SACRAMENTO MUNICIPAL UTILITY DISTRICT
UPPER AMERICAN RIVER PROJECT
(FERC NO. 2101)

RECREATION CARRYING CAPACITY
TECHNICAL REPORT

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APRIL 2005

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8.1 Recreation Carrying Capacity Study Plan

8.1.1 Pertinent Issue Questions

The Recreation Carrying Capacity Study addresses the following recreational resource question:

9. What is the recreation carrying capacity for the Project with respect to the recreational experience and the ecological system?

8.1.2 Background

Carrying capacity can be defined as the amount and type of use that an area can sustain over a given period given goals to maintain the physical environment and experience of the visitor. The Recreation Carrying Capacity Study will evaluate the ability of the Project (recreation facilities and project features) to accommodate existing and future recreation uses, and assess whether these uses are suitable given the potential effects on social and environmental resources. The study will be focused on Project recreation facilities, Project reservoirs and identified dispersed sites and river access points (see 7.1.4) and will consider both the social and physical aspects of carrying capacity. The social aspect of carrying capacity will be evaluated in terms of the visitor responses to interview questions regarding social impacts, such as crowding, relative to the corresponding estimated use levels. The analysis will also draw upon established Recreation Opportunity Spectrum classifications to characterize the expected visitor experience. The physical aspect of carrying capacity will be discussed in terms of physical limitations such as boat density and environmental impacts that may be identified that can be attributed to recreation use. It will also discuss the role and authority of land management agencies to effect changes in land management. It does not address carrying capacity as it relates to whitewater resources (reference Whitewater Boating Feasibility Study).

8.1.3 Study Objectives

The objectives of this study include:

- Identifying the capability of land managing agencies to set capacities and manage the use and quality of recreation experiences
- Identifying the social capacity of the Project (lands, water and recreation facilities)
- Identifying the environmental capacity of the Project (lands, water and recreation facilities)

8.1.4 Study Area and Sampling Locations

The study area for the carrying capacity will be the area within the Project boundary and other sites (e.g., dispersed sites and river access points) beyond the Project boundary as defined in the Recreation Supply Study. Generally, all identified sites within one-quarter of a mile of Project reservoirs (including locations or river access points in the High Country, Crystal Basin and Canyonlands), as well as other sites beyond the one-quarter mile zone identified in consultation with the ENF and other interested participants, and agreed to by SMUD, will be included in the study area. The study area encompasses the area of concern including the lake surface, shoreline and other locations where recreation related to the Project activities commonly occur.

8.1.5 Information Needed From Other Studies

Information needed from the Visitor Use and Impact Study includes: 1) locations of resource damage related to recreation use, 2) interview responses regarding conflicting uses, 3) interview responses regarding sense of crowding, 4) recreation use levels at Project recreation facilities and 5) boating use levels on Project reservoirs. The locations (if any) where impaired water quality is determined to be related to recreation use is needed from the Water Quality Study. Data for evaluating the capacity (surface area) of the Project reservoirs at different lake levels is needed from the Water Balance Study.

8.1.6 Study Methods And Schedule

The methods used to complete this study will draw, in part, on the information and data gathered in other studies. The methodology and timeframe to collect this information and data are outlined in the respective studies identified in 7.1.5. The analysis of the information and data to complete this study will begin in 2003. Methods will also include a literature and/or website review to obtain recent and applicable standards to evaluate carrying capacity, a review of CDBAW boating safety standards and determining applicable ENF standards and guidelines for the study area from the ENF LRMP and Sierra Nevada Forest Plan Amendment.

8.1.7 Analysis

This study will compile information collected from various studies and analyze it relative to standards in literature, websites, agency policy, applicable ENF standards and guidelines and ROS classification. The analysis will identify circumstances that may exist where the existing or future recreational use is not consistent with protecting environmental resources or the expected quality of the recreational experience of visitors. The analysis will identify how and where activities are competing for the same space and time. It will include a range of possible management and/or facility options.

8.1.8 Study Output

The study output will be a narrative report that also includes tabular data displaying and correlating the interview data (conflicting uses and sense of crowding) and use levels. Maps showing the locations of any resource damage related to recreation use, photographs of recreation use (boating, overnight and day use) may also be included. The narrative report will discuss the existing types and levels of use relative to published or applicable standards and identify conflicting uses and will include the issue questions addressed, objectives, study area, methods, results, analysis, discussion and conclusions. The report will be prepared in a format that allows the information to be inserted directly into the Licensee-prepared Draft Environmental Assessment that will be submitted to the FERC with the Licensee's application for a new license.

8.1.9 Preliminary Estimated Study Cost

A cost estimate for this study plan will be prepared after the Plenary Group approves the plan.

8.1.10 Recreation and Aesthetics TWG Endorsement

This study plan was approved on March 5, 2002 by the following entities of the TWG: ENF, SWRCB, American River Recreation Association/Camp Lotus, NPS, BLM, El Dorado County Parks Dept., California Outdoors and SMUD. This study plan will be sent out to other members of the Recreation and Aesthetics TWG for their consideration. On May 1, 2002 the following participants gave Plenary Group approval to the plan: USFS, BLM, USFWS, Taxpayers of El Dorado County, Friends of El Dorado County, Camp Lotus, El Dorado County Water Agency, El Dorado County, Placer County Water Agency, California Department of Fish and Game, California State Water Resources Control Board, Pacific Gas and Electric and Friends of the River. None of the participants at the meeting said they could not "live with" this study plan.

8.1.11 Literature Cited

None.

RECREATION CARRYING CAPACITY TECHNICAL REPORT

SUMMARY

The carrying capacity of the Upper American River Project (UARP or Project) is investigated in terms of the UARP recreation facilities, reservoir surfaces and the area generally within 0.25 mile of the UARP reservoirs. The UARP recreation facilities are defined as facilities that were constructed by SMUD as part of the original recreation plan for the UARP and the facilities that were constructed under the Exhibit R of the Jones Fork amendment to the UARP license. The study included a review of published or otherwise available information to obtain standards or guidelines relating to carrying capacity. SMUD also conducted field observations to assess recreational use at some UARP facilities and access points, identify areas with resource damage related to recreational use and characterize the boating density on the UARP reservoirs. Interviews with staff who operate the campgrounds and law enforcement were also conducted.

The documented annual use at UARP recreation facilities, which includes campgrounds, day use areas, boat launches and trailheads between 1999 and 2002 ranged from approximately 77,000 to 182,000 recreation-days. Using various assumptions to fill data gaps in documented visitor use data at UARP recreation facilities, SMUD estimates the annual average visitation to be 204,000 recreation-days. These facilities are generally open between mid-May and mid-October, depending on weather. Visitors to private recreation developments account for approximately 13,500 additional recreation-days at the UARP reservoirs. The estimated annual dispersed use that occurred generally within one-quarter mile of the UARP reservoirs between April 1, 2002 and March 31, 2003, was estimated to be 50,000 recreation-days. Approximately one-third of this dispersed use occurred at Loon Lake (excluding winter use), and about one-quarter occurred during the winter season.

UARP campgrounds, day use areas, boat launches and trailhead parking areas are usually filled to capacity during peak times on holidays and some weekends during the summer. During the weekdays, occupancy at the recreation facilities is low.

From the visitor's perspective, most of the survey responses indicated that people felt either 'not at all crowded' or 'slightly crowded.' The highest sense of crowding expressed by the visitors surveyed at UARP facilities generally occurred on weekends and holidays. The most common type of user conflict identified in the survey responses conducted at the UARP facilities was loud, disruptive behavior and these responses were frequently associated with Off-Highway-Vehicles (OHV) use. Law enforcement personnel also stated that public disturbances were the most frequent type of call they received in the Crystal Basin. Based on the survey responses, dispersed overnight users did not appear to be camping outside of the UARP campground because the UARP campgrounds were full. Similar to the visitors in the UARP campgrounds, most of the dispersed recreation visitors felt either 'not at all crowded' or 'slightly crowded.' Although there were fewer survey responses about user conflicts in the dispersed survey responses than in the developed survey responses, the types of conflicts were the same. The most frequent conflict listed in the dispersed surveys was the disruption and noise associated with OHV use, particularly at Loon Lake. Personal watercraft and improper boating use were also identified as user conflicts in the survey responses collected at all of the UARP recreation facilities.

Operations staff identified the main problems at the campgrounds as noise, problems with parking extra vehicles belonging to campground visitors, groups that exceed the maximum number of six people per campsite and dogs.

Resource damage and the density of visitors observed along the shoreline of Loon Lake between the two main dams indicated that recreational use may be exceeding what the environment can support. The results of water quality sampling at Union Valley near Fashoda Day Use Area, Camino Cove Campground, Jones Fork Campground and on two tributaries, Jones Fork Silver Creek and Big Silver Creek, indicated that high recreational use in these areas may be affecting water quality.

The existing density of boats operating at peak use times on the UARP reservoirs appears to be well within safe boating standards that appear in research and planning documents. Although the ENF ROS classifications do not provide standards for boat density, other public land management agencies have published standards for boat densities over a spectrum of opportunities. Recognizing that these standards do not apply to the ENF, a comparison is made to provide a sense of the existing recreation opportunity on the UARP reservoirs. Comparing the existing peak-use boating density on the UARP reservoirs to these standards, the existing condition would represent a recreation opportunity that would fall somewhere in the range of recreation opportunities between the middle and low (primitive) part of the spectrum. This condition would represent an opportunity where visitors would expect to encounter fewer people with quiet and more natural surroundings.

1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell & Associates, Inc., (DTA) and The Louis Berger Group, Inc. for the Sacramento Municipal Utility District (SMUD) as an appendix to SMUD's application to the Federal Energy Regulatory Commission (FERC) for a new license for the Upper American River Project (UARP or Project). This technical report focuses on the recreation carrying capacity at UARP recreation facilities and UARP features and their ability to accommodate existing and future recreational uses, as well as whether these uses are suitable given the potential effects on social and environmental resources. This report includes the following sections:

- **BACKGROUND** – Includes when the applicable study plan was approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; and the study area. In addition, requests by resource agencies for additions to this technical report are described in this section.
- **METHODS** – A description of the methods used in the study, including a listing of study sites.
- **RESULTS** – A description of the salient data results. The appendices to this report include raw data and frequency tables, which are provided by request in a separate compact disc (CD) for additional data analysis by interested parties.
- **ANALYSIS** - An analysis and discussion of the results, where appropriate.
- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the UARP, which can be found in the following sections of SMUD's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction).

Also, this technical report does not include a discussion regarding the effects of the UARP on recreational resources or associated environmental resources, nor does the report include a discussion of appropriate protection, mitigation and enhancement measures. A discussion regarding resource impacts associated with the UARP is included in the applicant-prepared preliminary draft environmental assessment (PDEA) document, which is part of SMUD's

application for a new license. Development of resource measures will occur in settlement discussions, which will commence in early 2004, and will be reported on in the PDEA.

2.0 BACKGROUND

The UARP Recreation and Aesthetics Technical Working Group (TWG) developed a total of eight recreation studies to collect information to answer the issue questions relating to recreation resources associated with the UARP. This report contains the results of the Recreation Carrying Capacity Study which is discussed below.

2.1 Recreation Carrying Capacity Study Plan

On May 1, 2002 the UARP Relicensing Plenary Group approved the Recreation Carrying Capacity Study Plan. This plan was developed and approved by the Recreation and Aesthetics TWG on March 5, 2002. The study plan was designed to address, in part, the following issues questions developed by the UARP Relicensing Plenary Group:

Issue Question 9. What is the recreation carrying capacity for the Project with respect to the recreational experience and the ecological system?

Specifically, the objectives of the study plan were to:

- Identify the capability of land managing agencies to set capacities and manage the use and quality of recreation experiences.
- Identify the social capacity of the Project (lands, water and recreation facilities).
- Identify the environmental capacity of the Project (lands, water and recreation facilities).
- Answering the pertinent issue question listed above.

The study area for the Carrying Capacity Study was the area within the UARP FERC Project Boundary and other sites (e.g., dispersed sites and river access points) outside the FERC Project Boundary as defined in the Recreation Supply Study Plan. Generally, all identified sites within one-quarter of a mile of UARP reservoirs (including locations or river access points in the High Country, Crystal Basin and Canyonlands), as well as other sites beyond the one-quarter mile zone identified in consultation with the Forest Service and other interest participants and agreed to by SMUD were included in the study area. The study area encompassed the area of concern including the reservoir surfaces, shoreline and other locations where recreation related to the UARP activities commonly occurs. Figure 2.1-1 shows the locations of the UARP reservoirs. Appendix A has more detailed maps of Loon Lake, Union Valley, Ice House and Gerle reservoirs which include the locations of developed recreation facilities at the reservoirs.

This study did not include the area surrounding Pacific Gas and Electric Company's Chili Bar Reservoir or the Reach Downstream of Chili Bar.

2.2 Water Year Types

The information in this subsection is provided for informational purposes, as requested by agencies. The derivation of water year types is described in the *Water Quality Technical Report*. Table 2.2-1 presents water year types for the period that is pertinent to this *Recreation Carrying Capacity Technical Report:* 1999 through 2002.

Table 2.2-1. Water year types applied to individual months of years 2001-2003.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1999	W	AN	W	AN	AN	AN	AN	AN	AN	AN	AN	AN
2000	AN	BM	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN
2001	AN	D	D	D	D	D	D	D	D	D	D	D
2002	D	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN
2003	BN	BN	BN	D	BN	BN	BN	BN	BN	AN	AN	AN

*CD=Critically Dry; D=Dry; BN=Below Normal; AN=Above Normal; W=Wet

2.3 Agency Requested Information

In a letter dated December 17, 2003 to SMUD, the agencies requested that SMUD provide the following information in the *Recreation Carrying Capacity Technical Report*:

- This study relies on the results of the recreation supply, demand, and visitor use and impact studies; therefore, this report should be completed in the agreed to format only after the other studies have been completed and accepted by the Recreation TWG. SMUD should propose a measure, methodology, and schedule for completing the carrying capacity study.

SMUD has reported the results of the Supply, Demand and Visitor Use and Impact studies at various Recreation and Aesthetics TWG meetings in 2003. The results of these studies were incorporated into this report, as specified in the Carrying Capacity Study Plan. The results of the Carrying Capacity Study were presented to the Recreation and Aesthetics TWG on October 22, 2003. The participants provided comments and requested some additional queries of the visitor use survey data. This information has been incorporated into the report.

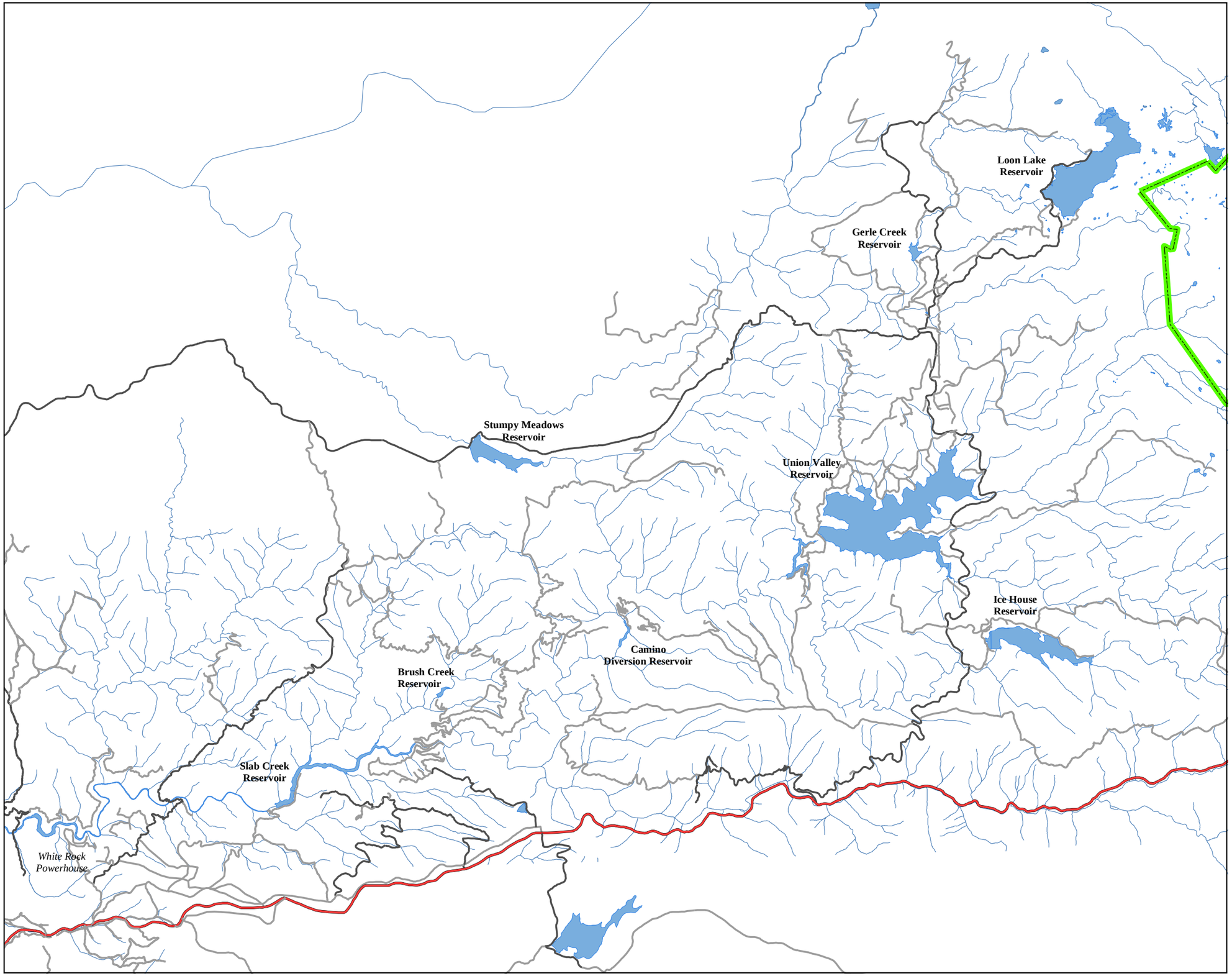
The Carrying Capacity Study Plan did not indicate that proposed measures would be included as part of the study results. Consequently, no such measures are included in the report.

The methodology and schedule used to complete this study were either outlined in the Carrying Capacity Study Plan or a reference was provided to a separate study plan where information used in the Carrying Capacity Study was being collected. With the exception of collecting information about boating use on the reservoirs, SMUD conducted the study in accordance with the methodology presented in the study plan. The study plan specified that aerial counts would be conducted if there were insufficient existing boating use data on the UARP reservoirs. SMUD did not conduct aerial boat counts but instead collected this information using observers traversing the entire reservoir surface by boat. During the October 22, 2003, Recreation and

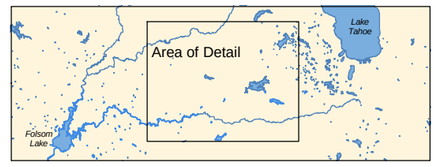
Upper American River Project

SMUD

Figure 2.1-1



Divided Highway
County Roads
Other Roads
Wilderness Boundary



N

SCALE 1:123,000

0 1 2 3 4 Miles

Prepared by VESTRA Resources, Inc., Redding. CA. Feb. 10, 2004

Aesthetics TWG meeting, Forest Service staff expressed a desire for a more rigorous methodology that could be used as a qualitative baseline reflecting boat distribution for future studies. The Recreation and Aesthetic TWG agreed that a study to investigate boat distribution may be considered during the development of resource measures.

3.0 METHODS

The study plan methods included: 1) identifying pertinent standards and guidelines regarding carrying capacity; 2) collecting occupancy data for UARP recreation facilities; 3) documenting boating use on UARP reservoirs; and 4) collecting use level data at dispersed recreation areas.

Information collected as part of other study plans is summarized in this report and was collected consistent with the study methods outlined in the respective study plans. The methods used to collect information from law enforcement and facility operations staff is included in the Recreation Demand Study Plan. Methods used to conduct visual assessments are included in the Visitor Use and Impact Study Plan. Methods to conduct water quality sampling are included in Water Quality Study Plan.

The information collected for this study is compared to existing standards to identify circumstances that may exist where the existing or future recreational use is not consistent with protecting environmental resources or the expected quality of the recreational experience of visitors.

3.1 Review of Standards and Guidelines Pertinent to Carrying Capacity

SMUD reviewed documents and plans relating to carrying capacity that have been recently published and appeared to be pertinent to the UARP. The sources of available information reviewed for this study included:

- Water Recreation Opportunity Spectrum Guidebook (Draft) (BOR 2002)
- Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity (BOR 1977).
- Eldorado National Forest Land and Resource Management Plan, as amended in 2002
- Final Environmental Impact Statement for the Lake Mead National Recreation Area (NPS 2002)
- Statewide Comprehensive Outdoor Recreation Plan (New York 2003)

3.2 Field Observations

Field observations were employed to obtain information where there was insufficient existing information about use levels at some recreation facilities and the reservoir surface. Key locations where use counts were conducted for this study include: 1) campgrounds; 2) day use areas; 3) parking lots; 4) reservoir surface; and 5) dispersed sites. The methodology also included collecting boat counts on the main reservoirs that could be correlated to applicable standards for boat density and Recreation Opportunity Spectrum. The methodologies used to collect use level information at the UARP recreation facilities, areas with dispersed recreation

near the reservoirs and boating use on the reservoirs are discussed below. The UARP recreation facilities are defined as facilities that were constructed by SMUD as part of the original recreation plan for the UARP and the facilities that were constructed by SMUD under the Exhibit R of the Jones Fork amendment to the UARP license.

3.2.1 Campgrounds and Day Use Areas

The ENF provided visitor use information for most of the campgrounds and day use areas; however, this information was incomplete. The study plan was developed under the assumption that the existing ENF use information would provide sufficient data for the study. Since the information was incomplete, SMUD identified the need to conduct additional field observations, beyond what was specified in the study plan, to obtain the information. In order to estimate the visitor use at recreation facilities, where use data were not available, recreational use estimates were developed based on what data have been provided by the Forest Service and additional occupancy observations collected by SMUD in 2003.

Occupancy observations were collected at the two boat-in or hike-in campgrounds at Azalea Cove and Lone Rock, located at Union Valley Reservoir, in 2003 to supplement the existing visitor use data. This information was collected on six observation dates during the summer of 2003: two Saturdays on holiday weekends, two Saturdays on non-holiday weekends and two weekdays. Although this methodology was not specified in the study plan, it is similar to the methodology outlined in the Visitor Use and Impact Study that was used to collect visitor use data. The only notable difference is that there was one less observation conducted on holiday weekends. The dates to collect this data were randomly selected between Fourth of July and Labor Day and are listed below:

Holiday Weekends	July 5, 2003 (Saturday of Fourth of July)
	August 30, 2003 (Saturday of Labor Day)
Non-Holiday Weekends	July 26, 2003 (Saturday)
	August 9, 2003 (Saturday)
Weekdays	August 5, 2003 (Tuesday)
	August 28, 2003 (Thursday)

The sites were visited between 10 am and 4 pm on the observation dates. The observer recorded the number of camp sites occupied based on visual inspection. Even if people were not present, the site was considered occupied if there was camping equipment present at the site. The annual number of visitors to these facilities is estimated using the average party size determined by analysis of the responses to the 2002 visitor use surveys.

3.2.2 Parking Areas

The study plan was developed under the assumption that the existing ENF use information would provide sufficient data for the study. However, there were no data available that provided vehicle count information for parking areas at boat launches, day use areas and trailheads. Since the information was incomplete, SMUD identified the need to conduct additional field

observations, beyond what was specified in the study plan, to obtain the information. Observations at these recreation facilities were conducted during the summers of 2002 and 2003. In 2002, observations were recorded while visiting various sites in the course of conducting other recreation work. These dates were not randomly selected and did not include mid-week observations. Six observation dates were randomly selected during the summer of 2003 between Fourth of July and Labor Day: two Saturdays on holiday weekends, two Saturdays on non-holiday weekends and two weekdays. Although this methodology was not specified in the study plan, it is similar to the methodology outlined in the Visitor Use and Impact Study that was used to collect visitor use data. The only notable difference is that there were three more observations conducted on holiday weekends. Data were collected on the following dates:

Holiday Weekends	May 25, 2002, May 26, 2002 (Sat & Sun of Memorial Day)
	July 4, 2002, July 5, 2002 (Sat & Sun of Fourth of July)
	July 5, 2003 (Saturday of Fourth of July),
	August 30, 2003 (Saturday of Labor Day)
Non-Holiday Weekends	August 10, 2002 (Saturday)
	July 26, 2003 (Saturday)
	August 9, 2003 (Saturday)
Weekdays	August 5, 2003 (Tuesday)
	August 28, 2003 (Thursday)

The sites were visited between 11 am and 2 pm on the observation date. At each site the observer recorded the number of: 1) vehicles only; 2) vehicles with trailers; and 3) trailers only. If the facility was filled, the observer also recorded if there were vehicles or trailers parked adjacent to the facility (overflow).

3.2.3 Reservoir Surfaces

Existing, reliable sources of boat count information for the main UARP reservoirs could not be located for the study. The Visitor Use and Impact Study methods specified that in the absence of reliable existing data, SMUD would conduct aerial boat counts on Saturday or Sunday of the July 4th weekend and one other Saturday on a non-holiday weekend in July or August 2002. SMUD did not conduct aerial counts but instead conducted boat counts from the reservoir surface. Instead of collecting this information on only two days of the summer, SMUD conducted boat counts on three days during the summer: Saturday of Labor Day weekend and on two non-holiday weekend days. Additional land-based boat counts at the three main reservoir surfaces were taken in 2002 and 2003 and this information is also included in the report. SMUD realizes that the land-based observation points do not offer a complete view of the reservoir surfaces however, these boat counts are provided in the report for informational purposes. Peak boating use on the reservoirs is estimated using observation data collected during the summers of 2002 and 2003. The observations took place at the main UARP reservoirs: Ice House, Union Valley, and Loon Lake reservoirs. In 2002, observations were recorded while visiting various sites in the course of conducting other recreation work. The 2002 observation dates were not randomly selected and did not include mid-week observations. Six observation dates were randomly selected during the summer of 2003 between Fourth of July and Labor Day: two Saturdays on holiday weekends, two Saturdays on non-holiday weekends and two weekdays.

Data was collected in 2002 and 2003 on the following dates:

Holiday Weekends	July 4, 2002, (Saturday of Fourth of July)
	August 30, 2003 (Saturday of Labor Day)
Non-Holiday Weekend	August 10, 2002 (Saturday)
	July 26, 2003 (Saturday)
	August 9, 2003 (Saturday)
Weekday	August 5, 2003 (Tuesday)
	August 28, 2003 (Thursday)

The observations included boat counts taken from the reservoir surface (by boat) and from key vantage points on land. Boat counts were taken between 10am and 3pm and the number of active watercraft were counted on the reservoir surface. The observer recorded the number of active watercraft operating on the reservoir at one time by the following categories: 1) powerboats; 2) small fishing boats; 3) non-motorized watercraft; and 4) personal watercraft (PWC). The observer recorded all active watercraft on the surface of the reservoir. Watercraft were considered active if they were engaged in activities on the reservoir surface or if they were at the shoreline with people in or around them (an active day use type of situation as opposed to a moored watercraft).

When the field observations of the reservoir surface were conducted using a boat, the entire reservoir surface was traversed to collect the boating use data. The active watercraft were counted by systematically traversing the reservoir from one end to the other to avoid double counting or omitting watercraft in the count.

When observations were made from land, binoculars were used to discern between the types of watercrafts. Although there are good vantage points, a few portions of the reservoir surfaces are not visible from land. Consequently the number of boats observed from land may be less than the actual number of boats operating on the reservoir during the observation.

3.2.4 Dispersed Sites *(at UARP reservoirs and river access points)*

SMUD collected observation data consistent with the methodology established in the Visitor Use and Impact Study Plan which specified conducting direct observations on three summer holiday weekends, two non-holiday weekends and two non-holiday weekdays, to estimate the recreational use at dispersed sites at Ice House, Union Valley, Gerle Creek, Robbs Forebay, Loon Lake, Junction, Slab Creek, and Brush Creek reservoirs. Observations were also made at Mosquito Road where it crosses the SF American River, Bryant Springs Road where it crosses SF Silver Creek, and Wentworth Springs Road at Gerle Creek. The recreational use at dispersed sites at the UARP is estimated based on group and vehicle counts taken during SMUD's observations at these locations in 2002 and 2003 as part of the surveys for the Visitor Use and Impact Study. The questionnaire responses for party size allow an average number of people per group to be calculated. This value is applied to the number of groups observed on weekdays, weekends and holidays to develop an estimate of non-winter recreational use at the dispersed sites at the UARP reservoirs and river access points.

In a similar manner, vehicle counts taken as part of the winter portion of the Visitor Use and Impact Study are the basis for winter recreational use estimates at the UARP. Plowed routes of travel in the UARP area allow vehicular access to the UARP area and visitors can drive and park along these routes to enjoy winter recreation activities. Between December 2002 and March 2003 vehicle counts were taken:

- Along the Bryant Springs Road between Ice House Road and Westpoint Boat Launch
- Along Ice House Road between Highway 50 and Loon Lake Chalet
- At Ice House Boat Launch
- Along Wentworth Springs Road between Ice House Road and the turnoff to Gerle Creek Dam
- At Big Hill Overlook

Observations were conducted on holidays, weekends and weekdays, consistent with the methodology specified in the Visitor Use and Impact Study Plan. The observer drove the entire route on each survey date and noted the number of vehicles parked along the routes. As the observer left Loon Lake Chalet and Westpoint Boat Launch, the observer recorded the number of oncoming vehicles seen driving on the roads. Administrative vehicles were recorded separate from non-administrative vehicles, based on the outward appearance of the vehicles such as insignias on doors and license plates. The winter questionnaire responses for the number of people in each vehicle allow an average number of people per vehicle to be calculated. This value is applied to the number of vehicles observed during the winter months to develop an estimate of winter recreational use at the UARP. Additional details about the methods used to conduct the winter observations and surveys are included in the Visitor Use and Impact Study Report.

3.2.5 Observations for Resource Damage

Resource damage can be an indication that an area may be receiving excessive recreational use. As part of the Visitor Use and Impact Study, SMUD also made site inspections in the study area with recreation activity to report where recreational use may be causing resource damage. The results of this investigation are included in this report however the reader is referred to the Visitor Use and Impact Study Report for additional information. Similarly, the possible effects of recreational use on water quality were investigated as part of the Water Quality Study. The results of water quality sampling near areas with recreational use are referenced in this report however the reader is referred to the Water Quality Study Report for additional information.

4.0 RESULTS

4.1 Developed Recreation Facilities

Generally speaking, most of the UARP recreational use occurs at the UARP reservoirs in the Crystal Basin at Ice House, Union Valley, Gerle Creek and Loon Lake reservoirs. UARP recreation facilities including campgrounds, day use areas, boat launches, trailheads and scenic overlooks exist at these UARP reservoirs. The following sections include discussions about

estimated recreational use, visitor survey responses, key contact interviews and areas where resource damage was observed related to UARP recreation facilities.

4.1.1 Use Estimates

The estimated recreational use at UARP recreation facilities was developed as part of the Visitor Use and Impact Study. These figures are also presented in this report so that the circumstances of crowding, turnaway days, and quality of the recreation experience can be correlated to the level of estimated recreational use. Tables 4.1-1a-d through 4.1-3 below display, for each UARP facility, the estimated number of visitors, the number of sites occupied and the number of turnaway days (for campgrounds only). A turnaway day is counted when a visitor arrives at the facility but cannot find a site because all of the sites are full. Table 4.1-1a-d includes information tabulated using site occupancy data from the concessionaire that operates the UARP facilities in the Crystal Basin. Table 4.1-2 includes visitor use information from the ENF for UARP facilities that the ENF operates under the Fee Demonstration Project. Table 4.1-3a-b includes the visitor use information from the ENF for UARP facilities that the ENF operates and does not charge a user fee. The period of time includes the months of May through October from 1999 to 2002.

Observations were also taken at parking areas at the various UARP boat launches, day use areas and trail heads facilities in the Crystal Basin. These observations were only taken at one time of the day during the afternoon in an effort to capture the recreational use during its peak on holidays, weekends and weekdays. Table 4.1-4 below summarizes the observations taken during the summers of 2002 and 2003, the capacity of the individual facilities and their occupancy rates.

4.1.1.1 Estimated Use from Private Recreation Developments Near UARP Reservoirs

The ENF authorizes two private camps to operate within one-quarter mile of UARP reservoirs. Mountain Camp is located on the north side of Ice House Reservoir and it has a capacity of 100 PAOT. Deer Camp is located on the east side of Loon Lake Reservoir and it has a capacity of 50 PAOT's. Both of these developments are youth camps that operate between June and August. An additional recreation facility, SMUDEA, is a 43-site campground located at Union Valley that is operated by SMUD's employee association. The estimated annual use at the UARP that is associated with these three private developments is approximately 13,500 recreation-days.

Table 4.1-1a. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for UARP recreation facilities operated by a concessionaire for the ENF.

		Ice House CG			Ice House DU		Ice House Boat Launch						Fashoda CG			Fashoda DU		Sunset CG		
							Day Use			Overnight Camping										
		# People	# Sites	Turn-away Days	# People	# Sites	# Vehicles	Group Size (3.5 people per vehicle)	# People	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	# People	# Sites	Turn-away Days
1999	May	1768	506	0	648	124	552	3.5	1932	16	8	3	285	58		10	2	826	193	
	June	5089	1348	0	1438	233	1871	3.5	6549				594	140		76	28	3561	893	
	July	4020	1789	1	1600	260	1950	3.5	6825			6	1836	396		490	82	10124	2129	
	August	6559	1749	0			1312	3.5	4592	65	33	10	1153	257		445	82	8908	1827	
	September	3811	1156	0				3.5	0				181	45		0	0	3133	736	
	October							3.5	0				0	0		0	0			
	Sub-Total	**21247**	**6548**	**1**	**3686**	**617**	**5685**	**3.5**	**19898**	**81**	**41**	**19**	**4049**	**896**	**0**	**1021**	**194**	**26552**	**5778**	**0**
2000	May	1473	309	0	238	37	129	3.5	452	10		0	364	82	2	96	16	1352	421	0
	June	7425	1740	10	835	212	526	3.5	1841	30		0	803	184	0	438	64	5553	1358	3
	July	9079	1966	28			1631	3.5	5709	46		0	1375	292	5	337	87	11074	2332	0
	August	6763	1498	3	456	82	541	3.5	1894	46	21	0	1022	274	3	305	82	9211	1991	15
	September	3195	763	0	14	6	167	3.5	585	168			0	0	0	0	0	2128	574	0
	October							3.5	0											
	Sub-Total	**27935**	**6276**	**41**	**1543**	**337**	**2994**	**3.5**	**10479**	**300**	**21**	**0**	**3564**	**832**	**10**	**1176**	**249**	**29318**	**6676**	**18**
2001	May	1473	309					3.5	0				368	82				1977	424	
	June	5921	1422					3.5	0				803	184				5671	1309	
	July	8025	1776					3.5	0				1369	292				11074	2332	
	August	6750	1500					3.5	0				1069	276				9126	1994	
	September	3323	820					3.5	0				0	0				2114	578	
	October							3.5	0											
	Sub-Total	**25492**	**5827**	**0**	**0**	**0**	**0**	**3.5**	**0**	**0**	**0**	**0**	**3609**	**834**	**0**	**0**	**0**	**29962**	**6637**	**0**
2002	May	2846	693	0	291		267	3.5	935	16	12	0	199	37	0	30	22	1467	384	0
	June	4878	1241	1	1187	158	404	3.5	1414	150	12	0	388	95	0	317	85	4741	1088	0
	July	7447	1658	8	1163	168	848	3.5	2968	238	46	0	801	173	1	821	103	9794	2196	8
	August	8020	1693	4	1215	203	965	3.5	3378	199	57	0	0	0	0	523	93	9479	2146	7
	September	2909	891	0	343	81	674	3.5	2359	324	21	0	0	0	0	0	0	1890	520	0
	October							3.5	0											
	Sub-Total	**26100**	**6176**	**13**	**4199**	**610**	**3158**	**3.5**	**11053**	**927**	**148**	**0**	**1388**	**305**	**1**	**1691**	**303**	**27371**	**6334**	**15**

Table 4.1-1b. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for UARP recreation facilities operated by a concessionaire for the ENF.

		Sunset Boat Launch						Wench Creek CG			Wench Creek Group 1			Wench Creek Group 2			Wolf Creek CG			Yellow Jacket CG		
		Day Use			Overnight Camping																	
		# Vehicles	Group Size (3.5 people per vehicle)	# People	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Days	Turn-away Days	# People	# Days	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days
1999	May		3.5	0				1380	327	1	30	1	0	200	4	4	715	169	0	782	189	2
	June	407	3.5	1425				2070	481	0	580	14	0	640	16	0	1139	231	0	1027	268	0
	July	1085	3.5	3798				6889	1479	10	1200	24	0	724	19	7	3242	662	9	3391	725	9
	August	715	3.5	2503				5250	1202	0	991	26	0	1070	22	0	2286	494	4	2398	539	6
	September	310	3.5	1085				1033	234	0	460	11	0				528	101	0	1268	323	3
	October		3.5	0																		
	Sub-Total	**2517**	**3.5**	**8810**	**0**	**0**	**0**	**16622**	**3723**	**11**	**3261**	**76**	**0**	**2634**	**61**	**11**	**7910**	**1657**	**13**	**8866**	**2044**	**20**
2000	May		3.5	0	24	4	0	1793	362	0							337	141	0	619	125	1
	June		3.5	0				2816	689	0	529	12	0	290	7	0	830	235	0	1362	298	0
	July	681	3.5	2384	125	44	0	6159	1383	3	796	21	0	695	16	0	1882	418	8	3083	671	10
	August	268	3.5	938	57	60	0	4195	1012	1	1025	16	0	700	12	0	855	268	1	1910	445	0
	September	101	3.5	354				180	41	0	250	7	0	500	10	0	72	20	0	854	215	0
	October		3.5	0																		
	Sub-Total	**1050**	**3.5**	**3675**	**206**	**108**	**0**	**15143**	**3487**	**4**	**2600**	**56**	**0**	**2185**	**45**	**0**	**3976**	**1082**	**9**	**7828**	**1754**	**11**
2001	May		3.5	0																		
	June		3.5	0																		
	July		3.5	0																		
	August		3.5	0																		
	September		3.5	0																		
	October		3.5	0																		
	Sub-Total	**0**	**3.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2002	May	135	3.5	473	0	0	0	531	165	0	190	4	0	105	3	0	127	34	0	481	98	0
	June	1155	3.5	4043	14	5	0	992	260	0	479	14	0	532	9	0	1010	207	0	964	242	0
	July	364	3.5	1274	694	32	0	5526	1223	2	817	57	0	524	49	0	1959	439	6	2514	564	3
	August	530	3.5	1855	1503	34	0	5215	1195	4	635	19	0	645	15	0	1968	457	4	2048	454	0
	September	419	3.5	1467	47	11	0	1236	293	0	260	11	0	197	8	0	312	87	0	183	34	0
	October		3.5	0																		
	Sub-Total	**2603**	**3.5**	**9111**	**2258**	**82**	**0**	**13500**	**3136**	**6**	**2381**	**105**	**0**	**2003**	**84**	**0**	**5376**	**1224**	**10**	**6190**	**1392**	**3**

Table 4.1-1c. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for UARP recreation facilities operated by a concessionaire for the ENF.

		Yellow Jacket Boat Launch			Gerle Creek CG			Gerle Creek DU		Loon Lake CG			Loon Lake Equestrian Family CG			Loon Lake Equestrian Group CG			Loon Lake Group #1 CG			Loon Lake Group #2 CG		
		Day Use																					
		# Vehicles	Group Size (3.5 people per vehicle)	# People	# People	# Sites	Turn-away Days	# People	# Sites	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Days	Turn-away Days	# People	# Days	Turn-away Days	# People	# Days	Turn-away Days
1999	May	82	3.5	287	532	127	0	148	8														
	June	191	3.5	669	1356	374	0	612	29	482	157	0	69	15	0				25	4	4		
	July	574	3.5	2009	3703	845	8	983	57	3233	927	11	265	53	2	266	15	15	765	20	20	223	10	7
	August	318	3.5	1113	3366	774	4	1052	43	2328	779	2	291	81	0	280	13	13	600	13	13	250	9	9
	September	91	3.5	319	1220	308	1	349	34	1621	460	0	100	19	0	125	5	0	150	3	0	110	5	5
	October		3.5	0																			
	Sub-Total	**1256**	**3.5**	**4396**	**10177**	**2428**	**13**	**3144**	**171**	**7664**	**2323**	**13**	**725**	**168**	**2**	**671**	**33**	**28**	**1540**	**40**	**37**	**583**	**24**	**21**
2000	May	56	3.5	196	571	147	1	187	12	574	135	1	69	16	3									
	June	304	3.5	1064	1446	402	0	643	26	1307	383	2				110	5	0	156	5	0	107	5	0
	July	610	3.5	2135	3447	788	8	1238	45	3824	926	0				415	20	0	682	19	0	295	15	0
	August	118	3.5	413	3293	747	8	1001	39	2812	721	0				278	12	0	222	9	0	186	9	0
	September	20	3.5	70						3754	921	0												
	October		3.5	0																				
	Sub-Total	**1108**	**3.5**	**3878**	**8757**	**2084**	**17**	**3069**	**122**	**12271**	**3086**	**3**	**69**	**16**	**3**	**803**	**37**	**0**	**1060**	**33**	**0**	**588**	**29**	**0**
2001	May		3.5	0	577	149				574	135		69	16										
	June		3.5	0	1449	396				1261	364		90	28										
	July		3.5	0	3441	790				3824	926		332	80										
	August		3.5	0	3300	746				3589	828		0	0										
	September		3.5	0	0	0				0	0		0	0										
	October		3.5	0																				
	Sub-Total	**0**	**3.5**	**0**	**8767**	**2081**	**0**	**0**	**0**	**9248**	**2253**	**0**	**491**	**124**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2002	May	55	3.5	193	699	184	1	421	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	June	151	3.5	529	1755	472	2	703	8	2015	498	0	173	53	0	60	8	0	400	9	0	207	9	0
	July	472	3.5	1652	3486	772	7	1490	55	3081	793	8	413	125	0	91	13	0	145	16	0	232	11	0
	August	475	3.5	1663	3871	839	8	1637	52	4445	986	7	480	120	0	135	17	0	494	15	0	200	10	0
	September	0	3.5	0	614	181	0	972	39	1093	391	0	98	24	0	85	8	0	320	6	0	65	3	0
	October		3.5	0																				
	Sub-Total	**1153**	**3.5**	**4036**	**10425**	**2448**	**18**	**5223**	**175**	**10634**	**2668**	**15**	**1164**	**322**	**0**	**371**	**46**	**0**	**1359**	**46**	**0**	**704**	**33**	**0**

Table 4.1-1d. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for UARP recreation facilities operated by a concessionaire for the ENF.

		Loon Lake DU		Loon Lake Boat Launch						Loon Wilderness Trailhead			GRAND TOTALS							
													Day Use Totals				Campground Totals			Total Visitors
				Day Use			Overnight Camping						Boat Launch Day Use		Picnic Areas/Trailheads		Overnight Camping			(DU + Overnight)
		# People	# Sites	# Vehicles	Group Size (3.5 people per vehicle)	# People	# People	# Sites	Turn-away Days	# Vehicles	Group Size (3.5 people per vehicle)	# People	# Vehicles	# People	# People	# Sites	# People	# Sites	Turn-away Days	# People
1999	May				3.5						3.5	0	634	2219	806	134	6534	1582	10	9559
	June	16	11	206	3.5	721	178	87	0	250	3.5	875	2675	8820	3017	301	16810	4028	4	28647
	July	314	53	434	3.5	1519	372	183	1	699	3.5	2447	4043	13004	5834	452	40253	9276	106	59090
	August	445	114	447	3.5	1565	301	125	0	515	3.5	1803	2792	8509	3745	239	36096	7943	61	48349
	September	159	36		3.5	0	92	46	0	282	3.5	987	401	1496	1495	70	13832	3452	9	16823
	October				3.5	0					3.5	0	0	0	0	0	0	0	0	0
	Sub-Total	**934**	**214**	**1087**	**3.5**	**3805**	**943**	**441**	**1**	**1746**	**3.5**	**6111**	**10545**	**34046**	**14896**	**1196**	**113525**	**26281**	**190**	**162467**
2000	May	256	26	120	3.5	420	55	17	0	157	3.5	550	305	703	1327	91	7241	1759	8	9270
	June	449	100	656	3.5	2296	201	112	0	448	3.5	1568	1486	3106	3933	402	22965	5435	15	30004
	July	425		722	3.5	2527	419		0	446	3.5	1561	3644	10646	3561	132	43396	8911	62	57603
	August	360		523	3.5	1831	310			353	3.5	1236	1450	3555	3358	203	32885	7095	31	39797
	September				3.5	0					3.5	0	288	1008	14	6	11101	2551	0	12123
	October				3.5	0					3.5	0	0	0	0	0	0	0	0	0
	Sub-Total	**1490**	**126**	**2021**	**3.5**	**7074**	**985**	**129**	**0**	**1404**	**3.5**	**4914**	**7173**	**19017**	**12192**	**834**	**117588**	**25751**	**116**	**148797**
2001	May				3.5	0					3.5	0	0	0	0	0	5038	1115	0	5038
	June				3.5	0					3.5	0	0	0	0	0	15195	3703	0	15195
	July				3.5	0					3.5	0	0	0	0	0	28065	6196	0	28065
	August				3.5	0					3.5	0	0	0	0	0	23834	5344	0	23834
	September				3.5	0					3.5	0	0	0	0	0	5437	1398	0	5437
	October				3.5	0					3.5	0	0	0	0	0	0	0	0	0
	Sub-Total	**0**	**0**	**0**	**3.5**	**0**	**0**	**0**	**0**	**0**	**3.5**	**0**	**0**	**0**	**0**	**0**	**77569**	**17756**	**0**	**77569**
2002	May	0	0	0	3.5	0	0	0	0		3.5	0	457	1600	742	43	6661	1614	1	9003
	June	222	74	221	3.5	774	158	61	0	255	3.5	893	1931	6143	3322	325	18916	4283	3	28381
	July	265	78	111	3.5	389	413	113	0	186	3.5	651	1795	6307	4390	404	38175	8280	43	48872
	August	399	86	436	3.5	1526	380	162	0	288	3.5	1008	2406	7275	4782	434	39717	8219	34	51774
	September	202	62	289	3.5	1012	176	87	0	133	3.5	466	1382	4002	1983	182	9809	2576	0	15793
	October				3.5	0					3.5	0	0	0	0	0	0	0	0	0
	Sub-Total	**1088**	**300**	**1057**	**3.5**	**3700**	**1127**	**423**	**0**	**862**	**3.5**	**3017**	**7971**	**25326**	**15218**	**1388**	**113278**	**24972**	**81**	**153822**

Table 4.1-2. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for UARP recreation facilities operated by the ENF under the Fee Demonstration Project.

		Northwind CG			Strawberry Point CG			Big Silver Group CG			Jones Fork CG			Northshore CG			Red Fir CG			GRAND TOTALS Overnight Camping		
		# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days
1999	May	195	42	3	260	85	4				216	67	2	103	39	0				774	233	9
	June	438	166	2	377	140	3				424	142	3	353	162	2				1592	610	10
	July	848	226	13	735	239	5				788	210	9	627	213	1				2998	888	28
	August	675	206	8	749	203	11				698	184	6	548	165	0				2670	758	25
	September	634	189	9	486	171	7				503	173	4	126	33	0				1749	566	20
	October																			0	0	0
	Sub-Total	**2790**	**829**	**35**	**2607**	**838**	**30**	**0**	**0**	**0**	**2629**	**776**	**24**	**1757**	**612**	**3**	**0**	**0**	**0**	**9783**	**3055**	**92**
2000	May	146	54	5	202	53	4	14	2	0	201	49	3	96	29	0	0	0	0	659	187	12
	June	564	193	8	539	149	4	180	11	0	692	181	7	294	119	1	80	4	0	2349	657	20
	July	802	216	13	893	225	12	399	15	0	732	201	9	506	184	0	82	9	0	3414	850	34
	August	692	195	11	783	224	7	288	16	0	772	218	13	574	206	4	351	16	0	3460	875	35
	September	419	127	0	242	97	0	0	0	0	299	94	2	219	88	0	0	0	0	1179	406	2
	October																			0	0	0
	Sub-Total	**2623**	**785**	**37**	**2659**	**748**	**27**	**881**	**44**	**0**	**2696**	**743**	**34**	**1689**	**626**	**5**	**513**	**29**	**0**	**11061**	**2975**	**103**
2001	May																			0	0	0
	June																			0	0	0
	July																			0	0	0
	August																			0	0	0
	September																			0	0	0
	October																			0	0	0
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2002	May	0	0		0	0					0	0		0	0					0	0	0
	June	433	114		583	135					458	126		397	116					1871	491	0
	July	823	236		869	200					662	179		620	209					2974	824	0
	August	626	181		749	206					842	206		625	188					2842	781	0
	September	337	114		265	96					214	77		381	133					1197	420	0
	October																			0	0	0
	Sub-Total	**2219**	**645**	**0**	**2466**	**637**	**0**	**0**	**0**	**0**	**2176**	**588**	**0**	**2023**	**646**	**0**	**0**	**0**	**0**	**8884**	**2516**	**0**

Table 4.1-3a. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for free use UARP recreation facilities operated by the ENF.

		Azalea Cove CG			Westpoint CG			Westpoint Boat Launch						Camino Cove CG			Lone Rock CG			Airport Flat CG		
								Day Use			Overnight Camping											
		# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# Vehicles	Group Size (3.5 people per vehicle)	# People	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days	# People	# Sites	Turn-away Days
1999	May							32	3.5	112	48	20	0							436	48	2
	June							211	3.5	739	198	69	5							297	75	0
	July							389	3.5	1362	524	148	13							882	173	0
	August							327	3.5	1145	583	204	8							579	152	0
	September							244	3.5	854	636	110	2							515	108	0
	October								3.5	0												
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**1203**	**3.5**	**4211**	**1989**	**551**	**28**	**0**	**0**	**0**	**0**	**0**	**0**	**2709**	**556**	**2**
2000	May	9	3	0	117	20	0	81	3.5	284				344	96	2	4	1	0	204	37	0
	June	21	9	0	287	69	6	220	3.5	770	180	18	5	1732	377	4	24	7	0	370	100	1
	July	51	14	0	422	103	7	249	3.5	872	321	90	4	2645	562	7	46	16	0	673	211	10
	August	26	11	0	301	72	2	115	3.5	403	193	55	0	1815	396	2	49	16	2	578	162	6
	September	2	1	0	124	42	0	43	3.5	151	106	48	0	425	123	0	0	0	0	377	109	3
	October								3.5	0												
	Sub-Total	**109**	**38**	**0**	**1251**	**306**	**15**	**708**	**3.5**	**2478**	**800**	**211**	**9**	**6961**	**1554**	**15**	**123**	**40**	**2**	**2202**	**619**	**20**
2001	May								3.5	0												
	June								3.5	0												
	July								3.5	0												
	August								3.5	0												
	September								3.5	0												
	October								3.5	0												
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2002	May								3.5	0												
	June								3.5	0												
	July								3.5	0												
	August								3.5	0												
	September								3.5	0												
	October								3.5	0												
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3.5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 4.1-3b. Recreational use estimates and occupancy data for 1999 to 2002 in the Crystal Basin for free use UARP recreation facilities operated by the ENF.

		Pleasant CG			Angel Creek Picnic		TOTALS							
							Boat Lanch Day Use		Picnic Areas		Overnight Camping			DU + Overnight
		# People	# Sites	Turn-away Days	# People	# Sites	# Vehicles	# People	# People	# Sites	# People	# Sites	Turn-away Days	# People
1999	May				38	4	32	112	38	4	484	68	2	634
	June				242	45	211	739	242	45	495	144	5	1476
	July				232	66	389	1362	232	66	1406	321	13	3000
	August				266	68	327	1145	266	68	1162	356	8	2573
	September				76	23	244	854	76	23	1151	218	2	2081
	October						0	0	0	0	0	0	0	0
	Sub-Total	**0**	**0**	**0**	**854**	**206**	**1203**	**4211**	**854**	**206**	**4698**	**1107**	**30**	**9763**
2000	May				12	2	81	284	12	2	678	157	2	974
	June				40	9	220	770	40	9	2614	580	16	3424
	July				152	18	249	872	152	18	4158	996	28	5182
	August				76	11	115	403	76	11	2962	712	12	3441
	September				15	1	43	151	15	1	1034	323	3	1200
	October						0	0	0	0	0	0	0	0
	Sub-Total	**0**	**0**	**0**	**295**	**41**	**708**	**2478**	**295**	**41**	**11446**	**2768**	**61**	**14219**
2001	May						0	0	0	0	0	0	0	0
	June						0	0	0	0	0	0	0	0
	July						0	0	0	0	0	0	0	0
	August						0	0	0	0	0	0	0	0
	September						0	0	0	0	0	0	0	0
	October						0	0	0	0	0	0	0	0
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2002	May						0	0	0	0	0	0	0	0
	June						0	0	0	0	0	0	0	0
	July						0	0	0	0	0	0	0	0
	August						0	0	0	0	0	0	0	0
	September						0	0	0	0	0	0	0	0
	October						0	0	0	0	0	0	0	0
	Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 4.1-4. Observations of the occupancy of parking areas at boat launches, day use areas and trailheads taken in 2002 and 2003 in the Crystal Basin.

		No. of Spaces Occupied[1]			Capacity of the Site[1]			% Occupancy (No. Sites Occupied/Site Capacity)		
Location (BL=Boat Launch DU=Day Use TH=Trailhead)	**Date/Time/Day of week (H=holiday, WE=weekend, WD=weekday)**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total No. Sites Occupied**	**Single vehicle**	**Vehicle with trailer**	**Total capacity**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total**
Ice House										
Ice House DU Area	7/4/02, 3:00pm (H)	37	0	37	12	3	15	308%	0%	260%
	7/5/03, 2:38pm (H)	49	0	49				408%	0%	327%
	8/30/03, 11:05am (H)	4	0	4				33%	0%	27%
	7/26/03, 12:35pm (WE)	37	0	37				308%	0%	247%
	8/9/03, 11:04am (WE)	12	0	12				100%	0%	80%
	8/5/03,1:56pm (WD)	5	0	5				42%	0%	33%
	8/27/03, 1:53pm (WD)	3	0	3				25%	0%	20%
Ice House BL	7/4/02, 10:00am (H)	18	9	27	0	62	62	N/A	15%	44%
	7/4/02, 2:45pm (H)	26	17	43				N/A	27%	69%
	7/5/03, 2:15pm (H)	45	16	61				N/A	26%	98%
	8/30/03, 11:am (H)	14	12	26				N/A	19%	42%
	8/10/02, 5:20pm (WE)	17	0	17				N/A	0%	27%
	7/26/03, 12:15pm (WE)	32	17	49				N/A	27%	79%
	8/9/03,11:00am (WE)	28	11	39				N/A	18%	63%
	8/5/03 1:50pm (WD)	8	6	14				N/A	10%	23%
	8/27/03, 1:46pm (WD)	5	1	6				N/A	2%	10%
Union Valley										
Jones Fk. Bike TH	7/5/03, 2:06pm (H)	18	0	18	13	0	13	138%	N/A	138%
	8/30/03,11:15am (H)	3	0	3				23%	N/A	23%
	7/29/03, 12noon (WE)	1	0	1				8%	N/A	8%
	8/9/03, 11:12am (WE)	3	1	4				23%	N/A	31%
	8/5/03,1:35pm (WD)	0	0	0				0%	N/A	0%
	8/27/03, 1:24pm (WD)	0	0	0				0%	N/A	0%

Table 4.1-4. Observations of the occupancy of parking areas at boat launches, day use areas and trailheads taken in 2002 and 2003 in the Crystal Basin.

		No. of Spaces Occupied[1]			Capacity of the Site[1]			% Occupancy (No. Sites Occupied/Site Capacity)		
Location (BL=Boat Launch DU=Day Use TH=Trailhead)	**Date/Time/Day of week (H=holiday, WE=weekend, WD=weekday)**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total No. Sites Occupied**	**Single vehicle**	**Vehicle with trailer**	**Total capacity**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total**
Union Valley										
Westpoint BL	5/26/02, 2:00pm (H)	14	0	14	9	6	15	156%	0%	93%
	7/5/03, 11:38am (H)	16	10	26				178%	167%	173%
	8/30/03, 12:24pm (H)	11	0	11				122%	0%	73%
	7/26/03, 11:15am (WE)	10	4	14				111%	67%	93%
	8/9/03, 2:48pm (WE)	12	5	17				133%	83%	113%
	8/5/03, 10:51am (WD)	3	3	6				33%	50%	40%
	8/27/03, 10:54am (WD)	5	1	6				56%	17%	40%
Sunset BL	7/4/02, 4:00pm (H)	25	18	43	0	92	92	N/A	20%	47%
	7/5/03, 1:55pm (H)	71	51	122				N/A	55%	133%
	8/30/03, 11:38am (H)	31	26	57				N/A	28%	62%
	8/10/02, 4:20pm (WE)	24	25	49				N/A	27%	53%
	7/26/03, 11:50am (WE)	48	45	93				N/A	49%	101%
	8/9/03,11:25am (WE)	23	23	46				N/A	25%	50%
	8/5/03, 1:28pm (WD)	14	9	23				N/A	10%	25%
	8/27/03, 1:18pm, (WD)	2	1	3				N/A	1%	3%
Fashoda DU Area[3]	5/26/02,2:30pm (H)	35	0	35	110	0	110	32%	N/A	32%
	7/4/02, 4:00pm (H)	42	1	43				38%	N/A	39%
	7/5/03, 1:52pm (H)	110	0	110				100%	N/A	100%
	8/30/03, 11:35am (H)	25	2	27				23%	N/A	25%
	7/26/03, 11:52am (WE)	55	0	55				50%	N/A	50%
	8/9/03 11:23am (WE)	62	3	65				56%	N/A	59%
	8/5/03,1:30pm (WD)	6	1	7				5%	N/A	6%
	8/27/03, 1:15pm (WD)	2	0	2				2%	N/A	2%

Table 4.1-4. Observations of the occupancy of parking areas at boat launches, day use areas and trailheads taken in 2002 and 2003 in the Crystal Basin.

		No. of Spaces Occupied[1]			Capacity of the Site[1]			% Occupancy (No. Sites Occupied/Site Capacity)		
Location (BL=Boat Launch DU=Day Use TH=Trailhead)	**Date/Time/Day of week (H=holiday, WE=weekend, WD=weekday)**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total No. Sites Occupied**	**Single vehicle**	**Vehicle with trailer**	**Total capacity**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total**
Union Valley										
Big Silver Bike TH	7/5/03, 1:46pm (H)	5	0	5	7	0	7	71%	N/A	71%
	8/30/03, 11:46am (H)	0	0	0				0%	N/A	0%
	7/25/03, 11:45am (WE)	0	0	0				0%	N/A	0%
	8/9/03, 11:32am (WE)	0	0	0				0%	N/A	0%
	8/5/03,1:23pm (WD)	1	0	1				14%	N/A	14%
	8/27/03, 1:11pm (WD)	1	0	1				14%	N/A	14%
Wench Cr. Bike TH	7/5/03, 1:20pm (H)	5	0	5	6	0	6	83%	N/A	83%
	8/30/03, 11:19am (H)	2	0	2				33%	N/A	33%
	7/26/03, 11:40am (WE)	0	0	0				0%	N/A	0%
	8/9/03, 11:35am (WE)	2	0	2				33%	N/A	33%
	8/5/03,1:13pm (WD)	0	0	0				0%	N/A	0%
	8/27/03, 1:01pm (WD)	0	0	0				0%	N/A	0%
Yellowjacket BL[2]	7/5/03, 11:57am (H)	30	5	35	0	18	18	N/A	28%	194%
	8/30/03, 12:07pm (H)	15	6	21				N/A	33%	117%
	7/26/03, 11:30pm (WE)	14	3	17				N/A	17%	94%
	8/9/03, 11:44am (WE)	16	4	20				N/A	22%	111%
	8/5/03, 11:08am (WD)	2	2	4				N/A	11%	22%
	8/27/03, 11:17am (WD)	0	0	0				N/A	0%	0%
Big Hill Overlook	7/5/03, 3:38pm (H)	1	0	1	5	0	5	20%	N/A	20%
	7/26/03 12:45pm (WE)	1	0	1				20%	N/A	20%
	8/5/03,2:24pm (WD)	2	0	2				40%	N/A	40%
	8/27/03, 2:00pm (WD)	1	0	1				20%	N/A	20%

Table 4.1-4. Observations of the occupancy of parking areas at boat launches, day use areas and trailheads taken in 2002 and 2003 in the Crystal Basin.

		No. of Spaces Occupied[1]			Capacity of the Site[1]			% Occupancy (No. Sites Occupied/Site Capacity)		
Location (BL=Boat Launch DU=Day Use TH=Trailhead)	**Date/Time/Day of week (H=holiday, WE=weekend, WD=weekday)**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total No. Sites Occupied**	**Single vehicle**	**Vehicle with trailer**	**Total capacity**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total**
Gerle Creek										
Angel Cr. DU Area[2]	7/5/02, 9:00am (H)	1	0	1	12	0	12	8%	N/A	8%
	7/5/03, 1:04pm, (H)	9	0	9				75%	N/A	75%
	8/30/03, 12:09pm (H)	7	0	7				58%	N/A	58%
	7/26/03, 1:45pm (WE)	2	0	2				17%	N/A	17%
	8/9/03,12:20pm (WE)	7	0	7				58%	N/A	58%
	8/5/03, 11:39 (WD)	2	0	2				17%	N/A	17%
	8/27/03, 11:47am (WD)	0	0	0				0%	N/A	0%
Gerle Cr. DU Area	7/5/02, 10:30am (H)	4	0	4	18	0	18	22%	N/A	22%
	7/5/03, 12:55pm (H)	9	0	9				50%	N/A	50%
	8/30/03, 1:00pm (H)	9	0	9				50%	N/A	50%
	7/26/03, 1:30 (WE)	16	0	16				89%	N/A	89%
	8/9/03,12:08pm (WE)	14	0	14				78%	N/A	78%
	8/5/03, 11:39 (WD)	2	0	2				11%	N/A	11%
	8/27/03, 11:37am (WD)	1	0	1				6%	N/A	6%
Gerle Cr. TH	7/5/03, 12:50pm (H)	10	0	10	15	0	15	67%	N/A	67%
	8/30/03, 12:53pm (H)	0	0	0				0%	N/A	0%
	7/26/03 1:28pm (WE)	2	0	2				13%	N/A	13%
	8/9/03, 12:02pm (WE)	4	0	4				27%	N/A	27%
	8/5/03,11:26am (WD)	0	0	0				0%	N/A	0%
	8/27/03, 11:33am (WD)	0	0	0				0%	N/A	0%

Table 4.1-4. Observations of the occupancy of parking areas at boat launches, day use areas and trailheads taken in 2002 and 2003 in the Crystal Basin.

		No. of Spaces Occupied[1]			Capacity of the Site[1]			% Occupancy (No. Sites Occupied/Site Capacity)		
Location (BL=Boat Launch DU=Day Use TH=Trailhead)	**Date/Time/Day of week (H=holiday, WE=weekend, WD=weekday)**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total No. Sites Occupied**	**Single vehicle**	**Vehicle with trailer**	**Total capacity**	**Single vehicle or trailer**	**Vehicle with trailer**	**Total**
Loon Lake										
Loon Lake TH	7/5/03, 12:20pm (H)	41	0	41	40	0	40	103%	N/A	103%
	8/30/03,1:25pm (H)	9	0	9				23%	N/A	23%
	7/26/03, 1:50pm (WE)	21	0	21				53%	N/A	53%
	8/9/03 12:35am (WE)	38	0	38				95%	N/A	95%
	8/5/03, 11:52am (WD)	9	1	10				23%	N/A	25%
	8/27/03, 12:07pm (WD)	2	0	2				5%	N/A	5%
Loon Lake BL	5/25/02, 3:30pm (H)	11	7	18	13	40	53	85%	18%	34%
	7/5/03, 12:26pm (H)	35	19	54				269%	48%	102%
	8/30/03, 1:34pm (H)	36	10	46				277%	25%	87%
	8/10/02, 2:10pm (WE)	18	14	32				138%	35%	60%
	7/26/03,1:51pm (WE)	48	11	59				369%	28%	111%
	8/9/03, 12:40pm (WE)	35	15	50				269%	38%	94%
	8/5/03, 11:55am (WD)	4	3	7				31%	8%	13%
	8/27/03, 12:21 pm (WD)	3	4	7				23%	10%	13%

[1]Includes the sites that are designated as accessible parking spaces.
[2]Parking area does not have striped parking spaces. Capacity is estimated.
[3]Parking lot was reconstructed between 2002 and 2003 observations. The capacity is based on the reconstructed design.
N/A=Not Applicable

Hydropower licensees are required to report recreational use at their Projects to the FERC every six years. The most recent filing of this information for the UARP was in 2003. The recreational use data to prepare this filing with the FERC was developed using data from the 2002 recreation season that was summarized on the Licensed Hydropower Development Recreation Report Form, which is also known as Form 80. This form was filed with and accepted by the FERC on April 1, 2003. The information on the 2003 FERC Form 80 is another source of information that documents the levels and patterns of recreational use occurring at the UARP. Table 4.1-5 below summarizes this information for the main UARP reservoirs.

Table 4.1-5. Recreational use estimates and occupancy for UARP reservoirs in the Crystal Basin as reported to the FERC in 2003.

	Ice House	Union Valley	Gerle Creek	Loon Lake
Number of Recreation Days[1]:				
Daytime Annual Total	17,333	20,989	2,905	13,346
Daytime Peak Weekend Average[2]	794	1,257	113	524
Nighttime Annual Total	43,234	79,826	11,057	26,330
Nighttime Peak Weekend Average[2]	1,178	3,744	558	928
Facility Capacity Percent[3]				
Access Areas[4]	50%	50%	50%	50%
Boat Ramps	30%	30%	N/A	20%
Boat Launching Lanes	30%	30%	N/A	20%
Fishing Piers	N/A	N/A	25%	N/A
Trails	N/A	20%	N/A	25%
Swimming Areas	N/A	30%	N/A	N/A
Picnic Areas	30%	30%	35%	25%
Camping Areas	65%	50%	50%	75%
Organization Camps	50%	40%	N/A	100%
Group Camps	50%	50%	N/A	N/A

[1]Each visit by a person to a development for recreational purposes during any portion of a 24-hour period.
[2]Weekends when recreational use is at its peak for the season (July 4th weekend and other holiday weekends).
[3]Amount of weekend use for this season reported compared with the facility's capacity to handle such use.
[4]Unimproved but well-known/popular sites which can be used to reach development waters (including waters below a dam) without trespassing on other property.

It should be noted that the ENF had several gaps in the occupancy data that they provided to SMUD. Recognizing that these data gaps could underestimate use, SMUD developed an estimate of use by making some assumptions and incorporating use information from the FERC Form 80. This use estimate and the underlying assumptions are provided in Table 4.1-6 below.

Table 4.1-6. UARP recreation facility use estimates in recreation days May-Sept. (1999 – 2002).

	Type[1]	1999	2000	2001	2002	Average
CAMPGROUNDS[2]						
Ice House	C	*21328	28235	25492	27027	26918
Northwind	FD	2790	2623		#2674	2696
Strawberry Point	FD	2607	2659		#3201	2822
Total for Ice House Reservoir						*32436*

Table 4.1-6. UARP recreation facility use estimates in recreation days May-Sept. (1999 – 2002).						
	Type[1]	**1999**	**2000**	**2001**	**2002**	**Average**
CAMPGROUNDS[2]						
Azalea Cove	F	n/a	109		#1690	900
Big Silver Group	FD	n/a	881		#1375	1128
Camino Cove	F	n/a	6961		#8704	7833
Fashoda	C	4049	3564	3609	n/a	3741
Jones Fork	FD	2629	2696		#2694	2673
Lone Rock	F	n/a	123		#775	449
Sunset	C	26552	29524	29962	29629	28917
Wench Creek Family	C	16622	15143		13500	15088
Wench Creek Group 1 & 2	C	5895	4785		#5425	5368
Westpoint	F	1989	2051		#2272	2104
Wolf Creek	C	7910	3976		#6849	6245
Yellow Jacket	C	8866	7828		6190	7628
Total for Union Valley Reservoir						*82074*
Loon Lake Family	C	8607	13256	9248	11761	10718
Loon Lake Equestrian Family	C	725	*69	491	#2515	1244
Loon Lake Group 1 & 2	C	2123	1648		#5015	2929
Loon Lake Equestrian Group	C	671	803		#680	718
Northshore	FD	1757	1689		#2731	2059
Pleasant	F					500[4]
Red Fir Group	FD		513		#1385	949
Loon Lake Chalet	FFS				#1060	1060
Total for Loon Lake Reservoir						*20177*
Airport Flat	F	2709	2202			2456
Gerle Creek	C	10177	8757	8767	#11057	9690
Total for Gerle Creek Reservoir						*12146*
TOTAL						**146,833**
BOAT LAUNCHES[3]						
Ice House (I)	C	*19898	10479		#12458	14278
Yellow Jacket (U)	C	4396	3878		4036	4103
Sunset (U)	C	8810	*3675		#11712	10261
Westpoint (U)	F	4211	2478		#4938	3876
Loon Lake (L)	C	*3805	*7074		#8176	8176
TOTAL						**40,694**
PICNIC AREAS/TRAILHEADS						
Fashoda (U)	C	1021	1176		1691	1296
Ice House (I)	C	*3686	*1543		#4875	4875
Angel Creek (G)	F	854	295		n/a	575
Gerle Creek (G)	C	3144	*3069		5223	4184

Table 4.1-6. UARP recreation facility use estimates in recreation days May-Sept. (1999 – 2002).						
	Type[1]	1999	2000	2001	2002	Average
PICNIC AREAS/TRAILHEADS						
Loon Lake Picnic (L)	C	934	*1490		#1450	1291
Loon Lake Wilderness Trailhead[3] (L)	--	6111	4914		3017	4681
TOTAL						**16,902**
UARP FACILITY TOTAL (Recreation Days)						**204,429**

Source: Forest Service use data sheets unless otherwise noted.
[1] C=Concessionaire; FD=Fee Demo; FFS=Fee to FS; F=Free
[2] Includes use counts for boat launch site camping.
[3]Boat launch day use AND Loon Lake Wilderness Trailhead use were recorded in vehicles. Thus, these estimates incorporate a persons-per-vehicle multiplier of 3.5 (as provided by the Forest Service) to convert to Recreation Days.
[4]This use number uses professional judgment because no use data was provided for any of the 4 years.
blank/empty cells indicate the Forest Service did not provide any data for the facility for the entire year.
An asterisk (*) indicates the Forest Service provided only partial data for the facility for the year.
A pound (#) indicates this use estimate was obtained from the estimates used for the FERC Form 80 for 2002, developed by Mr. Bob Logan; these estimates are used (1) where the Forest Service did not provide any data for the facility, or (2) when the Form 80 estimate is substantially greater that the estimate derived from the Forest Service data sheets.
n/a = Facility was not yet constructed and/or open for use that year.
Average column does not include partial data years unless that use estimate represents the largest use estimate of the set.
[+] Recreation Day is defined as a visit by a person during any portion of a 24-hour period.

4.1.2 Visitor Survey Responses

The recreation visitor surveys conducted as part of the Visitor Use and Impact Study included questions about visitor crowding, conflicting uses, and resource damage. This information can provide additional information for evaluating the physical and social conditions of the area relative to carrying capacity. Tables 4.1-7 to 4.1-14 present the results of various queries of the visitor survey data that relates to crowding, user conflicts and resource damage.

Table 4.1-7. Responses to recreation visitor surveys conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin.				
Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) at:**			
	Ice House n=167	**Union Valley n=171**	**Gerle Creek n=175**	**Loon Lake n=184**
Not at all crowded	45%	55%	45%	43%
Slightly crowded	27%	27%	25%	27%
Moderately crowded	16%	15%	25%	22%
Extremely crowded	12%	3%	4%	8%
Don't know	0%	0%	1%	0%

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-8. Responses to recreation visitor surveys conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin

Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) about how crowded they felt.**					
Ice House						
	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Northwind	7	57%	29%	14%	0	0
Strawberry Point	8	38%	38%	0%	25%	0
Ice House Boat Launch	71	38%	38%	14%	10%	0
Ice House Day Use	19	63%	5%	16%	16%	0
Ice House Campground	62	47%	19%	21%	13%	0
Union Valley						
	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Azalea Cove/Lone Rock CG	2	100%	0%	0%	0	0
Big Silver Group CG	2	50%	50%	0%	0	0
Camino Cove CG	9	33%	44%	22%	0%	0%
Jones Fork CG	6	67%	17%	17%	0%	0%
Sunset CG	39	44%	33%	21%	3%	0%
Sunset Boat Launch	34	62%	21%	15%	3%	0%
Wench Creek CG	20	55%	20%	20%	5%	0%
Wench Creek Group	6	100%	0%	0%	0%	0%
West Point Boat Launch	28	61%	25%	7%	7%	0%
West Point CG	3	67%	0%	33%	0%	0%
Wolf Creek CG	6	50%	50%			0%
Yellowjacket Boat Launch	5	40%	40%	20%	0%	0%
Yellowjacket CG	11	55%	36%	9%	0%	0%
Gerle Creek						
	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Airport Flat CG	43	40%	26%	21%	14%	0%
Gerle Creek CG	103	46%	27%	23%	2%	2%
Gerle & Angel Cr. Day Use	29	48%	17%	34%	0%	0%
Loon Lake						
	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Loon Lake Boat Launch	134	43%	26%	23%	8%	0%
Loon Lake Chalet	2	50%	0%	0%	50%	0%
Loon Lake CG[1]	29	52%	24%	21%	3%	0%
Loon Lake Group CG	4	75%	0%	25%	0%	0%
Loon Lake Eq. Group	1	100%	0%	0%	0%	0%
Northshore CG	10	20%	50%	20%	10%	0%
Pleasant CG	1	0%	100%	0%	0%	0%
Red Fir Group	1	0%	0%	100%	0%	0%

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.
[1]Includes surveys conducted at Loon Lake Equestrian Campground

Table 4.1-9. Responses to recreation visitor surveys (sorted by facility and day of week) conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin.

Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) about how crowded they felt.**					
All Recreation Facilities						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	45	58%	11%	29%	2%	0
Tuesday	56	77%	11%	7%	5%	0
Wednesday	32	69%	22%	3%	6%	0
Thursday	62	45%	29%	18%	6%	2%
Friday	64	39%	31%	22%	8%	0
Saturday	249	41%	28%	20%	10%	1%
Sunday	189	43%	31%	22%	4%	0
Strawberry Point Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0
Thursday	0	0	0	0	0	0
Friday	1	1/100%	0	0	0	0
Saturday	4	2/50%	2/50%	0	0	0
Sunday	3	0	1/33%	0	2/67%	0
Ice House Boat Launch						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	4	0	2/50%	2/50%	0	0
Tuesday	7	5/72%	1/14%	0	1/14%	0
Wednesday	11	7/64%	2/18%	0	2/18%	0
Thursday	6	3/50%	3/50%	0	0	0
Friday	9	2/22%	2/22%	3/33%	2/22%	0
Saturday	17	6/35%	7/41%	2/12%	2/12%	0
Sunday	3	0	1/33%	0	2/67%	0
Ice House Day Use						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	2	2/100%	0	0	0	0
Tuesday	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0
Thursday	4	1/25%	0	1/25%	2/50%	0
Friday	0	0	0	0	0	0
Saturday	9	7/78%	1/11%	0	1/11%	0
Sunday	4	2/50%	0	2/50%	0	0

Table 4.1-9. Responses to recreation visitor surveys (sorted by facility and day of week) conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin.

Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) about how crowded they felt.**					
Ice House Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	5	2/40%	0	3/60%	0	0
Tuesday	0	0	0	0	0	0
Wednesday	4	2/50%	2/50%	0	0	0
Thursday	4	0	1/25%	2/50%	1/25%	0
Friday	12	7/58%	2/17%	3/25%	0	0
Saturday	19	9/47%	3/16%	1/5%	6/32%	0
Sunday	18	9/50%	4/22%	4/22%	1/6%	0
Sunset Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	0	0	0	0	0	0
Tuesday	5	4/80%	1/20%	0	0	0
Wednesday	0	0	0	0	0	0
Thursday	4	2/50%	2/50%	0	0	0
Friday	6	2/33%	4/67%	0	0	0
Saturday	13	3/23%	5/38%	5/38%	0	0
Sunday	11	6/55%	1/9%	3/27%	1/9%	0
Wench Creek Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0
Wednesday	3	3/100%	0	0	0	0
Thursday	4	0	2/50%	1/25%	1/25%	0
Friday	0	0	0	0	0	0
Saturday	6	4/67%	0	2/33%	0	0
Sunday	7	4/57%	2/29%	1/14%	0	0
Airport Flat Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	6	4/67%	1/17%	1/17%	0	0
Tuesday	2	1/50%	1/50%	0	0	0
Wednesday	0	0	0	0	0	0
Thursday	4	2/50%	2/50%	0	0	0
Friday	2	0	1/50%	1/50%	0	0
Saturday	16	4/25%	3/19%	3/19%	6/38%	0
Sunday	13	6/46%	3/23%	4/31%	0	0

Table 4.1-9. Responses to recreation visitor surveys (sorted by facility and day of week) conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin.

Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) about how crowded they felt.**					
Gerle Creek Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	7	3/43%	0	3/43%	1/14%	0
Tuesday	8	6/75%	1/13%	1/13%	0	0
Wednesday	5	3/60%	1/20%	1/20%	0	0
Thursday	10	3/30%	2/20%	4/40%	0	1/10%
Friday	9	4/44%	3/33%	1/11%	1/11%	0
Saturday	50	20/40%	16/32%	13/26%	0	1/2%
Sunday	14	8/57%	5/36%	1/7%	0	0
Gerle Creek & Angel Creek Day Use						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	3	3/100%	0	0	0	0
Tuesday	2	1/50%	0	1/50%	0	0
Wednesday	5	3/60%	2/40%	0	0	0
Thursday	1	0	1/100%	0	0	0
Friday	0	0	0	0	0	0
Saturday	12	4/33%	2/17%	6/50%	0	0
Sunday	6	3/50%	0	3/50%	0	0
Loon Lake Boat Launch						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	10	6/60%	1/10%	3/30%	0	0
Tuesday	20	15/75%	1/5%	2/10%	2/10%	0
Wednesday	2	2/100%	0	0	0	0
Thursday	12	7/58%	3/25%	2/17%	0	0
Friday	7	1/14%	2/29%	2/29%	2/29%	0
Saturday	54	17/31%	19/35%	13/24%	5/9%	0
Sunday	31	10/32%	10/32%	9/29%	2/6%	0
Loon Lake Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0
Thursday	4	3/75%	0	1/25%	0	0
Friday	2	1/50%	1/50%	0	0	0
Saturday	6	4/67%	1/17%	1/17%	0	0
Sunday	17	7/41%	5/29%	4/24%	1/6%	0

Table 4.1-9. Responses to recreation visitor surveys (sorted by facility and day of week) conducted in 2002 at UARP recreation facilities about the sense of crowding that visitors experience at UARP recreation facilities at UARP reservoirs in the Crystal Basin.

Please indicate which of the following statement best describes how crowded you feel at this facility.	**% of respondents surveyed at UARP recreation facilities (campgrounds, day use areas and boat launches) about how crowded they felt.**					
Northshore Campground						
Day of Week	n=	Not at all crowded	Slightly crowded	Moderately crowded	Extremely crowded	Don't know
Monday	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0
Wednesday	2	2/100%	0	0	0	0
Thursday	0	0	0	0	0	0
Friday	0	0	0	0	0	0
Saturday	4	0	2/50%	1/25%	1/25%	0
Sunday	4	0	3/75%	0	1/25%	0

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-10. Responses to recreation visitor surveys conducted in 2002 at UARP recreation facilities about conflicting recreation and non-recreation activities at UARP reservoirs in the Crystal Basin.

		% Responses from visitor surveys conducted at:			
		Ice House n=167	**Union Valley n=171**	**Gerle Creek n=175**	**Loon Lake n=184**
Were there any recreation activities that conflicted with your recreation activities?	**YES**	18%	12%	13%	14%
	NO	78%	87%	85%	86%
	NO OPINION	3%	1%	2%	0%
	NO RESPONSE	1%	0%	0%	0%
Were there any non-recreation activities that conflicted with your recreation activities?	**YES**	1%	3%	3%	4%
	NO	94%	95%	93%	96%
	NO OPINION	4%	1%	2%	0
	NO RESPONSE	1%	1%	2%	0

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-11. Responses to visitor surveys conducted in 2002 at UARP recreation facilities indicating the type of conflicting activities that visitors experience at UARP reservoirs in the Crystal Basin.

What recreation activities conflicted with your recreation activities? List two.	**% Responses from visitor surveys conducted at:**							
	Ice House		**Union Valley**		**Gerle Creek**		**Loon Lake**	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	31/167 (19%)	3/167 (2%)	20/171 (12%)	6/171 (4%)	23/175 (13%)	5/175 (3%)	26/184 (14%)	6/184 (3%)
Type of conflict by % of affirmative responses:								
PWC – noisy and disruptive	32.3	66.7	15	33.3	4.3	0	11.5	33.3
OHV – too loud, disruption of peace	3.2	0	25	0	39.1	20	15.4	0
Rowdy people – noise, disruptive	22.6	33.3	35	50	17.4	40	26.9	33.3
Swimmers – disrupts fishing, boating hazard	3.2	0	0	0	0	20	0	16.7
Gunshots or fireworks – noise, dangerous, made nervous	9.7	0	0	16.7	17.4	20	19.2	0
Motor boating related	19.4	0	20	0	8.7	0	19.2	0
Other	6.5	0	5	0	13	0	7.7	16.7
No response	3.2	0	0	0	0	0	0	0
	% Responses from visitor surveys conducted at:							
	Ice House		**Union Valley**		**Gerle Creek**		**Loon Lake**	
What non-recreation activities conflicted with your recreation activities?								
No. of affirmative responses/ total no. of surveys completed at the reservoir	2/167 (1%)		6/171 (4%)		6/175 (3%)		7/184 (4%)	
Type of conflict by % of affirmative responses:								
Bears – camped at sunset to get away from them			16.6					
Bears – could not sleep; afraid							14	
Bears – safety issue							14	
Bears							14	
Bees - put bee traps in trees at campsites							14	
Roads blocked – denied access							14	
St. Pauli fire on Hwy 50, cut stay in half							14	
Wentworth Springs Rd. construction – too rough & dusty							14	
CG host not needed/stated all sites rsvd. but sites were available			16.6					

Table 4.1-11. Responses to visitor surveys conducted in 2002 at UARP recreation facilities indicating the type of conflicting activities that visitors experience at UARP reservoirs in the Crystal Basin.				
	% Responses from visitor surveys conducted at:			
	Ice House	**Union Valley**	**Gerle Creek**	**Loon Lake**
What non-recreation activities conflicted with your recreation activities?				
No. of affirmative responses/ total no. of surveys completed at the reservoir	2/167 (1%)	6/171 (4%)	6/175 (3%)	7/184 (4%)
Fire danger - didn't go dispersed camping		16.6		
Intruders during camping (w/rifle)		16.6		
Logging trucks early in morning - noise		16.6		
YJCG water system shut down at night – bathrooms closed		16.6		
Logging			33.3	
Construction noise			16.6	
Construction of a bridge over Gerle Cr. – trail closed			16.6	
Trucks hauling gravel down Ice House Rd. – going too fast making driving dangerous			16.6	
Workmen working on road to Angel Creek – noise during day			16.6	
Gravel pit – eyesore	50			
Hunting – sound is disturbing	50			

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-12. Type of conflicts identified by respondents at each UARP facility in the Crystal Basin.

What recreation activities conflicted with your recreation activities? Could list up to two.	Type of Conflict (number)								
	Rowdy people – noise, disruptive	PWC – noisy and disruptive	OHV – too loud, disruption of peace	Gunshots or fireworks – noise, dangerous	Motor boating - wake	Motor boating - noisy	Swimmers – disrupts fishing; boating hazard	Other and no response	Totals
Facility where survey was conducted:									
Ice House CG	3	3		2			1	2	11
Strawberry CG		1						1	2
Camino Cove CG	1		2						3
Sunset CG	1	1				1			3
Wench Creek Family CG	4	1						1	6
Westpoint CG	1		1						2
Wolf Creek CG	1	2							3
Yellowjacket CG	1								1
Airport Flat CG	3		5	3					11
Gerle Creek CG	3		4	2		1	1	2	13
Loon Lake CG	4	1	1	1				1	8
Loon Lake Group CG			1						1
Northshore CG	3					1			4
Pleasant CG			1						1
Ice House BL	3	7	1	1	1			2	15
West Point BL	1		2	1	1				5
Sunset BL		1			1	1			3
Loon Lake BL	2	4	1	4		2	1	3	17
Ice House Picnic	2	1			1	2			6
Gerle/Angel Picnic		1	1		1			1	4

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-13. Responses to recreation visitor surveys conducted in 2002 at UARP recreation facilities indicating whether visitors perceive activities are occurring that harm the environment at UARP reservoirs in the Crystal Basin.

		% Responses from visitor surveys conducted at:			
		Ice House n=167	Union Valley n=171	Gerle Creek n=175	Loon Lake n=184
Were there any recreation activities causing harm to the environment?	**YES**	27%	19%	20%	24%
	NO	67%	81%	77%	72%
	NO OPINION	5%	0%	3%	4%
	NO RESPONSE	1%	0%	0%	0%
Were there any non-recreation activities causing harm to the environment?	**YES**	2%	2%	4%	5%
	NO	90%	98%	91%	90%
	NO OPINION	5%	0%	3%	4%
	NO RESPONSE	3%	0%	2%	1%

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

Table 4.1-14. Responses to visitor surveys conducted in 2002 at UARP recreation facilities indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin.								
Were there any recreation activities that you observed that cause harm to the environment? List two.	**% Responses from visitor surveys conducted at:**							
	Ice House		**Union Valley**		**Gerle Creek**		**Loon Lake**	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	45/167 (27%)	9/167 (5%)	33/171 (19%)	4/171 (2%)	36/175 (21%)	4/175 (2%)	45/184 (24%)	8/184 (4%)
Type of harm caused by recreation activities by % of affirmative responses:								
OHV's degrade forest, erosion, air pollution	8.9	0	9.1	0	58.3	0	22.2	0
PWC - water and air pollution	17.8	0	12.1	25	2.8	25	11.1	0
Power boats – water and air pollution	11.1	11.1	3	25	0	25	24.4	50
Visitors leaving trash behind	24.4	33.3	39.4	25	19.4	50	22.2	12.5
Gun shooting - dangerous	6.7	0	3	0	2.8	0	6.7	37.5
Campfires outside of developed campgrounds	2.2	11.1	6.1	0	0	0	2.2	0
Hunters killing wildlife	6.7	11.1		0	0	0	0	0
Campfires too big or left burning – forest fire hazard	4.4	0	12.1	0	2.8	0	2.2	0
Cutting or chopping trees	11.1	11.1	3	0	5.6	0	0	0
Fireworks – forest fire hazard	0	0	6.1	0	0	0	6.7	0
Other	6.7	22.2	6.1	25	8.3	0	2.2	0
Were there any non-recreation activities that you observed that cause harm to the environment? List two.	**% Responses from visitor surveys conducted at:**							
	Ice House		**Union Valley**		**Gerle Creek**		**Loon Lake**	
No. of affirmative responses/ total no. of surveys completed at the reservoir	4/167 (2%)		4/171 (2%)		7/175 (4%)		9/184 (5%)	
Type of harm caused by non-recreation activities by % of affirmative responses:								
Logging – clear cutting causing erosion	25				14			
Logging	25							
Roads – holes	25							
Tree beetles, fire killing trees in the campground- not replaced	25							
Chainsaw cutting trees - smoke			25					
Clear cutting ruins natural appearance			25				11	
Logging – dusty, fire hazard – the piles			25					
Off-trail hikers dragging coolers			25					
Building bridge over Gerle Cr. feels like a highway					14			
Dogs off leashes – disrupts people					14			
Logging noticeable					14			

Table 4.1-14. Responses to visitor surveys conducted in 2002 at UARP recreation facilities indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin.				
Were there any non-recreation activities that you observed that cause harm to the environment? List two.	**% Responses from visitor surveys conducted at:**			
	Ice House	**Union Valley**	**Gerle Creek**	**Loon Lake**
No. of affirmative responses/ total no. of surveys completed at the reservoir	4/167 (2%)	4/171 (2%)	7/175 (4%)	9/184 (5%)
Type of harm caused by non-recreation activities by % of affirmative responses:				
Quarry disrupts regular environment			14	
Too many improvements/takes away the naturalization			14	
Trash/logging – pollution/slashing			14	
Bears destroy property				11
Deforestation – logging of trees				11
Dogs defecate on trail – some trash in areas				11
Food carelessness - bears				11
Overheard someone talking about killing snakes				11
Sign screwed into tree- trapped fish in Rubicon River				11
Smoking – fire hazard				11
Yellowing of the pine trees unsightly – could it be pollution				11

Source: Survey responses from all UARP recreation facilities in the Crystal Basin.

4.1.3 Law Enforcement and Facility Operations Staff Interviews

Interviews with the resort owners in the Crystal Basin and the campground hosts and area manager for American Land and Leisure, the concessionaire that operates and maintains developed ENF recreation facilities in the Crystal Basin, revealed a few issues related to carrying capacity. Julie Wentworth, Ice House Resort owner, and the campground hosts at Ice House Reservoir have heard a few complaints from anglers about PWC use and sport boaters on the reservoirs.

The campground hosts were fairly consistent in describing the occupancy patterns they observe at the campgrounds they manage. At Wolf Creek, located at Union Valley Reservoir, the host stated that there are many weekends that the campground does not fill. The campground occasionally fills up on Friday nights. She has also observed an increasing number of users coming to the campground over the past five years. At Ice House Campground, the host stated that the campground usually fills up for the weekend on Thursdays by 10am. The hosts notice that some people take one of the first-come, first-served campsites for a weekend and then when people start leaving on Sundays, they will relocate to a more desirable site for their stay during the ensuing week. At Loon Lake and Sunset (located at Union Valley Reservoir) campgrounds the hosts stated that these campgrounds usually fill every weekend usually by Friday night and sometimes by Thursday night. At Wench Creek Campground, where none of the sites are reservable, the hosts state that they observe a few occupants at the beginning of the week, the sites begin filling Thursday nights and the campground is usually filled on most weekends.

At Ice House Campground at Ice House Reservoir and at Wolf Creek, Sunset, and Wench Creek campgrounds at Union Valley Reservoir the staff indicated that they observe problems with parking extra cars that belong to campground visitors. Each family camp site has a limit of two cars and when visitors bring more than this, they park along the campground access roads, squeeze into the individual campsite spurs or park them along the roads outside of the campground. Campground hosts charge $5 per car per night for extra cars and usually direct visitors to park extra cars in the boat launch parking areas.

The campground hosts mentioned that they have problems with visitors that exceed the family campsite party size limit of six people per site. This problem was noted at Ice House, Sunset, and Wench Creek campgrounds. The campground hosts also observe that noise is often a problem with the larger sized parties. The Loon Lake campground host said that she had not experienced a problem with visitors exceeding the campsite limit.

The recreation facility staff interviews identified a conflicting use related to dogs. Currently there is no limit on the number of dogs that a visitor can bring to a campsite. Campground hosts mentioned unpleasant problems occur when people bring their dogs to the developed facilities such as barking, feces around the campsites, dogs off of leashes and even occurrences of dog bites.

The EDC sheriff deputy who patrols the Crystal Basin stated that the three most common types of calls they receive for assistance are, in order of prevalence: 1) disturbance; 2) theft; and 3) search and rescue. Calls for assistance with public disturbances are usually due to loud and excessive behavior and are almost always associated with alcohol use. The deputy stated he observes this problem to be associated generally with OHV users that tend to stay in the non-fee campgrounds or dispersed camping areas. He mentioned Camino Cove Campground as an example of where this problem exists. The calls about theft are usually associated with the private land within the Crystal Basin. Over the last five to ten years, the deputy has seen an increase in the number of responses related to disturbance and theft in the Crystal Basin. There are also calls related to search and rescue and these mainly occur in the winter.

4.1.4 Resource Damage Observed

Within developed recreation facilities it is expected to see effects on environmental resources such as soil compaction and lack of vegetative cover because these areas have been allocated for concentrated visitor use. Within the developed facilities, these effects were not considered to be resource damage. These effects often extend beyond the boundaries of the developed facilities to areas where people are drawn to participate in various recreation activities. At Ice House Reservoir, there appears to be some resource damage near the shoreline that adjoins the Strawberry, Northwind and Ice House campgrounds. This is mainly in the form of many user-defined trails to the shoreline and damage to vegetation where people tie their boats along the shoreline. At Union Valley Reservoir, similar effects were noted near the campgrounds. Although resource damage was noted at dispersed recreational use areas along the Loon Lake Reservoir shoreline, observations at and near the UARP recreation facilities at Loon Lake did not reveal any notable resource damage. At Gerle Creek Reservoir, the shoreline near the Angel Creek Day Use Area includes a shallow marshy area where grasses and other riparian vegetation grows near and below the high water mark of the reservoir. Footprints in the mud and trampled vegetation are evident in this area from repeated visitor use.

Campground hosts mentioned in their interviews two other types of resource damage that occur in the UARP campgrounds. The first is that they have observed visitors cutting standing trees or other vegetation within the developed campground for their campfires. The other source of damage that they observe is large campfires that can burn or scorch adjacent vegetation at a campsite. Additionally, campground hosts have observed campfires with tall flame lengths that could potentially escape a campsite fire ring and cause a wildland fire.

The one facility where resource damage was observed was at Pleasant Campground. There are numerous routes within the site that are overgrown and areas with erosion. The trail connecting the campground to the Rubicon Hiking Trail is very overgrown and it has deep ruts. Directional signs and site markers are missing or damaged. The two restrooms are pit toilets, which are no longer acceptable facilities for meeting the sanitation needs at developed campgrounds on National Forest System lands. During the site inspection in 2002, open bags of lye were observed near one of the restrooms.

4.1.5 Water Quality Sampling

Two types of water sampling were conducted to investigate recreation impacts to water quality. The results of this sampling relative to areas of recreational use are presented here as this may indicate areas where the carrying capacity for recreational use may be exceeded. The reader is referred to the *Water Quality Technical Report* for the complete results of the Water Quality Study.

Fecal coliform concentrations in Loon Lake, Buck Island, Gerle Creek and Ice House reservoirs were comparatively low near areas known to have high levels of recreational use when sampling was conducted in the summer of 2003. Union Valley Reservoir was identified as an area where water quality may be affected by such high recreational use. Fecal coliform levels were high at Union Valley Reservoir near Camino Cove Campground, Fashoda Beach, and Jones Fork Campground during sampling periods with high recreational activity. However, these levels diminished in subsequent sampling efforts when there was lower recreational activity occurring in the respective areas.

4.2 UARP Reservoir Surfaces

4.2.1 Use Estimates

The UARP provides boating opportunities on seven of its reservoirs. As part of this study, the number of watercraft and the type of boating activities occurring on the reservoirs were recorded at the three primary storage reservoirs (Ice House, Union Valley and Loon Lake). All three of these reservoirs are located in the Crystal Basin. The weather on survey dates was typical for the summer season with pleasant temperatures and no precipitation. The reservoir elevations were at levels that visitors would normally expect during the course of the summer during a normal type of water year.

Boating use information was not collected at the four other UARP reservoirs because of their remote locations, small sizes and low use. At Gerle Creek Reservoir, there is minimal concern for safety issues related to boat density on the reservoir surface since motorized boating is not allowed at this reservoir. Consequently, information relating to boat density was not collected as this reservoir. The information collected during the summers of 2002 and 2003 is presented in Table 4.2-1.

The observer recorded the types of watercraft observed and estimated the percentage of the watercraft that were near the shoreline floating, with visitors picnicking or otherwise taking a break from boating. At Ice House Reservoir, the percentage of active watercraft along the shoreline varied from 0 to 30 percent. At Union Valley and Loon Lake reservoirs, the percentage of active watercraft along the shoreline varied from 20 to 30 percent and 5 to 20 percent, respectively. Even though these watercraft were not moving on the reservoir surface during the observation, they were counted as active watercraft so that the level of boating use on the reservoir would not be under estimated. It should be noted that this investigation was intended to assess boat density as it relates to boating safety.

Table 4.2-1. Observations of boating activity on Ice House, Union Valley and Loon Lake reservoirs in the summers of 2002 and 2003.							
Observation Date/Time	**WD=Weekday WE=Weekend H=Holiday**	**Point of Observation[1]**	**No. of Active Powerboats**	**No. of Active Small Fishing Boats**	**No. of Active Personal Watercraft**	**No. of Active Non-motorized Watercraft**	**Total No. of Active Watercraft on Reservoir**
Ice House							
7/4/02, 10:00am	H (Thursday)	IHBL	4	0	0	13	17
7/4/02, 1:35pm	H (Thursday)	IHBL	7	0	2	4	13
7/4/02, 2:45pm	H (Thursday)	IHBL	13	0	0	12	25
8/30/03, 10:52am	H (Saturday)	Reservoir Surface	6	8	0	1	15
8/10/02, 4:45pm	WE (Saturday)	Reservoir Surface	5	3	3	6	17
7/26/03, 12:18pm	WE (Saturday)	IHBL	7	2	1	2	12
8/9/03,11:15am	WE (Saturday)	Reservoir Surface	6	7	3	0	16
8/5/03, 2:00pm	WD (Tuesday)	IHBL	1	1	0	2	4
8/27/03, 1:52pm	WD (Thursday)	IHBL	1	2	1	0	4
Union Valley							
8/30/03, 11:45am	H (Saturday)	Reservoir Surface	28	8	12	9	57
8/10/02, 2:50pm	WE (Saturday)	Reservoir Surface	17	4	10	13	44
7/26/03, noon	WE (Saturday)	Big Hill	24	6	5	5	40
8/9/03,1:55pm	WE (Saturday)	Reservoir Surface	49	14	14	26	103
8/5/03, 2:30pm	WD (Tuesday)	Big Hill	10	1	1	0	12
8/27/03, 2:00pm	WD (Thursday)	Big Hill	2	1	0	0	3
Loon Lake							
8/30/03, 2:00pm	H (Saturday)	Reservoir Surface	1	4	1	8	14
8/10/02,11:30am	WE (Saturday)	Reservoir Surface	1	7	1	14	23
7/26/03, 2:10pm	WE (Saturday)	Main Dam	1	8	1	12	22
8/9/03,12:32pm	WE (Saturday)	Reservoir Surface	9	9	1	9	28
8/5/03, noon	WD (Tuesday)	Main Dam	1	2	0	9	12
8/27/03,12:08pm	WD (Thursday)	Main Dam	1	3	0	3	7

[1]IHBL=Ice House Boat Launch, Big Hill=Big Hill Overlook, Main Dam=Main Dam at Loon Lake, Reservoir Surface=Observations taken by boat

enforcement on the reservoir surface and the type of watercraft using the reservoir. The only UARP reservoir with boating restrictions is Gerle Creek Reservoir where boating activity is restricted to non-motorized use. Loon Lake Reservoir has many places that are shallow and have rocks that lie just beneath the surface that tend to discourage high-speed boating and watersport activities (i.e., wakeboarding, waterskiing). Union Valley and Ice House reservoirs tend to receive the highest boating use at the UARP and the type of boats typically observed at these reservoirs include small fishing boats, power boats, sail boats, kayaks, canoes, sail boards and PWC.

Boat density standards have been published in research literature and established as standards in planning documents. A publication prepared for the Department of Interior, Bureau of Outdoor Recreation (BOR 1977) determined densities for safe boating presented in Table 4.2-4 below.

Table 4.2-4. Safe boat density standards. (BOR 1977)	
Type of Boating Activity	**Boat Density**
Non-power boating	1.3 vessels/acre
Waterskiing	12 acres/vessel
Boat fishing	0.5 acres/vessel
Unlimited power boating	9 acres/vessel

The New York State Comprehensive Outdoor Recreation Plan published in 2003 (New York 2003) has the following minimum boat density requirements:

Table 4.2-5. Boat density standards. (New York 2003)	
Type of Boating Activity	**Boat Density**
Sail boating	6-8 acres/vessel
Water skiing	15-20 acres/vessel
Row boating	1 acre/vessel
Power boating	6-8 acres/vessel

Boat capacity guidelines for five Recreation Opportunity Spectrum classifications are presented in a draft publication, Water Recreation Opportunity Spectrum (WROS) Guidebook prepared for the Bureau of Reclamation, May 2002. The final version of the publication cannot be located at this time. It should be noted that the description of the five WROS classes in Table 4.2-6 below does not apply to the ROS classifications of the National Forest System lands associated with this UARP. Since similar guidelines for boating density do not exist for the ROS classes as established by the Forest Service, these guidelines are presented in this report only to provide additional perspective on the subject of boating density on the UARP reservoirs on public land.

Based on the highest number of watercraft observed during the study, the boat densities for the three reservoirs with motorized boating are presented in Table 4.2-2 below. On each reservoir, the highest number of watercraft observed were derived from reservoir-based observations.

Table 4.2-2. Average number of acres per vessel on the Ice House, Union Valley and Loon Lake reservoirs based on the highest number of watercraft observed during the study observations

Reservoir	Reservoir surface acres[1]	Highest no. of watercraft observed	Average no. of acres per vessel
Ice House	678	25	27.1
Union Valley	2,860	103	27.7
Loon Lake	1,450	28	51.8

[1]UARP Initial Information Package, July 2001. Values are at maximum pool elevation.

4.2.2 Visitor Survey Responses

Information about how crowded visitors felt while boating on the surface of the reservoirs is provided in the responses to the visitor surveys conducted in 2002 as part of the Visitor Use and Impact Study. The survey data are sorted by reservoir and are provided below in Table 4.2-3.

Table 4.2-3. Responses to recreation visitor survey conducted in 2002 about the sense of crowding visitors experience on the reservoir surfaces.

Please indicate which of the following statements best describes how crowded you feel… on the surface of this reservoir…	**% of respondents for each reservoir**					
	Ice House n=88	**Union Valley** n=134	**Loon Lake** n=106	**Gerle Creek** n=47	**Slab Creek** n=17	**Brush Creek** n=1
Not at all crowded	64%	73%	74%	79%	82%	100%
Slightly crowded	22%	19%	15%	13%	12%	0%
Moderately crowded	13%	4%	2%	4%	0%	0%
Extremely crowded	0%	0%	2%	0%	6%	0%
Don't know	2%	4%	6%	4%	0%	0%
No response	0%	0%	2%	0%	0%	0%

Source: Survey responses from: 1) UARP recreation facilities, 2) dispersed, and 3) windshield surveys in the Canyonlands.
n=number of survey responses for the subject reservoir
No responses were received for Junction Reservoir

4.2.3 Law Enforcement and Facility Operations Staff Interviews

Interviews with the El Dorado County Sheriff deputies that patrol the three major UARP reservoirs (Ice House, Union Valley and Loon Lake reservoirs) did not identify any specific areas of the reservoir surfaces that had problems with crowding or concentrated use patterns. Similarly, the operators of the recreation facilities did not know of any areas of the reservoirs where visitors experience problems with crowding.

4.2.4 Boat Density Standards

The physical carrying capacity of a reservoir is a function of the size and configuration of the reservoir surface, any restrictions on boating activity that exist, the presence of active law

Table 4.2-6. Boating density guidelines for Water Recreation Opportunity Spectrum. (BOR 2002).		
WROS Classification	**Range of Boats at One Time**	
	Low Range	**High Range**
Urban	1 acre/vessel	10 acres/vessel
Rural Developed	10 acres/vessel	20 acres/vessel
Rural Natural	20 acres/vessel	110 acres/vessel
Semi-primitive	110 acres/vessel	480 acres/vessel
Primitive	480 acres/vessel	3200 acres/vessel

This publication also includes guidelines for the types of activities that may be appropriate for each WROS classification that is used by the Bureau of Reclamation. The activities that may be considered appropriate for each WROS are indicated by a solid line in the Figure 4.2-1 below; a dashed line indicates a point of transition.

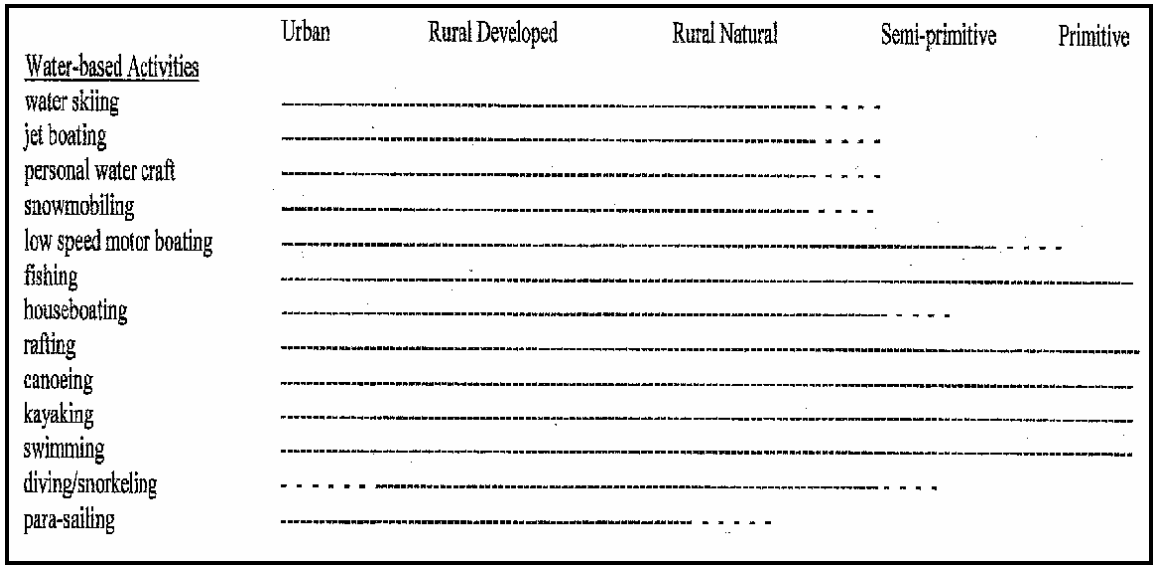


Figure 4.2-1. A generalized representation of recreation activities by Water Recreation Opportunity Spectrum classes (BOR 2002).

The National Park Service similarly developed boating standards for their different ROS classifications in the Lake Management Plan for Lake Mead (NPS 2002). These standards are presented in Table 4.2-7 below. Again, these standards and ROS classes do not apply to the ENF lands however they are presented to supplement information about boating density relative to reservoirs located on public lands.

Table 4.2-7. Boating density standards used by the National Park Service in the Lake Management Plan for Lake Mead. (NPS 2002)	
ROS Classification	Boats at One Time
Urban Park	4.5 acre/vessel
Urban Natural	6.75 acres/vessel
Rural Natural	9 acres/vessel
Semi-primitive	13.5 acres/vessel
Primitive	18 acres/vessel

4.3 Dispersed Recreation Areas

Dispersed recreation occurs at the UARP reservoirs in the form of overnight use, fishing, picnicking, swimming, and other day use activities. Although most of the dispersed recreation occurs in the Crystal Basin, the reservoirs in the High Country and the Canyonlands also provide settings for dispersed recreational use. The following sections include the results of this study relative to dispersed recreational use including estimated recreational use, visitor survey responses, key contact interviews and areas where resource damage was observed in the vicinity of dispersed recreation areas.

4.3.1 Use Estimates

The estimated recreational use at dispersed recreation areas was developed as part of the Visitor Use and Impact Study. These figures are also presented in this report so that the circumstances of crowding and the quality of the recreation experience can be correlated to the level of estimated dispersed recreational use. Table 4.3-1 below displays, for each reservoir, the estimated number of recreation-days based on data collected in spring, summer and fall of 2002 and the winter of 2002-2003. A recreation-day is defined as one person visiting for a day or a portion of a day.

Table 4.3-1. Dispersed recreational use estimates (recreation-days[1]) based on data collected in 2002 and 2003 at the main UARP reservoirs in the Crystal Basin and in the Canyonlands.

	Spring, Summer and Fall			Winter		
Location	**Day Use**	**Overnight Use**	**Total**	**Day Use**	**Overnight Use**	**Total**
Ice House	2,329	0	2,329			
Union Valley	2,760	2,226	4,986			
Gerle Creek	377	2,416	2,793			
Loon Lake	1,648	15,217	16,865			
Crystal Basin[2]				11,403	2,908	14,311
	Spring and Summer			**Fall and Winter**		
Canyonlands[3]	4,785	938	5,723	1911	729	2,640

[1]Recreation day is a visit by a person during any portion of a 24-hour period
[2]Includes recreational use at Ice House, Union Valley, Gerle Creek and Loon Lake reservoirs
[3] Includes recreational use at Junction, Camino, Slab Creek, Brush Creek reservoirs

4.3.2 Visitor Survey Responses

The visitor surveys conducted as part of the Visitor Use and Impact Study included questions about visitor crowding, conflicting uses and resource damage. The results of the visitor responses relating to visitor crowding are provided in Table 4.3-2 below. The results of the visitor responses relating to conflicting uses and resource damage are provided in Tables 4.3-3 through 4.3-6. This information collected from the visitor surveys can provide additional information for evaluating the physical and social conditions of the area relative to carrying capacity.

In order to get a sense of whether dispersed visitors were camping at their location by choice or because there was not enough capacity for developed overnight use, visitors were asked whether they intended to camp at their current location or if they had intended to camp at a developed facility. This information is summarized in Table 4.3-7 below.

Table 4.3-2. Responses to recreation visitor surveys conducted in 2002 at dispersed recreation areas about the sense of crowding that visitors experience at dispersed day use and overnight recreation areas at the UARP reservoirs in the Crystal Basin and Canyonlands.

How crowded do you feel in this area?	Dispersed Recreation Areas in the Crystal Basin								Dispersed Recreation Areas in the Canyonlands					
	Ice House		Union Valley		Loon Lake		Gerle Creek		Junction		Slab Creek		Brush Creek	
	Day Use	Overnight	Day Use	Overnight	Day Use	Overnight	Day Use	Overnight	Day Use	Overnight	Day Use	Overnight	Day Use	Overnight
	n=7	n=2	n=4	n=17	n=1	n=22	n=0	n=10	n=3	n=2	n=18	n=6	n=5	n=0
Not at all crowded	43%	100%	75%	71%	0%	45%		80%	100%	100%	62%	33%	100%	
Slightly crowded	57%	0%	25%	12%	100%	32%		10%	0%	0%	19%	33%	0%	
Moderately crowded	0%	0%	0%	18%	0%	18%		10%	0%	0%	14%	0%	0%	
Extremely crowded	0%	0%	0%	0%	0%	5%		0%	0%	0%	0%	33%	0%	
Don't know	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	

Source: Survey responses from 1) dispersed surveys in the Crystal Basin, 2) windshield surveys in the Canyonlands.

Table 4.3-3. Responses to recreation visitor surveys conducted in 2002 at dispersed recreation areas about conflicting recreation and non-recreation activities at the UARP reservoirs in the Crystal Basin and Canyonlands

		Dispersed Recreation Areas in the Crystal Basin				Dispersed Recreation Areas in the Canyonlands		
		Ice House	Union Valley	Loon Lake	Gerle Creek	Junction	Slab Creek	Brush Creek
		n=14	n=22	n=48	n=11	n=6	n=27	n=5
Were there any recreation activities that conflicted with your recreation activities?	**YES**	14%	18%	23%	18%	0%	26%	0%
	NO	79%	82%	73%	92%	100%	59%	100%
	NO OPINION	0%	0%	0%	0%	0%	11%	0%
	NO RESPONSE	7%	0%	4%	0%	0%	4%	0%
Were there any non-recreation activities that conflicted with your recreation activities?		**n=14**	**n=22**	**n=48**	**n=11**	**n=6**	**n=27**	**n=0**
	YES	7%	9%	2%	0%	0%	7%	
	NO	93%	91%	92%	100%	100%	74%	
	NO OPINION	0%	0%	6%	0%	0%	11%	
	NO RESPONSE	0%	0%	0%	0%	0%	7%	

Source: Survey responses from 1) dispersed surveys in the Crystal Basin, 2) windshield surveys in the Crystal Basin and 3) windshield surveys in the Canyonlands.

Table 4.3-4. Responses to visitor surveys conducted in 2002 at dispersed recreation areas indicating the type of conflicting activities that visitors experience at the UARP reservoirs in the Crystal Basin.

What recreation activities conflicted with your recreation activities? List two.	**% Responses from visitor surveys conducted at:**													
	Dispersed Recreation Areas in the Crystal Basin								**Dispersed Recreation Areas in the Canyonlands**					
	Ice House		**Union Valley**		**Loon Lake**		**Gerle Creek**		**Junction**		**Slab Creek**		**Brush Creek**	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	3/9	1/9	4/21	1/21	11/48	1/48	1/10	0/10	0/5	0/5	7/24	1/24	0/5	0/5
Type of conflict by % of affirmative responses:														
Motor boat related			25%		9%						14%			
OHV – too loud, disruption of peace	33%				73%									
PWC-noisy and disruptive	33%		25%		0%							100%		
Gunshots or fireworks – noise, dangerous, made nervous	33%		50%		9%						29%			
Rowdy people-noisy, disruptive of peace				100%	9%						29%			
OHVs-degrade forest, erosion, air pollution											29%			
Other		100%				100%	100%							
No response														
What non-recreation activities conflicted with your recreation activities?														
No. of affirmative responses/ total no. of surveys completed at the reservoir	1/9	0/9	2/21	0/21	1/48	0/48	0/10	0/10	0/5	0/5	2/24	0/24	1/5	0/5
Type of conflict by % of affirmative responses:														
Timber harvesting-sad landscape unappealing	100%													
Can't have fire pit-disappointing			50%											
Regulations and rules very much restricts freedoms (FS & Sheriff)			50%											
Numerous helicopter overflights					100%									
Kayaking-too much water out of power plant (upstream end of Slab Cr.)													100%	

Source: Survey responses from 1) dispersed surveys in the Crystal Basin, 2) windshield surveys in the Crystal Basin and 3) windshield surveys in the Canyonlands.

Table 4.3-5. Responses to recreation visitor surveys conducted in 2002 at dispersed recreation areas indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin and Canyonlands.

		Dispersed Recreation Areas in the Crystal Basin				Dispersed Recreation Areas in the Canyonlands		
		Ice House	Union Valley	Loon Lake	Gerle Creek	Junction	Slab Creek	Brush Creek
		n=14	n=22	n=48	n=11	n=6	n=27	n=5
Were there any recreation activities causing harm to the environment?	**YES**	43%	41%	33%	18%	17%	37%	20%
	NO	57%	59%	60%	73%	83%	56%	80%
	NO OPINION	0%	0%	6%	9%	0%	7%	0%
	NO RESPONSE	0%	0%	0%	0%	0%	0%	0%
Were there any non-recreation activities causing harm to the environment?	**YES**	7%	9%	10%	0%	0%	17%	20%
	NO	93%	86%	77%	91%	100%	67%	80%
	NO OPINION	0%	5%	8%	9%	0%	17%	0%
	NO RESPONSE	0%	0%	4%	0%	0%	0%	0%

Source: Survey responses from 1) dispersed surveys in the Crystal Basin 2) windshield surveys in the Crystal Basin and 3) windshield surveys in the Canyonlands.

Table 4.3-6. Responses to visitor surveys conducted in 2002 at dispersed recreation areas indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin.

Were there any recreation activities that you observed that cause harm to the environment? List two.	% Responses from visitor surveys conducted at:													
	Dispersed Recreation Areas in the Crystal Basin								Dispersed Recreation Areas in the Canyonlands					
	Ice House		Union Valley		Loon Lake		Gerle Creek		Junction		Slab Creek		Brush Creek	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	3/9	1/9	1/21	0/21	15/48	0/48	1/10	1/10	0/5	0/5	11/24	1/24	0/5	0/5
Type of harm by % of affirmative responses:														
OHVs-degrades forest, erosion, air pollution	67%				40%		100%							
PWC-water and air pollution					7%									
Power boats-water and air pollution		100%			20%									
Fireworks-forest fire hazard														
Visitors leaving trash behind			100%		7%									
Gunshooting-dangerous								100%						
Cutting or chopping trees					7%									
Campfires too big or left burning-forest fire hazard					7%									

Table 4.3-6. Responses to visitor surveys conducted in 2002 at dispersed recreation areas indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin.

Were there any recreation activities that you observed that cause harm to the environment? List two.	**% Responses from visitor surveys conducted at:**													
	Dispersed Recreation Areas in the Crystal Basin								**Dispersed Recreation Areas in the Canyonlands**					
	Ice House		**Union Valley**		**Loon Lake**		**Gerle Creek**		**Junction**		**Slab Creek**		**Brush Creek**	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	3/9	1/9	1/21	0/21	15/48	0/48	1/10	1/10	0/5	0/5	11/24	1/24	0/5	0/5
Type of harm by % of affirmative responses:														
Alcohol consumption & guns-lots of troublemakers											5%			
Campers had fire in middle of road and extinguished improperly											5%			
Large wakes from jetskier & large motors											5%			
People going to the bathroom wherever they were standing											5%			
People leaving their trash-broke glass, rusty cans, plastic etc. could be injurious to wildlife											5%			
Reservoirs-may impact fish & local wildlife											5%			
Senseless idiots with garbage-litter dumped											5%			
Shooting guns into the water-one ricocheted off a rock-com about 15 feet from group of people											5%			
Skeet shooting-not bad											5%			
Trash-environment											5%			
Trash											5%			
Unauthorized illegal campfire by homeless family											5%			
Unable to launch boat until road cleared, potential fire											5%			
Other	33%				13%							100 %		
No response														

Table 4.3-6. Responses to visitor surveys conducted in 2002 at dispersed recreation areas indicating the activities observed by visitors that cause harm to the environment at UARP reservoirs in the Crystal Basin.

What non-recreation that you observed that cause harm to the environment? List two.	**% Responses from visitor surveys conducted at:**													
	Dispersed Recreation Areas in the Crystal Basin								**Dispersed Recreation Areas in the Canyonlands**					
	Ice House		**Union Valley**		**Loon Lake**		**Gerle Creek**		**Junction**		**Slab Creek**		**Brush Creek**	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
No. of affirmative responses/ total no. of surveys completed at the reservoir	1/9	0/9	2/21	0/21	5/48	0/48	0/10	0/10	0/5	0/5	4/24	0/24	0/5	0/5
Type of harm by % of affirmative responses:														
Forest thinning is too thin & clear cutting - eyesore			50%		20%									
Sheriffs on guard driving quickly-lots of dust														
Debris from construction in river-ruins the pristine nature of the area-could be a danger											20%			
Hydroelectric generation & timber harvesting harms wildlife											20%			
I worry about erosion from clearcuts-erosion											20%			
Timber harvest on hill overlooking Slab Creek-affects beauty & creates runoff											20%			
Logging habitat fragmentation & destruction, erosion	100%													
Logging-visual degradation, presumed increased erosion & silting of streams					20%									
Reservoirs may impact fish & local wildlife					20%									
Timber harvest					20%									
Timber harvesting					20%									
Other			50%											
No response														

Source: Survey responses from 1) dispersed surveys in the Crystal Basin 2) windshield surveys in the Crystal Basin and 3) windshield surveys in the Canyonlands.

Table 4.3-7. Responses to recreation visitor surveys conducted in 2002 at dispersed recreation areas about the location they intended to stay overnight at the UARP reservoirs in the Crystal Basin and Canyonlands.

If you are staying overnight at this location, did you plan to stay here or did you intend to stay at a developed facility?	**Dispersed Recreation Areas in the Crystal Basin**				**Dispersed Recreation Areas in the Canyonlands**		
	Ice House **n=2**	**Union Valley** **n=13**	**Loon Lake** **n=22**	**Gerle Creek** **n=10**	**Junction** **n=3**	**Slab Creek** **n=0**	**Brush Creek** **n=0**
Intended to stay here	100%	85%	100%	90%	100%	N/A	N/A
Intended to stay at a developed campground	0%	15%	0%	10%	0%		
Not staying at an undeveloped campsite	0%	0%	0%	0%	0%		

Source: Survey responses from 1) dispersed surveys in the Crystal Basin, 2) windshield surveys in the Crystal Basin except for the surveys collected at the Loon Lake Wilderness Trailhead and 3) windshield surveys in the Canyonlands. No survey responses were received regarding intended location to stay overnight at Slab Creek or Brush Creek.

4.3.3 Resource Damage Observed

Resource damage can indicate that an area may be receiving excessive recreational use. The areas with recurrent day and overnight dispersed use were inspected in 2002 and 2003 for resource damage including signs of erosion, vegetation damage and removal, soil compaction, ground cover, evidence of prohibited activities, presence of trash, pollution and improperly disposal of human and animal waste. Although dispersed use occurs at many locations, the following section includes only those sites with dispersed use where resource damage was observed.

4.3.3.1 High Country

Rubicon Reservoir

Dispersed use occurs at the UARP reservoirs in the high country. Rubicon Reservoir, located in the Desolation Wilderness is adjacent to the Rubicon Hiking Trail. Campfires are not allowed in the wilderness however the presence of cleared, flat areas and a few fire rings revealed nine campsites at the reservoir, most of them on the south side of the reservoir. Trash was not observed during the site inspection and the presence of needles and cones covering the previously cleared area at the dispersed sites indicates that seven of nine the sites had not received use during the summer of the site inspection. Fire rings at two of the sites had ashes and appeared to have been recently used. Visitors have constructed a rock bench at one site. All of the sites are located within 50 to 300 feet from the high water mark of the reservoir. Other than the evidence of campfires at two of the dispersed campsites, resource damage was not observed.

Buck Island Reservoir

Buck Island Reservoir receives a high level of recreational use that is mostly associated with OHV access by the Rubicon OHV Route. A site inspection of the shoreline revealed 15 dispersed campsites with some of the sites having multiple campfire rings that seem to be used by groups of visitors. The types of resource damage observed at this reservoir included soil compaction, cut and damaged vegetation, nails and signs in trees, oil and transmission fluid on rocks and soil, carved trees, trash, vehicle tracks off of designated routes, vehicle tracks in streams and wet areas and scorched trees. There are also user created tables and outhouses and evidence of improperly disposed human and animal waste. Some of the sites are not set back from the shoreline and are located at the high water mark of the reservoir.

4.3.3.2 Crystal Basin

Ice House Reservoir

At Ice House Reservoir, overnight dispersed camping is not allowed at the reservoir outside of designated campgrounds. Despite this restriction overnight camping was observed during site inspections. Along the north shore, most of the dispersed recreational use occurs between

Strawberry Point Campground and the inlet of the SF Silver Creek. Resource damage associated with dispersed recreational use at this area includes soil compaction from vehicles driving off of the access road, improperly disposed human and animal waste, trash and vegetation damage. Vehicles were also observed driving below the high water mark when the reservoir was low. On the south side of the reservoir, five dispersed overnight sites were observed. Resource damage observed at these sites includes vehicles driving on roads that are closed to the public, vegetative cover has been eliminated and soil has been compacted by vehicles traveling to the shoreline, and there are recently used fire rings in a location where overnight camping is prohibited.

Union Valley Reservoir

Dispersed use at Union Valley Reservoir includes overnight as well as day use. On the north side of the reservoir, the shoreline west and adjacent to the Westpoint boat launch is regularly used during the summer for dispersed camping. This area is flat, compacted and has no vegetation. The access road on the peninsula known as Westpoint was closed to vehicles until 2003. During the field inspection in 2003, there were drivable waterbars and the road was very dusty. Dispersed camping activity was observed in 2003 but resource damage was not observed. Nine dispersed campsites were identified between Westpoint and Camino Cove Campground. At these sites, it was common to see fire rings, cut and damaged vegetation, compacted soil, lack of vegetative cover, improperly disposed human and animal waste and trash. Vehicle tracks were also observed even though the area is closed to vehicle access. Most of the sites are located too close to the high water mark. Along the shoreline in the vicinity of the Jones Fork and Sunset campgrounds there are several user created trails that visitors use for pedestrian access to the shoreline. Some of the trails appeared steep and did not have waterbars to prevent erosion. OHV tracks were observed that lead to the shoreline in the Jones Fork arm of the reservoir and along the shoreline across from the Sunset boat launch. These are areas not open to vehicular access for the public. Dispersed overnight and day use was also observed along Tells Creek immediately upstream of Union Valley Reservoir. Resource damage observed at this location included trash, improperly disposed human and animal waste, graffiti on rocks and a user-made pit toilet.

Gerle Creek Reservoir

At Gerle Creek, there are signs informing visitors that overnight use is restricted to developed campgrounds along the shoreline of Gerle Reservoir. Despite this restriction two dispersed overnight campsites were located between the Angel Creek Day Use Area and Angel Creek. The sites were identified by the presence of rock fire rings and they had been recently used. Although overnight use is not allowed at this location, resource damage was not observed. A user-created trail extends from the Angel Creek Day Use Area to near the Loon Lake Tailrace where it enters Gerle Reservoir. The trail does not appear to get much use; some areas were overgrown with vegetation and there were branches and duff observed on the trail. Although the trail is user-created, resource damage was not observed.

The area on the opposite side of Gerle Creek from Airport Flat Campground receives heavy overnight use and OHV use was regularly observed in this location during the study. The area is

flat and open and users drive and park their vehicles, trailers and OHV's throughout the area. This has resulted in considerable soil compaction, lack of vegetative cover at this site and there are numerous user-created fire rings. Some overnight dispersed campsites are located within 100 feet of the streambank. Trash and toilet paper were also obvious throughout the site.

On Gerle Creek just downstream of Wentworth Springs Road, the ENF has implemented a road closure and installed rock barriers to control dispersed overnight use along the east bank of Gerle Creek upstream of Gerle Reservoir. These measures have effectively eliminated overnight use in sensitive streamside areas and only minor amounts of trash were observed at the site visit during the summer of 2003.

Loon Lake Reservoir

Dispersed overnight and day use occurs around most of the shoreline at Loon Lake. The most prevalent resource damage was observed between the two main dams, which includes about two miles of shoreline. This is a popular place for overnight dispersed camping, especially for groups of visitors. The types of resource damage observed along this portion of the shoreline include fire rings too close to the highwater mark, trash, oil and transmission fluid on rocks and soil, trash, cut and damaged vegetation and improperly disposed human waste. The flat terrain allows visitors to drive their vehicles into many areas at the shoreline. The widespread use of vehicles along this portion of the shoreline has caused soil compaction and a lack of ground cover. Visitors using these areas contribute to overflowing trash bins located at nearby campgrounds and at Robbs Resort. Dispersed recreation visitors adjacent to the Northshore RV Campground also use the restrooms at the campground. There is also a dirt surfaced road near the dam across Rocky Basin that visitor use to launch boats. This route allows visitors to drive their vehicles to the shoreline. No erosion was observed at this area but there is widespread compaction and lack of ground cover.

There are several islands on the reservoir that are also used for dispersed overnight and day use. It was common to find fire rings along the shorelines, trash and toilet paper scattered on the islands. In the south portion of the reservoir, as many as seven fire rings were observed on the largest island. The peninsula that extends along the south side of the area of the reservoir known as Pleasant Lake has approximately 10 dispersed overnight sites and there is a user-created trail between the end of the peninsula and the spillway. Some of the fire rings are too close to the shoreline. The user-created trail did not appear to be causing any resource damage. However, dirt bike tracks were observed along the peninsula and vehicle tracks were observed on the north side of the peninsula. Other resource damage noted in this area included painted graffiti on rocks, user-created tables and shelves nailed to trees, and large driftwood logs buried vertically along the shoreline to serve as tie-up points for boats.

Along the west shoreline of the area of the reservoir known as Pleasant Lake and the inlet of Ellis Creek, OHV use had been prevalent until the ENF constructed barriers and posted the area closed to OHV use in an effort to reduce resource impacts at and near the shoreline. Restoration of the area was completed by obliterating user-created trails, falling vegetation and mulching. These efforts have curtailed dispersed recreational use that had caused widespread soil and

vegetation damage in the past. A site inspection in 2003 revealed that the ENF measures have been largely successful in curtailing inappropriate recreation activities along this portion of the shoreline. A few areas with vehicle tracks and moved boulders were observed which indicates that some visitors are not complying with the closure.

Along the northern shoreline near the Pleasant Campground and the Loon Lake Tunnel, there are a few sites that visitors apparently use for boat-in camping. Occasional trash and toilet paper was observed at these sites. There is also a large dispersed overnight use site just north of the Loon Lake Tunnel. This site has one fire ring that is too close to the shoreline and one fire ring adjacent to a wet, marshy area. There are footpaths within the site that have been leveled and lined with rocks. It appears that the path in the site extends to the Rubicon Hiking Trail. There is also a sign nailed in the tree.

Between the Loon Lake Tunnel and the Loon Lake Campground five sites used for overnight dispersed camping were located. Most of the fire rings along this portion of the shoreline were within 100 feet of the high water mark. At least two of the sites with multiple fire rings have inadequate vegetative clearance that is necessary for a safe campfire. Some trash was observed at these sites.

4.3.3.3 Canyonlands

Slab Creek Reservoir

At the upper end of Slab Creek Reservoir near the bridge on the Forebay Road there are numerous fire rings along the north side of the reservoir. These sites are located along an access road that is approximately one-quarter to one-half a mile long. The end of the access road terminates at the waters edge and allows access for visitors to launch small boats. Resource damage that was observed at this site included fire rings and vehicle use occurring too close to the shoreline, deep ruts caused by OHV or 4-wheel drive vehicles on steep slopes, user-created pit toilet at the waters edge, graffiti, trash, and damage to riparian vegetation. Visitors have repeatedly used one area, for target practice as evidenced by an accumulation of shell casings and various targets including an old microwave and a computer terminal. During the site inspection in 2002, one visitor had an active campfire during the fire season when a Forest Closure Order was in effect that prohibited campfires outside of developed recreation facilities.

At the lower end of Slab Creek Reservoir near the dam, there is an access road leading the waters edge that allows access for launching small boats. There is a fire ring at this location, an accumulation of shell casings, paint on rocks and a rope swing tied in the tree at the shoreline. Trash was also observed at this site. At the dam, it appears that dispersed overnight use occurs at this location. Shell casings and trash were observed on the paved portion of the access road where it terminates at the gate to the dam.

Junction Reservoir

Dispersed day and overnight recreational use occurs at the informal boat launch that is located near the inlet of the SF of Silver Creek. Three fire rings were located and trash was observed both in the fire rings and the surrounding area. Two of the fire rings are located close to the shoreline and the third is located on a bench more than 100 feet from the shoreline. The access road is in good condition and erosion was not observed.

4.3.4 Water Quality Sampling

Two types of water sampling were conducted to investigate recreation impacts to water quality. The results of this sampling relative to areas of recreational use are presented here as this may indicate areas where the carrying capacity for recreational use may be exceeded. The reader is referred to the *Water Quality Technical Report* for the complete results of the Water Quality Study.

Fecal coliform concentrations in Loon Lake, Buck Island, Gerle Creek and Ice House reservoirs were comparatively low near areas of high dispersed recreational use when sampling was conducted in the summer of 2003. Two tributaries to the Union Valley Reservoir, Big Silver and Jones Fork Silver creeks, were identified as areas where water quality may be affected by high recreational use. These tributaries have numerous dispersed campsites along their banks, upstream of Union Valley Reservoir. The ENF has attempted to manage the dispersed recreational use in these areas that cause resource damage. Management actions such as road closures, fire ring removal, signage, and various watershed restoration efforts have been implemented in order to reduce the effects of recreational use on natural resources. These efforts have only been undertaken in the last two to three years and appear to be reducing, but not eliminating, the level of inappropriate recreational use along these tributaries. Fecal coliform levels were high at the sampling sites for these tributaries when samples were taken during periods of high recreational use; these levels diminished in subsequent sampling efforts when there was lower recreational activity occurring in the respective areas.

4.4 ENF ROS Classifications

The ENF manages the all National Forest System land within its boundaries using a concept known as ROS which is described in the ENF LRMP, as amended. This concept is applied forest-wide and all lands are placed in one of the five ROS classes described in Table 4.4-1 below. The guidelines in the ENF LRMP do not appear to include specific guidelines for bodies of water within the ENF. The descriptions and guidelines for the ROS classes provide a basis to evaluate carrying capacity relative to the existing visitor density and the type of recreation experience available to the public.

Table 4.4-1. Descriptions of ENF ROS classifications. (ENF 1988)		
ROS Classification	**General Description**	**Standards and Guidelines**
Primitive	Manage the area to be essentially free from evidence of man-induced restrictions and controls. Provide a range of primitive recreation opportunities and experiences.	Meet the ROS objective of Primitive. Interaction between visitors is very low and the evidence of other users is minimal. Capacity ranges from .002 to 0.03 PAOT per acre. Motorized use is prohibited. Recreation development would not be provided
Semi-primitive, Non-motorized	Manage the area so that minimum on-site controls and restrictions are subtle. Provide a range of semi-primitive non-motorized recreation opportunities and experiences.	Meet the ROS objective of Semi-primitive, Non-motorized. Interaction between visitors is low but there is evidence of other users. Capacity ranges from .008 to .083 PAOT per acre. Motorized use is normally prohibited. Recreation development would be Level I or 2 sites/acre.
Semi-primitive, Motorized	Manage the area so that minimum on-site controls and restrictions are present but subtle. Provide a range of semi-primitive motorized recreation opportunities and experiences.	Meet the ROS objective of Semi-primitive, Motorized. Concentrations of users are low but there is often evidence of other users. Capacity ranges from .008 to .083 PAOT per acre. Motorized use is permitted and access roads to facilitate resource management shall be Maintenance Levels I and II local roads. Recreation development would be Level II or two sites/acre
Roaded Natural	Manage the area so there is only moderate evidence of the sites and sounds of man. Provide a range of roaded natural recreation opportunities and experiences.	Meet the ROS objective of Roaded Natural. Interaction between users is usually low to moderate with evidence of other users prevalent. Resource modification practices are evident. Conventional motorized use is provided for in construction standards and facilities designs, capacity ranges from .08 to 2.5 PAOT/acre. Recreation development would be Level II, III or I or 2 to 5 sites/acre.
Rural	Manage the area to accommodate substantial modification of the natural environment. Provide a range of rural recreation opportunities and experiences.	Meet the ROS objective of Rural. Sights and sounds of man are evident. Interaction between users is moderate to high. Facilities are designed for use by large numbers of people and intensified for motorized use and parking. Capacity ranges from .083 to 7.5 PAOT per acre. Recreation development would be Level III or IV or 3 to 10 sites/acre.

The average site densities for the various campgrounds are presented in Table 4.4-2.

Table 4.4-2. The density of campsites for the UARP family campgrounds			
Campground	**No. of sites**	**Facility Size (acres)[1]**	**No. of sites per acre**
Airport Flat	16	unknown	N/A
Azalea Cove	10	5	2.0
Camino Cove	32	16-18	2.0-1.78
Fashoda	30	14	2.14
Gerle Creek	50	17	2.94
Ice House	83	38	2.18

Table 4.4-2. The density of campsites for the UARP family campgrounds			
Campground	**No. of sites**	**Facility Size (acres)[1]**	**No. of sites per acre**
Jones Fork	10	3	3.33
Loon Lake	53	12	4.42
Lone Rock	5	2	2.5
Northshore RV	15	5	3.0
Northwind	9	unknown	N/A
Pleasant	10	4	2.5
Strawberry Point	10	2	5.0
Sunset	131	40	3.28
Wench Creek	100	34	2.94
Westpoint	8	2	4.0
Wolf Creek	42	30	1.4
Yellowjacket	40	14	2.86

[1]Exhibit R Recreation Plan dated January 1985 and Revision to Exhibit R Recreation Plan dated July 1997.

Rubicon Reservoir is located in the Desolation Wilderness. This area has a Primitive ROS classification.

Loon Lake Reservoir and the surrounding area are within two Management Areas in the ENF LRMP. The northeast half of the reservoir and shoreline are within Management Area 7 in the ENF LRMP. This management area has a Semi-primitive motorized ROS classification. This area generally includes the portion of the reservoir known as Pleasant Lake and the area to the east and south of Pleasant Lake to the Loon Lake Wilderness Trailhead. The southwest half of the reservoir is within Management Area 20, which has three ROS classifications: Semiprimitive-motorized, Roaded Natural and Rural. It appears that the southwest half of the reservoir and surrounding shoreline is within the Roaded Natural ROS classification. The UARP recreation sites at the reservoir including campgrounds, day use areas, and boat launches have a Rural ROS classification.

The area around Gerle, Union Valley, Ice House and Slab Creek reservoirs are also within Management Area 20. It appears that the land where these reservoirs are located is designated Roaded Natural. The UARP recreation sites at these reservoirs including campgrounds, day use areas, scenic overlooks and boat launches have a Rural ROS classification.

Junction Reservoir is within Management Area 21-23, which has two ROS classifications: Semiprimitive motorized and Roaded Natural. It appears that the land where the reservoir is located is designated Roaded Natural.

Brush Creek Reservoir is within Management Area 24, which has a Roaded Natural ROS classification.

The ENF LRMP also includes numerous other standards and guidelines that represent the Forest level of management direction. These standards and guidelines are an extension of the Forest practices and set the minimum conditions that must be applied to the land to meet ENF goals and objectives. The ENF uses these standards and guidelines to evaluate proposed actions affecting

National Forest System lands such as timber sales, watershed restoration projects, and applications for special uses of NFS lands. There are other management actions that the ENF may take, after proper review and documentation as required by the National Environmental Policy Act (NEPA), to meet the standards and guidelines established in the LRMP. Examples of these actions may include: road closures, area closures, use restrictions, instituting quotas and user fees, land acquisition and designating special management areas.

5.0 ANALYSIS

5.1 UARP Recreation Facilities

5.1.1 Campgrounds

The UARP recreation facilities are popular recreation destinations for visitors. With over 200,000 day and overnight visitors a year during the summer, there are indicators that the recreation facilities cannot always provide a place for everyone seeking a recreation experience in the vicinity of the UARP. It appears that the capacity of UARP recreation facilities in the Crystal Basin becomes an issue during peak times on holidays and some weekends during the summer. On weekdays, occupancy at the UARP Campgrounds is considerably lower than what occurs on summer weekends and holidays.

The number of turnaway days reported at the campgrounds operated by the ENF under the Fee Demonstration Project and as free use campgrounds are incomplete for all years for all facilities. However the number of turnaway days reported for the concessionaire-operated campgrounds are more complete and can provide a sense of whether the level of recreational use is at or above the physical capacity of the campgrounds.

From 1999 and 2002, the 13 campgrounds operated by the concessionaire accumulated 387 turnaway days. This amounts to approximately 7.4 turnaway days per concessionaire-operated campground per year. It should be noted that in 2001 the reservoir levels were extremely low due to the energy crisis in California and drought and there were no turnaway days recorded during that year. Consequently, this calculated average for the concessionaire-operated facilities may be low, however, periodic droughts occur in California and low reservoir levels and subsequent low visitation should not be considered an anomaly. Most of the turnaway days occurred during the months of July and August which usually include two of the three summertime holidays, Fourth of July and Labor Day. On these holidays, many visitors can take advantage of at least a three-day weekend for a recreational outing. The calculated average number of turnaway days per concessionaire-operated campground seems to align with the number of days associated with the holiday weekends that usually occur in July and August.

It should also be noted that some turnaway days could also be caused by environmental factors. Some turnaway days occurred at campgrounds during the month of May when late melting snow can delay opening some campgrounds. This can cause the campgrounds that are open to fill to their capacity with visitors that may have intended to stay at other campgrounds in the Crystal Basin that may not have been open for the season.

Another factor that may lead to turnaway days is the level of development of the campgrounds. Notable differences between the campgrounds may include choice of reservoir, condition of the campground facilities, type of access, proximity to lakeshore, elevation, availability of potable water, flush vs. vault toilets, spur length, and whether there is a fee. Consequently, a high number of turnaway days may indicate that visitors prefer overnight facilities with, or without, certain amenities rather than a shortage of developed overnight capacity. It may be that a weekend visitor who is turned away from their first choice destination would likely be accommodated in the Crystal Basin at another campground, especially considering that there are developed overnight facilities that are available on a first-come, first-served basis. However, these visitors may have an experience that does not meet their expectations. On holiday weekends, the number of people seeking a developed campsite likely exceeds the capacity of the developed campgrounds.

The number of turnaway days appears to be higher at the reservoirs with the lowest overnight capacity which are Gerle Creek and Ice House reservoirs. The campgrounds at these reservoirs have about half of the sites available to the public by reservation. By contrast, the Wench Creek Campground, located at Union Valley Reservoir with 100 family campsites which are entirely available on a first-come, first-served basis, experienced fewer turnaway days with only 11, 4, 0 and 6 turnaway days between 1999 and 2002. This could indicate that the number of turnaway days could also be affected by the number of sites available on a first-come, first-served basis within the campgrounds.

From a social perspective, in general, it does not appear that visitors feel crowded at the campgrounds since most of the survey responses were either ‘not at all crowded’ or ‘slightly crowded.’ The survey responses indicating the highest degree of crowding occurred on Saturdays, Sundays and Mondays. Surveys conducted at Gerle Creek, Ice House and Airport Flat campgrounds had the highest frequencies, 25, 34 and 35 percent, respectively, of responses of ‘moderately’ or ‘extremely’ crowded.

The most frequent user conflict identified in the survey responses conducted at the campgrounds was people with loud, disruptive behavior. This complaint spanned almost all of the surveys regardless of which campground the survey was conducted. Law enforcement personnel also stated that this is one of their most frequent calls for assistance at the campgrounds. The highest frequency of this survey response occurred at Wench Creek (Union Valley Reservoir) and Loon Lake Campground. OHV use and its associated noise was also a frequently listed user conflict at the campgrounds. Gunshots and fireworks were also listed as a conflict at UARP campgrounds at each of the reservoirs.

Relative to the ROS site classifications, the site densities for the developed family campgrounds range from 1.4 to 5.0 sites per acre. These site densities for the developed family campgrounds are within the range of the guidelines of three to ten sites per acre for a Rural ROS classification.

Water quality may be affected by recreational use at Union Valley Reservoir near Camino Cove Campground, Fashoda Beach, and Jones Fork Campground. This may be an indication that the carrying capacity has been exceeded at these locations. Other resource damage that was

observed by SMUD in the vicinity of the campgrounds and reported in the results of this study are probably not indicators of over-use but rather unmanaged use. For example, since there are no designated trails that have been constructed and maintained between the Strawberry Campground and the reservoir shoreline, the public has created several trails that cause unnecessary resource damage. Similarly, the lack of maintenance and, not over-use, at the Pleasant Campground has led to resource damage within the site.

5.1.2 Day Use Areas, Boat Launches and Trailheads

Capacity patterns at the day use facilities, boat launches and trailhead parking lots follow a similar pattern of reaching capacity on holiday weekends in the summer. All but seven of the developed parking areas for these facilities were observed at or above their designed capacity during one or more of the observations of the study. The sites that were not observed at or above their designed capacity included Ice House Boat Launch, Big Silver Bike Trailhead, Wench Creek Bike Trailhead, Big Hill Overlook, Angel Creek Day Use Area, Gerle Creek Day Use Area and Gerle Creek Trailhead.

The highest occupancy was generally observed on holidays, however a few of the sites were also at or above their designed capacity on weekends during the summer. These sites include Ice House Day Use Area, Westpoint Boat Launch, Sunset Boat Launch, Yellowjacket Boat Launch and Loon Lake Boat Launch. The occupancy at the boat launches is somewhat expected considering two factors. First, parking spurs within the campgrounds are not large enough to allow visitors to park their vehicles and/or their boat trailers at their campsites. Consequently, there may be trailers parked at the boat launch for a period of days. Additionally, there may be campsites where visitors have more than two vehicles, which is the maximum allowed per campsite. Campground hosts enforce this rule and direct visitors to park their extra cars at the boat launch parking areas, for a fee. Again, these vehicles may remain at the parking area for a period of days. At the Loon Lake Boat Launch, OHV trailers (without their towing vehicles) were observed parked in the parking lot. This use in the boat launch parking area appears to be associated with visitors at Loon Lake that may be using the Rubicon OHV Route rather than the reservoir.

On weekdays, none of the day use, boat launch or trailhead facilities were observed at or above their designed capacity. The observations ranged between 0 and 40 percent of the facility capacity which indicates that there is plenty of capacity available to the public at these facilities on weekdays during the summer.

From a social perspective, in general, it does not appear that visitors feel crowded at the day use areas and boat launches since most of the survey responses were either ‘not at all crowded’ or ‘slightly crowded.’ The survey responses indicating the highest degree of crowding occurred on Fridays, Saturdays, Sundays and Mondays. Thirty one and 34 percent of the responses to the surveys conducted at Loon Lake Boat Launch and Angel Creek/Gerle Creek day use areas, respectively, had the highest frequencies of responses of ‘moderately’ or ‘extremely’ crowded.

There were very few comments about user conflicts in the visitor surveys conducted at day use areas, boat launches and trailheads. Visitors surveyed at these locations echoed the conflicts identified by campground users as to people with loud, disruptive behavior, OHV use and gunshots or fireworks. At these facilities, survey responses indicated that visitors also found that the noise associated with PWC and motorboats conflicted with their activities.

The types of resource damage noted at these sites are probably not indicators of over-use but rather indicate unmanaged use. The trampled riparian area at the Angel Creek day use area is probably caused by visitors seeking to be on the reservoir shoreline, which would occur regardless of the occupancy at the site.

5.2 UARP Reservoir Surfaces

Boating occurs on seven of the UARP reservoirs. Three of the reservoirs, Brush Creek, Junction and Slab Creek have attributes that attract minimal boating use. In general, these three reservoirs have narrow and long access routes including portions of unpaved roads, they are small sized reservoirs, they are located at the lower elevations of the UARP where air temperatures can be high in the summer months, they have steep shorelines and narrow reservoir surface configurations. Boating activity does occur on these reservoirs, mainly for fishing, however the low use does not cause any concerns related to boat density on these reservoirs. Similarly, crowding on the surface of Gerle Creek Reservoir, is not a great concern because only non-motorized boating is allowed. The remaining three reservoirs, Ice House, Union Valley and Loon Lake warrant an analysis of safe boating in terms of the density of boats that use the reservoir surfaces. Considering the goal of this analysis relates to safety, it is appropriate to use the data associated with the highest use levels of boating activity observed during the study.

The calculated boat densities for Ice House, Union Valley and Loon Lake reservoirs do not appear to indicate that the number of boats on the reservoir surface is causing safety concerns. The average number of acres per vessel at the reservoirs from the study observations are 35 to 260 percent higher than the most restrictive boating standard, for waterskiing, 20 acres per vessel, that is presented in Section 4.2.4. Considering the reservoirs have regular shapes, active law enforcement on the reservoir surfaces and a combination of watercraft types that include non-motorized and low speed boating, the most restrictive boating standard would probably not be the most applicable standard to apply but it would represent the worse case scenario. A more applicable standard would probably be 8 to 12 acres per vessel. Regardless, the current level of boating is not even close to any published minimum boat density standard for safe boating. The visitor survey responses about crowding on the reservoirs and the interview data from the deputies that patrol the reservoirs also indicate that there are currently no crowding problems on the reservoirs.

The guidelines for the density of PAOTs that is described in the ENF ROS classification definitions apply to land-based recreation. Without a standard that is directly applicable to National Forest System land for water-based recreation, the standards that have been published for reservoirs on other public land are compared to the observed boating densities on the reservoirs. The BOR guidelines define five classifications: Urban, Rural Developed, Rural

Natural, Semi-primitive and Primitive. Although there are likely differences in how the BOR and ENF define their ROS classifications, both systems consist of five categories that appear, by their titles, have similar character. The average boat densities based on the study observations fall into the BOR category of 'Rural Natural' which is in the middle of the WROS spectrum. This WROS classification has a guideline of boat densities from 20 acres per vessel to 110 acres per vessel. Drawing a parallel between the BOR and ENF ROS systems, the boat densities experienced at the three UARP reservoirs would be consistent with the 'Semi-primitive motorized' classification that exists under the ENF ROS system. Analyzing boat densities relative to the standards used at Lake Mead, the existing boat densities on the three reservoirs are even lower than boat density standard for the 'Primitive' classification used by the NPS. The 'Primitive' ROS classification has the lowest threshold for boat density in the NPS ROS spectrum at 18 acres per vessel.

Although the survey responses regarding conflicts were low (only 3 to 19% of visitors at each reservoir mentioned a conflicting use in their survey), PWC use may be an activity that is causing conflict among the existing users. In total, there were a total of 23 survey responses from all of the UARP reservoirs which indicated that visitors thought PWC use was noisy or disruptive; the highest frequency of responses was at Ice House Reservoir. There were also 17 survey responses that mentioned conflicts with motorized boating; again, the highest frequency of responses was at Ice House Reservoir. With only three survey responses relating to a user conflict between swimming and fishing, there does not seem to be conflict between these recreational uses on the reservoirs.

Since the ENF ROS classification system does not provide a standard or guidance relative to the types of boating activity that are appropriate for each ROS class, it is not possible to determine if the types of boating activities that occur on the reservoirs is consistent with their respective ROS classifications. Of all the reservoirs, Loon Lake Reservoir has the most restrictive ROS classification, Semi-primitive motorized. This designation allows motorized use so it would be reasonable to consider that motorized boating use would also be a consistent use for area with this ROS classification. The ROS classifications for the remainder of the reservoirs, Roaded Natural and Rural, prescribe a less primitive character for the landscape where the evidence human activity is more acceptable. The full spectrum of boating activity on the UARP reservoirs from non-motorized boating, such as kayaking, to high-speed boating, such as PWC use, would be consistent with these two ROS classifications.

5.3 Dispersed Recreation Areas

Dispersed overnight use does not appear to be influenced by the occupancy at the UARP campgrounds. Eighty-five to one-hundred percent of the visitors surveyed at dispersed areas indicated that they intended to stay overnight at a dispersed location. Socially, most of the dispersed visitors said they did not feel crowded at the location where they were surveyed with 77 to 100 percent of all dispersed survey responses either 'not at all crowded' or 'slightly crowded.' The highest frequency (23%) of the 'moderately crowded' and 'extremely crowded' responses occurred with dispersed overnight users at Loon Lake Reservoir.

Relative to the established ROS classes for the reservoir areas, the shoreline at Loon Lake Reservoir is an area where the existing use may exceed the standard for its Roaded Natural ROS classification, which is 0.83 to 2.5 PAOT per acre. The highest number of groups SMUD observed along the shoreline between the two main dams was 15 (see Visitor Use and Impact Study Report). With an average party size, as calculated from the survey responses, of 7.52 people per group, this would mean that there were as many as 113 people observed along this segment of shoreline on a peak weekend in 2002. In order to meet the density standard for the Roaded Natural ROS classification, there would have to be over 45 acres of suitable area along this two-mile stretch of shoreline. Since the most concentrated use occurs between the road and the shoreline, there is probably less than 45 acres of suitable land available and the standard is likely exceeded. Additionally, within this ROS classification, the interaction between users is supposed to be low to moderate. The shoreline between the two dams at Loon Lake Reservoir has several areas where people camp along the shoreline in large groups. The view along the shoreline between the two dams on holidays and weekends is a continuum of recreation vehicles, trailers, OHVs, and tents. This level of use does not appear to represent low to moderate interaction between users. By comparison, at some locations along the shoreline, the user density appears greater than that which occurs at the developed campgrounds in the Crystal Basin.

Resource damage is another indication that the carrying capacity for recreational use has been exceeded at Loon Lake Reservoir between the two dams. Widespread impacts such as soil compaction, improperly disposed human waste, lack of soil cover, damaged vegetation are the main indicators of this condition. The resource damage that was noted at other areas of Loon Lake Reservoir and near the other UARP reservoirs could be considered indicators of unmanaged use rather than over-use.

Recreational use may be affecting water quality at Union Valley Reservoir and on two tributaries to the reservoir, Big Silver and Jones Fork Silver creeks. This may be an indication that the carrying capacity has been exceeded at these locations as well.

6.0 LITERATURE CITED

Bureau of Reclamation 2002. Water Recreation Opportunity Spectrum Guidebook (Draft). Prepared by Aukerman and Associates LLC in conjunction with the USDOI, Bureau of Reclamation. May 2002.

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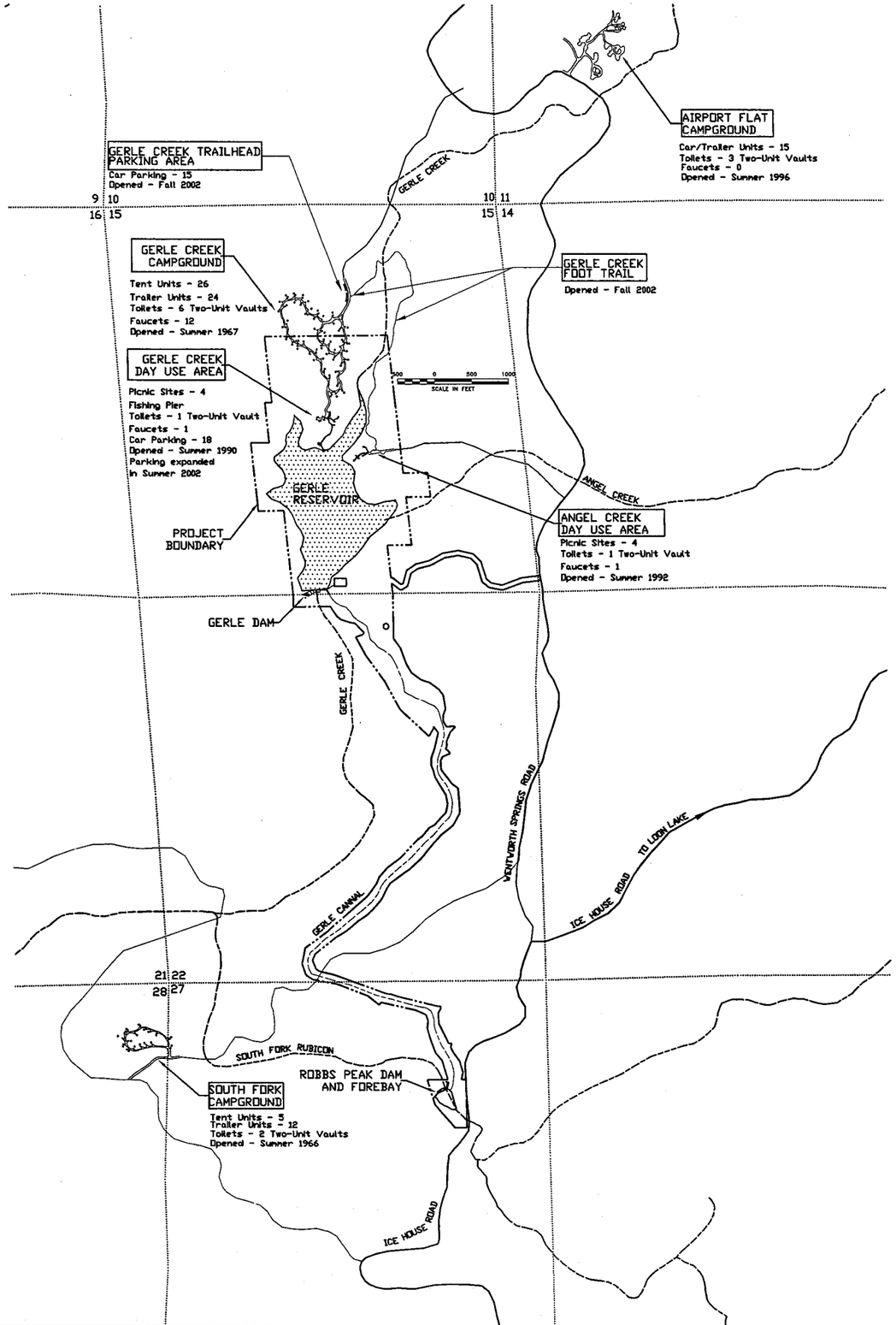
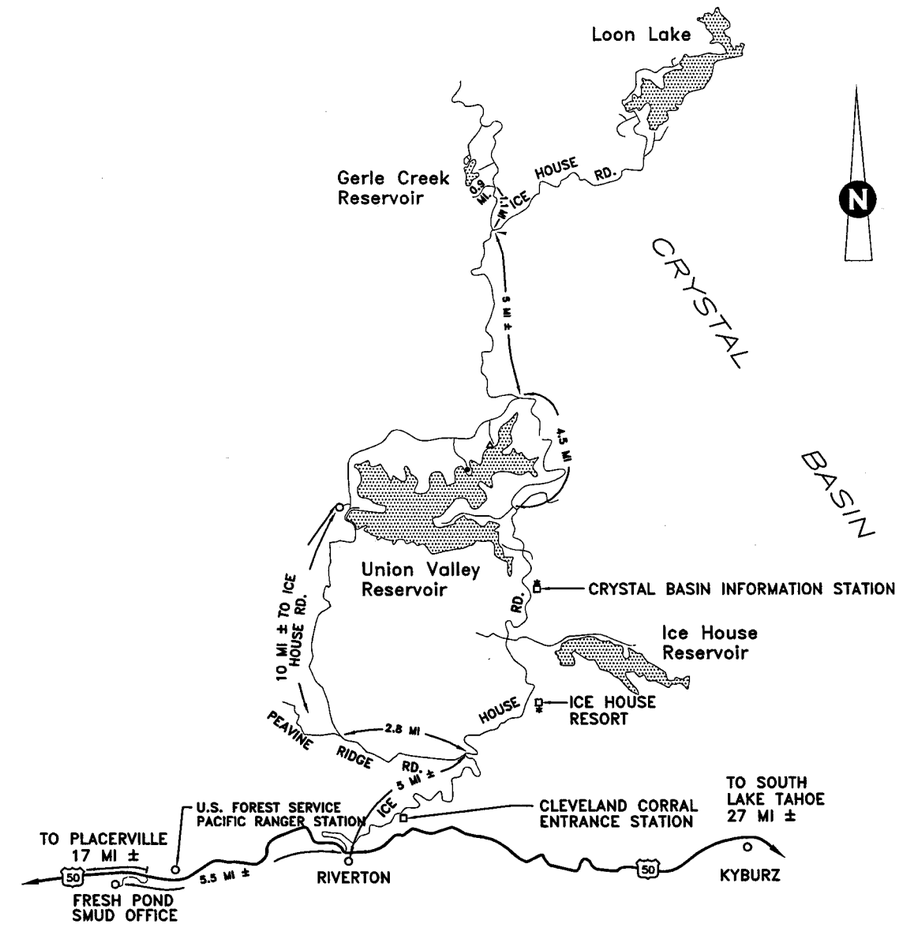
SMUD 2001. Initial Information Package, Upper American River Project. July 2001.

APPENDIX A

MAPS SHOWING UARP RECREATION FACILITIES AT GERLE, ICE HOUSE, LOON LAKE, AND UNION VALLEY RESERVOIRS





VICINITY MAP

N.T.S.

NO	DATE	REVISION	DR BY	CHK'D BY	DESIGNER/ ENGINEER	SUPERVISOR	FILM
1	9/03	Added Phase 4A & 4B					

SCALE	INDEX	TITLE	E8.3-2 RECREATION FACILITIES AT GERLE CREEK RESERVOIR
DR BY SS	DATE 9SEP00		
CHK'D BY	DATE	LOCATION	GERLE RESERVOIR
W.O. NUMBER	DESIGNER/ENGINEER CM	OVERLAY	SUPERVISOR / RELEASE DATE / DCN
SMUD SACRAMENTO MUNICIPAL UTILITY DISTRICT	DWG NO R-3		REVISION 1

500 0 500 1000
SCALE IN FEET

ICE HOUSE CAMPGROUND #2
TRAILER UNITS – 26
CAR/TENT UNITS – 19
TOILET – 2 TWO–UNIT
WATER FAUCETS – 15
OPENED – SUMMER 1961
RENOVATED – 1980

T12N. R14E.
T11N. R14E.

ACCESS FROM ICE HOUSE RD.

RECREATIONAL VEHICLE
SANITATION STATION
OPEN – SUMMER 1969

ICE HOUSE MOUNTAIN BIKE TRAIL

SWIMMING AREA

DIKE NO. 1

DIKE NO. 2

NORTHWIND OVERFLOW PARKING (USFS)
CAR UNITS – 6
OPENED SUMMER 1999

MOUNTAIN CAMP 2 (PRIVATE
ORGANIZATION CAMP
100 PEOPLE AT ONE TIME)

NORTHWIND BEACH

MOUNTAIN CAMP BEACH

ICE HOUSE BOAT LAUNCH
PARKING – OVERNIGHT 12 R.V.
PARKING – DAY USE 49 CAR & BOAT
FAUCETS – 3
TOILETS – 2 TWO–UNIT VAULT
OPENED – AUTUMN 1962
RENOVATED 1999

NORTHWIND CAMPGROUND
TRAILER UNITS – 8
CAR/TENT UNITS – 1
TOILETS – 1 TWO–UNIT VAULT
OPENED – SUMMER 1990

STRAWBERRY
OVERFLOW PARKING

ICE HOUSE CAMPGROUND #1
TRAILER UNITS – 19
CAR/TENT UNITS – 19
TOILETS – 8 TWO–UNIT VAULT
WATER FAUCETS – 9
OPENED – SUMMER 1961

STRAWBERRY POINT CAMPGROUND
TRAILER UNITS – 9
CAR/TENT UNITS – 1
TOILETS – 1 STD 2 UNIT VAULT
OPENED – SUMMER 1990

N

ICE HOUSE DAM

T11N. R14E. T11N. R15E.

ICE HOUSE DAY USE AREA
PICNIC – 10 TABLES
PARKING – 12 CARS & 3 CAR/TRAILERS
TOILET – 1 FOUR–UNIT VAULT
OPEN – SUMMER 1961

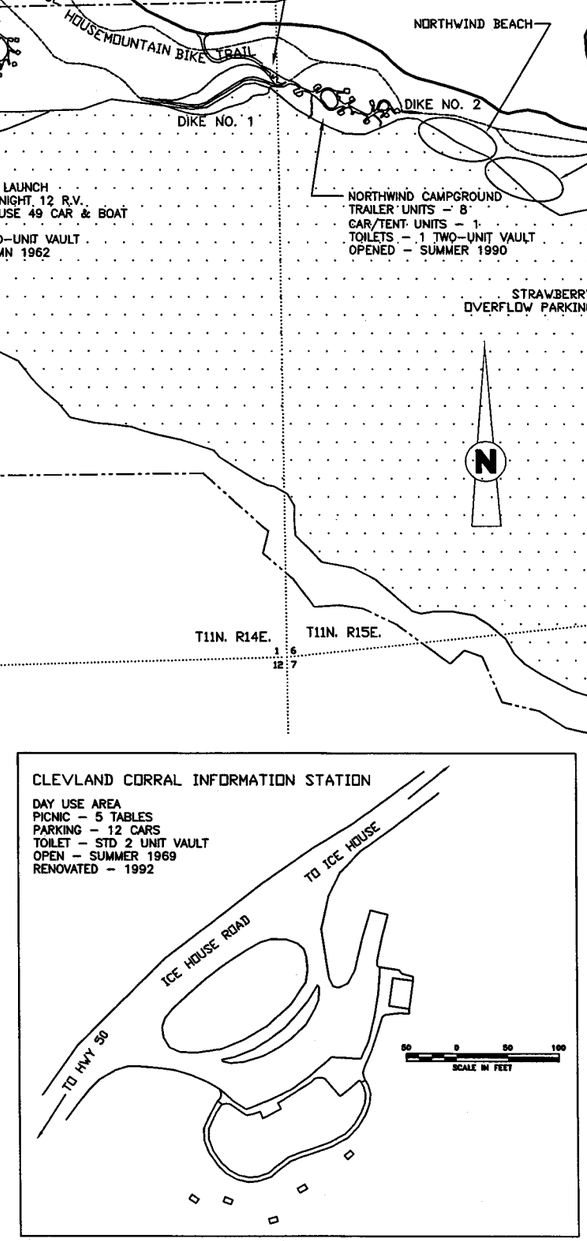
ACCESS FROM ICE HOUSE ROAD (UNPAVED)

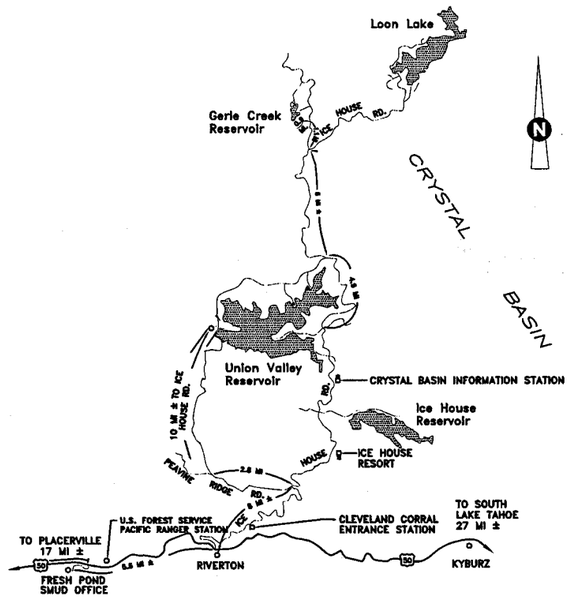
HIGH WATER LINE

PROJECT BOUNDARY

CLEVLAND CORRAL INFORMATION STATION

DAY USE AREA
PICNIC – 5 TABLES
PARKING – 12 CARS
TOILET – STD 2 UNIT VAULT
OPEN – SUMMER 1969
RENOVATED – 1992





VICINITY MAP
N.T.S.

NO	DATE	REVISION	DR BY	CHKD BY	DESIGNER/ ENGINEER	SUPERVISOR	FILM
4	23FEB1	INCORPORATED USFS EDITS	S.A.		C.M.		
3	1DEC99	REDRAWN, NORTH WIND AND STRAWBERRY PT. C.G.s ADDED			C.M.		

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

SCALE	1"=500'
INDEX	
DR BY	
DATE	
CHKD BY	
DATE	
W.O. NUMBER	
DESIGNER/ENGINEER	CM
OVERLAY	
SUPERVISOR	
RELEASE DATE	
DCM	
DRG NO	R–8
REVISION	3

TITLE: E8.3–3 RECREATION FACILITIES AT ICE HOUSE RESERVOIR
LOCATION: ICE HOUSE RESERVOIR & CLEVLAND CORRAL

WENTWORTH SPRINGS CAMPGROUND
Car/Tent Units - 6
Double Family Units - 2
Toilets - 1/2 Unit Vault
Opened - Summer 1933

Wentworth Springs Rd./ Rubicon Jeep Trail

Gerle Creek

PLEASANT CAMPGROUND
Tent Units - 18
Group Units - 1
Toilets - 2 One-Unit Pit
Opened - Summer 1968

Trail to Desolation Wilderness

LOON LAKE RESERVOIR

RED FIR GROUP CAMPGROUND
Car/Tent Units - 6
Toilets - 1/2 Unit Vault
Opened - Summer 1990

SKI TRAIL

ICE HOUSE Road

LOON LAKE MAIN DAM

DEER CROSSING CAMP (PRIVATE)

NORTHSHORE R.V. CAMPGROUND
R.V. Units - 15
Toilets - 1/2 Unit Vault
Opened - Summer 1990

RUBICON HIKING TRAIL

PROJECT BOUNDARY

LOON LAKE AUXILLARY DAM

SKI CHALET
Opened - Summer 1989

LOON LAKE CAMPGROUND & DAY USE AREA
Tent Units - 11
Trailer Units - 23
Picnic Units - 10
Toilets - 2 Four-Unit Vaults
Toilets - 2 Two-Unit Vaults
Fountains - 2
Faucets - 3
Opened - Summer 1967
Renovated - 1998

LOON LAKE GROUP CAMPGROUND NO.2
Group Units - 6
Toilets - 2 Two-Unit Vaults
Fountains - 1
Opened - Summer 1967
Renovated - 1991

TRAILHEAD WILDERNESS PARKING
Parking - 40 Spaces
Toilets - 1 Two-Unit Vault
Opened - Summer 1998

LOON LAKE EQUESTRIAN CAMPGROUND
Equestrian Units - 9
Toilets - 1 Two-Unit Vault
Opened - Summer 1998

LOON LAKE BOAT RAMP
Parking - 72 Cars & Trailers
Parking - 12 Cars
Picnic Units - 12
Toilets - 2 One-Unit Vaults
Fountains - 2
Opened - Summer 1968
Renovated - 2001

LOON LAKE EQUESTRIAN GROUP CAMPGROUND
Equestrian Units - 5
Toilets - 1 One-Unit Vault
Opened - Summer 1991

LOON LAKE FAMILY CAMPGROUND
Family Units - 18
Toilets - 2 One-Unit Vaults
Opened - Summer 1987

1000 0 1000 2000
SCALE IN FEET

SKI TRAIL

LOON LAKE TRAIL

ICE HOUSE ROAD

Loon Lake Sanitation Station-
Located 2.5 miles southwest of LLCG adjacent to Ice House Road
Opened - 1992

Loon Lake

Gerle Creek Reservoir

ICE HOUSE RD.

CRYSTAL BASIN

Union Valley Reservoir

10 MI ± TO ICE HOUSE RD.

CRYSTAL BASIN INFORMATION STATION

Ice House Reservoir

ICE HOUSE RESORT

PEAVINE RIDGE RD.

2.8 MI

5 MI ±

U.S. FOREST SERVICE PACIFIC RANGER STATION

CLEVELAND CORRAL ENTRANCE STATION

TO PLACERVILLE 17 MI ±

TO SOUTH LAKE TAHOE 27 MI ±

5.5 MI ±

FRESH POND SMUD OFFICE

RIVERTON

KYBURZ

VICINITY MAP

N.T.S.

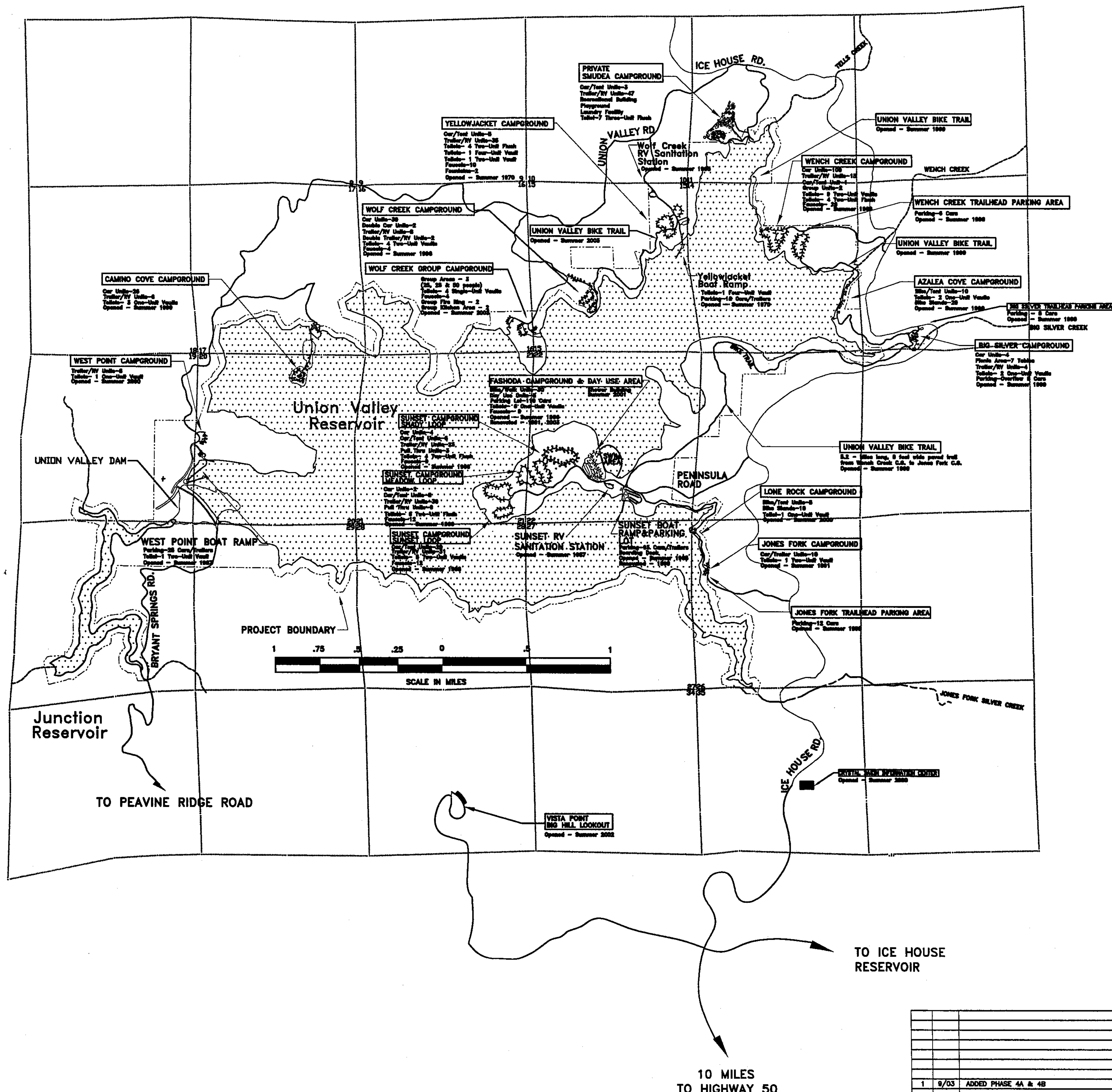
NO	DATE	REVISION	BY	CHKD BY	DESIGNED/ ENGINEER	SUPERVISOR	PLN

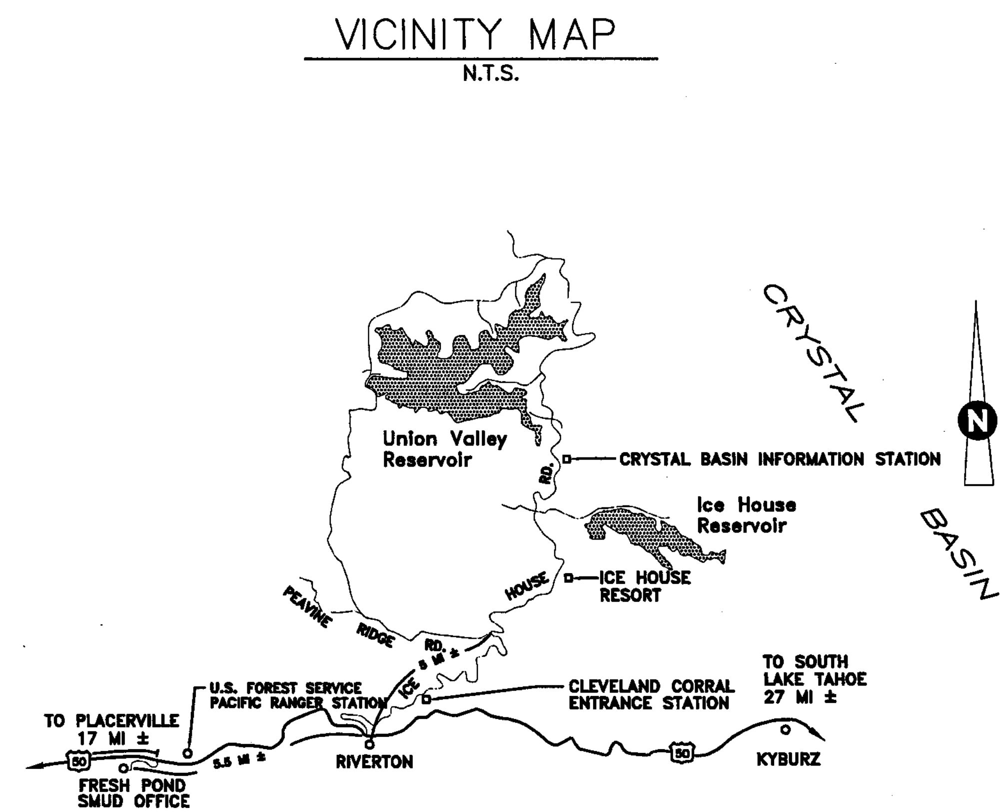
SMUD SACRAMENTO MUNICIPAL UTILITY DISTRICT

SCALE	INDEX
DR BY SS	DATE 9SEP00
CHKD BY	DATE
W.O. NUMBER	DESIGNER/ENGINEER CM
OVERLAY	SUPERVISOR
RELEASE DATE	DCN
DWG NO R-4	REVISION

TITLE: E8.3-1 RECREATION FACILITIES AT LOON LAKE RESERVOIR

LOCATION: LOON LAKE RESERVOIR





NO	DATE	REVISION	BY	CHKD BY	DESIGNER/ENGINEER	SUPERVISOR	FILM
1	9/03	ADDED PHASE 4A & 4B	S.A.				

DR BY: SS — DATE: 9SEP00 — DESIGNER/ENGINEER: CM

E8.3-4 RECREATION FACILITIES AT UNION VALLEY RESERVOIR

UNION VALLEY RESERVOIR

SMUD SACRAMENTO MUNICIPAL UTILITY DISTRICT

DWG NO R-2 — REVISION 1