

## Appendix E – 2005 Visitor Survey Excerpt



# **Glen Canyon National Recreation Area: 2005 Visitor Study**



## **Technical Report**

Prepared for

**Glen Canyon National Recreation Area  
National Park Service**

by

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October, 2005



## INTRODUCTION

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

Between 1999 and 2004 water levels at Glen Canyon NRA dropped 100 vertical feet. The drop was caused primarily by the occurrence of drought in the desert southwest. This drop in water level changes the surface area of Lake Powell. One consequence of this change is that the physical carrying capacity of Lake Powell for recreational boating decreases. Moreover, the social carrying capacity and quality of the visitor experience may also change as a result of the drop in water level.

The National Park Service is the managing authority for Glen Canyon NRA and is charged with providing high quality recreation experience opportunities for Glen Canyon NRA visitors. The current recreation management plan for recreational boating was written and implemented before the drought occurred. The physical and social carrying capacities outlined in the current management plan are based on conditions that existed prior to the drought. Glen Canyon NRA staff asked NPS staff and University of Minnesota researchers associated with the Cooperative Park Studies Program (CPSP) and the Great Lakes Northern Forest Cooperative Ecosystem Studies Unit (GLNF CESU) to conduct a study of visitor use at Glen Canyon NRA. The CPSP was asked to conduct the study because it had conducted the visitor study that was used to establish social carrying capacity for Lake Powell prior to the drought. The research team at the University of Minnesota collaborated with e<sup>2</sup>M, a consulting firm in Denver, Colorado with a long history of developing physical carrying capacity models for the NPS, and with Glen Canyon NRA park staff to develop and administer the visitor survey instrument. Glen Canyon NRA staff will use the study results to determine physical and social carrying capacities for recreational use, especially boating use, at Glen Canyon NRA.

#### PURPOSE OF THE STUDY

Lower water levels change the surface area of Lake Powell with subsequent changes in amount of shoreline, number of access points to enter and exit Lake Powell, number of quality shoreline camping opportunities, and number of overnight anchoring sites for recreational boaters. However, visitor demand for access and quality boating and camping experiences may not change as a result of lower water levels. Changes in facilities and condition of facilities impacts visitor expectations and experiences. Specifically, the net effect of lower water levels may be an increase in visitor competition for recreational space and resources resulting in increased visitor crowding and conflicts.

Specific topics addressed in this survey included:

- Characteristics of respondents' visits (e.g., activities engaged in and type of boat used at Glen Canyon NRA),
- Respondents' socioeconomic background (e.g., age, gender, education, income, ethnicity and race, residence, past experience at Glen Canyon NRA),
- Respondents' desired experiences and benefits they attain as a result of visiting Glen Canyon NRA,
- Respondents' preferences for seeing and hearing other visitors at Glen Canyon NRA,
- Respondents' perceptions of problems such as crowding and use conflicts at specific locations on Lake Powell,
- Respondents' preferences for management actions to solve visitor problems resulting from lower water levels, and
- Respondents' satisfaction with the quality of service at Glen Canyon NRA.

These data will allow Glen Canyon NRA planners and managers to determine if changes in physical and social carrying capacities are needed, where changes might be appropriate, and how the recreating public will respond to changes made as a result of lower water levels.



## STUDY METHODS

A mailback survey was used to gather study data. Glen Canyon NRA staff and e<sup>2</sup>M consultants worked with GLNF CESU researchers to develop the survey instrument. Once the survey instrument was designed and approved by all parties, University of Minnesota researchers prepared and submitted the survey and survey documentation to the Office of Management and Budget (OMB) for their approval. NPS staff at Glen Canyon NRA gathered names and mailing addresses of past visitors to Glen Canyon NRA. The names and addresses came from various mailing lists maintained by the park. Specifically, the mailing lists represented the following groups: a) boaters who rent slips, dry boat storage space or buoys at Glen Canyon NRA, b) individuals on NPS and concessioner marina mailing lists, c) independent business partners with the park, and d) public information lists used for mailing information notices on past park planning efforts. These lists represented a total of 2,922 names and addresses. The names and addresses were sent to e<sup>2</sup>M where their consultants checked the lists for duplicate names and incomplete addresses. Once duplicates or incomplete addresses were removed, e<sup>2</sup>M drew a random sample of 500 names for the study. Dillman's Tailored Design Method (2000) was followed so that each person in the sample received a prenotice postcard, mailed questionnaire with cover letter explaining the purpose of the study, and follow-up reminder postcards and re-mailings of questionnaires as needed. The survey is included in Appendix B and copies of each piece of survey correspondence is included in Appendix C of this report. The survey packet included a self-addressed, stamped envelope for respondents to mail their completed questionnaire back to University of Minnesota researchers who were responsible for raw data retrieval, data entry, data analysis, and report writing. The survey mailings took place during May and June 2005. Four questionnaires were undeliverable resulting in a total sample size of 496. A total of 332 usable questionnaires were returned resulting in a response rate of 66 percent  $[(332)/(500-4)]$ .

### Study Limitations

A purpose of this study is to look at how visitor characteristics, use patterns, expectations, and perceptions have changed since the 1999-2000 visitor use studies were conducted. This study is being conducted because of the significant change in water levels at Lake Powell since 2000. The study population for the 2005 study represents a convenience sample from which names were randomly selected. It does not represent a random selection of visitors using Lake Powell during any particular season. It also is not representative of visitor use by access point. Caution should be exercised when comparing this study's results to results of the 1999-2000 visitor use studies. Those studies represented a random sample of visitors by access point to Lake Powell and the degree of confidence in generalizing the study sample responses to the entire Lake Powell recreational visitor population is high compared to the ability to generalize this study's findings to the larger population.

Compared to the 1999-2000 study respondents, the 2005 study respondents are:

- More likely to be male (83 percent in 2005 vs. 60 percent in 1999-2000),
- More likely older (average age of 54 vs. 42),
- More likely to have a college education (55 percents vs. 49 percent),
- More likely to have a significantly higher income (75 percent > \$75,000 vs. 75 percent > \$40,000),
- More likely to have visited the area more times (96 percent > 10 visits vs. 58 percent > 5 visits),
- More likely to spend fewer nights in the area (5 nights vs. 5.7 nights), and
- More likely to use a houseboat on the lake (58 percent vs. 20 percent).

## DISCUSSION

This study was conducted because water levels in Lake Powell have dropped dramatically due to drought conditions. The change in water level creates changes in lake characteristics such as amount of surface area available for recreational use, the location of shoreline camping options and the number of shoreline campsites available, travel distances by water to specific points on Lake Powell, and the number of usable access points to the lake. When lake characteristics change, recreational behaviors, experiences and on-site benefits related to experiences and perceptions of resource conditions may also change. In particular, crowding and conflicts among recreational user groups may increase causing lower levels of visitor attainment of on-site beneficial experiences. Visitor impacts to the resource area especially beaches and shoreline camping areas may increase. Visitor perceptions of the kinds and seriousness of problems present in the resource area may become greater. Finally, visitor preferences for management actions to resolve problems may change.

The type of changes noted above relate to the physical carrying capacity and social carrying capacity of Lake Powell. The physical carrying capacity is the ability of the resource to accommodate a specified number of watercraft on the lake surface without causing unacceptable resource impact to water quality and lake shoreline. The social carrying capacity is the ability of the resource to sustain a given level of use over a specified time period without causing unacceptable damage to the resource area and the quality of the visitor experience. The most recent visitor use studies conducted at Glen Canyon NRA occurred in 1999 and 2000 (James, et al, 2001a, 2001b, and 2001c). Data from these studies was used in setting physical and social carrying capacities for Lake Powell. With the dramatic drop in water levels at Glen Canyon NRA over the past few years, appropriate levels of use based on capacity figures for non-drought conditions may need to be adjusted.

When looking at study results relevant to carrying capacity, the data suggest that respondents are aware that lake levels have dropped and may have adjusted their expectations about crowding or the acceptability of the number of watercraft and people they see on Lake Powell. In the 1999-2000 study the overall mean scores for the number of watercraft and people on the lake surface, on the lake shore, at shoreline campsites, at fueling docks and at landings were all rated as slightly unacceptable. In the 2005 study the overall mean scores for these same locations were rated in the acceptable range.

Data displaying respondent ratings of potential problems and the seriousness of them, though, shows an increase in mean scores over the 1999-2000 data. In the earlier studies, the only potential problem to be rated as slightly serious was finding a beach campsite. The 2005 data show 11 potential problems were given scores that show them to be slight to moderate problems. The kinds of problems rated in this way are associated with problems that are likely to be related to low water levels, which suggests that even though respondents may have adjusted their expectations about crowding, crowding is playing a role in their ability to get away from other boats on the lake surface and to find beach and shoreline campsites. The decrease in the surface area of the lake may also be responsible for the higher ratings they gave to problems such as the amount of litter they see on beaches and the shoreline, the number of inconsiderate people they encounter, and the number of people they see operating their boats unsafely.

Potential problems may also be related to the lake area shrinking and the impact that has on respondents' ability to travel to other parts of Lake Powell. If demand for recreational use on Lake Powell has not changed from 1999-2000, then less surface area means people and their watercraft will be in closer proximity to one another. In the 1999-2000 studies the heaviest used zones were Zones 1, 6, 9, 11, and 12. Zones 1, 11, and 12 continue to experience high use but Zones 1 and 11 are the major access points for Lake Powell so their continued high number of users is to be expected. Zones 6 and 9, though, experienced significantly less use in 2005 than in the earlier studies. Low water levels are probably the cause of fewer respondents traveling to these zones. As a result, the distribution of use and travel patterns on Lake Powell has changed and might be impacting visitors' experiences and perceptions of problems. Both Zones 6 and 9 are considered uplake zones. Uplake respondents rated problems such as the amount of time waiting to launch a boat, seeing evidence of pets and

their droppings, having to travel farther to find fuel, and having adequate toilet facilities on the lake and at landings as more serious problems than downlake respondents. They may have perceived some of these problems as more serious because of the constraints low water levels place on their ability to move around the lake.

Respondent preferences for ways to address problems do not vary significantly from the earlier studies to the 2005 study. In both studies, respondents prefer indirect management tactics such as visitor education and information as a way to persuade visitors to change their behavior or use of the area. Persuasive tactics, though, can be problematic in that managers can develop the materials but it is the visitor choice whether to take advantage of and use the education and/or information materials (McCool and Braithwaite, 1992; Cole et al, 1997a). Time may also be a factor in persuading people to behave differently. It is also common for visitors to prefer more facilities and services to address perceived problems. If wait times are longer than visitors like at launch points or if toilet facilities are inadequate on the lake and at other points along the lake shore, the assumption is that more of these things will solve the problem. But research in a variety of disciplines has shown that this approach is not always successful. Increasing launch areas may increase traffic to the lake creating greater congestion and crowding at access points, on the water, and at shoreline camping spots.

Limits and regulations are generally more effective at setting physical and social carrying capacities. They are viewed as fair from a distributive justice point of view because they apply equally to everyone (Frost and McCool 1988). However, recent research suggests that from a visitor's point of view fairness is more related to how the limit or regulation was developed and less to whom it might apply (Davenport, and Anderson, 2005). If visitors view the process of establishing limits or regulations as fair they are far more likely to agree with them. If park staff believes that new physical and social carrying capacities are necessary at this time and that they must use limits or new regulations to maintain quality resource conditions and visitor experiences during low water conditions, they should seek to make sure the process they use to set limits or regulations is transparent to the public and if possible has public involvement as a part of the process. Public involvement in the process leading up to implementing of use limits can be a positive factor in whether use limits become an accepted part of the management plan for a given area. In general, acceptance of use limits increases when stakeholders and the public understand that maintaining acceptable biophysical or social conditions depends upon implementing use limits (McCool and Christensen 1993; Cole et al. 1997b). Moreover, most visitors support use limits to reduce crowding and protect resources (Anderson and Manfredo 1986; Shelby et al. 1992). It might also be possible for park staff to set a time limit on how long the limits or regulations are in effect. In other words, establish limits or regulations that only apply to low water levels and when water levels come back to some acceptable level either remove the limits or regulations or review whether their continued use is necessary.

Finally, park staff should carefully look at the respondent management preferences for solving potential problems related to recreational use. For many of the problems there are a variety of solutions proposed. But not all of the solutions are supported by respondents. Some solutions are opposed by all respondents and some are only opposed by respondents who do not see a particular problem. Other solutions to address a particular problem are supported by all respondents regardless of whether they think a particular problem exists or not. Also, since many of the solutions can be used to address more than one problem, park staff should look at the most efficient suite of actions to address any of the problems listed. A useful source to help park staff decide which actions to pursue can be found at: [http://www.cnr.umn.edu/CPSP/publications/revtactics\\_handbook.pdf](http://www.cnr.umn.edu/CPSP/publications/revtactics_handbook.pdf) (Anderson et al. 1998). This handbook was developed with National Park Service managers and outlines a strategy and process for selecting management actions that are most likely to be successful in resolving visitor caused problems to the resource and / or visitor experiences (Wang et al. 2000).





As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.



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