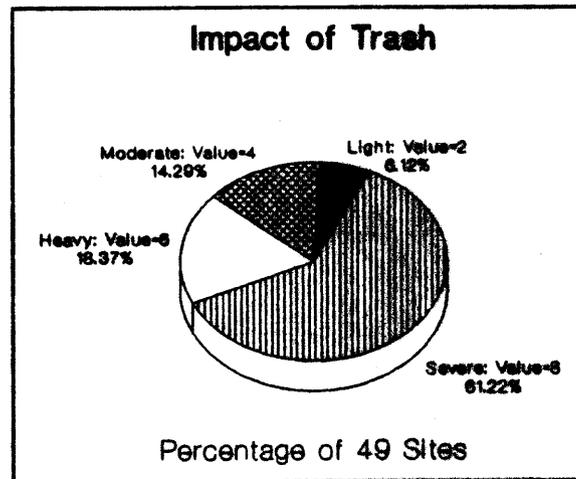


FIGURE 13.

By separating sites into day use areas, designated campsites, and illegal campsites, Figure 14 shows that designated campsites were the most heavily impacted with respect to trash. Ninety-three percent of the campsites, 78% of the day use sites, and 57% of the illegal campsites were heavily to severely impacted.

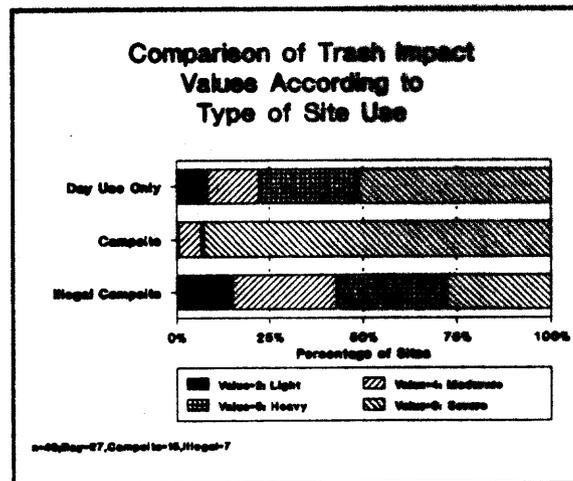


FIGURE 14.

Pests and Insects

Each site was examined for the presence of pests and insects which included flies, midges, ants, rodent tracks and ravens displaying scavenging behaviors. Numbers of pests and intensity of disturbance by pests were documented.

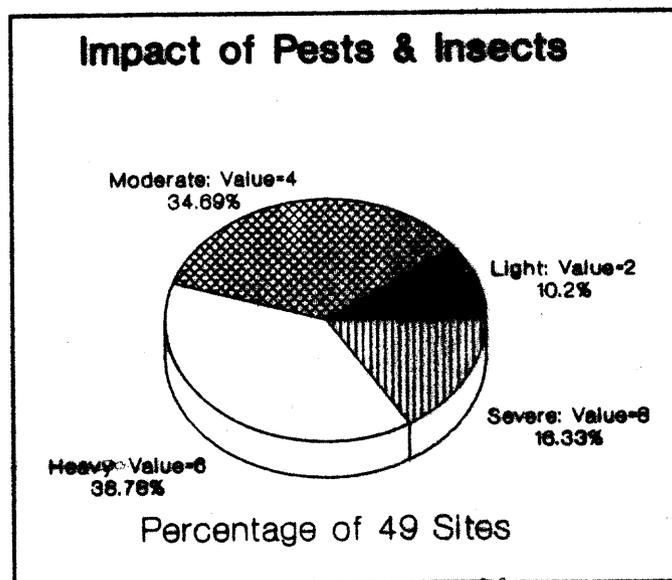


FIGURE 15.

Figure 15 shows that the majority of the sites were moderately to heavily impacted with respect to pests and insects. On downriver sites this was often due to the presence of cow manure. Only 5 sites (10.20%) were lightly impacted, 17 sites (34.69%) were moderately impacted, 19 sites (38.78%) were heavily impacted, and 8 sites (16.33%) were severely impacted.

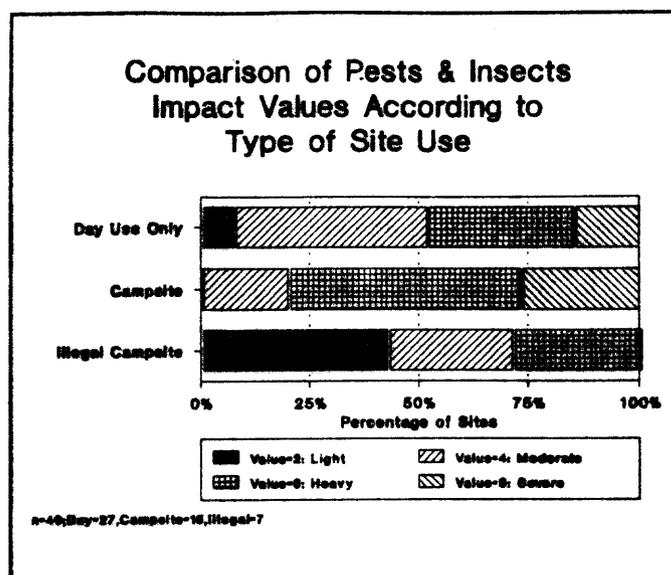


FIGURE 16

By separating sites into use types, Figure 16 shows that 80% of the designated campsites, 48% of the day use areas, and 29% of the illegal campsites were heavily to severely impacted.

Site Modification

Each site was examined to the presence of rock or log seats, rock tables, or just the movement of large rocks onto site for tent stabilization.

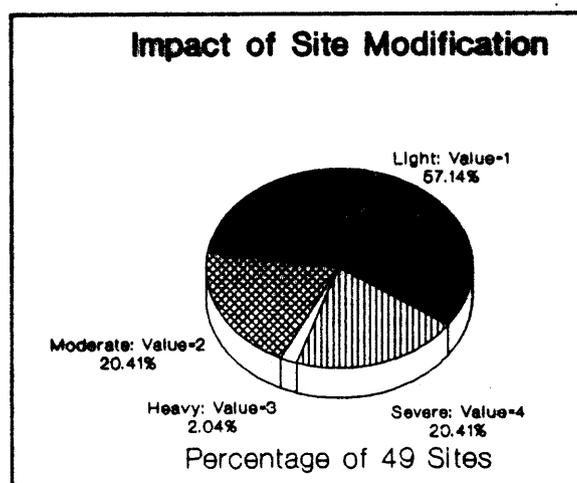


FIGURE 17.

Figure 17 shows that the majority of the sites were lightly impacted with respect to site modification. Twenty-eight sites (57%) were lightly impacted, 10 sites (20%) were moderately impacted, 1 site (2%) was heavily impacted, and 10 sites (20%) were severely impacted.

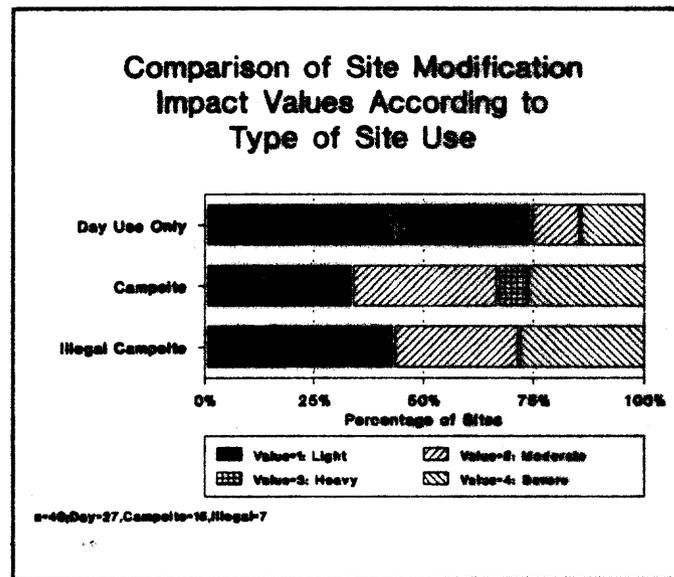


FIGURE 18.

By separating sites into day use areas, designated campsites, and illegal campsites, Figure 18 shows that only 33% of the campsites, 29% of the illegal campsites, and 15% of the day use sites were heavily to severely impacted with respect to site modification.

Condition Class

The 49 sites were separated into condition classes by impact indexes calculated from the sum of the eight impact values. Sites with indexes ranging from 18 to 28 were considered lightly impacted, from 29 to 45 moderately impacted, from 46 to 61 heavily impacted and from 62-72 severely impacted.

Figure 19 shows that none of the 49 sites had an impact index less than 32, so there were no lightly impacted sites. Eight sites (16%) were moderately impacted, 28 sites (57%) were heavily impacted and 13 sites (26%) were severely impacted. Therefore, 84% of the 49 sites were heavily to severely impacted with respect to the eight impact indicators.

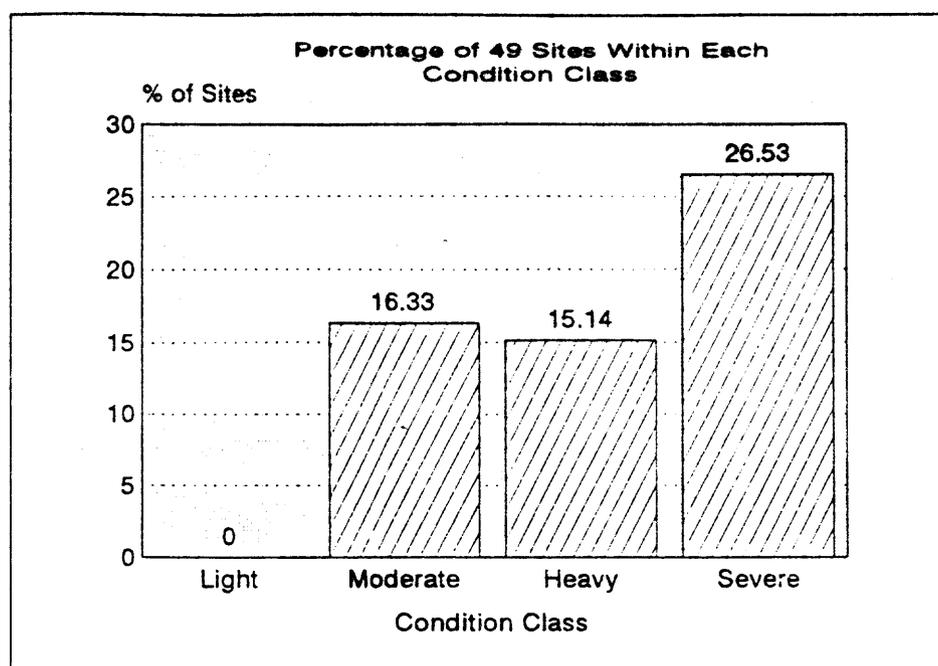


FIGURE 19.

Separating sites into type of site use, Figure 20 shows that no day use sites, campsites, or illegal campsites were lightly impacted. Five day use sites (18%) were moderately impacted, 17 (63%) were heavily impacted, and five (18%) were severely impacted. One campsite (7%) was moderately impacted, seven (47%) were heavily impacted, and seven (47%) were severely impacted. Three illegal campsites (43%) were moderately impacted, three (43%) were heavily impacted, and one (14%) was severely impacted.

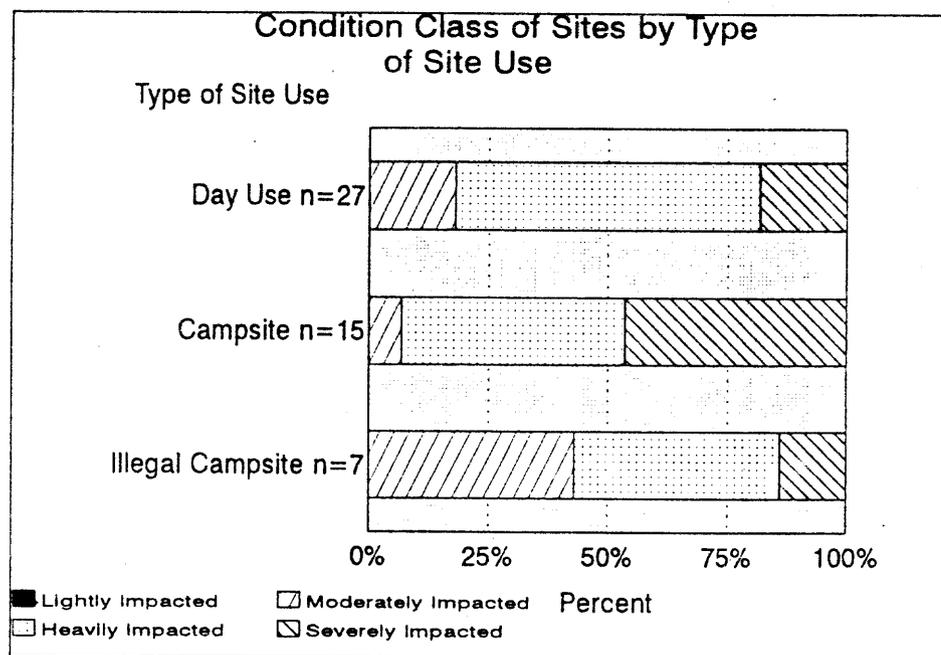


FIGURE 20.

Social Impacts

Findings on the social impacts of recreation use and river flow levels are presented in several sections. The first section describes the rafting and angling river users separately, including their socio-demographic characteristics, group type, their method of fishing, and their spatial use of the river for fishing and camping. The second section describes the river experience as perceived by both rafters and anglers including numbers of other river users seen, perceptions of crowding, problems they may or may not have encountered, and their overall satisfaction. Section three describes users' opinions toward river management including their views on specific use restrictions, possible management actions, and their willingness to pay a user fee. The fourth section describes anglers' perceptions of the impact of river flow level on fishing quality. Angler perceptions are presented according to the flow level at which they were interviewed and comparisons are made among the three flow levels. The fifth and final section expands upon results presented in section four and compares the findings on a number of issues among the three river flow levels.

Use and User Characteristics

Anglers

Socio-Demographic Characteristics

Age. Anglers range in age from 17 to 86 years old, with an average age of 44.2 years (Table 1). More than half of the anglers surveyed were between 30 and 50 years old (59%).

Gender. The overwhelming majority of anglers at Lee's Ferry are male (Figure 21). Among those surveyed, 92 percent were male and 8 percent were female. This is not unexpected, given the traditional dominance of males among anglers, although we might

expect this to change somewhat as more women become interested in angling.

Table 1. Age of Lee's Ferry anglers (n=275).^a

Age (years)	Percent
Less than 20	0.4
20 - 30	12.7
31 - 40	31.0
41 - 50	28.1
51 - 60	14.8
61 - 70	9.8
71+	3.2

Mean age = 44.5 years

^a Missing cases = 6.

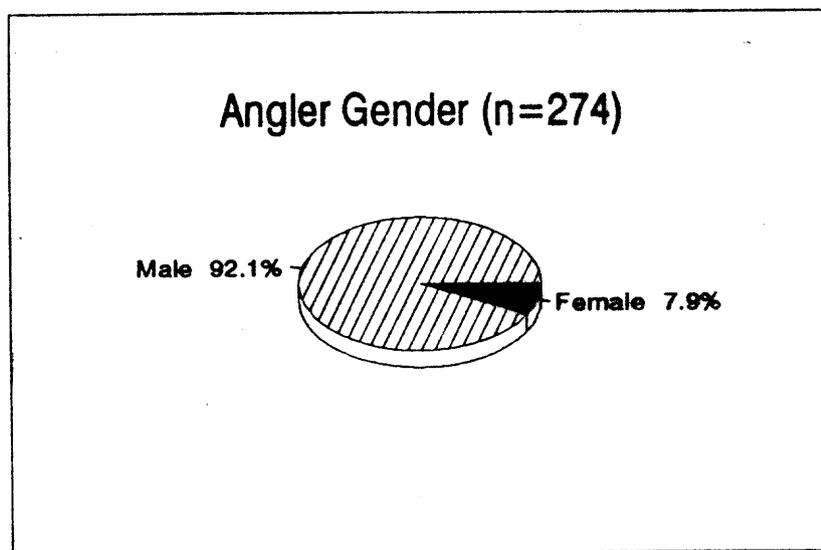


FIGURE 21.

Education. Anglers at Lee's Ferry tend to be well educated, with 87 percent having had at least some college, 21 percent of whom were college graduates and 18 percent who had at least a master's degree (Figure 22). Among the remaining anglers surveyed, 12 percent were high school graduates and 1 percent had less than a high school education.

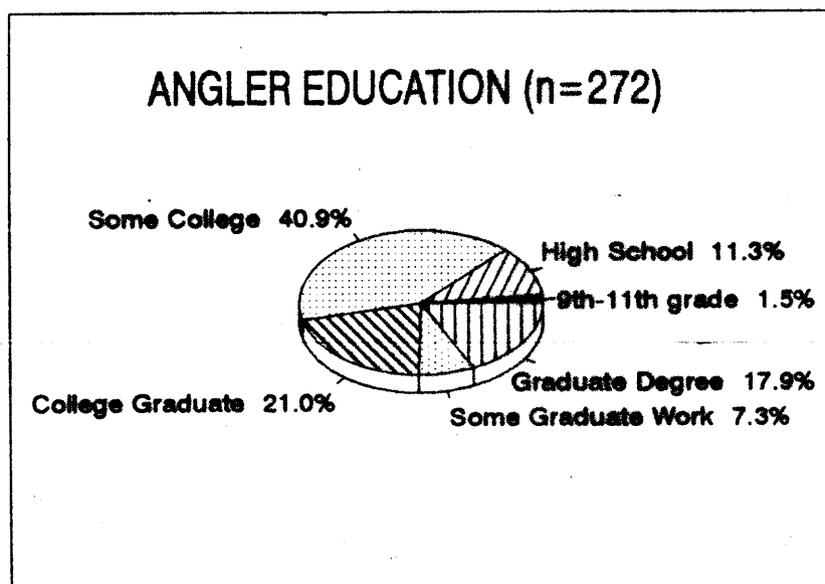


FIGURE 22.

Marital status. Married anglers outnumber unmarried anglers. Seventy-two percent of those surveyed were married, 17 percent were single, having never married, 9 percent were divorced, 2 percent were separated, and less than 1 percent were widowed (Figure 23).

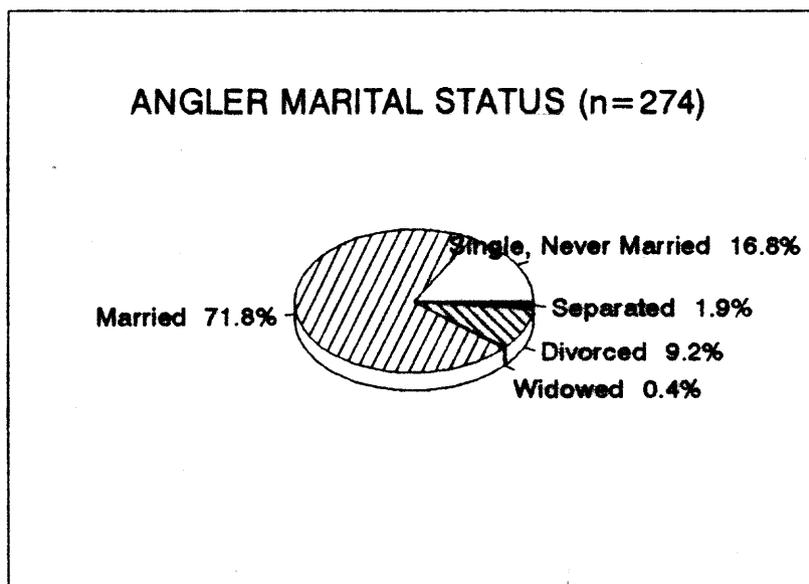


FIGURE 23.

Race or ethnic group. There are very few minority groups represented among anglers at Lee's Ferry. Among anglers surveyed, 95 percent were White, 3 percent were Native American, 2 percent were Hispanic, less than 1 percent were Asian or Pacific Islander, and there were no Blacks (Figure 24).

Employment. The majority of anglers are employed full-time (74 percent) (Table 2). There is a fairly large proportion of retired individuals (15%), the majority of whom are not working although there are some retired individuals who work part time (3%) or full time (2%). Students and homemakers each make up 1 percent of anglers, part-time employees make up 4 percent, less than 1 percent were unemployed, and 4 percent classified themselves in some combination of categories.

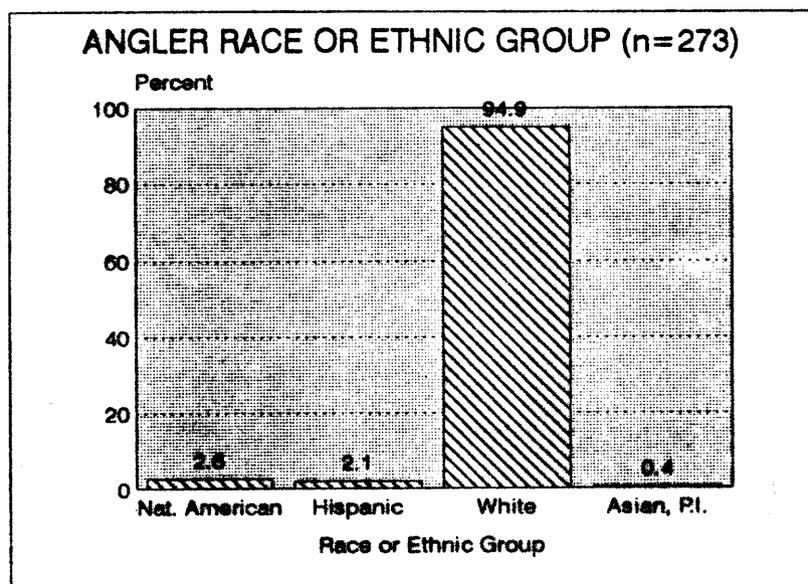


FIGURE 24.

Table 2. Employment status of Lee's Ferry anglers (n=268)..^a

Employment status	Percent
Employed full time	74.1
Retired, not working	10.4
Retired, but working part-time	3.1
Employed part-time	3.6
Retired, but working full time	1.8
Homemaker	1.2
Student, not working	1.4
Unemployed	0.3
Other	4.1

^a Missing cases = 13.

Income. The income levels among anglers is presented in Table 3. The largest proportion of anglers have a total household income of 100 thousand dollars or more a year (16%). The next largest group of anglers (15%) reported incomes between 30 and 39,999 dollars, followed by incomes between 40 and 49 thousand dollars (13%), 50 to 59 thousand dollars (11%), and 20 to 29 thousand dollars (10%). Only 2 percent of anglers reported a yearly income of less than 10 thousand dollars.

State of residence. Lee's Ferry primarily attracts regional as shown in Table 4. More than three quarters of anglers live in Arizona (76%), followed by California (6%), Nevada (5%), Utah (4%), Colorado (1%), Florida (1%), and New Mexico (1%). Other states represented by fewer than 1 percent of anglers include Florida, Hawaii, Idaho, Maine, Montana, Nebraska, New York, Oregon, South Dakota, Texas, Vermont, and Wyoming. Fewer than 1 percent of anglers were from countries outside the U.S.

Table 3. Angler annual household income (n=262).^a

Income	Percent
\$0 - 9,999	2.4
\$10,000 - 19,999	5.6
\$20,000 - 29,999	10.0
\$30,000 - 39,999	15.5
\$40,000 - 49,999	12.9
\$50,000 - 59,999	11.4
\$60,000 - 69,999	7.8
\$70,000 - 79,999	5.8
\$80,000 - 89,999	8.3
\$90,000 - 99,999	4.2
\$100,000+	16.1

^a Missing cases = 19.

Table 4. Angler state of residence (n=279).^a

State	Percent
Arizona	75.8
California	6.4
Nevada	4.7
Utah	4.0
Colorado	1.5
New Mexico	1.3
Florida	1.1
Montana	0.6
New York	0.6
Wyoming	0.6
Maine	0.5
Oregon	0.5
South Dakota	0.5
Texas	0.5
Idaho	0.4
Hawaii	0.3
Nebraska	0.3
Vermont	0.3
Foreign country	0.3

^a Missing cases = 2.

Use of the River

Trip type. Consistent with the regional residence of anglers, the majority of anglers were visiting Glen Canyon NRA for a weekend or multi-day outing (48%) or even a day outing (21%) (Table 5). Almost a quarter of the anglers came to Glen Canyon NRA for a vacation (12%) or as part of a larger vacation itinerary (12%). Relatively few anglers came for less than a day (4%) or were working on the river (3%).

Table 5. Angler trip type (n=269).^a

Trip type	Percent
Weekend or multi-day trip	47.6
Day outing	21.4
Vacation to Glen Canyon NRA	12.4
Vacation with Glen Canyon NRA as part of the travel plan	11.6
Visit for several hours or less than a day	4.4
Work on the river	2.6

^a Missing cases = 12.

Party size. Angler party size ranged from 1 to 7 people, with an average of 2.5 (Table 6). The majority of anglers came in groups of two (55%) or three (24%).⁴ Few anglers came alone.

Table 6. Angler party size (n=271).^a

Party size	Percent
1	6.1
2	55.1
3	23.7
4	10.0
5	4.2
7	0.9

Average party size = 2.5 persons

^a Missing cases = 10.

⁴ There was some confusion in how this question was asked during the on-site interview. Adjustments were made to compensate for the problem. However, these numbers should be used with some caution, as they may not accurately reflect angler party size.

Group type. Lee's Ferry anglers are most often travelling with friends or family members and less often alone. More than one-third of anglers surveyed (35%) were travelling in groups of two or more friends (Table 7). Twenty-two percent came with their spouse, 16 percent came as a family, and 10 percent came as two or more families together. Family/friend groups made up 9 percent of anglers, and 6 percent came alone. Relatively few came with special interest groups.

Table 7. Angler group type (n=279).^a

Group type	Percent
Two or more friends together	35.2
A couple	22.2
Family	15.9
Two or more families or relatives together *	9.6
Family and friends	9.2
Alone	5.9
Special interest group (tour group)	2.0

^a Missing cases = 2.

First-time visitors. Anglers tend to be return visitors to Glen Canyon NRA. Close to three-quarters (73%) of those surveyed indicated this was not their first visit (Table 8). The majority of anglers (64%) had visited between 1 and 4 times. Seven anglers reported having visited Glen Canyon 100 or more times within the past year. Five of those anglers were guides who work on the river and the other two live at Marble Canyon. Excluding those seven responses, prior visits within the past year ranged from 1 to 30, with an average of 4.7 prior visits.

Table 8. Angler prior visitation to Glen Canyon NRA.

Q: Is this your first trip to Glen Canyon National Recreation Area? (n=279)^a

	Percent
Yes	26.7
No	73.3

Q: If no, how often did you come to this area in the last twelve months? (n=175)^b

Number of times	Percent
1	21.8
2	23.0
3	8.4
4	11.0
5	6.8
6 - 10	14.3
11 - 20	10.1
21 - 30	1.3
More than 30	3.3

^a Missing cases = 2.

^b Missing cases = 32.

Accommodations. To learn the extent to which Lee's Ferry anglers use nearby overnight accommodations, we asked anglers who stayed more than one to indicate the type of accommodations they used. Results are presented in Table 9. Among those who stayed overnight, the largest number of anglers stayed at a motel in the Marble Canyon area (35%), the campground at Lee's Ferry (28%), or upriver campsites (11%). Fewer anglers stayed at the Wahweap Lodge or Campground, with friends or family, in motels in Page, or a variety of other locations.

Table 9. Angler overnight accommodations (n=267).^a

Type of accommodation	Percent
Motel at Marble Canyon, Vermillion Cliffs, Cliff Dwellers	35.4
Campground at Lee's Ferry	28.4
Upriver camps	11.4
Wahweap Campground	1.7
Friend or relative's home	1.2
Motel in Page	0.7
Wahweap Lodge	0.4
Other	20.8

^a Missing cases = 14.

Fishing method. Lee's Ferry anglers are both fly and lure anglers. Forty-five percent of those surveyed used lures only, 27 percent used flies only, and 26 percent used both (Figure 25). In addition there were a small proportion (1%) who were planning to recreate but not fish.

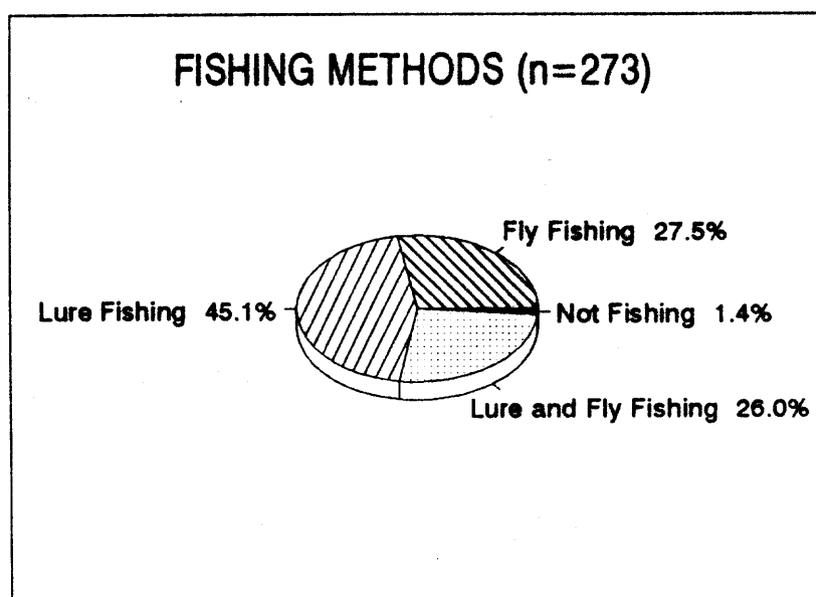


FIGURE 25.

More anglers fishing the Lee's Ferry stretch of the river were fishing primarily from a boat (41%) than were bank fishing (34%), while a number (24%) were doing both (Figure 26).

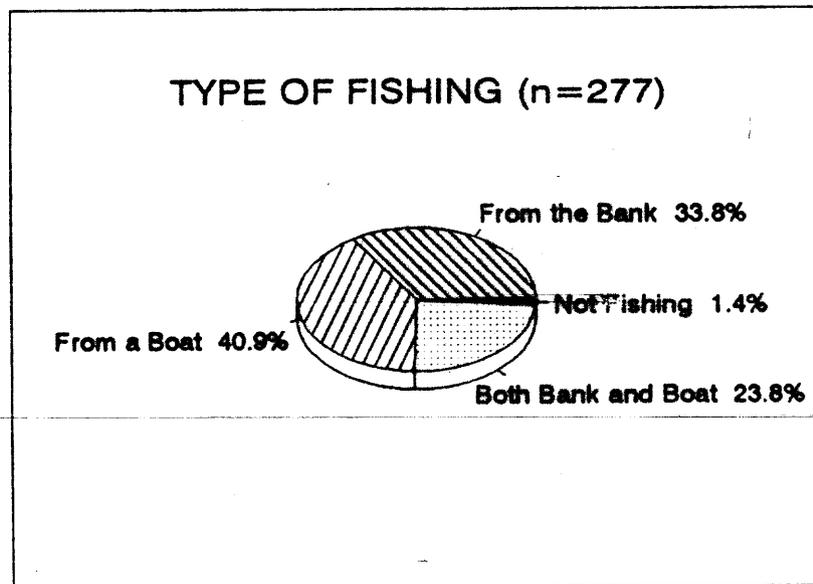


FIGURE 26.

The large majority of anglers were not fishing with a guide (81%) (Figure 27). Fifteen percent of those surveyed were fishing with a guide, 2 percent were guides, and 1 percent were recreating rather than fishing.

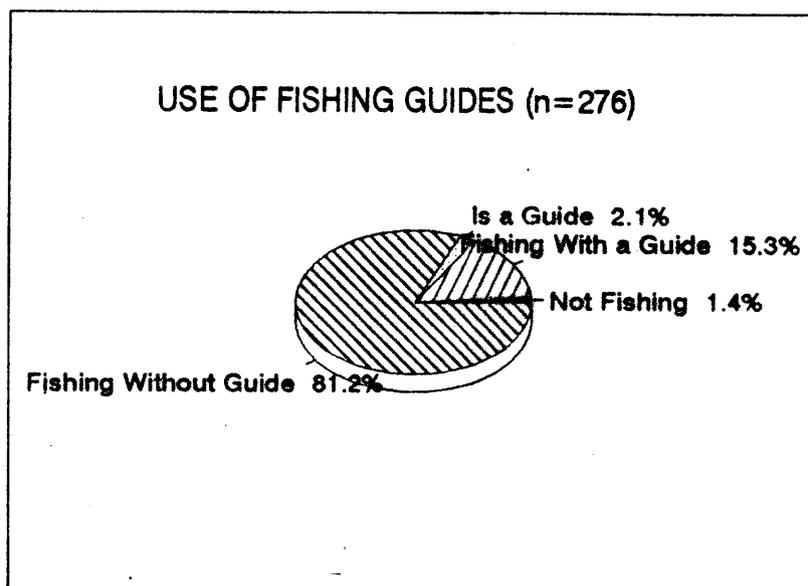


FIGURE 27.

Fishing locations. The survey questionnaire included a map of the Colorado River from Lee's Ferry to the dam (Figure 28). The river was divided into 5 zones and anglers were asked to indicate where they stopped to fish on the river. Results are presented in Table 10. Anglers are fishing multiple locations and the most popular fishing locations are upriver from the boat launch. At least half of the anglers fished in Zone 4 (7.5-mile, Finger Rock to 11-mile, Ferry Swale) (56%), Zone 5 (11-mile, Ferry Swale to Glen Canyon Dam (57%), and Zone 3 (3-mile bar to 7.5-mile Finger Rock) (51%).

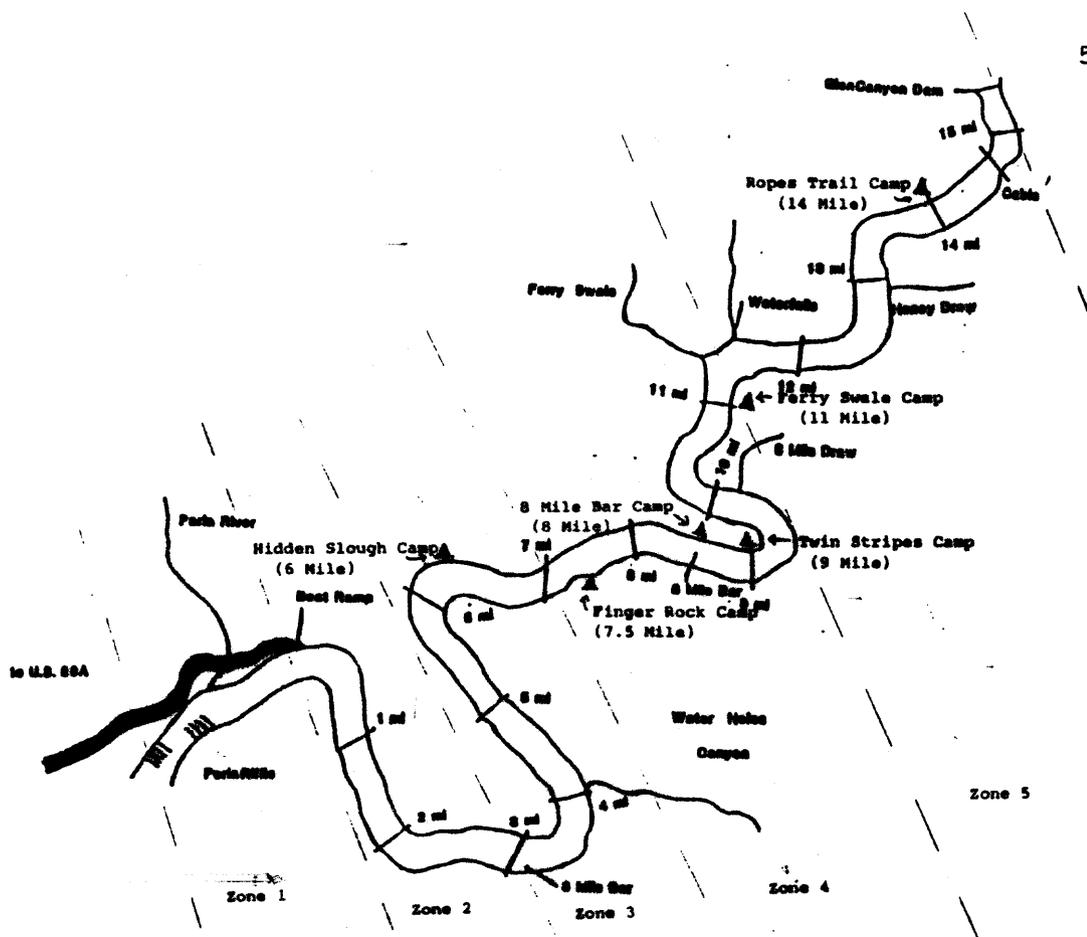


FIGURE 28. ANGLER FISHING ZONES.

Table 10. Fishing locations (n=263).^a

Fishing zone	Percent ^b
Zone 1 (Paria Beach to Lee's Ferry launch ramp)	37.5
Zone 2 (Launch ramp to 3-mile bar)	40.5
Zone 3 (3-mile bar to 7.5-mile, Finger Rock)	51.2
Zone 4 (7.5-mile, Finger Rock to 11-mile, Ferry Swale)	56.5
Zone 5 (11-mile, Ferry Swale to Glen Canyon Dam)	57.0

^a Missing cases = 16.

^b Totals more than 100 percent due to multiple responses.

The popularity of upriver fishing locations is reflected in anglers' first choice for a fishing spot, although preferred locations appear to be fairly evenly distributed along the river (Table 11). Zone 5, from 11-mile, Ferry Swale to the dam, was the first choice for 32 percent of anglers, followed by Zone 4 (25%), and Zone 3 (22%). Zone 1, from Paria Beach to the Lee's Ferry boat launch ramp, was the first choice for 12 percent of anglers, and the least preferred zone was Zone 2, from the launch ramp to 3-mile bar, preferred by 8 percent of anglers.

Table 11. Angler first choice for a fishing site (n=241).^a

First choice zone	Percent
Zone 5 (11-mile, Ferry Swale to Glen Canyon Dam)	32.0
Zone 4 (7.5-mile, Finger Rock to 22-mile, Ferry Swale)	25.3
Zone 3 (3-mile bar to 7.5-mile, Finger Rock)	22.3
Zone 1 (Paria Beach to Lee's Ferry launch ramp)	12.4
Zone 2 (Launch ramp to 3-mile bar)	8.0

^a Missing cases = 40.

While the majority of anglers (68%) were able to fish in their first choice site, those that didn't gave a variety of reasons why (Table 12). Crowded conditions on the river was apparently not a significant factor, with only 9 percent of anglers who said they were unable to fish their first choice spot saying it was because that site was already taken and 6 percent saying the site was too crowded. The most common reason, given by 39 percent of those who gave reasons, was that the site was inaccessible because the water was too high. Other reasons

included inaccessibility because of low water (13%) and a number of others grouped as "other reasons" (32%).

Table 12. Reasons why anglers could not fish their first choice site (n=72).

Reasons	Percent
Inaccessible because of high water	39.2
Inaccessible because of low water	13.5
Already taken	8.7
Too crowded	6.4
Others	32.2

Camping locations. The majority of anglers (86%) said they did not camp overnight on the river. Among those who did, the "Ferry Swale" campground was most popular, with 30 percent of those camping upriver staying at that site (Table 13). "Twin Stripes" and "Hidden Slough" were the next most popular campsites (17 and 18% of anglers, respectively), followed by the "8-Mile Bar" (15%), "Ropes Trail" (13%), and "Finger Rock" (6%) camps.

Table 13. Upriver camping locations (n=37).^a

Camping location	Percent
11-mile, "Ferry Swale"	30.3
6-mile, "Hidden Slough"	18.5
8.5-mile, "Twin Stripes"	17.3
8-mile, "8-Mile Bar"	15.1
13.5 mile, "Ropes Trail"	12.6
7.5-mile, "Finger Rock"	6.3

^a Missing cases = 1.

Rafters

Socio-Demographic Characteristics

Age. Visitors of a variety of ages take raft trips down the Glen Canyon NRA reach of the Colorado River. Those we interviewed ranged in age from 15 to 81 years old and averaged close to 48 years old (Table 14). The largest group of rafters were between 40 and 50 years old (30%), followed by those 31 to 40 years old (19%), and anglers 51 to 60 years old (18%). Six percent of anglers surveyed were older than 70 years old.

Table 14. Rafter ages (n=449).^a

Age (years)	Percent
Less than 20	0.6
20 - 30	10.5
31 - 40	19.5
41 - 50	29.8
51 - 60	18.5
61 - 70	15.4
71+	5.7

Mean age = 47.9 years

^a Missing cases = 9.

Gender. Rafting visitors to Glen Canyon NRA are fairly evenly split between male and female. Among those surveyed, 51 percent were male and 49 percent were female (Figure 29).

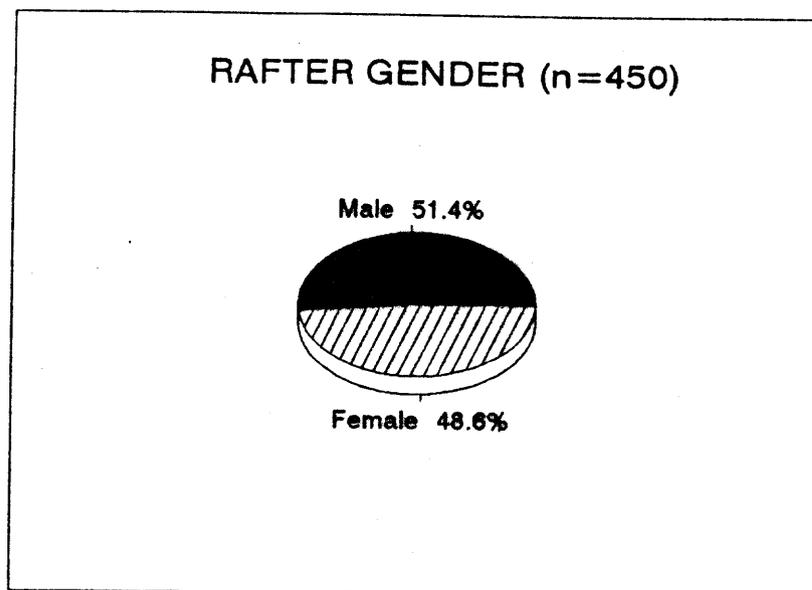


FIGURE 29.

Education. Rafters are well-educated, with close to half (49%) having some college or are college graduates and another one-third (31%) having a graduate or professional degree (Figure 30). Eleven percent had some graduate school work, and only 8 percent had a high school education or less.

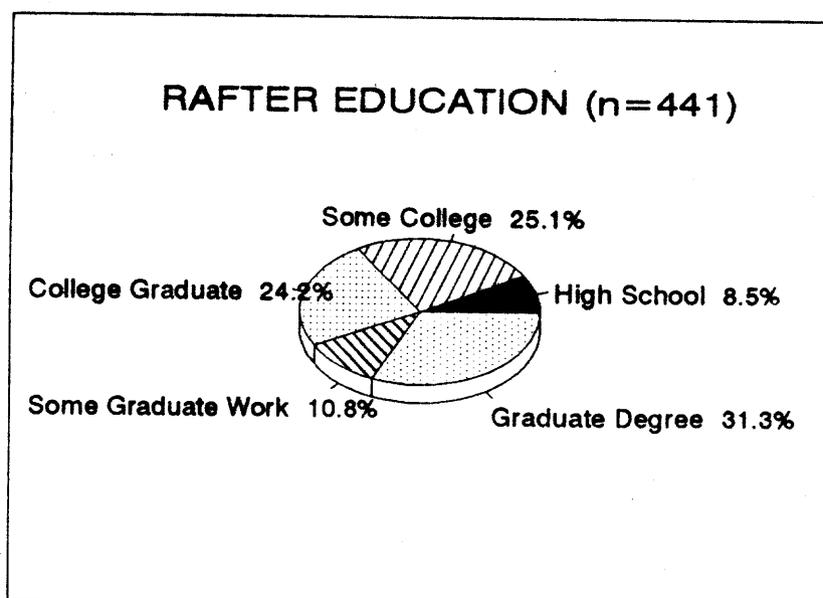


FIGURE 30.

Marital status. Married visitors outnumber unmarried visitors among rafters. Seventy-four percent of those surveyed were married, followed by single, never married visitors (13%), divorced (7%), widowed (3%), and separated (1%) visitors (Figure 31).

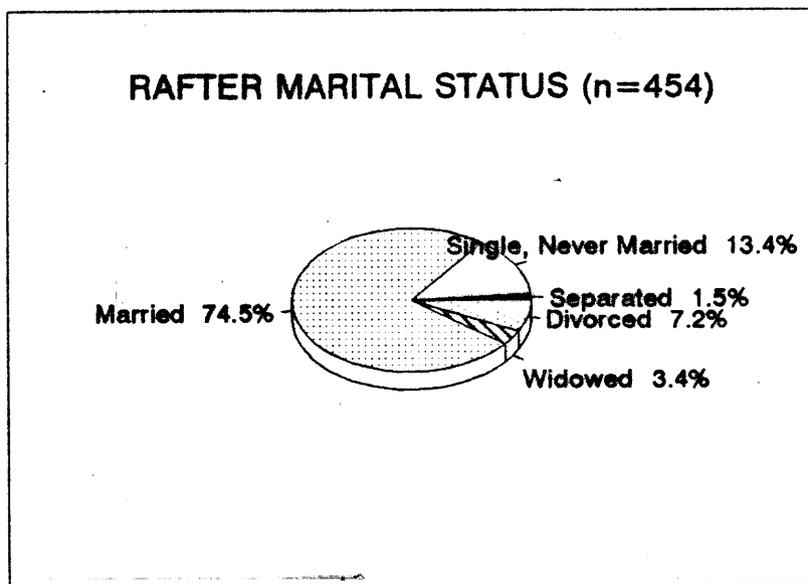


FIGURE 31.

Race or ethnic group. The racial or ethnic composition of Glen Canyon NRA rafters is presented in Figure 32. The large majority of rafters are White (94%), followed by Asian (2%), Hispanic (2%), Black (1%), and American Indian (less than 1%).

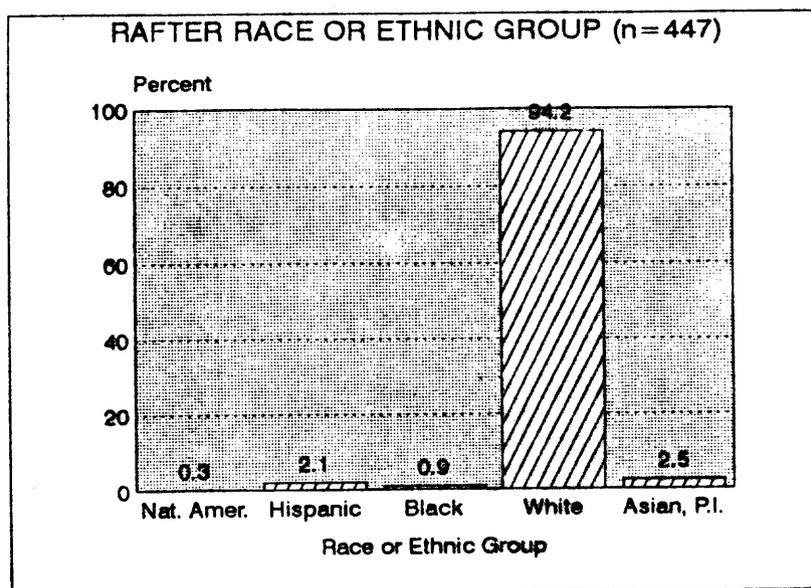


FIGURE 32.

Employment. More than half of Glen Canyon rafters are employed full-time (60%), although retired individuals including those who are not working (14%), those retired but working part-time (6%), and those retired but working full-time (1%), make up a sizeable proportion of rafters (21%) (Table 15). Homemakers make up 6 percent of rafters, as do part-time employees, followed by students (3%), unemployed individuals (1%), and those who classified themselves as some combination of the other classes (2%).

Table 15. Rafter employment status (n=439).^a

Employment status	Percent
Employed full time	59.8
Retired, not working	13.7
Retired but working part-time	5.8
Retired but working full time	1.4
Homemaker	6.3
Employed part-time	6.1
Student	3.5
Unemployed	1.4
Other	2.1

^a Missing cases = 19.

Income. There is substantial wealth distributed among Glen Canyon rafters. Twenty-one percent of rafters reported a yearly household income between \$70,000 and \$100,000 and another 21 percent have an income of \$100,000 or more (Table 16). An additional 43 percent had incomes ranging between \$30,000 and \$70,000 a year and the remaining 15 percent of rafters had household incomes of less than \$30,000 a year.

Table 16. Rafter annual household income (n=417).^a

Income	Percent
\$0 - 9,999	2.4
\$10,000 - 19,999	4.5
\$20,000 - 29,999	7.7
\$30,000 - 39,999	10.7
\$40,000 - 49,999	10.8
\$50,000 - 59,999	11.2
\$60,000 - 69,999	10.4
\$70,000 - 79,999	8.6
\$80,000 - 89,999	7.2
\$90,000 - 99,999	5.2
\$100,000 or more	21.2

^a Missing cases = 41.

State of residence. Rafterers are largely out-of-state residents, coming from throughout the United States. A substantial number come from California (12%) and eastern states such as New York (12%), New Jersey (8%), and Florida (8%) (Table 17). Twelve percent of rafterers are foreign visitors. Relatively few rafterers (6%) live in Arizona.

Table 17. Rafter state of residence (n=455).^a

State	Percent
California	12.2
New York	11.8
New Jersey	7.6
Florida	7.6
Arizona	6.1
Texas	4.5
Connecticut	3.5
Maine	3.4
Pennsylvania	3.0
Ohio	2.5
Illinois	2.5
Georgia	2.4
Virginia	2.1
Michigan	2.1
Maryland	1.9
New Mexico	1.8
North Carolina	1.2
Tennessee	1.1
Wisconsin	1.0
Colorado	0.9
Utah	0.9
Nevada	0.8
South Carolina	0.7
Louisiana	0.7
Indiana	0.7
Washington	0.6
Minnesota	0.6
Alabama	0.5
Oregon	0.5
Alaska	0.4
Delaware	0.4
Oklahoma	0.4
Arkansas	0.3
Iowa	0.2
Kansas	0.2
Kentucky	0.2
New Hampshire	0.2
Vermont	0.2
Foreign	12.2

^a Missing cases = 21.

Use of the River

Trip type. Many of those who take the raft trip at Glen Canyon NRA come as part of a group tour and their visit to Glen Canyon is often part of a larger tour trip itinerary. This is reflected in rafter responses regarding trip type shown in Table 18. The majority of rafters (60%) reported that their visit to Glen Canyon was part of a vacation with a travel plan that included other places. Six percent of rafters said their visit was a vacation specifically to Glen Canyon NRA. Twenty-seven percent of rafters came for a day or several-hour visit and 7 percent were there for a weekend or multi-day outing.

Table 18. Rafter trip type (n=442).^a

Trip type	Percent
Vacation to Glen Canyon NRA as part of travel plan	60.0
Visit for several hours or less than a day	14.6
Day outing	12.4
Weekend or multi-day trip	7.2
Vacation to Glen Canyon NRA	5.6
Work on the river	0.2

^a Missing cases = 16.

Party size. Because of the relatively large number of rafters coming with tour groups, party sizes ranged from visitors travelling by themselves to groups of 40 or more people with an average party size of 7 people (Table 19). The majority of

rafters came in groups of two (50%) and 9 percent came in parties of 20 or more people⁵

Table 19. Rafter party size (n=456).^a

Party size	Percent
1	2.0
2	50.3
3	13.1
4	16.0
5	4.2
6-10	4.1
11-20	1.3
More than 20	9.0

Average party size = 7 persons

^a Missing cases = 2.

Group type. Most rafters come to Glen Canyon NRA with their spouse (32%), their family (27%), or as part of a special interest group (23%) (Table 20). Others come with friendship groups (8%), as multiple family groups (5%), or in groups of family and friends (2%). Relatively few rafters come alone (2%).

⁵ There was some confusion in how this question was asked during the on-site interview. Adjustments were made to compensate for the problem. However, these numbers should be used with some caution, as they may not accurately reflect rafter party sizes.

Table 20. Rafter group type (n=446).^a

Group type	Percent
A couple	31.1
Family	27.1
Special interest group (tour group, etc.)	23.4
Two or more friends together	7.9
Two or more families or relatives together	5.2
Family and friends	2.3
Alone	2.0

^a Missing cases = 12.

First-time visitors. The river rafting trip is their first exposure to Glen Canyon NRA for the large majority of visitors (91%) (Table 21). Nine percent of rafters had previously visited Glen Canyon NRA. Among that group of repeat visitors, 43 percent had visited the area once within the past 12 months, 18 percent had visited twice, and 13 percent had visited three times. Others had visited 4, 5, 7, 8, and 20 times during the past year.

Accommodations. Rafters tend to stay more than one day in the area, taking advantage of overnight lodging at Wahweap, Page, and Grand Canyon National Park. Rafters in the survey most often stayed in accommodations at Grand Canyon (37%), at Wahweap Lodge (27%), or a motel in Page (21%) (Table 22). Fewer stayed in the campgrounds at Wahweap (6%) or Lee's Ferry (less than 1%). The remaining rafters stayed overnight with friends or relatives (less than 1%) or some other accommodations (9%).

Table 21. Rafter prior visitation to Glen Canyon NRA.

Q: Is this your first trip to Glen Canyon National Recreation Area? (n=452)^a

	Percent
Yes	91.2
No	8.8

Q: If no, how often did you come to this area in the last twelve months? (n=22)^b

Number of times	Percent
1	42.9
2	18.3
3	12.7
4	4.5
5	7.7
7	3.9
8	5.0
20	5.0

Missing cases = ^a6, ^b17.

Table 22. Rafter overnight accommodations (n=455).^a

Accommodations	Percent
Accommodations at Grand Canyon N. P.	36.7
Wahweap Lodge	26.7
Motel in Page	20.7
Wahweap Campground	5.7
Friend or relative's home	0.4
Lee's Ferry Campground	0.2
Other	9.5

^a Missing cases = 3.

Summary

Anglers and rafters appear to be two rather distinct user groups who share the same river resource. Anglers tend to be somewhat younger, are primarily male, are well educated, married, White, have fairly high income levels and are employed, although there are a substantial number of retired individuals among them. Most of them live in Arizona and surrounding states. Their trips to Glen Canyon are multi-day or day outings rather than vacations and the majority are repeat visitors to the area. They come with friends or spouses in parties averaging 2 people. Those that stay overnight stay primarily at nearby Marble Canyon or the campground at Lees Ferry. Comparatively few of them fish with a guide, close to half use lures only with the remainder using either flies only or both lures and flies. At least half fish the upriver fishing zones and the zone from 11-mile Ferry Swale to the Dam is the most popular fishing zone.

Day-use rafters are slightly older on average than anglers, they are equally split between males and females, are also well educated, married, White, have even higher income levels, and are largely employed, although this group also includes a notable proportion of retirees. Few rafters live in Arizona, the largest proportions coming from the eastern U.S. and overseas. Their trip to Glen Canyon, the first for almost all rafters, is part of larger vacation plans often as part of longer vacation tours. They also come most often with spouses or friends in groups averaging 7 people. Rafters that stay overnight in the area most often stay at Grand Canyon, Wahweap Marina or a motel in Page.

The River Experience

This portion of the report describes visitor perceptions of perceived crowding, problems they may have encountered during their time on the river, and their evaluation of their overall experience.

Perceived Crowding

We examined perceived crowding from several perspectives. Both anglers and rafters were asked to indicate how crowded they felt the river was overall. Both groups indicated the number of rafts, motorboats, and wading anglers they saw and related their feelings about seeing that particular number of people or boats. In addition, anglers who camped upriver were asked to evaluate crowding at their campsites.

Overall Perceptions of Crowding

Rafters and anglers were asked to indicate how crowded they felt the river was overall using a 9-point scale ranging from 1, not at all crowded, to 9, extremely crowded, with 6 being moderately crowded. An average crowding value was calculated for each group and is presented in Table 23. Neither group perceives the river as being crowded overall, although rafters see it less so than anglers, whose average value corresponds to "slightly crowded."

The crowding scale was collapsed into two categories, "crowded" and "not crowded" using Shelby and Heberlein's (1986) "one-third two-thirds" carrying capacity rule (Table 23). No estimation of whether or not carrying capacity has likely been exceeded can be made for anglers, as fewer than two-thirds felt crowded (58%). The percentage of anglers who felt crowded is high enough, however, to warrant continued monitoring of angler perceptions of crowding to avoid potential problems in the

future. According to rafters, the river is probably below carrying capacity, as fewer than one-third felt crowded (19%).

Table 23. Perceptions of crowding.

	Mean value ^a	Percent who felt crowded ^b
Anglers (n=274) ^c	3.2	58
Rafters (n=450) ^d	2.0	19

^a Based on a 9-point scale where 1 = not at all crowded to 9 = extremely crowded.

^b Using the collapsed crowding scale.

Missing cases = ^c7 and ^d8.

Impacts of Seeing Other Visitors

Both anglers and rafters were asked to estimate the number of other rafts, motorboats, and anglers they saw during a day fishing or during the course of their raft trip. They were then asked to indicate how they felt about seeing the number of rafts, boats, and anglers they saw using a scale ranging from "Would like to have seen a lot more ..." to "far too many ..." and including an "I don't know" category. Responses are shown in Tables 24 to 26.

Anglers and rafters differed in their estimates of the number of rafts seen (Table 24). Anglers said they saw more rafts, an average of 10 rafts in a day versus rafters who said they saw an average of 4 rafts in a day (Table). While both anglers and rafters were largely unaffected by the number of rafts they saw, anglers were more apt to say they saw too many rafts (34%). Few members of either groups said they would like to have seen more rafts.

Table 24. Estimated number of rafts seen and visitor reactions.

Number of rafts seen ^a	Anglers (n=261) ^b	Rafters (n=418) ^c
	- - - - percent - - - -	
0 - 3	9.0	46.8
4 - 6	25.0	38.6
7 - 10	35.4	11.3
11 - 20	28.1	3.0
21+	2.5	0.2
Mean	9.7 rafts	4.3 rafts

Visitor reaction	Anglers (n=274) ^d	Rafters (n=447) ^e
Would like to have seen a lot more rafts	0.3	0.5
Would like to have seen a few more rafts	3.3	3.6
Neither too many nor too few	51.8	81.8
A few too many rafts	22.0	6.9
Far too many rafts	12.4	1.1
I don't know	10.2	6.1

^a Anglers were asked to estimate numbers seen during the course of one day; rafters were asked to estimate numbers seen during their raft trip, either one-half or whole day trips.

Missing cases = ^b20, ^c40, ^d7, ^e11.

Anglers and rafters varied in the number of motorboats they saw during their time on the river (Table 25). Rafters said they saw fewer motorboats overall, with close to 50 percent saying they saw 6 or fewer boats. A majority of anglers said they saw between 7 and 20 motorboats, with an average of 11.5 motorboats. Again, the majority of both groups appear to be unaffected by the number of motorboats they saw, although anglers were less

tolerant. Close to 17 percent saw too boats many compared to rafters where 9 percent saw too many.

Table 25. Estimated number of motorboats seen and visitor reactions.

Number of motorboat seen ^a	Anglers (n=267) ^b	Rafters (n=433) ^c
	- - - - percent - - - -	
0 - 3	15.0	31.8
4 - 6	19.6	37.7
7 - 10	25.5	18.1
11 - 20	29.2	10.5
21+	10.7	1.9
Mean	11.5 boats	6.3 boats

Visitor reaction	Anglers (n=274) ^d	Rafters (n=447) ^e
Would like to have seen a lot more boats	1.3	0.2
Would like to have seen a few more boats	2.3	2.2
Neither too many nor too few	67.0	83.1
A few too many boats	11.8	7.1
Far too many boats	5.5	2.1
I don't know	12.2	5.3

^a Anglers were asked to estimate numbers seen during the course of one day; rafters were asked to estimate numbers seen during their raft trip, either one-half or whole day trips.

Missing cases = ^b14, ^c25, ^d9, ^e14.

Anglers reported seeing an average of 9 bank or wading anglers during the day, while rafters said they saw an average of 5 anglers during their river trip (Table 26). The two groups

were fairly consistent in their feelings toward seeing anglers. Close to three-quarters of both groups were unaffected by the number of anglers they saw. Fourteen percent of anglers and 12 percent of rafters said they would have liked to have seen more anglers. Five percent of anglers said they saw too many anglers, compared to 3 percent of rafters.

Table 26. Estimated number of bank or wading anglers seen and visitor reactions.

Number of bank or wading anglers seen ^a	Anglers (n=269) ^b	Rafters (n=441) ^c
	- - - - percent - - - -	
0 - 3	21.0	45.8
4 - 6	27.8	26.2
7 - 10	22.3	16.7
11 - 20	24.4	9.6
21+	4.5	1.7
Mean	9.1 anglers	5.3 anglers

Visitor reaction	Anglers (n=271) ^d	Rafters (n=435) ^e
Would like to have seen a lot more anglers	5.8	2.7
Would like to have seen a few more anglers	8.5	9.0
Neither too many nor too few	73.3	75.3
A few too many anglers	4.8	2.6
Far too many anglers	0.8	0.9
I don't know	6.7	9.6

^a Anglers were asked to estimate numbers seen during the course of one day; rafters were asked to estimate numbers seen during their raft trip, either one-half or whole day trips.

Missing cases = ^b12, ^c17, ^d10, ^e23.

Crowding at Campsites

Anglers who camped upriver were asked to assess crowding at their campsites. Because relatively few anglers camped upriver overnight (14%), the number of anglers who used any one site was fairly small. Nonetheless, these results provide a general view of crowding at campsites and are presented in Tables 27 and 28.

Crowding at campsites does not seem to be a problem, as the mean crowding scale values for most of the campsites ranged between 1 and 2, representing "not at all crowded" on the scale. The possible exceptions appear to be the "8-mile Bar" campsite which showed a mean crowding value of 3.1, which on the scale reflects "slightly crowded." Again, caution should be taken in interpreting these numbers, given the small sample sizes for each campsite.

Table 27. Perceptions of crowding at upriver campsites.

Campsite	n	Mean value ^a
6-mile, "Hidden Slough"	7	1.8
7.5-mile, "Finger Rock"	2	1.0
8-mile, "8-Mile Bar"	6	3.1
8.5-mile, "Twin Stripes"	7	2.0
11-mile, "Ferry Swale"	11	2.0
13.5-mile, "Ropes Trail"	4	2.2

^a Based on a 9-point scale where 1 = not at all crowded to 9 = extremely crowded.

The numbers of groups of anglers seen at any one campsite ranged from 0 to 4, with one individual saying he/she saw 12 other groups at the "Ferry Swale" campsite (Table 28). Of the anglers who camped there, 18 percent said they saw a few too many people. At "8-mile Bar," the campsite with the highest value on the crowding scale, anglers reported seeing an average of 1.2

other groups. The primary reaction was indifference, although 15 percent said they saw a few too many anglers. Again, the relatively small number of anglers camping at any one site suggests these results should be interpreted with some caution.

Table 28. Estimated number of angler groups seen at campsites and angler reactions.

Campsite	Percent
<u>6-mile, "Hidden Slough"</u>	
Number of angler groups seen (n=6 ^a):	
0	69.3
2	17.2
4	13.5
Mean: 0.88 group	
Angler reactions (n=7):	
Neither too many nor too few	61.1
A few too many people	38.9
<u>7.5-mile, "Finger Rock"</u>	
Number of angler groups seen (n=1 ^b):	
1	100.0
Mean: 1 group	
Angler reactions (n=2):	
Would like to have seen a few more people	65.1
Neither too few nor too many	34.9
<u>8-mile, "8-Mile Bar"</u>	
Number of angler groups seen (n=6):	
0	27.1
1	29.1
2	43.7
Mean: 1.2 groups	
Angler reactions (n=6):	
Neither too many nor too few	85.4
A few too many	14.6

Table 28. Continued.

8.5-mile, "Twin Stripes"

Number of angler groups seen (n=3 ^c):	
1	51.8
4	48.2

Mean: 2.4 groups

Angler reactions (n=7):	
Neither too many nor too few	50.9
A few too many	36.4
Far too many	12.7

11-mile, "Ferry Swale"

Number of angler groups seen (n=10 ^d):	
1	54.6
2	25.5
3	9.9
12	9.9

Mean: 2.5 groups

Angler reactions (n=10 ^e):	
Would like to have seen a few more people	7.8
Neither too many nor too few	59.9
A few too many	17.7
I don't know	14.5

13.5-mile, "Ropes Trail"

Number of angler groups seen (n=3 ^f):	
1	100.0

Mean: 1 group

Angler reaction (n=4):	
Neither too many nor too few	100.0

Missing cases = ^a1, ^b1, ^c4, ^d1, ^e1, ^f1.

Summary

Anglers see the river as being somewhat more crowded than rafters although neither group perceives the river as being crowded overall. Using the "one-thirds two-thirds" rule, the river was probably below carrying capacity, particularly from the rafters' perspective.

There was not a great deal of consistency either within or between the two groups in the number of rafts, motorboats, or anglers seen on the river during the course of a day. Anglers consistently reported seeing more boats and anglers on the river than rafters. Both groups were less tolerant of seeing motorboats than they were about seeing rafts or anglers.

Anglers tended to be less tolerant than rafters of seeing all but other anglers. This is not altogether surprising given the nature of the activities of these two user groups. Fishing may be disrupted and negatively affected by noisy rafters and motorboats. Accordingly, anglers may be more aware of the presence of other users. On the other hand, rafters' floating experience may not be disrupted by the presence of other rafts, boats, or anglers, and they may be less aware and more tolerant of the activities of other river users.

Crowding at angler campsites does not appear to be a problem although the relatively small number of anglers surveyed who camped upriver inhibits the validity of these findings.

Problems Encountered

One of the objectives of the study was to identify any problems that visitors may have encountered on the river during their stay at Glen Canyon NRA. Potential problems included situations caused by the behavior of others such as wakes caused by passing boats, noise, litter, human waste, graffiti, or vessels passing too close. Other problems related to natural and dam-related processes such as water temperature, flow level,

safety, beach erosion, and access to fishing and camping sites. Management-related problems included poorly maintained toilets and difficulty finding parking spaces. Response categories included "encountered but not a problem," "a minor problem," "a serious problem", and "did not encounter." Results are presented separately for anglers and rafters in Tables 29 and 30.

Anglers were by and large not very critical about conditions they encountered on the river (Table 29). The majority of anglers (more than 50%) said they did not encounter the following problems:

- human waste at campsites (51%)
- finding a campsite upriver (57%)
- remains of illegal fires on beach or at campsites (58%)
- boat swamped while tied up on beach (62%)
- damage to raft and/or motor (52%)
- lots of unburned trash in firegrates at campsites (57%)
- graffiti on petroglyph panels (57%)

Items that anglers said they did encounter but a majority said were not a problem include:

- water too clear (84%)
- waiting at boat launch ramp (70%)
- finding a space to park my vehicle/trailer (74%)
- water too cold (69%)
- within sight and sound of wading or bank anglers too often (65%)
- accessing desired fishing spots (61%)
- did not feel safe while wading (60%)
- water too warm (59%)
- litter at fishing spots (52%)
- inability to fish in solitude (52%)
- within sight and sound of boats too often (52%)
- human waste at fishing spots (50%)
- boats running over fishing line (50%)
- people shouting and yelling (50%)

There were a number of issues that at least 40 percent of anglers said were either not a problem or not encountered. These included things such as inconsiderate anglers, rafters, and guides, litter at campsites, noisy motorboats, boats or rafts blocking river channels, water too low and too slow, water too muddy, toilet facilities poorly maintained, too often within

sight and sound of rafts, boat getting beached, and vessels passing too close to one another.

Table 29. Problems encountered by anglers (n=371).

Problem	<u>Did encounter and it was:</u>			
	Not a problem	Minor problem	Serious problem	Did not encounter
	- - - - - percent - - - - -			
Waiting at boat launch ramp ^a	69.7	4.2	0.9	25.2
Finding a space to park my vehicle/ trailer ^b	73.8	11.3	0.6	14.3
Accessing desired fishing spots ^c	61.3	18.7	6.9	13.1
Litter at fishing spots ^d	51.8	25.2	4.1	18.9
Human waste at fishing spots ^e	50.3	8.8	2.4	38.5
Litter at campsite ^f	35.5	16.8	2.8	44.8
Human waste at campsite ^g	36.1	10.6	2.1	51.1
Vegetation damage at fishing and camping location ^h	37.4	15.8	11.6	35.2
Boats running over fishing line ⁱ	49.6	6.5	1.2	42.8
People shouting and yelling ^j	50.5	12.2	3.0	34.3
Inconsiderate anglers ^k	48.3	18.1	1.4	32.1
Wakes created by rafts motoring upriver ^l	33.9	42.5	10.0	13.6
Noisy motorboats ^m	47.6	28.2	6.5	17.6
Finding a campsite upriver ⁿ	33.3	7.0	2.6	57.0
Boats or rafts on the river blocking channels ^o	41.1	17.9	4.0	37.0
Inconsiderate rafters ^p	48.5	12.4	4.7	34.4
Wakes created by passing boats ^q	36.9	45.3	3.9	14.0
Inconsiderate guide ^r	44.0	5.7	1.6	48.7
Water too warm ^s	59.0	1.3	0.9	38.7
Water too low and too slow ^t	42.4	16.9	8.2	32.5

Table 29. Continued.

Problem	Did encounter and it was:			
	Not a problem	Minor problem	Serious problem	Did not encounter
----- percent -----				
Remains of illegal fires on beach or at campsites ^u	30.9	9.3	1.6	58.2
Water too high and too fast ^v	30.3	20.2	27.2	22.4
Water too clear ^w	84.3	4.9	0.5	10.2
Boat swamped while tied up on beach ^x	35.4	1.5	1.2	61.9
Erosion of beaches ^y	23.0	15.3	23.9	37.8
Water too muddy ^z	40.0	10.2	2.5	47.4
Inability to fish in solitude ^{aa}	52.4	21.2	4.5	22.0
Did not feel safe while wading ^{bb}	60.4	9.4	1.9	28.3
Damage to raft and/or motor ^{cc}	51.2	14.0	2.7	52.1
Within sight and sound of boats too often ^{dd}	52.3	20.9	3.0	23.8
Lots of unburned trash in firegrates at campsites ^{ee}	29.3	11.1	2.4	57.2
Within sight and sound wading of bank anglers too often ^{ff}	64.7	9.9	1.2	24.2
Toilet facilities poorly maintained ^{gg}	39.8	16.9	6.1	37.2
Graffiti on petroglyph panels ^{hh}	25.8	11.7	5.8	56.6
Within sight and sound of rafts too often ⁱⁱ	45.9	30.0	7.7	16.4
Water too cold ^{jj}	68.7	14.9	6.4	10.0
Boat getting beached ^{kk}	45.7	6.1	1.5	46.6
Vessels passing too close to one another ^{ll}	41.5	22.5	2.9	33.0

Missing cases = ^a15, ^b13, ^c17, ^d11, ^e14, ^f17, ^g23, ^h17, ⁱ12,
^j13, ^k13, ^l9, ^m10, ⁿ26, ^o14, ^p14, ^q9, ^r17, ^s12, ^t15, ^u20,
^v14, ^w20, ^x18, ^y14, ^z19, ^{aa}16, ^{bb}16, ^{cc}17, ^{dd}17, ^{ee}19,
^{ff}16, ^{gg}16, ^{hh}18, ⁱⁱ16, ^{jj}17, ^{kk}24, ^{ll}20.

There were a several problems that emerged as being of particular concern to anglers, mentioned as either a minor or serious problem by a significant proportion of anglers. These included:

- wakes created by rafts motoring upriver (52%)
- wakes created by passing boats (49%)
- erosion of beaches (39%)
- within sight and sound of rafts too often (38%)
- noisy motorboats (35%)
- vegetation damage at fishing and camping location (27%)
- water too low and too slow (25%)
- vessels passing too close to one another (25%)
- toilet facilities poorly maintained (23%)
- boats or rafts on the river blocking channels (22%)

In addition, litter at campsites and inconsiderate anglers were problems specified by close to 20 percent of anglers.

In summary, issues of concern to anglers appear to focus on the wakes, noise, and congestion caused by boats and rafts on the river. Erosion and vegetation damage were mentioned along with low water levels as natural and dam-related processes and poorly maintained toilets were a management-controlled problem.

Rafters were even less critical than anglers of conditions they encountered during their raft trip (Table 30). For all but nine of the 35 problem items listed, 90 percent or more of rafters said they either did not encounter that condition, or they encountered it and it was not a problem. Because of the large percentage of rafters who indicated that the majority of conditions presented were "not a problem", rafters, may not have clearly distinguished between the response categories "Did encounter and it was not a problem" and "Did not encounter." Thus, for the purposes of this discussion, we will not make a clear distinction between conditions rafters said they did not encounter, and those they said were not a problem. We will focus on items that appear to be potential problems for rafters. There were seven conditions that at least 18 percent of rafters said

were either a minor or serious problem during their river trip. These included:

- toilet facilities poorly maintained (39%)
- graffiti on petroglyph panels (34%)
- water too cold (31%)
- noisy motorboats (23%)
- wakes created by passing boats (18%)
- water too low and too slow (18%)
- human waste at rest stop site (18%)

Rafter use of the river environment is concentrated primarily at the launch site, the rest stop site, and, for rafters on day trips, the lunch stop site. Litter and vegetation damage at the lunch and rest stop sites are not seen as problems although human waste at the rest stop site appears to be a problem along with poorly maintained toilet facilities. The petroglyph panels are located at the rest stop site and rafters see the graffiti on the panels as a problem, a serious problem according to 18 percent of rafters.

Noise and wakes caused by passing boats are also problems for rafters as is low, slow, cold water. The extent to which the problem of low water is tied related to low flow levels is examined in the later section where responses are compared among low, medium, and high flow levels.

Table 30. Problems encountered by rafters (n=458).

Problem	<u>Did encounter and it was:</u>			
	Not a problem	Minor problem	Serious problem	Did not encounter
- - - - - percent - - - - -				
Waiting to launch rafts ^a	79.4	4.9	0.0	16.7
Litter at lunch stop sites ^b	65.6	4.1	0.0	30.3
Vegetation damage at lunch stop site ^c	60.7	8.9	0.5	29.9
Human waste at lunch stop site ^d	54.9	7.4	1.9	35.8
Human waste at rest stop site ^e	50.6	11.8	6.4	31.2
Vegetation damage at rest stop site ^f	63.7	9.6	1.0	25.7
Litter at rest stop site ^g	67.7	5.7	0.5	26.1
Anglers fishing in path ^h of raft ^h	68.5	4.7	0.0	26.8
People shouting and yelling ⁱ	66.5	0.8	0.7	32.0
Inconsiderate anglers ^j	65.0	1.2	0.2	33.6
Water too low and too slow ^k	60.0	14.0	4.1	22.0
Wakes created by passing boats ^l	68.8	16.2	1.4	13.6
Noisy motorboats ^m	59.6	19.3	3.5	17.6
Inconsiderate guide ⁿ	61.4	2.6	0.5	35.6
Vessels passing too close to one another ^o	63.3	4.0	0.7	31.9
Raft stuck on beach ^p	62.9	3.7	0.2	33.1
Water too cold ^q	56.0	24.2	6.9	12.9
Graffiti on petroglyph panels ^r	37.8	16.5	17.8	27.9
Water too warm ^s	48.8	0.3	0.0	51.0
Inconsiderate rafters ^t	51.9	1.3	0.2	46.6
Remains of illegal fires on beach ^u	45.0	2.9	0.3	51.9
Water too high and too fast ^v	50.8	0.4	0.2	48.6
Water too clear ^w	80.0	0.0	0.5	19.3
Raft swamped while tied up on beach ^x	49.8	0.4	0.0	49.8

Table 30. Continued.

Problem	<u>Did encounter and it was:</u>			
	Not a problem	Minor problem	Serious problem	Did not encounter
	----- percent -----			
Erosion of beach at rest site ^y	53.3	9.9	1.8	35.0
Water too muddy ^z	53.0	2.4	0.3	44.4
Erosion of beach at lunch site ^{aa}	51.4	7.1	1.8	39.8
Feeling unsafe on the raft ^{bb}	60.7	1.1	0.5	37.7
Within sight and sound of bank or wading anglers too often ^{cc}	62.4	2.3	0.7	34.6
Wakes created by rafts motoring upriver ^{dd}	64.7	6.6	0.7	27.9
Guide had difficulty landing raft on a beach ^{ee}	60.2	4.0	0.0	35.8
Within sight and sound of other rafts too often ^{ff}	62.3	8.9	1.2	27.6
Damage to raft and/or motor ^{gg}	51.3	3.0	1.8	43.8
Within sights and sounds of boats too often ^{hh}	62.5	7.9	1.6	28.0
Toilet facilities poorly maintained ⁱⁱ	35.9	23.7	15.0	25.4

Missing cases = ^a12, ^b29, ^c33, ^d29, ^e23, ^f23, ^g23, ^h17, ⁱ19,
^j18, ^k17, ^l15, ^m17, ⁿ20, ^o15, ^p17, ^q16, ^r14, ^s21, ^t17, ^u16,
^v16, ^w19, ^x17, ^y18, ^z16, ^{aa}28, ^{bb}16, ^{cc}16, ^{dd}18, ^{ee}15,
^{ff}18, ^{gg}16, ^{hh}19, ⁱⁱ18.

Overall Trip Satisfaction

The perceived problems or lack thereof of anglers and rafters is reflected in their responses to a question about their overall trip satisfaction. Response categories ranged from "very satisfied" to "very dissatisfied," including a "don't know" category and results are presented in Table 31. While both

groups appear largely satisfied with their trips on the river, rafters appear to be more so, with two-thirds of those surveyed being "very satisfied" with their trip compared to 38 percent of anglers. An additional 25 percent of rafters and 41 percent of anglers said they were "satisfied" with their trip. Twelve percent of anglers said they were "dissatisfied" compared to 5 percent of rafters.

Table 31. Overall trip satisfaction.

Satisfaction	Anglers (n=273) ^a	Rafters (n=450) ^b
	- - - - - percent - - - - -	
Very satisfied	37.8	66.9
Satisfied	41.5	25.0
Dissatisfied	12.1	3.1
Very dissatisfied	7.5	4.7
Don't know	1.1	0.3

Missing cases = ^a8, ^b8.

Opinions Toward River Management

Visitors were asked their opinions about a variety of river management strategies, including restricting use, requiring visitors to have camping permits, and closing particular areas on the river. Visitors were also asked whether or not they would be willing to purchase an annual pass to Glen Canyon National Recreation.

Use Restrictions

In an attempt to understand how rafting and angling visitors feel about use restrictions on the river, we asked them to

indicate whether or not they would support restricting use on the river, for a number of different reasons such as to maintain a trophy trout fishery, protect cultural sites, or increase peace and quiet on the river. Results are presented in Tables 32 and 33.

Anglers were in general very supportive of use restrictions for the purpose of maintaining the fishery, protecting cultural sites, reducing impacts, and increasing safety (see Table 32). More than 80 percent of anglers would support use restrictions to preserve food sources for the trout fishery (90%) and to maintain a trophy trout fishery (81%). Somewhat fewer (76%) support use restrictions to preserve native fish. However, close to 50 percent of anglers would not support use restrictions to reduce the number of anglers at fishing sites (49%) or upriver campsites (43%).

Eighty-five percent support restrictions to protect cultural sites and 81 percent support restrictions to reduce human impacts such as litter and human waste. Similarly, 70 percent would support use limits to protect beaches from erosion and increase boating safety. More than half of anglers support restrictions to create a wilderness experience (56%) and improve upriver campsites (54%). Close to that number would be supportive to decrease crowding (48%).

Table 32. Angler support for use restrictions (n=281).

	Would support	Would not support	Don't know
	- - - - - percent - - - - -		
Maintain a trophy trout fishery ^a	80.7	10.4	8.8
Preserve native fish ^b	76.1	13.8	10.2
Preserve food sources for the trout fishery ^c	89.7	4.3	6.0
Protect cultural sites ^d	84.6	6.5	8.9
Improve upriver campsites ^e	54.2	20.8	25.0
Create a wilderness experience ^f	56.3	22.8	20.9
Increase boating safety ^g	70.6	9.0	20.4
Increase peace and quiet ^h	66.9	12.7	20.4
Protect beaches from erosion ⁱ	69.8	15.0	15.2
Reduce human impacts (litter, human waste) ^j	80.6	8.0	11.4
Reduce number of anglers at fishing sites ^k	25.5	48.6	25.8
Reduce number of anglers at campsites ^l	24.4	42.7	32.9
Reduce number of day-use rafters on the river ^m	43.5	29.3	27.2
Decrease crowding ⁿ	48.2	23.6	28.2

Missing cases = ^a10, ^b16, ^c11, ^d9, ^e12, ^f13, ^g12, ^h12, ⁱ8, ^j10, ^k11, ^l14, ^m13, ⁿ13.

Rafters rate protecting cultural sites and reducing human impacts as high priorities with more than 90 percent of rafters supporting use restrictions for these reasons (Table 33). Rafters also support use restrictions to protect beaches from erosion (85%), preserve native fish (83%), increase peace and quiet (76%), create a wilderness experience (72%), increase boating safety (69%), and decrease crowding (59%). They are less supportive of reducing the number of day-use rafters or anglers on the river, with 33 and 27 percent, respectively, saying they would not support use restrictions for those purposes.

Table 33. Rafter support for use restrictions (n=458).

	Would support	Would not support	Don't know
	- - - - - percent - - - - -		
Maintain a trophy trout fishery ^a	33.4	25.3	41.4
Preserve native fish ^b	82.8	3.4	13.8
Preserve food sources for the trout fishery ^c	63.0	10.5	26.6
Protect cultural sites ^d	92.1	1.0	6.9
Improve upriver campsites ^e	37.8	22.9	39.3
Create a wilderness experience ^f	71.9	8.1	20.0
Increase boating safety ^g	69.2	5.5	25.4
Increase peace and quiet ^h	76.3	5.0	18.7
Protect beaches from erosion ⁱ	85.5	5.8	8.7

Table 33. Continued.

	Would support	Would not support	Don't know
- - - - - percent - - - - -			
Reduce human impacts (litter, human waste) ^j	91.4	2.0	6.6
Reduce number of anglers at fishing sites ^k	31.0	27.0	42.0
Reduce number of anglers at campsites ^l	34.5	23.0	42.5
Reduce number of day-use rafters on the river ^m	37.4	32.9	29.8
Decrease crowding ⁿ	58.7	12.5	28.8

Missing cases = ^a29, ^b19, ^c25, ^d20, ^e28, ^f19, ^g31, ^h20, ⁱ22,
^j20, ^k23, ^l26, ^m30, ⁿ31.

It is interesting to note that while rafters are supportive of restrictions to preserve native fish (83%), there is less support for restrictions to preserve food sources for the trout fishery (63%) and maintain a trophy trout fishery (33%). Rafters appear to distinguish between native fish and the trophy trout fishery and are more inclined to support actions to preserve native species. A second explanation may be that rafters may not know or understand what a "trophy trout fishery" is, as evidenced by 41 percent saying they don't know whether they would support use restrictions to maintain that fishery, and so they may feel less inclined to support use restrictions for that purpose.

River Management Actions

In addition to asking visitors willingness to support use restrictions, we asked anglers and rafters to comment on other river management actions such as requiring permits to camp upriver or closing fishing or cultural sites. Response categories included "favor," "do not favor but would accept," "would not accept" and "no opinion." Results are presented separately for anglers and rafters in Tables 34 and 35.

River management strategies favored by anglers include restricting the number of rafters per day (50%), implementing a permit system for upriver camping (46%), closing stressed fishing areas (41%), and restricting the use of campfires (40%) (Table 34). Actions that anglers generally would not accept include restricting the number of bank anglers per day (46%) and requiring all boats to have "porta-potties" to carry out human waste (33%). They also were reluctant to restrict the number of motorboats on the river (27% not accepting), limit party sizes (27% not accepting), close certain beaches (24% not accepting), and close stressed fishing areas (21% not accepting).

The remaining restrictions such as requiring upriver campers to carry out fire ash, closing certain archeological sites, and restricting the number of rafters per day were either favored or at least accepted by a majority of anglers.

Table 34. Angler opinions toward specific river management actions (n=281).

Management actions	Favor	Do not favor but would accept	Would not accept	No opinion
	- - - - - percent - - - - -			
Require all boats to have a "portapotty" to carry out human waste ^a	26.2	32.6	33.1	8.2
Implement a permit system for upriver camping ^b	45.1	29.8	14.7	9.4
Limit party sizes ^c	32.9	30.4	26.7	10.1
Require upriver campers to carry out fire ash ^d	33.1	33.6	18.4	14.8
Restrict use of campfires ^e	40.4	32.5	16.2	10.9
Close stressed fishing areas ^f	41.4	29.5	20.9	8.1
Close certain beaches ^g	24.8	37.2	24.1	13.8
Close certain archeological sites ^h	30.2	35.2	19.9	14.6
Restrict number of motorboats per day ⁱ	32.7	33.6	27.2	6.4
Restrict number of bank anglers per day ^j	18.2	28.7	46.0	7.0
Restrict number of rafters per day ^k	49.8	23.6	14.9	11.7

Missing cases = ^a10, ^b7, ^c8, ^d11, ^e9, ^f12, ^g11, ^h9, ⁱ7, ^j9, ^k10.

Rafters are supportive of virtually all the management actions presented. At least 50 percent of rafters favored all but four of the 11 river management actions. They are obviously concerned about the fishery, with 75 percent in favor of closing stressed fishing areas. Like the anglers, they also favor implementing a permit system for upriver camping (72%), restricting use of campfires (62%), and restricting the number of rafters per day (52%). However, unlike anglers, rafters favor restricting the number of motorboats per day on the river (66%), and requiring all boats to carry "porta-potties."

There were no actions that a substantial number of rafters would not accept. The least favored action would be to close certain archeological sites, with 19 percent not accepting that action. Rafters seem to be particularly tolerant of management actions, much more so than anglers.

Table 35. Rafter opinions toward specific river management actions (n=458).

Management actions	Favor	Do not favor but would accept	Would not accept	No opinion	----- percent -----				
Require all boats to have a "porta-potty" to carry out human waste ^a	55.2	23.3	8.4	13.1					
Implement a permit system for upriver camping ^b	72.4	11.9	3.0	12.7					
Limit party sizes ^c	58.1	20.9	8.3	12.8					
Require upriver campers to carry out fire ash ^d	48.7	20.1	12.0	19.2					
Restrict use of campfires ^e	62.2	21.3	5.4	11.1					

Table 35. Continued.

Management actions	Favor	Do not favor but would accept	Would not accept	No opinion
	----- percent -----			
Close stressed fishing areas ^f	75.5	9.0	3.5	11.9
Close certain beaches ^g	47.6	25.8	8.7	17.9
Close certain archeological sites ^h	43.1	25.8	19.0	12.1
Restrict number of motorboats per day ⁱ	65.9	19.3	5.1	9.7
Restrict number of bank anglers per day ^j	46.0	28.1	10.4	15.5
Restrict number of rafters per day ^k	51.7	29.3	7.9	11.2

Missing cases = ^a21, ^b21, ^c21, ^d22, ^e24, ^f22, ^g28, ^h22, ⁱ18, ^j19, ^k22.

Willingness to Pay a User Fee

We asked visitors if they would be willing to pay \$15.00 to buy an annual pass to Glen Canyon National Recreation and if they would not pay, to indicate why not. As shown in Table 36, anglers and rafters differ in both their willingness to buy an annual pass and their reasons for not wanting to do so.

Table 36. User willingness to pay a user fee.

Willing to pay \$15.00 to buy an annual pass to Glen Canyon NRA?	Anglers (n=267) ^a	Rafters (n=440) ^b
	- - - - percent - - - -	
Yes	51.6	22.0
No	48.4	78.0
If no, why not?		
Don't use park enough to justify buying a pass	57.2	95.3
There are too many other places to go that are cheaper	3.4	0.3
Can't afford that much	0.6	--
It is unfair to ask money to enter a public place	38.7	4.4

Missing cases = ^a14, ^b18.

Anglers are fairly evenly divided on their willingness to pay a user fee, with 52 percent willing to pay and 48 percent saying no. The main reasons given for not paying a user fee were that they don't use the park enough to justify buying a pass (57%) and that it is unfair to ask money to enter a public place (39%).

Rafters are even less willing to purchase an annual pass to Glen Canyon NRA, with 78 percent saying no. The reason given by 95 percent of rafters was that they don't use the park often enough to justify buying a pass.

Summary

Figure 33 presents a summary of angler and rafter support of use restrictions to achieve various goals. Both anglers and

rafters generally supported use restrictions designed to maintain the fishery, protect cultural sites, reduce impacts, and increase safety. Anglers were less supportive of use restrictions to reduce the number of anglers on the river. However, close to half favor implementing an upriver camping permit system.

	<u>Anglers</u>	<u>Rafters</u>
Maintain a trophy trout fishery	S+	U
Preserve native fish	S+	S+
Preserve food sources for the trout fishery	S+	S+
Protect cultural sites	S+	S+
Create a wilderness experience	S+	S+
Increase peace and quiet	S+	S+
Improve upriver campsites	S+	U
Protect beaches from erosion	S+	S+
Reduce human impacts	S+	S+
Increase boating safety	S+	S+
Decrease crowding	S	S+
Reduce number of anglers at fishing sites	O	U
Reduce number of anglers at campsites	O	U
Reduce number of day-use rafters on the river	S	S

S+	Majority Support	O+	Majority Would Not Support
S	More Support than Opposition	O	More Opposition Than Support
U	Uncertain (don't know)		

FIGURE 33. USE RESTRICTION MATRIX

Rafters give high priority to protection cultural sites, preserving native fish, and reducing human impacts and would support use restrictions for these purposes. They are also

supportive of use restrictions to preserve native fish, prevent beach erosion, increase peace and quiet and increase safety. The majority of rafters favor a number of river management activities that would help preserve the fishery, reduce physical impacts, and provide a quieter, safer experience on the river.

Anglers and rafters differed somewhat in their support of specific river management actions, as summarized in Figure 34. There was overwhelming support among rafters for all the management actions listed including those that would affect them most directly such as closing certain archeological sites and restricting the number of rafters on the river. Anglers were more selective of management actions they would support. They generally favored implementing an upriver camping permit system, limiting party sizes, restricting the use of campfires, closing stressed fishing areas, and restricting the number of day use rafters on the river. They opposed restricting the number of bank anglers per day and were divided in their support of requiring all boats to carry "porta-potties."

Neither group overwhelmingly supported having to pay a user fee. Anglers were evenly split but three-quarters of rafters said no. The primary reason given by both groups was that they did not use the park enough to justify buying a pass. This is particularly true of rafters who are primarily first-time visitors.

	<u>Anglers</u>	<u>Rafters</u>
Require all boats to have a "portapotty" to carry out human waste	Div	F+
Require upriver campers to carry out fire ash	(S)	F
Restrict use of campfires	F	F+
Implement a permit system for upriver camping	F	F+
Close stressed fishing areas	F	F+
Close certain beaches	A	F+
Close certain archeological sites	A	F
Limit party sizes	F	F+
Restrict number of motorboats per day	(S)	F+
Restrict number of bank anglers per day	O	F
Restrict number of rafters per day	F+	F+

F+	Majority Favor	O+	Majority Would Not Accept
F	More Favor than Accept or Do Not Accept	O	More Would Not Accept than Favor or Accept
A	More Accept than Favor or Not Accept	Div	Divided
(S)	Probable Support		

FIGURE 34. RIVER MANAGEMENT ACTION SUPPORT MATRIX.

Effects of River Flow Level on Visitor Experiences

A primary objective of this research was to examine what, if any, effect river flow levels have on recreation experiences, particularly visitor perceptions of crowding and problems they may have encountered during their time on the river.

Both anglers and rafters were contacted during each of the three research flow levels: low (5,000 cfs), medium (15,000 cfs), and high, fluctuating flows (10,000-30,000 cfs). Survey data were then weighted to compensate for unequal samples sizes

to provide an equal representation of visitors for all three flow levels.

Results of flow level comparisons are presented in four parts. The first section describes selected angler and rafter use characteristics such as proportions of first time visitors and type of fishing. Differences in perceptions of crowding and overall satisfaction among among the three flow levels is presented in the second section, followed by a discussion of problems that may be related to flow level. The fourth section describes angler perceptions of the impact of flow on fishing quality.

Use Characteristics

First visit. There appears to be a relationship between flow level and angler repeat visitation (Table 37). There were more repeat visitors among medium flow anglers (81%) than anglers contacted at low (72%) or high fluctuating (66%) flows. This relationship does not, however, hold true for rafters. Ninety percent or more of rafters contacted during all three flows were first time visitors.

Fishing methods. Flow level influences the type of anglers using the river. Lure anglers appear to be fairly evenly distributed among flow levels, making up 43-49 percent of anglers at all three flows (Table 38). In contrast, fly anglers are most often found fishing medium and, to a lesser extent, low flows (39% and 26%, respectively). There were comparatively fewer fly anglers among those fishing high fluctuating flows (19%). Anglers using both lures and flies were found equally at low and high flows (31% and 32%, respectively), and less often during medium flow levels (16%).

Table 37. Proportion of first time visitors by river flow levels.

First time visitors	Flow level			Chi-square statistic
	Low	Medium	High	
	----- percent -----			
Anglers ^b	27.7	18.5	33.7	7.18 ^a
Rafters ^c	90.5	90.3	93.0	1.00

^a Significant at $p \leq .05$.

^b $n = 65$ (low flow), 119 (medium flow) and 95 (high flow).

^c $n = 147$ (low flow), 134 (medium flow) and 171 (high flow).

Table 38. Type of fishing by flow levels.

Type of fishing	Flow level		
	Low (n=62)	Medium (n=112)	High (n=94)
	----- percent -----		
Fly fishing	25.8	39.3	19.1
Lure fishing	43.5	44.6	48.9
Both lure and fly fishing	30.6	16.1	31.9

$X^2 = 13.9$ $p \leq 0.01$.

The contrast between the presence of bank and/or boat anglers among the flow levels was less marked, although the differences were significant (Table 39). Low flow anglers were fairly equally divided among bank only fishing (32%), boat only (37%), and those who did both (31%). Fewer anglers did both bank and boat angling during medium flows (17%) but were similar in their use of bank only (43%) and boat only (40%) fishing. There were fewer bank only anglers during high fluctuating flows (28%), almost half of high flow anglers were boat only anglers (47%) and close to one-quarter (24%) used both.

Comparatively few anglers fish with guides (15% of anglers contacted) and those that do are most often found at low water. Twenty-five percent of low flow anglers fished with a guide versus 10 and 12 percent, respectively at medium and high fluctuating flows (Table 40).

Table 39. Angler primary fishing method by flow levels.

Fishing from:	Flow level		
	Low (n=65)	Medium (n=112)	High (n=95)
	----- percent -----		
Bank	32.3	42.9	28.4
Boat	36.9	40.2	47.4
Both bank and boat	30.8	17.0	24.2

$X^2 = 10.0$ $p \leq 0.05.$

Table 40. Angler fishing with a guide by flow levels.

Fished with a guide	Flow level		
	Low (n=65)	Medium (n=107)	High (n=92)
	----- percent -----		
Yes	24.6	10.3	12.0
No	75.4	89.7	88.0

$X^2 = 10.8$ $p \leq .01$.

Fishing zones. Anglers' choices of places to fish did not vary significantly among the three flow levels with the exception of Zone 5, 11-mile from Ferry Swale to Glen Canyon Dam (Table 41). Zone 5 is a popular fishing area with 57 percent of all anglers fishing within that zone. Use of the zone varied among the flow levels. Sixty-five percent of low flow anglers fished in Zone 5 and 44 percent of them said Zone 5 was their first choice fishing spot (Table 42). Forty-eight of medium flow anglers and 58 percent of high fluctuating flow anglers also fished Zone 5.

Table 41. Angler fishing zones by flow levels.

Fishing zone	Flow level			Chi-square statistic
	Low (n=65)	Medium (n=121)	High (n=95)	
	----- percent -----			
Zone 1	34.9	42.7	35.2	1.9
Zone 2	34.9	40.5	46.1	3.0
Zone 3	47.6	47.7	58.2	3.4
Zone 4	57.1	52.7	59.3	1.0
Zone 5	64.5	48.1	57.8	6.2 ^a

^a Significant at $p \leq .05$.

Table 42. Angler first choice fishing zones by flow levels.

First choice:	Flow level		
	Low (n=57)	Medium (n=99)	High (n=85)
	----- percent -----		
Zone 1	10.5	15.1	11.8
Zone 2	5.3	8.1	10.6
Zone 3	14.0	27.3	25.9
Zone 4	26.3	22.2	27.1
Zone 5	43.9	27.3	24.7

$X^2 = 15.5^a$ $p \leq .05$

^a 14% of data are missing.

A large proportion of low flow anglers also fished Zone 4, 7.5-mile from Finger Rock to Ferry Swale (57%), and Zone 3, 3-mile Bar to 7.5-mile Finger Rock (48%), with fewer fishing Zones 1 and 2 (35 percent in each zone).

Medium flow anglers most often fished Zone 4 (53%), Zone 5 (48%), and Zone 3 (48%). Zones 3 and 5 were their first choice fishing locations. More than half of high flow anglers fished Zone 4 (59%), Zone 5 (58%), and Zone 3 (58%). Zones 4, 3, and 5 were their first choices. Close to half of high flow anglers (46%) fish Zone 2, Launch Ramp to 3-mile Bar, a higher proportion than medium and low flow anglers. Eleven percent of high flow anglers said Zone 2 was their first choice.

Medium flow anglers were most likely to fish their first choice fishing site (75%), although close to two-thirds of high fluctuating (65%) and low (64%) flow anglers also were able to fish their first choice (Table 43). Flow level does not appear to significantly affect anglers being able to fish preferred sites. Among reasons given for not fishing first choice sites, as expected, more low flow anglers said inaccessibility due to low water than medium and high flow anglers (10% vs. 1% and 2%, respectively). Similarly, 18 percent of high fluctuating flow anglers didn't fish their first choice spot because of inaccessibility due to high water compared to medium (9%) and low (10%) flow anglers.

Table 43. Angler ability to fish first choice sites by flow levels.

Why not first choice:	Flow level		
	Low (n=50)	Medium (n=101)	High (n=82)
	----- percent -----		
Already taken	4.0	2.0	2.4
Too crowded	2.0	3.0	1.2
Inaccessible due to high water	10.0	8.9	18.3
Inaccessible due to low water	10.0	1.0	2.4
Other	10.0	9.9	11.0
Able to fish first choice site	64.0	75.2	64.6

$X^2 = 17.5$ $p \leq .06.$

In summary, there is some evidence that suggests that anglers prefer medium flow levels, particularly fly fishing anglers. The highest proportion of repeat anglers were found at medium flow levels, suggesting that experienced anglers who return to the area prefer medium flows. There were more bank fishing anglers at medium flows, the fewest during high flow levels. Boat anglers were more likely to fish high or medium flows.

Flow level doesn't appear to significantly affect anglers choice of fishing zones nor their ability to fish preferred sites although low and high flow anglers were more likely than medium flow anglers to mention problems accessing preferred sites.

Crowding and Visitor Satisfaction

There does not appear to be a strong relationship between angler and rafter overall satisfaction and river flow levels (Table 44). Slightly fewer anglers fishing low flows reported being satisfied or very satisfied (77%) than those fishing at medium (80%) or high fluctuating (81%) flows, although the differences were not significantly different. More high fluctuating flow anglers reported being very dissatisfied (12%) than did medium (4%) or low (6%) anglers. This may be due in part to the fact that anglers fishing during the high fluctuating flow periods may have experienced more drastic and sudden changes in river levels than anglers fishing at low or medium flows.

Table 44. Angler overall satisfaction by flow levels.

Satisfaction	Flow level		
	Low (n=64)	Medium (n=114)	High (n=95)
	----- percent -----		
Very satisfied	34.4	41.2	37.9
Satisfied	46.9	38.6	39.0
Dissatisfied	10.9	14.0	11.6
Very dissatisfied	6.2	4.4	11.6
Don't know	1.6	1.7	--

$X^2 = 8.9$ $p \leq .04$.

Rafters showed similar results although in general, they were more satisfied than anglers (Table 45). Ninety percent or more of rafters at low (92%), medium (90%), and high fluctuating (93%) flows were either satisfied or very satisfied with their

trip. In contrast to anglers, fewer high fluctuating flow rafters (3%) were very dissatisfied compared to medium (5%) and low (6%) flow anglers.

Table 45. Rafter overall satisfaction by flow levels.

Satisfaction	Flow level		
	Low (n=144)	Medium (n=134)	High (n=172)
	----- percent -----		
Very satisfied	65.3	70.9	64.5
Satisfied	27.1	19.4	28.5
Dissatisfied	2.1	3.7	3.5
Very dissatisfied	5.6	5.2	3.5
Don't know	--	0.7	--

$X^2 = 8.2$ $p \leq .04$.

Flow level does not appear to influence anglers' and rafters' perceptions of overall crowding on the river. While anglers reported higher crowding scores overall, significant differences were not found among mean crowding scores compared among flow levels (Table 46). Medium flow anglers reported the highest crowding mean (3.5 or slightly crowded) and high fluctuating flow anglers the lowest (3.3). Rafters were very consistent in their perceptions of crowding, with scores at all three flow levels averaging 2.0 or not at all crowded.

Table 46. Crowding means^a by flow level.

Group	Flow level			ANOVA F-test	Tukey Post Hoc ^d
	Low	Medium	High		
Anglers ^b	3.3	3.5	2.8	3.32 (p=.04)	n.s.
Rafters ^c	2.0	1.9	1.9	0.37 (p=.69)	n.s.

^a Based on a crowding scale where 1 = not at all crowding and 9 = extremely crowded.

^b Number of cases by flow: low=62; medium=120; high=92.

^c Number of cases by flow: low=146; medium=133; high=171.

^d Significant at .05 level.

How anglers and rafters feel about seeing others on the river during their visit varies and depends primarily on the type of use occurring. For example, flow level did not significantly effect how anglers felt about the number of rafts they saw (Table 47). Between 46 and 58 percent of anglers at all three flow levels said they saw neither too few nor too many rafters and between 27 and 33 percent saw too many. Fewer low flow anglers (27%) saw too many than did medium (38%) or high fluctuating (38%) flow anglers.

Table 47. Angler feelings about the number of rafts seen, by flow levels.

	Flow level		
	Low (n=62)	Medium (n=117)	High (n=95)
	----- percent -----		
Saw too few	4.8	1.7	4.2
Neither too many nor too few	58.1	51.3	46.3
Saw too many	27.4	37.6	37.9
Don't know	10.0	9.4	11.6
$X^2 = 6.1 \quad p \leq 0.4$			
Average number of rafts seen: ^a	9.3	9.2	10.8

^a $F = 2.00, p = .138$

Differences in opinions among rafters about the numbers of rafts they saw were more pronounced (Table 48). The number of rafts seen by rafters at low, medium, and high fluctuating flow levels ranged from 3.9 (medium flow rafters) to 4.8 (low flow rafters). While at least 80 percent of low, medium, and high fluctuating flow rafters said they saw neither too many nor too few rafts, 10 percent of low and high fluctuating flow rafters said they saw too many rafters compared to only 4 percent of medium flow rafters.

Table 48. Rafter feelings about the number of rafts seen, by flow levels.

	Flow level		
	Low (n=146)	Medium (n=130)	High (n=171)
	----- percent -----		
Saw too few	1.4	6.1	4.7
Neither too many nor too few	82.2	80.8	82.5
Saw too many	10.3	3.8	9.9
Don't know	6.2	9.2	2.9
$\chi^2 = 16.1 \quad p \leq 0.05.$			
Average number of rafts seen: ^a	4.8	3.9	4.3

^a $F = 2.96, p \leq 0.05.$

How anglers and rafters at low, medium, and high fluctuating flow levels feel about the number of motorboats they saw is shown in Tables 49 and 50. There were significant differences in opinion among anglers at the three flow levels but not among rafters.

Medium flow anglers reported seeing significantly more motorboats and were more negative in their evaluations of those numbers than high fluctuating or low flow anglers. High fluctuating flow anglers were least likely to see too many boaters compared to medium and high flow anglers, and at least 62 percent of anglers at all three flow levels saw neither too many nor too few (Table 49).

Table 49. Angler feelings about the number of motorboats seen, by flow levels.

	Flow level		
	Low (n=64)	Medium (n=115)	High (n=93)
	----- percent -----		
Saw too few	3.1	1.0	6.4
Neither too many nor too few	67.2	61.7	72.0
Saw too many	14.1	29.6	8.6
Don't know	15.6	7.8	12.9
$X^2 = 25.1 \quad p \leq 0.01$			
Average number of motorboats seen: ^a	11.3	15.4	7.7

^a $F = 14.59, p \leq 0.001.$

Tukey Studentized Range Test ($p = .05$) = medium > high, low.

Rafters at all flow levels were less disturbed than anglers by the number of boats they saw (Table 50). While medium flow rafters reported seeing significantly more boats than low or high fluctuating flow rafters, their evaluations of the number of motorboats seen did not vary significantly by flow. Eighty-two to 86 percent of all three groups saw neither too few nor too many. Between 8 and 11 percent of low, medium, and high fluctuating flow rafters saw too many boats.

Table 50. Rafter feelings about the number of motorboats seen, by flow levels.

	Flow level		
	Low (n=147)	Medium (n=133)	High (n=164)
	----- percent -----		
Saw too few	2.7	1.5	3.0
Neither too many nor too few	85.7	82.0	81.7
Saw too many	8.2	11.3	7.9
Don't know	3.4	5.3	7.3
$X^2 = 4.9 \quad p \leq 0.6.$			
Average number of motorboats seen: ^a	6.6	8.2	4.1

^a $F = 23.67, p \leq 0.001.$

Tukey Studentized Range Test ($p = .05$) = medium > high, low and low > high.

As might be expected, anglers were more tolerant of seeing other anglers than they were of seeing boats or rafts but their responses differed significantly among flow levels (Table 51). Low and medium flow anglers reported seeing more bank or wading anglers than high fluctuating flow anglers (an average of 11 or 12 vs. 5). Low flow anglers were largely satisfied with the numbers they saw (82%) with relatively few seeing too many (3%) and some wanting to see more (9%). Medium flow anglers were also largely satisfied (76% saw neither too few nor too many) but 9 percent saw too many and 9 percent wanted to see more. High fluctuating flow anglers were in general satisfied (62% saw neither too few nor too many) but almost a quarter (24%) wanted to see more anglers on the river.

Table 51. Angler feelings about the number of bank or wading anglers seen, by flow levels.

	Flow level		
	Low (n=64)	Medium (n=117)	High (n=90)
	----- percent -----		
Saw too few	9.4	9.4	24.4
Neither too many nor too few	81.2	76.1	62.2
Saw too many	3.1	9.4	4.4
Don't know	6.2	5.1	8.9
$\chi^2 = 21.1 \quad p \leq 0.01$			
Average number of anglers seen: ^a	11.0	12.2	5.3

^a $F = 18.76, p \leq 0.001.$

Tukey Studentized Range Test ($p = .05$) = medium, low > high.

Rafters at different flow levels, on the other hand, reported seeing significantly different numbers of anglers but showed no significant relationship between flow levels and feelings toward the numbers of anglers they saw (Table 52). Low and medium flow rafters reported seeing an average of 7 bank or wading anglers compared to an average of 2 anglers reported by high fluctuating flow anglers. Eighty, 76 and 70 percent of low, medium, and high fluctuating flow rafters, respectively, were satisfied with the numbers of bank or wading anglers they saw. Relatively few rafters saw too many anglers (between 2 and 4 percent at each flow level) and 9, 12, and 13 percent of low, medium, and high fluctuating flow rafters, respectively, would like to have seen more bank or wading anglers.

Table 52. Rafter feelings about the number of bank or wading anglers seen, by flow levels.

	Flow level		
	Low (n=143)	Medium (n=131)	High (n=161)
	----- percent -----		
Saw too few	9.1	12.2	13.4
Neither too many nor too few	80.4	75.6	69.6
Saw too many	4.2	3.8	2.5
Don't know	6.3	8.4	14.3
$X^2 = 9.4 \quad p \leq 0.2.$			
Average number of anglers seen: ^a	7.1	6.9	2.0

^a $F = 44.55, p \leq 0.001.$

Tukey Studentized Range Test ($p = .05$) = low, medium > high.

How flow level affected angler and rafter feelings about seeing other varies depending on the type of user seen. For example, flow level does not appear to affect how anglers feel about the number of rafts they see. It may, however, affect how they feel about seeing rafts and other anglers. Medium flow anglers more often reported seeing too many motorboats and too many other anglers than high fluctuating or low flow anglers. If these medium flow anglers are repeat anglers who may have experience on the river, they may be more critical in their desires to see motorboats as well as other anglers.

Rafters' feelings about seeing other types of users did not vary as significantly by flow level. While rafters at different flow levels reported seeing significantly different numbers of

boats and anglers on the river, their reactions to seeing them was not significantly different among the three flows.

Problems Encountered

The purpose of this portion of the analysis was to identify specific problems encountered by angler and rafter visitors that may be expressly related to river flow level. To make comparison of responses among the three flow levels easier, we reduced the problem response categories from four to three, combining the "minor problem" and "serious problem" categories into a single "problem" category.

A discussion and tabular presentation of problems encountered by anglers and rafters in general is presented in an earlier section. Rather than reproduce each of those tables again breaking out anglers and rafters by the three flow levels, this discussion focuses only on those issues where the chi-square statistic showed a significant relationship between flow level and a particular issue. Angler and rafter evaluations for the majority of the problem-related issues showed no statistically significant relationship to river flow levels. While it may be argued that knowing which problems are not related to river level is also important, we feel that given the objectives of the study, the value lies in identifying problems that appear to be related to flow levels.

According to anglers, the most significant association between flow level and problems has to do with water depth, water velocity, and safety. As might be expected, low flow anglers were more likely than medium or high fluctuating flow anglers to say that low, slow water was a problem (45% vs. 13% and 16%, respectively) (Table 53). Conversely, two-thirds of high fluctuating flow anglers mentioned too high and too fast water as a problem, as did 49 percent of medium and 25 percent of low flow anglers.

Table 53. Problems significantly^a related to river flow levels encountered by anglers

Problems	Flow level			X ² statistic
	Low (n=65)	Medium (n=121)	High (n=95)	
	----- percent ^b -----			
Water too low and too slow	45.3	12.8	16.1	44.0 ^c
Water too high and too fast	25.4	49.1	67.0	59.1 ^c
Did not feel safe while fishing	3.1	18.5	12.9	18.1 ^c
Within sight and sound of boats too often	18.3	34.2	19.4	11.3 ^d
Finding a space to park my vehicle/trailer	7.8	19.6	8.7	12.7 ^d
Litter at campsite	10.0	29.5	19.6	21.5 ^d
Noisy motorboats	36.9	36.3	31.2	13.2 ^d
Human waste at campsite	6.9	19.1	12.2	9.9 ^c
Inconsiderate anglers	14.3	28.3	16.3	9.3 ^c
Water too muddy	6.3	12.8	19.1	10.3 ^c
Within sight and sound of wading anglers too often	7.8	17.4	8.7	10.7 ^c

^a Significant using a Chi-square statistic at $p \leq .05$.

^b Percent of anglers who identified this item as either a minor or serious problem.

^c Significant at $p \leq .001$.

^d Significant at $p \leq .01$.

^e Significant at $p \leq .05$.

Safety appears to be a problem primarily for medium and high fluctuating flow anglers. Eighteen percent and 13 percent, respectively, of those two groups indicated safety while fishing was a problem, compared to only 3 percent of low flow anglers. This may have been a particular problem for anglers fishing during high fluctuating flows since an angler may wade out at low water and encounter high water when he/she wanted to return to shore later.

Other problems showing a significant relationship with flow level have to do with the behavior of other users. Inconsiderate anglers and being within sight and sound of boats and anglers were problems more for medium flow anglers than low and high fluctuating flow anglers as was finding a place to park a vehicle and/or trailer. Similarly, litter and human waste at campsites was also a problem for a greater proportion of medium flow anglers than low or high fluctuating flow anglers. Muddy water was a problem for more high fluctuating flow anglers (19%) than medium (13%) and low (6%) flow anglers. Dramatic fluctuations in water levels during the high fluctuating flow periods could be reflected in higher reportings of muddy water among anglers.

While relatively few rafters pointed out problems encountered during their river trip, issues they mentioned that were significantly related to flow level again had to do with river conditions and the actions of others (Table 54).

Slow, low water was a problem for 34 percent of low flow rafters compared to 10 and 11 percent of medium and high fluctuating flow rafters, respectively. Only 2 percent of high fluctuating flow rafters said high, fast water was a problem, but no medium or low flow anglers said the same.

Low flow rafters are more likely than medium or high fluctuating flow rafters to mention problems with waiting to launch rafts, damage to rafts, and problems with anglers. Having to wait to launch rafts was a problem more for low flow anglers

Table 54. Problems significantly^a related to river flow levels encountered by rafters

Problems	Flow level			X ² statistic
	Low (n=149)	Medium (n=135)	High (n=174)	
	----- percent ^b -----			
Water too low and too slow	33.8	9.8	10.8	44.5 ^c
Raft stuck on beach	3.5	8.2	0.0	17.6 ^c
Erosion of beach at lunch stop	6.6	5.4	14.6	14.0 ^d
Within sight and sound of bank or wading anglers too often	4.9	3.8	0.6	14.1 ^d
Anglers fishing in path of raft	7.6	5.3	1.2	16.3 ^d
Wakes created by rafts motoring upriver	5.6	11.4	4.8	10.5 ^e
Water too cold	34.3	22.6	36.8	11.6 ^e
Damage to raft and/or motor	9.2	0.8	4.8	15.8 ^e
Water too high and too fast	0.0	0.0	1.8	9.9 ^e
Waiting to launch rafts	7.6	3.0	1.2	10.6 ^e
Guide had difficulty landing raft on a beach	2.1	7.5	2.4	9.3 ^e

^a Significant using a Chi-square statistic.

^b Percent of rafters who identified this item as either a minor or serious problem.

^c Significant at $p \leq .001$.

^d Significant at $p \leq .01$.

^e Significant at $p \leq .05$.

(8%) than for medium (3%) or high fluctuating (1%) flow anglers. Similarly damaging a raft or motor was a problem for 9 percent of low flow rafters versus 1 percent of medium flow rafters and 5 percent of high fluctuating flow rafters.

Low flow rafters were more likely to have problems with anglers fishing in the path of the raft (8%) than medium (5%) and high fluctuating (1%) flow rafters and more of them said that being within sight and sound of bank or wading anglers too often was a problem (5%) than medium (4%) and high fluctuating (1%) flow rafters.

Rafts getting stuck on beaches, guides having difficulty landing a raft on a beach, and wakes created by rafts motoring upriver are flow-related problems mentioned more often by medium flow rafters than low or high fluctuating flow rafters. Approximately 8 percent of medium flow rafters said a raft getting stuck or having landing difficulties were problems compared to 3 percent of less of low and high fluctuating flow rafters. Eleven percent of medium flow rafters said wakes from rafts motoring upriver were a problem compared to 6 percent and 5 percent of low and high flow rafters, respectively.

The only problem mentioned most often by high fluctuating flow rafters, other than high and cold water, was erosion of the beach at the lunch stop site. Fifteen percent of high flow rafters said this was a problem compared to 7 percent of low and 5 percent of medium flow anglers. Rafters on the river during the fluctuating high flow period may have seen beach erosion caused by potentially dramatic changes in water level.

In summary, both anglers and rafters identified problems that appear to be significantly related to flow levels. High fluctuating flow problems for both anglers and rafters obviously have to do with high, fast water and other impacts possibly related to the significant changes in water level during this period. High fluctuating flow anglers also mentioned muddy water

and litter at campsites as problems more often than anglers at the other two flow levels.

Medium flow rafters are more likely than rafters at low and high fluctuating flows to see problems with rafts getting stuck, problems landing a raft, and wakes created by rafts motoring upriver.

Low flow anglers complained about low, slow water, as did low flow rafters. Low and medium flow anglers and, to a lesser extent, high fluctuating flow anglers, had problems with noisy motorboats.

Low flow rafters are more likely than medium or high fluctuating flow rafters to have problems with waiting to launch, damage to raft and/or motor, cold water, anglers fishing in their path, and being within sight and sound of bank or wading anglers too often.

Impact of Flow Level on Fishing Quality

Anglers were asked to evaluate the impact that river flow levels might have on the quality of their fishing trip. They were asked to indicate how the river flow affected their fishing trip and because anglers were interviewed at low, medium, and high fluctuating flows, we were able to compare responses among the three flow levels using a chi-square statistic (Table 55).

Flow level appears to affect fishing quality in a number of ways. In some cases flow level clearly increased or decreased a particular fishing-related variable such as catching fish or gaining access to fishing and camping sites, but in other cases the relationship was less obvious, with anglers reporting both positive and negative effects of the same flow level.

Table 55. Angler-perceived impacts of river flow level on fishing quality.

Effect of water level on:	Flow level			Chi-square statistic
	Low (n=65)	Medium (n=121)	High (n=95)	
	----- percent -----			
Chances of catching a fish:				38.0 ^a
Increased	30.0	8.2	7.4	
Decreased	42.7	54.5	68.1	
No effect	22.6	22.7	10.6	
Don't know	6.7	14.5	10.6	
Chances of catching a trophy fish:				36.5 ^a
Increased	23.0	4.6	4.3	
Decreased	39.3	55.0	66.0	
No effect	21.3	20.2	11.7	
Don't know	16.4	20.2	18.1	
Availability of suitable fish habitat:				14.8 ^b
Increased	26.7	21.7	13.2	
Decreased	48.3	46.2	61.5	
No effect	13.3	21.7	9.9	
Don't know	11.7	10.4	15.4	
Amount of time spent fishing:				14.7 ^b
Increased	20.0	22.9	11.6	
Decreased	26.7	27.5	40.0	
No effect	50.0	51.4	46.3	
Don't know	3.3	9.2	2.1	
Ability to safely wade the river:				81.7 ^a
Increased	42.4	6.7	6.4	
Decreased	20.3	40.0	57.4	
No effect	27.1	29.5	17.0	
Don't know	10.2	23.8	19.2	
Access to preferred fishing sites on the river:				18.1 ^a
Increased	27.1	15.6	11.7	
Decreased	42.4	35.8	54.3	
No effect	25.4	40.4	27.7	
Don't know	5.1	8.3	6.4	

Table 55. Continued.

Effect of water level on:	Flow level			Chi-square statistic
	Low (n=65)	Medium (n=121)	High (n=95)	
	----- percent -----			
Access to desirable camping sites:				15.8 ^{a,c}
Increased	3.6	6.8	5.9	
Decreased	7.3	13.6	23.8	
No effect	50.9	54.4	40.5	
Don't know	38.2	25.2	29.8	
Ability to navigate through narrow channels:				62.0 ^{a,c}
Increased	7.0	37.3	28.6	
Decreased	59.6	18.6	19.8	
No effect	21.1	31.4	33.0	
Don't know	12.3	12.7	18.7	
Chances of damaging boat and/ or motor:				47.8 ^{a,c}
Increased	61.4	19.2	34.4	
Decreased	7.0	30.8	24.4	
No effect	17.5	36.5	25.6	
Don't know	14.0	13.5	15.6	
Chances of boat being beached at a camping or fishing site:				18.6 ^{a,c}
Increased	27.3	17.8	29.5	
Decreased	3.6	19.8	17.1	
No effect	38.2	39.6	27.3	
Don't know	30.9	22.8	26.1	
Chances of boat being swamped at a camping or fishing site:				3.5 ^c
Increased	14.6	15.5	18.9	
Decreased	10.9	15.5	8.9	
No effect	45.4	42.7	41.1	
Don't know	29.1	26.2	31.1	

^a $p \leq .01$.

^b $p \leq .05$.

^c 11 to 14% of data are missing.

It is evident that flow level affects chances of catching fish and those effects vary by flow level. Thirty percent of anglers fishing at low flow said the flow increased their chances of catching fish while 43 percent said flow decreased their chances. In contrast, only 8 percent of medium flow anglers said the flow level increased their chances and more than half (54%) said the medium flow decreased their chances. The contrast is even more evident at high fluctuating flow levels. Sixty-eight percent of anglers said their chances of catching fish decreased because of flow and 7 percent said their chances increased. A similar relationship is found between flow level and anglers' chances of catching a trophy fish. Anglers at low flows said flow both increased and decreased their chances while at medium and high fluctuating flows a majority of anglers felt flow decreased their chances at a trophy fish.

Recognizing that different types of anglers may prefer different types of fishing water and thus view flow level somewhat differently, lure and fly angler responses to the impact questions were examined separately. Differences between these two types of anglers were evident, including a preference for different flow levels. Thirty percent of lure only anglers fishing at low flow said flow level increased their chances of catching a fish and 41 percent said flow decreased their chances, suggesting less preference for low flows. In contrast, 40 percent of low flow fly fishing anglers said flow increased their chances of catching fish and 33 percent said flow decreased fishing chances, suggesting a stronger preference among fly anglers for low flows.

Lure and fly anglers fishing at medium and high fluctuating flows were in closer agreement as to the effects of flow, although lure anglers were more likely to say that flow had no effect on catching fish whereas more than three-quarters of fly anglers at both medium and high fluctuating flows felt flow

decreased their chances of catching fish and relatively few said flow had no effect.

Anglers in general feel that flow level has a negative effect on the availability of suitable fish habitat. Forty-eight percent of low flow anglers, 46 percent of medium flow anglers, and 61 percent of high fluctuating flow anglers said flow decreased available fish habitat. It is uncertain whether anglers are referring to a particular constant flow level in their evaluation or if they are also considering the impact of the fluctuations in river flow levels that has been common in the past and could have been experienced by anglers during the high fluctuating flow period.

The amount of time anglers spend fishing seems less affected by flow level although there were statistically significant differences among effects and the three flow levels. A majority of anglers fishing at low and medium flows said flow had no effect on the amount of time they spent fishing. High fluctuating flow anglers were divided in their impression of flow impact on fishing time. Forty-six percent said flow had no effect and 40 percent said it decreased the time they spent fishing.

Wading safety and fluctuating river flows have been a concern on the river below Glen Canyon Dam, and there appears to be a relationship between flow levels and anglers' perceptions of wading safety. Forty-two percent of anglers at low flow felt the river level increased their ability to safely wade the river, 20 percent said flow decreased their wading ability, and 27 percent said flow had no effect. In contrast, 40 percent of medium flow anglers said flow decreased their ability to wade, 29 percent said it had no effect, and 7 percent said it increased their ability to safely wade. Anglers fishing at high fluctuating flows generally felt that flow decreased their ability to safely wade (57%) which could again be a result of their experiencing dramatic shifts in flow level during their time on the river and

the potential for being stranded. Seventeen percent said flow had no effect and 6 percent said it increased their wading ability.

Access to preferred fishing and camping sites on the river appears to be, for the most part, negatively impacted or not impacted by river flow level. Access to preferred fishing sites was seen as being decreased by flow according to anglers at low (42%), medium (36%), and high fluctuating (54%) flows. Forty percent of medium flow anglers said flow had no effect, as did 25 percent and 28 percent of low and high fluctuating flow anglers, respectively. Access to desired camping sites appears to be generally unaffected by flow for all but high fluctuating flow anglers. Fifty-one and 54 percent of low and medium flow anglers, respectively, said flow had no effect on access to camping sites. Forty percent of high fluctuating flow anglers reported no effect and 24 percent said flow negatively affected access to desirable camping sites.

The ability to navigate through narrow river channels is of particular concern at low flow levels. Sixty percent of low flow anglers said that flow decreased their ability to navigate narrow channels while 21 percent indicated flow had no effect. Interestingly more than one-third of medium flow anglers said flow increased their ability to navigate narrow channels, 19 percent said flow increased abilities and 31 percent said flow had no effect. High fluctuating flow anglers responded similarly, reporting that flow increased (29%), decreased (20%), and had no effect (33%) on navigation abilities.

Low flow levels can also result in more chances to damage boats and motors on exposed rocks. Anglers at low flows voiced this concern, with 61 percent saying flow increased the chances of damaging boat and/or motor. Medium flow anglers were more evenly divided in their evaluation of the effects, with anglers suggesting that at medium flows, flow may increase (19%), decrease (31%), or have no effect (36%) on chances of damaging

boats and/or motors. High fluctuating flow anglers responded somewhat similarly with some suggesting that flow increases (34%), decreases (24%), or has no effect (26%) on chances of damage.

The remaining flow-related issues have to do with the chances of boats becoming swamped or beached due to rising and falling water levels. Anglers appear to recognize that it is the often drastic fluctuations in water level rather than a particular flow level that are likely to result in a boat becoming beached. Twenty-seven percent of low flow anglers and 29 percent of high fluctuating flow anglers said flow increased the chance of a boat becoming beached at a camping or fishing site. A substantial number (38%, 40%, and 27%, respectively) of low, medium, and high fluctuating flow anglers felt flow had no effect on chances of a boat becoming beached and almost that same number said they did not know what the effect would be.

The chances of a boat becoming swamped at a camping or fishing site appear to be even less related to flow than the chances of becoming beached. There were no significant differences among the three flow levels on angler perceptions of the effects of flow level. More than 40 percent of all three groups said flow had no effect on chances of becoming swamped and between 26 and 30 percent of each group did not know what the effect was.

In summary, anglers perceive flow levels to affect fishing quality in a variety of ways, both positively and negatively (Figure 35). Low flow negatively affects the ability to navigate narrow river channels, the availability of suitable fish habitat and access to preferred fishing sites. It increases the chances of damaging boats and/or motors and many lure anglers feel low flows decrease their chances of catching fish.

	<u>Flow</u>		
	<u>Low</u>	<u>Medium</u>	<u>High</u>
Chances of catching fish	D	D+	D+
Chances of catching trophy fish	D	D+	D+
Availability of suitable fish habitat	D	D	D+
Amount of time spent fishing	N+	N+	N
Access to preferred fishing sites on the river	D	N	D+
Access to desirable camping sites	N+	N+	N
Ability to safely wade the river	I	D	D+
Ability to navigate through narrow channels	D+	I	N
Chances of damaging boat and/or motor	I+	N	I
Chances of boat being beached at a camping or fishing site	N	N	I
Chances of boat being swamped at a camping or fishing site	N	N	N

D+ Majority Say Decreases I+ Majority Say Increases
 D Decreases More than Increases I Increases More Than
 N+ Majority Say No Effect Decreases
 N More No Effect Than Increases
 or Decreases

FIGURE 35. FLOW IMPACTS MATRIX.

On the other hand, low flows may increase anglers' ability to safely wade the river, increase the availability of suitable fish habitat and may increase fly anglers' chances of catching fish.

Medium flows may improve anglers' ability to navigate narrow channels, decrease chances of damaging boats and/or motors, and may or may not provide suitable fish habitat. Medium flows decrease chances of catching fish, including trophy fish. They have a negative effect on anglers' ability to safely wade the river and access to preferred fishing sites.

High fluctuating flow levels increase anglers ability to navigate narrow river channels. On the other hand, the potential changing flow levels as well as the high water level has a negative effect on chances of catching fish, access to preferred fishing sites, time spent fishing, suitable fish habitat, and the ability to safely wade the river. High fluctuating flows also increase chances of damaging boats and/or motors and boats being beached.

Addition insight into user perceptions of flow level along with a variety of other issues related to their visit to the area can be found in Appendix D in the form of open-ended comments to the question "Is there anything else you would like to tell us about your visit to Glen Canyon NRA?" These comments are not organized in any specific order but are organized by type of user and flow level.

CONCLUSIONS AND IMPLICATIONS: HOW TO USE THIS REPORT

A primary goal of resource management is to provide high quality recreation opportunities that are compatible with the expectations of users and the biophysical capabilities of the resource. To do that requires evaluating the social and ecological values of the recreation experience against the impacts caused by recreation and the management actions available to mitigate those impacts.

This chapter outlines our suggestions for how information gathered in this research can be used in management planning for the Colorado River in Glen Canyon N.R.A. The format is similar to that used by Shelby et al. (1987) in a study of the Deschutes River and is similar to the process used for resource decision-making using Limits of Acceptable Change (Stankey and McCool 1984). The format presented here is adapted for Lees Ferry, referencing the specific information in this report.

Choosing Management Goals

Glen Canyon N.R.A.'s 1985 Statement for Management provides a starting point for choosing management goals (National Park Service 1987). Management objectives applicable to this study include:

- To manage the recreation area so that it provides maximum recreational enjoyment to the American public and its guests.
- To maximize not only the recreational experiences, but the number of opportunities for enjoying the recreation area as well.
- To manage the park's ecosystem in ways that interfere with natural processes as little as possible, consistent with permitted recreational and commercial uses.

-To determine the significance of the park's cultural resources and to maintain the integrity of these resources.

- To support maintenance of a blue-ribbon trout fishery.

Using these overall management objectives, the first step in choosing management goals for the below-dam portion of the river is to specify the recreation experiences and biophysical settings to be provided on the river. Information on present resource conditions and user perceptions and preferences would be a good starting point for developing goals. This information can be found in the sections of this report on Biophysical Impacts, Use and User Characteristics, The River Experience, and Effects of River Flow Level on Visitor Experiences. Using the Recreation Opportunity Spectrum (ROS) in conjunction with information on users could also help identify existing recreation experience opportunities.

There are primarily two user groups on the river--anglers and day-use rafters. These two groups are distinctively different types of users and engage in different activities suggesting they may differ in the experiences they prefer. However, these two groups share the same river corridor, which can cause conflicts. Although major conflicts were not evident from the study, conflicts need to be resolved by establishing compatible goals for each user group, which may require spatial or temporal zoning of use. The opinions of the two user groups have been identified separately throughout this report to help identify areas where user conflicts exist.

Once goals have been set for the type of recreation experiences to be provided on the river in terms of social and ecological conditions, the next step is to generate specific management objectives.

Specify Management Objectives

Goals for the river should be further defined by specifying the social and ecological impacts that need to be limited to create the desired recreation experience. Information about social impacts is presented in sections entitled Perceived Crowding, Problems Encountered, and Effects of River Flow Level on Visitor Experiences. Information on ecological impacts is presented in the Biophysical Component section.

An important consideration during this and subsequent steps of the process is to determine the relative importance to give the data on site impact gathered during the biophysical inventory and visitor perceptions of site impacts. It appears that visitors may not view the levels of physical impacts at various sites on the river as severe as measured by the biophysical impact inventory. In some cases data on visitor perceptions may validate inventory results and in other cases there may appear to be disagreement between manager-defined and user-perceived impacts. For example, 51 percent of the 49 sites inventoried were rated as heavily impacted with regards to human waste. The greatest concern of visitors regarding human waste was at the rafter lunch stop where 18 percent of rafters said human waste was a problem. Only 12 percent of anglers said human waste was a problem at campsites. Ninety-three percent of designated campsites were rated as heavily or severely impacted with regards to trash. Six percent or less of rafters said litter was a problem at either the lunch stop or rest stop sites but 20 percent of anglers said litter was a problem at fishing spots and 13 percent said litter was a problem at campsites. Consideration must be given to both visitor- manager-perceived impacts in setting impact parameters as well as acceptable impact levels.

The selected impacts must be measurable so that their condition at any time can be compared with a quantitative standard to see if the type of experience specified is being provided.

Once the relevant social and ecological impact parameters have been determined, acceptable levels for each impact should be established. The standards must be established at levels that will create the type of recreation experience defined in the goals for the river. Research results on perceived crowding, problems encountered and biophysical impacts may be useful in defining impact parameters as well as standards for acceptable social and ecological conditions.

The selected social and ecological impact parameters and the acceptable levels for each provide the basis for future management direction. Consequently, they must be based on a clear idea of the type of recreation experience to be provided. Without clear objectives it is difficult to make consistent and justifiable management decisions.

Assess Current Conditions

With management objectives established, the next step is to assess current levels of social and ecological impacts, and the relationship between impact levels and use patterns. Social impacts and use patterns are described in the sections entitled Use of the River, The River Experience and the Effects of River Flow Level on Visitor Experiences. Information on current ecological conditions is summarized in the section on the Biophysical Component. This assessment identifies areas where impacts exceed acceptable levels and further management action is required. It also identifies areas where future impact problems may develop.

Choose Management Alternatives

There are usually several ways of reducing impacts to the levels specified by management objectives. Visitor support and acceptance of a number of alternative actions are reviewed in the sections on Opinions Toward River Management and summarized in the Alternative Support and Use Restriction matrices. The

matrices are intended to be used only as guides; visitor support is discussed in more detail in the text.

Examples of how the inventory of current conditions can be used with information on visitor support for management alternatives might be useful. We will use four recreation-related impacts identified in the biophysical inventory included: litter, soil disturbance, human waste, and fire remains.

Litter. Results of the biophysical survey of litter revealed that 80 percent of the 49 sites surveyed were heavily to severely impacted by litter. If the management goal for the river is to provide a semi-wilderness experience, an acceptable level of litter impact could be set. For example, 60% of sites should be lightly or moderately impacted, 30% of the sites heavily impacted, and only 10% of sites severely impacted. Results of the sociological survey revealed that 81% of anglers and 91% of rafters favor management actions to reduce human impacts of litter, suggesting that management actions to reduce litter at sites would have user support. Management actions to reduce litter could include intensive maintenance of fire grates by park employees or stricter law enforcement of litter violations.

Soil disturbance. Biophysical results revealed that only one site was lightly impacted with respect to soil disturbance, which includes soil compaction, loosening, and erosion. Fourteen sites (29%) were moderately impacted, 12 sites (24%) heavily impacted, and 22 sites (45%) were severely impacted for soil disturbance. In total 70 percent of the 49 sites were heavily to severely impacted. Depending upon the park's management objectives, data on present site condition can be used to help managers determine realistic long-term site condition goals. If the goal is to improve sites with respect to soil disturbance because of the quality camping experience manager's wish to provide to recreationists, then acceptable impact levels might be to have 25% of sites lightly impacted, 25% moderately impacted, 25% of sites heavily impacted, and 25% of sites severely impacted. Management alternatives to accomplish this goal might include relocating campsites from upper benches to lower benches to reduce erosion and numbers of gullies, or reduction of party size or control of use by a permit system. Results of the sociological survey reveal that 70% of anglers and 85% of rafters favored use restrictions to protect beaches from erosion. The majority of anglers and rafters would accept the closure of beaches and the majority of both groups would accept the implementation of a camping permit system. Public opinion supports management actions to reduce impacts of soil disturbance.

Human waste. Currently, 26% of the sites are lightly to moderately impacted with respect to human waste and 73% are heavily to severely impacted. Should the acceptable level of human waste impact be to have 75% of sites lightly to moderately impacted and 25% of sites heavily to severely impacted, for example, one management action to accomplish this goal could be to require all boaters to have a porta-potty and carry out human waste. Eighty percent of anglers and 91% of rafters said they would support use restrictions to reduce impacts of human waste along the river and 59% of anglers and 78% of rafters were willing to accept the action requiring boaters to have porta-potties.

Fire remains. Fifty-three percent the inventoried sites were severely impacted with respect to illegal fire rings, fire stains, ash across site, burned vegetation and stained rocks. If a management objective is to protect beaches and soil microbes while providing a quality recreation experience, one objective may be to reduce fire impacts. Results of the visitor survey revealed that 73% of anglers and 83% of rafters would accept a management action to restrict use of campfires and two-thirds of both groups would accept a management action that would require upriver campers to carry out fire ash. These two management action alternatives would likely reduce fire impacts and would be consistent with the above management goal. Managers may wish to set acceptable levels of fire impacts on sites using impact values or impact classes calculated in the biophysical survey.

Monitor and Follow-Up

Once management actions are implemented, conditions should be monitored to assess the effectiveness of management actions. This is necessary to determine the effectiveness of actions taken initially to mitigate impacts and as use patterns and other conditions such as river flow levels change over time. Monitoring impact levels will point out the effectiveness of the management plan in resolving impact problems, where certain actions may not have been necessary, and how changes in recreation and resource conditions may be affecting the experience of the user or the ecological condition of the resource.

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APPENDIX A
List of Biophysical Inventory Sites

Impact Monitoring Sites Ferry to Glen Canyon Dam

Site #	Mile	Side	Site Name	Use Restriction
#0A	-2.5	R	Below Confluence of Paria River	Day Use
#0B	-2.0	R	Above Confluence of Paria River	Day Use
#1	.2	R	Landing for Raft Trips	Day Use
#2	1.0	R	Old Ferry Site	Day Use
#3	2.5	L	Falls Canyon	Day Use
#4A	3.0	L	Cave Canyon Beach	Day Use
#4B	3.0	L	Cave Canyon Directly Over Dune	Day Use
#4C	3.0	L	Cave Canyon Near Giant Tamarisk	Day Use
#5	4.0	R	4 Mile Bar Fishing Spot	Day Use
#6	5.0	L	5 Mile Day Use	Day Use
#7	5.7	R	Big Sandy	Day Use
#8	5.8	L	Little Sandy	Day Use
#9A	6.0	R	Hidden Slough Camps West Camp	Desig. Camp
#9B	6.0	R	Hidden Slough Camps East Camp	Desig. Camp
#9C	6.0	R	Hidden Slough Camps Lower West	Satellite
#9D	6.0	R	Hidden Slough Camps Lower Center	Satellite
#9E	6.0	R	Hidden Slough Camps Lower East	Satellite
#10A	6.2	R	Upper Hidden Slough Day Beach	Day Use
#10B	6.1	R	Hidden Slough Day/Illegal Camp	Day Use
#11	6.5	R	GCES Well Site	Day Use
#12	7.0	L	Float Trip Alternate Lunch Stop	Day Use
#13	7.2	L	Float Trip Lunch Stop	Day Use
#14A	7.5	L	Finger Rock Camps West Camp	Desig. Camp
#14B	7.5	L	Finger Rock Camps Middle Camp	Desig. Camp
#14C	7.5	L	Finger Rock Camps East Camp	Desig. Camp
#14D	7.5	L	Finger Rock Camps Far East Site	Satellite
#14E	7.5	L	Finger Rock Camps Far West Site	Satellite
#15A	8.0	R	8 Mile Bar Camps West Camp	Desig. Camp
#15B	8.0	R	8 Mile Bar Camps East Camp	Desig. Camp
#16A	9.0	R	Twin Stripes Camps Southwest Camp	Desig. Camp
#16B	9.0	R	Twin Stripes Camps Northeast Camp	Desig. Camp
#16C	9.0	R	Twin Stripes Camps Lower SW	Satellite
#16D	9.0	R	Twin Stripes Camps Lower NE	Satellite
#17A	10.0	L	Petroglyph Access	Day Use
#17B	10.0	L	Petroglyph Panel	Day Use
#18A	10.5	R	Faatz Inscription Beach	Day Use
#18B	10.5	R	Faatz Inscription Old Camp	Day Use
#19A	11.0	L	Ferry Swale Camps North Camp	Desig. Camp
#19B	11.0	L	Ferry Swale Camps Middle Camp	Desig. Camp
#19C	11.0	L	Ferry Swale Camps South Camp	Desig. Camp
#20	11.2	L	Upper Ferry Swale	Day Use
#21A	12.0	R	Twelve Mile Beach	Day Use
#21B	12.0	R	Twelve Mile Old Camp	Day Use
#22	13.2	L	Thirteen Mile Bar near Waterfall	Day Use
#23A	14.0	R	Ropes Trail Camp Southwest Camp	Desig. Camp
#23B	14.0	R	Ropes Trail Camp Middle Camp	Desig. Camp
#23C	14.0	R	Ropes Trail Camp Northeast Camp	Desig. Camp
#24	14.5	L	Water Plant/ USGS Cable	Day Use
#25	15.0	R	Fifteen Mile	Day Use

APPENDIX B
Biophysical Data Sheets

SITE FORM: CAMPSITES AND DAY USE AREAS UPRIVER FROM LEES FERRY

Site No.: River Mile: UTM Coordinates:

Site Name: River Side: Left/Right

Coded by: Flow level: Date:
Time of Day:

SITE DESCRIPTION:

Present Use Restriction:

Day Use Only/ Campsite/ Illegal Satellite Campsite

Dominant User Type:

Angler/ Rafter/ Hiker/ Combination/ Uncertain

Use Concentrated On:

Beach/ Within Tamarisk/ Lower Bench/ Upper Bench/ Gravel Bar

Attraction:

Spawning Bar/ Cultural/ Natural/ Hiking Trail/ Designated Camp

Prominent Vegetation and Proportion:

Total Percent Vegetation Cover:

Distance Core from River: Vertical Climb:

Capacity: # of People: # of Tents:

Proximity to Other Sites:

Toilets Present?: Yes/No How Far to Nearest Toilet?:

Fire Grates Present?: Yes/No

Number of Boats Able to Moor at Landing:

Description of Access:

Cobble Bar/ Extremely Shallow/ Sand Bar/ Deep Water/ Large Rocks

Grazing Impacts Present: Manure/ Grazed Vegetation/ None

Evidence of Beaver Activity:

Camp or Day Use Area (sq. ft.): Barren Core Area:

RECREATIONAL USE IMPACT INDICATORS

Site No.: _____ River Mile: _____ Date: _____

1. Soil Disturbance: Compaction/Loosening/Erosion
 \ Disturbance _____ Average Trail Depth _____

1	2	3	4
None	<30% of soils show compaction of fine soils or loosening of coarse soils.	30-60% of soils show compaction or loosening	>60% of soils show compaction or loosening.
Apparent		Gullying in 1 location.	Gullying in >=2 locations.
	Trail depth <1"	Trail depth 1" to 3"	Trail depth >3"

Rating: _____

2. Vegetation Damage: Trampling/Cutting/Carvings/Exposed Roots/Reduced Vigor
 \ Damaged Vegetation _____

1	2	3	4
No Damage	<5% of vegetation is damaged	5-25% of vegetation is damaged	>25% of vegetation is damaged
Apparent			

Rating: _____

3. Trails: Site to Site/Site to Toilet/Site to Attraction
 \ of Trails _____ Average Trail Width _____

1	2	3	4
1 trail from landing to use area.	1 trail off main trail leading to attraction or toilet.	2-3 trails off main trail.	>3 trails off main trail.
Trail width <=12"	Trail width 12" to 18"	Trail width 18" to 24"	Trail width >24"

Rating: _____

4. Fire Impacts: Illegal Fire Rings/Fire Stains/Ash Across Site/ Burned Vegetation/Stained Rocks
 \ of fire rings _____ Total area of fire stain _____

1	2	3	4
None	1 fire stain area <=1 sq.ft.	1 fire ring and/or total area of fire stain >1 sq.ft. but <=9 sq.ft.	>1 fire ring and/or fire stain >=9 sq.ft.
Apparent	no fire rings		

Rating: _____

RECREATIONAL USE IMPACT INDICATORS (continued)

Site No.: _____ River Mile: _____ Date: _____

5. Human Waste: Fecal Matter/Toilet Paper/Odor of Urine
 Files of Human Waste _____ Files of Toilet Paper _____
 Areas with odor of urine _____

1	2	3	4
None	1 pile of toilet paper	1-2 piles of toilet paper	>2 piles of toilet paper
Present		1 pile feces	>1 pile feces
		1 area with odor of urine	>1 area with odor of urine

Rating: _____

6. Trash: Unburned in Fire Grates/Across Site
 \ small pieces _____ \ large pieces _____

1	2	3	4
None	<=1 small pieces of trash (gum wrappers, bottle tops)	1-2 large pieces of trash or <=5 pieces small & large	>2 large pieces of trash or >5 pieces small & large
Present			

Rating: _____

7. Pests & Insects: Flies/Midges/Ants/Rodent Tracks/Ravens

1	2	3	4
None or if present not associated with human impact	Vary few insects or rodent tracks. 1 or 2 flies near toilet or fire grate. Ants near edge of site.	Insects are present but associated with human impacts on portion of site. Groups of flies. A swarm of midges. Isolated rodent tracks.	Amount of insects associated with trash, human waste, fire grates, is extensive. Swarms of flies and midges. Rodent tracks throughout site.

Rating: _____

8. Site Modification: Rock or Log Seats/Rock Table/Other
 Specify other: _____

1	2	3	4
No Site Modification	Rocks used to stabilize tents or as seats	Rock table. Log bench. Other: using natural materials (stick as TP holder)	Rock or log seats around fire ring or rock table. Any unnatural feature like seats made from milk crates.

Rating: _____

CALCULATION OF SITE IMPACT INDEX

Site No.: _____ River Mile: _____ Date: _____

Impact	Rating	X	Factor	Weighting	= Impact Value
Soil Disturbance	_____	X	3	=	_____
Vegetation Damage	_____	X	3	=	_____
Trails	_____	X	3	=	_____
Fire Impacts	_____	X	2	=	_____
Human Waste	_____	X	2	=	_____
Trash	_____	X	2	=	_____
Pests & Insects	_____	X	2	=	_____
Site Modification	_____	X	2	=	_____

Site Impact Index (Total) = _____
 Condition Class = _____

Explanation of Data Sheet (Page 1)

SITE FORM: CAMPSITES AND DAY USE AREAS UPRIVER FROM LEES FERRY

Site No.: Sites were assigned consecutive numbers in ascending order beginning at Lees Ferry and continuing upriver to the Dam. Each distinct numeral (#1, #2, etc.) is associated with a distinct mile. Alpha suffixes were assigned to sites with two or more separate use areas. For example, site #9 is at 6.0 mile. Sites #9A, #9B, #9C, etc. are individual camp areas within site #9.

River Mile: River mile upstream from Lees Ferry. Lees Ferry is Mile 0.0 and the Dam is considered Mile 15.5.

UTM Coordinates: Report in the format seven digits north, six digits east.

Site Name: Sites were named according to river mile or after some outstanding quality of the site.

River Side: River right or river left as you are standing facing downriver.

Coded by: Last names of persons recording data.

Flow level: Approximate the flow level of the River at the time you start recording data.

Date: Month/Day/Year

Time: Time of day when you begin taking data. Report in military time.

Present Use Restriction: Circle appropriate use.

Dominant User Type: Circle appropriate user type.

Use Concentrated On: Circle area where use is concentrated.

Attraction: Circle any that apply. If an attraction exists that is not listed, write it in.

Prominent Vegetation and Proportion: Record the predominant species of vegetation on the site and along the edge of the site. Approximate the percentage of each species out of 100%. That is, if the site were denuded except for a small patch of atriplex, we would not record percent vegetation cover, but instead we would record that the atriplex was the only species on site and say 100%. If the site had many atriplex plants and only a tiny patch of ephedra, we might record: atriplex 90%, ephedra 10%.

Total Percent Vegetation Cover: Percentage of live vegetation on site. Do not include dead trees/shrubs or duff. The area a tree covers is determined by the area the trunk fills not the canopy cover.

Distance Core from River: Record in feet and obtain by pacing.

Pace from the center of the core area to the river's edge. Obviously this measurement will change at different flow levels.

Vertical Climb: Standing at the river's edge, estimate how high the site is above the river. Record in feet.

Capacity: # of People: Approximate the number of persons that could comfortably camp in the use area. It may be easier to estimate the number of tents that could be erected and then multiply by two to get number of people. This was approximately the technique we used.

Capacity: # of Tents: Approximate the number of two-person tents that could be erected in the use area.

Proximity to Other Sites: For campsites or day use sites with more than one separate use area, record the distance from site to site in feet by pacing. For all sites, record the distance in miles to the nearest site upriver and downriver.

Toilets Present?: Is there a porta-john within walking distance of the use area? Circle yes or no.

How Far to Nearest Toilet?: If there is a porta-john adjacent to the site, pace the distance from the core of the use area to the toilet. Record in feet. If there is no toilet within walking distance of the use area, record how far to the nearest toilet upriver or downriver in miles.

Fire Grates Present?: Is there an NPS fire grate on site? Circle yes or no. Some of the day use sites have remnants of fire grates present. Circle no for these sites.

Number of Boats Able to Moor at Landing: Consider the number of fishing boats, not one-day float trip rafts, that could moor at one time at the landing closest to the site being recorded.

Description of Access: Circle the responses which best describe boat access to the site at the water level you experienced as you approached the site. Two additional responses can be added: shallow and sandy.

Grazing Impacts Present: Circle appropriate response(s).

Evidence of Beaver Activity: Write in any evidence of Beaver activity such as tracks, gnawed signpost, dam. If there is no evidence, write no. You may also want to record evidence of other significant animal activity, eg. Coyote or Badger.

Camp or Day Use Area: Pace the area of the site, length X width, and record in square feet. An edge of a site is where undisturbed vegetation and soil begins. If portions of the site are separated by large islands of vegetation, add the areas of the portions of the site together. For day use areas which are strictly beach, the area of the site will vary according to water level. Just record the site area at the water level you are experiencing.

Barren Core: Pace all the bare areas on the site, length X width, and add the areas together. Record in square feet. Do not include areas with scattered vegetation or duff.

Explanation of Data Sheet (Page 2)
RECREATIONAL USE IMPACT INDICATORS

To assess recreational use impacts on site, eight impact indicators were chosen. Modifying the methods used by Kitchell and Conner in Canyonlands National Park in 1984 (Cole, 1989), site condition was determined by calculating a site impact index from the impact indicators.

Completing the Data Sheet:

Site No.: Use the number assigned to the site on Page 1.

River Mile: Same as on Page 1.

Date: Month/Day/Year

1. Soil Disturbance: Indicate if soils on site exhibit compaction of fine soils and/or loosening of coarse soils by circling the appropriate responses. If eroded trails or gullies are present, as in many upper bench sites, circle erosion. Exposed plant roots due to foot traffic also constitute erosion.

% Disturbance: Estimate the total percentage of compacted and/or loosened soils on site.

Average Trail Depth: Measure the depth of all trails leading away from the site using a measuring tape and record the average depth in inches.

Rating: Using percent disturbance and average trail depth, determine which description of soil disturbance, column 1,2,3 or 4, most accurately describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of soil disturbance. As a rule, percent soil disturbance and trail depth should determine the rating when no gullies were present.

2. Vegetation Damage: Indicate if vegetation on site and along the edge of the site is trampled, has cut branches, carvings in the bark, exposed roots, and/or is exhibiting reduced vigor by circling the appropriate responses.

% Damaged Vegetation: Estimate the percentage of the vegetation recorded under Total Percent Vegetation Cover on Page 1 that is damaged (exhibits the impacts circled above).

Rating: Using percent damaged vegetation, determine which description of vegetation damage, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of vegetation damage.

3. Trails: Indicate the types of trails present which lead away from the site by circling the appropriate responses. Cultural sites, natural phenomenon, hiking trails and spawning bars are considered attractions.

of Trails: Count the number of trails leading away from the site. Include both barely discernable and well-worn trails.

Average Trail Width: Measure the width of all of the trails leading away from the site using a measuring tape and record the average trail width in feet.

Rating: Using number of trails and average trail width, determine which description of trailing, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of trails. As a rule, rating should be determined by the worse of the two impacts. The number of trails should determine the rating if the number of trails is greater than three, but average trail width is less than 2 feet. If the number of trails is two, but the trail width is 3 feet or greater, rating is determined by trail width. In both cases the site rating would be a "4".

4. Fire Impacts: Indicate the types of fire impacts present on site by circling the appropriate responses.

of Fire Rings: Count the number of rock rings encircling fire pits found on site.

Total Area of Fire Stain: Pace the area of each individual fire stain found on site, length X width. Add all of the areas together to get total area of fire stain.

Rating: Using number of fire rings and total area of fire stain, determine which description of fire impacts, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of fire impacts. As a rule, area of fire stain determines the rating when no fire rings were present.

5. Human Waste: Indicate evidence of human waste impacts on site or adjacent to site by circling the appropriate responses. For many sites, stands of Tamarisk adjacent to the site serve as "latrine" sites. It is appropriate to consider evidence of human waste impacts in these stands to be associated with the site.

Piles of Human Waste: Count the number of piles of solid human waste located on site, in adjacent stands of Tamarisk associated with the site or on a trail leading to the site.

Piles of Toilet Paper: Count the number of piles of toilet paper on site, in adjacent stands of Tamarisk associated with the site, or on a trail leading to the site.

Areas with Odor of Urine: Count the number of areas on site or adjacent to site from which a strong odor of urine emanates.

Rating: Using the number of piles of human waste, toilet paper and areas with odor to urine, determine which description of human waste impacts, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of human waste. As a rule, number of piles of toilet paper determines site rating when no feces or areas with urine are found. When one pile of feces is present but no piles of toilet paper, feces is the impact that determines the rating.

6. Trash: Indicate if the trash present on the site was found in the firegrate and/or strewn across the site by circling the appropriate responses.

Small Pieces: Count the number of small pieces of trash on site, in firegrate, and adjacent to site on trails or in stands of Tamarisk. Small pieces of trash include cigarette butts, pop tops, rubber bands, gum wrappers, pieces of glass, etc.

Large Pieces: Count the number of large pieces of trash on site, in firegrate, and adjacent to site on trails or in stands of Tamarisk. Large pieces of trash include soda cans, beer cans, bottles, rags, pieces of clothing, soap, paper plates, paper cups, outboard lubricant containers, styrofoam coolers, etc.

Rating: Using the number of small and large pieces of trash, determine which description of trash impacts, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of trash.

7. Pests & Insects: Indicate presence of pests or evidence of pests on site by circling the appropriate responses. Ravens should be displaying scavenging behaviors before considering them as pests.

Rating: Determine which description, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating of 1,2,3, or 4, the number which corresponds to the column, for the impact indicator of pests & insects.

8. Site Modification: Indicate disturbance of rocks or logs for use as seats, tables, tent stabilizers, stepping stones, fire rings, etc. by circling appropriate responses. Write in uses not listed under "specify other." Also record presence of unnatural features such as seats made from milk crates, nails in trees creating a soap dish, fire poker in tree used as backpack hanging rack, etc. under "specify other."

Rating: Using types of site modification present, determine which description, column 1,2,3 or 4, best describes the condition of the site. Assign the site a rating 1,2,3 or 4, the number which corresponds to the column, for the impact indicator of site modification.

CALCULATION OF SITE IMPACT INDEX

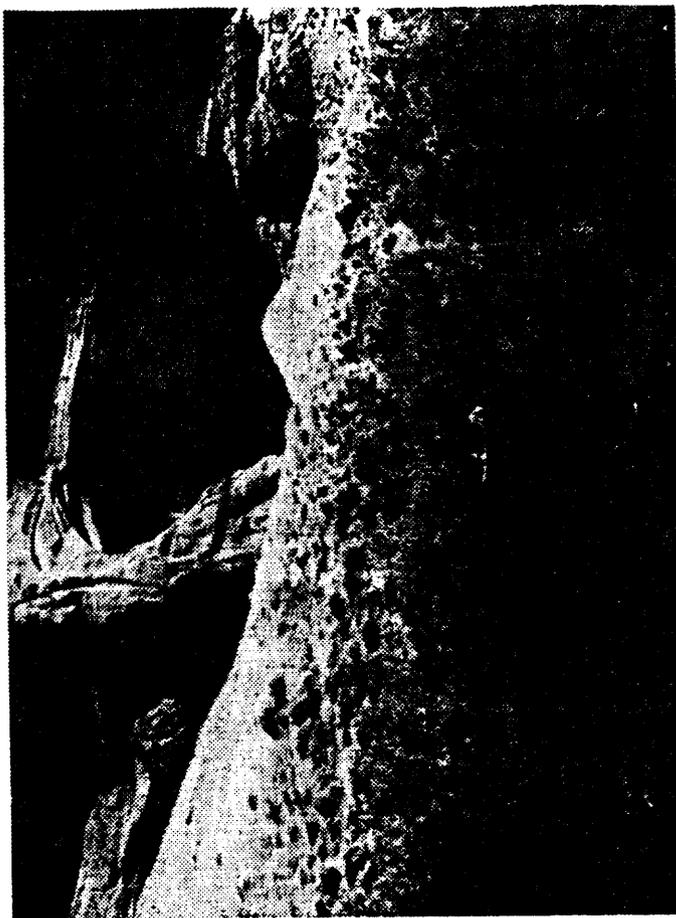
To get an **Impact Value** for each of the eight impact indicators, multiply the **Rating**, assigned above, by the **Factor Weighting Value**, assigned by managers in accordance with the importance managers have given to the impact indicator. Traditionally, higher Factor Weighting Values (FWV) are assigned to impacts which are more lasting and are biophysically detrimental to the site as opposed to just aesthetically displeasing to the eye (Cole, 1989). In this survey, importance was defined by the effort it would take to ameliorate the site with regard to the specific impact. The greater the effort, the higher FWV for the specific impact. For example, the trash impact indicator has a lower FWV than trails, because trash can be easily removed from the site where trail revegetation would entail much more work.

To calculate the **Site Impact Index**, sum the eight **Impact Values**. The lowest value the Site Impact Index can be is 18 and the highest is 72. If the Site Impact Index is a value from 18 to 28, the site is considered to be lightly impacted. If the Site Impact Index is a value from 29 to 45, the site is considered to be moderately impacted. If the Site Impact Index is a value from 46 to 61, the site is considered to be heavily impacted and if the value is from 62 to 72, the site is considered to be severely impacted. **Lightly Impacted, Moderately Impacted, Heavily Impacted and Severely Impacted** are called the **Condition Classes**.

APPENDIX C

Angler and Rafter Survey Instruments

1991 Angler Study Glen Canyon National Recreation Area



16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus the permanent data will be anonymous. Please do not put your name or that of any member of your group on the questionnaire. Data collection through visitor surveys may be disclosed to the Department of Justice when relevant to litigation or anticipated 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 22 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, National Park Service, P.O. Box 37127, Washington, DC 20014-7127; and to the Office of Management and Budget, Paperwork Reduction Project 1024, Washington, DC 20503





United States Department of the Interior

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area

Box 1507
Page, Arizona 86040
602/645-2471



OMB Approval 1024-0078
Expires 10/31/91

INSTRUCTIONS: When answering the following questions, please refer to the stretch of the Colorado River between Glen Canyon Dam and Lees Ferry. If you are on a multi-day trip, please complete the questionnaire on the SECOND DAY of your trip.

Q-1. When did you first enter Glen Canyon National Recreation Area on this trip?

DATE _____ am pm (circle one)
TIME _____

Q-2. When do you expect to leave for the last time on this trip?

DATE _____ am pm (circle one)
TIME _____

Q-3. What type of trip are you on while visiting Glen Canyon National Recreation Area? (circle number)

- 1 VACATION TO GLEN CANYON NATIONAL RECREATION AREA
- 2 VACATION WITH GLEN CANYON NATIONAL RECREATION AREA AS PART OF TRAVEL PLAN
- 3 WEEKEND OR MULTI-DAY TRIP
- 4 DAY OUTING
- 5 VISIT FOR SEVERAL HOURS OR LESS THAN A DAY
- 6 WORK ON THE RIVER

Q-4. Are you travelling with family, friends, or what? (circle one number)

- 1 ALONE
- 2 A COUPLE
- 3 FAMILY
- 4 TWO OR MORE FAMILIES OR RELATIVES TOGETHER
- 5 FAMILY AND FRIENDS
- 6 TWO OR MORE FRIENDS TOGETHER
- 7 SPECIAL INTEREST GROUP (tour group, others)

Dear Park Visitor:

Many people visit Glen Canyon National Recreation Area each year. You come from many different places and have a variety of reasons for visiting Glen Canyon. To assist in the management decision process, more information is needed about visitor experiences and activities. To this end, I have asked researchers at Northern Arizona University to conduct a survey of Glen Canyon visitors.

You have been selected as part of a sample of visitors to participate in the survey. In order for the results to be truly representative of all visitors, it is important that you take the time to complete the enclosed questionnaire. When you have finished, please place it in one of the survey drop boxes located in the Lees Ferry boat launch area, or seal it and drop it in the nearest mailbox. It is pre-addressed and the postage is paid.

An identification number is included on the questionnaire so we may check your name off the mailing list when the questionnaire is returned. Your name will not be placed on the questionnaire.

We greatly appreciate your cooperation in this study. I hope that you enjoyed your visit to Glen Canyon National Recreation Area.

Sincerely,

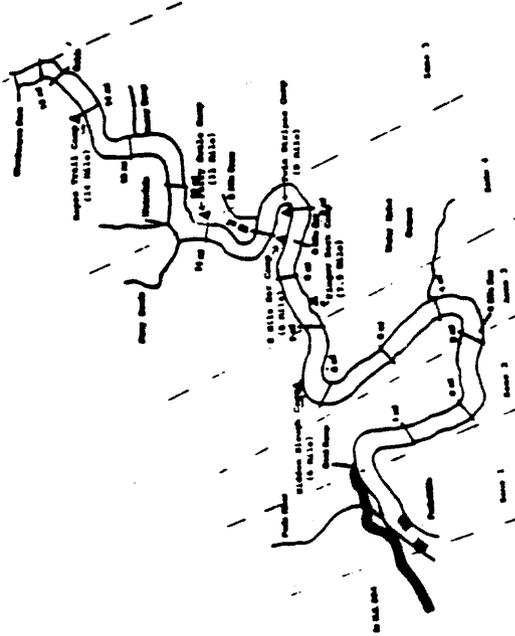
John O. Lancaster
John O. Lancaster
Superintendent

Enclosure



Q-5. Where did you stop to fish on the river? (See map below, circle all that apply)

- 1 ZONE 1 (PARIA BEACH TO LEE'S FERRY LAUNCH RAMP)
- 2 ZONE 2 (LAUNCH RAMP TO 3-MILE BAR)
- 3 ZONE 3 (3-MILE BAR TO 7.5 MILE FINGER ROCK)
- 4 ZONE 4 (7.5 MILE, FINGER ROCK TO 11-MILE, FERRY SWALE)
- 5 ZONE 5 (11-MILE, FERRY SWALE TO GLEN CANYON DAM)



Q-6. Which of the zones is your first choice for a fishing spot?

ZONE _____

If you didn't fish at your first choice spot, why didn't you? (circle one number)

- 1 ALREADY TAKEN
- 2 TOO CROWDED
- 3 INACCESSIBLE BECAUSE WATER WAS TOO HIGH
- 4 INACCESSIBLE BECAUSE WATER WAS TOO LOW
- 5 OTHER REASON _____
- 6 I WAS ABLE TO FISH AT MY FIRST CHOICE SPOT

We are interested in how you feel about seeing other users on the river.

Q-7. Overall, do you feel that the river is: (circle number)

1	2	3	4	5	6	7	8	9
Not at all crowded		Slightly crowded		Moderately crowded			Extremely crowded	

Q-8. Estimate the number of RAFTS you saw during the course of one day?

I saw about _____ RAFTS in a day.

Q-9. How did you feel about the number of RAFTS you saw in a day?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE RAFTS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE RAFTS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY RAFTS
- 5 FAR TOO MANY RAFTS
- 6 I DON'T KNOW

Q-10. Estimate the number of MOTORBOATS you saw in a day.

I saw about _____ MOTORBOATS in a day.

Q-11. How did you feel about the number of MOTORBOATS you saw in a day?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE MOTORBOATS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE MOTORBOATS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY MOTORBOATS
- 5 FAR TOO MANY MOTORBOATS
- 6 I DON'T KNOW

Q-12. Estimate the number of bank or wading ANGLERS you saw in a day.

I saw about _____ ANGLERS in a day.

Q-13. How did you feel about the numbe. of bank or wading anglers you saw in a day?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE ANGLERS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE ANGLERS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY ANGLERS
- 5 FAR TOO MANY ANGLERS
- 6 I DON'T KNOW

Q-14. Did you camp overnight on the river? (circle one number)

- 1 NO (Skip to Q-19)
- 2 YES (Please proceed)

Where did you stay? (refer to map, circle one or more)

- 1 6-MILE, "HIDDEN SLOUGH"
- 2 7.5-MILE, "FINGER ROCK"
- 3 8-MILE, "8-MILE BAR"
- 4 8.5-MILE, "TWIN STRIPES"
- 5 11-MILE, "FERRY SWALE"
- 6 13.5-MILE "ROPES TRAIL"

Q-15. How many nights did you camp on the river?

_____ NIGHTS

Q-16. Overall, did you feel your camping location was:

- | | | | | | | | | |
|--------------------|------------------|--------------------|-------------------|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| not at all crowded | slightly crowded | moderately crowded | extremely crowded | | | | | |

Q-17. Were you within sight and sound of other campers? (circle one number)

- 1 NO
- 2 YES

(If yes) How many other GROUDS could you see or hear?

_____ GROUPS

Q-18. How did you feel about the number of groups you saw at your camping location?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE PEOPLE
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE PEOPLE
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY
- 5 FAR TOO MANY
- 6 I DON'T KNOW

River flows on this section of the Colorado River are affected by the operation of Glen Canyon Dam. River flows, in turn, may have an impact on the quality of a fishing trip. Fish might be easier or harder to catch, access along the banks may be better or worse, or boats may be easier or harder to handle. We would like you to tell us how the river flow affected your fishing trip.

Q-19. Indicate what effect the water level had on each of the following items. Please circle the number that best describes your feelings.

What effect did the water level have on:	INCREASED	DECREASED	NO EFFECT	DON'T KNOW
a. Your chances of catching fish	1	2	3	4
b. Your chances of catching a trophy fish	1	2	3	4
c. Amount of time you spent fishing	1	2	3	4
d. Your ability to safely wade the river	1	2	3	4
e. Access to preferred fishing sites on the river	1	2	3	4
f. Access to desirable camping sites	1	2	3	4
g. Chances of damaging your boat and/or motor	1	2	3	4
h. Chances of your boat being beached at a camping or fishing site	1	2	3	4
i. Availability of suitable fish habitat	1	2	3	4
j. Chances of your boat being swamped at a camping or fishing site	1	2	3	4
k. Your ability to navigate through narrow channels	1	2	3	4

Q-20. Information about problems you may have experienced while on the river would be helpful to Glen Canyon managers. To what extent did you find each of the following to be a problem:

Circle the number that best describes how serious you found EACH to be.

	DID ENCOUNTER AND IT WAS:			
	NO PROBLEM	MINOR PROBLEM	SERIOUS PROBLEM	DID NOT ENCOUNTER
a. Waiting at boat launch ramp	1	2	3	4
b. Finding a space to park my vehicle/trailer	1	2	3	4
c. Accessing desired spots	1	2	3	4
d. Litter at fishing spots	1	2	3	4
e. Human waste at fishing spots	1	2	3	4
f. Litter at campsite	1	2	3	4
g. Human waste at campsite	1	2	3	4
h. Vegetation damage at fishing and camping location	1	2	3	4
i. Boats running over fishing lines	1	2	3	4
j. People shouting and yelling	1	2	3	4
k. Inconsiderate anglers	1	2	3	4
l. Wakes created by rafts motoring upriver	1	2	3	4
m. Noisy motorboats	1	2	3	4
n. Finding a campsite upriver	1	2	3	4
o. Boats or rafts on the river blocking channels	1	2	3	4
p. Inconsiderate rafters	1	2	3	4
q. Wakes created by passing boats	1	2	3	4
r. Inconsiderate guide	1	2	3	4
s. Water too warm	1	2	3	4
t. Water too low and too slow	1	2	3	4

DID ENCOUNTER AND IT WAS:

	NOT A PROBLEM	MINOR PROBLEM	SERIOUS PROBLEM	DID NOT ENCOUNTER
u. Remains of illegal fires on beach or at campsites	1	2	3	4
v. Water too high and too fast	1	2	3	4
w. Water too clear	1	2	3	4
x. Boat swamped while tied up on beach	1	2	3	4
y. Erosion of beaches	1	2	3	4
z. Water too muddy	1	2	3	4
aa. Inability to fish in solitude	1	2	3	4
bb. Did not feel safe while fishing	1	2	3	4
cc. Damage to raft and/or motor	1	2	3	4
dd. Within sight and sound of boats too often	1	2	3	4
ee. Lots of unburned trash in firegrates at campsites	1	2	3	4
ff. Within sight and sound of wading or bank anglers too often	1	2	3	4
gg. Toilet facilities poorly maintained	1	2	3	4
hh. Graffiti on petroglyph panels	1	2	3	4
ii. Within sight and sound of rafts too often	1	2	3	4
jj. Water too cold	1	2	3	4
kk. Boat getting beached	1	2	3	4
ll. Vessels passing too close to one another	1	2	3	4

Next, we would like to ask you about your overall experience on the river.

Q-21. Overall, how satisfied were you with your trip to Glen Canyon National Recreation Area? (circle number)

- 1 VERY DISSATISFIED
- 2 DISSATISFIED
- 3 SATISFIED
- 4 VERY SATISFIED
- 5 DON'T KNOW

Q-22. Was there anything you expected to do during your visit to Glen Canyon but were not able to do? If yes, what?

Another important purpose of this study is to learn more about how people feel about the management of this area.

Q-23. Demand for use of the river in Glen Canyon National Recreation Area has been increasing. If increased use becomes a problem, please tell us how you would feel about restricting use on the river for the purposes listed below.

(Please circle the number that best describes your position).

Restrict use to:	WOULD SUPPORT	WOULD NOT SUPPORT	DON'T KNOW
a. Maintain a trophy trout fishery	1	2	3
b. Preserve native fish	1	2	3
c. Preserve food sources for the trout fishery	1	2	3
d. Protect cultural sites	1	2	3
e. Improve upriver campsites	1	2	3
f. Create a wilderness experience	1	2	3
g. Increase boating safety	1	2	3
h. Increase peace and quiet	1	2	3

Q-23. If increasing use becomes a problem, please tell us how you feel about each of the following management actions for managing the river.

(Please circle the number that best describes your position).

Management actions:	FAVOR	DO NOT FAVOR BUT WOULD ACCEPT	NO WOULD ACCEPT	OPINION
a. Require all boats to have a "porta-potty" to carry out human waste	1	2	3	4
b. Implement a permit system for upriver camping	1	2	3	4
c. Limit party sizes	1	2	3	4
d. Require upriver campers to carry out fire ash	1	2	3	4
e. Restrict use of campfires	1	2	3	4
f. Close stressed fishing areas	1	2	3	4
g. Close certain beaches	1	2	3	4
h. Close certain archeological sites	1	2	3	4
i. Restrict number of motorboats per day	1	2	3	4
j. Restrict number of bank anglers per day	1	2	3	4
k. Restrict number of rafters per day	1	2	3	4

Restrict use to:

	WOULD SUPPORT	WOULD NOT SUPPORT	DON'T KNOW
i. Protect beaches from erosion	1	2	3
j. Reduce human impacts (litter, human waste)	1	2	3
k. Reduce number of anglers at fishing sites	1	2	3
l. Reduce number of anglers at campsites	1	2	3
m. Reduce number of day-use rafters on the river	1	2	3
n. Decrease crowding	1	2	3

Q-24. Would you be willing to pay \$15.00 to buy an annual pass to Glen Canyon National Recreation Area? (circle one number)

- 1 YES
- 2 NO

(If no) Why would you choose not to pay? (circle one number)

- 1 DON'T USE PARK ENOUGH TO JUSTIFY BUYING A PASS
- 2 THERE ARE TOO MANY OTHER PLACES TO GO THAT ARE CHEAPER
- 3 CAN'T AFFORD THAT MUCH
- 4 IT IS UNFAIR TO ASK MONEY TO ENTER A PUBLIC PLACE

Finally, we would like to ask a few questions about yourself to help interpret the results.

Q-26. What is the year of your birth? 19 ____

Q-27. What is your sex? (circle number)

- 1 MALE
- 2 FEMALE

Q-28. What is the highest educational level you have attained? (please circle one number)

- 1 8TH GRADE OR LESS
- 2 9TH-11TH GRADE
- 3 12TH GRADE - HS GRADUATE
- 4 13-15 YEARS - SOME COLLEGE, BUSINESS, TRADE SCHOOL
- 5 16 YEARS - COLLEGE/UNIVERSITY GRADUATE
- 6 17 YEARS+ - SOME GRADUATE WORK
- 7 MASTERS, DOCTORAL OR PROFESSIONAL DEGREE

Q-29. What is your present marital status: (circle number)

- 1 SINGLE, NEVER MARRIED
- 2 MARRIED
- 3 WIDOWED
- 4 DIVORCED
- 5 SEPARATED

Q-30. Which number indicates your race or ethnic group? (circle one)

- 1 AMERICAN INDIAN OR ALASKAN NATIVE
- 2 ASIAN OR PACIFIC ISLANDER
- 3 BLACK, NOT OF HISPANIC ORIGIN
- 4 HISPANIC
- 5 WHITE, NOT OF HISPANIC ORIGIN

Q-31. Which of the following describes your present employment status? (circle number)

- 1 HOMEMAKER
- 2 UNEMPLOYED
- 3 STUDENT
- 4 RETIRED, NOT WORKING
- 5 RETIRED, BUT WORKING FULL TIME
- 6 RETIRED, BUT WORKING PART TIME
- 7 EMPLOYED FULL TIME
- 8 EMPLOYED PART-TIME
- 9 OTHER

Q-32. Which of the following income levels best describes your total household income before taxes? (circle one number)

- 1 0 to \$9,999
- 2 \$10,000 to \$19,999
- 3 \$20,000 to \$29,999
- 4 \$30,000 to \$39,999
- 5 \$40,000 to \$49,999
- 6 \$50,000 to \$59,999
- 7 \$60,000 to \$69,999
- 8 \$70,000 to \$79,999
- 9 \$80,000 to \$89,999
- 10 \$90,000 to \$99,999
- 11 \$100,000 or more

Q-33. Is there anything else you would like to tell us about your visit to Glen Canyon NRA?

1991 Rafter Study
Glen Canyon National Recreation
Area



16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus the permanent data will be anonymous. Please do not put your name or that of any member of your group on the questionnaire. Data collection through visitor surveys may be disclosed to the Department of Justice when relevant to litigation or anticipated 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 15 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to the information Collection Clearance Officer, National Park Service, P.O. Box 37127, Washington, DC 20014-7127; and to the Office of Management and Budget, Paperwork Reduction Project 1024, Washington, DC 20503





United States Department of the Interior

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area

Box 1507

Page, Arizona 86040
602/645-2471

IN REPLY REFER TO:
A5427



OMB Approval 1024-0079
Expires 10/31/91

INSTRUCTIONS: When answering the following questions, please refer to the stretch of the Colorado River between Glen Canyon Dam and Lees Ferry.

Q-1. When did you first enter Glen Canyon National Recreation Area on this trip?

DATE _____ am pm (circle one)
TIME _____

Q-2. When do you expect to leave for the last time on this trip?

DATE _____ am pm (circle one)
TIME _____

Q-3. What type of trip were you on while visiting Glen Canyon National Recreation Area? (circle number)

- 1 VACATION TO GLEN CANYON NATIONAL RECREATION AREA
- 2 VACATION WITH GLEN CANYON NATIONAL RECREATION AREA AS PART OF TRAVEL PLAN
- 3 WEEKEND OR MULTI-DAY TRIP
- 4 DAY OUTING
- 5 VISIT FOR SEVERAL HOURS OR LESS THAN A DAY
- 6 WORK ON THE RIVER

Q-4. Are you travelling with family, friends, or what? (circle one number)

- 1 ALONE
- 2 A COUPLE
- 3 FAMILY
- 4 TWO OR MORE FAMILIES OR RELATIVES TOGETHER
- 5 FAMILY AND FRIENDS
- 6 TWO OR MORE FRIENDS TOGETHER
- 7 SPECIAL INTEREST GROUP (tour group, others)

Q-5. How many other people are you traveling with on this raft trip?

_____ PEOPLE

1

Dear Park Visitor:

Many people visit Glen Canyon National Recreation Area each year. You come from many different places and have a variety of reasons for visiting Glen Canyon. To assist in the management decision process, more information is needed about visitor experiences and activities. To this end, I have asked researchers at Northern Arizona University to conduct a survey of Glen Canyon visitors.

You have been selected as part of a sample of visitors to participate in the survey. In order for the results to be truly representative of all visitors, it is important that you take the time to complete the enclosed questionnaire. When you have finished, please place it in one of the survey drop boxes located in the Lees Ferry boat launch area, or seal it and drop it in the nearest mailbox. It is pre-addressed and the postage is paid.

An identification number is included on the questionnaire so we may check your name off the mailing list when the questionnaire is returned. Your name will not be placed on the questionnaire.

We greatly appreciate your cooperation in this study. I hope that you enjoyed your visit to Glen Canyon National Recreation Area.

Sincerely,

John O. Lancaster
John O. Lancaster
Superintendent

Enclosure



We are interested in how you feel about seeing other visitors on the river.

Q-6. Overall, do you feel that the river is:

- | | | | | | | | | |
|--------------------|------------------|--------------------|-------------------|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Not at all crowded | Slightly crowded | Moderately crowded | Extremely crowded | | | | | |

Q-7. Estimate the number of RAFTS you saw during your trip down the river.

I saw about _____ RAFTS at any one time during the raft trip.

I saw about _____ RAFTS total during the raft trip.

Q-8. How did you feel about the number of RAFTS you saw during your trip?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE RAFTS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE RAFTS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY RAFTS
- 5 FAR TOO MANY RAFTS
- 6 I DON'T KNOW

Q-9. Estimate the number of BOATS (not rafts) you saw during your trip down the river.

I saw about _____ BOATS total during the trip.

Q-10. How did you feel about the number of BOATS (not rafts) you saw during your trip down the river?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE BOATS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE BOATS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY BOATS
- 5 FAR TOO MANY BOATS
- 6 I DON'T KNOW

Q-11. Estimate the number of bank or wading ANGLERS you saw during your trip down the river.

I saw about _____ ANGLERS total during the trip.

Q-12. How did you feel about the number of bank or wading anglers you saw during your trip down the river?

- 1 WOULD LIKE TO HAVE SEEN A LOT MORE ANGLERS
- 2 WOULD LIKE TO HAVE SEEN A FEW MORE ANGLERS
- 3 NEITHER TOO MANY NOR TOO FEW
- 4 A FEW TOO MANY ANGLERS
- 5 FAR TOO MANY ANGLERS
- 6 I DON'T KNOW

Q-13. Information about problems you may have experienced while on the river would be helpful to Glen Canyon managers. To what extent did you find each of the following to be a problem:

Circle the number that best describes how serious you found EACH to be.

	DID ENCOUNTER AND IT WAS:			DID NOT ENCOUNTER
	NOT A PROBLEM	MINOR PROBLEM	SERIOUS PROBLEM	
a. Waiting to launch rafts	1	2	3	4
b. Litter at lunch stop site	1	2	3	4
c. Vegetation damage at lunch stop site	1	2	3	4
d. Human waste at lunch stop site	1	2	3	4
e. Human waste at rest stop site	1	2	3	4
f. Vegetation damage at rest stop site	1	2	3	4
g. Litter at rest stop site	1	2	3	4
h. Anglers fishing in path of raft	1	2	3	4
i. People shouting and yelling	1	2	3	4
j. Inconsiderate anglers	1	2	3	4

Q-18. If increasing use becomes a problem, please tell us how you feel about each of the following management actions for managing the river.

(Please circle the number that best describes your position).

Management actions:	DO NOT FAVOR BUT		WOULD NOT ACCEPT		NO OPINION
	FAVOR	WOULD ACCEPT	FAVOR	WOULD ACCEPT	
a. Require all boats to have a "porta-potty" to carry out human waste	1	2	3	4	
b. Implement a permit system for upriver camping	1	2	3	4	
c. Limit party sizes	1	2	3	4	
d. Require upriver campers to carry out fire ash	1	2	3	4	
e. Restrict use of campfires	1	2	3	4	
f. Close stressed fishing areas	1	2	3	4	
g. Close certain beaches	1	2	3	4	
h. Close certain archeological sites	1	2	3	4	
i. Restrict number of motorboats per day	1	2	3	4	
j. Restrict number of bank anglers per day	1	2	3	4	
k. Restrict number of rafters per day	1	2	3	4	

Restrict use to:

	WOULD SUPPORT	WOULD NOT SUPPORT	DON'T KNOW
i. Protect beaches from erosion	1	2	3
j. Reduce human impacts (litter, human waste)	1	2	3
k. Reduce number of anglers at fishing sites	1	2	3
l. Reduce number of anglers at campsites	1	2	3
m. Reduce number of day-use rafters on the river	1	2	3
n. Decrease crowding	1	2	3

Q-17. Would you be willing to pay \$15.00 to buy an annual pass to Glen Canyon National Recreation Area? (circle one number)

- 1 YES
- 2 NO

(If no) Why would you choose not to pay? (circle one number)

- 1 DON'T USE PARK ENOUGH TO JUSTIFY BUYING A PASS
- 2 THERE ARE TOO MANY OTHER PLACES TO GO THAT ARE CHEAPER
- 3 CAN'T AFFORD THAT MUCH
- 4 IT IS UNFAIR TO ASK MONEY TO ENTER A PUBLIC PLACE

Finally, we would like to ask a few questions about yourself to help interpret the results.

Q-19. What is the year of your birth? 19 ____

Q-20. What is your sex? (circle number)

- 1 MALE
- 2 FEMALE

Q-21. What is the highest educational level you have attained? (please circle one number)

- 1 8TH GRADE OR LESS
- 2 9TH-11TH GRADE
- 3 12TH GRADE - HS GRADUATE
- 4 13-15 YEARS - SOME COLLEGE, BUSINESS, TRADE SCHOOL
- 5 16 YEARS - COLLEGE/UNIVERSITY GRADUATE
- 6 17 YEARS+ - SOME GRADUATE WORK
- 7 MASTERS, DOCTORAL OR PROFESSIONAL DEGREE

Q-22. What is your present marital status: (circle number)

- 1 SINGLE, NEVER MARRIED
- 2 MARRIED
- 3 WIDOWED
- 4 DIVORCED
- 5 SEPARATED

Q-23. Which number indicates your race or ethnic group? (circle one)

- 1 AMERICAN INDIAN OR ALASKAN NATIVE
- 2 ASIAN OR PACIFIC ISLANDER
- 3 BLACK, NOT OF HISPANIC ORIGIN
- 4 HISPANIC
- 5 WHITE, NOT OF HISPANIC ORIGIN

Q-24. Which of the following describes your present employment status? (circle number)

- 1 HOMEMAKER
- 2 UNEMPLOYED
- 3 STUDENT
- 4 RETIRED, NOT WORKING
- 5 RETIRED, BUT WORKING FULL TIME
- 6 RETIRED, BUT WORKING PART TIME
- 7 EMPLOYED FULL TIME
- 8 EMPLOYED PART-TIME
- 9 OTHER

Q-25. Which of the following income levels best describes your total household income before taxes? (circle one number)

- 1 0 to \$9,999
- 2 \$10,000 to \$19,999
- 3 \$20,000 to \$29,999
- 4 \$30,000 to \$39,999
- 5 \$40,000 to \$49,999
- 6 \$50,000 to \$59,999
- 7 \$60,000 to \$69,999
- 8 \$70,000 to \$79,999
- 9 \$80,000 to \$89,999
- 10 \$90,000 to \$99,999
- 11 \$100,000 or more

Is there anything else you would like to tell us about your visit to Glen Canyon NRA?

APPENDIX D

Angler and Rafter Additional Comments

ANGLER COMMENTS

Q 33: Is there anything else you would like to tell us about your visit to Glen Canyon NRA?

Low Flow Anglers

- a) Went primarily to catch large trout.
- b) Have no problem with total catch and release.
- c) Have fished area many times in past 10 years.
- d) Fishing not as good and is declining.
- e) My opinion water too cold & flows changed too much.
- f) Saw many people using bait and keeping fish out of slot.
- g) Beautiful place, hope to use 2-3 times a year.
- h) Easy to catch smaller fish in back channels that warm up when river is lowered.
- i) Like to see some surface water pulled off of Lake Powell to warm river in canyon like on the Green River below Flaming Gorge.

On this particular trip there was not many people. The water flow was at 5000, which was perfect for me to fish. The only complaints I ever have are about some of the fishing guides. They act like they own the river.

Nice Place.

It's a beautiful river.

Beautiful place. Campsite clean and well-maintained. Best kept secret in state!

Prop damage at 3 mile bar. Too many guides. Boated 11 fish 10"-18", all returned to water. Beautiful fishing trip. A few fish appeared thin (undernourished?). Thanks for the study.

Beautiful river stretch. Beautiful area, will come back to fish (_____?).

Keep up the good work and good luck.

Always enjoy GCNRA. Have fished GCNRA since mid-70's. I support major decisions to maintain and preserve the area. Overall all my experiences have been pleasurable and educational.

Have some way for anglers to cross a boat landing without a boat. Some type of ferry.

Take away the ability of the Western Power Authority to regulate water release levels from Glen Canyon. Establish a "best use for all" policy that will protect the river environment and promote maximum recreational use.

Fishing was great but some fish were too thin & sick looking.

Speaking of the fish, I believe that the decrease of trout in the river is partly due to the fluctuation of the water. But it could also just be helping out the cycles of aquatic life. There could be just a brief period of decreasing then change abruptly!

Open up another ten miles of river downstream. With the right boat, it can easily be navigated. With crowding becoming a problem it seems a shame to reserve 180 miles of river for a handful of park service employees.

A shower would sure be nice. The summer days are very hot and it is difficult to stay for several days at a time without a shower.

Great experience! Excellent guide, well worth the \$\$\$\$. Best trout fishing I've ever done. Hope to do it again. Simply beautiful area, unbelievable!

As you will notice I don't particularly care too much about erosion, because erosion is with us for millions or billions of years and what create such a beauty as the Grand Canyon and other wonders of this planet is nothing else but erosion. But as I enjoy fishing Lee Ferry especially for trophy trout for the past _____ years you don't have to be a _____ to know, that when the tremendous amount of water is release from Glen Canyon dam a tremendous amount of moss and algae, who are the primary habitat and forages for the fish are washed out, there for your answer to starving fish. There maybe other problems to this situation, but let's face it _____ has a tendency of creating it.

I was disappointed with the fish quality. They seemed to be long & skinny - white mushy meat - what happened to the fat pink meated fish?

I was impressed with the fishing guide concern with the fish and the overall catch and release attitude. Would like to see a trophy trout area.

Beautiful, would hope all could see & use. How about use of tunnel & float fishing once through - no boat motor except for safety use.

Would like to see Game & Fish & Park Rangers, inspect more boats & enforce safety rules. It was the most enjoyable visit in AZ. We stayed at Motel Glen Canyon & was O.K. Beautiful river. Fished from 6:00am to 6:00pm Sat & Sun. Found friendliness on cleanliness on the river, Thank you.

We came to Glen Canyon for a guided fishing trip, the water level was bad & so was the fishing. Way too much fluctuation on normal days.

The fishing was good, like the no increase in water flow, but it's a shame more people were not there to use this river. Caught 14 fish but 10 were in the slot. Not too sure the slot is doing what they said it will do.

I have fished the ferry over the last 10 years - I like catching trout, but the chance of catching a trophy just isn't there anymore. It has turned into more of a fly fisherman, upper-class type, too many fish are being caught and released. They don't fight as well. I also feel the water level should be kept more constant - steady flow. I prefer to hike down below Marble Canyon Bridge, the fishing is better and more like it used to be.

Help the fish habitat. Thank you.

Development of catch/release trophy trout fishing should be encouraged.

First day had very low flows - fishing was great but had some problems with low water navigating shallow stretches. Second day water was high and fast, fishing was poor.

Catch and release may be harming some of the fish, a few I caught didn't look healthy, because they had been handled so much. Maybe the slot restriction should only apply every other month and reduce the limit to one fish.

The number of fish seems to be good, the quality is not anywhere near what it was in the early 80's. A 20" fish back then would have been close to 5 lbs. Sorry for not sending this earlier.

I was surprised to encounter a fellow taking nude photographs of a woman on the rocks downstream from the boat launch.

I have been in the Glen Canyon area several times for the past several years and have always enjoyed not just the fishing but equally - the beauty and grandeur of the area - although we have realized the presence of others, there has never been a feeling of crowding. In the present attempt to reallocate the resources of the area and "downstream" uses I hope the fishery is not only maintained but can be improved.

Great. I fish the Glen Canyon area 2-3 days each month of the year - usually with a guide. This year the canyon isn't crowded. It has been crowded in the past, but due to the decrease in the number of fish and also size, the fishing during the past year is poor compared to the past few years.

You took this survey at the wrong time of year, it is not representative of actual river use. (in back) Yes! Stop the ridiculous water flows - they are killing the fish. Get more law enforcement for fishing and water safety. Don't let people navigate the river until they can prove they know how to handle it safely. Too many underpowered boats.

I vehemently oppose the alternative of a re-regulation dam that would eliminate the fishery and inundate the last remaining stretch of Glen Canyon.

Stock river with trout.

I wouldn't want to see any limits on access to Lee's Ferry. We have enough limits on us now. The river needs a balanced flow. It's ruining the fishing and the beaches. Of course you already know that. Other than that everything was great as usual. Good luck.

Area is beautiful, water was clear. I think we expected to catch huge fish because you hear so much about it. But it was probably the time of year. People were very friendly that we met, and it didn't seem too crowded.

These responses are based only on this particular visit. If I were to answer the same questions after a Thanksgiving weekend or one of the other high use times my responses would be different. I've been coming to Lee's Ferry for over 8 years and the crowding has become considerably worse and the fishing success has gone way down.

Medium Flow Anglers

The level of the river should be maintained at a constant level!

Enjoyed the scenery, angling along the riverbank.

Keep water level constant!!

If they stop fluctuations of flow for shore benefit, may damage fishing and fish habits used for many past years. Maybe past large fluctuations are needed for fish feeding habits to continue.

Like it is, is great! We don't need a bunch of rules that cannot be enforced.

Would like to see guide svcs(service) limited, as rafting is - guides are on the river the greatest # of days per year, the most fishing by individuals are limited to # of days they fish. I travel 450 miles to fish, can only take 2 fish home. How many fish does guide svcs(service) personnel damage in a day? and then the fish die. I would like to NO GUIDES on the river.

- 1) I like the idea of the public paying the bill after all we are the ones using and abusing the area.
- 2) I fish this river area approximately 25 to 30 days a week (year?) and I would like to see a scheduled fluctuation of the water flow, preferably not to exceed 12 - 15,000 cfs (perfect fishing = 3000 rise slowly to 10,000, steady flow 5000 to 8000)

Filling out this booklet/survey is very time consuming. Reward respondent w/special maps/fishing info/etc for filling out. Thanks for asking for feedback from consumer for a change.

Most visits were great, but this time there were too many people. This is also the first time I went on a holiday.

I support actions to improve the fish populations and preserve the natural resource for recreational purposes.

I think the Park Service or AZ Game and Fish should put some fire hose bumper on the boat dock. Now it is uncovered wood, this dings your boat.

There have been very bad effects on the fish in this area in the last 12-15 months. In my opinion the extreme fluctuation of water released during these studies have caused this. The fish are skinny and stressed in areas and the great numbers of fish are not here as in the past. The fishing was great 1 1/2 years ago before these studies and getting better. I feel the impact of these studies are bad for the river, especially the flow studies of water. The size slot was a good addition.

I've been coming to the res? for three years and never had any problems with the other users. However, this year state and park rangers seemed to be everywhere bothering everyone. Vick Brown in particular was very aggressive. What's your problem?

I have enjoyed coming here. It is not a rowdy young place and I feel that it should stay this way. Do you stock the river with any trout?

I didn't like that the camping areas were so limited. I understand wanting to preserve the natural surrounding, but I do think more camp sites could be created with good taste and min. harm to nature.

I frequently go upriver in my kayak for combination of exercise and canyon beauty. Raft guides and motor boaters are usually very considerate and friendly. Don't mind the number of boats though noise is a bother. Don't restrict raft traffic - thousands of tourists wouldn't otherwise see a S.W. desert canyon and they need to.

I came for a fishing experience and had a good one. Trout are plentiful but in poor condition. No fresh water scuds, very little insect life, very little feed.

This is my fourth visit (ie: my eighth day of fishing) and the fishing has never been this slow. I believe the 15,000 cfs constant flow has to be a significant factor in the poor fishing.

Must the water level vary so extremely? Isn't there some moderate average that could be maintained daily?

Additional camp sites could be added to present day use areas. Restrict motor boats to 20-50 HP.

Help the fish!

I enjoy coming up here to get away from people. I like fishing the river and camping in the campgrounds. I just enjoy the canyon.

We enjoy come up here two or three times a year, just to be by the river and see the rafts leaving to go down river and camp in the area.

Control water release out of dam to a max of plus or minus 10%. I was here one year release was about 30,000 cfs in 3 days went to 3,000 cfs then the study was made about where the fish went. They died on the riverbanks or starved when the feed died.

No - very nice - YES - Replace the smiley face on the Lee's Ferry water tower. Thanks.

I had a wonderful time.

I have spent only one day really fishing the river previously with a guide (Terry Gunn) and was concerned about the condition of the fish that I caught. Mr. Gunn indicated that the way the river flow was being controlled had adversely affected the natural food supply and that proposals were being made to stabilize future water releases from the dam. I had been aware of the quality of fish and fishing conditions in the past but never experienced them. I hope that it will be possible to re-establish the river as a quality fishery in the near future. Thank you, a fisherman.

I felt more people were on the river prior to a holiday would like to see consistent water flow. When we were there water flow was consistent.

Difficult to obtain info - Ranger station was closed; brochures unavailable; fly fishing store was closed on Wed. (private); Personnel in Marble Canyon Trading Post were unhelpful (they need an orientation to their backyard by the rangers).

We got our preferred campsite. We had 3 days of fantastic weather and fishing. Am looking forward to returning in October.

I have fished the Glen Canyon NRA 4 times in the last 3 years and have always found it to be a wonderful day.

It's a wonderful environment, I appreciate its beauty, and I would support its protection from any mis-use. The more natural the better!

It's great! Preserve it as it is.

More shade, more fish, more facilities, more fire wood.

Yes, put the face back on the water tower.

Don't regulate the area more than absolutely required. It's been regulated & controlled too much already! Please do not restrict personal use of the area. It's the only part of Glen Canyon left! It's not too crowded yet. Just do not promote or improve it more. It's still as I remember in the 1960's, I made my first trip here before 1960 and almost every year since! Please contact me if further surveys or opinions are needed. I would love to know the outcome of this one! Address listed.

This is our first & maybe last trip to Glen Canyon. More clean porta-potty near fishing sites would help the human waste problem.

Annual pass should be based on one pass per motorcraft. I would be interested in the results of your survey.

I'm sorry for not returning this questionnaire sooner. Lee's Ferry is a beautiful area along with wonderful fishing. Do whatever it takes to preserve it, so our children can enjoy it as much as my wife and I have, don't let outside pressures influence good common sense. Let me know how this turns out.

I have fished Lee's Ferry for over 11 years. I seen at its highest peak and at lowest level. I feel the future of the river is in trouble. In my opinion it is not getting better it is getting worse. We need impose catch and release reg. Cut down on the amount of fishermen. Including the fishing guides less fishing guideless fishermen on the river. There reason for conservation of the river is strictly for profits only. I know most of them would like to have the river to themselves and to paying consumers. I would gladly cut down my vists and pay more for special stamp to river but not if the guides were not restricted to. (P.S Stop the down river rafts trips into G.C. before they screw that up.

I think we should avoid overregulation. There are good rules in effect now. They need to be enforced. Vic Gray (Brown?) seems interested in help from volunteers like me - this should be encouraged. There are many people who love this place and would help! Thanks for your interest!

I would like to see the flow of water kept as steady as possible.

I was a little disappointed in accessability by auto mobile to different locations. It seemed a long way from one point to

another. As a crow flies a stone throw, by car hours of driving. With the terrain the way it is I can understand the limited access. With gas prices it was somewhat expensive and a draw back. All and all I had a very memorable experience.

It was a very good day with plenty of fish caught, but none above the slot limit.

Comments attached. None found.

Great as was.

The water was spectacular and so were the canyon walls.

We went fishing with a guide, this was the fourth time in 3 years. We had a very enjoyable day and we are looking forward to our next trip this fall.

I have a strong objection to the catch and release situation caused by the slot fishing limits. Many anglers do not know how to properly handle trout when releasing and many of them die and are wasted.

Porta-potty is a must and if a boat owner does not have one give first warning. Then second time stopped to inspect if no potty \$250.00 fine. Permit system is great; People AZ: \$15.00, People CA: \$30.00, I'm sure people from Calif. use the river as well. If I apply for fishing license in Calif. price would be double. Boating is great and people on boats also, but you know as well as I do some boaters are party great. But they don't clean up and carry out after they are thru. These people don't care if they can get away with it. Short term they should pay fine if no Porta potty onboard being used yes they should pay user fee. I bought fishing license and trout stamp cost me \$22.00 Arizona. Other wise you will have nothing but garbage shoreline. If it gets bad some people will go someplace else. I camp and my wife for 40 years we clean our campground before we camp and before we leave. This is the way it should be. Other wise you will have a real big mess to clean up. You start by enforcement of rull to not to be brokn. If you do not control it from the start give them a fine. If they do not pay impound there boat till they do. Glen Canyon is a gift from God to man, it's beautiful.

I have indicated this before in this survey but will say it again. I guess I resent the exploitation of the river by the guides who bring in individuals who want big fish, do not enjoy or care about the natural beauty of the area. With a fly rod the 14" trout are a great day pleasure. I do not identify with the beer drinking trophy hunter? that pay to be led by the nose to the fish.

When I see people with clipboards we are in trouble. These waters were fantastic 5-10 years ago. The management allowed it to go to pot & then out come the clipboards. Why not close it every other year. No regulation, no management, no interest until it is in bad

shape then tell us how great it is 7 make so many conditions it's not worth visiting.

I spend one 3-day weekend a month from SEpt. to June fishing at Lee's Ferry. Fishing with my family and friends. We always camp at twin stripes and never have a problem finding a site. We enjoy fresh trout for suppers and would hate to see it go to a no kill river. There is ample solitude after the day fishermen leave for the day. Please do not restrict my access to this wonderful river.

I love it.

Yes! What the hell was the testing going on while I was there. I heard lots of helicopter activity up river one afternoon and suddenly I was confronted with a solid flourescent orange river with helicopters with nose mount cameras filming. I assumed this was an experience (ment) in charting river flow and channels and currents, etc. I can't express my outrage, stuff like this can be intellectualized until blue in the face. I hate it. When will we stop messing with this magnificent thing we call nature and allow for a living balance between all things.

I am concerned with the water levels affecting the hatch of fish and the food supply for them. We saw and caught a lot less fish this time and they were all smaller than previous trips. Overall you have done a fine job. All resources were clean and the personnel very friendly.

When the dam was built in the early 1960's priority was not to sell the cheapest power possible. That is the priority now. The fluctuations will again kill. Fluctuations are fine, however, it is the rate of fluctuation that is dangerous and harmful to the environment. There needs to be a minimum and maximum flow determined (8-20,000 cfs) and the rate (of increase?).

We really like fishing and camping at Lee's Ferry. What I enjoy most is the water is so clean and clear that I can actually see the fish underwater. I understand this is due to not enough erosion and silt depositing but it's difficult to have the best of both worlds.

I would like to catch a few more fish. I would like to be able to rent a boat and motor.

I think you are screwed up on some of your questions we the taxpayers are to enjoy this put worm fishing from cable to bridge.

Very enjoyable-

Find some way to publish when the river is going to be at high water for number of days, or place to call that (it) is published. Like way you are restricting fish size and take and use of artificial lures only. Might suggest certain areas be restricted to fly fishing only.

There are a lot of pros and cons to too many things at the river. It does not matter to me if it runs high or low. I think it would be a good idea to have so many reservations so many day use only. And some spots open for both for passer bys or just stop to check out say 30 30 10. Less raft trips from dam. Outhouse pump out more often and solar showers on beaches.

For me, it was a thrilling experience. Fishing was mediocre but exciting and landscape breathtaking.

This survey is stuped. A waste of time and money. Quit stocking fingerlings - they will eat all the forage. Let the trout be - quit messing with a good thing.

Great Time, fast H2O.

Limiting raft trips and boat would be the biggest help of all to the area and the fishing.

Plant more fish!! Rainbows - Brook trout. Maintain flows between 3,000 to 12,000 cfs, 15,00 max. Everything else is fine.

I love this area and as a boat owner I would hate to have Glen Canyon restricted. I do think the fluctuations of the river should be more of a constant.

It is one of the most beautiful area of the U.S.. The fishing is declining over the past 4 years. A steady flow of water would permit more invertebrate life and greatly help the fishery, decrease erosion of beaches, and improve safety. I'd favor a steady dam output with solar and wind turbines to provide peak energy needs now served by dam releases.

(Guide) 1.- Fluctuations of the type experienced in the last 2 years is killing our river.

2.- Boating safety is a major problem at Glen Canyon (Lee's Ferry).

3.- Rafters and fishermen should not have problems co-existing at Lee's Ferry as long as common courtesy is observed.

4.- Most important - manage this area as a recreation area and take control away from the dam.

5.- Don't study our river to death!

(Guide) Game and Fish need to check shore fishermen & boats @ dock 2 hrs. every evening.

(Guide) Restrict rapid ramping rates and high flows and low flows.

High Fluctuating Flow Anglers

This is a premier fishing stream and should be kept that way.

I loved it! Your rangers are 1st class professionals. I do believe you need a ranger patrol boat operating where ever there is a congestion of speed boats. I am a retired U.S.C.G. licensed vessel captain and I know first hand how idiots, beer, and boats act together.

Glen Canyon should be managed by the Parks & serviced by the Parks. Asking anglers to carry port-o-johns is totally ludicrous. If Glen Canyon is having money problems they should lobby for more tax dollars. Also, if I want to jump in my pick-up & go to the Ferry on a whim, I don't want to worry about permits.

1. Guides come to close to floating boat fisherman with no respect.
2. Would like to see a sign indicating graffiti is against the law at petroglyph panels.
3. Do not fluctuate water level more than 3 feet during spawning season.
4. Some fish seemed thin and think 4 fish should be the limit to thin fish for lack of food for too many fish. 2 over 22.

Great place. Don't restrict, just manage.

I hope you feel the problem with the fish. Try following Colorado's example and promote Blue Ribbon waters.

Over regulated! I have been stoped and checked as many as 3 times in one weekend.

They should do away with the slot limit and increase the bag limit back to four, my main interest in fishing is to eat them, not play around with them.

Extremely concerned with condition of trout. Undernourished! They do not have the energy to feed in normal feeding channels and are laid up in back eddies. They're is a crisis occurring in the river. I am a catch and release (barbless) fly caster. How can I help? Business card attached.

It is quite clear that a major issue is water level fluctuation.

It was great. We plan to visit more often.

I had a great time, however, it became irritating with all the rafters. They were polite & the guides tried to stay out of my way. I tried to stay out of their way also. The rafters were always waving & taking pictures & it became embarassing. Also, drift fishing you tend to go past the same rafters many times. It just became uncomfortable.

Keep up the good work.

- More presevation efforts (clean up beaches.)
 - Something needs to be done about fluctuating flows from G.C. dam.
 - There should be more information on the area available.
- Awareness is our only hope!

I feel steps have been implemented to help the fishing- ie: Lures only, slot and 2 fish bag - possession limit. If there were adequate enforcement of these existing rules I believe they would work. I have been to Lee's Ferry on at least 10 occassions and have never been checked for a thing. On a far more serious note, I do feel water fluctuation is a major concern. This great amount of raising and lowering of levels carries a tremendous impact for environmental and fisheries.

My comments are based on 12 years of coming here. During last 9 years have averaged at least one trip a month using my own boat. I am very familiar with the river, its bars, and channels. At its most crowded periods it still is a special place but I don't feel access should be restricted. Crowds are only occassional. Major problem is H2O fluctuation. A minimum level (suggest 8,000 cfs) to preserve breeding bars and prevent fish kill, should be established.

I usually make a fishing trip here at least once per year usually during the summer. I have noticed a significant reduction in the amount of "shrimp" available for trout to feed on over the past two years. The trout I have caught during this visit are smaller and skinnier than I've ever seen in the 5 or 6 years that I've been fishing here. Where have the shrimp gone? The area I usually fish is near the gravel pit by the Paria beach.

We think a higher profile of Fish & Game wardens would prevent some people from taking excessive # of fish from river - one group in the area boasted of eating 30 trout the previous evening!

I love the area, but am very upset about the erosion of the beaches due to the release of water to produce electricity! It's sad that the greed of men & disrespect of our beautiful parks is secondary when it comes to the all mighty dollar. We need to change our priorities before it's to late.

Water level 5,000 - 30,000 cfs. Excellent fishing all day. 30 - 40 fish catch and release only.

I visit Glen Canyon to fish and enjoy its natural beauty. A. Fishing: Do away with slot regulation. Allow 4 fish limit (2 if experts feel fishery is being depleted) regardless of size. B. Do whatever is necessary to preserve the granduer & majesty of the canyon. The commercialization of Glen Canyon is readily seen in the # of day trip type rafters plying the river on an almost hourly basis. This type of activity, in my mind, destroys the serenity, magic, & special ambiance of Glen Canyon. It cheapens ones experience.

It is a beautiful place. More information should be made available on water releases & fishing. San Juan has a nice set up. Different areas are restricted for certain types of fishing, ie. catch & release, flies, lures, bait.

Surprised there was not more supervision and monitoring of fishing along banks.

Beautiful place to visit and to fish. Should be accessible to all who want to experience the portion of the river that we visited.

I found Glen Canyon NRA to be in good condition. Please do not restrict people who behave themselves from the waterways and land that is theirs. You could & should restrict glass containers from all rivers & public areas in the U.S.A., the beer drinking slobs ruined many areas.

I enjoy the trout fishing and I practice catch and release. I use forceps and try not to take the fish out of the water.

Maintaining a more normal flow and minimizing peaks and valleys.

Less talk, more action - we're studying the river to death - getting past the bureaucracy will be the milestone not the implementation of regulations to make Lee's Ferry into its potential. Good luck!

Great time.

There is no consideration given to the few of us that are handicapped and still enjoy the sport of fishing.

I was disappointed in the fishing. My family of four fished for two days saw lots of fish, but did not get a bite. I have seen several TV shows on fish taken at Glen Canyon, however, we did not take any. We used all kinds of flies and lures.

We came up in July so conditions may not have been so crowded as other times of the year. We enjoyed our fishing trip all though it was hard to turn back a 21" fish but we did. Yes, you were right I did lose my questionnaire and I thank you for sending me another.

Spent 4 full days fly fishing NOV 1990. FLOW was about 5,000 cfs and fishing was excellent due to exposed sand & gravel bars & islands. I go there strictly for quality fly fishing. My last trip in July was fair because of the water fluctuation & overall high water. I will return only during winter months when the water release is stable and low. I have to drive 9 hours and spend too much money on the trip for me to have high water & fluctuations cut my quality fishing times in half.

It was a very pretty area..., but we were limited in the amount of time we had to spend there & basically went on the "spur of the moment". Would like to see & do more up there but its pretty far to go! And way too hot this time of year, plus the water is so cold! We caught & released 2 trout, one 5", one 12". Trout catch rule is kind of confusing.

I go there often (20 times per year). I have yet to have a bad experience. Public awareness & education can handle just about all future problems. It does not bother me to see other people down there.

I was very impressed with it. I was somewhat upset by the way the river fluctuated. This made it difficult to fish in some areas due to the wet grounds... it also attracted bugs!! I am also concerned about the water temp. This seemed to make the fish less active - I am an avid supporter of catch and release but the fish I caught were not active. I also believe that there should be increased dock area and to make it manditory for all rafting expeditions to dock for loading of equipment & passengers. I was impressed with the cleanliness of the area.

I utilize GCNRA 8-12 times/year to fish on 1-2 day trips and enjoy the scenic beauty, water clarity, general cleanliness, and fishing quality. I feel, however, that over the last 2 years, it has been researched to death, and more harm has been done to the fishery than perhaps it can recover from. I realize that the creation of the fishery was a bonus after the building of the dam, but it is now part of the recreation area, a very important part of the fishing community, and should be protected, and managed as such. I would like to see the minimum flows raised to 5,000 cfs, the maximum dropped to 24-26,000 cfs, and the ramping rate controlled, so that what was once a great fishery can rebound to become a better and safer fishery.

Overall a good experience, had a great time - the right amount of rafts, they did not bother me except for their wakes - would like to see the river flow constant, or posted at Lee's Ferry - it seems easy enough to build a sign so you could post expected future flows, so boaters would not be stranded! A 15.00 fee may seem too high, but a 2.00 or 3.00 camping fee would be fine. I think there should be a few more campsites made available. We were not hampered by lack of sites, but on a busy weekend or holiday, I think it would be very crowded. Thanks.

Visited Lee's Ferry, fished w/ waders. No fish. Usually hire a guide w/boat. Had an enjoyable day trip.

Yeah. I think you folks are doing a pretty good job and you just can't beat the scenery! Here's your pencil back.

The quality of the fish is decreasing. High water levels make it difficult to fly fish. There appears to be a need to find additional forage for the fish.

The serenity of the river has been downgraded by the introduction of the rafts. Would like to see river from Lee's Ferry to dam for angling only. Keep rafts below Lee's Ferry. Trout fishing is best enjoyed in a more solitude setting as before the rafts were introduced.

Disheartened by the dramatic reduction of moss (ie. shrimp) habitat on the river bottom - beach erosion - camp fire pits on beaches and the litter buried in them, I love Glen Canyon NRA.

I want a quality trophy trout fishery here. Catch and release - no keeping of fish. Moderate flows, less flex. Less studying, more action.

I very much enjoy visiting there and would like to see facilities upgraded & use restricted by requiring reservations & use fees.

1. Quality of fishing has greatly been impacted because of the water fluxuation (poor management). No more fireside talks, poor sanitation of restrooms at Lee's Ferry campground.

Should be able to use bait so you can have more of a chance to catch fish off shore day & night. Also should have outside shower heads by the restrooms to cool off during the blistering heat in the summer.

Wonderful trip - we look forward to coming back. We were on the water at all times and did not use the "bathroom" or impact the surface area at all.

Showers in campground. Increase limit (If slot limit is kept). Change slot limit: 18-24" or 18-22" *under 15 *over 22 (1 fish trophy).

Campground was nice, however, showers would be nice.

Beautiful area - fishing is average to poor, probably due to extreme water fluctuations. What could be done to enhance natural spawning and survival of hatch? Also - barbless hooks should be mandatory.

1. Keep public areas as open to the general public as possible.
2. Enhance access to river for non-boaters - add trails , not limits.
3. Do not make this an exclusive club location for "trophy" anglers.
4. Maintain prudent wildlife management. Don't go overboard!
5. Add trash receptacles and/or toilets to help reduce amount of litter/waste in area.
6. It's a big river, find ways to use it all.
7. Stock with other fish than trout for variety.

Extreme water fluctuations for extended periods is poor management (even for studys). The campground should be closer to the boat ramp & not on the windy ridge.

I am really disappointed that the large trophy fish that used to be there are gone. Also many of the fish we catch appear unhealthy and skinny. What is going on to destroy what was once such a beautiful fishing area?

We had a great guide.

Would like to see some restriction on number of downriver raft trips. Gives indication that the more \$, the more rafts and people. Crowded condition around boat landing, is it possible to start rafts from below cable?

This is one of my favorite places. It is so beautiful.

The guide we had on our first trip to Glen Canyon was excellent. However, we were very disappointed with the size and quality of the fish. We released all of the fish we caught, everyone should catch and release! From everything we heard the size & no's are going downhill. A priority has to be habitat for the trout and a catch and release rule for the public.

RAFTER COMMENTS

Q 26: Is there anything else that you would like to tell us about your visit to Glen Canyon NRA?

Low Flow Rafters

The Colorado River should be allowed to run in its natural red form - the river should be seen in the form in which it actually carved the canyon. The Colorado running cold and green changes the entire ecosystem of the canyon. Also the pollution from the Navaho Power Plant must be controlled.

We had an excellent guide named Darby. We had a wonderful time.

Stupendous! I spent 5 days on Lake Powell (Wahweap to Bullfrog) & was thoroughly dazzled & impressed by God's natural show. I was less impressed with the "loud" music & noise from houseboats & loud zooming from jet skis (Also wondered about the safety issue on jet skis). Also do people "know" how to drive motorboats when they rent them? What about having notices posted in French, German, and Japanese for our visitors?? Is it necessary for one concessionaire (ARA) to have all monetary rights to Glen Canyon & environs? Prices were high; service provided on the whole were OK to very good.

I truly enjoyed our day trip. The guide was knowledgeable, friendly, and fun. He answered questions completely and encouraged more. Next time I'm gonna FISH!!

Had a great time.

Outstanding fun.

Survey is too long.

I really enjoyed it and would like to return to see Lake Powell & do a 3 day rafting trip into the Grand Canyon.

My wife and I enjoyed the entire Tauck Tour, since we have never vacationed this part of the country of USA and were overwhelmed at the sites we encountered.

Enjoyed it very much.

Although comparable to other touristic events we found the price somewhat high in relation to the activities offered. For Europeans the dollar is still twice as much as the Dutch guilder? but spent in the same way.

Should continue to allow these areas open to public under your normal present restrictions. We enjoyed our visit immensely.

I am from the east coast. I enjoyed my visit to the area. I don't know how valid are my opinions since I doubt if I will be back in the area within the next few years.

Visit to Glen Canyon was an experience of a lifetime! Keep up the rafting tour. For those who don't or can't afford a boat, and for all visitors from around the globe. Because the Glen Canyon experience will leave a lifelong impression, which I hope many of my generations will be able to experience. Thank you.

It was a very pleasant, educational, & wonderful experience.

It is most important that people are using Glen Canyon on its terms not the opposite.

No, but I think questions # Q-23 & Q-25 are irrelevant to survey.

It was beautiful and clean and uncluttered. Keep it that way. Was very refreshing not to see litter everywhere. Makes a much more pleasant holiday.

Thank you!

I think a more balanced view should be given re: the status of the region to visitors. Specifically, the adverse effects of tourism & dams on the Colorado River. Eco-tourism should be the theme of the region and the visitor's role and responsibility in this. The average visitor to the Glen Canyon NRA does not know that the Colorado River is disappearing and that the dams themselves contribute to this problem (as much good as they do)... this balance perspective should be given. It will create a greater responsibility in the visitor to protect the environment.

It was very nice. I am from the Atlanta area and we always see more people every time we raft or canoe down river. This trip seemed very private and secluded compared to home.

Would like to see real toilets.

We all loved it. People were delightfully helpful. The area is truly beautiful. We rented a boat - more helpful in instruction on what to see on our own would have been appreciated.

We loved it!

Very enjoyable.

It was a wonderful trip. We enjoyed every minute of it. I would recommend it to everyone. The guide explained all the things to all and answered any questions we had. We had a safe and good time.

Great!

My husband & I thoroughly enjoyed the Park and raft trip.

I had a great day.

Atmosphere was very hot the day we went, but it was expected.

We thoroughly enjoy the trip - and our guide Joni was a delight. Also, bus driver Tom.

Roads are too narrow!!! 4 lane roads are needed- enforce min. speed limit!!!

My husband and I were pleased to see the dam from below as we began the float. We did not realize that was where the tour began. Also we found the tunnel and learning how and why it was made very interesting, an extra bonus to what was a very inspiring and beautiful tour.

The raft operators should be knowledgeable about history and geology of the area. They know quite little. You should have more education & less bull. Also an adult only program would be nice. The screaming children are a bit much all day. Trip is much too slow and not varied. Lunch is awful. No one in their right mind would do it twice. Our equipment & the rafts leaving on the same trip broke down 3 times! We were 1 1/2 hours late as a result. The ads lead one to believe it is closer or in the Grand Canyon. Quite a disappointment to learn where it is located.

Make sure river pilots are well-versed on canyon.

Great job.

We enjoyed ourselves very much.

More roads to access Lake Powell ... less dependence on gas at marinas.

A beautiful experience - Hopefully, the Canyon and its environs remain pristine and practical.

Great!

Beautiful. Seems well maintained.

The only thing I found annoying was the gnats.

What a great area. We visit each year for 3 to 4 weeks.

The guides on rafts could be better trained in correct English grammatical expressions - but they are young and summer employees. However, they said they were college students. Their English expressions needed improvement. Very beautiful trips - enjoyed it very much.

Excellent in every parameter.

It was a memorable experience, however, I would be saddened to see an overexposure of this beautiful canyon.

It was a great trip down the river. The area seems well taken care of and not crowded. I (we) would recommend it to anyone. Also, the guide was very professional and knowledgeable.

It was one of the highlights of our vacation - just needed better bathroom facilities at lunch site.

Had diarrhea & vomiting for 2 days after raft trip lunch...? Ate ham, rye bread, mayonnaise, cheese, mustard, and chips & dip..?

We were disappointed about the lack of information provided during the raft tour.

Our visit was part of a tour, it was handled very well, but I would have enjoyed seeing the lake recreational area also.

It was an extremely pleasurable experience.

It was a lot of fun.

NPS has adopted a too visible law enforcement - restriction - control - prohibition attitude in Glen Canyon - more analysis of passive measures needed - they need to remember this is a recreation area - not a national park. Litter control and Lake cleanup needs to be addressed.

Thumbs up.

It is a very nice place to visit.

The lunch was great, however, not enough seating. There were many older people in our group who had trouble balancing food on lap while sitting on log or climbing back in raft. Maybe chairs or some seating could be provided & maybe the young host/hostesses could serve the lemonade rather than have each person doing a balancing act to get lunch. Great spot. Had a wonderful time.

It was a wonderful vacation experience.

Matt was a great guide, cared a lot and was funny.

Provide more knowledgeable guides.

A nice area to visit.

It was marvelous. The raft trip was the highlight of our vacation. Please let me know where I can purchase a T-shirt saying "I rafted the Colorado". Thank you.

Very good guide. Was interesting.

What a beautiful place.

The commentary by our guide during the raft trip was often too "cutesy" and almost condescending.

Enjoyable day. Thank you.

We saw 2 cows grazing!!

I am on a Tauck Tour - a senior citizen & therefore consider this to be a one-time visit - I enjoyed it very much.

Limit auto access, provide busses to shuttle people in & out to cut down on burgeoning pollution problems.

The raft trip was very enjoyable, but I think Lake Powell and the dam are interfering with the natural changes of the canyons of the Colorado River. Lake Powell is ugly compared to natural surroundings. A different energy source should be cultivated for the area; then allow safe and restricted use of the river and its bounds.

It was great.

First time in this area of the country. Day trips out of Grand Canyon. Overall experience was great, would come again.

.... 6 week tour of S.W. America..(foreigner)

It was a wonderful experience. Thank you.

I had intended to return this survey as soon as we returned home, but had misplaced it. Thank you for sending another. Since arriving home, we have read about the flow of water having a negative affect on the Grand Canyon (erosion etc.). We support any measures which lessen manmade environmental changes. However, we do have to expect natural forces to constantly change our land. Without these natural forces we would have no Glen Canyon or Grand Canyon to enjoy today.

Very enjoyable.

Enjoyed.

It was a memorable experience (smooth-water raft trip). We were amazed at the clarity of the water and all the rainbow trout we could see! And what a way to see the canyon! We thought the rafting crew did a good job except for beaching the rafts and then muddying up the bottom to unbeach them. Only objectionable part of the trip was the condition of the porta-johns at the rest areas.

Beautiful area.

The raft trip was managed very well by the tour people. The water was low but it did not take away from the beauty. We had a wonderful, fun-filled day. We would do it again.

We are at a time in our life when we feel that the stupidity of mankind is certainly taking a toll on nature. Your facility and many others are doing their best at making recreational sites available to the public, but the public is oblivious to the part it must play. We try & have our children pick up after themselves, which is not always easy. I can well imagine the immensity of that task, in regards to the public, for you. Your people were very courteous, helpful, & patient. If only all people would realize that it takes all of us working together to achieve even small goals. Our family would like to thank you for the opportunities you have provided.

- a. A nice trip.
- b. The bus trip back very boring.
- c. Price + 20% is too high.

Medium Flow Rafters

Thoroughly enjoyable - great pilot - young man helpful, personable, very informative about the area.

I would recommend it to our family and friends.

Our son, who is a law student majoring in Environmental Law, answered this questionnaire. He is a whitewater river raft guide & has spent 21 days on the Colorado River from Lee's Ferry to Lake Mead. We are retired Forest Service. If possible, I'd like an area for sailing & canoes - away from speed boats & speed skis.

I would support any sensible measures used toward preserving this environment. The use of fuel-driven vehicles to any great degree should be limited to what the environment can absorb safely - some places should be closed to fuel use. It was a marvelous experience and I encountered nothing but courtesy from all the staff.

We'll be back in a few years with our future children.

Nice experience, both spouse and I.

Too much time used for lunch and restroom stops.

Toured with organized tour group (Tauck).

Brilliant - don't mess with the environment.

Enjoyed the wonderful engineering of the tunnel.

Our trip was very enjoyable. We hope that the Glen Canyon will not become a huge recreational area. We had to see the beauty spoiled by tourism and human ignorance. Our trip consisted of two rafts and two rafts that were empty passed us. There were several fishermen but I didn't feel it was a lot, but I would hate to see anymore. I also hate to see some of the graffiti some ignorant tourist left.

It is most important to keep areas like Glen Canyon for future generations. The graffiti on the petroglyph panels was a travesty. If you must put these off-limits, or limit the amount of visitors, or have full-time "guards" then that should be done. Maybe then we will all take a more active role in protecting our environment and national treasures. We did not encounter crowds - we left before weekend.

In relation with the negative answers given on pages 4 & 5 I would like to state the following; - neither the Tauck tour guide nor the raft guide did advise the participants of the danger they were running by sitting on the external float of the raft. They even encouraged them to do so. My wife did so. The waves created by a too near passing high speed motorboat provoked her fall into the water. A good thing she's young and a good swimmer. I prefer not to think at what would have happened if some elderly non-swimming person would have been ejected. The material consequences of the "event", not to mention the great fright and the inconveniences caused by the fact that you are hurled into ice cold water, are the following:

- the loss of a Dunhill? lady's watch damaged beyond repair
- the loss of a sweater, hung out to dry on the raft and blown away by the wind.

I do regret I did not lodge a complaint.

As our party was about to board the raft rain commence. The guide on the raft made no effort to pull the cover on the raft thus we sat on rain soaked seats. The guide was not too well oriented on group dynamics and thus gave little explanation of the trip.

I have pleasure in returning herewith your questionnaire relating to the 1991 Rafter Study. I had no particular difficulty in completing the return but I think one or two additional comments might be useful. I have travelled fairly extensively in Europe but I have never been so impressed by the works of nature as during my recent visit to the Canyonlands area of Arizona and Utah. Clearly this is an area which must be preserved for the benefit of future generations and the NPS is to be congratulated on its continuing efforts to balance the conflicting needs of the ecology and of Tourism.

I had the privilege of visiting Glen Canyon in May when the number of visitors was quite small and my answers are, I suspect, influenced by this fact. My answers to questions 8, 10, 12, and 13 would almost certainly have been different had my visit been in August. For instance, I saw only the 3 rafts of our party, only 3 or 4 boats and only about 5 anglers. I have indicated in each case

that these numbers are acceptable although I appreciate that they are impossibly low for the high summer months and that some increase in river usage has to be accepted before the restrictions indicated in question 18 are implemented.

This raises the question as to the point at which increased use becomes a problem and as to who makes the subjective decision that a problem has arisen, Personally, I would not like to have the company of a motor boat throughout my raft trip but anglers might well object to a proliferation of rafts and so on!

Question 17 gave me a problem. As a foreigner it is unlikely that I shall make many visits to Glen Canyon and so it is perhaps reasonable that I should not want to buy an annual pass. However, I could equally well have circled point 4 because I firmly believe, and I have argued this way in England; that one should not be expected to pay to enter a public place. To charge a fee could be to deny entry to those who genuinely cannot afford to pay and this cannot be right. I wonder whether discrete voluntary contribution boxes might be a partial solution?

My visit to Canyon lands and to Glen Canyon in particular was a memorable experience which I hope to repeat (thus adding to the overcrowding?). During the rest stop I walked as far away from the rafts as I could and for a brief moment enjoyed the silence and sense of awe that must have been experienced by the early explorers of 200 years ago. How to give everyone that experience?: the NPS has a very difficult balancing act to perform.

This was truly a unique experience. I would like to return several years from now to enjoy again and see what may have changed.

The young girl that operated our raft was not sufficiently trained in motor/raft handling. She did not accept the fact that she would have to raise her voice for all to hear (In this case all the passengers were senior citizens and most probably had hearing capability).

I felt the experience of a day raft trip for someone from back east was an educational and awesome experience. My experience was a peaceful magnificent work of nature.

Interesting - really shows the depth & size of the canyon.

Would like more information available on fishing. Would like a little whitewater experience, not into the really rough stuff, but maybe another mile or two past Lee's Ferry.

I enjoyed it immensely. We were very fortunate in that we visited on a weekday and there was very little activity on the water. This is the way I believe it should be maintained if it means limiting its use. The only problem I encountered with the float was the smell of gasoline from the motors which I know is difficult to eliminate. I was on a Tauck Tour. Everything was handled well, on the part of our tour guide as well as your staff. The young man who escorted us on the float, his name was Hans, was delightful.

This trip was before main tourist season so opinion might be different if conditions more crowded. This is probably one time visit from 2 thousand miles away so I was reluctant to express opinion (or had none) about many questions.

Loved it.

My wife and I were very impressed by the scenery & river the different colorations the panoramic feeling of rafting & seeing all the forms of the rock formations. It was all a total heart warming experience & we thank you.

As visitors to the U.S. from England, we were very impressed with our raft trip down the river and found it most enjoyable.

We all had a very nice time. This was my first time, but our honor roll kids have gone the last two years. The fee goes up and the trip goes shorter was about our only dislike. Our guide was Russ was very nice, considerate, handled the raft very well, and most of all very good looking. The girls and I enjoyed him. Overall we loved it. It just wasn't long enough. Thank you.

My son Josh - Oak Creek 8th grader - and myself were on the "Honor Trip". We had a wonderful time: we had two fun, excellent guides - they always talked about the canyon - stopped at things to see - gave us excellent trip wit lots of fun. Thanks.

We were appalled to see vandalized petroglyphs on the river. These areas should be closed to the general public unless a park service guide accompanies. Houseboats, etc. shouldn't be allowed to dump waste in the water. WE live near a lake in the Southeast that has coliform bacteria counts because they allow it. Please stop this problem before it gets bad. We loved the Glen Canyon NRA & hope to return. We will give our friends rave reviews.

It wa beautiful - we enjoyed it thoroughly. The only two problems I noticed was the human waste & a need to protect the petroglyphs.

It's awesome!

I enjoyed the raft trip. There wasn't any crowding on the river the day I was there. I enjoyed being able to see the petroglyphs up close. I believe they should be protected by a fence to preserve them for future generations.

It was beautiful and we all had a lasting and memorable experience. Thank you.

1. Increase non-motorized raft trips. We thought we were going to float down.
2. A training program for float pilots for natural history & geology of area.

I enjoyed it tremendously & felt everything was handled in an environmentally responsible manner.

We don't need more rules and regs. Perhaps a greater awareness for the environment.

I am an English visitor & unable to equate my situation in Q's 21 & 25. My wife and I thoroughly enjoyed our raft trip which was very well organized & a great experience.

Pleasant. Part of our visit to the Grand Canyon. Would not have (Probably) visited if it was not encouraged by people at Grand Canyon.

Really enjoyed the stark beauty of the area. Would like to come back again someday to see more of the area & when we were there the climate was much more pleasant than i had expected.

Great experience.

Thoroughly enjoyable and controlled by tauck tour guide.

I wish that more people would really realize how low the water supply is in western regions and quit the excessive building, etc.

Would have enjoyed raft ride better if there had been a back on the seat.

Clean up the porta-pots. They smell awful & this is as you know unnecessary. NO toilet paper.

It was a lovely trip and our guide, Michelle, was knowledgeable and very nice. I would have loved a few mild rapids (perhaps a 2) but realize that the others on the tour may not have appreciated that!

The raft trip is too slow and could have been done in less time.

Think 1 day raft trip provided by Grand Canyon is well handled.

- My boatsman, Bart, did a great job.
- Wish there was a one-day whitewater rafting trip available.
- Felt that the storage of gasoline on top of raft was smelly and dangerous. It should not be left in the hot sun.

Seemed very pristine and clean. Not crowded. Enjoyed the dam tour very much- excellent presentation.

It was a wonderful experience. The trip was very well run!
Suggest you limit 10 people to raft.

Our group really enjoyed the trip! Loved it. Do think that more info by the guide would be helpful. Maybe a speaker system so he could talk & be heard, over the motor (We were on such in Moab on the Colorado River). Some of our group even liked it better than

the trip to Rainbow Bridge! Would have appreciated a way to be somewhat out of the sun, but I have a sun allergy- so I'm sure all others loved it.

It is obvious the dam is having an affect on downstream habitat. Certainly the lake is an amenity worth keeping - it should be made available to campers, swimmers, non-boaters.

NPS restrooms not maintained very well.

Very enjoyable.

So beautiful. I told all my friends and relatives & we all plan to come again.

The guide could have been more informative & act more like a park ranger as opposed to just a raft driver. The place is beautiful, sell it!!

All I can say is everything was organized and comfortable. I can't think of one thing to say that would be negative. The boat driver was a doll. Thank you very much for a great raft ride.

Our guide was pleasant, but "bubbleheaded". Pristine beauty needs to be preserved!

I thought the personnel on our raft trip were all very congenial. I felt that the speed of the small boats was excessive and noisy. On our raft the motor didn't seem noisy, maybe because you didn't power it up as much. Anglers are fine and kind of fun to see, but they could slow down on their boats a little, I feel.

I really enjoyed the trip & felt our guide, Tammy, did a terrific job - very knowledgeable, etc..

GREAT!!

Pretty ride.

This was 2nd visit in 3 years and will probably visit again in the future. We are satisfied w/the sites, cleanliness, and beauty of this area. The raft operators are professional and friendly. Sorry for this mess, we are driving on I-40 heading for Albuquerque.

We had a wonderful time. Our guide Hans was delightful. A lovely area, keep up the good work.

We enjoyed the trip very much.

Very enjoyable. Petroglyphs must be protected. Would like to see archeological hike following petroglyph signs.

I do not know how the raft companies bid for or are assigned concessions, but I would like to see a reduced rate for students Using the raft trip for educational purposes.

We were told we wouldn't get wet. We brought a video camera and a camera on the raft. I didn't mind gettin wet - but if we were told ahead we could have brought something along to protect our equipment.

Trip was well planned & well run. Our guide, Dave, was friendly, informative, & helped make our trip more enjoyable. Keep up the good work. Thanks for a great day.

Our bus driver down to the rafts and back from Lee's Ferry is a GEM! He told so many interesting things and was so friendly. I felt as though I learned a lot about indians and the reservation, the canyon, etc. Also, our raft driver was excellent in her rafting skills and information. It was an experience i'll never forget and a highlight of our visit here! Your park service does an excellent job in all ways!!

Nature's gift to us - Don't hesitate to protect it from US!

My husband and I enjoyed our time here. We only wish we had more time!

It's always wonderful here. I hope it is preserved. It seems to be handling the brunt of people ok to this point, but I worry about it. Biggest problem is overcrowding & private boats. A motor size limit must be placed as well as limiting numbers. Grand Canyon requires backcountry permits - this should be no different.

We truly enjoyed our visit, including the raft trip on the river & boat ride to Rainbow Bridge, the visitor center at the dam, and the John Wesley Powell Museum in Page. We arrived in Page on 5-25-91 & left Wahweap on 5-28-91. It is a lovely and different area to visit, but we would not want to live here! Darby our raft pilot was super. Our bus driver, Tom, was great too. He told us a lot about the Navajo way of life on the reservation, and made our trip most interesting. Our young lady pilot on the Rainbow trip was excellent also.

I believe the dam is doing a good job as provided by current federal law. People should provide the true facts. In fact I plan on writing my Congressman in support of the current management.

High Fluctuating Flow Rafters

Brad was great.

We enjoyed the area but are concerned about environmental impact of the dam on Grand Canyon Nat'l. Park and the surrounding environs.

The packaging of this survey was excessive - no plastic bag or pencil was needed.

Management and workers attitudes very poor, not helpful. Very expensive to visit, costs unreasonable.

We're sitting next to the raft driver and he was constantly smoking. Also, like to see the tour conductor someone knowledgeable (preferably local people). Our driver was very young didn't know much about the canyon. He was out of state and only about less than a month on the job. Thanks.

I was shocked at how low the water was! I think it would be wonderful if more education about the area could have been provided during the trip. The guides were very nice but not informed enough about the area. Every one of us expressed a major concern over how low the water is.

It was just a pleasure to be able to take a "breath of fresh air" and open my eyes to the beauty of Glen Canyon and surrounding area of Lake Powell. I never could have imagined that such formations existed. Our guides were very informative and knowledgeable - thus lending to an exciting trip. Glad that some people truly care about the environment and the preservation of wildlife, truly inspirational!!! I hope to come back for another visit and maybe really "raft" the Colorado!

Very pretty, very relaxing, pleasant place.

A spectacular day.

The bus ride to and from there from Grand Canyon was too long. Prices in the shop were too high.

Sorry you had to follow up with additional mailings; we (my 3 sons and I) completed the original questionnaire on the bus trip back to Grand Canyon and mailed at Maswick Lodge same day... don't know what happened! We enjoyed the trip thoroughly. Brad is an exceptional guide! Selfishly, I would have loved to have about half as many people on the raft and more lazy time to lay back, drift, and enjoy what I was seeing and what I was not hearing. Just peaceful, quiet, and beautiful. Thank you.

Loved it!

Had a wonderful time!!

It was beautiful, awesome, and even serene. All three - what more could one ask?

Our guide K.C. was wonderful and did well even though his motor was not reacting well and the other raft guide was rather rude about passing our raft too quick and too close.

It was a beautiful site.

Beautiful!

Very nice visit, not to be missed by every U.S. citizen at some point in life.

Impressions: 1. Natural beauty, 2. Very clean, 3. Quiet.

Suggestion: Restrict noise level on motors (well muffled or electric).

Need more signs, ie: site descriptions, mile markers on river, etc..

I enjoyed it and will suggest it to others.

I have floated the Salmon & Snake rivers, I have tried "whitewater" at several others. This raft trip was everything one could wish for. Not crowded; other users were well mannered; spectacular vistas; amazing kaliedescope of colors and unique formations; heavy emphasis on maintaining the ecology through clean, non-littering environment. River seems to be well managed at present. Heavy usage would call for certain restrictions. Although this is public land, its usage is a privilege and not a right!

It was great.

Raft guide was nice and very knowledgeable but endangered rafters by drifting under the bridge while talking during the first few minutes of trip (No one in raft had hard hats). All guides should be cautioned against doing this. Also, this questionnaire is very confusing. Hotel Wahweap - bread served at dinner (July 24) was moldy - when told, no one seemed to care.

I already have - I loved it - hope everybody has such a positive experience.

The tunnel to the dam was neat - we enjoyed it a lot! Lunch was real good. The price was OK; please don't raise it (till the economy improves a whole lot more!) Thanks.

The area was spectacular.

Wonderful experience, good guide.

My wife and I visited your canyon as part of our Tauck Tour of canyons - Grand, Bryce, etc.. We had stayed at Wahwee Lodge the night before. We encountered no problems and thoroughly enjoyed our tour.

The bus from Grand Canyon by Paul Harveys Tours did not have a working air conditioner and it was almost unbearable. Of course we're talking about 2 hours to and from Glen Canyon.

My guide, Vonnie Nations, was superb in identifying points of interest throughout the canyon.

It was an outstanding experience for me, and I never could have imagined the beauty of the canyons and the river if I hadn't seen it for myself.

Whatever means needed to establish a harmonious balance between accessibility and preservation of this truly wonderful area. Man can live hand in hand with nature, but of course, this does mean some sacrifices/inconveniences. But these sacrifices should be a small price for the education and enjoyment of future generations' ventures into Glen Canyon. Give Brad a raise.

Larger print on survey.

Fantastic, educational experience with vital historical value in absolute need of preserving, maintaining & regulating.

Beautiful area.

The guide on our raft, a student, was extremely good & enjoyed his holiday job.

Would like to see better publicity and information & access to purchase of river trip @ Wahweap Lodge.

Our pilot was very knowledgeable about the area. He was personable & looked out for our safety. The canyon was beautiful to see (in the clear, sunny sky & in the cloudy rain).

It was great!

Keep it as beautiful as it is, but allow people to learn and enjoy it.

Need better toilet facilities.

This is a beautiful area, and my family and I enjoyed are half-day trip tremendously. We traveled from Williams - which is quite a distance - simply to see this area. We were very impressed with the area's beauty. However, the poverty of the Navajo Indians was heartbreaking. What about them? Who helps them break their cycle of poverty?

It was very enjoyable.

We have certainly enjoyed our visit here. Expected to stay one night and have stayed 3. Would like to say we expect to return soon, but we live just too many miles away, in Ontario (Canada). P.S. I suggest you have an envelope better suited size-wise to your questionnaire.

We went smooth water rafting for 4 hrs and thought it was fabulous!! We encountered no problems at all! We were very impressed!

It was a wonderful experience for my husband and myself.

Guide needs to be more knowledgeable.

I thought the raft trip was excellent and handled very well. I would not increase the number of boats, rafts, fishermen, or anything else that would impair the hearty of Glen Canyon.

Inspirational experience.

Very impressed by the courtesy, humor, and helpfulness of guides. The area appeared not to be over used and although the dam has obviously altered the fauna and flora - if fish not stocked but allowed to breed and population monitored - a balanced ecosystem should be established.

Do all to preserve what you have & continue to allow access (and not restrict access to Park Rangers and dignitaries).

Wonderful - a link to our past - can envision the native Americans and later settlers as they struggled with the elements. If they could see us now!!!

Most of the people on the trip commented on the overpowering smell of gasoline on the raft trip. Some complained of headaches as a result. I would hope there is some way you could pass regulations requiring the motors to have better emission control devices. Stored too much gasoline on the boat during the trip, but it was when the motor was running that the smell was so strong.

It was a wonderful informative trip. The canyon is well taken care of and clean and beautiful!!

The motor on our raft went bad. Our guide reported it twice and was told help was on the way. After an hour of drifting (not unpleasant, but might have been) another guide in our party found us and towed us to the lunch site. More honest communication please.

We really enjoyed it! It wasn't too crowded but if it had been I would say that our enjoyment of the trip would have been much less. The river should be shared by anglers and rafters equally. If the area becomes too over used then both groups should be restricted so that the ones that do use the river can best appreciate it.

Enjoyed our raft trip. Douglas was a considerate and informative guide. Would like to come back and go on a longer whitewater raft trip in the future.

It was great. Wish I could have stayed longer to boat and fish, etc..

We enjoyed it thoroughly. It would have been fun to add the first encounter of #1 rapids to the trip to add a bit of adventure!

My wife & I were impressed by how clean everything is - we hope it stays this way.

The beauty was absolutely breathtaking. After having visited the canyon and going on the rafting trip we became aware of Lake Powell and modified our travel plans to incorporate 3 full days there. The Lake was the absolute highlight of our trip - better even than the Grand Canyon itself. We're definitely coming back when we have children, if not before!!

It was even more enjoyable than we anticipated. We were treated well and fed better than we expected. It was well worth the money we paid. It is an experience we will recommend to anyone visiting the area. It was one of the highlights of our trip to the Grand Canyon. But even though we would like to see others enjoy such an adventure, "WE" would support all efforts to maintain & preserve the wonderful natural beauty of this area.

Enjoyed it immensely.

Good trip - wish I could have stayed longer.

All the power river rafts run 2 stroke outboards. They burn a lot of fuel and dump 2 stroke oil/fuel mix in the water. They smoke and pollute the air. They are very noisy. The Honda 4 stroke outboard burns 50% less fuel, creates 94% less hydrocarbon emissions; doesn't burn oil; doesn't smoke; doesn't pollute the water like a 2 stroke and is extremely quiet. They ought to be mandatory.

We loved it! Keep it clean and pure so it can be used forever.

I think the scenery is beautiful. I think the overall maintenance is good. I enjoyed the visit.

Had a very enjoyable time.

Since I was only on a float trip, I was not aware of beaches or campsites. More floating and not so much use of motor on raft would have been more enjoyable, especially where river moves faster. Perhaps on hot or rainy days fast trips would be ok, but not on nice days. The trip, although too short, was great, relaxing and beautiful.

Yes - and I thank you for the opportunity to express our concerns. Fred Harvey advertises the 4 hr. raft trip as one which is conducted at the Grand Canyon on the Colorado. We had no idea that we would be traveling to Lake Powell to begin this trip. Lake

Powell was scheduled by AAA to be our next days stopover. Had we known we would have spent the day at the Grand Canyon then taken the raft trip the next day from Lake Powell.

Our guide Vonnie was very nice and courteous. We would recommend other people to do the one day raft trip.

My family and I enjoyed the raft trip enormously. We were very impressed with the beauty we saw. Our raft guide Joni was exceptional.

It was a very nice experience and I hope that with a good management many people will enjoy it without destroying it.

One of the only problems we encountered were cigarette butts! We found no other trash.

This was our first visit and would love to come back. We would like to see Lake Powell. I would like to have had access to information about fishing in GCNRA and guides. I did not see any at the sites or at the Grand Canyon. Thank you very much for a great time.

Very enjoyable.

Would like to have less raft stopping on river and longer run at river current speeds w/talking and descriptions as we go.

Of all the recreational waterways that I have visited, this was the cleanest, least populated, and most efficiently monitored for the enjoyment of those visiting the area.

It would be better if smooth water rafts used quieter motors. Also, each raft should include a dry chemical fire extinguisher.

The motors on the rafts seem to be emitting a lot of smoke & oil. Perhaps maintenance on them could be improved so as to reduce their noise and pollution problems.

Enjoyed the trip very much, keep the recreational area the same way it was the day we visited it. Also keep this area open to the public with the least restrictions possible to anglers, visitors, and all others.

Wahweap was efficiently run, but certainly not as rustic as I imagined - not at all the interesting experience I had hoped for - more like the Hilton with bathing suits. Overcrowded - suggest smaller resorts in NRA's, people can go to Disneyland too! The river trip was great but young children must be monitored more closely by guides & parents or not permitted.

Too short.

We enjoyed it - but do wish there was mild whitewater & not necessary to hike out of Canyon but we realize this is apparently not possible.

Tour: Also told stopped at East Rim Grand Canyon - not so. Tour guide on boat ; Brad was fantastic.

Our guide Andy was terrific.

The trip on the river was very enjoyable. It was refreshing to see so much unspoiled natural beauty.

Dear Superintendents, I think the raft trip was great. Maybe you could think about making each bus go with a raft and a time schedule so not so many people together at a time (On a raft trip ,trading post, etc.) Too hot to have 120 people together. If you put 1 bus with 2 rafts and go and cut the trip down a little in time (to hot) would be good. My idea - good trip. Beautiful.

The natural beauty and history of the Canyon are its great assets.

Human waste is a large problem with all the rafters on the trip. Staff should monitor children to ensure they do not trod on vegetation (or ask parents to). Archeology sites should be monitored by park staff.

It is a beautiful area & I hope to be able to afford to come back some time & spend a week or so.

Andy, our guide/raftman was superb. His ability to interact with a diverse group was good.

We enjoyed the opportunity to be on the Colorado River in a smooth place. We would appreciate seeing more petroglyphs, perhaps more could be uncovered if sand were excavated.

Great experience.

Should be a weather shelter at Lee's Ferry. Our coach was late and it would have been nice to be in shade - elderly people on trip suffered. The rock archeology sites should be better protected from vandals, eg. cage or glaze with protective glass or polycarbonate as used in telephone kiosks.

Would prefer that all motorized boats kept out of Glen Canyon, as in Snake River - Grand Teton NP. and rafts oared down if possible. No need for high speed boats to use the canyon.

I think the raft trip we were taken on through a tour group could be shortened. it was extremely hot sitting in the boat and not moving. Information given was good & when we were moving, it was pleasant. It doesn't have to take 4 hours to do that trip.

A general understanding from start of planning to construction simply mindboggling. Geological changes are astounding. Provide exciting stimulus to learn more about vegetation along banks of the canyon, geology in general, as well as to acknowledge our own responsibility to future generations.

The guides are gorgeous. Especially Russ. And this place is beautiful!