

**Alcoa Power Generating Inc.
Yadkin Division**

Yadkin Project Relicensing (FERC No. 2197)

Recreational Use Assessment

Draft Report

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**Prepared by
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EXECUTIVE SUMMARY

The Yadkin Hydroelectric Project consists of four developments (High Rock, Tuckertown, Narrows, and Falls) located along the Yadkin River in central North Carolina. Alcoa Power Generating Inc. (APGI) is the licensee for the Project. The Project is currently licensed by the Federal Energy Regulatory Commission (FERC No. 2197) and the existing license expires on April 30, 2008. As part of the relicensing process, APGI must assess the effects of the Project on a variety of resources, including recreation. This study provides baseline information on recreational use, activities, facilities, and issues.

Recreational data was collected over a one-year period (May 10, 2003 to May 9, 2004) using a variety of survey instruments including:

- 7,052 Spot Counts
- 966 Visitor Use Surveys,
- 186 Tailwater Use Surveys,
- 5 Canoe/kayak registrations,
- 1,764 Resident Use Surveys,
- 125 Private Community Use Surveys,
- 18 Commercial business and private organization phone surveys, and
- 71 Uwharrie National Forest Recreation Surveys.

All recreational use is measured in terms of recreation days. A Recreation Day is defined as “each visit by a person to a development for recreation purposes during any portion of a 24-hour period.” In other words, any and all recreation during a 24-hour period by one person would equal one recreation day.

Annual recreational use for the entire Yadkin Project is estimated at over 2.4 million recreation days for the one year study period. Recreational use is not evenly distributed among the four reservoirs, with High Rock and Narrows (Badin Lake) receiving the most use (53 percent and 45 percent, respectively). Tuckertown Reservoir receives about 2 percent of total project recreational use, and Falls Reservoir is very lightly used (<1 percent of total project use). High Rock and Narrows reservoirs are the largest reservoirs and both have large resident populations, which are not found at the other two reservoirs.

Waterfront residents at High Rock and Narrows reservoirs are estimated to represent about 55 percent of the total recreation days at the Project. Non-waterfront residents (19 percent), commercial businesses and private organizations (15 percent), and visitors (11 percent) represent nearly all of the remaining use. The canoe registries that were established at the portage trails around the four dams receive very light use (estimated at 50 recreation days per year).

The four reservoirs are primarily used for boating and fishing (both from boats and along the shoreline), with swimming, sunbathing, picnicking, waterskiing, and camping

(primarily at the Uwharrie National Forest) also popular. High Rock and Narrows reservoirs are used for a wide variety of recreational activities. Tuckertown Reservoir is primarily a fishing destination, while Falls Reservoir is popular for camping and fishing.

Recreational use at High Rock and Narrows reservoirs, with a large resident population that participates in a relatively diverse set of recreational activities, primarily occurs between Memorial Day and Labor Day, with still fairly high use during the May and September shoulder months. These five months (May through September) represents 75 percent of the total recreation days at High Rock Reservoir and 68 percent at Narrows Reservoir. Tuckertown and Falls Reservoirs do not have any waterfront residents with pier permits from APGI, are smaller, and are primarily destinations for fishing and camping. Recreational use at these reservoirs picks up earlier in the year (early April) than at High Rock and Narrows reservoirs. Recreational use also drops off earlier at Tuckertown and Falls reservoirs (August) than at High Rock or Narrows reservoirs.

In terms of recreational issues, some users (generally between 10 and 20 percent) complained about the availability of sanitary facilities and the improper disposal of litter, trash, and toilet paper at each of the four reservoirs. Low water levels was identified as a “big” or “moderate” problem by nearly 50 percent of waterfront and non-waterfront residents at High Rock Reservoir and approximately 40 percent at Narrows Reservoir, but was not an issue at Tuckertown and Falls reservoirs. On a related note, about 45 percent of waterfront and non-waterfront residents at High Rock Reservoir identified boating hazards (e.g., stumps, shallow water) as a big or moderate problem, which may be attributed to the more significant drawdown that occurs at that reservoir. Only about 20 percent of waterfront and non-waterfront residents identified boating hazards as a big or moderate problem at Narrows Reservoir, where the reservoir drawdown is usually much less.

There are clear differences in opinion between waterfront residents and visitors regarding various potential issues at High Rock and Narrows reservoirs. Residents have strong concerns about low water levels; improper disposal of litter, trash, and toilet paper; and boating hazards. Most visitors appear pleased with their trips to the reservoirs and raise few concerns, other than about the availability of toilets.

Overall most respondents indicated that the recreational facilities were in at least acceptable condition. In most cases when respondents indicated facilities were “mostly” or “totally” inadequate, it was because the facilities (e.g., toilets) were lacking rather than not being in good condition. APGI has conducted a separate report, *Recreation Facility Inventory and Condition Assessment*, which evaluates facility condition in more detail.

Recreational facilities at the public access recreation areas were evaluated in terms of their capacity to meet recreational demand. The number of boat launch lanes and amount of parking generally appear adequate. Several relatively heavily used recreation areas lacked any trash receptacles and toilets. Given the number of survey respondents who identified lack of sanitary facilities and improper disposal of litter and trash as big or moderate problems, additional trash receptacles and toilets are warranted. The

recreational use at some fishing access areas, however, is typically very dispersed, which makes conveniently locating toilets and trash receptacles so they will be used very challenging. Provision of these facilities at fishing access areas needs to be made on a site-specific basis.

Recommendations

The following recommendations are made based on the results of this study:

- Efforts should be made to limit drawdown at High Rock Reservoir between approximately May through September to the extent possible. The data suggest that low water becomes a big or moderate problem at between 4 to 5 feet of drawdown.
- Boating hazards, especially at High Rock Reservoir, may need to be better marked to alert boaters.
- Recreation use projections indicate that the physical carrying capacity of High Rock and Narrows reservoirs may be exceeded prior to 2030. APCI should coordinate with the U.S. Forest Service, North Carolina Wildlife Resources Commission, and other recreation managers at the reservoirs to determine the best way to manage recreational growth and to avoid the safety hazards associated with exceeding a reservoir's carrying capacity.
- Monitor parking at York Hill Boat Access, Flat Creek Fishing Access, and UNF Cove Boat Landing to determine whether parking capacity is being sufficiently exceeded to warrant an expansion of the parking area.
- Evaluate whether it is possible to create legal parking at several formerly used fishing pull-off areas (i.e., Crane Creek Fishing Access, Highway 47 Fishing Pull-off, Abbotts Creek/NC 8 Bridge Pull-off, and Lick Creek Fishing Pull-off) that are no longer used because of the lack of legal parking.
- Improve collection of trash and litter at public fishing access areas
- Provide additional toilets and trash receptacles at several public access recreation areas.

1.0 INTRODUCTION

The Yadkin Hydroelectric Project (Project) is located along a 38-mile stretch of the Yadkin River, in Montgomery, Stanly, Davidson, Davie, and Rowan Counties, North Carolina. The Project consists of four developments: High Rock, Tuckertown, Narrows, and Falls. Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197 and the existing license expires on April 30, 2008. Presently, the electricity generated by Alcoa's hydroelectric operations is used to support Alcoa's other operations at Badin Works and Alcoa's aluminum operations in other locations, and is also sold to the open market.

The Project lands and waters are used extensively for recreation. The four Project reservoirs can be accessed five different ways:

- 40 public access recreation areas;
- 4 canoe portage trails;
- 3,729 waterfront residences with piers (as of May 2003);
- Approximately 7,471 non-waterfront residences within private waterfront communities (as of June 2003); and
- 33 commercial businesses and private organizations.

The purpose of this recreation use assessment is to collect, analyze, and provide information regarding recreational use of the Yadkin Project as part of the Project's relicensing process. The specific objectives of the study are summarized below.

1. Collect and analyze sufficient information to make statistically sound estimates of the following aspects of recreational use at the Yadkin Project:

- Total annual recreation use under varying water levels at each of the four Project reservoirs;
- Total annual daytime and nighttime use at each of the four Project reservoirs;
- Peak use weekend average recreation use;
- Total annual recreation use at the Yadkin Project by recreational activity type (e.g. boating, fishing, camping, hiking, swimming, picnicking, etc.);
- Effects of varying water levels on amount and type of recreational use and recreational safety (e.g., boating hazards);
- Percent utilization of each individual public access recreation area expressed as percent capacity; and
- Recreational user profile information.

2. Assess the effects of the Yadkin Project on recreation in the tailwaters of the four dams that comprise the Project, including the following information needs/issues:

- Characterize existing recreational use within the Project tailwaters;
- Evaluate vehicular, pedestrian, and disabled access to the tailwater areas;
- Evaluate canoe/kayak portage conditions and opportunities;
- Evaluate effects of flow rates, timing, and water quality on boating/angling/other tailwater recreational uses; and
- Evaluate recreational safety issues such as physical hazards, effects of Project operations on water currents and depths, and access to tailwater areas.

3. Evaluate the recreational carrying capacity of the Yadkin Project, including the following aspects:

- Estimate the physical (safety) and social carrying capacities of each of the four reservoirs, while also noting environmental effects related to recreational use;
- Identify traditional recreational uses of the Project area; and
- Estimate future recreational use of the Project area.

2.0 METHODOLOGY

This section describes the methodologies used to collect and analyze recreation use data.

2.1 Data Collection

A variety of data collection measures were used to obtain information regarding recreational use of the Project area. These measures were designed to collect information on recreational use for each of the five ways to access the Project reservoirs:

Public Access Recreation Areas

- Spot Counts, which were made at the 40 public access recreation areas;
- Visitor Use Survey, which was administered at the 40 public access recreation areas; and
- Tailwater Use Survey, which was administered at the tailwaters of the four Project dams.

Canoe Portages

- Canoe/kayak registry installed at the four canoe portages.

Waterfront Residences

- Resident Use Survey, which was mailed to every waterfront residence with a pier permit from APGI.

Private Waterfront Communities

- Private Communities Use Survey, which was mailed to a random sample of 1,568 residences in private communities with direct access to a Project reservoir.

Commercial Businesses and Organizations

- Commercial business and private organization phone survey of every business, organization, and club with direct access to a Project reservoir.

Table 2-1 provides a summary of the methods used to collect recreational data at the Yadkin Project.

All recreational use is measured in terms of recreation days. A Recreation Day is defined by the Federal Energy Regulatory Commission (FERC) as “each visit by a person to a development for recreation purposes during any portion of a 24-hour period.” In other words, any and all recreation during a 24-hour period by one person would equal one recreation day.

Table 2-1 Summary of Data Collections Methods

Instrument	User Category	Type of Survey	Estimated Population	Number Responses	Response Rate	Confidence Level
Spot Counts	Public Access Recreation Area Visitors	On-site spot counts	Potential 43,800 counts ¹	7,052	16%	99%
Visitor Use Survey	Public Access Recreation Area Visitors	On-site contact survey	~200,000 groups ²	966	0.5%	97%
Tailwater Recreation Survey	Tailwater Recreation Users	On-site contact survey	Unknown	186	NA	NA
Canoe Portage Registry	Canoe Portage Trail Users	Registry at canoe take-out	Unknown	5	Unknown, assumed to be 20%	NA
Resident Use Survey	Waterfront residents	Mail back survey	3,729 residences	1,764	47%	98%
Private Community Use Survey	Private Community (non-waterfront) Residents	Mail back survey	~7,471 residences ³	125	2%	92%
Business and Organization Survey	Businesses and Organizations	Telephone survey	Unknown – 33 businesses and organizations	18	55%	NA
Uwharrie National Forest Survey	Recreators within the Uwharrie National Forest	On-site contact survey	~3,400	71	2%	90%

¹ Assumes 3 observations per day, 365 days per year, at 40 public access recreation areas.

² Based on 1996 Form 80 visitor use estimate of 534,749 recreation days and an average group (persons per vehicle) size of 2.65.

³ Estimated by assuming that 80 percent of waterfront residences are located within private waterfront communities. There are 10,455 parcels within the private waterfront communities. The number of non-waterfront residences in these private waterfront communities is $10,455 - 2,984 = 7,471$

2.1.1 Spot Counts

Spot counts were conducted at 40 public access recreation areas throughout the study period (May 10, 2003 to May 9, 2004). Sampling dates were selected using a stratified random sampling methodology, and all calendar days were stratified by holiday weekends (Memorial Day, 4th of July, and Labor Day), normal weekends, and weekdays for each month to ensure adequate representation of all months and peak and off-peak use periods. Each public access recreation area was sampled approximately 62 days over the year with the following frequency: 3 weekend days and 3 weekdays a month during April, May, June, July, August, September, and October (including Memorial Day, 4th of July, and Labor Day peak weekends); and 2 weekend days and 2 weekdays a month during the rest of the year. Table 2-2 lists the Spot Counts by month and type of day (i.e., weekends, weekdays, holidays). Overall, spot counts were conducted at some Yadkin public access recreation area on 282 days during the study period (77% of 366 days in the year).

Table 2-2 Spot Counts by Month and Type of Day

Month	Number of Day Surveyed	Number of Spot Counts			Total
		Weekend	Weekday	Holiday	
May	27 of 31	285	387	167	839
June	22 of 30	339	363	0	702
July	27 of 31	255	402	99	756
August	27 of 31	260	348	57	665
September	24 of 30	256	350	74	680
October	25 of 31	326	350	0	676
November	22 of 30	233	120	0	353
December	20 of 31	135	165	0	300
January	21 of 31	174	249	0	423
February	20 of 29	220	205	0	425
March	20 of 31	291	240	0	531
April	27 of 30	381	321	0	702
Total	282	3,155	3,500	397	7,052
Percent of Total	77%	45%	50%	5%	100%

During each sampling day, staff visited the randomly selected areas (usually between 5 and 20 of the 40 potential areas) three times (early in the morning, mid-day, and late afternoon/evening) to determine total daily recreational use and better estimate the turnover rate. Therefore, approximately 186 spot counts were conducted at each of the 40 public access recreation areas during the study period. In some cases, bad weather or vehicular problems resulted in fewer observations. A few areas were surveyed less frequently because of low use and remoteness (e.g., Highway 601 Access Area and Rowan County Pump Station). A total of 7,052 Spot Counts were conducted (Table 2-3).

Table 2-3 Number of Spot Counts at Each Public Access Recreation Area

Site #	APGI Site Code #	Reservoir	Location	Spot Counts
1	H1	High Rock	Highway 601 Access Area	165
2	H3	High Rock	Rowan County Pump Sta.	165
3	H8	High Rock	York Hill Boat Access	165
4	H16	High Rock	Crane Creek Fishing Access	165
5	H19	High Rock	Little Crane Creek Fishing Access	165
7	H28	High Rock	Southmont Boat Access	189
8	H31	High Rock	High Rock Marina/Campground	186
9	H36	High Rock	Highway 47 Fishing Pull-off	183
10	H39	High Rock	Buddle Creek Boat Access	189
12	H44	High Rock	Abbots Creek/NC 8 Bridge Pull-off	189
13	H47	High Rock	Tamarac Marina	171
14	H48	High Rock	Dutch Second Creek Boat Access	171
15	H64	High Rock	Flat Swamp Boat Access	189
		<i>HIGH ROCK</i>	<i>SUBTOTAL</i>	<i>2,292</i>
17	T1	Tuckertown	High Rock Dam Picnic and Fishing Access	163
18	T2	Tuckertown	High Rock Dam Tailrace	163
19	T3	Tuckertown	Bringle Ferry Boat Access	170
20	T4	Tuckertown	Cedar Creek Fishing Pull-off	163
21	T6	Tuckertown	Lick Creek Fishing Pull-off	163
22	T8	Tuckertown	Flat Creek Boat Access	164
23	T9	Tuckertown	Flat Creek Fishing Access	164
24	T10	Tuckertown	Newsome Road Access	163
25	T12	Tuckertown	Riles Creek Recreation Area	163
26	T14	Tuckertown	Highway 49 Boat Access	181
27	T15	Tuckertown	Tuckertown Pull-off Fishing Access	174
		<i>TUCKERTOWN</i>	<i>SUBTOTAL</i>	<i>1,831</i>
29	N1	Narrows	Tuckertown Dam Tailrace	171
30	N2	Narrows	Garr Creek Access	181
32/33	N5/6	Narrows	Old Whitney	197
34/35	N9/10	Narrows	Lake Forest CG/Fish Tales Marina	198
37	N13	Narrows	Circle Drive Boat Access	180
38	N16	Narrows	Lakemont Access	180
39	N24	Narrows	UNF Holt's Cabin Picnic Area	195
40	N25	Narrows	UNF Walk-in Fishing Pier	185
41	N26	Narrows	UNF Badin Lake Campground	185
42	N27	Narrows	UNF Cove Boat Landing	183
43	N28	Narrows	Palmerville Access	181
44	N29	Narrows	Badin Lake Swim/Picnic Area	181
45	N30	Narrows	Badin Boat Access	176
47	N36	Narrows	Badin Lake Group Camp	167
		<i>NARROWS</i>	<i>SUBTOTAL</i>	<i>2,560</i>
48	F1	Falls	UNF Deep Water Trail Access	188
49	F2	Falls	Falls Boat Access	181
		<i>FALLS</i>	<i>SUBTOTAL</i>	<i>369</i>
			GRAND TOTAL	7,052

At the public access recreation areas, the number of vehicles, boat trailers, personal watercraft trailers, mounted roof-top carriers for canoes or kayaks (not including roof-top carriers that come with vehicles), campers, anglers, swimmers, picnickers, and other recreation users were recorded. Any capacity issues were noted. A standardized data collection form was used to ensure completeness of the spot counts and to facilitate data entry into the electronic database (see Appendix A). Appendix B includes the survey technician instruction sheet for the Spot Counts and Visitor Use Survey.

2.1.2 Visitor Use Surveys

The purpose of the Visitor Use Survey (VUS) was to obtain information on recreational “visitor” characteristics, activities, concerns, and overall recreational experience. Although referred to as a Visitor Use Survey, this survey was intended to survey all users of the public access recreation areas, including non-locals (tourists), local residents who do not own waterfront property, and even some waterfront property owners who occasionally use the public access recreation areas for various reasons (e.g., to put their boats in or take their boats out of the reservoir at the beginning and end of the recreation season).

This contact survey was administered on-site by trained survey technicians at the same 40 public access recreation areas where the Spot Counts were conducted. Sampling occurred on the stratified random sampling days selected for the Spot Counts. After completing the Spot Counts at each public access recreation area, the survey technicians asked visitors to participate in the VUS. The surveys were self-administered (i.e., the recreational user filled out the survey themselves rather than responding to questions by the survey technician). Only one person per group was given the survey to avoid group bias and only adults (i.e., over 16 years of age) were asked to complete the survey. The survey was not given to visitors just arriving at the site because several questions on the survey asked about their experience at the site. Appendix B includes the survey technician instruction sheet for the Spot Counts and VUS.

A standardized survey form was developed and used (see Appendix C). The VUS was also available in Spanish because there is a significant Hispanic population that uses the reservoirs (see Appendix C). The survey form included questions related to user profile and expenditure information, such as: length of stay, types of recreational activities, party size, adequacy of recreation facilities, degree of crowding, conflicts with other recreational users, changes in their visitation frequency to the Yadkin Project over time, and recreation-related expenditures made on their current trip (e.g., food, lodging, supplies, equipment, entertainment, fuel).

It was common to observe few people at many of the public access recreation areas for several reasons:

- Many sites receive very little use, especially during the low use season;
- Many fishing access sites only receive significant use in the spring;
- Anglers were often widely dispersed along the shoreline and sometimes difficult to find in order to survey; and
- Watercraft users (motor boaters, boat anglers, personal watercraft users, sailors, windsurfers, water-skiers, canoeist/kayakers) were usually recreating on the reservoir and often were difficult to survey.

The majority of the surveys were collected between May and August. A total of 966 VUS were completed. Ten percent of surveys were collected during holiday periods, 56 percent on weekend days, and 34 percent on weekdays (Table 2-4).

Table 2-4 Number of Visitor Use Surveys by Month and Day of Week

Month	Sun.	Mon.	Tues.	Weds.	Thurs.	Fri.	Sat.	Holiday	Total
May	12	10	12	20	9	15	25	44	147
June	89	15	12	24	19	27	72	NA	258
July	49	12	21	20	14	20	67	44	247
August	33	7	1	3	3	18	30	10	105
September	13	7	0	3	2	2	23	2	52
October	11	3	1	0	0	4	15	NA	34
November	10	0	0	1	0	1	4	NA	16
December	2	0	2	0	0	0	2	NA	6
January	1	0	0	0	0	0	3	NA	4
February	2	0	1	0	1	1	1	NA	6
March	22	0	1	0	2	0	5	NA	30
April	6	2	6	0	6	2	39	NA	61
Total	250	56	57	71	56	90	286	100	966

NA = Not Applicable

Visitor Use Surveys were collected at each of the four reservoirs as follows:

- High Rock Reservoir – 39 percent
- Tuckertown Reservoir – 23 percent
- Narrows Reservoir – 35 percent
- Falls Reservoir – 2 percent

Table 2-5 lists the number of VUSs collected at each public access recreation area.

Table 2-5 Number of Visitor Use Surveys by Reservoir and Recreation Site

Site #	Reservoir	Location	Surveys
1	High Rock	Highway 601 Access Area	3
2	High Rock	Rowan County Pump Sta.	8
3	High Rock	York Hill Boat Access	33
4	High Rock	Crane Creek Fishing Access	7
5	High Rock	Little Crane Creek Fishing Access	6
7	High Rock	Southmont Boat Access	93
8	High Rock	High Rock Marina/Campground	8
9	High Rock	Highway 47 Fishing Pull-off	0
10	High Rock	Buddle Creek Boat Access	75
12	High Rock	Abbots Creek/NC 8 Bridge Pull-off	3
13	High Rock	Tamarac Marina	33
14	High Rock	Dutch Second Creek Boat Access	70
15	High Rock	Flat Swamp Boat Access	41
	<i>HIGH ROCK</i>	<i>TOTAL</i>	<i>380</i>
17	Tuckertown	High Rock Dam Picnic and Fishing Access	28
18	Tuckertown	High Rock Dam Tailrace	16
19	Tuckertown	Bringle Ferry Boat Access	25
20	Tuckertown	Cedar Creek Fishing Pull-off	4
21	Tuckertown	Lick Creek Fishing Pull-off	2
22	Tuckertown	Flat Creek Boat Access	33
23	Tuckertown	Flat Creek Fishing Access	22
24	Tuckertown	Newsome Road Access	7
25	Tuckertown	Riles Creek Recreation Area	40
26	Tuckertown	Highway 49 Boat Access	31
27	Tuckertown	Tuckertown Pull-off Fishing Access	10
	Tuckertown	Site number unknown	1
	<i>TUCKERTOWN</i>	<i>TOTAL</i>	<i>219</i>
29	Narrows	Tuckertown Dam Tailrace	28
30	Narrows	Garr Creek Access	14
32/33	Narrows	Old Whitney	54
34/35	Narrows	Lake Forest CG/Fish Tales Marina	4
37	Narrows	Circle Drive Boat Access	46
38	Narrows	Lakemont Access	13
39	Narrows	UNF Holt's Cabin Picnic Area	12
40	Narrows	UNF Walk-in Fishing Pier	24
41	Narrows	UNF Badin Lake Campground	24
42	Narrows	UNF Cove Boat Landing	33
43	Narrows	Palmerville Access	2
44	Narrows	Badin Lake Swim/Picnic Area	55
45	Narrows	Badin Boat Access	29
47	Narrows	Badin Lake Group Camp	3
	Narrows	Site number unknown	8
	<i>NARROWS</i>	<i>TOTAL</i>	<i>349</i>
48	Falls	UNF Deep Water Trail Access	8
49	Falls	Falls Boat Access	9
	<i>FALLS</i>	<i>TOTAL</i>	<i>17</i>
	Other	Site number unknown	1
		GRAND TOTAL	966

2.1.3 Tailwater Use Survey

The purpose of the Tailwater Use Survey (TUS) was to obtain information on user characteristics, activities, concerns, and overall recreational experience in the tailwaters of the four dams. Tailwater areas are typically popular fishing areas and may have different user issues and concerns than the reservoirs. Therefore a survey form was developed that was nearly identical to the VUS, but had several additional questions that were tailored to tailwater recreation areas (see Appendix D). The VUS was also available in Spanish because there is a significant Hispanic population that uses the tailwaters (see Appendix D).

The TUS was conducted two ways. The survey technicians distributed the survey to and collected the survey from tailwater users along the shoreline using the same procedures as for the VUS (see Section 2.1.2 above). In addition, the survey was distributed to approximately 89 boaters in the tailwaters by APGI's fisheries consultant (Normandeau Associates or NAI) during their fieldwork so that both boaters as well as onshore recreational users were surveyed. Appendix E includes the TUS instructions provided to NAI. Boaters were asked to mail back the surveys, which were pre-addressed and stamped. Approximately 57 percent of the surveys that were distributed to boaters were returned.

A total of 186 TUS were collected. Six of the mail back boater surveys did not respond for a single tailwater, but indicated that they use multiple dam tailwaters. The total number of responses received was 199. Table 2-6 indicates the number of surveys collected on shore and by boat at each tailwater.

Table 2-6 Tailwater Use Survey by Location

Location	# of On-Shore Surveys Collected	# of Boater Surveys Collected	Total # of Surveys Collected
High Rock Dam Tailwater	69	8	77
Tuckertown Dam Tailwater	71	16	87
Narrows Dam Tailwater	3	14	17
Falls Dam Tailwater	0	18	18
Total	143	56	199

Data used to describe tailwater physical conditions were gathered from field observation and inspection at a range of discharges.

2.1.4 Canoe/Kayak Registry

The purpose of the canoe/kayak registry was to estimate the number of paddlers using the portage trails around the four dams. Recognizing that the chances of encountering a paddler on the portage trail were very low and there was not a surrogate measure of use (e.g., counting the number of vehicles at public access recreation areas), a weather-protected sign and registry form was used in lieu of conducting spot counts at the canoe portage trails at each of the four dams. Signs were posted at prominent locations near each take-out requesting all paddlers to sign the registry (Figure 2-1). Paddlers were asked to register the date, time, number in their party, and to rate the level of difficulty of the portage (Appendix F). There was also space provided for any additional comments. These registries were checked periodically (approximately every 2 weeks) to insure the registries were in good condition and to tally the number of users.

A total of 5 groups signed the registries – three using the High Rock Dam portage and two using the Narrows Dam portage.

2.1.5 Resident Use Survey

The purpose of the Resident Use Survey (RUS) was to obtain information on waterfront resident recreational use characteristics, activities, concerns, and overall recreational experience. A non-contact mail-back survey was developed and sent to 3,729 waterfront residents with APGI pier permits on High Rock and Narrows reservoirs. Although there are adjacent property owners on Tuckertown Reservoir, there are no private recreational facilities (e.g., piers) allowed, so for purposes of this study it was assumed that there were no waterfront property owners on Tuckertown Reservoir. There are no waterfront property owners on Falls reservoirs. A cover letter was sent with each survey explaining the purpose of the survey (see Appendix G). The surveys were distributed 9 times (once a month for the period of March through October and once for the collective period of November through February). Each residence was randomly selected to receive one of the 9 mailings requesting information on their recreational use of the reservoirs over the prior month.

A standardized survey form was used (see Appendix G). The survey form included questions related to: household size, approximately how many days a year they reside at their waterfront residence, frequency of recreational use for each recreational activity by season, number of guests who also recreated at Yadkin reservoirs, average amount of time spent recreating per outing, adequacy of recreation facilities, degree of crowding, conflicts with other recreational users, changes in their visitation frequency to the Yadkin Project over time, recreation-related expenditures for a typical day of recreation, and questions regarding Project area aesthetics.

Table 2-7 lists the responses to the mail back survey. The overall response rate was 47 percent, which is excellent for a mail back survey. This response rate enables a 98 percent confidence level with these data. A few surveys (30) were returned by the post office as undeliverable because of incorrect address. Some surveys (23) were returned by the residents, but none of the survey questions were answered. Finally, some surveys were returned partially complete, but the resident did not answer the question as to which reservoir they lived on, so these responses could not be attributed to a specific reservoir and were not included in the data analysis.

Figure 2-1 Canoe/Kayak Registry Photographs



Photo 1: Canoe Registry Notice and Box

Photo 2: Canoe Registry as seen from the canoe take-out at High Rock Dam.

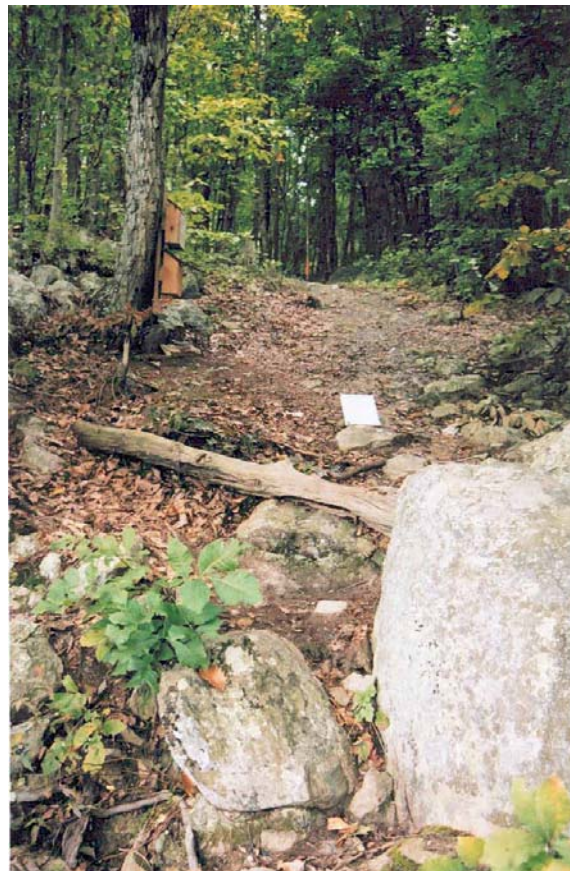


Table 2-7 Waterfront Resident Use Survey Responses

Reservoir	Surveys Mailed	Surveys Returned Complete	Surveys Returned Incomplete	Returned Unknown Reservoir	Surveys Returned Undeliverable	Surveys Not Returned
High Rock	2,722	1,243 (47%)	NA	NA	NA	NA
Narrows	1,007	521 (52%)	NA	NA	NA	NA
Total	3,729 (100%)	1,764 (47%)	23 (1%)	39 (1%)	30 (1%)	1,872 (50%)

NA = Not available

The response rate for each mailing was good and ranged from a high of 60 percent for High Rock Reservoir in June and 60 percent for Narrows Reservoir in September to a low of 35 percent for High Rock Reservoir in May and 39 percent for Narrows Reservoir in April. Table 2-8 lists the response rate for each reservoir for each month.

Table 2-8 Waterfront Resident Use Survey Response Rate by Month

Month	High Rock Reservoir		Narrows Reservoir	
	# of Responses	Response Rate	# of Responses	Response Rate
May	105	35%	65	59%
June	179	60%	61	55%
July	125	42%	57	51%
August	135	45%	60	54%
September	142	47%	67	60%
October	139	46%	57	51%
Nov, Dec, Jan, Feb	159	49%	65	54%
March	126	42%	57	51%
April	122	41%	43	39%
Total	1,243	47%	521	52%

2.1.6 Private Communities Use Survey

The purpose of the Private Communities Use Survey (PCUS) was to collect information regarding recreational use by non-waterfront residents of private communities with access to Yadkin reservoirs via private community boat launches, marinas, or piers. Based on a search of tax records in Davidson, Rowan, and Montgomery counties by APGI, it is estimated that there are approximately 4,976 parcels in private communities with access to High Rock Reservoir and 5,479 parcels in private communities with access to Narrows Reservoir. There are no private communities with access to Tuckertown or Falls reservoirs. These estimates of parcels include both waterfront and non-waterfront parcels. Information is not readily available on the number of these parcels that are improved (i.e., a residence has been constructed versus simply an undeveloped lot) or how many of the parcels are waterfront.

For purposes of this analysis, it was assumed that approximately 80 percent of High Rock waterfront residences with pier permits from APGI (2,722 waterfront residences x 80 percent = 2,178 waterfront residences) and 80 percent of Narrows waterfront residents with pier permits from APGI (1,007 waterfront residences x 80 percent = 805 waterfront residences) are located within these private communities. Subtracting the number of waterfront residences in these private communities from the total number of residences leaves the number of non-waterfront residences as follows:

	High Rock	Narrows
# of Private Community parcels	4,976	5,479
# of Waterfront residences	<u>- 2,178</u>	<u>- 806</u>
# of Non-Waterfront residences	2,798	4,673

A mail back survey was conducted of a stratified random sample of 1,568 residents within private communities with boat launches using a mailing list provided by APGI. Property owners received one of four equal mailings (392 properties per mailing) requesting information on their recreational use of the reservoirs over the prior season, as defined as:

- Spring – March, April, and May
- Summer – June, July, and August
- Autumn – September, October, and November
- Winter – December, January, and February.

A standardized survey form was used (see Appendix H). A cover letter was sent with each survey explaining the purpose of the survey (see Appendix H). The survey form was nearly identical to the RUS form and included questions related to: household size, types of recreational activities, approximately how many days a year they reside at their waterfront residence, frequency of recreational use for each recreational activity by season, number of guests who also recreated at Yadkin reservoirs, average amount of time spent recreating per outing, adequacy of recreation facilities, degree of crowding, conflicts with other recreational users, changes in their visitation frequency to the Yadkin Project over time, recreation-related expenditures for a typical day of recreation, and questions regarding Project area aesthetics.

There were 446 responses received for this survey, or a 28 percent response rate. However, many of these responses (321) either indicated that they owned waterfront property or did not indicate whether they owned waterfront property. It was not possible to determine prior to the mailing which properties were waterfront properties, which were already included in the Resident Use Survey. Therefore the survey asked whether the respondent was a waterfront property owner. Those responses indicating they were waterfront property owners and those that did not indicate whether they were waterfront owners were not included in this analysis because this survey focused on non-waterfront property owners. Table 2-9 lists the non-waterfront responses to the mail back survey. The overall non-waterfront response rate was 2 percent. This response rate enables a 92 percent confidence level with these data.

Table 2-9 Private Community Resident Use Survey

Reservoir	Surveys Mailed	Surveys Returned Complete	Surveys Returned Incomplete	Returned Unknown Reservoir	Survey Returned Undeliverable	Surveys Not Returned
High Rock	NA	224 (%)	NA	NA	NA	NA
Narrows	NA	222 (%)	NA	NA	NA	NA
Total	1,568 (100%)	446 (28%)	6 (<1%)	27 (2%)	36 (2%)	1,053 (67%)

NA = Not available

The response rate for each mailing was good and was relatively consistent for each of the four seasons, although the spring response was lower than the other three seasons. Table 2-10 lists the response rate for each reservoir for each month.

Table 2-10 Private Communities Use Survey Response Rate

Months	High Rock Reservoir		Narrows Reservoir	
	<i>No. of Responses</i>	<i>Response Rate</i>	<i>No. of Responses</i>	<i>Response Rate</i>
June, July, August	62	43%	61	25%
Sept, Oct, Nov	57	39%	69	28%
Dec, Jan, Feb	67	46%	56	23%
March, April, May	38	26%	36	15%
Total	224	39%	222	22%

2.1.7 Business and Organization Survey

The purpose of the Business and Organization Survey was to obtain information on recreational use at commercial marinas and campgrounds and various private organizations and clubs that have direct recreational access to a Yadkin reservoir via a boat launch, marina, or pier. There are 31 commercial businesses and organizations with a recreational component identified by APGI in consultation with the IAG at the Yadkin Project, including 26 at High Rock Reservoir, 2 on Tuckertown Reservoir, and 5 on Narrows Reservoir – there are no businesses or organizations with direct access to Falls Reservoir. Each business and organization was contacted by telephone. Three standardized surveys were developed – one for private organizations and clubs, one for commercial marinas, and one for campgrounds (see Appendix I).

The surveys were conducted of the private clubs and organizations within the Project area to collect information on the organization/club's membership, extent of annual use (e.g., all year, summer, hunting season), frequency of use, and type of recreational facilities and activities at each site. A telephone survey was also conducted of the campground and commercial facility operators within the Project area to collect information on the number of campsites, relative number of permanent, seasonal, and occasional residents, and recreational facilities and opportunities at the campgrounds.

A total of 18 businesses and organizations agreed to participate in the phone survey. The other 15 businesses and organizations either refused to participate in the survey or never responded to repeated messages. Surveys were completed with 44 percent of the campgrounds, 50 percent of the marinas, and 62 percent of the organizations (Table 2-11).

Table 2-11 Commercial Business/Private Organization Survey Response Rate

Reservoir	Campgrounds		Marinas		Organizations	
	# of campgrounds	# responses	# of marinas	# responses	# of organizations	# of responses
High Rock	12	4	2	0	12	8
Tuckertown	2	1	0	0	0	0
Narrows	2	2	2	2	1	1
Total	16	7	4	2	13	8

2.1.8 Uwharrie National Forest Survey

The purpose of the Uwharrie National Forest Recreation Survey (UNFRS) was to obtain information specific to the Uwharrie National Forest to help evaluate whether the U.S. Forest Services' (USFS) Recreation Opportunity Spectrum (ROS) goals for the Uwharrie National Forest are being attained. The survey asked questions regarding the type of recreational experience, crowding, and the relative importance of the Project reservoirs to the overall recreational experience.

A standardized survey form was used (see Appendix J). The survey technicians distributed the survey to and collected the survey from recreational users within the Uwharrie National Forest using the same procedures as for the VUS (see Section 2.1.2 above).

A total of 71 UNFRSs were collected. Table 2-12 lists the number of surveys collected by month.

Table 2-12 Uwharrie National Forest Recreation Surveys by Month

Month	No. of Surveys	% of Total
May	13	18%
June	34	48%
July	24	34%
Total	71	100%

2.1.9 Aerial Photographs

Six aerial photographs of High Rock, Tuckertown, Narrows, and Falls reservoirs were conducted on 2 holiday weekends, 2 summer weekends, and 2 summer weekdays. The exact dates are as follows:

- Holiday weekends
 - 4th of July weekend - Friday July 4, 2003
 - Labor Day weekend - Sunday August 31, 2003
- Summer weekends
 - Saturday June 21, 2003
 - Saturday August 9, 2003
- Summer weekdays
 - Friday July 18, 2003
 - Monday August 18, 2003

The overflights were all conducted between noon and 2 pm and were only conducted during good weather (sunny and clear). The aerial photographs were taken at an altitude low enough to allow the number and type of boats to be easily counted.

2.2 Recreational Use Data Analysis

Overall recreational use at the Yadkin Project was estimated by summing the estimates of each of its components:

- Public Access Recreational Use
- Waterfront Resident Recreational Use
- Private Communities (non-waterfront properties) Recreational Use
- Commercial Business and Private Organization Recreational Use
- Canoe/Kayak Portage Recreational Use

Tailwater recreational use was not included in this estimate because this use is included in the Public Access Recreational Use estimates. The canoe/kayak portage use is included in calculating overall recreational use because these users would not necessarily be included in any of the other estimates (e.g., they may be thru paddlers that are beginning and ending outside of the Yadkin Project or may not be putting in or taking out at any of the public access recreation areas.

The process used in estimating each of these components of overall recreational use is described below.

2.2.1 Public Access Recreational Use

Recreational use at the 40 public access recreation areas was estimated using data obtained from the Spot Counts and the Visitor Use Surveys. The following equation was used to estimate recreational use at each public access recreation area for each month:

$$\text{Recreational Use} = (\text{type of day}) \times (\text{vehicles/day}) \times (\text{people/vehicle}) \times (\text{turnover rate})$$

Each of these factors is described below.

Type of Day

Table 2-13 identifies the number of each type of day per month during the study period.

Table 2-13 Type of Days per Month for Study Period

Month	Weekend Days	Weekdays	Holidays	Total
May	9	19	3	31
June	9	21	0	30
July	6	22	3	31
August	8	21	2	31
September	8	21	1	30
October	8	23	0	31
November	10	20	0	30
December	8	23	0	31
January	9	22	0	31
February	9	20	0	29
March	8	23	0	31
April	8	22	0	31
Total	100	257	9	366

Vehicles per Day

The number of vehicles per day was estimated based on the Spot Counts at each public access recreation area. The spot counts were disaggregated to develop specific vehicle per day estimates for each type of day for each month for each public access recreation area.

People per Vehicle

The number of people per vehicle was estimated based on the responses to the VUS question, “How many people came in your vehicle to the reservoir today?” (Appendix C - Question #3). The average persons per vehicle was calculated for each reservoir and is listed below:

- High Rock Reservoir – 2.40 persons per vehicle
- Tuckertown Reservoir – 2.42 persons per vehicle
- Narrows Reservoir – 2.87 persons per vehicle
- Falls Reservoir – 2.64 persons per vehicle

Some respondents indicated that as many as 161 persons came in their vehicle to the reservoir. For purposes of calculating average persons per vehicle, only responses of less than 8 persons per vehicle were included in the calculations.

Turnover Rate

The Spot Counts identify the number of vehicles present at a public access recreation area at one moment in time. Three spot counts were conducted each sampling day at each public access recreation area in order to get a better estimate of average number vehicles at the site over a full day. In order to translate these three “spot counts” to an estimate of

the total number of vehicles that were present at a public access recreation area over the course of a full day a turnover rate is applied.

The turnover rate is an estimate of the average duration of visit divided by the day length in order to estimate how many times a day the number of vehicles “turns over”. The average duration of visit was determined from the responses to the VUS question, “How long will you be staying at the reservoir today?” (Appendix C - Question #4). The average duration of visit was calculated for each reservoir for each month (the months of November to February were combined) plus holidays. Table 2-14 presents the day length, average duration of visit, and turnover rate for each reservoir for each month (Table 2-14).

Table 2-14 Turnover Rates

Month	Day Length (hours)	High Rock Reservoir		Tuckertown Reservoir		Narrows Reservoir		Falls Reservoir	
		Average Duration of Visit (hours)	Turnover Rates	Average Duration of Visit (hours)	Turnover Rates	Average Duration of Visit (hours)	Turnover Rates	Average Duration of Visit (hours)	Turnover Rates
May	12	4.61	2.60	4.50	2.67	4.97	2.41	4.69	2.56
June	14	5.31	2.64	5.55	2.52	5.24	2.67	5.37	2.61
July	14	4.87	2.87	4.25	3.29	4.57	3.06	4.56	3.07
August	14	4.44	3.15	3.79	3.69	4.44	3.15	4.56	3.07
September	12	5.13	2.34	4.29 ³	2.80	4.92	2.44	4.78	2.51
October	10	5.17 ²	1.93	4.29 ³	2.33	4.53 ⁵	2.21	4.66	2.51
November to February	8	5.47	1.46	4.13	1.94	4.60	1.74	4.73	1.69
March	10	4.72 ¹	2.12	3.69 ¹	2.71	4.95	2.02	4.45	2.25
April	10	4.67	2.14	3.14	3.18	5.30 ⁴	1.89	4.37	2.29
Holiday Weekends	14	4.64	3.01	4.18	3.35	4.66	3.00	4.49	3.12

¹ 2 surveys in March, combined March/April to estimate trip duration

² 11 surveys in October, combined September/October to estimate trip duration

³ 9 September and 8 October respondents combined

⁴ 4 surveys in April, combined March/April to estimate trip duration

⁵ 8 surveys in October, combined September/October to estimate trip duration

2.2.2 Waterfront Resident Recreational Use

Recreational use by waterfront residents and their guests was estimated for High Rock and Narrows reservoirs. There are no waterfront residences with pier permits from APGI at Tuckertown and Falls reservoirs. The methods use to estimate resident and guest use are described separately below.

Recreational Use by Waterfront Residents

Overall waterfront resident recreational use was estimated using data obtained from the Resident Use Survey. Nine sets of responses were received detailing recreational use for 8 individual months plus the winter (November to February).

The following equation was used to estimate recreational use for High Rock and Narrows reservoirs for each month:

$$\text{Resident Recreational Use} = (\text{median number of adult recreation days} + \text{median number of child recreation days}) \times \text{number of waterfront households}$$

Each of these factors is described below.

Median Number of Adult and Child Recreation Days

The median number of adult and child recreation days was calculated based on responses to the RUS (Appendix G). The number of adults and children for each household (Question #3) was multiplied by the number of recreation days for the adult and child from that household whose birthdays were closest to July 1st (Question #4) for each of the 1,150 useable responses for High Rock Reservoir and 456 responses for Narrows Reservoir. These median number of household recreation days was calculated for each month for each reservoir (Table 2-15).

Table 2-15 Median Number of Waterfront Household Recreation Days

Month	Resident Recreational Use	Guest Residential Use
May	40.0	17.0
June	60.0	40.0
July	60.0	69.0
August	62.0	40.0
September	49.0	40.0
October	35.0	17.5
November	2.1	5.0
December	2.1	5.0
January	2.1	5.0
February	2.1	5.0
March	12.0	2.5
April	28.0	15.5

Number of Households

There are 2,722 High Rock Reservoir households and 1,007 Narrows Reservoir households with pier permits from APGI at the time of the survey.

Recreational Use by Guests

The RUS also asked residents about the number of guests that visited their waterfront residence and recreated at the reservoir during the survey period (Appendix G – Question #3). The following equation was used to estimate recreational use by guests:

$$\text{Guest Recreational Use} = (\text{Median Number of Guest-days/household/month}) \times (\text{Number of Households})$$

The median number of guest-days per household was calculated by summing the number of guest-days in the survey responses and dividing by the number of responses. It appears that Question #3 confused many respondents as 21 percent provided mathematically impossible answers (i.e., the number of guest days was less than the number of guests). These responses were not included in estimating the number of guest-days at the reservoirs. Several respondents indicated that they had an extremely large number of guests (e.g., as many as 365) during a single month. Many of these were for special events (e.g., one respondent noted that they had a wedding at their waterfront house). In order not to let these few special events skew the estimate of the typical number of guest-days per household per month, the median, rather than the mean, number of guest-days per household was used to estimate overall recreational use by waterfront resident guests. Table 2-16 indicates the median number of guest-days per household per month for each reservoir.

Table 2-16 Median Number of Guest-Days per Household by Month

Month	High Rock Reservoir	Narrows Reservoir
May	4	2
June	5	4
July	6.5	4.5
August	6	4
September	4	2
October	3	1
November ¹	0.5	0.5
December ¹	0.5	0.5
January ¹	0.5	0.5
February ¹	0.5	0.5
March	2	1.5 ²
April	2	1.5

¹ The median number of guest-days per household for the winter (November, December, January and February) was evenly allocated across the four months.

² The median for this month was 0, so the mean was used instead.

The number of households is 2,722 for High Rock Reservoir and 1,007 for Narrows Reservoir at the time of the survey.

2.2.3 Private Communities Recreational Use

Recreational use by non-waterfront residents who live in private communities with water access was estimated for High Rock and Narrows reservoirs. There are no private communities with direct access to Tuckertown and Falls reservoirs. The method used to estimate the recreational use by private community residents is described below.

Overall private community resident recreational use was estimated using data obtained from the Private Community Use Survey. Four sets of responses were received detailing recreational use for summer (June, July, and August), fall (September, October, and November), winter (December, January, and February), and spring (March, April, and May).

The following equation was used to estimate private community resident recreational use for High Rock and Narrows reservoirs:

$$\text{Private Community Recreational Use} = (\text{mean number of adult recreation days} + \text{mean number of child recreation days}) \times \text{number of non-waterfront private community households}$$

Each of these factors is described below.

Mean Number of Adult and Child Recreation Days

The mean number of adult and child recreation days is presented in Table 2-17. This information is based on responses to the PCUS (Appendix H). The number of adults and children for each household (Question #3) was multiplied by the number of recreation days for the adult and child from that household whose birthdays were closest to July 1st (Question #4) for each of the 35 useable responses for High Rock Reservoir and 73 useable responses for Narrows Reservoir. There were not enough responses to have a statistically valid estimate for each season, therefore, the total responses for each reservoir were summed to develop an estimate of the mean number of household recreation days annually for each reservoir. The estimate of the annual number of household recreation days is:

- High Rock Reservoir – 20.2 recreation days per household per year
- Narrows Reservoir – 86.1 recreation days per household per year

Table 2-17 Average Number of People Per Waterfront Household

Month	High Rock Reservoir			Narrows Reservoir		
	Mean # adults per household	Mean # children per household	Mean total people per household	Mean # adults per household	Mean # children per household	Mean total people per household
May	2.57	0.77	3.34	2.41	0.83	3.24
June	3.40	1.07	4.47	3.10	1.29	4.39
July	3.99	1.52	5.51	4.04	1.56	5.60
August	2.88	1.09	3.97	3.28	0.81	4.09
September	3.09	1.42	4.51	3.44	1.02	4.46
October	2.61	0.69	3.30	2.83	0.67	3.50
November	2.69	0.97	3.66	2.33	1.20	3.53
December	2.69	0.97	3.66	2.33	1.20	3.53
January	2.69	0.97	3.66	2.33	1.20	3.53
February	2.69	0.97	3.66	2.33	1.20	3.53
March	2.35	0.98	2.83	2.59	0.54	3.13
April	2.80	0.81	3.61	2.80	1.44	4.24

Number of Parcels

There are approximately 2,798 High Rock Reservoir non-waterfront private community parcels and 4,673 Narrows Reservoir non-waterfront private community parcels with access to High Rock and Narrows reservoirs via community recreational facilities.

2.2.4 Commercial Business and Private Organization Recreational Use

The Commercial Business and Private Organization phone survey asked respondents about typical weekend and weekday use (in terms of number of recreation users) during the spring (including March, April, and May), summer (including June, July, and August), fall (including September, October, and November), and winter (including December, January, and February). Table 2-18 presents the estimates obtained from the phone surveys. These estimates were multiplied by the number of each type of day per month (see Table 2-13) to generate total annual recreation use. Peak use estimates were also obtained and were used to estimate Memorial Day weekend, 4th of July weekend, and Labor Day weekend use.

Table 2-18 Business and Organization Daily Recreation Use by Season and Type of Day

Businesses and Organizations	Spring		Summer		Fall		Winter		Holiday
	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	
High Rock									
Holshouser Properties	60	20	65	20	60	20	40	10	125
Salvation Army	30	0	60	60	0	0	0	0	60
Miller's Cove Camping/Rentals	10	8	15	8	8	6	6	5	20
Cicero Lylerly Rental Property	50	25	175	75	125	100	40	25	175
Boy Scouts Camp Old N. Council	25	0	0	50	25	0	15	0	50
Boy Scouts Camp Old Hickory and General Green Troop	30	0	30	0	30	0	30	0	100
Central Carolina Boat Club	40	10	50	20	30	10	15	6	80
Marsh Property Rentals	70	25	80	30	25	30	5	5	80
Eagle Point Nature Preserve	10	3	10	3	10	3	0	3	15
Clear Reservoir Water Skiers	15	10	18	10	10	10	0	0	500
Rowan County Voiture #115	3	2	4	4	2	0	0	0	35
High Rock Boat and Ski Club ¹	45	20	54	24	16	7	3	1	65
Tuckertown									
H.B. Newsome Property	20	1	40	5	2	1	0	0	60
Narrows									
Old North State Club Marina	150	50	300	100	100	30	20	10	600
Badin Shores Resort	800	400	900	500	800	400	400	200	1500
Badin Lake Ski Club	10	4	10	5	6	5	2	0	15
Whip-O-Will Campground Marina	5	6	125	5	25	4	8	3	375
Camp Barnhardt	125	25	300	300	900	25	100	25	700

¹ Only open Wednesday, Thursday, Friday, and Saturday year round. Assumes 10 percent of users put-in at this location. The remainder boat-in from other locations.

2.2.5 Canoe/Kayak Portage Recreational Use

The response rate (i.e., percentage of groups using the portage that registered) for the canoe registry is unknown. The canoe registry was prominently posted and it would have been difficult for a group to use the portage and not notice the registry. The registry was simple to use and took approximately one minute to complete. For purposes of estimating use, a 20 percent response rate (1 out of every 5 groups registered) and an average of 2 people per group (this was the average for the five paddler surveys collected) were assumed.

2.3 Reservoir Water Levels

It is important in evaluating water-based recreational data to understand how representative the study period was in terms of climatic conditions. Precipitation affects river flow, which affects reservoir water levels, which in turn can affect recreation use patterns. The study period (May 10, 2003 thru May 9, 2004) was compared with the prior 17 years (May 1986 thru April 2003) in terms of precipitation and average reservoir water elevations.

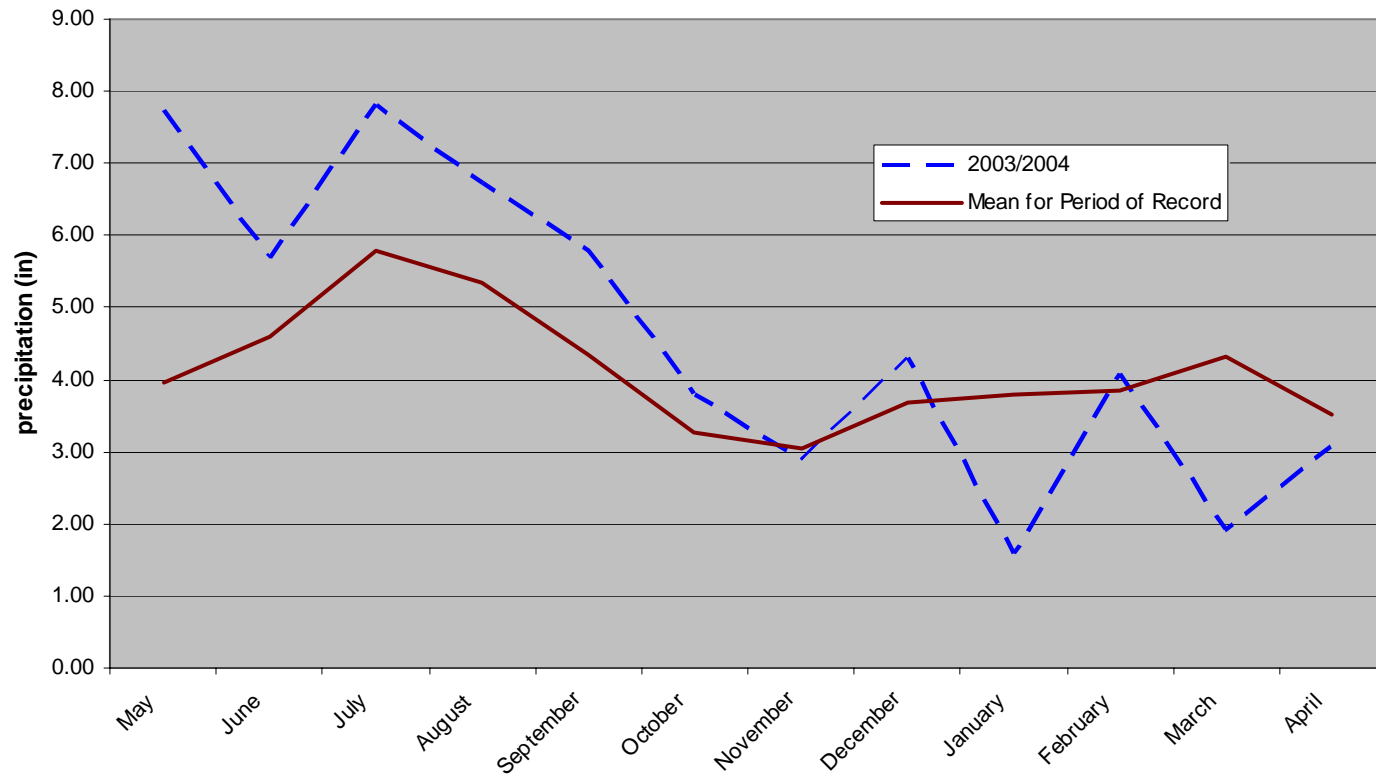
2.3.1 Precipitation

The study period was wetter than normal (Figure 2-2). Precipitation data was obtained for central North Carolina for the period from 1895 to 2003 inclusive (NOAA, 2004). The mean annual precipitation for the Project area over that period was 44.94 inches (Table 2-19). Precipitation for the study period was 55.31 inches, or 23 percent over normal. It was the 20th wettest year on record. Eight months (May thru October, December, and February) had above average precipitation. May 2003 was the second wettest May on record with 7.73 inches of rainfall.

Table 2-19 Historic Monthly Precipitation Data

Months	Mean Precipitation (1895-2003) (inches)	5/03 to 4/04 Precipitation (inches)	Rank in terms of wettest (out of 109)
May	3.95	7.73	2
June	4.59	5.68	26
July	5.78	7.81	18
August	5.33	6.72	22
September	4.34	5.78	22
October	3.27	3.80	40
November	3.04	2.87	56
December	3.67	4.29	36
January	3.80	1.59	104
February	3.86	4.06	50
March	4.31	1.91	106
April	3.52	3.07	74
Total	44.94	55.31	21

FIGURE 2-2. Historic Monthly Precipitation
Means for Period of Record (1895 to September 2004 and May 2003 to April 2004)



2.3.2 Reservoir Water Elevations

Tuckertown and Falls reservoirs are operated in a run-of-river mode with relatively little water level fluctuation (maximum drawdown during the study period was 2.95 feet at Tuckertown Reservoir and 2.56 feet at Falls Reservoir). Therefore, these two reservoirs are not significantly affected by precipitation patterns and water levels were nearly identical to the historic averages. Conversely, water levels at High Rock and Narrows reservoirs can fluctuate significantly (maximum drawdown during the study period was 18.78 feet at High Rock Reservoir and 16.56 feet at Narrows Reservoir).

Figures 2-3 and 2-4 compare water levels at High Rock and Narrows reservoirs for the study period with the 17 prior years. As the figures indicate, water levels during the study period at High Rock Reservoir were higher than average from May through December, but were then below the historic average from late December until April. A similar pattern occurred at Narrows Reservoir, where water levels were higher than average from May through November. Beginning just before Thanksgiving, Narrows Reservoir was significantly drawn down in order to conduct several FERC relicensing studies. Water levels were considerably below the historic average from late November through December. Water levels were restored to historic levels in early January and remained near the historic average for the rest of the study period.

2.3.3 Summary

Overall, the study period was generally representative of average water levels. Spring and Summer 2003 were wetter than average, which may have discouraged some recreational use. Water levels during late summer and fall were higher than average, which may have encouraged recreational use. Water levels were lower than normal during the winter at High Rock and Narrows reservoirs.

FIGURE 2-3. High Rock Reservoir Water Surface Elevations

1986 to 2003
and
May 2003 to April 2004

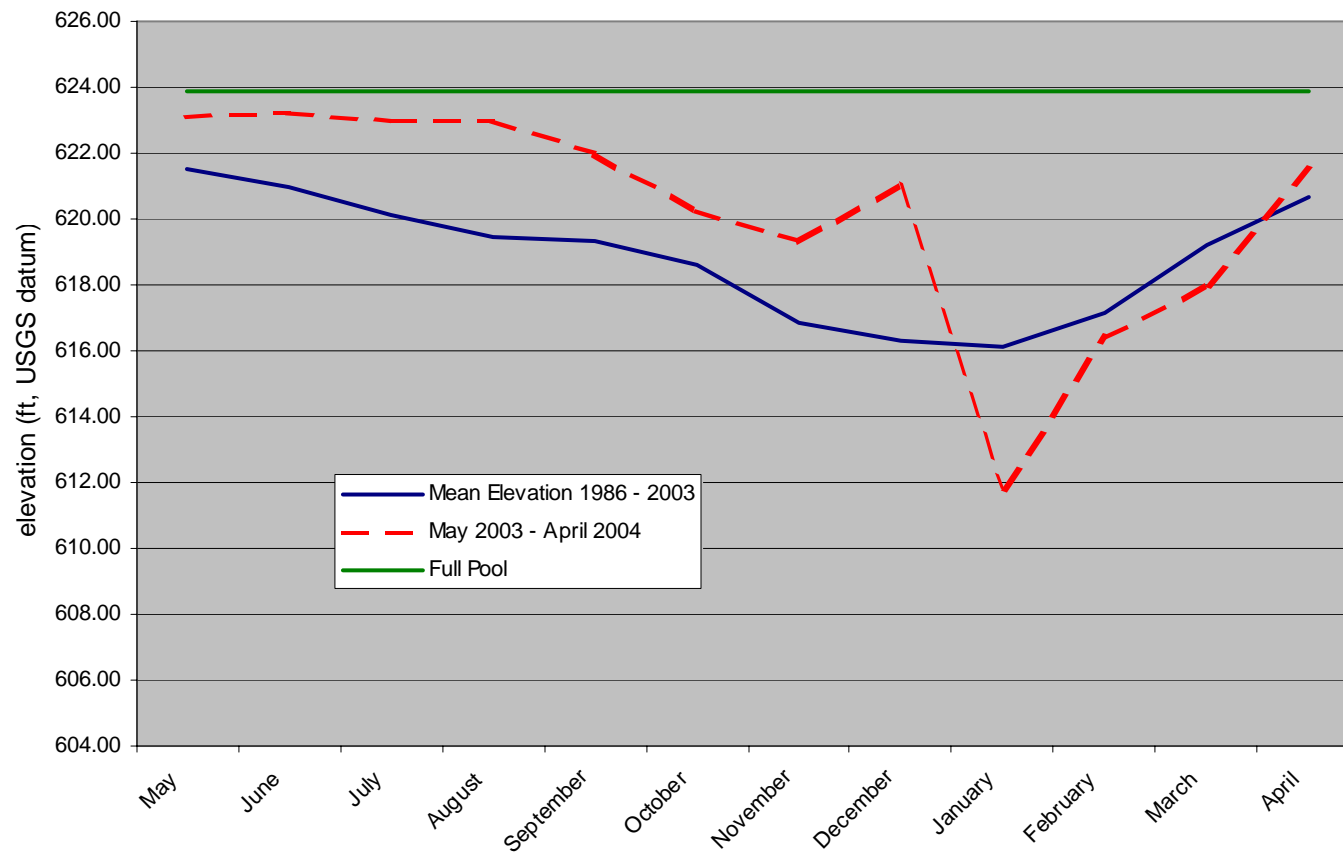
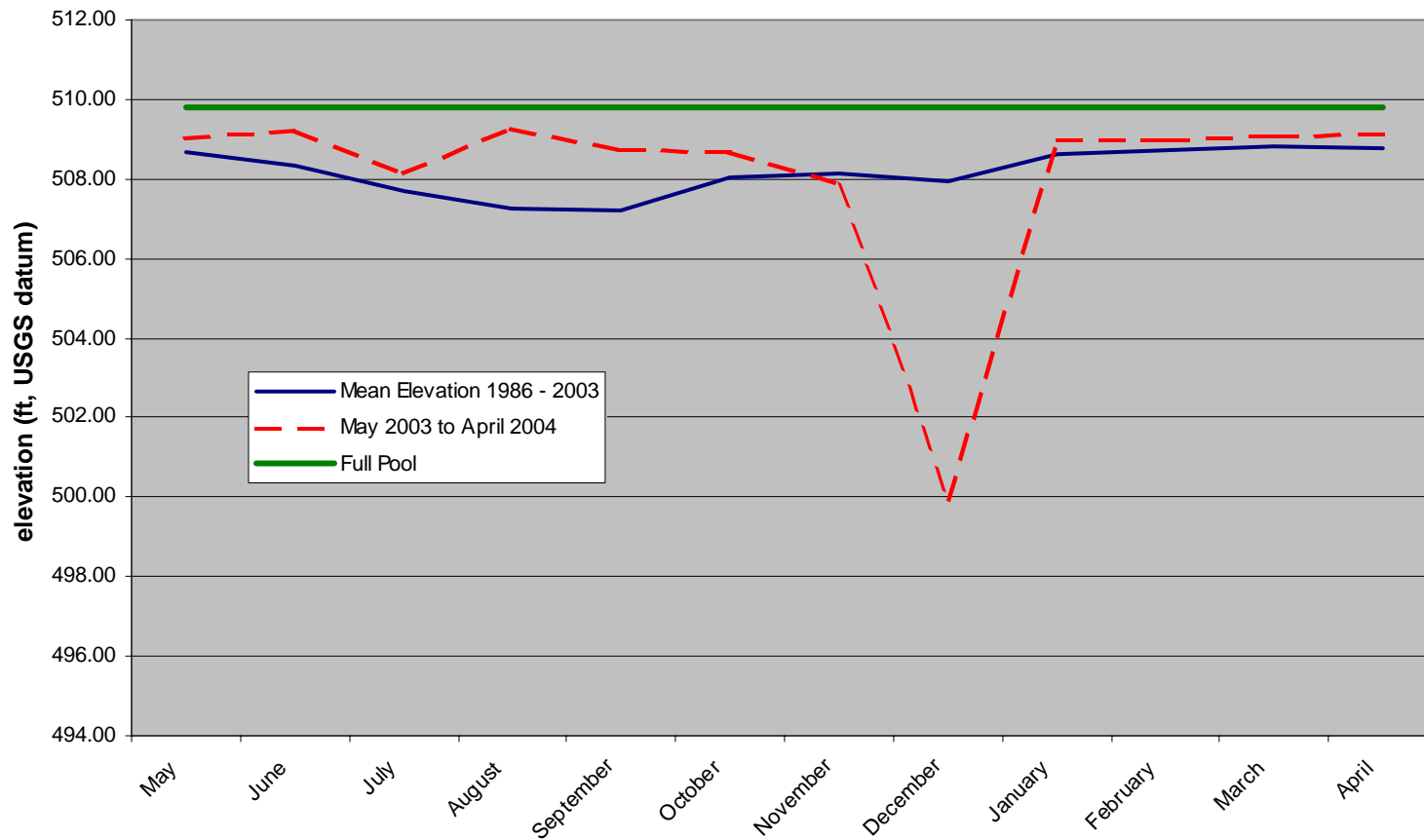


FIGURE 2-4. Narrows Reservoir Water Surface Elevation

1986 to 2003
and
May 2003 to April 2004



3.0 CONSULTATION

As part of the relicensing process, APGI prepared and distributed in September 2002 an Initial Consultation Document (ICD), which provided a general overview of the Project. Agencies, municipalities, non-governmental organizations, and members of the public were given an opportunity to review the ICD and identify information and studies that were needed to address relicensing issues. To further assist in the identification of issues and data/study needs, APGI has formed several Issue Advisory Groups (IAGs) to advise APGI on resource issues throughout the relicensing process. The Recreation, Aesthetics, and Shoreline Management IAG was one of several IAGs that were formed.

On March 13, 2003 the Recreation, Aesthetics and Shoreline Management IAG met and discussed objectives for the Recreation Use Assessment Study. Based on written comments and the discussions at the IAG meeting, the study objectives were identified for this recreational use assessment study. In addition, the study plan was reviewed, revised and finalized, incorporating comments and input from the April 10, 2003 IAG meeting. The study plan for the Recreation Use Assessment was finalized on May 23, 2003 (Appendix H).

The Recreation, Aesthetics, and Shoreline Management IAG received updates on the Recreation Use Assessment at meetings on July 9, 2003, October 8, 2003, February 4, 2004, May 4, 2004 and November 3, 2004.

A Draft Recreation Use Assessment was provided to Recreation, Aesthetic, and Shoreline Management IAG members in December 2004 for their review and comment.

4.0 RECREATIONAL USE ASSESSMENT

4.1 Recreational User Profile

This section describes recreational users at the Yadkin Project in terms of age, gender, residence, and where they stayed while visiting the Project.

4.1.1 Age and Gender

Information on the age of recreational users is only available for those users who completed the surveys, which generally were adults. Tables 4-1 and 4-2 present the age distribution and gender for respondents to the VUS, RUS, PCUS, and TUS, respectively.

Table 4-1 Recreational User Age Distribution

	High Rock				Tuckertown		Narrows				Falls	
Age	VUS	RUS	PCUS	TUS	VUS	TUS	VUS	RUS	PCUA	TUS	VUS	TUS
<16	<1	1	0	1	0	0	1	0	0	0	0	0
16-21	4	<1	0	4	11	6	7	<1	0	0	0	0
22-45	72	17	27	73	55	48	63	15	19	22	93	29
46-65	23	57	61	19	31	44	28	56	68	78	7	57
>65	1	26	12	3	3	2	2	29	13	0	0	14

Table 4-2 Recreational User Gender

	High Rock				Tuckertown		Narrows				Falls	
Gender	VUS	RUS	PCUS	TUS	VUS	TUS	VUS	RUS	PCUA	TUS	VUS	TUS
Male	85	73	61	95	87	96	79	72	63	88	67	93
Female	15	27	39	5	13	4	21	28	37	12	33	7

Most recreation users at the public access recreation areas (VUS) and tailwaters (TUS) are between 27 and 45 years old. Most waterfront (RUS) and non-waterfront (PCUS) residents tend to be older, between 46 and 65 years old. Most respondents to all of the surveys tend to be males, but especially at the public access recreation areas and tailwaters.

4.1.2 Place of Residence

Most (63 percent) public access recreation area users were from the five-county Project region. Most of the other users were from elsewhere in North Carolina, with only about 3 percent of recreation users living outside of North Carolina (Table 4-3).

Table 4-3 Place of Residence for Public Access Recreation Area Users

Location	# of Respondents	% of Respondents
5 County Project Region ¹	592	63%
Rest of North Carolina	314	34%
South Carolina	3	<1%
Other States	27	3%
Total	936	100%

¹ The 5 County Project Region includes Davie, Davidson, Montgomery, Rowan, and Stanly counties.

4.1.3 Overnight Stay Location

The vast majority of all recreational users at the Yadkin Project stayed at either their permanent residence or vacation home at or near the reservoirs. Overall, approximately 6 percent of recreational users were either tent or RV camping.

Public Access Recreation Areas

Approximately 10 percent of recreational users accessed the Yadkin reservoirs via public access recreation areas. Table 4-4 indicates the responses from the VUS regarding overnight stay location. As these data indicate, most respondents stayed at their own homes. A relatively high percent of respondents at Narrows and Falls reservoirs indicated that they were tent camping, either at the Uwharrie National Forest or the several private campgrounds located on Narrows Reservoir.

Table 4-4 Overnight Stay Location

Location	High Rock	Tuckertown	Narrows	Falls	Total
My house	83.1%	88.4%	48.4%	58.3%	72.7%
Vacation home	3.2%	2.1%	2.5%	8.3%	2.9%
Friend's house	3.2%	5.3%	3.1%	0.0%	3.5%
Rent house nearby	6.4%	3.2%	3.7%	0.0%	4.8%
Hotel/motel	0.4%	0.0%	0.6%	0.0%	0.4%
Tent camp	1.6%	3.2%	34.2%	41.7%	13.0%
Trailer/RV	3.2%	0.0%	8.1%	0.0%	4.1%
Other	0.0%	0.0%	4.7%	0.0%	0.2%

Residents

As indicated in Sections 4.2 through 4.5, approximately 68 percent of recreational users at the Yadkin reservoirs are waterfront or non-waterfront residents. All of these users are presumably staying at their own homes while recreating at the Yadkin Reservoirs.

4.2 High Rock Development Recreational Use

The High Rock Development was the third of the Project developments to be built and was completed in 1927. The dam is located at River Mile (RM) 253 on the Yadkin River. The development has approximately 360 miles of shoreline. Much of this shoreline is undeveloped (57 percent is forested), although there is significant residential and limited commercial development along approximately 34 percent of the shoreline. There are 2,722 residences with pier permits from APCI on High Rock Reservoir.

High Rock Dam impounds an available storage capacity of 234,100 acre-feet at a full pool elevation of 623.9 feet. High Rock Reservoir is the largest of the four Yadkin reservoirs and covers a water surface area of 15,180 acres. The mean depth of the reservoir at full pool is 17 feet with a maximum water depth of 62 feet.

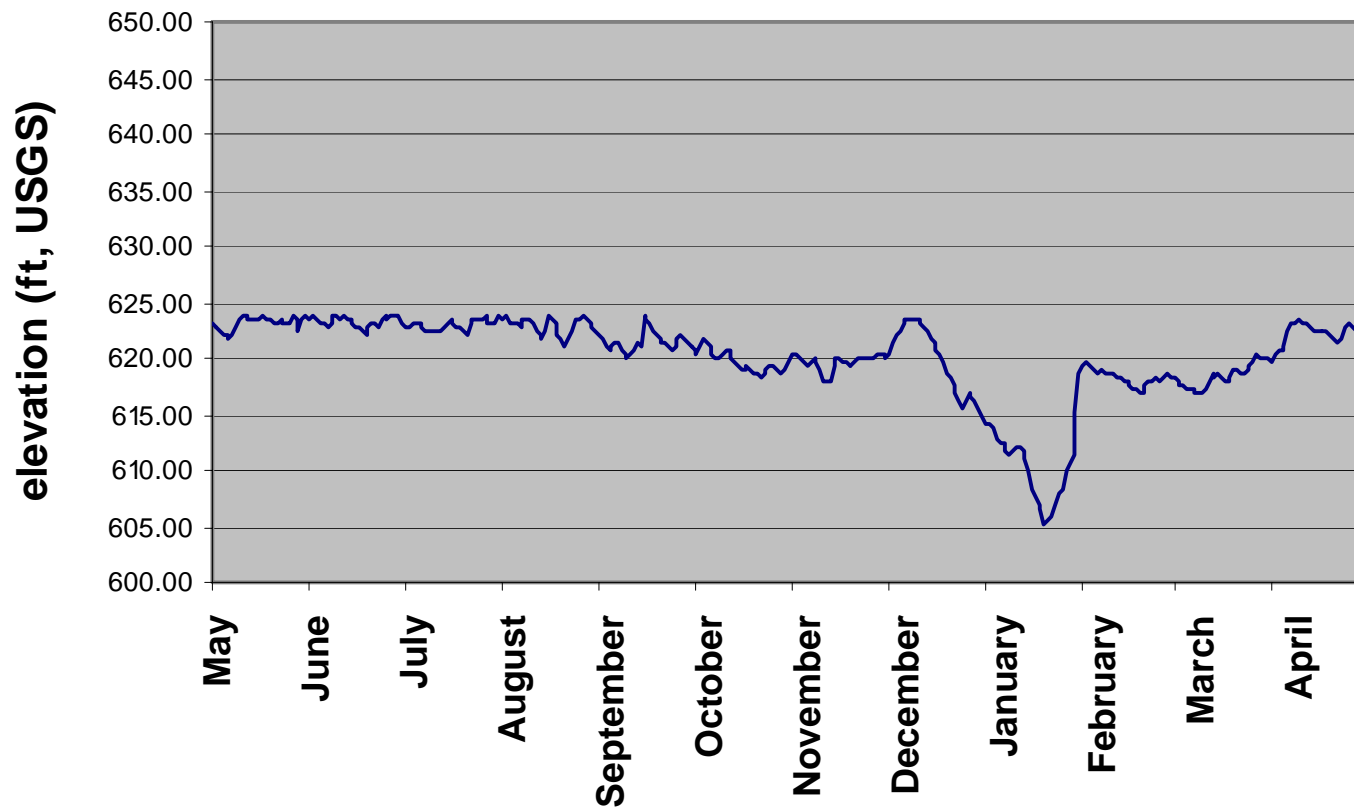
The High Rock Development is operated in a store and release mode in accordance with an operating guide or “rule curve”. The operating guide was established in 1968. Within the limits of available streamflow, the operating guide is designed to maintain higher water elevations from mid-May to mid-September followed by a fall – winter drawdown to allow for refill during the late winter and spring. During periods of low water levels and low streamflow at High Rock Reservoir, the operating guides have overriding requirements for APCI to discharge a minimum amount of water to satisfy downstream needs from early March to mid-September. Because of these minimum water discharge requirements, extensive drawdowns of the reservoir can occur during drought conditions. Based on historical data, the operating guides will normally limit drawdown of High Rock Reservoir to five feet or less, greater than 95 percent of the time between Memorial Day and Labor Day.

High Rock Reservoir has an average daily water level fluctuation of less than one foot and a maximum daily fluctuation of 2 to 4 feet. Between 1986 and 2002, the maximum winter drawdown averaged approximately 12 feet, the maximum spring drawdown averaged 8 feet, the maximum summer drawdown averaged 5 feet, and the maximum fall drawdown averaged 10 feet. Figure 4-1 shows High Rock Reservoir water levels for the entire study period.

The discussion of recreational use at High Rock Reservoir is based on the following information:

- 2,292 Spot Count observations,
- 380 Visitor Use Survey responses,
- 1,243 Resident Use Survey responses,
- 25 Private Community Survey responses,
- 12 Commercial business and private organization phone surveys, and
- 3 canoe portage registrations.

**Figure 4-1 High Rock Headwater Elevation:
May 10, 2003 to May 9, 2004**



4.2.1 Recreational Facility Condition

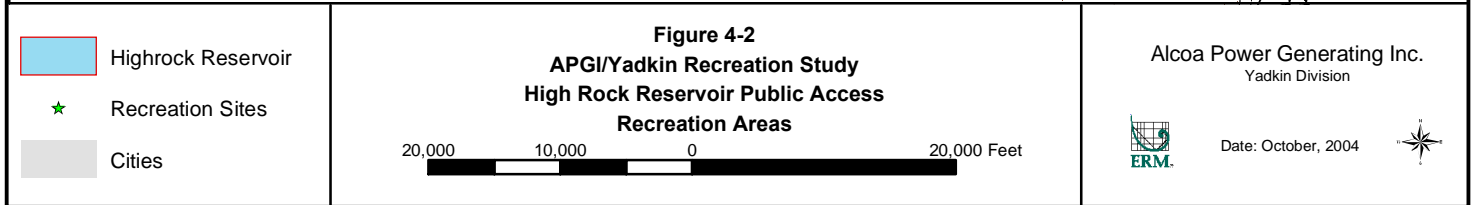
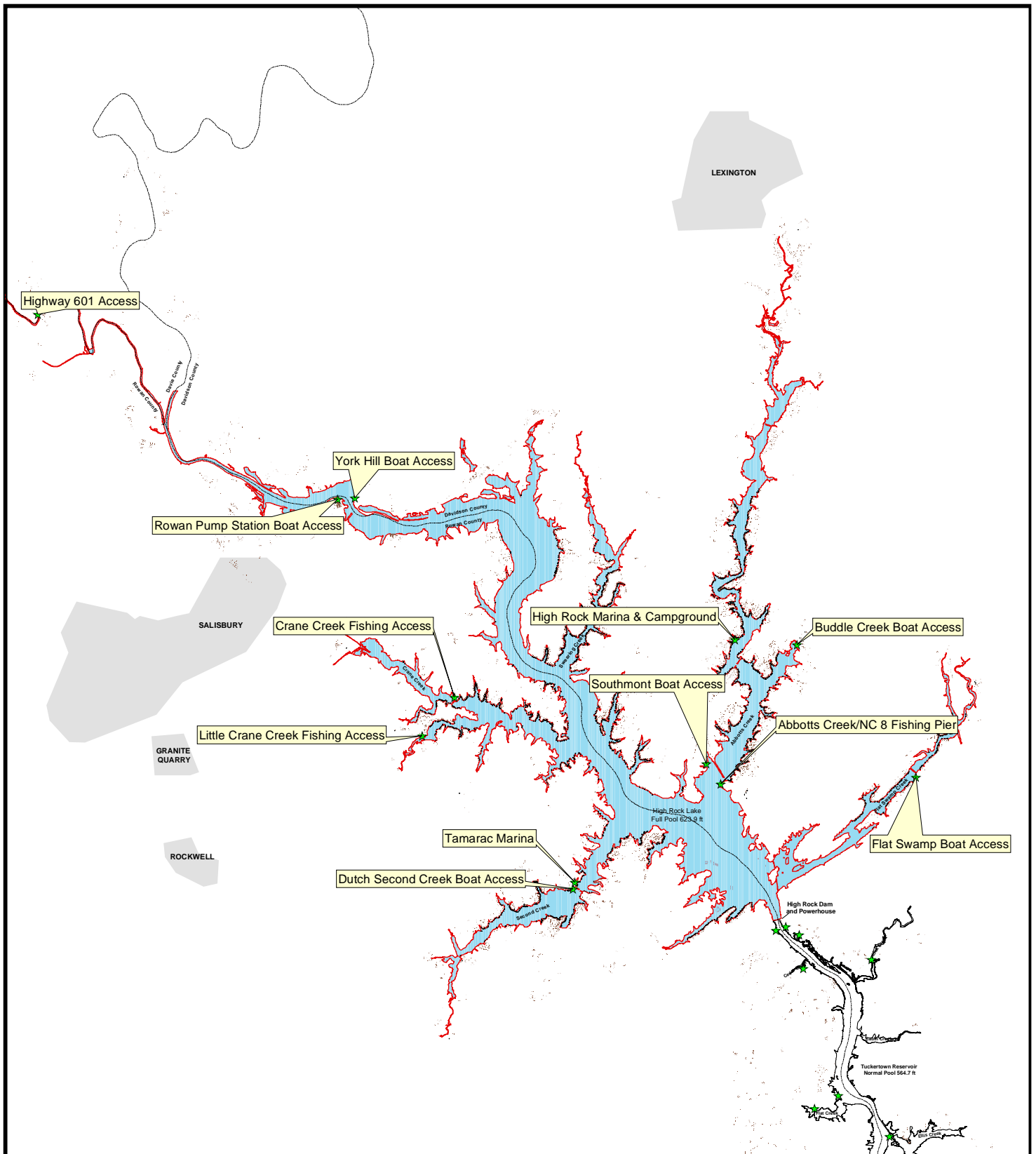
There are 13 public access recreation areas and 26 private recreation areas at High Rock Reservoir (Figure 4-2).

Public Access Recreation Areas

Table 4-5 lists the recreational facilities present at each public access recreation area (APGI, 2004). There is also a canoe portage route around High Rock Dam, which is discussed in Section 4.3.

Table 4-5 High Rock Reservoir Public Access Recreation Area Facilities

Site Number	Name	Parking Capacity	Number of Boat Launch Lanes	Shoreline Fishing Capacity	Picnic Tables	Trash Receptacles	Toilets	Boat Dock /Fishing Pier	Camp sites	Beach
1	Highway 601 Access Area	10 vehicles with trailers	1	6 anglers	0	4	0	0	0	No
2	Rowan County Pump Station	10 vehicles with trailers	1	4 anglers	0	0	0	0	0	No
3	York Hill Boat Access	20 with trailers	2	16 anglers	0	2	0	0	0	No
4	Crane Creek Fishing Access Pull-Off	No legal parking	0	24 anglers	0	0	0	0	0	No
5	Little Crane Creek Fishing Access	8 vehicles, 4 with trailers	2	24 anglers	0	6	0	0	0	No
7	Southmont Boat Access	200 vehicles and trailers	5	50 anglers	3	11	2	1	0	No
8	High Rock Marina and Campground	100 vehicles	1	80 anglers	3	2	2	17 slips	106	No
9	Highway 47 Fishing Pull-Off	No legal parking	No legal parking	24 anglers	0	0	0	0	0	No
10	Buddle Creek Boat Access Area	100 vehicles and 50 trailers	2	12 anglers	7	12	2	1	0	Yes
12	Abbotts Creek/NC 8 Bridge Pull-Off	No legal parking	0	200 anglers	0	0	0	0	0	No
13	Tamarac Marina	80 vehicles with trailers	1	0	3	5	0	3	0	No
14	Dutch Second Creek Boat Access	120 vehicles with trailers	2	36 anglers	0	0	0	2	0	No
15	Flat Swamp Boat Access	30 vehicles and 30 trailers	3	26 anglers	2	13	1	1	0	Yes



Appendix K provides the VUS responses on facility condition for each of the 13 public access recreation areas. Most of the facilities were found to be in acceptable to excellent condition. The VUS respondents identified the following significant problems (defined as >10 percent of respondents indicating the facility was totally inadequate or >20 percent of respondents indicating the facility was mostly or totally inadequate) with public recreational facilities at High Rock Reservoir. Please note that for some of these public access recreation areas the number of responses is low, which reduces the confidence level of the results.

- Rowan County Pump Station Boat Access (n=8) – 13 percent of respondents indicated that the boat ramp was totally inadequate and between 13 and 26 percent of respondents complained about the lack of toilets, marinas, fishing piers, lighting, and picnic tables at this site.
- Crane Creek Fishing Pull-off Access (n=7) – 29 percent of respondents complained about the lack of toilets at this site.
- Little Crane Creek Fishing Access (n=6) – 34 percent of respondents indicated that the boat ramp was mostly or totally inadequate and 17 percent indicated that the parking lot was mostly inadequate at this site. About 17 percent complained about the lack of beaches, toilets, fishing piers, and picnic tables at this site.
- Flat Swamp Boat Access (n=41) – 20 percent of respondents indicated that the toilet was mostly or totally inadequate at this site.

Some respondents complained about the lack of toilets, fishing piers, and other recreational facilities at the Highway 601 Boat Access and the Abbotts Creek/Highway 8 Bridge Pull-off Fishing Access, but there were too few responses to draw any firm conclusions. The condition of recreational facilities at York Hill Boat Access, Southmont Boat Access, High Rock Marina and Campground, Buddle Creek Boat Access, Tamarac Marina, and Dutch Second Creek Boat Access was found to be at least acceptable by most respondents.

Commercial Businesses and Organizations

Table 4-6 lists the recreational facilities present at each private recreation area. Customers of these private businesses and members of these organizations were not surveyed regarding their opinions on the condition of recreational facilities at these private recreation areas as part of this study, so no information on facility condition is available.

Table 4-6 High Rock Reservoir Private Recreation Facilities

Private Recreation Facilities	Boat Ramp	Boat Pier	Fishing Pier	Swim/Beach	Camping
South Yadkin Campground *	Yes	Yes	No	No	Yes
Rowan County Shiners *	Yes	Yes	No	No	No
Rowan County Voiture #115	No	Yes	Yes	No	No
Spencer Moose Lodge*	Yes	Yes	No	No	No
Elks Lodge #662 *	Yes	Yes	No	No	No
Marsh Property Rentals	Yes + 7 private boat ramps	63 private slips	No	No	82 campsites
High Rock Boat and Ski Club	Yes	Yes	No	No	No
Central Carolina Boat Club	Yes	Yes	Yes	No	No
Skipjack Marina *	Yes	Yes	No	No	No
Clear Reservoir Water Skiers	Yes	Yes	No	Yes	No
Eagle Point Nature Preserve	Yes	No	No	No	No
Boy Scouts Camp Old Hickory	No	Yes	No	No	3 campsites
Boy Scouts Camp-Old North Council	Yes	Yes	No	Yes	Yes
Piedmont Boat Club *	Yes	Yes	No	No	No
Foster's Point Campground *	Yes	Yes	No	No	Yes
Boat Dock Marina *	No	No	No	No	No
Boggs Camping/Rental *	No	No	No	No	Yes
Kesler Camping/Rentals *	Yes	Yes	No	No	Yes
Poole Camping/Rentals	Yes	Yes	No	No	12 campsites
Cicero Lyerly Rental Property	Yes (undeveloped)	Yes	Yes	No	50 campsites
Miller's Cove Camping/Rentals	Yes	No	Yes	No	40 campsites
Pops Carolina River Campground Rentals *	Yes	Yes	No	No	Yes
Luther Holshouser Camping Rentals *	Yes	Yes	No	No	Yes
Donald Holshouer Camping Rentals *	Yes	Yes	No	No	Yes
Holshouser, Property, Barry Ritchie Camping *	Yes	Yes	No	No	34 campsites
Salvation Army	Yes	Yes	No	No	No

* These commercial businesses and private organizations did not respond to the Commercial Business and Private Organization phone survey. The information provided is from a previous inventory of recreation facilities.

Canoe Portage

The High Rock Dam canoe portage trail is approximately 1,800 feet long and is located on the west side of the dam. The takeout is marked with a "Yadkin River Canoe Portage Trail" sign and the portage trail is marked. Three groups totaling 7 people registered at the High Rock Dam canoe portage. The three groups each rated the degree of difficulty of the portage differently, assigning an easy, moderate, and difficult rating. One group commented that the portage was "way too hard" and that an easier portage was needed.

Another group seems to be a repeat user and commented on the mowing and new paint. The third group simply said “thanks” for the portage. Figure 4-3 provides some representative photographs on the High Rock Dam canoe portage.

4.2.2 Recreational Activities

Residents and visitors generally have similar recreational interests, although simply motor boating and swimming tend to be more popular with residents, while fishing (both by boat and along the riverbank or on piers) is more popular with visitors (Table 4-7).

Table 4-7 High Rock Resident and Visitor Recreational Activities (percent of total recreation days)

Recreational Activity	Public Access Areas	Waterfront Residents	Non-Waterfront Residents
Motor boating	15%	26%	22%
Boat fishing	33%	10%	30%
Bank fishing	22%	14%	19%
Canoeing/kayaking	0%	3%	0%
Swimming	9%	13%	11%
Personal Watercraft use	2%	9%	0%
Camping	3%	1%	0%
Windsurfing	0%	0%	0%
Waterskiing	1%	4%	1%
Picnicking	3%	5%	2%
Hiking	1%	1%	11%
Sunbathing	8%	11%	3%
Sailing	0%	1%	0%
Other	3%	2%	1%
Total	100%	100%	100%

In terms of public access recreation areas, fishing, both by boat and along the shoreline, is the primary recreational activity at High Rock Reservoir with nearly 85 percent of all respondents participating (Table 4-8). Another common recreational activity (over 20 percent participation rate) includes motor boating (as distinct from boat fishing), especially at High Rock Marina & Campground, Tamarac Marina, and Dutch Second Creek Boat Access, with an overall participation rate of 23 percent. Occasional recreational activities (over 5 percent participation rate) include swimming (especially at Flat Swamp Boat Access), sun bathing (especially at Flat Swamp Boat Access, High Rock Marina & Campground, and Tamarac Marina), camping (especially at High Rock Marina & Campground), and picnicking (especially at Flat Swamp Boat Access).

Figure 4-3 Representative High Rock Dam Portage Trail Photographs

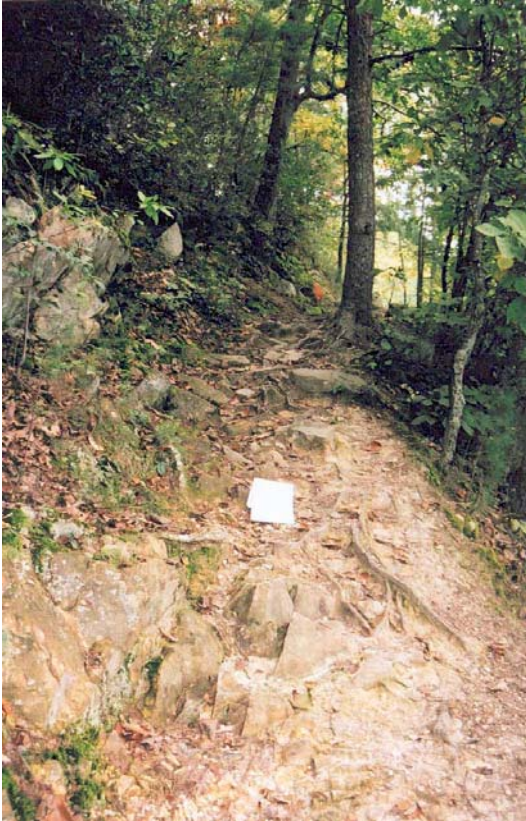
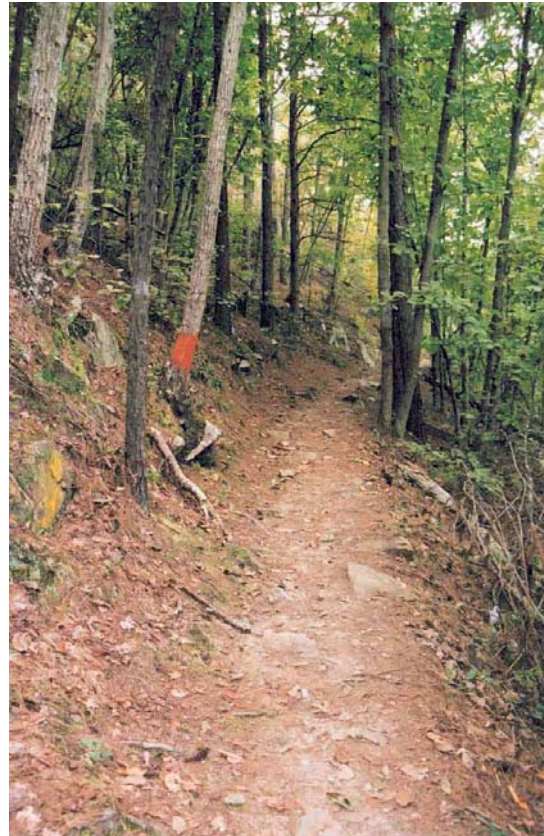


Photo 1: High Rock Dam portage trail

Photo 2: High Rock Dam portage trail



**Table 4-8 High Rock Public Access
Recreation Participation Rate**

Percent of Visitors Participating in Each Recreational Activity

Site No.	Site Name	No. of Surveys Completed	Motor Boating	Boat Fishing	Bank Fishing	Canoeing / Kayaking	Hiking	Swimming	Personal Watercraft Use	Water Skiing	Camping	Windsurfing	Picnicking	Sunbathing	Sailing	Hunting	Other
1	Highway 601 Access	3	0%	33%	67%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	Rowan Pump Station Boat Access	8	13%	13%	88%	0%	0%	13%	0%	0%	13%	0%	13%	0%	0%	13%	0%
3	York Hill Boat Access	33	15%	58%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%	0%
4	Crane Creek Fishing Access	7	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	Little Crane Creek Fishing Access	6	0%	17%	83%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7	Southmont Boat Access	93	25%	57%	31%	0%	5%	5%	3%	2%	3%	0%	4%	8%	0%	1%	1%
8	High Rock Marina & Campground	8	63%	38%	50%	0%	0%	13%	0%	0%	75%	0%	13%	25%	0%	0%	0%
10	Buddle Creek Boat Access	75	19%	43%	53%	0%	4%	11%	5%	1%	7%	0%	5%	0%	0%	4%	1%
12	Abbotts Creek/NC 8 Fishing Pier	3	0%	67%	33%	0%	0%	0%	33%	0%	33%	0%	0%	0%	0%	33%	0%
13	Tamarac Marina	33	36%	45%	24%	0%	0%	18%	6%	3%	3%	0%	3%	24%	0%	0%	3%
14	Dutch Second Creek Boat Access	70	33%	70%	13%	0%	0%	14%	3%	6%	0%	0%	3%	19%	0%	0%	3%
15	Flat Swamp Boat Access	41	12%	46%	15%	0%	0%	56%	0%	0%	2%	0%	17%	37%	0%	0%	0%
	OVERALL TOTAL HIGH ROCK ACTIVITIES RESPONSE*	380	23%	51%	34%	0%	2%	14%	3%	2%	5%	0%	5%	12%	0%	3%	1%

* Totals can add to more than 100%.

4.2.3 Recreational Use

Recreation users access High Rock Reservoir via the 13 public access recreation areas, 2,722 waterfront residences with pier permits from APGI, approximately 2,798 non-waterfront private community residences that can access High Rock Reservoir via community boat ramps, piers, or marinas, and 26 commercial business or private organizations with direct reservoir access. There is a canoe portage around High Rock Dam, but that is discussed in Section 4.3.3. Tailwater Use Surveys are discussed below and in Section 6.0, but are not included in estimating overall recreational use to avoid double counting since these users are included in the public access recreation area use estimates.

Public Access Recreation Area Use

Annual recreational use at the 13 public access areas on High Rock Reservoir exceeded 80,000 recreation days (Table 4-9). A large percentage (36 percent) of this use occurred at the Southmont Boat Access, with Dutch Second Creek Boat Access and Tamarac Marina also receiving relatively heavy use (an additional 31 percent of total High Rock Reservoir visitor recreational use). Several public access areas are used almost exclusively in the spring and early summer (April through July) for fishing and receive little use during the rest of the year.

Table 4-9 High Rock Public Access Recreational Use by Site and Month (in recreation days)

Site No.	Site Name	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
1	Highway 601 Access Area	9	21	50	16	3	12	0	0	0	5	0	0	116
2	Rowan County Pump Station	234	246	236	59	26	33	6	9	0	0	0	25	873
3	York Hill Boat Access	739	674	1,051	952	235	715	70	941	178	168	268	410	6,400
4	Crane Creek Fishing Access	69	87	19	19	1	0	0	0	0	0	0	12	208
5	Little Crane Creek Fishing Access	10	32	51	17	3	0	0	0	0	0	0	37	151
7	Southmont Boat Access Area	5,368	4,113	4,937	4,528	3,747	2,241	643	344	556	259	336	2,781	29,854
8	High Rock Marina/Campground	394	443	398	599	366	88	47	0	0	0	0	112	2,447
9	Highway 47 Fishing Pull-off	44	6	25	3	2	0	0	0	0	0	0	124	204
10	Buddle Creek Boat Access Area	1,348	1,597	1,945	1,191	546	291	23	23	13	58	119	1,330	8,486
12	Abbotts Creek/NC 8 Bridge	17	391	12	3	2	0	0	0	0	0	0	40	464
13	Tamarac Marina	1,993	2,230	2,251	1,363	774	781	53	403	16	197	484	546	11,091
14	Dutch Second Creek Boat Access	2,671	2,502	2,403	2,016	1,334	1,010	88	457	42	256	790	1,111	14,680
15	Flat Swamp Boat Access	1,003	1,909	1,547	1,036	518	585	93	127	156	28	106	766	7,875
	Total	13,899	14,250	14,926	11,804	7,556	5,758	1,022	2,304	961	972	2,103	7,295	82,850

Waterfront Resident Recreational Use

Recreational use by waterfront residents and their guests was significantly higher than that by visitors (Table 4-10). This is attributable to the 2,722 waterfront residences with pier permits. Resident use picks up in April, is high from May through September, and begins to fall in October. Winter use is very low, which may be attributed to both the weather and reservoir drawdown. Guest use is also high (about 10 percent of resident use) and is concentrated in the primary recreation season (Memorial Day weekend to Labor Day weekend).

Table 4-10 Waterfront Resident and Guest Recreation Use by Month (in recreation days)

Month	Resident Recreational Use	Guest Residential Use	Total Residential Use
May	108,880	10,888	119,768
June	163,320	13,610	176,930
July	163,320	17,693	181,013
August	168,764	16,332	185,096
September	133,378	10,888	144,266
October	95,270	8,166	103,436
November	5,716	1,361	7,077
December	5,716	1,361	7,077
January	5,716	1,361	7,077
February	5,716	1,361	7,077
March	32,664	5,444	38,108
April	76,216	5,444	81,660
Total	964,676	93,909	1,058,585

Private Waterfront Communities Recreational Use

Recreational use by the approximately 2,798 non-waterfront parcels in private waterfront communities at High Rock Reservoir was estimated as 56,355 recreation days per year. This averages about 20 recreation days per household per year. It should be noted that an undetermined number of these parcels are unimproved (i.e., are not improved with a residence) and may be rarely used over the course of a year.

Commercial and Organizational Recreational Use

There are 26 commercial businesses or private organizations with direct access to High Rock Reservoir – 12 of these responded to a phone survey. Based on information provided by the owner/operator, annual recreational use at each of these businesses and organizations is presented below. Recreational use was not estimated for the other 14 businesses and organizations that did not respond to the phone survey. Total commercial business and private organizational use at High Rock Reservoir was estimated at 84,923 recreation days for the study period (Table 4-11).

**Table 4-11 High Rock Reservoir Commercial and Organizational Recreation Use
(in recreation days)**

Site Name	High Rock Reservoir Total Monthly Visitors												Total
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	
Holshouser Properties	1145	1,005	1,05	1,190	975	940	1,000	550	580	580	940	920	11,030
Salvation Army	360	1,800	1,860	1,860	0	0	0	0	0	0	240	240	6,360
Miller's Cove Camping/Rentals	278	303	326	328	212	202	200	163	164	154	264	256	2,850
Cicero Lyerly Rental Property	1225	3,150	3225	3,325	3,225	3,300	3,250	895	910	860	975	950	25,290
Boy Scouts Camp Old N. Council	345	1,050	1250	1,150	240	200	250	120	135	135	200	200	5,275
Boy Scouts Camp Old Hickory and General Green	570	240	480	440	340	240	300	240	270	270	240	240	3,870
Central Carolina Boat Club	775	870	980	980	500	470	500	258	267	255	550	540	6,945
Marsh Property Rentals	1345	1,350	1380	1,430	795	1,290	1750	155	155	145	1,135	1,110	12,040
Eagle Point Nature Preserve	192	153	171	173	158	149	160	24	27	27	149	146	1,529
Clear Reservoir Water Skiers	1225	372	1828	1,354	340	310	300	0	0	0	350	340	6,419
Rowan County Voiture #115	170	120	217	186	51	16	20	0	0	0	70	68	918
High Rock Boat and Ski Club*	325	312	347	377	92	107	100	138	20	16	270	293	2,397
All Facility Total	7,955	10,725	13,269	12,793	6,928	7,224	7,830	2,543	2,528	14,926	5,383	5,303	84,923

* ERM is verifying this information.

Canoe Portage Use

Three groups totaling 7 people registered as using the canoe portage at High Rock Dam to access Tuckertown Reservoir during the one year study period. Two of the three groups identified take-out locations along Tuckertown Reservoir (i.e., River Road and Tuckertown Dam).

The response rate (i.e., percentage of groups using the portage that registered) for the canoe registry is unknown. The canoe registry was prominently posted and it would have been difficult for a group to use the portage and not notice the registry. The registry was simple to use and took approximately one minute to complete. For purposes of estimating use, a 20 percent response rate (1 out of every 5 groups registered) and an

average of 2 people per group (this was the average for the five canoe surveys collected at the four Yadkin portages) were assumed. This would equate to 15 groups of two persons per group, or 30 recreation days per year at the High Rock Dam canoe portage.

Total Annual Recreational Use

Total annual recreational use at High Rock Reservoir was estimated at 1,481,817 recreation days by summing recreational uses estimates for public access recreational areas, waterfront residents, private communities, commercial businesses, and organizations (Table 4-12). Recreational use at High Rock Reservoir varies by month, type of day, and between overnight and day users, which are discussed below.

Table 4-12 Estimated Annual High Rock Reservoir Recreation Use (in recreation days)

	Public Access Rec Use	Waterfront Resident Rec Use	Private Community Rec Use	Commercial and Club Rec Use	Canoe Portage Use ¹	Total	% of Total Use
May	13,899	119,768	6,376	7,955	4	148,002	12
June	14,250	176,930	9,419	10,725	4	211,328	16
July	14,926	181,013	9,636	13,269	2	218,846	17
August	11,804	185,096	9,853	12,793	2	219,548	17
September	7,556	144,266	7,680	6,928	4	166,434	13
October	5,758	103,436	5,507	7,224	4	121,929	9
November	1,022	7,077	377	7,830	2	16,308	1
December	2,304	7,077	377	2,543	2	12,303	1
January	961	7,077	377	2,528	0	10,943	1
February	972	7,077	377	2,442	0	10,868	1
March	2,103	38,108	2,029	5,383	2	47,625	4
April	7,295	81,660	4,347	5,303	4	98,609	8
Total	82,850	1,058,585	56,355	84,923	30	1,282,743	100

¹ Total estimated canoe portage use (30 recreation days) was distributed among the study period based on professional judgment.

Recreational Use by Month

Table 4-12 provides estimates of recreational use by month. Overall, recreational use was relatively high from April through October, with use peaking in July and August. Winter use (November through February) was low. Use levels began to increase in March (presumably for fishing).

Recreational Use by Type of Day

Recreation use data by type of day (e.g., weekend day, weekday, holiday) is only available for public access recreational use, but this use is assumed to be fairly representative of total recreational use in this regards. Recreational use was generally highest during major holidays (i.e., Memorial Day, 4th of July, and Labor Day weekends) and weekends during the summer, with significantly less use on weekdays. Since weekdays represent such a large percentage of total days (70 percent), total recreational

use was highest on weekdays. Recreational use by type of day was distributed as follows:

- Weekdays – 50 percent of total use, 162 recreation days/weekday
- Weekend days – 39 percent of total use, 324 recreation days/weekend day
- Holidays – 11 percent of total use, 977 recreation days/holiday day

Day versus Overnight Recreational Use

Although High Rock Marina & Campground is the only public access recreation area with camping facilities at High Rock Reservoir, some respondents to the VUS at other public access recreation areas also indicated that they were camping. Several respondents at the following public access recreation areas indicated that they were camping:

- Rowan County Pump Station Boat Access
- Southmont Boat Access
- Buddle Creek Boat Access
- Abbotts Creek Highway 8 Bridge Pull-off Fishing Area
- Tamarac Marina
- Flat Swamp Access

It is not known whether these recreational users were camping at these specific recreation areas, elsewhere at High Rock Reservoir, or at other campsites not associated with the Yadkin Project. For purposes of estimating overnight recreational use, however, these recreational users were all assumed to be camping somewhere along High Rock Reservoir. The number of campers at the public access recreation areas is estimated at 4,086 recreation days (nights) annually.

There are also several commercial campgrounds as well as private organizations with camping facilities (e.g., Boy Scout Camps). Overnight recreational use at these facilities total approximately 60,355 recreation days (nights) per year (see Table 4-11). Therefore, overnight use represents approximately 4 percent (64,441 recreation days/1,481,817 total recreation days) of the total High Rock Reservoir recreational use. There may also be some anglers fishing at night, but we do not have any data on which to base an estimate of this use.

4.2.4 Recreational Facility Capacity

The adequacy of existing recreational facilities in terms of capacity was evaluated for parking areas and boat launches.

Parking Areas

In terms of parking capacity, in only 7 out of 2,292 observations (<0.1 percent of the time) did the numbers of vehicles observed during the Spot Counts exceed the capacity of

the parking areas (Table 4-13). In fact, there were only 20 occasions throughout the study period when the observed number of parked vehicles at the 13 public access areas exceeded 75 percent of available capacity. The Flat Swamp Boat Access was the site observed to be most frequently approaching capacity (8 times over 75 percent capacity). The York Hill Boat Access was the parking area with the highest average annual percent capacity, but this was only 19 percent of available capacity.

Boat Launches

There are 10 public access recreation areas with boat ramps (see Table 4-5). The maximum number of boats launched during the study period was estimated based on the average number of trailers (average of three Spot Count observations) on the peak day times the assumed turnover rate. The number of launch lanes required to accommodate this number of boat launches was estimated assuming the capacity of each launch lane is 50 launches and retrievals per day (SOBA, 1989). The number of launch lanes required to accommodate the estimated peak day boat launches was compared with the number of existing launch lanes.

Table 4-14 presents the results of this analysis. It indicates that peak day boat launch demand exceeded existing capacity at Southmont Boat Access, Tamarac Marina, and Dutch Second Creek Boat Access. Southmont Boat Access already has five launch lanes, but the peak day during the study period (Memorial Day weekend 2003) required six lanes. This was the only day surveyed during the study that would have required six lanes at Southmont, therefore, the existing number of launch lanes is considered adequate. Tamarac Marina is a commercial business with a single launch lane that allows the public to launch boats for a fee. Based on the peak day during the study period (Saturday June 14, 2003), three launch lanes were needed. The observed number of trailers at Tamarac Marina exceeded the normal capacity of the single launch lane several times. Tamarac Marina is a private business and APGI cannot require that additional launch lanes be provided at this location. The Dutch Second Creek Boat Access exceeded capacity twice during the study period, but normally provides adequate capacity.

Table 4-13 High Rock Public Access Recreation Sites Parking Capacity

Site Number	Name	Number of Observations	Parking Capacity	Maximum # of Vehicles			> 100% Capacity		Average # of Vehicles		Annual Average	
				Number	Date	Day	# of Times	Percent of Time	Weekends	Weekdays	# of Vehicles	Percent of Capacity
1	Highway 601 Access Area	165	10 vehicles with trailers	5	7/20/03	Sun.	0	0%	0.2	<0.1	0.1	1%
2	Rowan County Pump Station	165	10 vehicles with trailers	8	6/14/03	Sat.	0	0%	0.9	0.4	0.6	6%
3	York Hill Boat Access	165	20 vehicles with trailers	27	10/12/03	Sun.	3	2%	4.2	3.1	3.7	19%
4	Crane Creek Fishing Access Pull-Off	165	No legal parking	2	5/15/03	Thurs.	NA	NA	0.1	0.2	0.1	NA
5	Little Crane Creek Fishing Access	165	8 vehicles, 4 with trailers	5	7/20/03	Sun.	0	0%	0.2	<0.1	0.1	2%
7	Southmont Boat Access	189	200 vehicles and trailers	135	5/25/03	Holiday	0	0%	28.6	9.5	18.2	8%
8	High Rock Marina and Campground	186	100 vehicles	5	7/26/03 6/23/03	Mon. Sat.	0	0%	1.9	0.9	1.4	1%
9	Highway 47 Fishing Pull-Off	183	No legal parking	3	4/17/04	Sat.	NA	NA	0.2	0.1	0.1	NA
10	Buddle Creek Boat Access Area	189	100 vehicles and 50 trailers	58	7/26/03	Sat.	0	0%	8.9	2.5	5.4	5%
12	Abbotts Creek/NC 8 Bridge Pull-Off	189	No legal parking	23	6/23/03	Mon.	NA	NA	0.1	0.3	0.2	NA
13	Tamarac Marina	171	80 vehicles with trailers	81	6/14/03	Sat.	1	1%	10.6	4.4	7.6	10%
14	Dutch Second Creek Boat Access	171	120 vehicles with trailers	57	6/14/03	Sat.	0	0%	10.5	6.5	8.6	7%
15	Flat Swamp Boat Access	189	30 vehicles and 30 trailers	68	7/26/03	Sat.	2	1%	6.9	2.7	4.6	16%

Table 4-14 High Rock Public Access Recreation Area Boat Launch Capacity

Site Number	Name	Number of Existing Launch Lanes	Peak Day					Full Year > 100% Capacity	
			Date	Avg. Number of Trailers	Turnover Rate	Number of Boats Launched	Number of Launch Lanes Needed *	# of Times	Percent of Times
1	Highway 601 Access Area	1	7/20/03	1	2.87	3	1	0	0%
2	Rowan County Pump Station	1	6/14/03	3	2.64	8	1	0	0%
3	York Hill Boat Access	2	10/23/03	20	1.93	39	1	0	0%
5	Little Crane Creek Fishing Access	2	5/26/03	1	2.60	3	1	0	0%
7	Southmont Boat Access	5	5/25/03	112	2.60	291	6	1	2%
8	High Rock Marina and Campground	1	6/21/03	3	2.64	8	1	0	0%
10	Buddle Creek Boat Access Area	2	7/26/03	34	2.87	98	2	0	0%
13	Tamarac Marina	1	6/14/03	43	2.64	114	3	6	11%
14	Dutch Second Creek Boat Access	2	5/26/03	44	2.64	116	3	2	4%
15	Flat Swamp Boat Access	3	5/17/03	12	2.87	34	1	0	0%

* Assumes capacity of each launch lane is 50 boats per SOBA, 1989.

4.2.5 Recreational Issues

Recreational user perceptions of potential problems at High Rock Reservoir were collected through the VUS, RUS, and PCUS. Respondents to the VUS, RUS, and PCUS rated six potential recreational issues on a scale of 1 to 4, with 1= big problem, 2=moderate problem, 3=slight problem, 4=no problem (Table 4-15). There were differences of opinions regarding several of these potential issues between the various survey responses. Each potential recreational issue is discussed below. For purposes of this discussion, significant issues are identified, which are defined as > 10 percent of responses indicating a big problem or > 20 percent of responses indicating a big or moderate problem at High Rock Reservoir.

Table 4-15 Potential Recreational Issues at High Rock Reservoir

Low Water Levels at this Reservoir						
Surveys	Number of Responses	Scores Average Score	1	2	3	4
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	374	3.8	1	3	6	90
Residential Use Survey	1,159	2.3	46	13	8	33
Priv. Comm. Use Survey	25	2.0	52	16	16	16
Improper Disposal of Litter, Trash, or Toilet Paper						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	377	3.7	3	6	13	78
Residential Use Survey	1,129	2.7	17	23	32	27
Priv. Comm. Use Survey	23	2.8	13	17	43	26
Conflicts With Other Recreational Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	372	3.9	0	2	7	91
Residential Use Survey	1,095	3.7	2	4	14	81
Priv. Comm. Use Survey	22	3.8	0	0	18	82
Loud, Rude or Inconsiderate Behavior by Other Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	373	3.9	0	3	5	92
Residential Use Survey	1,112	3.5	4	8	22	66
Priv. Comm. Use Survey	23	3.7	0	0	35	65
Boating Hazards (e.g, Stumps, Shallow Areas)						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	371	3.9	0	3	4	93
Residential Use Survey	1,136	2.5	23	26	27	23
Priv. Comm. Use Survey	23	2.6	22	22	35	22
Availability of Sanitary Facilities						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	373	3.8	4	3	6	87

Low Water Levels

There were significant differences in responses about low water levels at High Rock Reservoir between visitors and residents. Respondents to the VUS were asked to rate water levels on the day they were surveyed. Only four percent of respondents indicated that low water levels were a big or moderate problem. Conversely, respondents to the RUS and PCUS were asked more generally to rate water levels for the month for which they were surveyed. About 59 percent of respondents to the RUS and 68 percent of respondents to the PCUS indicated water levels were a big or moderate problem. Although water levels in High Rock Reservoir were unusually high during the study period, many respondents may have been responding with the drought of 2002 in mind when water levels were extremely low.

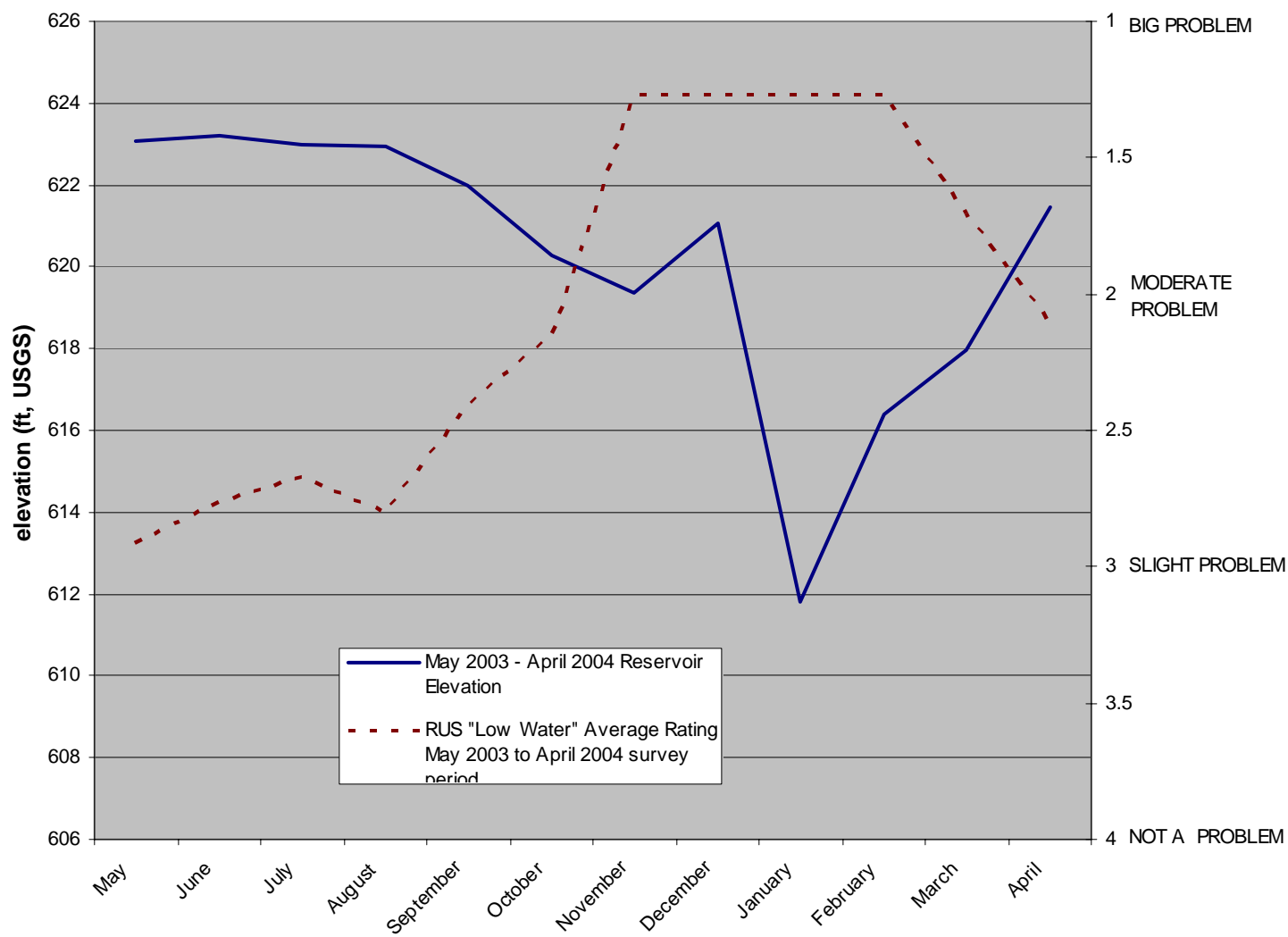
In order to better understand the relationship between water levels and recreational experience, the VUS and RUS responses to the question about how big a problem low water levels were at this reservoir were evaluated by month. As indicated above, relatively few respondents to the VUS (4 percent) indicated that low water levels were a big or moderate problem at High Rock Reservoir. In fact, most of those that did indicate low water levels were a big or moderate problem were interviewed in May, June, and July 2003 when water levels in High Rock Reservoir were quite high. These recreational users may have responded with previous years water levels in mind. There were some respondents in October thru March when water levels were down over 5 feet, however, that indicated low water levels were a big or moderate problem.

The RUS responses were also evaluated in terms of the effects of water levels on the recreation experience (Figure 4-4). In general, as water levels declined, especially below elevation 620 feet, waterfront residents indicated that “low water” was becoming a moderate to big problem. However, there was no statistically significant relationship between water levels and the percentage of respondents that indicated low water levels was a big or moderate problem by month. Many respondents indicated low water levels were a big or moderate problem during periods when High Rock Reservoir was nearly full. This suggests that residents were responding with historic rather than actual water levels in mind. In addition, the relatively high water levels in High Rock Reservoir through most of the study period (May through December) diluted any effect water levels would have on recreational use and the recreational experience during the prime recreation season.

Improper Disposal of Trash, Litter, and Toilet Paper

The improper disposal of trash, litter, and toilet paper was rated as a big or moderate problem by 40 percent of waterfront residents and 30 percent of non-waterfront residents, but only 9 percent of visitors. Respondents to the VUS particularly noted trash, litter, and toilet paper as a problem at Highway 601 Boat Access Area (n=3), Rowan County Pump Station Boat Access (n=8), and Little Crane Creek Fishing Access (n=6). In all three cases the number of responses was low and the results not statistically significant.

Figure 4-4 High Rock Reservoir Water Level vs RUS "Low Water" Rating



Conflict with Other Recreational Users

Conflicts with other recreational users was not considered a significant problem by respondents to any of the surveys, with the RUS having the highest percentage of respondents (6 percent) indicating a big or moderate problem (see Table 4-15).

Inconsiderate Behavior by Other Users

Inconsiderate behavior by other users was also not considered a significant problem by respondents to any of the surveys, with the RUS again having the highest percentage of respondents (12 percent) indicating a big or moderate problem (see Table 4-15).

Boating Hazards

“Boating hazards” were identified as a much greater problem by waterfront residents (49 percent of respondents identified boating hazards as a big or moderate problem) and non-waterfront residents (44 percent of respondents identified it as a big or moderate problem) than by visitors (only 3 percent of respondents identified it as a big or moderate problem). Visitors did not identify as boating hazards as significant issue at any of the public access recreation areas. The resident’s response to this potential issue may be related to their response to the low water level issue. The boating hazards of shallow areas and stumps are probably more of an issue during low water levels.

Availability of Sanitary Facilities

Only the VUS asked about the availability of sanitary facilities. Approximately 7 percent of respondents indicated that the lack of sanitary facilities was a big or moderate problem (see Table 4-15). The lack of sanitary facilities was specifically identified as a significant problem at the following individual public access recreation sites (see Appendix K for detailed summaries):

- Rowan County Pump Station Boat Access (n=8) – 25 percent indicated a big problem; and
- Little Crane Creek Fishing Area (n=6) – 33 percent indicated a big problem.

4.3 Tuckertown Development Recreational Use

The Tuckertown Development was the last of the Project developments to be built and was completed in 1962. The dam is located at RM 244 on the Yadkin River. The development has approximately 75 miles of shoreline, most of which is undeveloped (91 percent of the shoreline is either forested or used for recreational purposes). Although there are adjacent property owners on Tuckertown Reservoir, there are no private recreational facilities (e.g., piers) allowed, so for purposes of this study it was assumed that there were no waterfront property owners on Tuckertown Reservoir. There are two commercial campgrounds on the reservoir.

Tuckertown Dam impounds approximately 6,700 acre-feet at the full pool elevation of 564.7 feet. The reservoir has a surface area of 2,560 acres at full pool and extends to the tailwaters of High Rock Dam. The mean depth of the reservoir at full pool is 16 feet with a maximum depth of 55 feet.

The Tuckertown Development is essentially operated as a run-of-river facility. It has an average daily water level fluctuation of less than one foot and a maximum daily fluctuation of 1 to 3 feet. APCI's current license requires that, except under emergency conditions or for maintenance, the drawdown of Tuckertown Reservoir is limited to 3 feet below normal full pool elevation. There is no seasonal drawdown at Tuckertown Reservoir. Figure 4-5 shows Tuckertown Reservoir water levels for the entire study period.

The discussion of recreational use at Tuckertown Reservoir is based on the following information:

- 1,831 Spot Count observations,
- 218 Visitor Use Survey responses,
- 1 Commercial business phone survey, and
- 77 Tailwater Use Surveys.

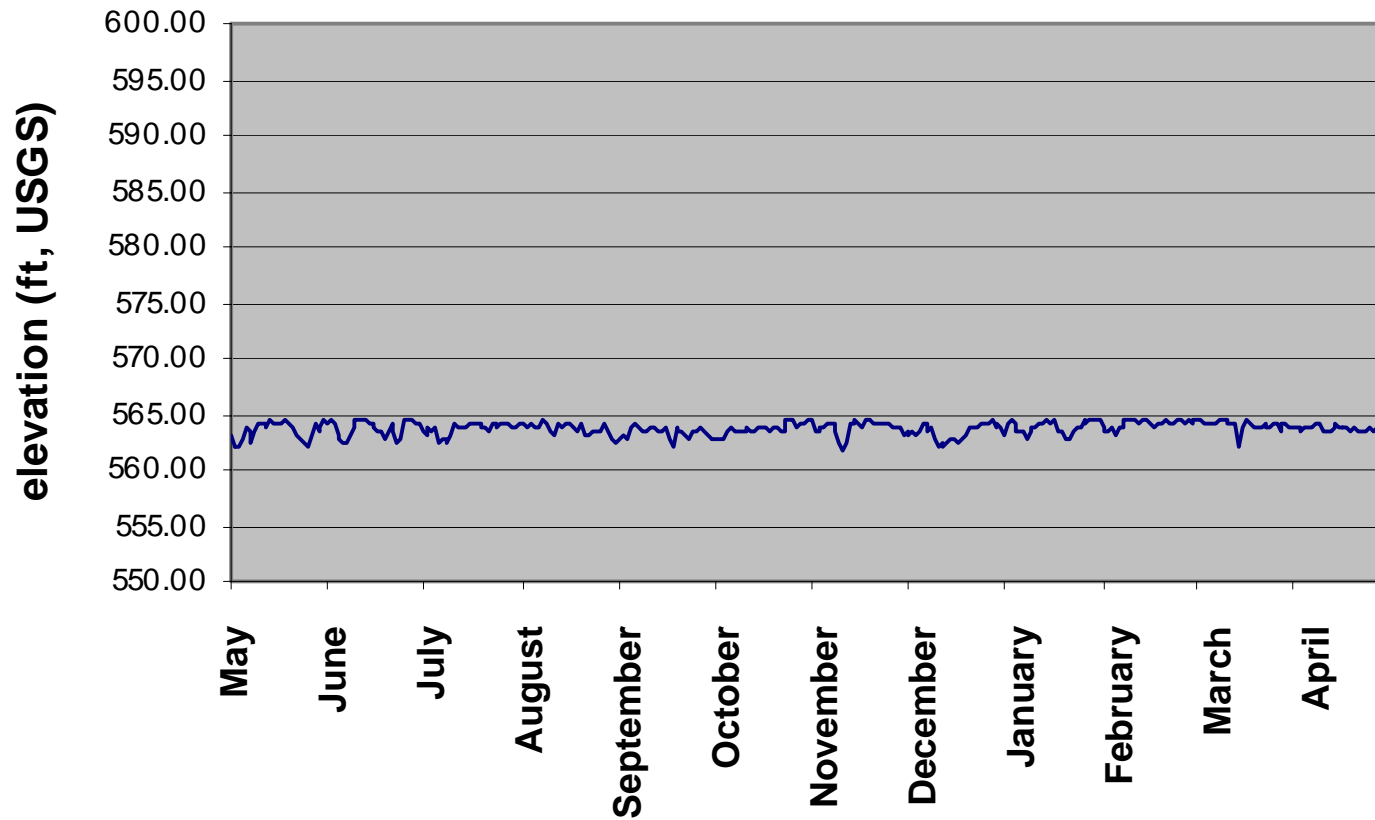
4.3.1 Recreational Facility Condition

There are 11 public access recreation areas and 2 private commercial recreational areas at Tuckertown Reservoir (Figure 4-6).

Public Access Recreation Areas

Table 4-16 lists the public recreational facilities present at each recreation area (APCI, 2004). In addition, there are canoe portage routes around High Rock and Tuckertown dams.

**Figure 4-5 Tuckertown Headwater Elevation:
May 10, 2003 to May 9, 2004**



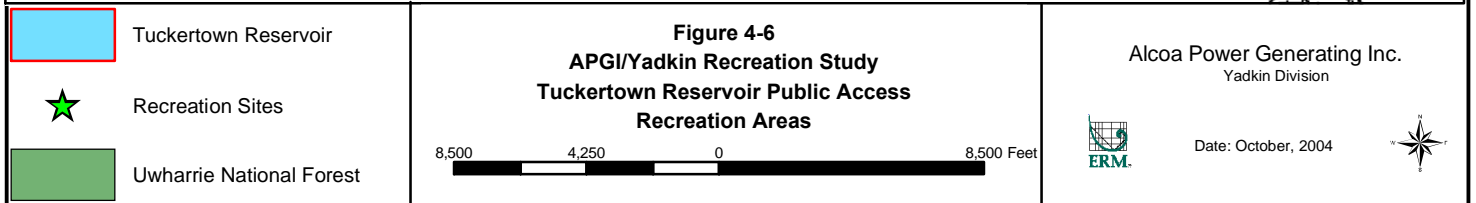
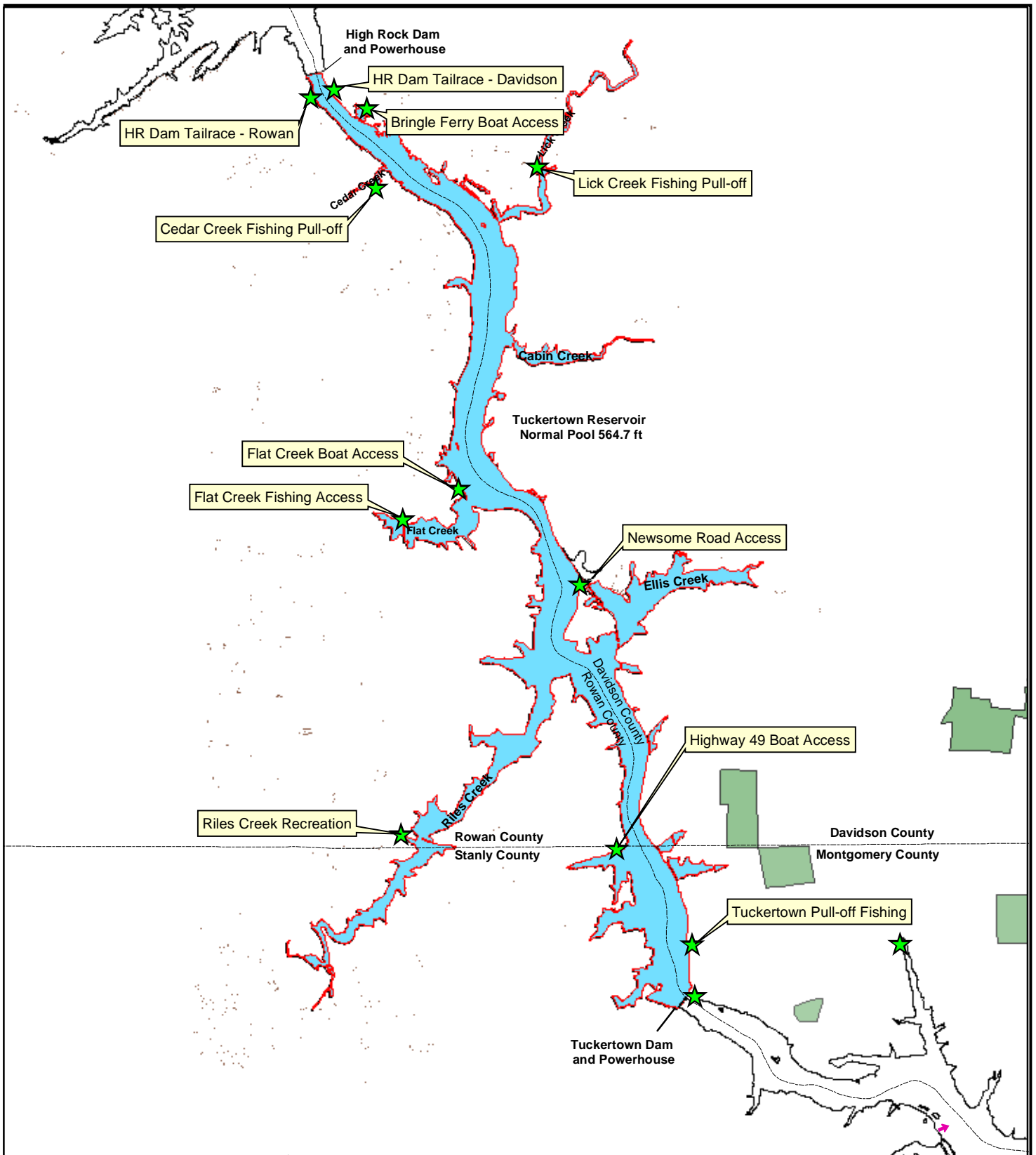


Table 4-16 Tuckertown Reservoir Public Access Recreation Area Facilities

Site Number	Name	Parking Capacity	Number of Boat Launch Lanes	Shoreline Fishing Capacity	Picnic Tables	Trash Receptacles	Toilets	Boat Dock/Fishing Pier	Campsites	Beach
17	High Rock Dam Picnic and Fishing Access Area (Rowan)	40 vehicles	0	64 anglers	4	14	1	0	0	No
18	High Rock Dam Tailrace Access	15 vehicles	0	64 anglers	0	4	0	0	0	No
19	Bringle Ferry Boat Access	25 vehicles and trailers	1	12 anglers	0	0	0	1	0	No
20	Cedar Creek Fishing Pull-Off	12 vehicles	0	24 anglers	0	3	0	0	0	No
21	Lick Creek Fishing Pull-Off	No legal parking	0	8 anglers	0	0	0	0	0	No
22	Flat Creek Boat Access Area	70 vehicles with trailers	2	56 anglers	0	3	0	1	0	No
23	Flat Creek Fishing Access Area	12 vehicles	0	64 anglers	1	3	0	0	0	No
24	Newsome Road Access	20 vehicles	2	40 anglers	6	3	0	0	0	No
25	Riles Creek Recreation Area	15 vehicles (5 pull-off parking areas)	0	52 anglers	5	6	0	0	0	No
26	Highway 49 Boat Access Area	60 vehicles with trailers	3	12 anglers	0	5	2	2	0	No
27	Tuckertown Pull-Off Fishing Accesses	24 vehicles	0	24 anglers	0	7	0	0	0	No

Appendix K provides the VUS responses on facility conditions for each of the 11 public access recreation areas. The key findings are summarized below. Most of the facilities were found to be in acceptable to excellent condition. The VUS respondents identified the following significant problems (defined as >10 percent of respondents indicating the facility was totally inadequate or >20 percent of respondents indicating the facility was mostly or totally inadequate) with public recreational facilities at Tuckertown Reservoir:

- High Rock Dam Tailrace Access (n=16) - 19 percent of respondents complained about the lack of sanitary facilities at this site.

- Tuckertown Pull-off Fishing Access (n=10) - 20 percent of respondents complained about the lack of toilets at this site.

Some respondents complained about the lack of campsites, toilets, parking, fishing piers, and other recreational facilities at the Cedar Creek Fishing Pull-off, but there were too few responses (n=4) to draw any firm conclusions. The recreational facilities at the High Rock Dam Picnic and Fishing Access, Bringle Ferry Boat Access, Cedar Creek Fishing Pull-off, Lick Creek Fishing Pull-off, Flat Creek Boat Access, Flat Creek Fishing Access, Newsome Road Access, Riles Creek Recreation Area, and Highway 49 Boat Access were all found to be acceptable.

The TUS did not identify any problems with the condition of recreational facilities at the High Rock Dam tailwaters.

Commercial Businesses and Organizations

Table 4-17 lists the recreational facilities present at the two private recreation areas at Tuckertown Reservoir. Customers of these private businesses and members of these organizations were not surveyed regarding their opinions on the condition of recreational facilities at these private recreation areas as part of this study, so no information on facility condition is available.

Table 4-17 Tuckertown Reservoir Private Recreational Facilities

Commercial Businesses	Boat Ramp	Boat Pier	Fishing Pier	Swim/Beach	Campsites
J. T. Morgan Campground *	Yes	Yes	No	No	Yes
H.B. Newsome Property	1 launch lane	1	1	Yes	31

*This commercial property did not respond to the Commercial Business and Private Organization phone survey,. The information provided is from a previous inventory of recreation facilities.

Canoe Portage

The Tuckertown Dam canoe portage trail, which provides canoe and kayak access to Narrows Reservoir, is approximately 1,600 feet long and is located on the east side of the dam. The takeout is marked with “Yadkin River Canoe Portage Trail” signs and the portage trail is marked. No surveys were completed at the Tuckertown Dam canoe portage during the survey. Figure 4-7 provides some representative photographs of the Tuckertown Dam canoe portage.

Figure 4-7 Representative Photographs of the Tuckertown Dam Portage Trail



Photo 1: Tuckertown Dam canoe take-out signs



Photo 2: Tuckertown Dam canoe portage trail

4.3.2 Recreational Activities

Fishing, both by boat and on the riverbank, is the primary recreational activity at all 11 public access recreation areas at Tuckertown Reservoir (Table 4-18). Other common (over 20 percent participation rate) recreational activities include picnicking (primarily at High Rock Dam Picnic and Fishing Access and Riles Creek Recreation Area), swimming, and just motor boating (primarily at Highway 49 Boat Access Area). Occasional (more than 5 percent participation rate) hiking, canoeing/kayaking, personal watercraft use, camping, and sunbathing occur at various recreation areas.

4.3.3 Recreational Use

Recreation users access Tuckertown Reservoir via the 11 public access recreation areas, two commercial businesses, and the High Rock Dam canoe portage trail. There are no waterfront residences, private waterfront communities, or private organizations with pier permits from APGI or with direct access to Tuckertown Reservoir. Tailwater Recreation Use surveys are discussed below and in Section 6.0, but are not included in estimating overall recreational use to avoid double counting since these users are included in the public access recreation area use estimates.

Public Access Recreation Area Use

Annual recreational use at the 11 public access areas on Tuckertown Reservoir exceeded 51,000 recreation days (Table 4-19). About 60 percent of this use occurred at the Highway 49 and Flat Creek Boat Accesses. As indicated above, fishing is the most popular recreational activity at Tuckertown Reservoir and several of the public recreation Areas receive relatively heavy use in the spring and early summer, but relatively light use for the remainder of the year.

Commercial and Organization Use

There are two commercial campgrounds on Tuckertown Reservoir – the J.T. Morgan Campground and the H.B. Newsome Property. Only the Newsome Property responded to the phone survey.

The Newsome Property is primarily used for camping on weekends in the spring and summer. Since these campers are coming to the reservoir, it is assumed that all campers use the reservoir each day that they are at the campground. Estimates of recreational use were based on information provided in a phone survey with the owner/operator.

Total annual commercial recreational use at Tuckertown Reservoir is estimated at 2,465 recreation days, exclusive of any recreational use at the J.T. Morgan Campground.

**Table 4-18 Tuckertown Public Access
Recreation Participation Rate**

Percent of Visitors Participating in Each Recreational Activity

Site No.	Site Name	No. of Surveys Completed	Motor Boating	Boat Fishing	Bank Fishing	Canoeing and Kayaking	Hiking	Swimming	Jet Skiing	Water Skiing	Camping	Windsurfing	Picnicking	Sunbathing	Sailing	Hunting	Other
17	HR Dam Tailrace - Rowan	28	11%	29%	75%	0%	4%	0%	0%	0%	7%	0%	32%	4%	0%	4%	4%
18	HR Dam Tailrace - Davidson	16	0%	19%	88%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%
19	Bringle Ferry Boat Access	25	8%	52%	48%	0%	0%	0%	0%	0%	0%	0%	4%	4%	0%	0%	0%
20	Cedar Creek Fishing Pull-off	4	0%	50%	75%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%
21	Lick Creek Fishing Pull-off	2	0%	50%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	Flat Creek Boat Access	33	6%	55%	27%	0%	6%	21%	6%	3%	3%	0%	9%	18%	0%	3%	0%
23	Flat Creek Fishing Access	22	9%	18%	82%	5%	5%	9%	0%	0%	9%	0%	5%	5%	0%	5%	0%
24	Newsome Road Access	7	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
25	Riles Creek Recreation	40	0%	8%	85%	8%	5%	8%	0%	0%	5%	0%	23%	10%	0%	3%	0%
26	Highway 49 Boat Access	31	29%	81%	6%	3%	3%	13%	6%	13%	0%	3%	6%	10%	0%	3%	6%
27	Tuckertown Pull-off Fishing	10	10%	20%	70%	10%	0%	10%	0%	0%	0%	0%	10%	20%	0%	0%	0%
	OVERALL TOTAL TUCKERTOWN ACTIVITIES RESPONSE	218	9%	36%	59%	3%	3%	8%	2%	2%	4%	0%	12%	8%	0%	2%	1%

Canoe Portage

There were no paddlers that signed the registry at the Tuckertown Dam canoe/kayak portage trail. Therefore we have no basis for estimating recreational use of the portage trail.

Table 4-19 Tuckertown Public Access Recreation Use by Site and Month (in recreation days)

Site No.	Site Name	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
17	High Rock Dam Picnic and Fishing Access	1056	927	957	441	160	140	204	31	0	0	75	662	4,653
18	High Rock Dam Tailrace Access	870	727	934	531	194	422	86	6	18	0	0	334	4,121
19	Bringle Ferry Boat Access	796	903	1,029	484	258	282	156	36	0	45	102	352	4,443
20	Cedar Creek Fishing Pull-off	58	219	44	276	4	43	0	0	0	0	26	236	906
21	Lick Creek Fishing Pull-off	14	0	119	0	0	37	15	0	0	0	102	85	372
22	Flat Creek Boat Access Area	2,414	1,086	3,446	2,467	1,622	683	431	56	0	91	210	1,637	14,143
23	Flat Creek Fishing Access Area	69	240	358	125	25	38	141	0	0	0	0	563	1,559
24	Newsome Road Access	207	235	59	82	5	66	56	31	0	0	50	420	1,211
25	Riles Creek Recreation Area	473	795	717	345	68	88	70	0	32	0	50	409	3,047
26	Highway 49 Boat Access Area	2,611	3,281	3,099	2,762	413	395	602	720	48	209	1,013	1,645	16,798
27	Tuckertown Pull-off Fishing Access	106	63	211	0	0	10	0	72	0	63	9	99	633
	Total	8,674	8,476	10,973	7,513	2,749	2,204	1,761	953	97	408	1,636	6,442	51,886

Total Recreational Use

The only recreational access to Tuckertown Reservoir is via the 11 public access recreation areas, the two commercial campgrounds, and the High Rock canoe portage. Total recreational use at Tuckertown Reservoir is estimated at approximately 54,381 recreation days per year (Table 4-20). Recreational use at Tuckertown Reservoir varies by month, type of day, and overnight versus day users. These variations in uses are described below.

**Table 4-20 Estimated Annual Tuckertown Reservoir Recreation Use
(in recreation days)**

Month	Public Access Rec Use	Waterfront Resident Rec Use	Private Community Rec Use	Commercial and Club Rec Use	Canoe Portage Use	Total	% of Total Use
May	8,674	0	0	379	0	9,053	17
June	8,476	0	0	465	0	8,941	16
July	10,973	0	0	530	0	11,503	21
August	7,513	0	0	550	0	8,063	15
September	2,749	0	0	97	0	2,846	5
October	2,204	0	0	39	0	2,243	4
November	1,761	0	0	40	0	1,801	3
December	953	0	0	0	0	953	2
January	97	0	0	0	0	97	<1
February	408	0	0	0	0	408	1
March	1,636	0	0	183	0	1,819	3
April	6,442	0	0	182	0	6,624	12
Total	51,886	0	0	2,465	0	54,351	100

Recreational Use by Month

In terms of month, recreation use was high from April through August, dropping sharply after Labor Day. Recreational use remained relatively low over the winter and began to pick up in March, especially at recreation sites favored by anglers.

Recreational Use by Type of Day

Recreational use was generally highest during major holidays (i.e., Memorial Day, 4th of July, and Labor Day weekends) and weekends during the summer, with significantly less use on weekdays. Since weekdays represent such a large percentage of total days (70 percent), total recreational use was highest on weekdays. Recreational use by type of day was distributed as follows:

- Weekdays – 47 percent of total recreational use, 94 recreation days/weekday
- Weekend days – 44 percent of total recreational use, 226 recreation days/weekend day
- Holidays – 10 percent of total recreational use, 555 recreation days/holiday

Day versus Overnight Use

Although none of the public access recreation areas provide any camping facilities, some respondents to the VUS indicated that they were camping. Several respondents at the following public access recreation areas indicated that they were camping:

- High Rock Dam Picnic and Fishing Access Area
- High Rock Dam Tailrace Access
- Cedar Creek Fishing Pull-off

- Flat Creek Boating Access
- Flat Creek Fishing Access
- Riles Creek Recreation Area

It is not known whether these recreational users were camping at these specific recreation areas, elsewhere at Tuckertown Reservoir, or at other campsites not associated with the Yadkin Project. For purposes of estimating overnight recreational use, however, these recreational users were all assumed to be camping somewhere along Tuckertown Reservoir. The number of campers at the public access recreation areas is estimated at 1,487 persons annually. The Newsome Campground has 31 campsites and recreational use was estimated at 2,465 recreation days (nights) per year. Therefore, overnight use represents approximately 7 percent (3,952 recreation days/54,381 total recreation days) of the total Tuckertown Reservoir recreational use. There may also be some anglers fishing at night, but we do not have any data on which to base an estimate of this use.

4.3.4 Recreational Facility Capacity

The adequacy of existing recreational facilities in terms of capacity was evaluated for parking areas and boat launches.

Parking Areas

In terms of parking capacity at the public access recreation areas on Tuckertown Reservoir, only 4 out of 1,831 observations did the number of vehicles observed during Spot Counts exceed the capacity of the parking areas (Table 4-21). In fact, there were only 13 occasions when the number of observed vehicles at one time exceeded 75 percent of available capacity. The Flat Creek Fishing Access Area recreation site was the most frequently at or above capacity, but this still only represented about 2 percent of the time. The High Rock Dam Tailrace Access was the parking area with the highest average annual percent capacity, but this was only 17 percent of available capacity.

Table 4-21 Tuckertown Public Access Recreation Sites Parking Capacity

Site Number	Name	Number of Observations	Parking Capacity	Maximum # of Vehicles			> 100% Capacity		Average # of Vehicles		Annual Average	
				Number	Date	Day	# of Times	Percent of Time	Weekends	Weekdays	# of Vehicles	Percent of Capacity
17	High Rock Dam Picnic and Fishing Access Area	163	40 vehicles	23	5/17/03	Sat.	0	0%	4.0	1.6	2.7	5%
18	High Rock Dam Tailrace Access	163	15 vehicles	11	6/22/03 7/19/03	Sun. Sat.	0	0%	2.4	1.9	2.1	17%
19	Bringle Ferry Boat Access	170	25 vehicles and trailers	22	5/17/03	Sat.	0	0%	3.5	1.8	2.7	2%
20	Cedar Creek Fishing Pull-Off	163	12 vehicles	17	8/3/03	Sun.	1	1%	0.6	0.4	0.5	4%
21	Lick Creek Fishing Pull-Off	163	No legal parking	4	10/26/03	Sun.	NA	NA	0.2	0.1	0.2	NA
22	Flat Creek Boat Access Area	164	70 vehicles with trailers	62	4/24/04	Sat.	0	0%	10.8	3.3	6.9	10%
23	Flat Creek Fishing Access Area	164	12 vehicles	23	7/27/03	Sun.	3	2%	1.2	0.6	0.9	8%
24	Newsome Road Access	163	20 vehicles	9	4/13/04	Sun.	0	0%	0.8	0.5	0.7	3%
25	Riles Creek Recreation Area	163	15 vehicles	10	7/19/03 7/27/03 4/03/04	Sat. Sun. Sat.	0	0%	2.1	1.3	1.7	11%
26	Highway 49 Boat Access Area	181	60 vehicles with trailers	48	8/23/03	Sat.	0	0%	12.7	5.0	8.6	13%
27	Tuckertown Pull-Off Fishing Access	174	24 vehicles	10	7/20/03	Sun.	0	0%	0.3	0.3	0.3	1%

Boat Launches

Four public access recreation areas at Tuckertown Reservoir have boat launches (i.e., Bringle Ferry and Flat Creek Boat Access areas with a single concrete launch lane each, Newsome Road Access Area with two launch lanes, and the Highway 49 Boat Access Area with three concrete launch lanes). Generally, each launch lane will accommodate approximately 50 launches and retrievals per day (SOBA, 1989). Based on the Spot Count observations of the number of trailers present, recreational use at the Flat Creek Boat Access exceeded capacity once (2 percent of the time) during the study period, with as many as 58 trailers observed at one time. Boating use was also high at the Highway

49 Boat Access area, but this site has three launch lanes, which were adequate to accommodate demand. In terms of public opinion as expressed in the Visitor Use Survey, approximately 4 percent of respondents (n=25) identified crowded boat launch conditions as a big or moderate problem at the Bringle Ferry Boat Access, 12 percent (n=33) at the Flat Creek Boat Access, 0 percent (n=7) at Newsome Road Access, and 19 percent (n=31) at the Highway 49 Boat Access Area (see Appendix K). Overall, the existing boat launches appear adequate to meet existing demand (Table 4-22).

Table 4-22 Tuckertown Public Access Recreation Area Boat Launch Capacity

Site Number	Name	Number of Existing Launch Lanes	Peak Day					Full Year > 100% Capacity	
			Date	Avg. Number of Trailers	Turnover Rate	Number of Boats Launched	Number of Launch Lanes Needed *	# of Times	Percent of Time
19	Bringle Ferry Boat Access	1	5/17/03	13	2.67	35	1	0	0%
22	Flat Creek Boat Access Area	2	4/24/04	36	3.18	114	3	1	2%
24	Newsome Road Access	2	8/9/03	2	3.69	7	1	0	0%
26	Highway 49 Boat Access Area	3	6/1/03	34	2.52	86	2	0	0%

* Assumes capacity of each launch lane is 50 boats per SOBA, 1989.

4.3.5 Recreational Issues

Recreational user perceptions of potential issues at Tuckertown Reservoir were collected through the VUS and TUS. Respondents to the VUS and the TUS rated six potential recreational issues on a scale of 1 to 4, with 1= big problem, 2=moderate problem, 3=slight problem, 4=no problem. As Table 4-23 indicates, the respondents to the VUS did not identify any significant problems (defined as >10 percent of responses indicating a big problem or >20 percent of responses indicating a big or moderate problem) at Tuckertown Reservoir. Respondents to the TUS identified the availability of sanitary facilities as a significant problem.

Table 4-23 Potential Recreational Issues at Tuckertown Reservoir

Low Water Levels at this Reservoir						
Surveys	Number of Responses	Scores Average Score	1	2	3	4
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	208	3.8	1	5	7	87
Tailwater Use Survey	71	3.9	1	3	3	93
Improper Disposal of Litter, Trash, or Toilet Paper						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	213	3.5	8	8	9	75
Tailwater Use Survey	70	3.7	0	10	13	77
Conflicts With Other Recreational Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	211	3.9	0	3	5	91
Tailwater Use Survey	70	3.8	0	0	15	85
Loud, Rude or Inconsiderate Behavior by Other Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	209	3.8	2	2	5	91
Tailwater Use Survey	69	3.8	0	0	15	85
Boating Hazards (e.g, Stumps, Shallow Areas)						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	210	3.8	1	5	7	87
Tailwater Use Survey	66	3.9	2	0	2	97
Availability of Sanitary Facilities						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	212	3.6	5	5	10	79
Tailwater Use Survey	70	3.6	9	0	13	79

For only two issues did more than 10 percent of respondents indicate a big or moderate problem:

- Improper disposal of litter and trash;
- Availability of sanitary facilities.

About 16 percent of VUS respondents and about 15 percent of TUS respondents indicated that the improper disposal of litter and trash was a big or moderate problem. This was particularly noted as a problem at High Rock Dam Picnic and Fishing Access in Rowan County (32 percent of VUS respondents identified it as a big or moderate problem), High Rock Dam Tailrace Access in Davidson County (19 percent of VUS respondents), Cedar Creek Fishing Pull-off (25 percent of VUS respondents), Riles Creek Recreation Area (15 percent of VUS respondents), and Tuckertown Pull-off Fishing Access (40 percent of VUS respondents). There are 14 trash receptacles at High Rock Dam Picnic and Fishing Access and 4 trash receptacles at the High Rock Dam Tailrace Access, but nearly all of these are located near the parking and picnic areas. Many recreation users hike along the fishing trails on both sides of the Yadkin River to reach the High Rock Dam tailrace, and this is where the trash and litter problems are the worst (Figure 4-8). Cedar Creek and Riles Creek access areas are located immediately adjacent to River Road (State Route 2152) and Stokes Ferry Road (State Route 1004) and may receive illegal dumping in addition to trash generated by recreational users. Tuckertown Pull-off Fishing Access received the most complaints about litter and trash. Although 5 trash receptacles are provided at this site, recreational use is very dispersed along the shoreline, which makes it difficult to conveniently locate trash receptacles for all users.

Finally, about 10 percent of VUS respondents and 15 percent of TUS respondents indicated the availability of sanitary facilities was a big or moderate problem. This was particularly noted at the High Rock Dam Tailrace Access (26 percent of VUS respondents and 15 percent of TUS identified it as a big or moderate problem), Riles Creek Recreation Area (13 percent), the Highway 49 Boat Access Area (16 percent), and Tuckertown Pull-off Fishing Access (30 percent). High Rock Dam Tailrace Access, Riles Creek Recreation Area, and Tuckertown Pull-off Fishing Access all do not have any sanitary facilities, primarily because the dispersed nature of shoreline fishing makes conveniently locating a toilet for all users at these sites very difficult. Highway 49 Boat Access has one portable toilet, which may not be adequate for this heavily used recreational site (over 16,000 annual recreation days). Although only 6 percent of respondents identified the availability of sanitary facilities a big or moderate problem at Flat Creek Boating Access, this heavily used recreation site (over 14,000 annual recreation days) does not offer any sanitary facilities. See Appendix K for detailed responses for individual public access recreation areas.

Figure 4-8 High Rock Dam Tailrace Litter and Trash Photographs



Photo 1: Trash and litter at the High Rock Dam Tailrace Access



Photo 2: Trash and litter at the High Rock Dam Tailrace Access

4.4 Narrows Development Recreational Use

The Narrows Development was the first of the Project developments to be built and was completed in 1917. The dam is located at RM 236.5 on the Yadkin River. The development has approximately 115 miles of shoreline. Much of this shoreline is undeveloped (approximately 48 percent is forested), although there is significant residential and some commercial development along approximately 43 percent of the shoreline. There are 1,007 waterfront residences with pier permits on Narrows Reservoir (Badin Lake).

Narrows Dam impounds an available storage capacity of approximately 129,100 acre-feet at the full pool elevation of 509.8 feet. At full pool, the surface area of the reservoir is approximately 5,353 acres. The mean depth of the reservoir is 45 feet with a maximum depth of 175 feet.

The Narrows Development is generally operated as a run-of-river facility. Narrows Reservoir (Badin Lake) has a normal daily water level fluctuation of less than one foot and a maximum daily fluctuation of 1 to 2 feet. Historically, the maximum annual drawdown at Narrows Reservoir has averaged approximately 3 feet. Narrows Reservoir does have available storage, which may be used during periods of very low streamflow to maintain the required minimum downstream releases. Figure 4-9 shows Narrows Reservoir water levels for the entire study period.

The discussion of recreational use at Narrows Reservoir is based on the following information:

- 2,560 Spot Count observations,
- 341 Visitor Use Survey responses,
- 475 Waterfront Resident Use Survey responses,
- 68 Private Community Use Survey responses,
- 5 Commercial Businesses and Clubs Phone Surveys,
- 87 Tailwater Use Survey responses, and
- 2 Canoe Portage registrations.

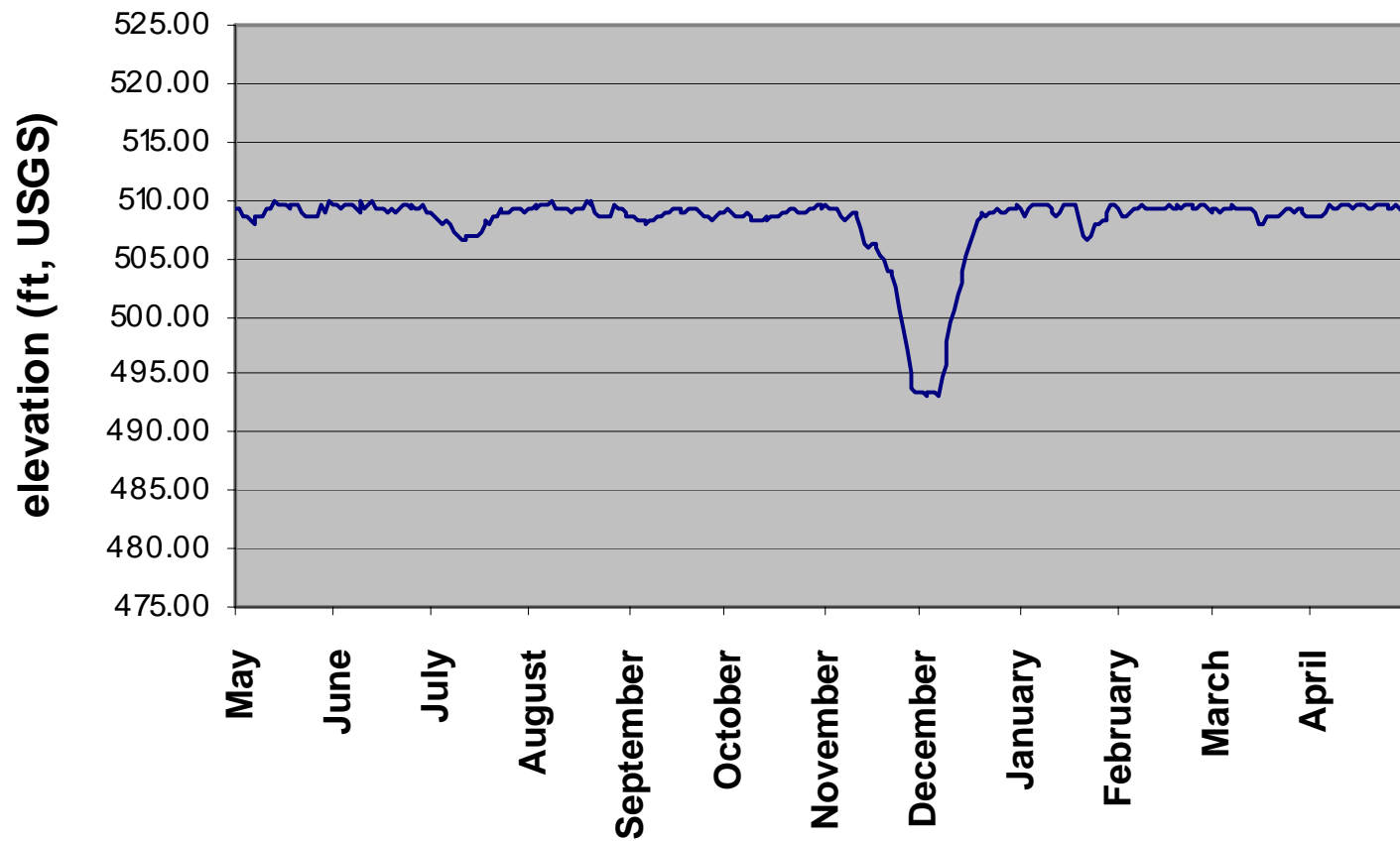
4.4.1 Recreational Facility Condition

There are 14 public access recreation areas and 5 private recreation areas at Narrows Reservoir (Figure 4-10).

Public Access Recreation Areas

Table 4-24 lists the recreational facilities present at each recreation area (APGI, 2004). In addition, there is a canoe portage around Tuckertown Dam.

**Figure 4-9 Narrows Headwater Elevation:
May 10, 2003 to May 9, 2004**



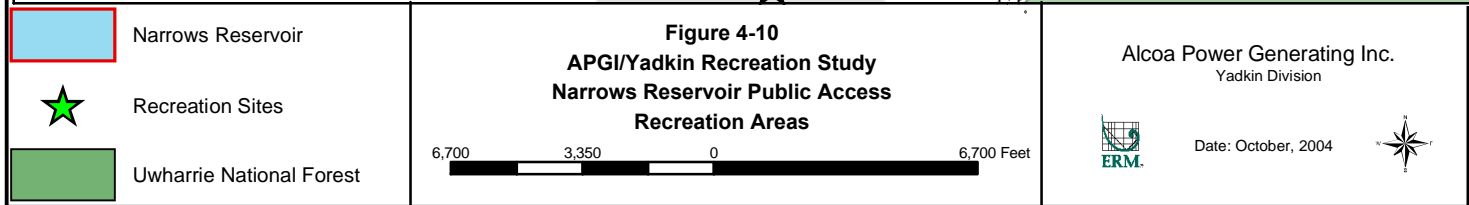
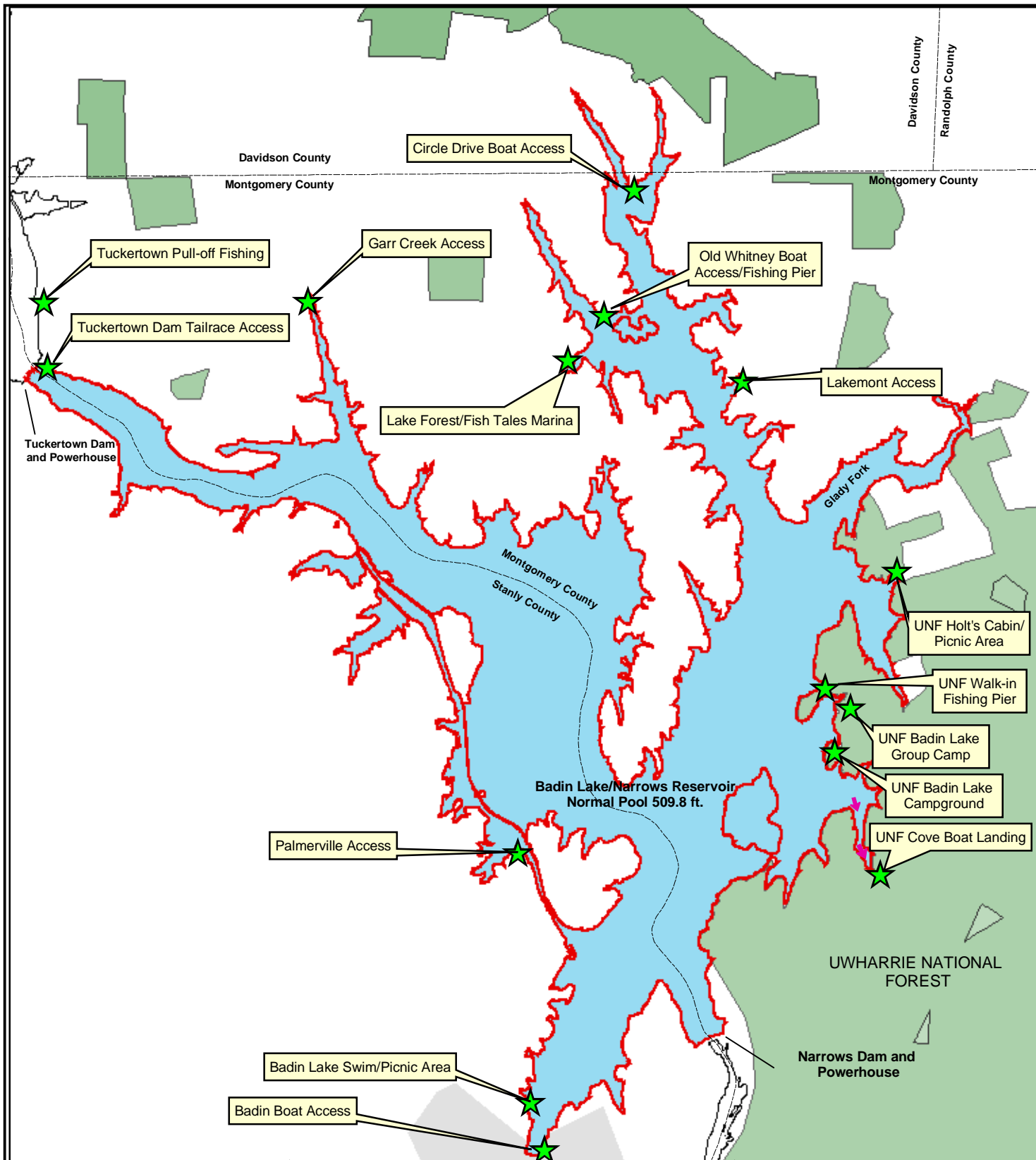


Table 4-24 Narrows Reservoir Public Access Area Recreation Facilities

Site Number	Name	Parking Capacity	Number of Boat Launch Lanes	Shoreline Fishing Capacity	Picnic Tables	Trash Receptacles	Toilets	Boat Dock /Fishing Pier	Campsites	Beach
29	Tuckertown Dam Tailrace Access	44 vehicles	0	48 anglers	0	10	1	0	0	No
30	Garr Creek Access Area	6 vehicles with trailers	1	8 anglers	0	2	0	0	0	No
32 33	Old Whitney Fishing Pier and Boat Access Area	65 vehicles	2	24 anglers	6	13	1	2	0	No
34 35	Lake Forest CG/Fish Tales Marina	30 vehicles with trailers	1	0	0	0	0	10 slips	55	No
37	Circle Drive Boat Access Area	70 vehicles with trailers	3	24 anglers	0	0	2	3	0	No
38	Lakemont Access Area	50 vehicles with trailers	2	6 anglers	0	0	0	0	0	No
39	UNF Holt's Cabin Picnic Area	12 vehicles	0	13 anglers	7	4	1	0	0	No
40	UNF Walk-in Fishing Pier	15 vehicles	0	8 anglers	0	0	0	1	0	No
41	UNF Badin Lake Campground	68	0	>50 anglers	34	3	6	0	34	No
42	UNF Cove Boat Landing	23 vehicles with trailers	1	32 anglers	16	0	2	1	0	No
43	Palmerville Access Area	13 vehicles	1	0	1	1	0	0	0	No
44	Badin Lake Swim/Picnic Area	175 vehicles	0	130 anglers	15	31	4	0	0	Yes
45	Badin Lake Boat Access	75 vehicles with trailers	3	28 anglers	9	12	2	2	0	No
47	Badin Lake Group Camp	~60 vehicles	0	0	18	9	4	0	~35	No

Appendix K provides the VUS responses on facility conditions for each of the 14 public access recreation areas. Most of the facilities were found to be in acceptable to excellent condition. The VUS respondents identified the following significant problems (defined as >10 percent of responses indicating the facility was totally inadequate or >20 percent of responses indicating the facility was mostly or totally inadequate) with recreational facilities at Tuckertown Reservoir:

- Garr Creek Access (n=14) – 21 percent of respondents complained about the lack of any sanitary facilities and 21 percent indicated that the parking lot was mostly or totally inadequate;
- Circle Drive Boat Access (n=46) – 20 percent of respondents indicated that the toilets were mostly or totally inadequate;
- Lakemont Access (n=13) – 46 percent of respondents considered the boat ramp mostly or totally inadequate, 31 percent considered the parking lot mostly or totally inadequate, 30 percent complained about the lack of any sanitary facilities and fishing piers; and
- Badin Lake Campground (n=24) – 21 percent of respondents indicated the toilets were mostly or totally inadequate.

Some respondents complained about the boat ramp, parking lot, and lack of lighting at the Palmerville Boat Access, but the number of responses was too low (n=2) to draw any firm conclusions. The condition of recreational facilities at Tuckertown Dam Tailrace Access, Old Whitney Fishing Pier and Public Boat Access, Lake Forest Campground/Fish Tales Marina, Holt's Cabin Picnic Area, Uwharrie National Forest Walk-in Fishing Pier, Cove Boat Landing, Badin Lake Swim and Picnic Area, Badin Lake Boat Access, and Badin Lake Group Campground was found to be at least acceptable by most respondents.

The TUS did not identify any problems with the condition of recreational facilities at the Tuckertown Dam tailwaters.

Commercial Businesses and Organizations

Table 4-25 lists the recreational facilities present at each private recreation area. Customers of these private businesses and members of these organizations were not surveyed regarding their opinions on the condition of recreational facilities at these private recreation areas as part of this study, so no information on facility condition is available.

Table 4-25 Narrows Reservoir Private Recreational Facilities

Business or Organization	Boat Ramp	Boat Pier	Fishing Pier	Swim/Beach	Camping
Old North State Club Marina	Yes	Yes	No	No	No
Badin Shores Resort	Yes	Yes	Yes	Yes	No
Badin Lake Ski Club	Yes	Yes	Yes	No	No
Whip-O-Will Campground Marina	No	Yes	Yes	Yes	63 campsites
Camp Barnhardt	Yes	No	No	Yes	15 group sites

Canoe Portage

The Narrows Dam canoe portage trail, which provides canoe and kayak access from Narrows to Falls reservoirs, is approximately 1,200 feet long and is located on the west side of Narrows Dam. The takeout is marked with a “Yadkin River Canoe Portage Trail” sign and the portage trail is marked.

4.4.2 Recreational Activities

Residents and visitors generally have similar recreational interests, although motor boating and swimming tend to be more popular with residents, while fishing (both by boat and along the riverbank) is more popular with visitors (Table 4-26).

Table 4-26 Narrows Resident and Visitor Recreational Activities (percent of total recreation days)

Recreational Activity	Public Access Areas	Waterfront Residents	Non-Waterfront Residents
Motor boating	9%	26%	23%
Boat fishing	19%	9%	19%
Bank fishing	18%	12%	17%
Canoeing/kayaking	3%	1%	2%
Swimming	12%	16%	13%
Personal Watercraft use	2%	12%	6%
Camping	10%	0%	2%
Windsurfing	0%	0%	0%
Waterskiing	1%	6%	4%
Picnicking	9%	2%	3%
Hiking	4%	1%	2%
Sunbathing	8%	12%	8%
Sailing	0%	0%	1%
Other	5%	3%	0%
Total	101%	100%	100%

The recreation participation rate for each public access recreation area is presented in Table 4-27. Boat and bank fishing are the primary recreational activities (over 40 percent participation rate) at public access recreation areas at Narrows Reservoir. Other common recreational activities (over 20 percent participation rate) include swimming and picnicking (especially at the UNF Cove Boat Landing and the Badin Lake Swim and Picnic Area), camping (especially at the recreation areas within the Uwharrie National Forest), and motor boating (especially at the Badin and Circle Drive boat accesses). Occasional (more than 5 percent participation rate) sunbathing, hiking, hunting and canoeing/kayaking occur at various recreation areas.

**Table 4-27 Narrows Public Access
Recreation Participation Rates**

Percent of Visitors Participating in Each Recreational Activity

Site No.	Site Name	No. of Surveys Completed	Motor Boating	Boat Fishing	Bank Fishing	Canoeing / Kayaking	Hiking	Swimming	Jet Skiing	Water Skiing	Camping	Windsurfing	Picnicking	Sunbathing	Sailing	Hunting	Other
29	Tuckertown Dam Tailrace Access	28	7%	36%	93%	7%	14%	11%	0%	0%	21%	4%	11%	11%	0%	14%	7%
30	Garr Creek Access	14	7%	79%	36%	0%	0%	7%	0%	0%	21%	0%	7%	0%	0%	7%	0%
32/33	Old Whiney Boat Fishing Pier	54	26%	65%	22%	2%	4%	15%	4%	4%	2%	2%	6%	6%	2%	4%	4%
34/35	Lake Forest/Fish Tales Marina	4	25%	25%	25%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	0%
37	Circle Drive Boat Access	46	35%	70%	7%	0%	2%	15%	9%	7%	7%	0%	4%	11%	0%	7%	0%
38	Lakemont Access	13	23%	77%	8%	0%	15%	15%	0%	0%	23%	0%	0%	15%	0%	15%	8%
39	UNF Holt's Cabin Picnic	12	0%	25%	58%	17%	8%	17%	0%	0%	25%	8%	17%	0%	0%	0%	0%
40	UNF Walk-in Fishing Pier	24	0%	4%	71%	25%	21%	21%	4%	0%	79%	0%	17%	13%	0%	4%	4%
41	UNF Badin Lake Campground	24	21%	17%	58%	17%	29%	33%	0%	8%	92%	0%	38%	25%	0%	4%	8%
42	UNF Cove Boat Landing	33	21%	36%	67%	6%	18%	58%	0%	3%	42%	0%	55%	36%	3%	15%	6%
43	Palmerville Access	2	50%	100%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
44	Badin Lake Swim/Picnic	55	13%	22%	42%	4%	5%	55%	2%	0%	7%	0%	47%	44%	0%	4%	2%
45	Badin Boat Access	29	38%	45%	28%	3%	0%	21%	17%	10%	7%	0%	14%	7%	0%	10%	10%
47	UNF Badin Lake Group Camp	3	33%	33%	33%	0%	0%	33%	33%	0%	100%	0%	0%	33%	0%	0%	0%
	OVERALL TOTAL NARROWS ACTIVITIES RESPONSE	341	20%	43%	41%	6%	9%	27%	4%	3%	24%	1%	21%	18%	1%	7%	4%

4.4.3 Recreational Use

Recreation users access Narrows Reservoir via the 14 public access recreation areas, 1,007 waterfront residences with pier permits from APGI, approximately 4,669 non-waterfront private community residences, and five commercial business or private organizations with direct public access. There is a canoe portage around Tuckertown Dam. The TUS results are discussed below and in Section 6.0, but are not included in estimating overall recreational use to avoid double counting since these users were included in the public access recreation area use estimates.

Public Access Area Recreational Use

Annual recreational use at the 14 public access areas on Narrows Reservoir exceeded 120,000 recreation days (Table 4-28). Over half of this use (54 percent) occurred at just three of the public access areas – Circle Drive Boat Access, Old Whitney Boat Access, and Badin Boat Access. The UNF Badin Lake Campground also received relatively heavy use, although less than the other three sites.

Table 4-28 Narrows Public Access Recreational Use by Site and Month (in recreation days)

Site No.	Site Name	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
29	Tuckertown Dam Tailrace	1,493	1,003	1,678	876	266	421	216	91	30	8	285	809	7,176
30	Garr Creek Access Area	362	596	285	193	432	192	16	0	26	15	187	356	2,660
32/33	Old Whitney Fishing Pier/Boat	3,800	4,234	3,129	3,065	1,365	1,320	857	227	67	424	1,003	1,372	20,862
34/35	Lake Forest CG/Fish Tale Marina	782	575	879	389	458	714	200	0	0	15	213	507	4,731
37	Circle Drive Boat Access	4,016	4,197	3,900	3,050	1,583	1,767	1,332	749	705	397	2,911	3,274	27,858
38	Lakemont Access Area	560	813	1,292	599	435	105	41	115	134	370	349	839	5,652
39	UNF Holt's Cabin Picnic Area	211	122	45	203	7	17	0	0	0	0	222	90	917
40	UNF Walk-in Fishing Pier	810	626	1,140	454	237	232	8	0	0	0	103	82	3,692
41	UNF Badin Lake Campground	2,948	2,687	2,828	1,854	445	726	66	0	0	60	472	485	12,571
42	UNF Cove Boat Landing	1,506	1,492	1,840	1,214	676	235	200	0	0	0	0	5	7,168
43	Palmerville Access Area	72	240	132	52	14	0	0	0	0	15	15	0	540
44	Badin Lake Swim/Picnic Area	1,363	2,232	2,279	1,654	441	98	50	40	0	15	255	82	8,509
45	Badin Boat Access	2,296	4,432	4,234	5,047	842	306	599	160	36	285	1,111	424	19,772
47	Badin Lake Group Camp	78	567	314	51	3,470	493	225	0	0	0	93	139	5,429
	Total	20,297	23,816	23,975	18,701	10,671	6,626	3,810	1,382	998	1,604	7,219	8,464	127,567

Waterfront Resident Recreational Use

Recreational use by waterfront residents and their guests was higher than that by visitors (Table 4-29). This is attributable to the 1,007 waterfront residences with pier permits. Resident use increases in April and May, is heavy from June through September, and begins to fall in October. Winter use is very low. Guest use is also high (about 10 percent of resident use) and is concentrated in the primary recreation season (Memorial Day weekend to Labor Day weekend).

Table 4-29 Narrows Waterfront Resident and Guest Recreational Use by Month (in recreation days)

Month	Waterfront Resident Recreational Use	Waterfront Guest Recreational Use	Total Waterfront Residence Recreational Use
May	17,119	2,014	19,133
June	40,280	4,028	44,308
July	69,483	4,532	74,015
August	40,280	4,028	44,308
September	40,280	2,014	42,294
October	17,623	1,007	18,630
November	5,035	504	5,539
December	5,035	504	5,539
January	5,035	504	5,539
February	5,035	504	5,539
March	2,518	1,511	4,029
April	15,609	1,511	17,120
Total	263,332	22,661	285,993

Private Waterfront Communities Recreational Use

Recreational use by the approximately 4,673 non-waterfront parcels in private waterfront communities at Narrows Reservoir was estimated as 401,908 recreation days per year. This averages about 86 recreation days per household per year. It should be noted that an undetermined number of these parcels are unimproved (i.e., are not improved with a residence) and may be rarely used over the course of a year.

Commercial Business and Organization Recreational Use

There are 5 commercial businesses or private organizations with direct access to Narrows Reservoir – all of these responded to the phone survey. Based on information provided by the owner/operator, annual recreational use at each of these businesses and organizations is presented below in Table 4-30. Badin Shores Resort accounted for over 60 percent of the total business and organization recreational use at Narrows Reservoir.

Table 4-30 Narrows Reservoir Business and Organization Recreational Use (in recreation days)

Site Name	Old North State Club Marina	Badin Shores Resort	Badin Lake Ski Club	Whip-O-Will Campground Marina	Camp Barnhardt	All Facility Total
May	2,900	17,800	211	759	4,600	26,270
June	4,800	18,600	195	1,230	9,000	33,825
July	5,800	20,900	215	1,985	10,500	39,400
August	5,700	20,700	215	1,855	10,100	38,570
September	1,540	15,600	161	324	8,725	26,350
October	1,490	15,600	163	292	7,775	25,320
November	1,600	16,000	160	330	9,500	27,590
December	390	7,800	16	133	1,375	9,714
January	400	8,000	18	138	1,450	10,006
February	380	7,600	18	132	1,400	9,530
March	2,350	15,600	172	178	1,575	19,875
April	2,300	15,200	168	172	1,550	19,390
Total	29,650	179,400	1,712	7,528	67,550	285,840

Canoe Registry

Two surveys were completed by paddlers using the Narrows Dam canoe portage to access Falls Reservoir. The response rate (i.e., percentage of groups using the portage that registered) for the canoe registry is unknown. The canoe registry was prominently posted and it would have been difficult for a group to use the portage and not notice the registry. The registry was simple to use and took approximately one minute to complete. For purposes of estimating use, a 20 percent response rate (1 out of every 5 groups registered) and an average of 2 people per group (this was the average for the five canoe surveys collected at the four Yadkin portages) were assumed. This would equate to 10 groups of two persons per group, or 20 recreation days per year at the Narrows canoe portage.

Total Recreational Use

Total annual recreational use at Narrows Reservoir was estimated at 1,101,308 recreation days by summing recreational uses estimates for public access recreational areas, waterfront residents, private communities, commercial businesses, and organizations (Table 4-31). Recreational use at Narrows Reservoir varies by month, type of day, and day versus overnight use. Each of these variations in use is discussed below.

Table 4-31 Estimated Annual Narrows Reservoir Recreation Use (in recreation days)

	Public Access Rec. Areas	Waterfront Resident Rec Use	Private Community Rec Use	Commercial and Club Rec Use	Canoe Portage Use ¹	Total	% of Total Use
May	20,297	19,133	26,888	26,270	2	92,590	8
June	23,816	44,308	62,266	33,825	2	164,217	15
July	23,975	74,015	104,014	39,400	2	241,406	22
August	18,701	44,308	62,266	38,570	2	163,847	15
September	10,671	42,294	59,436	26,350	2	138,753	13
October	6,626	18,630	26,181	25,320	2	76,759	7
November	3,810	5,539	7,784	27,590	2	44,725	4
December	1,382	5,539	7,784	9,714	2	24,421	2
January	998	5,539	7,784	10,006	0	24,327	2
February	1,604	5,539	7,784	9,530	0	24,457	2
March	7,219	4,029	5,662	19,875	2	36,787	3
April	8,464	17,120	24,059	19,390	2	69,035	6
Total	127,567	285,993	401,908	285,840	20	1,101,324	99%

¹ Total estimated canoe portage use (20 recreation days) was distributed among the study period based on professional judgment.

Recreational Use by Month

Table 4-31 provides estimates of recreational use by month. Overall, recreational use was high from June through September, with use peaking in July. Use levels declined rapidly in October and November. Winter use (November through February) was generally low. Use levels increased in the spring (March, April, and May) as air temperatures began to warm and fishing improved.

Recreational Use by Type of Day

Recreation use data by type of day (e.g., weekend day, weekday, holiday) is only available for public access recreational use, but this use is assumed to be fairly representative of total recreational use in this regards. Recreational use was generally highest during major holidays (i.e., Memorial Day, 4th of July, and Labor Day weekends) and weekends during the summer, with significantly less use on weekdays. Since weekdays represent such a large percentage of total days (70 percent), total recreational use was highest on weekdays. Recreational use by type of day was distributed as follows:

- Weekdays – 42 percent of total recreational use, 207 recreation days/weekday
- Weekend days – 43 percent of total recreational use, 543 recreation days/weekend day

- Holidays – 16 percent of total recreational use, 2,216 recreation days/holiday day

Day versus Overnight Recreational Use

Several of the public access recreation areas (i.e., Lake Forest Campground, Badin Lake Campground, Palmerville Access Area, and Badin Lake Group Camp) and private campgrounds (Whip-O-Will Campground and Camp Barnhardt) at Narrows Reservoir provide facilities for camping.

Some respondents to the VUS at other public access recreation areas also indicated that they were camping, including:

- Tuckertown Dam Tailrace Access
- Garr Creek Access
- Old Whitney Boat Access
- Circle Drive Boat Access
- Lakemont Boat Access
- UNF Holt's Cabin Picnic Area
- UNF Walk-in Fishing Pier
- UNF Cove Boat Landing
- Badin Lake Swim/Picnic Area
- Badin Boat Access

It is not known whether these recreational users were camping at these specific recreation areas, elsewhere at Narrows Reservoir (e.g., Uwharrie National Forest), or at other campsites not associated with the Yadkin Project. For purposes of estimating overnight recreational use, however, these recreational users were all assumed to be camping somewhere along Narrows Reservoir. The number of campers at the public access recreation areas is estimated at 30,864 recreation days (nights) annually.

There are also several commercial campgrounds as well as private organizations with camping facilities. Overnight recreational use at these facilities total approximately 75,078 recreation days (nights) per year (see Table 4-30). Therefore, overnight use represents approximately 10 percent (105,942 recreation days/1,101,308 total recreation days) of the total Narrows Reservoir recreational use. There may also be some anglers fishing at night, but we do not have any data on which to base an estimate of this use.

4.4.4 Recreational Facility Capacity

The adequacy of existing recreational facilities in terms of capacity was evaluated for parking areas and boat launches.

Parking Area

In terms of parking capacity, only 12 times out of 2,560 observations did the number of vehicles observed during the Spot Counts exceed the capacity of the parking areas (Table

4-32). The UNF Cove Boat Landing was the most frequently at or above capacity, but this still only represented about 2 percent of the time. The Garr Creek Access Area and the Circle Drive Access Area were the two parking areas with the highest average annual percent capacity (22 percent).

Table 4-32 Narrows Public Access Recreation Sites Parking Capacity

Site Number	Name	Number of Observations	Parking Capacity	Maximum # of Vehicles			> 100% Capacity		Average # of Vehicles		Annual Average	
				Number	Date	Day	# of Times	Percent of Time	Weekends	Weekdays	# of Vehicles	Percent of Capacity
29	Tuckertown Dam Tailrace Access	171	44 vehicles	34	5/26/03	Holiday	0	0%	4.1	2.9	3.5	8%
30	Garr Creek Access Area	181	6 vehicles with trailers	8	4/24/04 9/28/03	Sat. Sun.	2	1%	1.6	1.1	1.4	22%
32/33	Old Whitney Fishing Pier and Boat Access Area	197	65 vehicles	70	5/24/03	Holiday	1	<1%	14.5	7.0	10.6	17%
34 35	Lake Forest CG/Fish Tales Marina	198	30 vehicles with trailers	35	4/24/04	Sat.	1	<1%	3.5	1.4	2.4	8%
37	Circle Drive Boat Access Area	180	70 vehicles with trailers	66	7/5/03 7/20/03	Holiday Sun.	0	0%	21.0	8.6	15.2	22%
38	Lakemont Access Area	180	50 vehicles with trailers	22	7/20/03	Sun.	0	0%	4.9	1.5	3.2	7%
39	UNF Holt's Cabin Picnic Area	195	12 vehicles	15	3/7/04	Sun.	1	1%	1.0	0.2	0.6	5%
40	UNF Walk-in Fishing Pier	185	15 vehicles	41	7/6/03	Holiday	2	1%	2.9	0.8	1.8	12%
41	UNF Badin Lake Campground	185	68 vehicles	35	5/3/04 7/6/03 10/18/03	Sat. Holiday Sat.	0	0%	10.1	3.0	6.2	9%
42	UNF Cove Boat Landing	183	30 vehicles with trailers	42	5/24/03	Holiday	4	2%	5.5	1.2	3.3	10%
43	Palmerville Access Area	181	13 vehicles	8	7/12/03	Sat.	0	0%	0.5	0.1	0.3	2%
44	Badin Lake Swim/Picnic Area	181	175 vehicles	200	7/4/03	Holiday	1	<1%	7.4	1.4	4.4	3%
45	Badin Boat Access	176	75 vehicles with trailers	72	5/24/03	Holiday	0	0%	14.9	5.0	9.8	13%
47	Badin Lake Group Camp	167	~60 vehicles	59	9/27/03	Sat.	0	0%	4.2	0.9	2.5	5%

NA = Not Available

Boat Launches

Eight public access recreation areas at Narrows Reservoir have boat launches, with a total of 13 launch lanes. Generally, each launch lane will accommodate approximately 50 launches and retrievals per day (SOBA, 1989). Based on the Spot Count observations of the number of trailers present and the turnover rate, the number of boats launched on the peak day at each of these 8 recreation areas was estimated and compared with the physical capacity of the launches. This analysis indicates that the existing number of launch lanes was adequate to accommodate the peak day boat launch volume at all of the recreation areas (Table 4-33).

Table 4-33 Narrows Public Access Recreation Area Boat Launch Capacity

Site Number	Name	Number of Existing Launch Lanes	Peak Day					Full Year > 100% Capacity	
			Date	Avg. Number of Trailers	Turnover Rate	Number of Boats Launched	Number of Launch Lanes Needed *	# of Times	Percent of Times
30	Garr Creek Access Area	1	4/24/04	5	1.89	9	1	0	0%
32/33	Old Whitney Fishing Pier and Boat Access Area	2	3/28/04	42	2.02	85	2	0	0%
34/35	Lake Forest CG/Fish Tales Marina	1	4/24/04	20	1.89	38	1	0	0%
37	Circle Drive Boat Access Area	3	4/24/04	49	2.02	100	2	0	0%
38	Lakemont Access Area	2	7/20/03	14	3.06	43	1	0	0%
42	UNF Cove Boat Landing	1	7/22/03	14	3.06	43	1	0	0%
43	Palmerville Access Area	1	7/12/03	2	3.06	6	1	0	0%
45	Badin Boat Access	3	3/28/04	43	2.25	97	2	0	0%

* Assumes capacity of each launch lane is 50 boats per SOBA, 1989.

According to responses from the VUS, few recreational users perceived crowding as a big or moderate problem at Narrows Reservoir boat launches (see Appendix K):

- Garr Creek Access Area – 7 percent big or moderate problem (n=14)
- Old Whitney Boat Access – 6 percent big or moderate problem (n=54)
- Circle Drive Boat Access – 11 percent big or moderate problem (n=46)
- Lakemont Access – 8 percent moderate problem (n=13)
- UNF Cove Boat Landing – 6 percent moderate problem (n=33)
- Badin Boat Access - 3 percent moderate problem (n=29)

Some respondents indicated crowding was a big or moderate problem at the Lake Forest Campground and Palmerville Boat Access, but there were too few responses to draw any firm conclusions. Overall, these data support the conclusion that the existing boat launches at Narrows Reservoir are adequate to meet current demand.

4.4.5 Recreational Issues

Recreational user perceptions of potential issues at Narrows Reservoir were collected through the VUS, RUS, PCUS, and TUS (Table 4-34). Respondents to these surveys at Narrows Reservoir rated six potential recreational issues on a scale of 1 to 4, with 1= big problem, 2=moderate problem, 3=slight problem, 4=no problem. There were differences of opinions regarding several of these potential issues between the various survey responses. Each potential recreational issue is discussed below. For purposes of this discussion, significant issues are identified, which are defined as > 10 percent of responses indicating a big problem or > 20 percent of responses indicating a big or moderate problem at Narrows Reservoir.

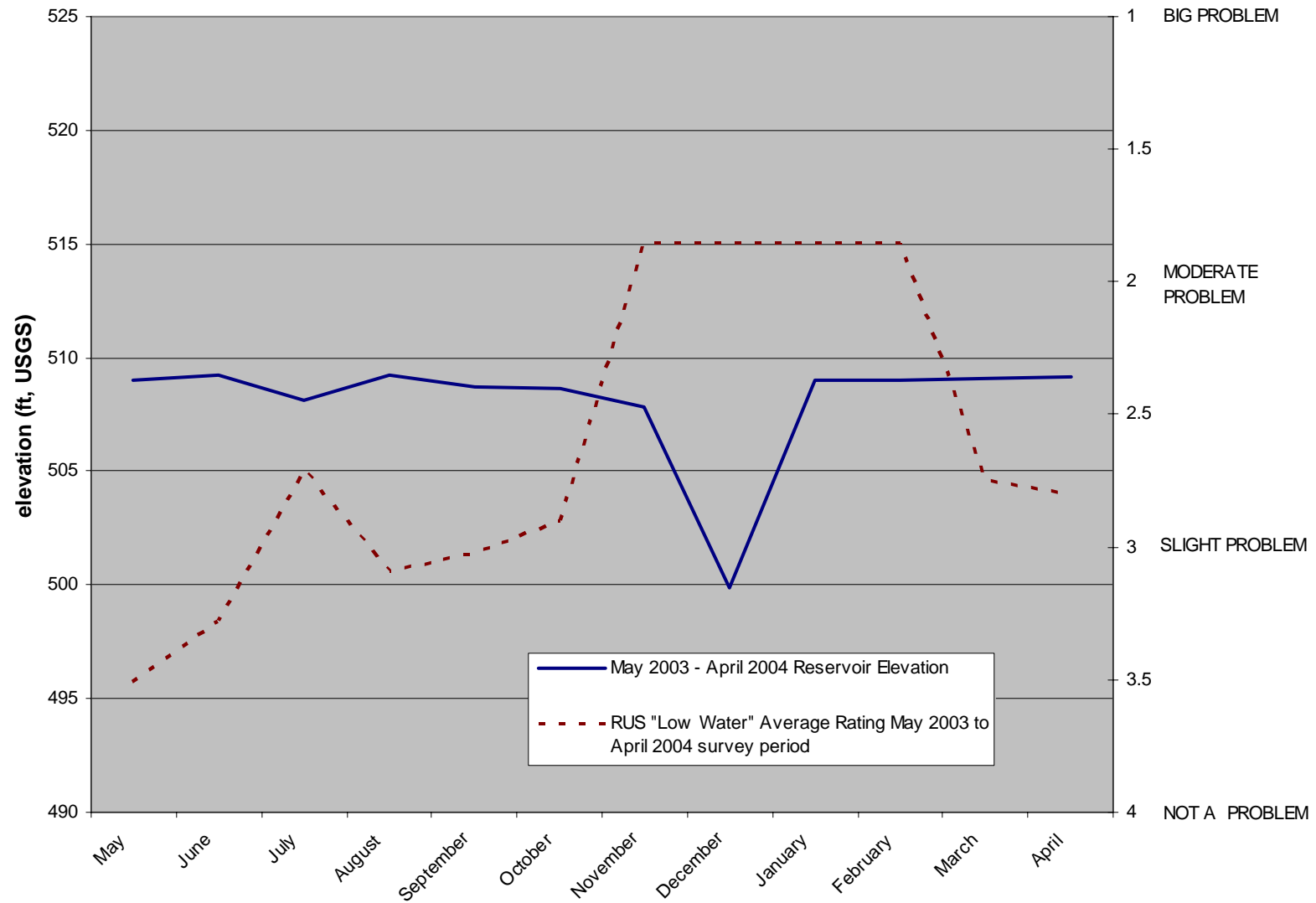
Low Water Levels

There were significant differences in responses about low water levels at Narrows Reservoir between visitors and residents. Only three percent of VUS and five percent of TUS respondents indicated that low water levels were a big or moderate problem. Conversely, about 38 percent of respondents to the RUS and 52 percent of respondents to the PCUS indicated water levels were a big or moderate problem. Although water levels in Narrows Reservoir were generally high during the study period (with the exception of an extreme drawdown in December for FERC relicensing studies), many respondents may have been responding to the drought of 2002 when water levels were extremely low.

In order to better understand the relationship between water levels and recreational experience, the VUS and RUS responses to the question about how big a problem low water levels were at this reservoir were evaluated by month. As indicated above, relatively few respondents to the VUS (4 percent) indicated that low water levels were a big or moderate problem at Narrows Reservoir. In fact, all of those that did indicate low water levels were a big or moderate problem were interviewed in May, June, and July 2003 when water levels in Narrows Reservoir were quite high. These recreational users may have responded with previous years water levels in mind.

The RUS responses were also evaluated in terms of the effects of water levels on the recreation experience (Figure 4-11). In general, most residents considered water levels acceptable for most of the year. During the December drawdown, however, waterfront residents indicated “low water” was a moderate to big problem. There was no statistically significant relationship between water levels and the percentage of respondents that indicated low water levels was a big or moderate problem by month. Many respondents indicated low water levels were a big or moderate problem during periods when Narrows Reservoir was nearly full. This suggests that residents were responding with historic rather than actual water levels in mind.

Figure 4-11 Narrows Reservoir Water Level vs RUS "Low Water" Rating



Improper Disposal of Trash, Litter, and Toilet Paper

The improper disposal of trash, litter, and toilet paper was rated as a big or moderate problem by 22 percent of waterfront residents and 25 percent of non-waterfront residents, but only 12 percent of visitors and 16 percent of tailwater users. Respondents to the VUS particularly noted trash, litter, and toilet paper as a problem at the Tuckertown Dam Tailrace Access, Garr Creek Access, and Lake Forest Campground public access recreation areas (see Appendix K).

Conflicts with Recreational Users

Conflicts with other recreational users was not considered a significant problem by respondents to any of the surveys, with the PCUS having the highest percentage of respondents (8 percent) indicating a big or moderate problem (Table 4-34).

Inconsiderate Behavior by Other Users

Inconsiderate behavior by other users was also not considered a significant problem by respondents to any of the surveys, with the RUS again having the highest percentage of respondents (15 percent) indicating a big or moderate problem (Table 4-34).

Boating Hazards

“Boating hazards” were identified as a much greater problem by waterfront residents (18 percent of respondents identified boating hazards as a big or moderate problem) and non-waterfront residents (22 percent of respondents identified it as a big or moderate problem) than by visitors (only 6 percent of respondents identified it as a big or moderate problem) or tailwater anglers (only 4 percent of respondents identified it as a big or moderate problem). Visitors only identified boating hazards as significant issue at Lake Forest Campground, but the survey response rate was low at this recreation site (n=4).

Availability of Sanitary Facilities

Only the VUS and the TUS asked about the availability of sanitary facilities. Approximately 13 to 14 percent of respondents indicated that the lack of sanitary facilities was a big or moderate problem (Table 4-34). The lack of sanitary facilities was specifically identified as a significant problem at the following individual public access recreation sites (see Appendix K for detailed summaries):

Table 4-34 Potential Recreational Issues at Narrows Reservoir

Low Water Levels at this Reservoir						
Surveys	Number of Responses	Scores Average Score	1	2	3	4
			Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	330	3.8	1	3	8	88
Residential Use Survey	475	2.9	22	16	15	48
Priv. Comm. Use Survey	65	2.7	14	28	31	28
Tailwater Use Survey	81	3.9	0	2	2	95
Improper Disposal of Litter, Trash, or Toilet Paper						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	337	3.6	6	7	12	75
Residential Use Survey	469	3.2	6	16	29	49
Priv. Comm. Use Survey	69	3.0	9	16	37	38
Tailwater Use Survey	80	3.5	7	7	13	73
Conflicts With Other Recreational Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	333	3.9	1	3	6	90
Residential Use Survey	461	3.8	1	3	13	83
Priv. Comm. Use Survey	65	3.6	3	5	23	69
Tailwater Use Survey	21	3.9	3	0	3	93
Loud, Rude or Inconsiderate Behavior by Other Users						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	333	3.8	2	2	8	88
Residential Use Survey	466	3.4	5	10	23	63
Priv. Comm. Use Survey	67	3.5	3	6	24	67
Tailwater Use Survey	79	3.9	3	0	3	93
Boating Hazards (e.g., Stumps, Shallow Areas)						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	323	3.8	3	3	7	87
Residential Use Survey	466	3.2	6	12	32	49
Priv. Comm. Use Survey	71	3.2	6	16	37	41
Tailwater Use Survey	78	3.9	1	1	1	96
Availability of Sanitary Facilities						
Surveys	Number of Responses	Average Score	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	332	3.6	9	5	6	79
Tailwater Use Survey	78	3.7	6	3	8	83

- Tuckertown Dam Tailrace Access (n=28) – 11 percent identified the availability of sanitary facilities as a big problem.
- Lakemont Access (n=13) – 31 percent identified the availability of sanitary facilities as a big or moderate problem.
- UNF Walk-in Fishing Pier (n=24) – 25 percent identified the availability of sanitary facilities as a big or moderate problem.
- Badin Lake Boat Access (n=29) – 10 percent identified the availability of sanitary facilities as a big problem.

Some respondents complained about the lack of sanitary facilities at the Lake Forest Campground, but there were too few responses to draw any firm conclusions. Lake Forest Campground and Lakemont Access do not have any public toilets. These sites receive moderate use (between 3,000 and 5,000 recreation days per year) and may warrant improved sanitary facilities. There is an existing toilet at the Tuckertown Dam Tailrace Access, but recreational use is very dispersed at this site and it is difficult to locate a toilet in a location that is convenient for all recreational users. There are two port-a-potties at the Badin Lake Boat Access. This is one of the more heavily used recreational sites (nearly 20,000 recreation days per year) and may warrant a third toilet if use levels increase much further.

4.5 Falls Development Recreational Use

Falls Reservoir is the farthest downstream of the four Yadkin Project reservoirs with Falls Dam located at RM 234. Falls Reservoir is also the smallest of the four Yadkin reservoirs with a surface area of 204 acres. The development has approximately six miles of shoreline with no residential or commercial development. The entire east side of the reservoir is within the Uwharrie National Forest. The west side of the reservoir is rural. Approximately 94 percent of the shoreline is forested and undeveloped. Morrow Mountain State Park is located immediately downstream of Falls Dam on the west side of the Yadkin River.

The Falls Development was completed in 1919 and was fully operational by 1922. The dam impounds approximately 940 acre-feet at the full pool elevation of 332.8 feet. The mean depth of the reservoir at full pool is 27 feet with a maximum depth of 52 feet.

Falls Development is essentially operated as a run-of-river facility. It has an average daily water level fluctuation of approximately one foot and a maximum daily fluctuation of 3 to 4 feet. There is no seasonal drawdown at Falls Reservoir. Figure 4-12 shows Falls Reservoir water levels for the entire study period.

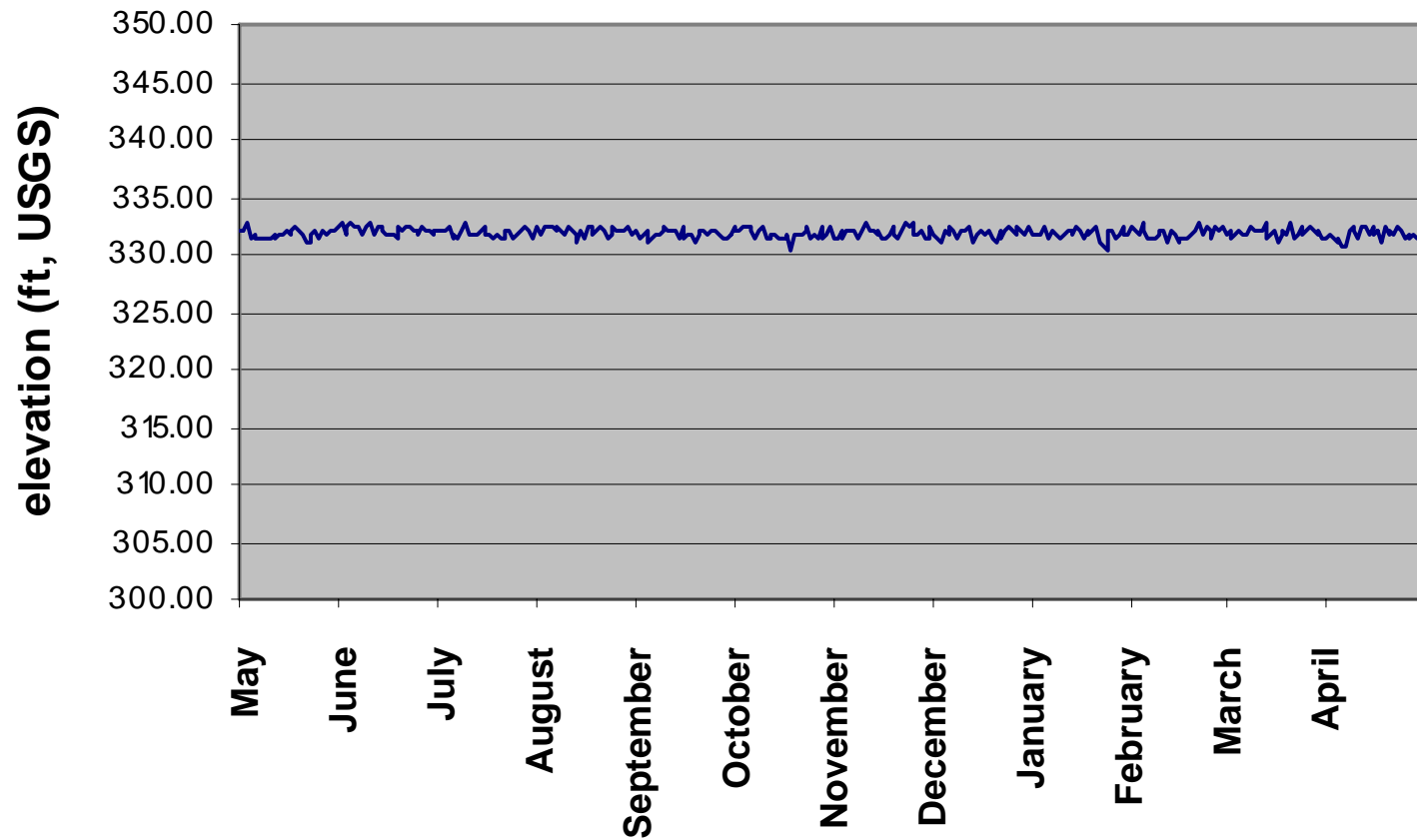
The discussion of recreational use at Falls Reservoir is based on the following information:

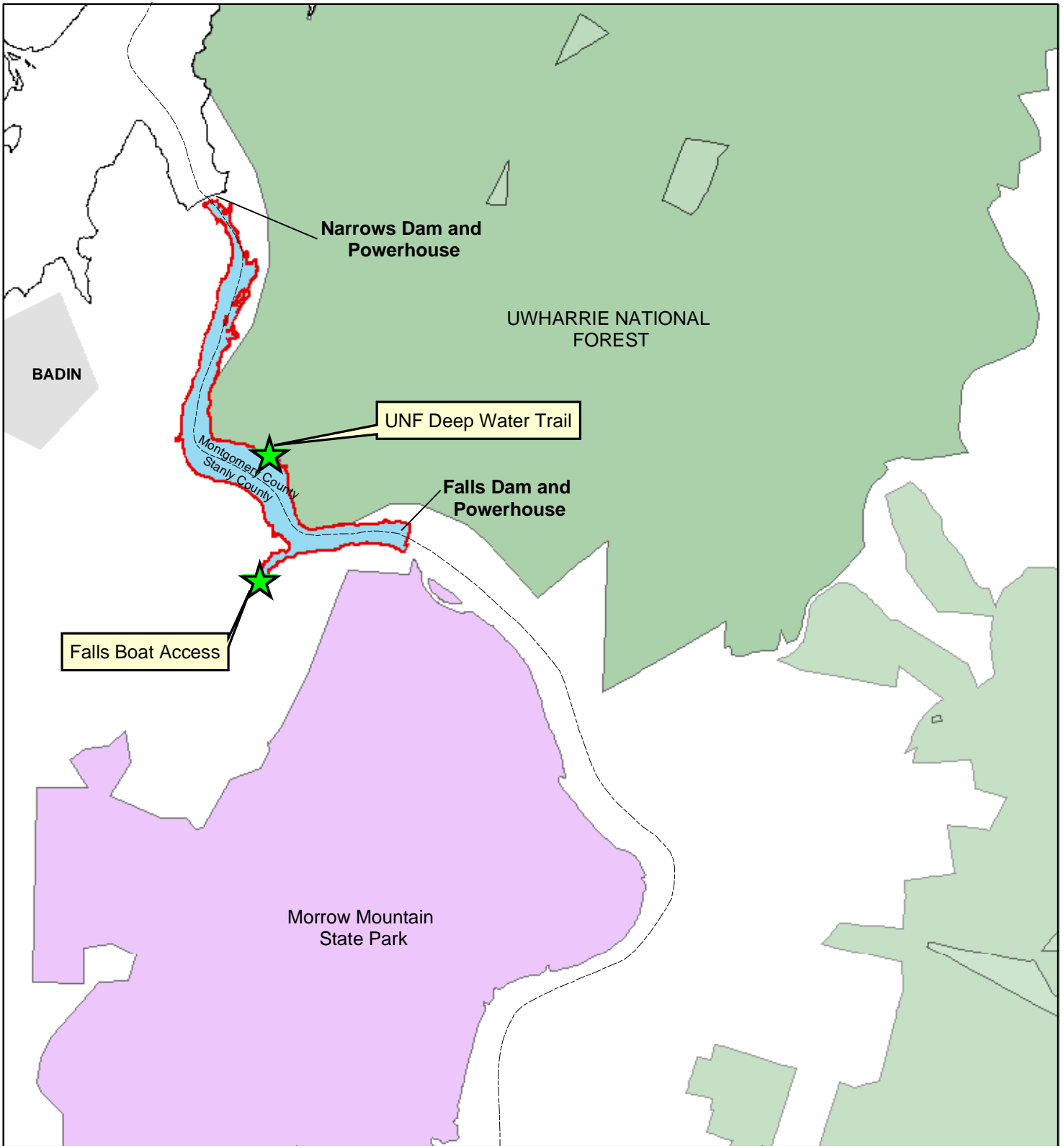
- 369 Spot Count observations,
- 17 Visitor Use Survey responses, and
- 35 Tailwater Use Survey responses.

4.5.1 Recreational Facility Condition

There are two public access recreational areas at Falls Reservoir – the Deep Water Trail Access and the Falls Boat Access Area (Table 4-35 and Figure 4-13). In addition, there is a canoe portage route around Falls Dam. The Mountain Trail within Morrow Mountain State Park provides access to the Yadkin River downstream of Falls Dam. There are unimproved trails that branch from the marked Mountain Trail and provide views of Falls Dam and access to the Falls Dam tailrace. These trails are not located within the Yadkin Project boundary and are not Project recreation facilities. There are no private business or organization recreational facilities on Falls Reservoir.

**Figure 4-12 Falls Headwater Elevation:
May 10, 2003 to May 9, 2004**












<ul style="list-style-type: none">  Falls Reservoir  Recreation Sites  Uwharrie National Forest  Morrow Mountain State Park 	<p align="center">Figure 4-13 APGI/Yadkin Recreation Study Falls Reservoir Public Access Recreation Areas</p> <p align="center">4,900 2,450 0 4,900 Feet</p> 	<p align="center">Alcoa Power Generating Inc. Yadkin Division</p> <p align="center">Date: October, 2004</p> <div>   </div>
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Table 4-35 Falls Reservoir Public Access Area Recreation Facilities (APGI, 2004)

Site Number	Name	Parking Capacity	Boat Ramp	Shoreline Fishing Capacity	Picnic Tables	Trash Receptacles	Toilets	Boat Dock /Fishing Pier	Campsites	Beach
48	Deep Water Trail Access	6 vehicles with trailers	1 dirt launch lane	20 anglers	0	2	0	0	Primitive (user-created) campsites	No
49	Falls Boat Access Area	8 vehicles with trailers	1 launch lane	1-2 anglers	0	4	0	0	0	No

Public Access Recreation Areas

Appendix K provides the VUS responses on facility condition for each of the two public access recreation areas. The key findings are summarized below.

The Deep Water Trail Access is located within the Uwharrie National Forest in Montgomery County and provides recreational opportunities for boating, bank fishing, and primitive camping. Recreational facilities include a dirt access road and parking for approximately ten vehicles, an unimproved dirt boat launch, and two trash receptacles.

The Falls Boat Access Area is located on the west side of Falls Reservoir off Falls Road (State Route 1719) in Stanly County and provides recreational opportunities for boating and bank fishing. Recreational facilities include a single concrete boat ramp, four trash receptacles, a paved parking area with capacity for approximately eight vehicles with trailers, and a gravel overflow parking area.

Most recreational users rate the condition of the recreational facilities at Falls Reservoir as acceptable to excellent. About 13 percent of the respondents at the Deep Water Trail Access (n=8) rated the boat ramp, parking area, lighting, and toilet as mostly inadequate. About 25 percent would prefer better swimming facilities (there is no beach at this site). About 22 percent of respondents (n=9) at the Falls Boat Access complained about the lack of toilet facilities.

Canoe Portage

The Falls Dam canoe portage trail, which provides canoe and kayak access from Falls Reservoir to Tillery Reservoir, is approximately 1,200 feet long and is located on the east side of Falls dam. The takeout is marked with a “Yadkin River Canoe Portage Trail” signs and the portage trail is marked.

4.5.2 Recreational Activities

According to the responses to the Visitor Use Survey (n=17), the primary (cited by over 40 percent of respondents) recreational activities at Falls Reservoir are camping, boat fishing, and bank fishing (Table 4-36). Other common (cited by over 20 percent of respondents) recreational activities included hiking, swimming, and picnicking. Occasional (cited by at least 5 percent of respondents) canoeing/kayaking, sunbathing, motor boating, water skiing, and personal watercraft use were cited, but the small size of this reservoir limits opportunities for these uses. Hunting was indicated as a recreational activity by approximately 12 percent of respondents, which may explain some spikes in recreational use observed in the Spot Counts, especially in November.

4.5.3 Recreational Use

Recreational access to Falls Reservoir is limited to the public access recreation areas and canoe portages because there are no waterfront residents with pier permits from APGI, private waterfront communities with access to Falls Reservoir, or commercial businesses or private organizations with direct access to Falls Reservoir. The TUS results are discussed below and in Section 6.0, but are not included in estimating overall recreational use to avoid double counting since these users were included in the public access recreation area use estimates.

Public Access Recreation Area Use

Based on the Spot Counts and Visitor Use Survey responses, total use at the Falls Reservoir public access recreation areas is estimated at approximately 4,158 recreation days per year (Table 4-37).

**Table 4-36 Falls Public Access
Recreation Participation Rates**

Percent of Visitors Participating in Each Recreational Activity

Site No.	Site Name	No. of Surveys Completed	Motor Boating	Boat Fishing	Bank Fishing	Canoeing/Kayaking	Hiking	Swimming	Jet Skiing	Water Skiing	Camping	Windsurfing	Picnicking	Sunbathing	Sailing	Hunting	Other
48	UNF Deep Water Trail Access	8	13%	38%	50%	13%	38%	38%	0%	0%	75%	0%	38%	38%	0%	13%	0%
49	Falls Boat Access	9	11%	44%	44%	22%	22%	22%	22%	11%	22%	0%	22%	0%	11%	11%	11%
	OVERALL TOTAL FALLS ACTIVITIES RESPONSE	17	12%	41%	47%	18%	29%	29%	12%	6%	47%	0%	29%	18%	6%	12%	6%

Table 4-37 Falls Public Access Recreational Use by Site and Month (in recreation days)

Site No.	Site Name	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Total
48	UNF Deep Water Trail Access	337	97	157	72	270	107	231	0	0	0	90	168	1,529
49	Falls Boat Access	269	572	455	460	72	107	119	93	17	76	150	240	2,629
	Total	606	669	611	532	342	215	349	93	17	76	240	408	4,158

Canoe Registry

There were no surveys completed at the Falls Reservoir canoe portage, although one survey from the Narrows Dam canoe portage indicated the intent to take out at Morrow Mountain State Park. Use of Falls Dam canoe portage appears to be very low.

Total Recreational Use

The only access to Falls Reservoir is via the two public access recreation areas and the canoe portage. Tailwater recreational use is not included in estimating overall recreational use to avoid double counting since these users were captured in the Spot Count estimates. Therefore, the total recreational use at Falls Reservoir is estimated at approximately 4,178 recreation days per year (Table 4-38). Recreational use at Falls Reservoir varies by month, type of day, and overnight versus day users. Each of these variations in recreational use is discussed below.

Table 4-38 Estimated Annual Falls Reservoir Recreation Use (in recreation days)

Month	Public Access Recreation Areas	Canoe Portage Use	Grand Total	% of Total Use
May	606	0	606	15
June	669	0	669	16
July	611	0	611	15
August	532	0	532	13
September	342	0	342	8
October	215	0	215	5
November	349	0	349	8
December	93	0	93	2
January	17	0	17	<1
February	76	0	76	2
March	240	0	240	6
April	408	0	408	10
Total	4,158	0	4,158	100

Recreational Use by Month

In terms of months, recreational use at Falls Reservoir was highest in June. Recreational use (primarily camping) at the Deep Water Trail Access (Site #48) within the Uwharrie National Forest tended to be higher in late spring (April through June), while recreational use at the Falls Boat Access tended to be higher in the summer (June through August). Recreational use in the fall and winter was generally low, although hunting is a popular recreational activity in this area and probably accounts for a spike in recreational use in November.

Recreational Use by Type of Day

Recreational use was generally highest during major holidays (i.e., Easter, Memorial Day, 4th of July, and Labor Day weekends) and weekends during the spring and summer, with significantly less use on weekdays. Since weekdays represent such a large percentage of total days (70 percent), total recreational use was highest on weekdays. Recreational use by type of day was distributed as follows:

Weekdays – 46 percent of total recreational use, 7 recreation days/weekday
Weekend days – 39 percent of total recreational use, 16 recreation days/weekend day
Holidays – 15 percent of total recreational use, 69 recreation days/holiday day

Day versus Overnight Use

Approximately 84 percent of the recreation users at the Deep Water Trail Access were camping for at least one night, while the remaining 16 percent were day users using this site for bank fishing and other activities. The camping equates to approximately 1,284 recreation days (nights) per year. Overnight users represent approximately 31 percent (1,284 recreation days/4,178 total recreation days) of the total Falls Reservoir recreational use. There are no facilities for camping or nighttime recreation at the Falls Boat Access. There may also be some anglers fishing at night, but we do not have any data on which to base an estimate of this use.

4.5.4 Recreational Facility Capacity

The adequacy of existing recreational facilities in terms of capacity was evaluated for parking areas and boat launches.

Parking Areas

Vehicle parking at the Deep Water Trail Access exceeded capacity once during 188 Spot Counts. On Sunday April 25, 2004, 14 vehicles were observed in the parking area, which exceeded the parking capacity of approximately 10 vehicles. Only three percent of the spot counts observed more than 6 cars parked at this site. Overall, parking capacity is adequate at this site.

Boat Launches

Vehicle parking at the Falls Boat Access approached capacity twice during 181 spot counts. On May 24, 2003 (Memorial Day weekend) and July 12, 2003, nine vehicles with six to seven boat trailers were observed at this site. The capacity of the Falls Boat Access is eight vehicles with trailers plus a gravel overflow parking area. Overall, parking capacity is adequate at this site.

Generally only cartop boats are launched at the Deep Water Trail Access, and capacity is not an issue based on the relatively light use at this recreation area. Although some users identified crowding at the Falls Boat Access boat launch as a big problem (11 percent of respondents), overall use at this facility would not justify adding an additional ramp. Generally, one ramp will accommodate approximately 50 launches and retrievals per day (SOBA, 1989). The estimated maximum number of launches and retrievals in one day during the study was 27.

4.5.5 Recreational Issues

Recreational user perceptions of potential problems at Falls Reservoir were collected through the VUS and TUS (Table 4-39). Respondents to these surveys rated six potential recreational issues on a scale of 1 to 4, with 1= big problem, 2=moderate problem, 3=slight problem, 4=no problem. Each potential recreational issue is discussed below. For purposes of this discussion, significant issues are identified, which are defined as > 10 percent of responses indicating a big problem or > 20 percent of responses indicating a big or moderate problem at Falls Reservoir. Please note that the results of the surveys collected at both the Narrows and Falls dam tailraces are discussed in this section, although recreational use at the Falls Dam tailrace is really more associated with the downstream Tillery Reservoir than with Falls Reservoir.

Generally, most respondents to the VUS and TUS did not identify any major problems at Falls Reservoir (Table 4-39). The only significant problems identified were the improper disposal of litter, trash, or toilet paper (25 percent of VUS responses identified this as a moderate problem); loud, rude, or inconsiderate behavior by other users (20 percent of VUS responses identified this as a moderate problem); boating hazards (11 percent of TUS responses identified this as a big problem at the Falls Dam tailrace); and availability of sanitary facilities (cited in both the VUS and the TUS).

At the individual recreation site level (see Appendix K), no respondents (n=8) identified any “big problems” at the Deep Water Trail Access. Improper disposal of litter/trash and inconsiderate behavior by other recreational users were the most commonly identified problems and were characterized as moderate problems by 25 percent of respondents. Several potential issues were identified by over 20 percent of respondents at Falls Boat Access (n=9) as big or moderate problems, including low water levels (22 percent), improper disposal of litter/trash (33 percent), conflicts with other recreational users (22 percent), boating hazards (22 percent) and the lack of sanitary facilities (33 percent).

Table 4-39 Potential Issues at Falls Reservoir

Low Water Levels at this Reservoir				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	6	13	19	63
Tailwater Use Survey (Narrows Dam Tailwaters)	8	0	25	67
Tailwater Use Survey (Falls Dam Tailwaters)	0	0	15	85
Improper Disposal of Litter, Trash, or Toilet Paper				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	6	25	31	38
Tailwater Use Survey (Narrows Dam Tailwaters)	17	8	8	67
Tailwater Use Survey (Falls Dam Tailwaters)	0	8	23	69
Conflicts With Other Recreational Users				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	0	13	13	73
Tailwater Use Survey (Narrows Dam Tailwaters)	0	0	0	100
Tailwater Use Survey (Falls Dam Tailwaters)	0	0	0	100
Loud, Rude or Inconsiderate Behavior by Other Users				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	0	20	20	60
Tailwater Use Survey (Narrows Dam Tailwaters)	0	0	0	100
Tailwater Use Survey (Falls Dam Tailwaters)	0	0	0	100
Boating Hazards (e.g, Stumps, Shallow Areas)				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	6	13	25	56
Tailwater Use Survey (Narrows Dam Tailwaters)	8	8	0	83
Tailwater Use Survey (Falls Dam Tailwaters)	7	7	21	64
Availability of Sanitary Facility				
	Big Problem (%)	Moderate Problem (%)	Slight Problem (%)	Not a Problem (%)
Visitor Use Survey	13	6	25	56
Tailwater Use Survey (Narrows Dam Tailwaters)	0	25	0	75
Tailwater Use Survey (Falls Dam Tailwaters)	9	27	0	64

4.6 Total Project Recreational Use

This section describes the overall recreational use at the Yadkin Project during the 2003-2004 study period and compares it with previous recreational use estimates.

4.6.1 Total Current Yadkin Project Recreational Use

Recreational use for the overall Yadkin Project is estimated at over 2.4 million recreation days for the one year study period (Table 4-40). Nearly all (98 percent) of this use occurs at High Rock and Narrows reservoirs. Waterfront residents and non-waterfront residents comprise the majority (74 percent) of recreational users.

Table 4-40 Total Project Recreational Use (in recreation days)

Reservoir	Visitor Use	Waterfront Resident Use	Non-Waterfront Resident Use	Businesses and Organization Use	Portage Use	Total Use	% of Total
High Rock	82,850	1,058,585	56,355	84,923	30	1,282,743	53%
Tuckertown	51,886	0	0	2,465	0	54,351	2%
Narrows	127,567	285,993	401,908	285,840	20	1,101,328	45%
Falls	4,158	0	0	0	0	4,158	<1%
Total	266,461	1,344,578	458,263	373,228	50	2,442,580	100%
% of Total	11%	55%	19%	15%	<1%	100%	

Tuckertown Reservoir receives less use than High Rock and Narrows reservoirs. This can be attributed to the following factors:

- Tuckertown Reservoir is much smaller than High Rock and Narrows reservoirs;
- Tuckertown Reservoir has no waterfront residents, private communities with water access, and only two commercial businesses with direct water access.

Falls Reservoir receives relatively light recreational use. This can be attributed to several factors:

- Falls Reservoir is by far the smallest of the four Yadkin reservoirs;
- Falls Reservoir has relatively few recreational facilities;
- Falls Reservoir has no waterfront residents, private communities with water access, and no commercial businesses or private organizations; and
- Falls Reservoir is relatively remote and access is limited.

4.6.2 Previous Recreational Use Studies

There have been three prior estimates of recreational use at the Yadkin Project in 1991 (EDAW, 1991), 1997 (Berger, 1997), and 2003 (ERM, 2003). The recreation use estimates for each reservoir from each study are presented in Table 4-41.

Table 4-41 Summary of Historical Annual Recreational Use at the Yadkin Project (in recreation days)

Reservoir	1991	1997	2002-2003	2003-2004
High Rock	708,500	815,166	410,230	1,282,743
Tuckertown	178,000	110,856	117,476	54,351
Narrows	614,000	365,596	289,521	1,101,328
Falls	12,000	9,036	10,209	4,158
Total	1,512,500	1,302,650	829,439	2,442,580

4.6.3 Comparison of Results of Existing Study with Prior Studies

As Table 4-41 indicates, the data for this study shows a reduction in recreational use at Tuckertown and Falls reservoirs and a significant increase in recreational use at High Rock and Narrows reservoirs. In order to better understand these differences, it is necessary to examine the components of overall recreational use – public access recreational area use, waterfront resident use, non-waterfront resident use, business and organization use, and canoe portage use. Each of these components is evaluated below.

Public Access Recreational Use

The estimates of public access recreational use at the four Project reservoirs were significantly lower in this survey than previous surveys (Table 4-42). The differences in the use levels among these surveys are discussed below for each reservoir.

Table 4-42 Comparison of Public Access Recreational Area Use Estimates (in recreation days)

	1991	1997	2003	2004
High Rock	184,210*	215,731	108,566	82,850
Tuckertown	17,800	110,856	117,476	51,886
Narrows	331,440*	199,126	157,691	127,567
Falls	12,000	9,036	10,209	4,178
Total	705,650	534,749	393,942	266,481

* The 1991 recreation survey did not distinguish between residents and visitors. The amount of visitor use (i.e., public access recreation area use) was estimated using the same ratio of visitor use to total use found in the 1997 recreation survey.

Public access recreational use was estimated using the following equation for each public access site:

$$\text{Recreational Use} = (\text{type of day}) \times (\text{vehicles/day}) \times (\text{people/vehicle}) \times (\text{turnover rate})$$

The 1997, 2003, and 2004 studies all surveyed 40 public access recreation areas, although the actual sites varied slightly. No data are available on how many and which public

access recreation areas were surveyed in the 1991 study. Therefore the number of public access recreation areas should not have affected the estimated use levels. Since all four recreation studies estimated recreational use for an entire year, the type of day would not vary significantly across the studies. This leaves three factors that may account for the differences in use levels. Table 4-43 compares the factors used in each study. These data indicate that in general, the persons per vehicle and the turnover rate factors used in this study were comparable to those used in the 2003 study and generally higher than those used in the 1997 study. Therefore, persons per vehicle and the turnover rate factors would not explain why the use estimates for 2004 were lower than previous studies.

Table 4-43 Comparison of Factors Used in Estimating Recreational Use

Reservoir	Vehicles/Day			People/Vehicle			Turnover Rate		
	1997	2003	2004	1997	2003	2004	1997	2003	2004
High Rock	134.3	47.1	37.6	2.2	2.63	2.40	2.0	2.40	2.51
Tuckertown	89.3	39.2	20.0	1.7	2.74	2.42	2.0	3.00	2.93
Narrows	129.9	61.8	46.7	2.1	2.62	2.87	2.0	2.67	2.60
Falls	5.0	3.5	1.7	2.5	2.63	2.64	2.0	3.00	2.59

The primary reason for the difference in the use estimates is the vehicles per day counts. The average vehicle per day counts are discussed below. All four of the recreation studies used spot counts to estimate the average number of vehicles per day. Obviously the number of spot counts is an important factor in assessing the accuracy of the spot count averages. Table 4-44 identifies the number of spot counts conducted for each study.

Table 4-44 Comparison of Number of Spot Counts

Reservoir	# of Spot Counts				Average # of Spot Counts/Day			
	1991	1997	2003	2004	1991	1997	2003	2004
High Rock	NA	2,747	828	2,292	NA	1	3	3
Tuckertown	NA	3,135	987	1,931	NA	1	3	3
Narrows	NA	1,753	1,160	2,560	NA	1	3	3
Falls	NA	322	165	369	NA	1	3	3
Total	NA	7,957	3,140	7,052	NA	1	3	3

The 1997 and 2004 studies both involved a large number of spot counts. The two studies did differ in the way the counts were scheduled. The 1997 study generally made one visit per day at a public access recreation area, but visited each site about 15 times a month and tried to vary the time of the visits. The current 2004 study generally made three visits per day at a public access recreation area, but only visited the sites between 4 and 6 times a month.

The advantage of the 1997 study approach was that it was less susceptible to the spot count coinciding with bad weather because it had more spot count days per month than the 2004 study. The disadvantage of this approach was that there was less confidence that the number of vehicles observed during the single visit was representative of the

entire day. The 2004 study design incorporated more visits per day so as to get a better average of the number of vehicles at the site that day. It is impossible to determine based on available data, which approach provides a better estimate of actual recreational use.

In addition to this methodological issue, other factors that may explain why visitor recreational use appears to be lower in 2004 include:

- A carry-over effect from the drought of 2002 may have discouraged visitors from returning to the Project reservoirs because of uncertainty regarding water levels. Some past visitors may have discovered other recreation areas during the drought of 2002 that they now patronize.
- In contrast to 2002, much of the study period was wetter than usual, especially during May and June of 2003, which may have discouraged recreational use during these peak recreation months.

There are some independent data to support the 2004 spot count data results. The North Carolina Wildlife Resource Commission (NCWRC) manages several of the public access recreation areas and provided some spot vehicle counts for the period of November 2002 through June 2003, which partially overlaps with this study period. Table 4-45 compares the average number of vehicles per day reported by the NCWRC (2003) with those observed during this study.

Table 4-45 Comparison of NCWRC Spot Counts with 1997 and 2004 Recreation Study Spot Counts

Site #	Recreation Site	Reservoir	Average # of Vehicles/Day		
			2003 NCWRC Spot Counts	2004 Recreation Survey	1997 Recreation Survey
14	Dutch 2nd Creek Boat Access	High Rock	4.1	8.5	27.6
19	Bringle's Ferry Boat Access	Tuckertown	2.9	2.6	8.1
22	Flat Creek Boat Access	Tuckertown	7.5	6.8	13.0
23	Flat Creek Fishing Access	Tuckertown	1.2	0.9	5.1
32/33	Old Whitney	Narrows	0.0	11.0	30.3
37	Circle Drive Boat Access	Narrows	8.3	15.1	35.6
38	Lakemont Boat Access	Narrows	1.3	3.4	11.9
39	Holts Cabin	Narrows	0.1	0.6	2.4
40	Badin Walk-in Fishing Pier	Narrows	0.0	1.8	NA

The NCWRC spot count data generally found similar, if not fewer, vehicles per day at the public access recreation areas they manage as compared with this study. These counts did not include the summer months, but did include the heavily used spring months. These data, although not systematically collected, still suggest lower use levels than

historically, especially in comparison with the average number of vehicles per day from the 1997 recreation study.

The U.S. Forest Service provided recreational use revenue figures for several sites within the Uwharrie National Forest for the federal fiscal years 2002, 2003, and 2004. The revenue figures for fiscal years 2002 and 2003 were averaged and converted to recreational use estimates for comparison with the results of this survey (Table 4-46).

Table 4-46 Comparison of Recreational Use Estimates Based on USFS Revenues and the APCI Survey

Recreation Site	Revenue (2003-2004 average)	Use Estimate (based on USFS revenue data)	Use Estimate (based on APCI data)
Badin Lake Campground	\$22,000	13,750 recreation days	12,571 recreation days
Badin Lake Group Camp	\$6,500	4,062 recreation days	5,429 recreation days
Cove Boat Landing ¹	\$71,500	25,535 recreation days	7,168 recreation days

¹ USFS data for Arrowhead Campground were used as a surrogate for the adjacent Cove Boat Landing

The recreational use estimates for this study are quite similar to those based on the U.S. Forest Service's revenue figures for Badin Lake Campground and Badin Lake Group Camp. The current estimate for the Cove Boat Landing is considerably lower than the use estimate based on the adjacent Arrowhead Campground. However, not all campers used the boat landing so it is expected that the use at the Cove Boat Landing would be less than at Arrowhead Campground. Overall, the U.S. Forest Service's revenue figures support the recreational use estimates of this study.

Waterfront Resident Use

The estimates of waterfront resident recreational use at High Rock and Narrows reservoirs were considerably higher in this survey than previous surveys (Table 4-47). There are no waterfront residents at Tuckertown or Falls reservoirs.

Table 4-47 Comparison of Resident Recreational Use Estimates (in recreation days)

Reservoir	1991	1997	2002-2003	2003-2004
High Rock	524,290*	599,435	301,664	1,058,585
Tuckertown	0	0	0	0
Narrows	282,440*	166,470	131,830	285,993
Falls	0	0	0	0
Total	334,860	765,905	433,494	1,344,578

* The 1991 recreation survey did not distinguish between residents and visitors. The amount of resident use was estimated using the same ratio of resident use to total use found in the 1997 recreation survey.

High Rock Reservoir

As Table 4-47 indicates, the 2003-2004 estimate of resident recreational use was significantly higher than prior studies. Water levels at High Rock Reservoir were very low during the 2002-2003 survey, which significantly reduced recreational use for that survey. The 2003-2004 estimate is approximately 77 percent higher than the 1997 survey estimate. There has not been a significant increase in the number of waterfront residences at High Rock Reservoir since 1997 that would help explain this increase in use.

There were some significant differences in methodology between the 1997 and the 2003-2004 recreation use surveys:

- The 1997 recreational use survey estimated waterfront resident recreational use based on 167 resident interviews total from both High Rock and Narrows reservoirs (the actual number from each reservoir is not available). This current survey estimated waterfront resident recreational use based on 1,243 mail-back surveys (47 percent response rate) from High Rock Reservoir waterfront residents.
- The 1997 survey asked residents to estimate their annual recreational use levels and activities. The 2003-2004 survey asked residents to estimate their recreational use for the past month, which should result in a more accurate estimate.
- The 1997 survey interviewed waterfront residents encountered along the shoreline. This is not necessarily a representative sample and may not have captured recreational boaters who represent over 50 percent of the total recreational use at High Rock Reservoir.

Limited data are available to evaluate the methodology used in the 1991 recreation use survey.

For these reasons, the current study's estimate of resident recreational use at High Rock Reservoir, although considerably higher than prior studies, is considered reasonable and more accurate.

Narrows Reservoir

As Table 4-47 indicates, the 2003-2004 estimate of resident recreational use was significantly higher than the estimate for 2002-2003, but 2002 was a drought year and water levels in Narrows Reservoir were unusually low, which reduced recreational use. The 2003-2004 estimate was higher than the 1997 estimate, but there has been a significant amount of residential growth around Narrows Reservoir since 1997, and a 14 percent increase in the number of waterfront residences with pier permits from APGI since 1996.

As discussed above, this survey was much more robust than prior studies in surveying waterfront residents with 521 responses (52 percent response rate) from Narrows Reservoir waterfront residents.

Therefore, this estimate of resident recreational use at Narrows Reservoir appears reasonable.

Non-waterfront Resident Use

None of the previous studies estimated recreational use associated with non-waterfront residences with access to the Project reservoirs via private community boat launches, marinas, and piers. The 1997 study stated that it assumed minimal recreational use from these private community sites. The number of private communities with water access, however, has increased significantly over the past several years, especially at Narrows Reservoir.

This current study did survey these private communities and estimated use as 458,263 recreation days per year, or about 17 percent of total use. This estimate of non-waterfront resident use is based on responses to the PCUS. It should be noted that only 108 useable survey responses were received (35 for High Rock Reservoir and 73 for Narrows Reservoir). This response rate provides an acceptably high confidence level (91 percent) for Narrows Reservoir, but a marginal confidence level (87 percent) for High Rock Reservoir (generally confidence levels above 90 percent are considered acceptable).

The results seem reasonable when compared with the use estimates for waterfront residents. We would expect the number of annual household recreation days to be less for non-waterfront residents than for waterfront residents, and the results support that finding (Table 4-48).

Table 4-48 Average Annual Number of Resident Recreation Days per Household

Reservoir	Recreation Days Per Waterfront Resident Household	Recreation Days Per Non-Waterfront Resident Household
High Rock	389	20.2
Narrows	284	86.1

Overall, the estimate of non-waterfront resident use appears reasonable and may underestimate non-waterfront resident use at High Rock Reservoir.

Business and Organization Use

None of the previous studies estimated recreational use associated with commercial businesses and private organizations that have direct access to the reservoirs. In this current study, this use was estimated as 373,228 recreation days per year, or about 15 percent of total use, with most of this occurring at High Rock and Narrows reservoirs.

This survey was self-reported and it was impossible to independently verify the use estimates. Therefore, these estimates could be high or low. It should be noted that 15 businesses or organizations did not respond to the survey and were not included in the estimates of business and organization recreational use. Inclusion of these additional businesses and organizations would increase the estimate of recreational use.

Canoe Portage Use

None of the previous studies specifically estimated recreational use for the canoe portages. In this current study, this use was estimated as 50 recreation days per year.

Summary

The 2003-2004 estimate of recreational use is significantly higher than previous estimates. Based on the analysis above, this estimate is supportable by the data. It appears that the higher use estimate is primarily due to:

- A better estimate of waterfront resident recreational use;
- Inclusion of an estimate for private community recreational use; and
- Inclusion of an estimate for business and organization recreational use.

5.0 RECREATIONAL CARRYING CAPACITY

Reservoir carrying capacity is a dynamic concept and can be measured several different ways. For purposes of this study, both physical and social carrying capacity were considered. Each of these is discussed below.

5.1 Physical Carrying Capacity

Physical carrying capacity is a measure of how much recreational boating a reservoir can safely accommodate at one time. Estimates of physical carrying capacity are primarily driven by safety considerations (i.e., maintaining safe distances between boats). There are several publications that provide guidelines for the area requirements of various types of water based recreational activities. These reports include:

- Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities (SOBA, 1989);
- Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity (U.S. Department of Interior, 1977);
- Recreation Carrying Capacity Handbook: Methods and Technologies for Planning, Design, and Management (U.S. Army Corps of Engineers, 1980);
- Carrying Capacity in Recreation Settings (Oregon State University, 1986); and
- Management of Aquatic Recreation Resources (Warren and Rea, 1989).

Methodology

The overall boat carrying capacity for the Yadkin Project was assessed based on a modification of standards and procedures identified in *Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity* (BOR, 1977) and *Management of Aquatic Recreational Resources* (Warren and Rea, 1989). Data included in this analysis included:

- total usable boating surface area;
- optimum boating acres per boat for each boat activity type; and
- distribution of the type of boating per category (e.g., what percent of the total boating use is motor boating, sailing, PWC)

The usable boating surface areas for Tuckertown, Narrows, and Falls reservoirs were determined by subtracting a near-shore area of 100 feet, which accounts for shallow water, piers, and nearshore recreation activities (e.g., bank fishing and swimming), from the total lake surface areas at the normal maximum water elevations (Table 5-1). These restrictions were applied to establish a conservative estimate of the usable boating surface area available at these reservoirs. The useable boating surface area for High Rock Reservoir was calculated differently because of the magnitude of reservoir drawdown and the extent of shallow water areas in the headwaters of the reservoir. The useable boatable surface area was calculated assuming a five foot drawdown (i.e., normal maximum

summer drawdown) and five feet of water depth to allow adequate water depth for safe boating, using available bathymetric data for High Rock Reservoir.

Table 5-1 Useable Water Surface Area

Reservoir	Lake Surface Area	Useable Acreage
High Rock	15,180	8,525
Tuckertown	2,560	2,200
Narrows	5,353	4,528
Falls	204	132

The recommended surface area per watercraft type is listed in Table 5-2. Because of the increased horsepower now common with personal watercraft, these are treated the same as motorboats.

Table 5-2 Watercraft Use Factor

Type of Watercraft	Use Factor
Motorboats	9.0 acres per boat
Sailboats	4.3 acres per boat
Canoes/kayaks	1.3 acres per boat
Waterskiing boats	12.0 acres per boat
Personal watercraft (PWC)	9.0 acres per boat

The mix of watercraft is the final factor in the analysis. The boating mix for each reservoir is based on the results of the RUS and the aerial photographs (Table 5-3).

Table 5-3 Watercraft Mix by Reservoir

Reservoir	Power Boats and PWC	Water skiers or Tubers	Sailboats	Canoes/kayaks/Windsurfers
High Rock	87%	6%	2%	5%
Tuckertown	83%	6%	0%	11%
Narrows	88%	10%	0%	2%
Falls	73%	7%	0%	20%

The final carrying capacity calculations for each reservoir takes into consideration the reservoir's useable surface area, watercraft mix, and watercraft use factor. Table 5-4 lists the physical watercraft carrying capacity for each reservoir.

Table 5-4 Project Physical Carrying Capacity by Reservoir

Reservoir	Motor Boats and PWC	Water skiers or Tubers	Sailboats	Canoes/Kayaks/Windsurfers	Total Watercraft
High Rock	852	59	20	50	981
Tuckertown	219	16	0	29	264
Narrows	435	49	0	10	494
Falls	13	1	0	4	18

5.2 Social Carrying Capacity

Social carrying capacity is a dynamic concept that can change over time with recreational user's expectations, the mix of boats, and changes in boating regulations. Estimates of social carrying capacity are a more direct measure of recreational experience and address crowding issues.

The VUS, RUS, PCUS, and TUS all asked recreational users about crowding. Recreational users' perceptions of crowding at each reservoir, at public boat launches, and along the shoreline are discussed below.

5.2.1 High Rock Reservoir

Crowding on High Rock Reservoir

Respondents to the VUS, RUS, and PCUS all rated the degree of crowding on High Rock Reservoir. The VUS asked recreational users about the extent of crowding at the reservoir on the day they were surveyed (including weekdays and weekends). The RUS and PCUS asked recreational users about crowding on High Rock Reservoir on a typical weekend during the month (for the RUS) or season (for the PCUS) they received the survey. In order to more fairly compare responses, weekend VUS responses were identified and evaluated separately (Figure 5-1). The results indicate that between 17 and 21 percent of respondents thought that High Rock Reservoir was "quite" or "very crowded" on weekends.

The VUS, RUS, and PCUS responses on crowding were disaggregated by season. As Figure 5-2 indicates, responses to all three surveys indicate that concerns about crowding were the greatest during the summer (between 21 and 36 percent of respondents indicated that High Rock Reservoir was quite or very crowded on typical weekends in the summer). Few respondents identified any concerns with crowding during the fall and winter, but nearly 20 percent of visitors and 12 percent of residents indicated that High Rock Reservoir is "quite" or "very crowded" in the spring.

In response to another question about reservoir crowding, 9 percent of respondents to the VUS, 18 percent of respondents to the RUS, and 22 percent of respondents to the PCUS identified "too many watercraft on the reservoir" as a big or moderate problem (Figure 5-3).

Figure 5-1 Survey Responses for Crowding at High Rock Reservoir

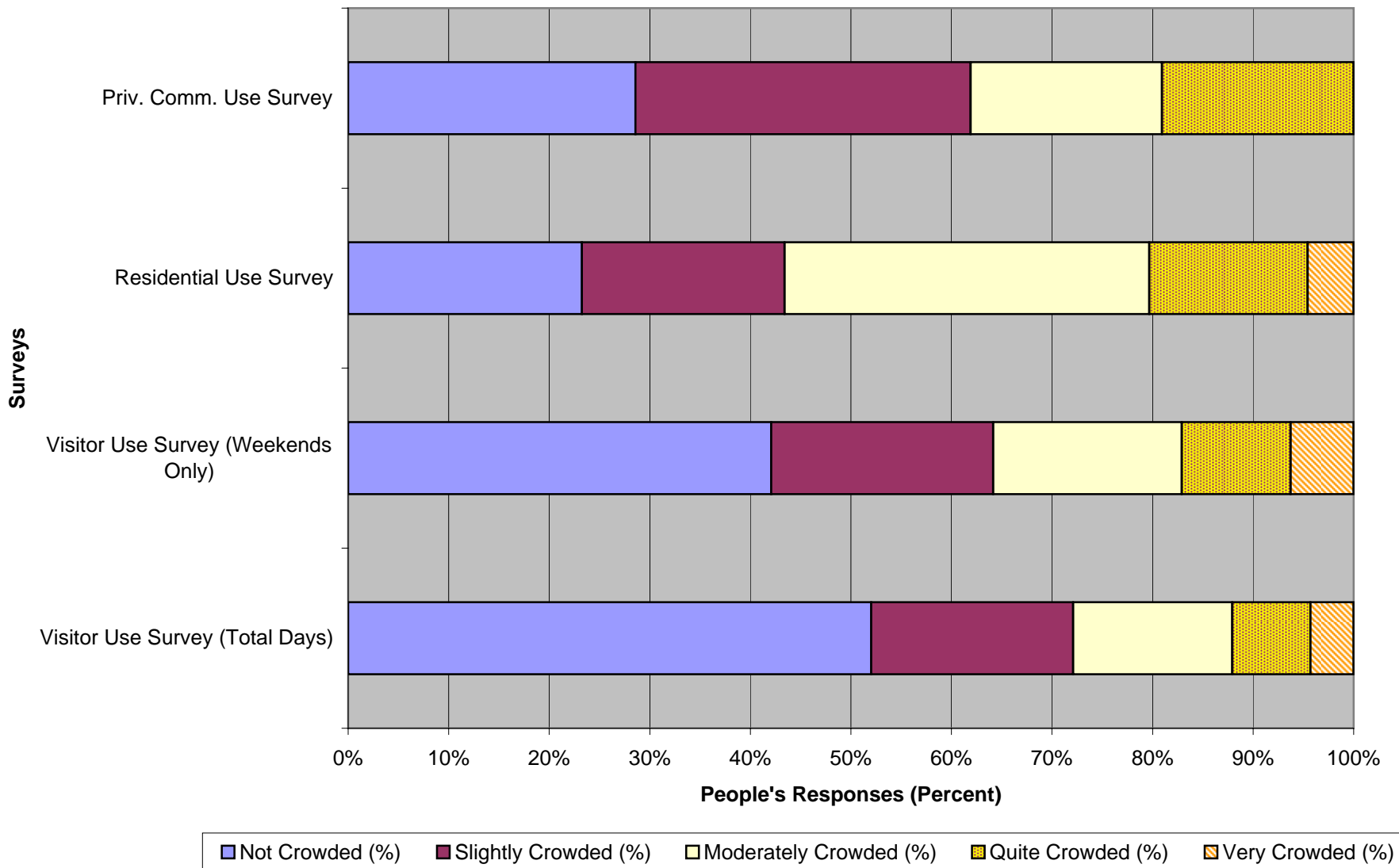


Figure 5-2 Survey Responses for Crowding on High Rock Reservoir by Season

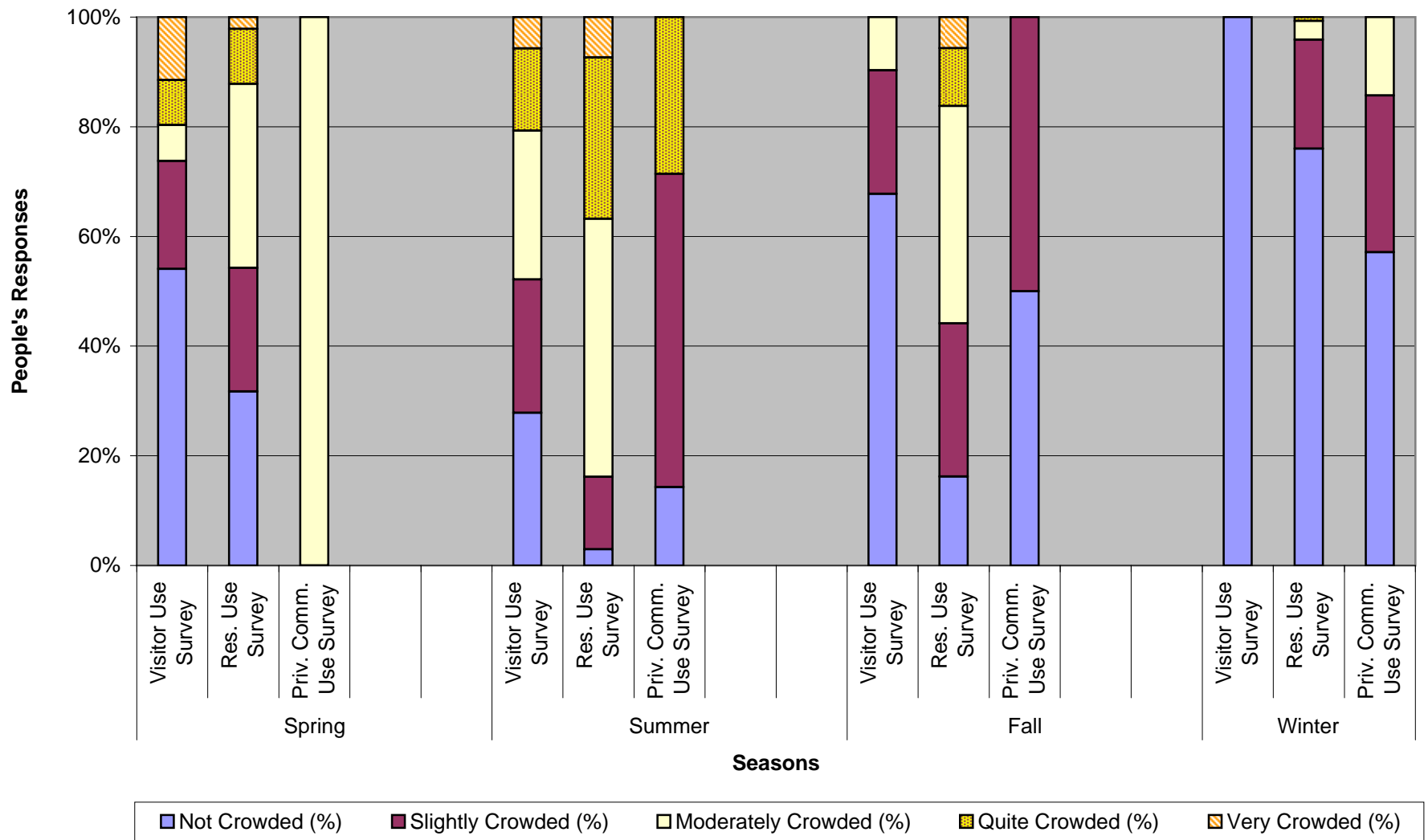
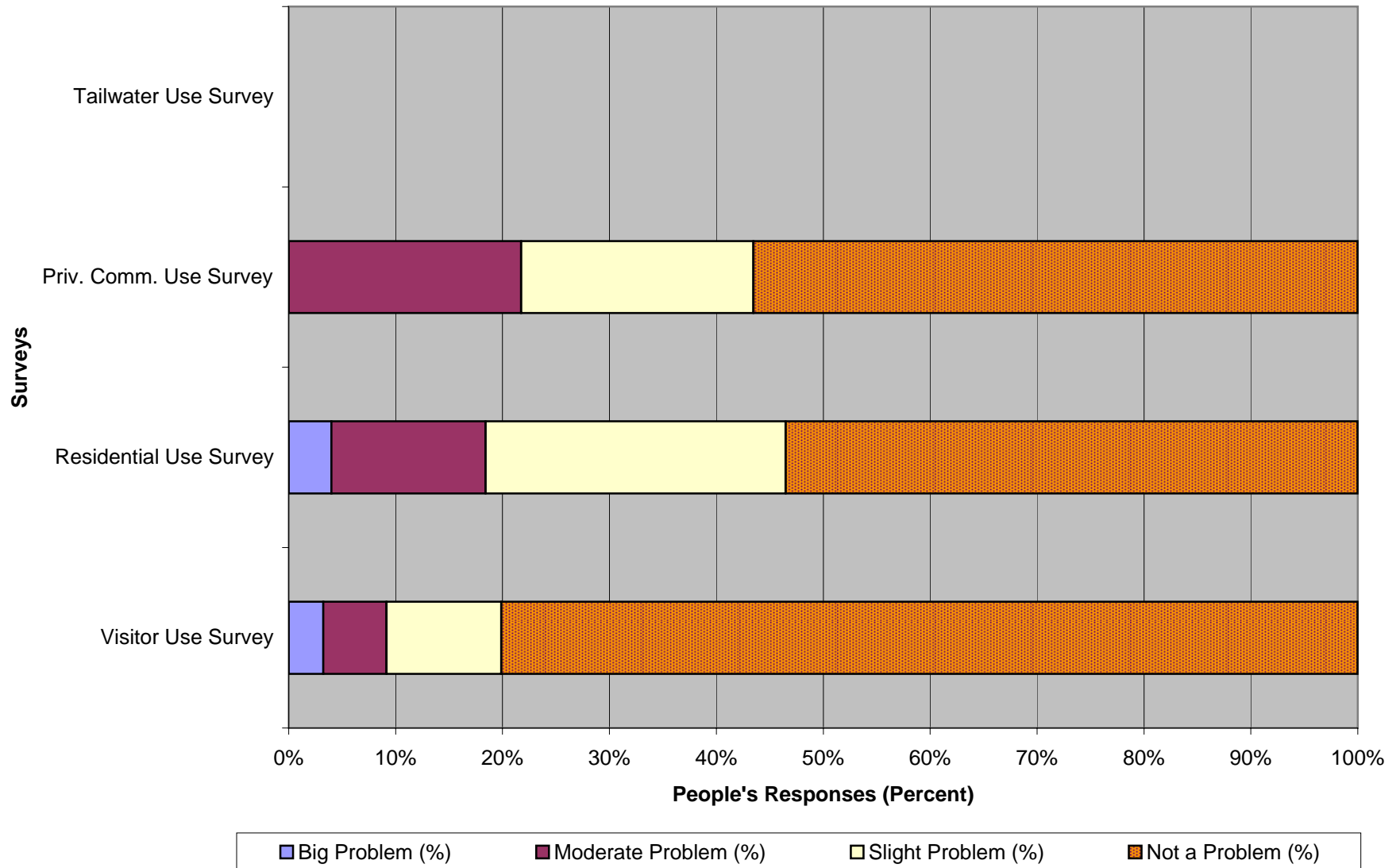


Figure 5-3 Survey Responses for "Too Many Watercraft on High Rock Reservoir"



Crowding at High Rock Boat Launches

There are 10 public boat launches on High Rock Reservoir (see Table 4-5) as well as several at private waterfront communities. Only 8 percent of respondents to the VUS indicated that crowding at the public boat launches at High Rock Reservoir was a big or moderate problem. About 77 percent indicated that crowding at these launches was not a problem at all. At none of the 10 public boat launches was crowding identified as a significant problem (defined as >10 percent of respondents indicating a big problem or >20 percent of respondents indicating a big or moderate problem).

Respondents to the PCUS identified more problems with crowding at boat launches with 4 percent indicating it was a big problem and 22 percent a moderate problem. These private community boat ramps are the responsibility of the respective communities and not APGI. Figure 5-4 presents the responses to these surveys.

Crowding Along High Rock Reservoir Shoreline

Respondents to the VUS, RUS, and PCUS all indicated that crowding along the High Rock Reservoir shoreline was not a problem. Only 0 to 4 percent of respondents indicated that this was a big or moderate problem (Figure 5-5).

5.2.2 Tuckertown Reservoir

Crowding on Tuckertown Reservoir

In response to the question, “How crowded was this (Tuckertown) reservoir today?”, 78 percent of respondents to the Visitor Use Survey (n=218) indicated not crowded or slightly crowded; 5 percent indicated very crowded (Figure 5-6). There are no waterfront residences or private waterfront communities on Tuckertown Reservoir.

In response to another question about crowding, only 1 percent of respondents to the VUS identified “too many watercraft on the reservoir” as generally a big problem and 3 percent identified it as a moderate problem (Figure 5-7). All but one of these responses occurred on either 4th of July weekend or on September 13, 2003 when a large fishing tournament (NCWRC estimates 85 boats) was held on Tuckertown Reservoir. None of the respondents to the TUS identified too many watercraft on the reservoir as a big or moderate problem. Most VUS and TUS survey responses indicated that usually the number of boats on Tuckertown Reservoir was not a problem. Overall, crowding on Tuckertown Reservoir does not appear to be an issue at this time.

Figure 5-4 Survey Responses for Crowding at High Rock Reservoir Boat Launches

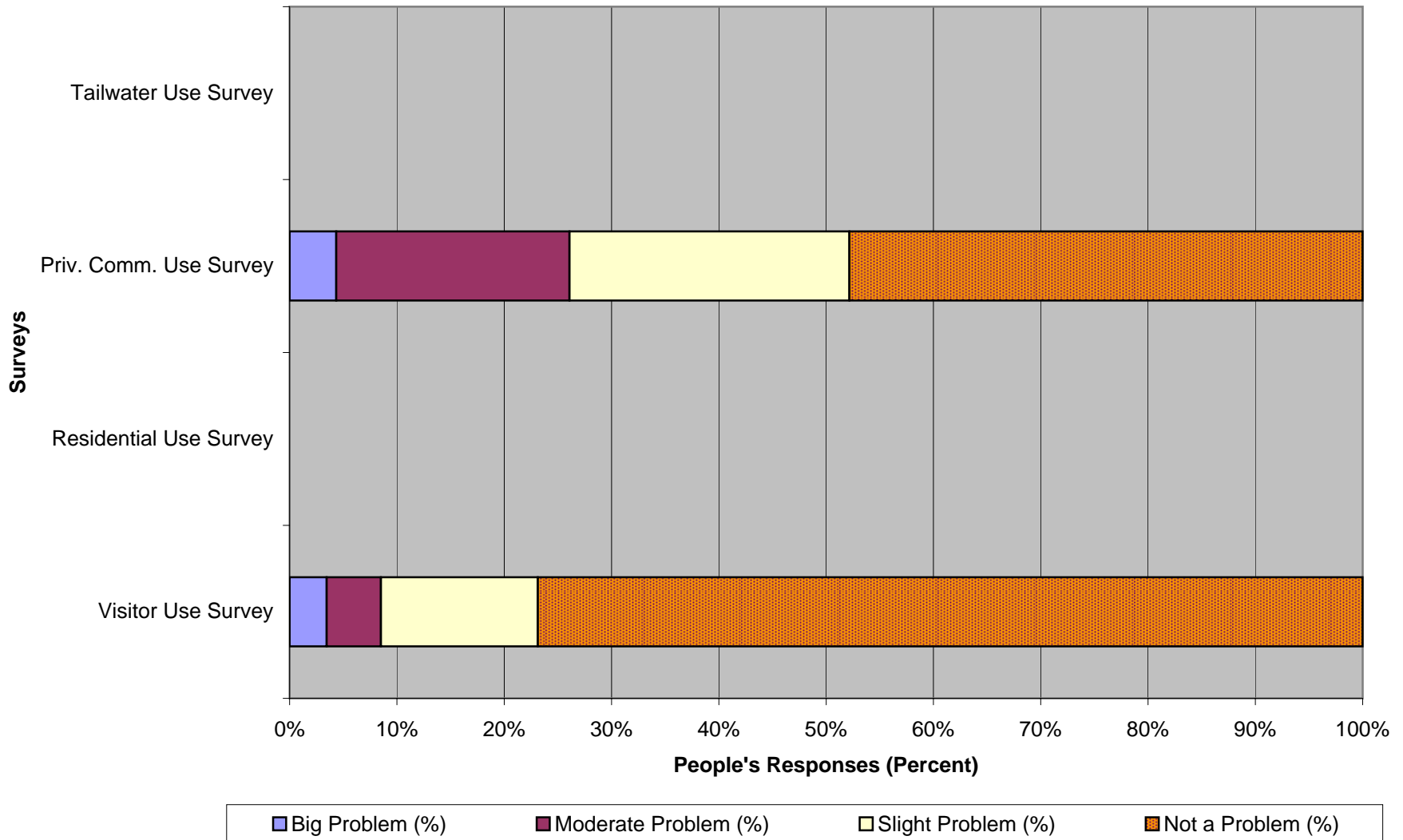


Figure 5-5 Survey Responses for "Too Many People Along the Shoreline at High Rock Reservoir"

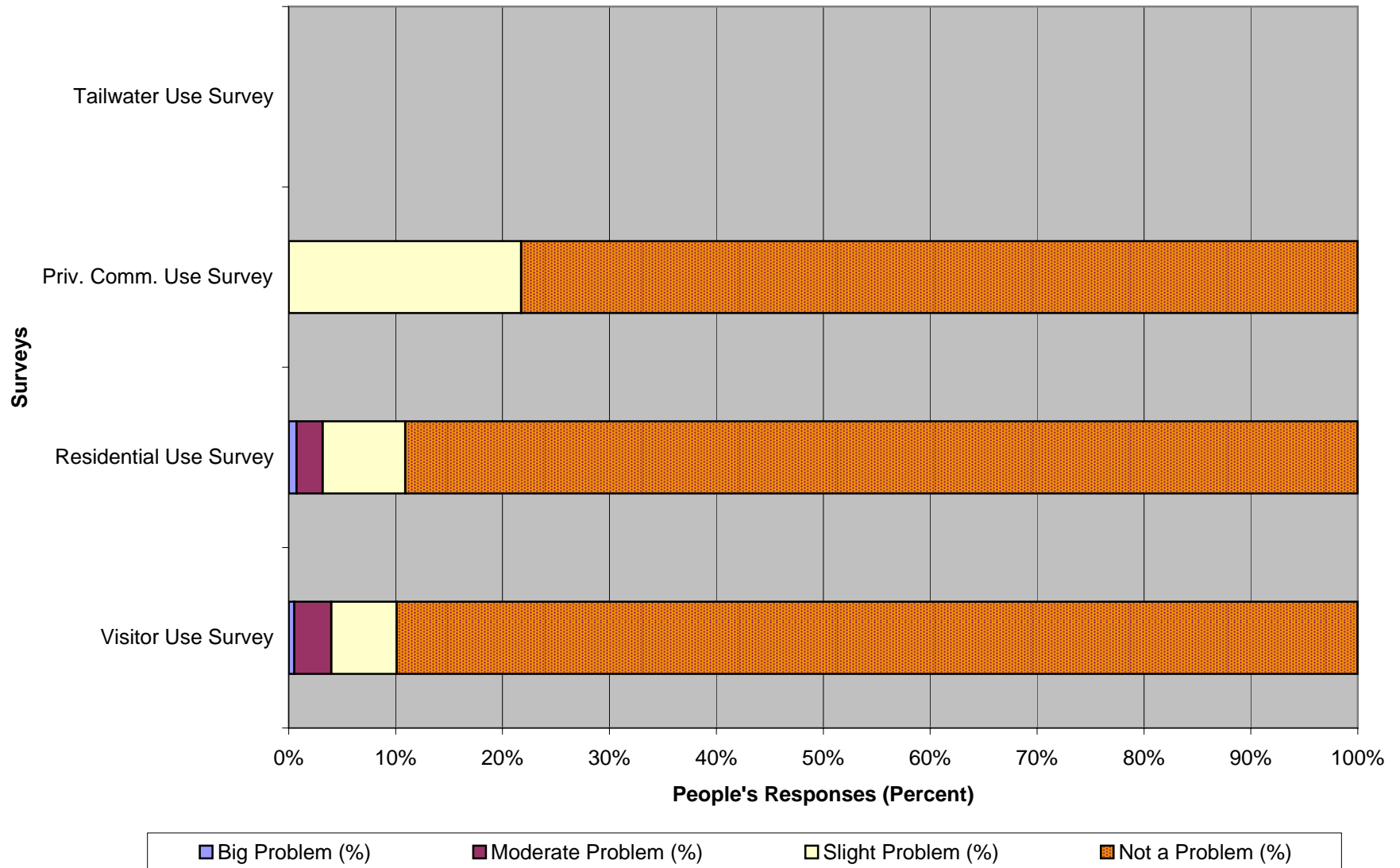


Figure 5-6 Survey Responses for Crowding on Tuckertown Reservoir

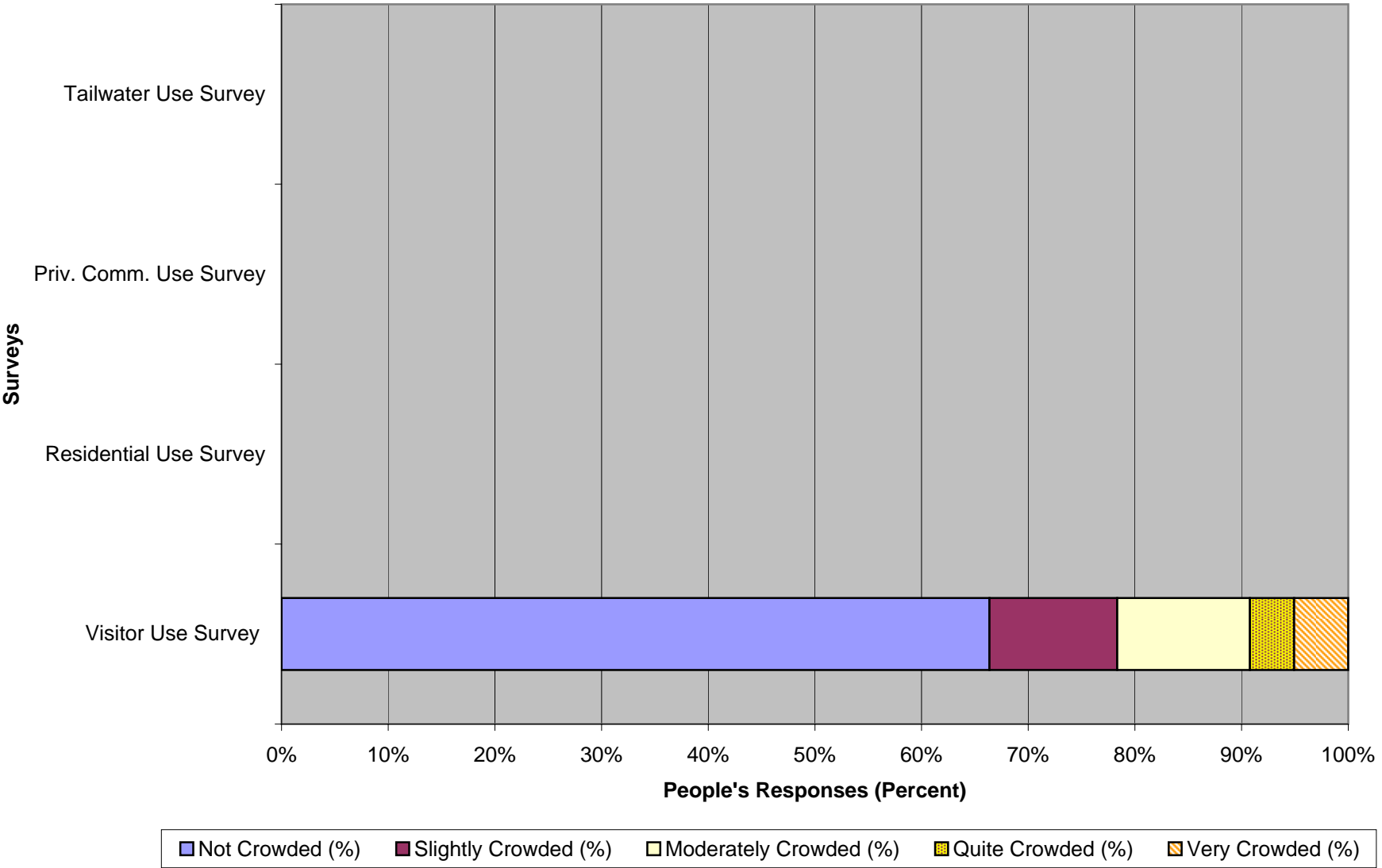
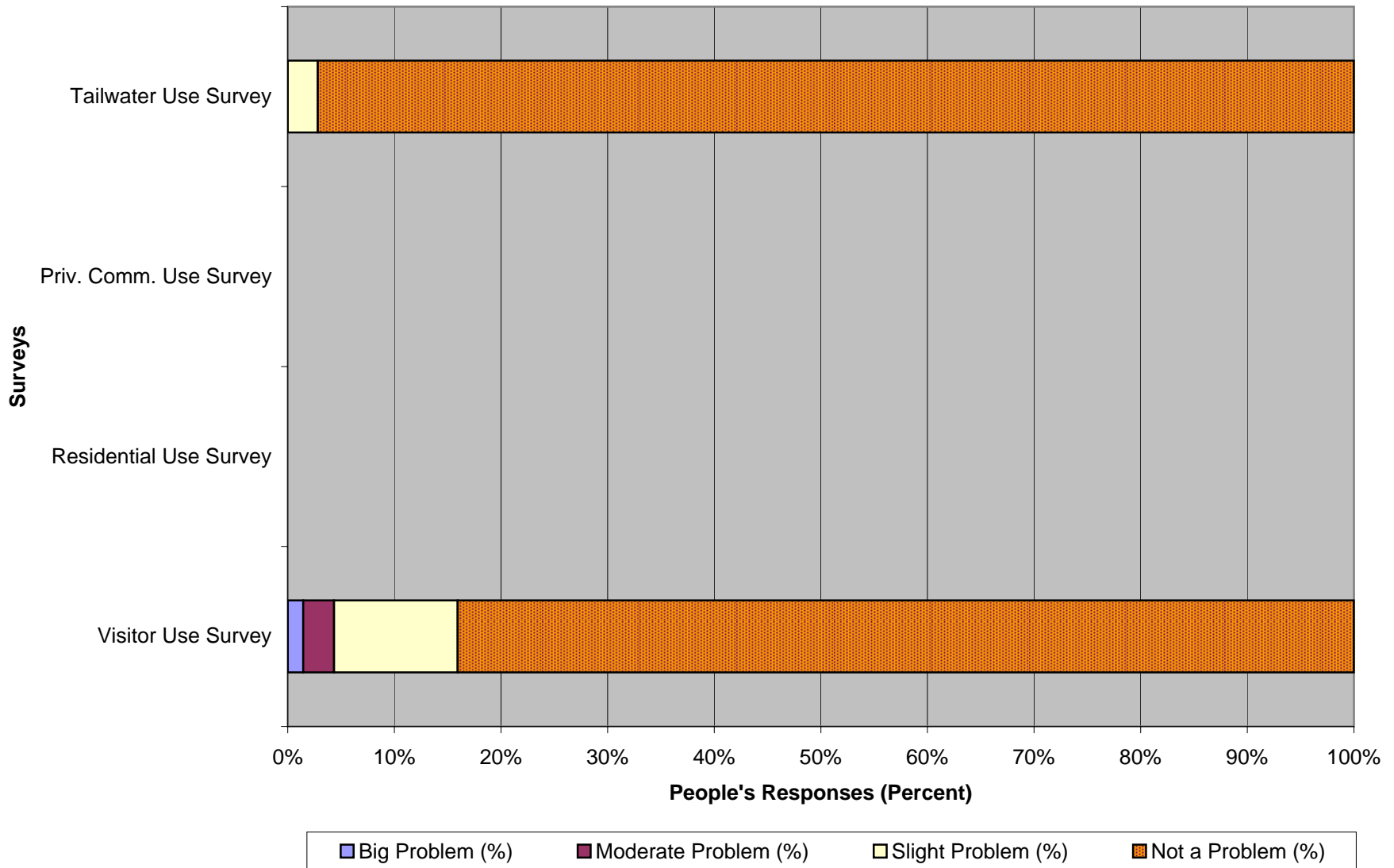


Figure 5-7 Survey Responses for "Too Many Watercraft on Tuckertown Reservoir"



Crowding at Tuckertown Reservoir Boat Launches

There are three public boat launches on Tuckertown Reservoir (i.e., Bringle Ferry, Flat Creek, and Highway 49 boat access areas). Over 80 percent of respondents to the VUS indicated that crowding at the boat launches was not a problem. Five percent of respondents claimed it was a moderate problem and two percent said it was a big problem. All of the responses that indicated a big problem and most of the responses that indicated a moderate problem occurred either on 4th of July weekend or during the fishing tournament on September 13, 2003 (Figure 5-8). Only 1 percent of the respondents to the TUS identified crowding at the Tuckertown boat launches as a big or moderate problem. Overall, crowding at the boat launches at Tuckertown Reservoir does not appear to be an issue at this time.

Crowding Along the Tuckertown Reservoir Shoreline

Finally, six percent of respondents to the VUS indicated that too many people along the shoreline were a big or moderate problem (Figure 5-9). Nearly 2/3 of these responses occurred on either 4th of July weekend or during the fishing tournament on September 13, 2003. Similarly, approximately 7 percent of respondents to the TUS identified crowding along the shoreline as a big or moderate problem. Overall, crowding along the shoreline does not appear to be an issue at Tuckertown Reservoir at this time.

5.2.3 Narrows Reservoir

Crowding on Narrows Reservoir

Respondents to the VUS, RUS, and PCUS all rated the degree of crowding on the reservoir, at boat launches, and along the shoreline. The VUS asked recreational users about the extent of crowding at the reservoir on the day they were surveyed (including weekdays and weekends), with about 5 percent rating the reservoir as quite or very crowded. The RUS and the PCUS asked recreational users about crowding on Narrows Reservoir on a typical weekend during the month (for the RUS) or season (for the PCUS) they received the survey. Residents tended to consider crowding more of an issue with 18 percent of waterfront residents and 25 percent of non-waterfront residents indicating Narrows Reservoir was quite or very crowded (Figure 5-10).

The VUS, RUS, and PCUS responses on crowding were disaggregated by season. As Figure 5-11 indicates, responses to all three surveys indicate that concerns about crowding were the greatest during the summer with 8 percent of visitors, 38 percent of waterfront residents, and 35 percent of non-waterfront residents indicating that Narrows Reservoir was quite or very crowded on typical weekends in the summer. Few respondents identified any concerns with crowding during the fall, winter, or spring.

Figure 5-8 Survey Responses for Crowding at Tuckertown Boat Launches

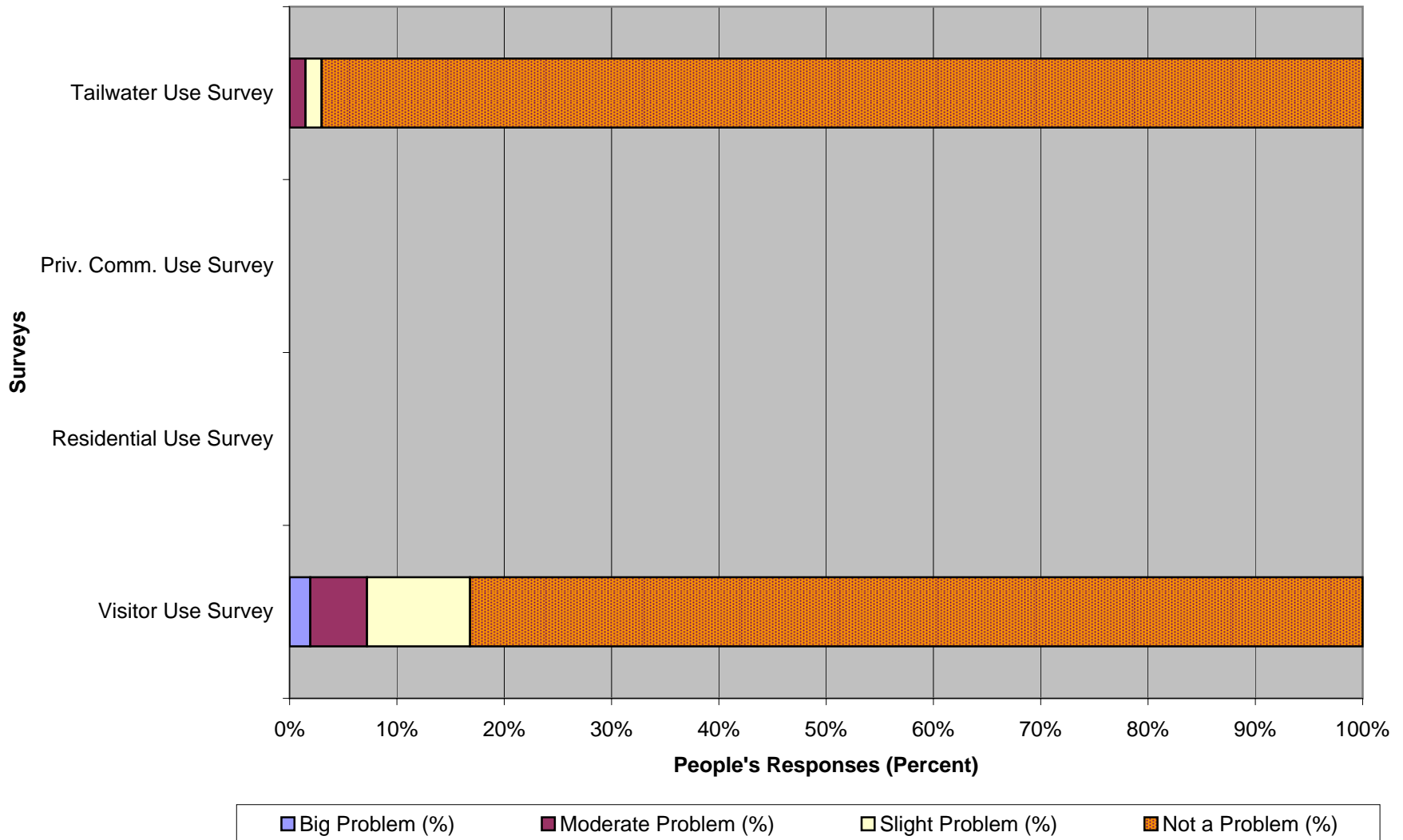


Figure 5-9 Survey Responses for "Too Many People Along the Shoreline at Tuckertown Reservoir"

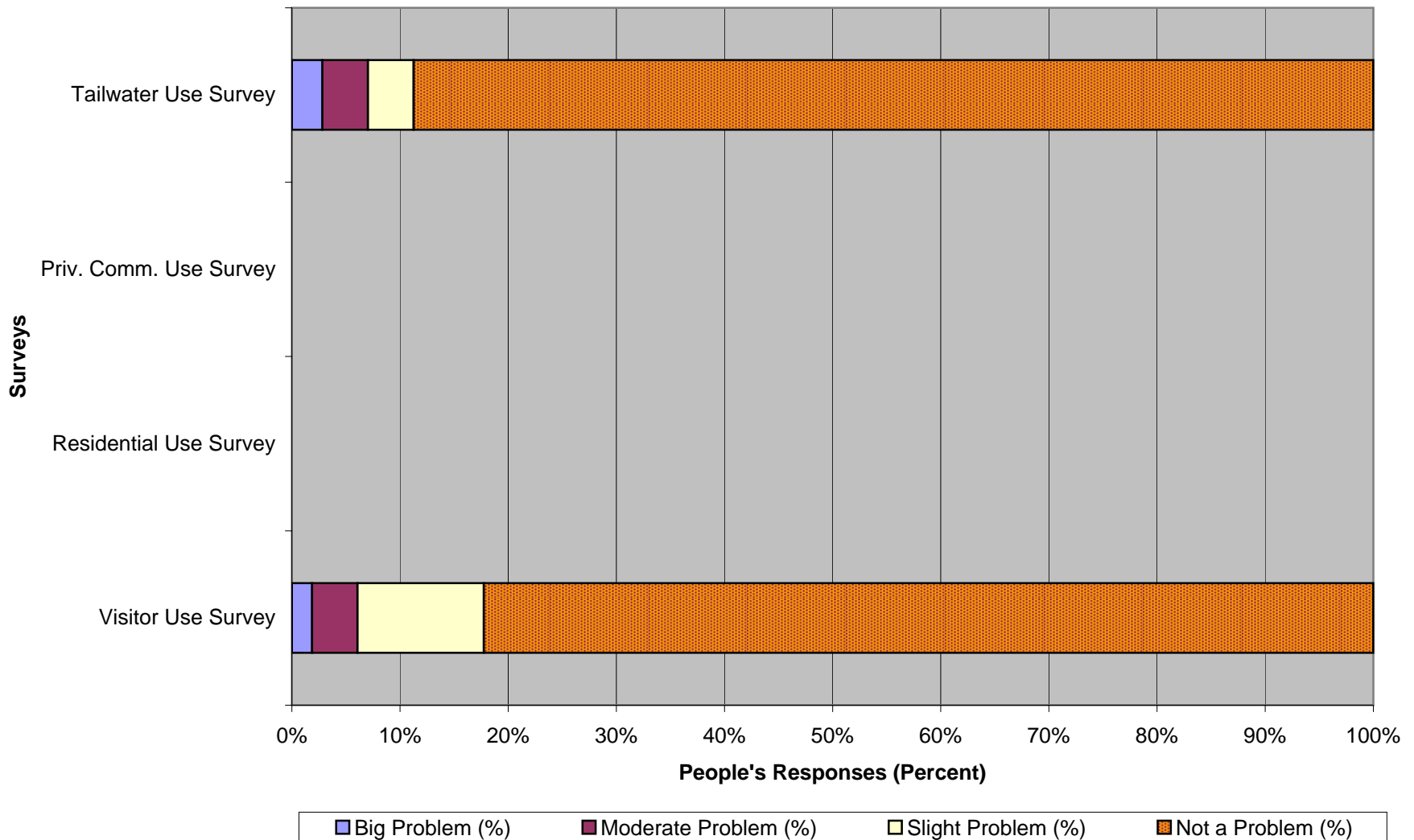


Figure 5-10 Survey Responses for Crowding on Narrows Reservoir

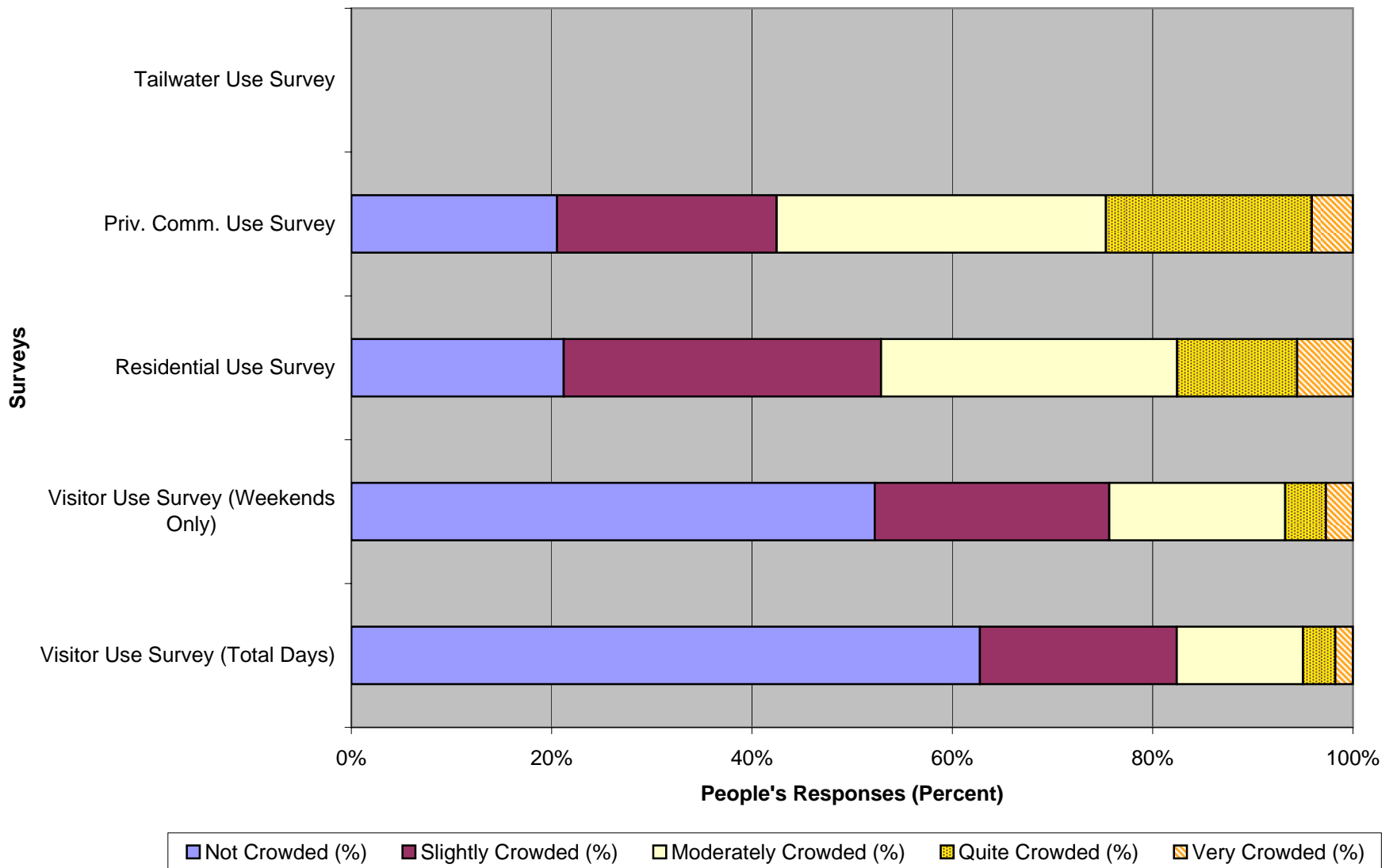
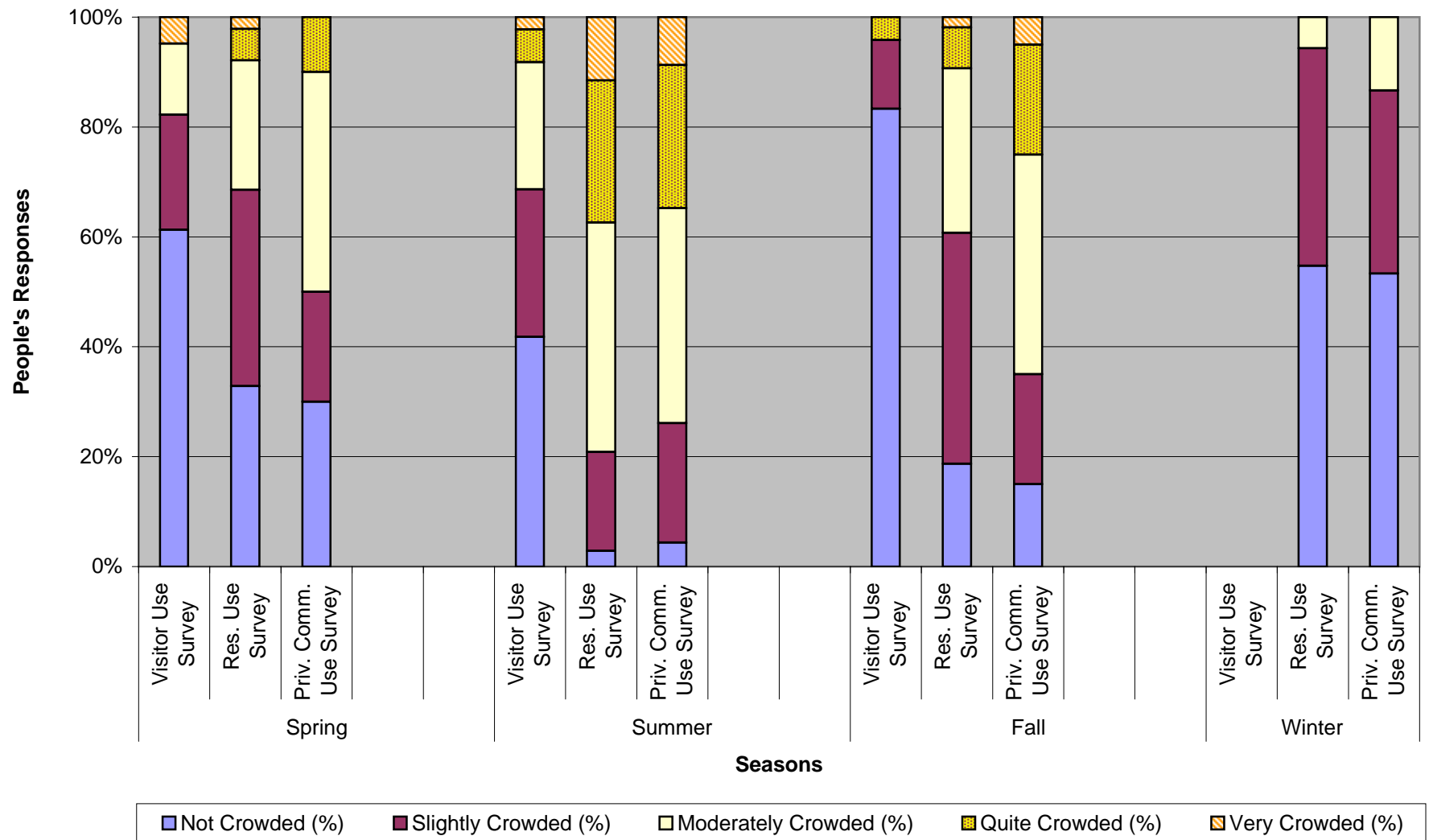


Figure 5-11 Survey Responses for Crowding on Narrows Reservoir by Season



In response to another question about crowding, between 2 percent of TUS respondents, 6 percent of VUS respondents, 24 percent of PCUS respondents, and 28 percent of RUS respondents identified “too many watercraft on the reservoir” as a big or moderate problem (Figure 5-12).

Crowding at the Narrow Reservoir Boat Launches

There are eight public access boat launches on Narrows Reservoir (see Table 4-24). Over 80 percent of respondents to the VUS and over 90 percent of respondents to the TUS indicated that crowding at the boat launches was not a problem. Lake Forest Campground/Fish Tales Marina was the only public boat launch where crowding was identified as a significant issue (25 percent of VUS respondents identified crowding at the boat launch as a moderate problem), but the response rate was low at this site (n=4) and not necessarily indicative of a real problem.

Respondents to the PCUS identified more problems with crowding at private community boat launches with 8 percent indicating it was a big problem and 11 percent a moderate problem. These private community boat ramps are the responsibility of the respective communities and not APGI. Figure 5-13 summarizes the responses to these surveys.

Crowding Along the Narrows Reservoir Shoreline

Few recreation users consider the shoreline along Narrows Reservoir crowded. Only between 2 percent (PCUS) and 7 percent (VUS and TUS) of respondents indicated that too many people along the shoreline at Narrows Reservoir were a big or moderate problem (Figure 5-14). Most respondents (86 to 90 percent varying by survey) did not consider crowding along the shoreline to be a problem at all. Overall, crowding along the shoreline does not appear to be an issue at Narrows Reservoir at this time.

5.2.4 Falls Reservoir

Crowding on Falls Reservoir

In response to the question, “How crowded was this (Falls) reservoir today?”, 81 percent of respondents to the VUS (n=17) indicated not crowded or slightly crowded, and none indicated very crowded (Figure 5-15). Since there are no waterfront residences or private waterfront communities on Falls Reservoir, no responses were received from these surveys for Falls Reservoir.

In a separate set of questions regarding potential issues at Falls Reservoir, no respondents (n=15) to the VUS identified “too many boats on the reservoir” as a big problem and only 6 percent identified it as a moderate problem (Figure 5-16). None of the respondents to the TUS identified too many boats on the reservoir as a big or moderate problem.

Figure 5-12 Survey Responses for "Too Many Watercrafts on Narrows Reservoir"

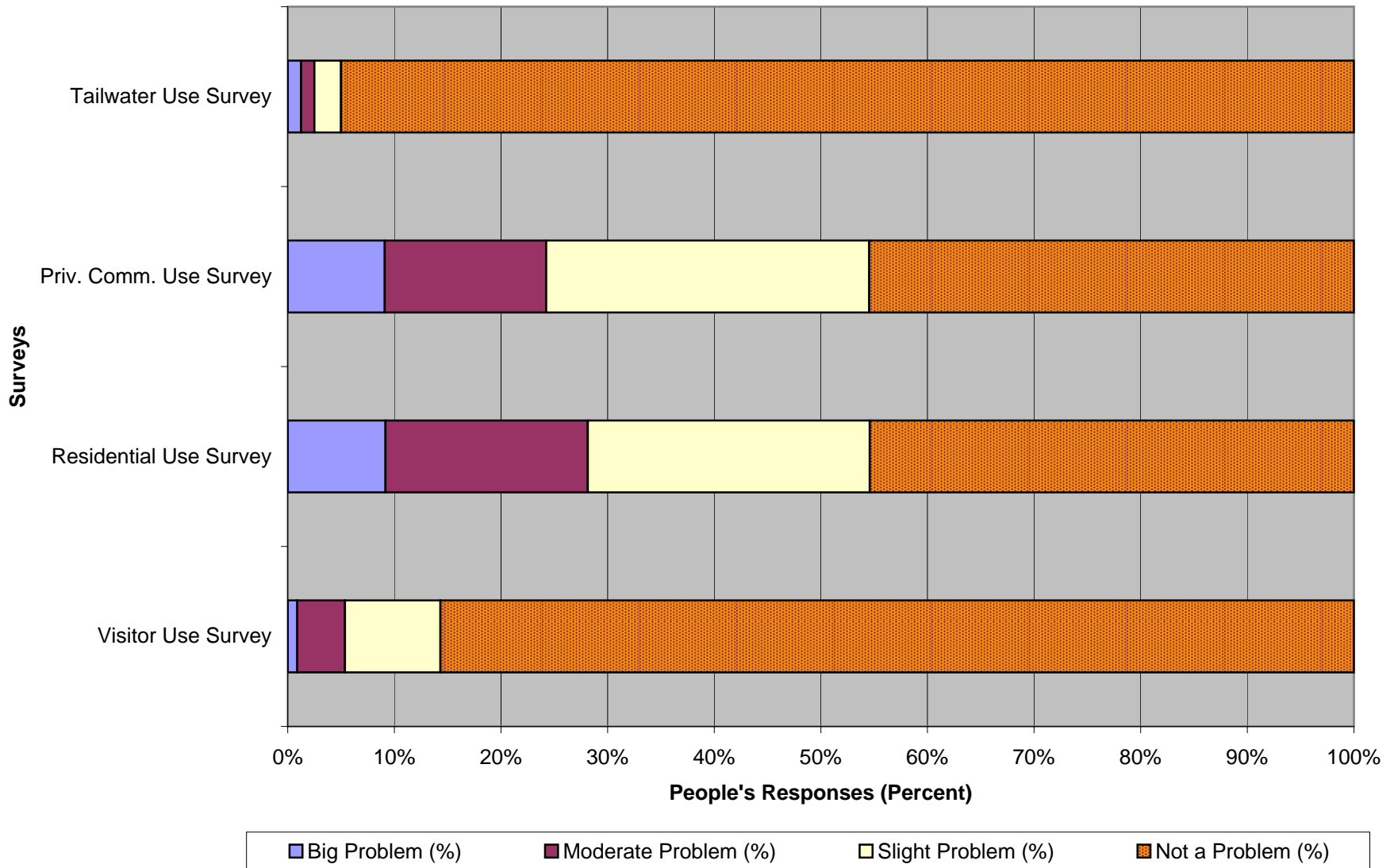


Figure 5-13 Survey Responses for Crowding at Narrows Reservoir Boat Launches

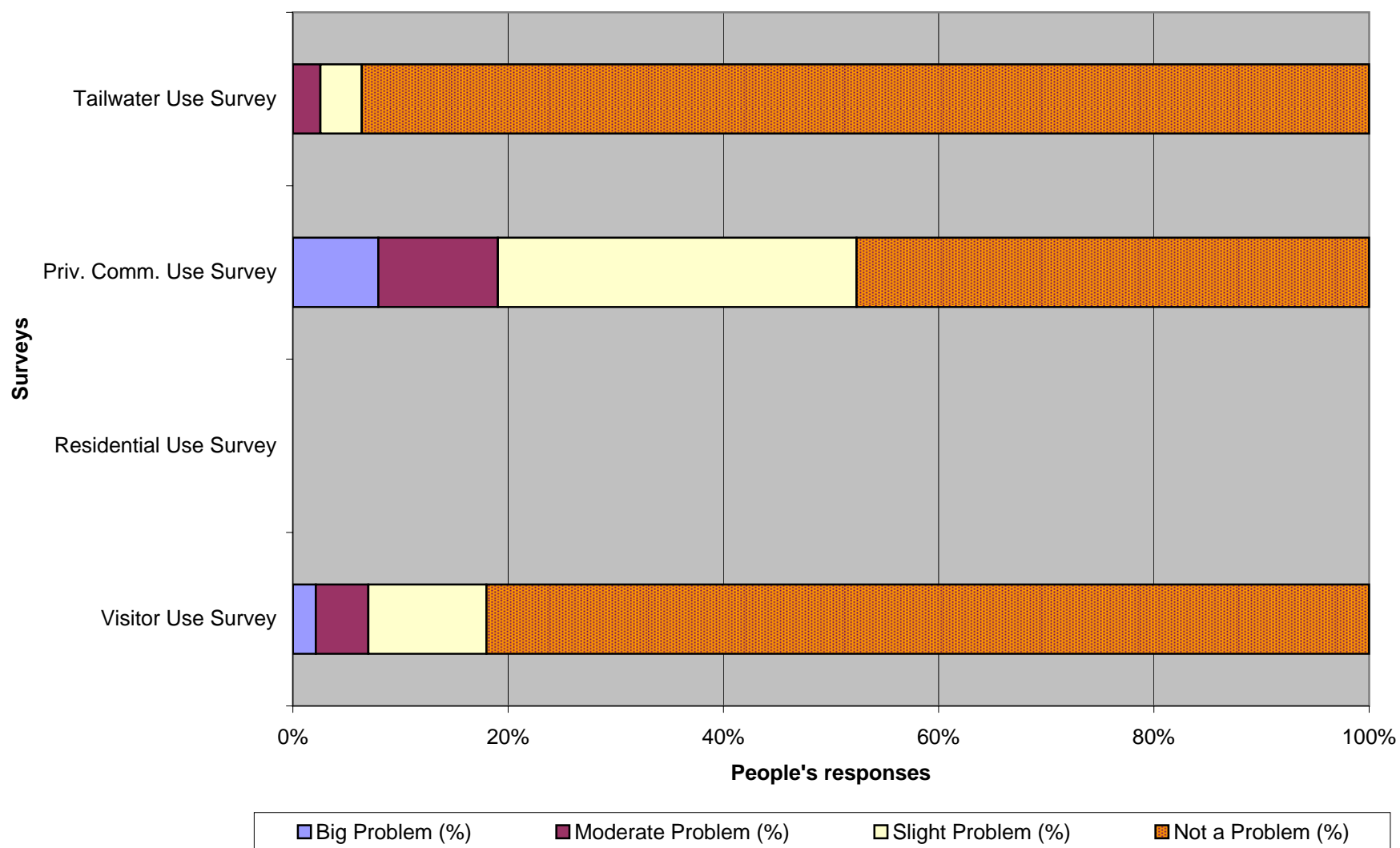


Figure 5-14 Survey Responses for "Too Many People Along the Shoreline at Narrows Reservoir"

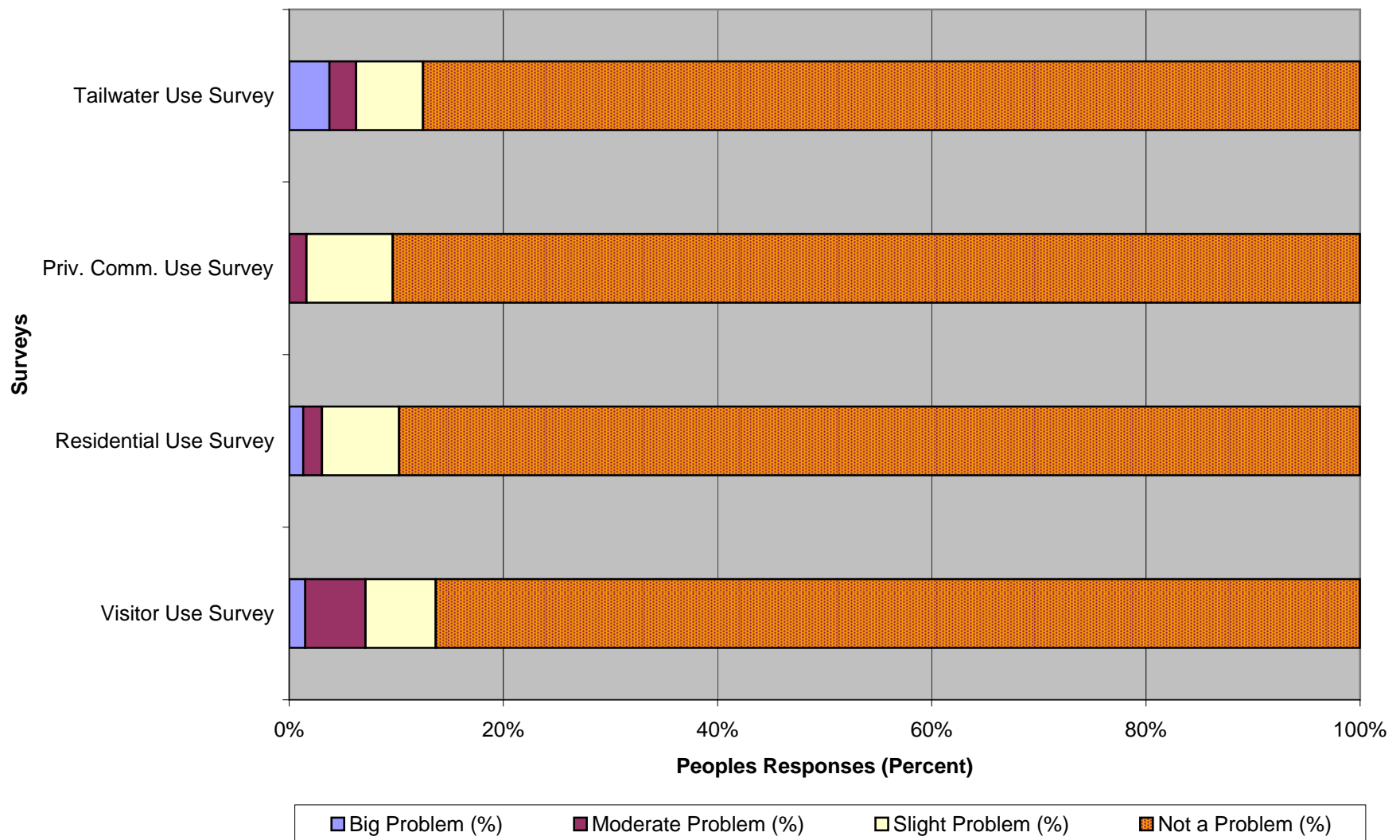


Figure 5-15 Survey Responses for Crowding on Falls Reservoir

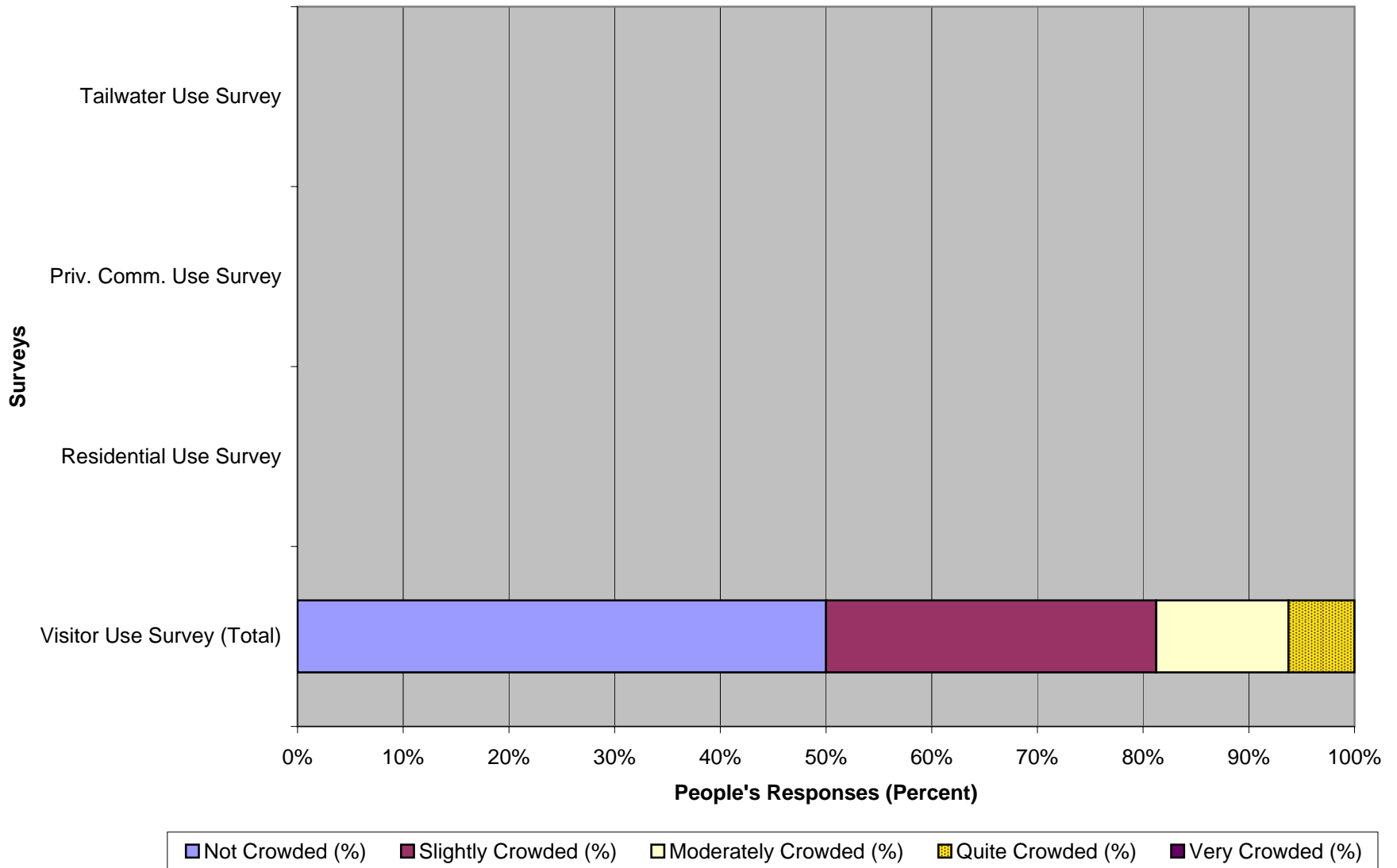
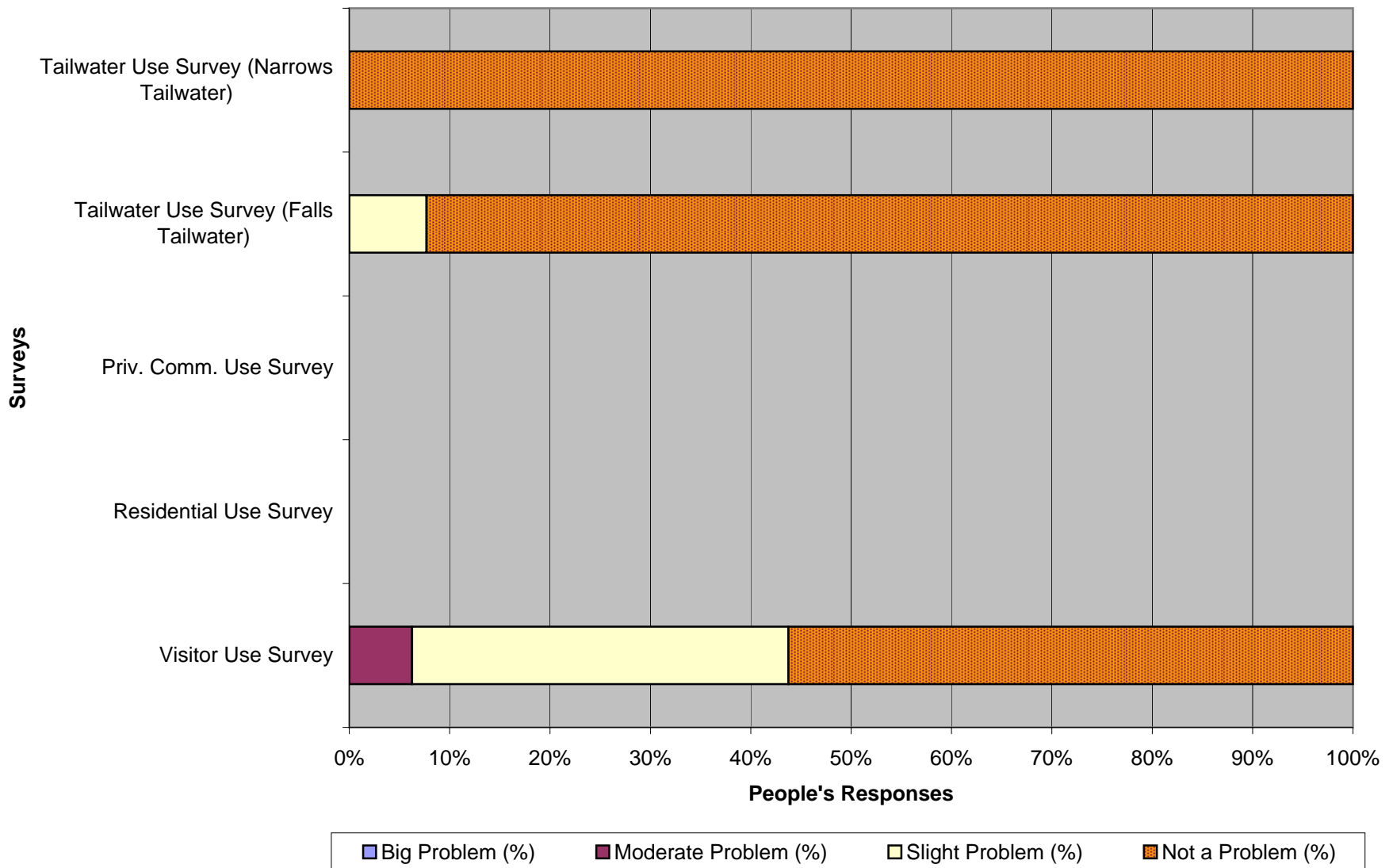


Figure 5-16 Survey Responses for "Too Many Watercraft on Falls Reservoir"



Crowding at the Falls Reservoir Boat Launches

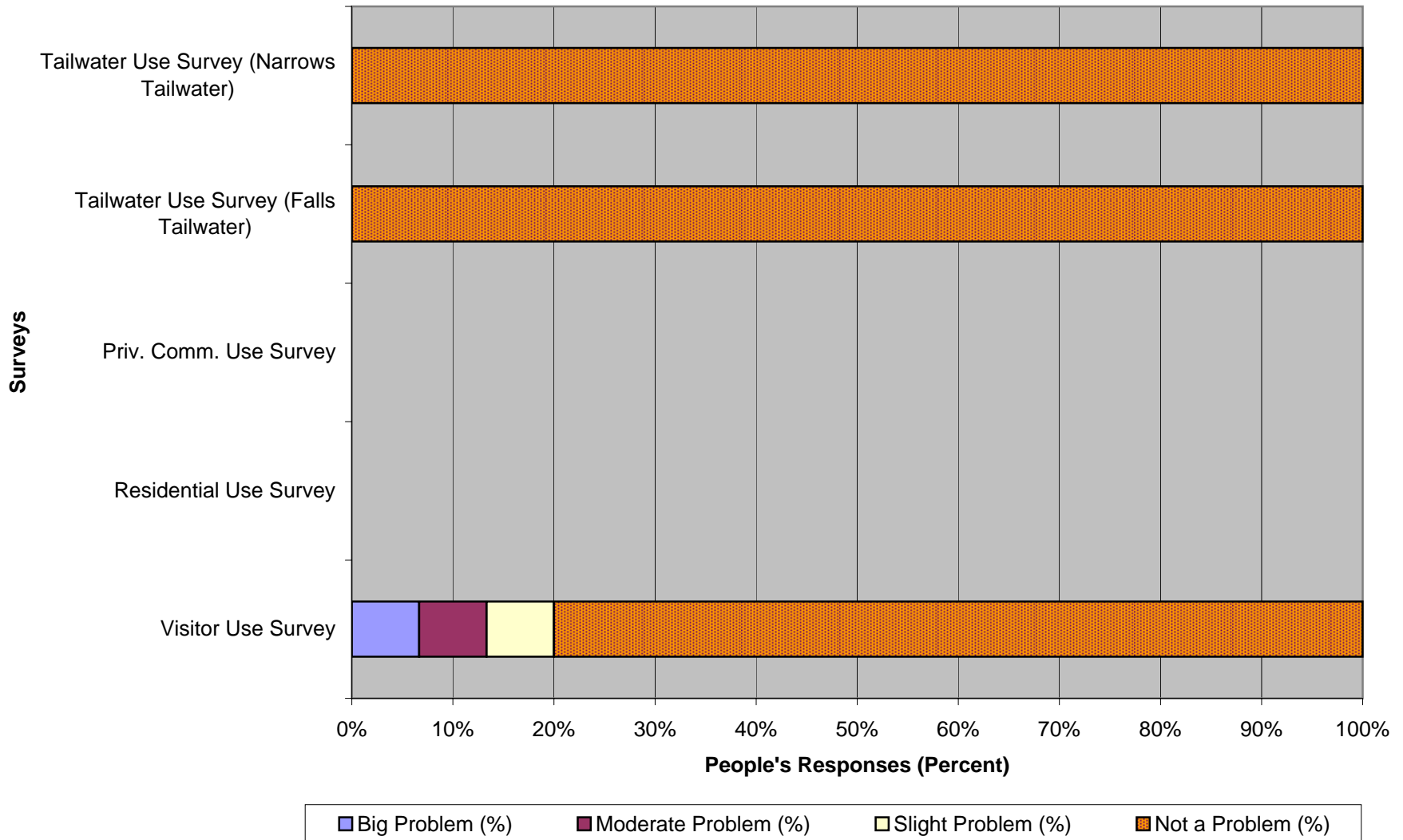
No respondents at the Deep Water Trail Access (n=7) identified crowding at the boat launch or along the shoreline as a moderate or big problem. One respondent at the Falls Boat Access (n=8) identified crowding at the boat launch as a big problem, although this occurred on July 4, 2003. Two respondents indicated that too many people along the shoreline were a big or moderate problem, but these responses were received on 4th of July and Memorial Day weekends, respectively. Otherwise, 78 percent of respondents indicated no problems with the crowding at the boat launch or along the shoreline, including other respondents on the 4th of July and Memorial Day weekends.

Crowding Along the Falls Reservoir Shoreline

No respondents to the VUS identified crowding along the shoreline at the Deep Water Trail Access as a big or moderate problem (Figure 5-17). Conversely, about 22 percent of respondents at the Falls Boat Access identified crowding along the shoreline as a big or moderate problem. The site has limited shoreline access, so crowding concerns here are understandable.

None of the respondents to the TUS identified crowding along the shoreline as a big or moderate problem at Falls Reservoir.

Figure 5-17 Survey Responses for "Too Many People Along the Shoreline at Falls Reservoir"



5.3 Overall Carrying Capacity

The following maximum number of boats at one time (BAOT) was estimated based on spot counts, aerial photographs on peak holiday weekends, and peak day recreational use from prior studies:

- High Rock Reservoir 641 watercraft
- Tuckertown Reservoir 92 watercraft
- Narrows Reservoir 411 watercraft
- Falls Reservoir 8 watercraft

5.3.1 High Rock Reservoir

The maximum number of BAOT documented at High Rock Reservoir has been 641 boats, which is less than the reservoir's estimated physical carrying capacity of 981 boats. Anecdotal evidence, however, indicates that this number may be exceeded during special events such as 4th of July firework displays. There are 10 public access recreation areas with boat launch facilities at High Rock Reservoir with a total capacity of 624 boats. In addition, there are 2,722 waterfront residences with pier permits from APGI, approximately 2,798 non-waterfront parcels in private communities, and 22 commercial businesses and private organizations with direct boating access to High Rock Reservoir. Clearly there is the potential for the reservoir's physical carrying capacity of 981 boats to be exceeded. As mentioned above, it does not appear that the physical carrying capacity of High Rock Reservoir is currently being exceeded very often, if at all.

In terms of social carrying capacity, about 17 to 21 percent of respondents to the VUS, RUS, and PCUS indicated that the reservoir was quite or very crowded on weekends. These data were disaggregated by season, which indicated that concerns about crowding were the greatest during the summer when between 21 and 38 percent of respondents indicated that High Rock Reservoir was quite or very crowded on weekends. Of these respondents, however, only 6 percent of visitors, 7 percent of waterfront residents, and 0 percent of non-waterfront residents rated High Rock Reservoir as "very" crowded during weekends in the summer. In addition, between 9 and 22 percent of respondents indicated that "too many watercraft on the reservoir" was a big or moderate problem. Although there are no specific standards for social carrying capacity, we generally consider social carrying capacity to be exceeded when about 20 percent of respondents indicate that the reservoir is very crowded. At this point it does not appear that the social carrying capacity of High Rock Reservoir is being exceeded, although it may be approached on peak holiday weekends in the summer.

In summary, it does not appear that the High Rock Reservoir's physical carrying capacity is being exceeded very frequently. However, on a smaller scale, the carrying capacity of certain popular coves and tributaries near large communities or major public access recreation areas (e.g., Southmont) may be routinely exceeded on peak use weekends in the summer. This may be the basis for some of the responses regarding crowding problems.

5.3.2 Tuckertown Reservoir

The maximum number of BAOT at Tuckertown Reservoir has been 92 boats, which is significantly below the reservoir's physical carrying capacity (264 boats). There are four public access recreation areas with boat launch facilities at Tuckertown Reservoir with a capacity of 175 boats. There are also two private campgrounds with boat ramps, but both are relatively small with at least 31 campsites. There are no waterfront residences, private communities, or private organizations with direct boat access to Falls Reservoir. Therefore, parking for boat trailers ($175 + 31 = 206$) effectively limits the potential for the reservoir's physical carrying capacity (264 boats) to be exceeded.

In terms of social carrying capacity, about 5 percent of VUS respondents indicated that Tuckertown Reservoir was "very crowded" and only about 1 percent identified that "too many boats on the reservoir" was a big problem. Most of these responses occurred on either 4th of July weekend or when a large fishing tournament was being held at Tuckertown Reservoir.

Therefore, there are currently no carrying capacity issues at Tuckertown Reservoir.

5.3.3 Narrows Reservoir

The maximum number of BAOT at Narrows Reservoir has been 411. There are 8 public access recreation areas with boat launch facilities at Narrows Reservoir with a total capacity of 339 boats. In addition, there are 1,007 waterfront residences with pier permits from APGI, approximately 4,669 non-waterfront parcels in private communities, and 4 commercial businesses and private organizations with direct boating access to Narrows Reservoir. Clearly there is the potential for the reservoir's carrying capacity (494 boats) to be exceeded. As mentioned above, it does not appear that the physical carrying capacity of Narrows Reservoir is currently being exceeded very often.

In terms of social carrying capacity, about 7 (VUS), 18 (RUS), and 25 (PCUS) percent of respondents indicated that the reservoir was quite or very crowded on weekends. These data were disaggregated by season, which indicated that concerns about crowding were the greatest during the summer when 9 (VUS), 37 (PCUS), and 38 (RUS) percent of respondents indicated that Narrows Reservoir was quite or very crowded on weekends. Most of these responses indicated that the reservoir was "quite" rather than "very" crowded – only 2 percent of visitors, 12 percent of waterfront residents, and 8 percent of non-waterfront residents indicated that the reservoir was "very" crowded.

In summary, it appears that Narrows Reservoir is approaching its physical carrying capacity and may exceed it on peak summer weekends. Most residents tend to rate the reservoir as "quite" crowded rather than "very" crowded, so it appears Narrows Reservoir is also approaching, but not yet exceeding, its social carrying capacity.

5.3.4 Falls Reservoir

The maximum number of BAOT at Falls Reservoir was 7 boats, which is significantly below the reservoir's physical carrying capacity (18 boats). There are only two public access recreation areas with boat launch facilities at Falls Reservoir with a capacity of 14 boats. There are no waterfront residences, private communities, commercial businesses, or private organizations with direct boat access to Falls Reservoir. Therefore, parking for boat trailers effectively limits the potential for the reservoir's physical carrying capacity to be exceeded.

In terms of social carrying capacity, no VUS respondents indicated that Falls Reservoir was "very crowded" or that "too many boats on the reservoir" was a big problem.

Therefore, there are currently no carrying capacity issues at Falls Reservoir.

5.4 Recreation Use Trends

Recreation use levels will change over time in response to changes in demographics and recreation use trends. Each of these is discussed below.

5.4.1 Demographic Changes

The Yadkin Project is located within a 5-county region that includes Davie, Davidson, Montgomery, Rowan, and Stanly counties. Approximately 63 percent of respondents to the VUS live within this region (see Table 4-3). This 5-county region surrounding the Project is Projected to grow at a moderate rate of about 1.5 percent per year over the next 30 years, for a total population increase of approximately 44 percent (Table 5-5). This rate is less than the average for the State of North Carolina, which is Projected to increase in population at 1.8 percent per year over the next 30 years.

**Table 5-5 Population Projections for Counties within the Project Area
(Source: NCSDC, 2003).**

County	2000	2005	2010	2015	2020	2025	2030
Davie	34,835	38,837	41,932	45,363	48,979	52,506	56,157
Davidson	147,246	157,205	166,833	176,493	186,335	196,069	205,603
Montgomery	26,822	28,509	30,347	32,065	33,937	35,730	37,681
Rowan	130,340	140,521	150,967	161,924	173,269	184,727	196,194
Stanly	58,100	61,300	64,281	67,337	70,662	73,587	76,649
Total	397,343	426,372	454,360	483,182	513,182	542,619	572,284
% Increase From 2000 in Project Area	NA	7.3%	14.3%	21.6%	29.1%	36.6%	44.0%
% Increase From 2000 for State of NC	NA	8.2%	17.3%	26.7%	36.0%	45.5%	54.9%

In terms of the immediate Project area, there have been several residential subdivisions and a significant increase in the number of platted waterfront lots along High Rock Reservoir in the past 10 years, although the number of new houses and pier permits from APGI have remained fairly consistent. It is anticipated the number of waterfront residences along High Rock Reservoir will increase by approximately 20 percent by 2030 as these currently platted lots are developed.

Narrows Reservoir has experienced a significant increase in waterfront residences (18 percent increase in the number of pier permits from APGI in the last 10 years), but especially in the number of private communities with access to Narrows Reservoir. The number of non-waterfront residences in private communities is now over four times the number of waterfront residences. Some of the private communities that have been developed over the past 10 years are not yet built out. Therefore there is the potential for an increase waterfront in housing at Narrows Reservoir, which is estimated at approximately 10 percent by 2030.

There are no waterfront residences or private communities with access to Tuckertown or Falls reservoirs, and this situation is not expected to change in the near future.

5.4.2 Recreational Use Trends

According to the North Carolina State Comprehensive Outdoor Recreation Plan (SCORP), during 2002, the five most popular outdoor recreational activities in North Carolina included walking for pleasure, driving for pleasure, viewing scenery, beach activities, and visiting historical sites (NCDPR, 2003). Table 5-6 provides a summary of the ranking, percentage of households participating, and household participation rates of recreational activities that occur within the Project area based on the North Carolina SCORP statewide survey.

Table 5-6 NCSCORP Ranking of Outdoor Recreational Activities
(Source: NCDPR, 2003)

Rank ¹	Activity	Percentage of Households Participating ²	Household Participation Rate ³
1	Walking for Pleasure	75	49.9
3	Viewing Scenery	71	31.4
4	Beach Activities	69	10.8
6	Swimming (in Lakes, Rivers and Oceans)	54	8.3
7	Visiting Natural Areas	53	6.75
8	Picnicking	52	4.3
11	Fishing - Freshwater	50	10.0
18	Camping (Tent or Vehicle)	29	3.3
20	Hunting	28	6.3
22	Power Boating	26	5.5
23	Trail Hiking	26	2.5
29	Water Skiing	19	2.5
30	Camping (Primitive)	14	.9
34	Canoeing and Kayaking	13	.7
40	Sailboating	7	.5
43	Windsurfing	1	.1

¹ Popularity Ranking

² Percentage of households that participated in this activity

³ The average number of occasions per year each household participates

The 2000 National Survey on Recreation and the Environment (NRSE), coordinated by the USDA Forest Service, included a phone survey of about 50,000 households nationwide, addressing areas such as outdoor recreation participation, demographics, constraints to participation, and other related factors. The NRSE survey results were applied to recreation demand models to Project future outdoor recreation participation nationally (Bowker, English and Cordell, 1999). Projections were conducted for various activities, some of which occur within the Project area, including canoeing, motor boating, non-pool swimming, rafting, fishing, and hunting. Table 5-7 provides a summary of the Projections for outdoor recreation participation for these activities, both for the southern states (where the Project is located) and nationally (for comparison purposes).

Table 5-7 Projected Indexes of Change in Recreation Days and Participation (Source: Bowker, English and Cordell, 1999)

Activity	Unit	Region	1995 ¹	2000 ²	2010 ²	2020 ²	2030 ²
Canoeing	Days	South	17.6	1.04	1.09	1.13	1.21
		National	74.6	1.02	1.14	1.28	1.43
	Participants	South	4.2	1.03	1.07	1.11	1.16
		National	14.1	1.02	1.08	1.15	1.24
Motorboating	Days	South	294.0	.99	1.00	1.02	1.05
		National	699.9	1.01	1.07	1.14	1.23
	Participants	South	15.5	1.04	1.13	1.24	1.33
		National	47.0	1.03	1.11	1.21	1.31
Non-pool Swimming	Days	South	410.9	.96	1.02	1.08	1.15
		National	1,241.4	1.00	1.05	1.12	1.20
	Participants	South	23.3	1.05	1.15	1.27	1.37
		National	78.1	1.03	1.12	1.21	1.33
Visiting Beach or Waterside	Days	South	1,037.5	1.05	1.16	1.28	1.41
		National	3,187.9	1.03	1.10	1.17	1.25
	Participants	South	37.7	1.07	1.20	1.30	1.48
		National	124.4	1.05	1.15	1.24	1.38
Rafting/Floating	Days	South	24.2	1.0	1.01	1.03	1.06
		National	77.3	1.01	1.08	1.17	1.27
	Participants	South	4.9	1.01	1.01	1.02	1.04
		National	2.3	1.05	1.20	1.30	1.52
Fishing	Days	South	491.5	1.02	1.11	1.19	1.26
		National	1,135.4	1.02	1.09	1.17	1.23
	Participants	South	20.2	1.04	1.11	1.19	1.24
		National	57.9	1.03	1.09	1.17	1.23
Hunting	Days	South	150.9	0.92	0.89	0.86	0.82
		National	416.3	0.96	0.97	0.99	1.00
	Participants	South	6.5	0.93	0.82	0.74	0.68
		National	18.6	0.97	0.93	0.91	0.89

¹ Estimated 1995 base recreation participation rate for millions of days and millions of participants

² Estimated Projected indexed of change from the 1995 base participation rate.

5.5 Future Recreational Use Projections

The population of the Project region is Projected to increase by 44 percent by 2030. This population increase primarily affects the number of “visitors” to the Project who use the public access recreation areas. Since over 63 percent of the visitors to the Project come from this 5-county region we would expect an approximately proportional increase in visitor recreational use.

In terms of changes in waterfront and non-waterfront resident use, we estimate the following increases in resident population at each reservoir by 2030:

- High Rock Reservoir 20% waterfront 20% non-waterfront
- Tuckertown Reservoir 0% waterfront 0% non-waterfront
- Narrows Reservoir 10% waterfront 20% non-waterfront
- Falls Reservoir 0% waterfront 0% non-waterfront

Based on recreational trends, we also estimate about a 33 percent increase in the participation rate (see Table 5-7 – motorboating) and a 5 percent increase in the frequency of recreational use (see Table 5-7 – motorboating). Table 5-8 summarizes the estimated future (2030) maximum BAOT for each reservoir.

Table 5-8 Comparison of Estimated Future BAOT with Reservoir Carrying Capacity

Reservoir	Current Max BAOT	Population Growth	Participation Rate Trends	Frequency Rate Trends	2030 Max BAOT	Physical Carrying Capacity (PCC)	2030 BAOT as % of PCC
High Rock							
Residents	367	1.20	1.33	1.05	615		
Visitors	274	1.44	1.33	1.05	551		
Total	641				1,166	981	119%
Tuckertown							
Total	92	1.44	1.33	1.05	185	264	70%
Narrows							
Residents	212	1.15	1.33	1.05	340		
Visitors	199	1.44	1.33	1.05	400		
Total	411				740	494	150%
Falls							
Total	8	1.44	1.33	1.05	16	18	89%

5.6 Comparison of Carrying Capacity with Future Recreational Use Projections

As indicated in Table 5-8, the future maximum BAOT at High Rock Reservoir is projected to exceed the reservoir's physical carrying capacity by nearly 20 percent. Current boating use may occasionally exceed the reservoir's physical carrying capacity during special events (e.g., 4th of July fireworks) and increases in both waterfront and non-waterfront residences, combined with regional trends for increased boating, result in the use levels that may exceed the reservoir's physical carrying capacity.

The future maximum BAOT at Narrows Reservoir is projected to exceed the reservoir's physical carrying capacity by a significant amount (59 percent). Current boating use is approaching the reservoir's physical carrying capacity, and increases in both waterfront and non-waterfront residences, combined with regional trends for increased boating, results in use levels that may exceed physical carrying capacity.

As indicated in Table 5-8, the estimated future maximum BAOT approaches, but does not exceed, the physical carrying capacity at Tuckertown and Falls reservoirs. It should be noted that current boat trailer parking capacity at Tuckertown and Falls reservoirs limit the potential for carrying capacity to be exceeded at these reservoirs.

6.0 UWHARRIE NATIONAL FOREST RECREATIONAL USE

An additional recreational use survey was administered in conjunction with the VUS at recreation sites within the Uwharrie National Forest. A total of 72 responses were received and are summarized below.

6.1 Reservoir Visitation

In response to the question, “Which reservoir are you visiting?” approximately 95 percent or respondents (n=72) indicated Narrows Reservoir, 3 percent indicated Falls Reservoir, and 2 percent indicated both reservoirs. Since there were so few responses from Falls Reservoir the rest of this discussion lumps all respondents together rather than disaggregating them by reservoir.

6.2 Recreation Experience

Recreational users were asked about the type of recreational experience they were having at the Yadkin reservoirs and the type of recreational experience they would like to have. Table 6-1 summarizes the results from these questions. In general, most visitors to Narrows and Falls reservoirs within the Uwharrie National Forest are looking for a recreation experience that involves a mostly natural landscape and a low to very low concentration of other people. In fact, this is the actual type of experience the majority of visitors are experiencing. Overall, the existing recreation experience appears to involve a little more landscape modification and higher concentrations than some visitors would prefer.

Table 6-1 Uwharrie National Forest Recreational Experience

Type of Experience		Actual	Desired
E	- landscape appears to be substantially urbanized - high concentration of users - opportunity for affiliation with others occurs frequently	3%	0%
D	- landscape is not generally natural appearing and has been modified substantially - moderate to high concentration of users - opportunity for affiliation with others occurs frequently	16%	3%
A	- mostly natural appearing landscape, modifications evident but blend with nature - low to moderate concentration of users - opportunity for contact with others and isolation from others about equal	65%	56%
B	- mostly natural appearing landscape, modifications not easily apparent - low concentration of users - opportunity for isolation from others more common than opportunity for contact with others	10%	26%
C	- natural appearing landscape with no evidence of modification - very low concentration of users - opportunity for isolation from others occurs frequently - motorized use does not occur	6%	15%

6.3 Crowding Distances

Recreational users were asked two questions dealing with crowding issues as they relate to boating and camping.

In terms of boating, recreational users were asked to indicate how far from your boat are other boats before you begin to feel crowded, moderately crowded, not crowded, moderately isolated, and isolated. Table 6-2 summarizes the results of these responses. The weighted average of the responses indicated that boaters generally feel crowded when other boats are within about 73 feet of their boat, and feel relatively isolated when other boats are more than about 302 feet of their boat.

Table 6-2 Crowding Responses Relative to Boating

Degree of Crowding	Approximate Distance to Nearest Boat							weighted average*
	20 ft	50 ft	80 ft	125 ft	225 ft	300 ft	>300 ft	
Crowded	15.0%	5.3%	1.8%	1.8%	0.0%	3.5%	0.0%	73
Moderately crowded	4.4%	7.1%	5.3%	1.8%	0.0%	0.9%	0.9%	88
Not Crowded	0.0%	1.8%	0.9%	5.3%	4.4%	1.8%	3.5%	233
Moderately isolated	1.8%	0.9%	0.0%	0.9%	1.8%	6.2%	3.5%	280
Isolated	2.7%	0.0%	0.0%	0.9%	1.8%	8.8%	5.3%	302

* Assumes 500 ft for responses ">300 ft"

In terms of camping, recreational users were asked to indicate how far from your campsite are other campsites before you begin to feel crowded, moderately crowded, not crowded, moderately isolated, and isolated. Table 6-3 summarizes the results of these responses. The weighted average of the responses indicated that campers generally feel crowded when other campsites are within about 62 feet of their campsite, and feel relatively isolated when other campsites are more than about 239 feet of their campsite.

Table 6-3 Crowding Responses Relative to Camping

Degree of Crowding	Approximate Distance to Nearest Boat							weighted average*
	20 ft	50 ft	80 ft	125 ft	225 ft	300 ft	>300 ft	
Crowded	13.7%	1.9%	4.3%	2.4%	0.9%	0.9%	0.0%	62
Moderately crowded	5.2%	6.6%	1.4%	3.8%	0.5%	0.9%	0.0%	77
Not Crowded	1.9%	5.7%	1.9%	1.9%	3.3%	4.3%	0.0%	144
Moderately isolated	1.4%	1.9%	2.8%	2.4%	4.3%	5.7%	0.5%	187
Isolated	1.4%	1.4%	1.4%	1.9%	0.9%	10.9%	1.4%	239

* Assumes 500 ft for responses ">300 ft"

6.4 Principal Reason for Visit

In response to the question, “Is your principal reason for recreating in this area to use/view the reservoir?” approximately 86 percent of respondents (n=57) indicated that the reservoirs were the principal reason for recreating in this area, while about 14 percent indicated that the reservoirs were not the principal reason.

6.5 Alternative Recreation Areas

Recreational users were asked “If this reservoir were not available for use, what recreation area would you most likely visit instead?”

Twenty one different responses were obtained with Jordan Lake, “some other location,” and Lake Tillery as the only alternative sites receiving more than 10 percent of the responses. These alternative recreation areas are listed below in priority order:

• Jordan Lake	20.9%
• Unspecified other location	14.0%
• Lake Tillery	11.6%
• High Rock Lake	4.7%
• Morrow Mountain Park	4.7%
• A “pool”	4.7%
• Unspecified river	4.7%
• Unspecified lake	4.7%
• Falls Reservoir	2.3%
• Hanging Rock	2.3%
• Linville	2.3%
• McIntosh	2.3%
• Oak Hollow	2.3%
• Pisgah	2.3%
• Santee Cooper Reservoir	2.3%
• Smith Mountain Lake	2.3%
• Uwharrie River	2.3%
• Lake Wylie	2.3%
• Yadkin River	2.3%

Jordan Lake and Tillery Reservoir provide similar types of recreational experiences as Narrows Reservoir. Both reservoirs have relatively large surface areas (13,940 and 5,263 acres, respectively, in comparison with 5,353 acres for Narrows Reservoir) and provide opportunities for camping and boating in a relatively rural setting. Other relatively nearby lakes (e.g., Lake Norman and Lake Wylie) were apparently not perceived as an alternative, possibly because these lakes are more developed. It is interesting to note that none of the respondents indicated Tuckertown Reservoir (possibly because there are limited camping opportunities) and relatively few indicated High Rock Reservoir.

7.0 TAILWATER USE ASSESSMENT

This section provides a physical description, discusses recreational use, identifies safety measures, and evaluates the effects of Project operations on each of the four Project dam tailwaters

7.1 Physical Description

High Rock Dam Tailwaters

The High Rock Dam tailwaters are immediately below High Rock Dam and represent the head of Tuckertown Reservoir (Figures 7-1, 7-2 and 7-3). The powerhouse is integral to the dam and located along the east bank of the Yadkin River. The plant is automated and is operated remotely. The High Rock tailwaters are bounded by moderate slopes near the shoreline.

Access to the east side of the High Rock tailwaters is easy. Recreational users must park along Bringle Ferry Road, but then can walk along the level, paved access road to the powerhouse (total length is approximately 1,500 feet). There are approximately five access trails from the powerhouse road to the tailwaters at various locations:

- The first trail from the parking area is a gravel road in good condition that also provides access to the Town of Denton's municipal water intake.
- The next three trails are dirt, steep, and rocky.
- The last trail is also dirt and skirts along the powerhouse security fencing to a concrete abutment immediately adjacent to the dam. The abutment falls steeply from the dam to the river, but does have a guard rail.

There is also a network of angler trails immediately along the shoreline from the Denton water intake to the concrete abutment.

Access to the west side of the High Rock tailwaters is more difficult. Recreational users must park at the High Rock Dam Picnic and Fishing Access Area and hike approximately 1,200 feet along a level, but increasingly rocky, angler trail to the tailwaters. The western shoreline is very rocky and many anglers jump among the exposed boulders to reach deeper water for fishing. The extent of exposed rocks varies with releases from High Rock Dam and water levels in the downstream Tuckertown Dam.

Figure 7-1 High Rock Dam Photographs



Photo A: *High Rock Dam as viewed from High Rock Reservoir*



Photo B: *Security fencing at High Rock Dam*

Figure 7-2 High Rock Tailwater Photographs



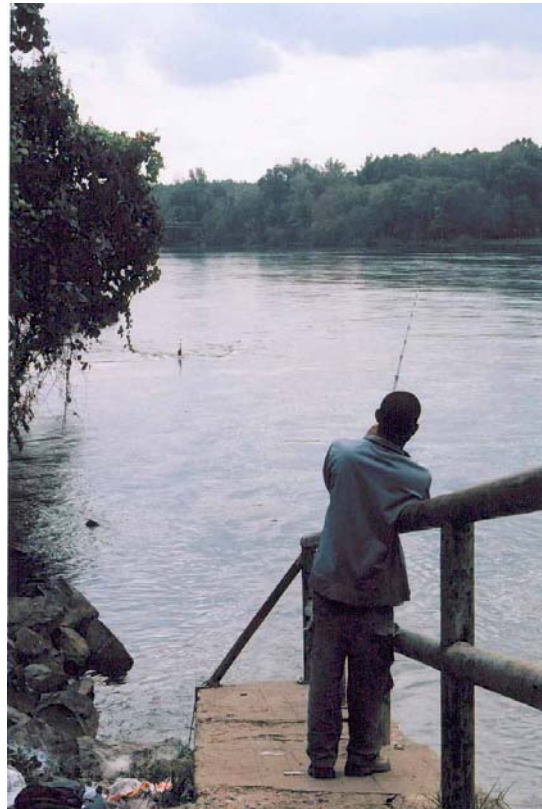
Photo A: High Rock tailwater as viewed from High Rock Dam

Figure 7-3 High Rock Tailwater Shoreline Photographs



Photo A: Rocky shoreline along east side of High Rock tailwaters

Photo B: Angler on concrete abutment on east side of High Rock tailwaters



The Bringle Ferry Boat Access is only approximately 2,000 feet downstream of High Rock Dam and provides convenient boat access to the tailwaters. There are also two private campgrounds with boat launch facilities that could provide boat access to the tailwaters. There are no waterfront and non-waterfront residents, or private organizations located on Tuckertown Reservoir that could provide access to the High Rock tailwaters.

Tuckertown Dam Tailwaters

The Tuckertown Dam tailwaters are immediately below Tuckertown Dam and represent the head of Narrows Reservoir (Figure 7-4). The powerhouse is integral to the dam and located along the east bank of the Yadkin River. The plant is automated and is operated remotely. The Tuckertown Dam tailwaters are bounded by gentle slopes - Tuckertown Dam is the smallest of the four Yadkin dams with a maximum height of 76 feet.

Foot access to the east side of the Tuckertown Dam tailwaters is easy via an approximately 1,000-foot-long gravel road from the Tuckertown Dam Tailrace public access recreation area parking lot. The walkway steepens near the tailrace and is not handicapped accessible. There is a concrete walkway along the top of the rip rap tailrace shoreline that provides easy convenient access to the tailrace. In some areas, it appears that APGI has poured concrete over the rip rap to improve shoreline access and safety. There is a dirt fishing trail that follows the eastern shoreline for a considerable distance downstream. The trail is flat and easy. There is no public access to the western shoreline of the Tuckertown tailwater.

There is not a public boat launch that serves the Tuckertown tailwaters, so visitors must put in downstream at one of the several public access recreation areas with boat launch facilities located on Narrows Reservoir. Waterfront and non-waterfront residents and customers or members of various commercial businesses or private clubs can use private boat launch facilities to access the tailwaters.

Narrows Dam Tailwaters

The Narrows Dam tailwaters are immediately below Narrows Dam and represent the head of Falls Reservoir (Figures 7-5 and 7-6). The powerhouse is immediately downstream of the dam on the east bank of the Yadkin River. The plant is automated and is operated remotely. Vehicular access to the powerhouse is provided by an access road that bridges across the Yadkin River approximately 550 feet downstream of Narrows Dam. The tailwaters are located in a gorge with steep rocky cliffs on the east side and steeply sloping ground on the west side – Narrows Dam is the tallest of the four Yadkin dams with a maximum height of 201 feet.

Figure 7-4 Tuckertown Dam Photographs



Photo A: *Tuckertown Dam as viewed from Tuckertown Reservoir*



Photo B: *Tuckertown Dam/Powerhouse as viewed from the east side of tailwaters*

Figure 7-5 Narrows Dam and Powerhouse Photographs



Photo A: *Narrows Dam and powerhouse as viewed from west side of tailwaters*



Photo B: *Narrows powerhouse and access road bridge as viewed from west side of tailwaters*

Figure 7-6 Narrows Tailwaters Photographs



Photo A: *Concrete abutment along west side of Narrows tailwaters*



Photo B: *Narrows tailwaters looking downstream from powerhouse access road bridge*

Foot access to the Narrows tailwaters is difficult. There is no pedestrian or vehicular access to the tailwaters from the west – the APGI access road is not open to the public and is posted with “No Trespassing” signs. The access road and bridge to the powerhouse are closed to the public. Foot access from the Uwharrie National Forest on the east side is very difficult and dangerous with no trails and steep cliffs along the river. The only readily available foot access is via the canoe portage trail from Narrows Reservoir. For these reasons, most recreational users at the Narrows Dam tailwaters are boaters. Some boaters do tie up along the shoreline (especially on the west side) and fish from the various concrete abutments. The shoreline is generally very steep or consists of these concrete abutments, therefore there is little opportunity to fish from the water’s edge without wading into the tailwaters.

There is no public boat launch at the Narrows tailwaters, boaters must put in downstream on Falls Reservoir at the Deep Water Trail boat launch or the Falls Boat Access. There are no waterfront and non-waterfront residents, commercial businesses, or private organizations located on Falls Reservoir that could provide access to the Narrows tailwaters.

Falls Dam Tailwaters

The Falls Dam tailwaters are immediately below Falls Dam and represent the head of Tillery Reservoir. The powerhouse is integral to the dam and located on the west bank of the Yadkin River. The plant is automated and is operated remotely. The tailwaters are bounded on both sides by steep rocky cliffs (Figures 7-7 and 7-8).

Foot access to the Falls Dam tailwaters is difficult. Bank anglers must either use the canoe portage trail to access the tailwaters from Falls Reservoir, or must hike approximately 1.5 miles from the parking lot at Morrow Mountain State Park to reach the tailwaters from downstream. It is not possible to access the tailrace shoreline without wading because of the steep cliffs. For these reasons, most recreational users at the Falls Dam tailwaters are boaters.

There is no public boat launch at the Falls tailwaters. Boaters must put in downstream at Morrow Mountain State Park or at various boat ramps associated with Tillery Reservoir.

7.2 Existing Recreational Use of Project Tailwaters

Fishing is the primary recreational activity in the Project tailwaters, although there are some differences in recreational use among the four tailwater areas. Tables 7-1 and 7-2 summarize the recreation participation rates for various recreational activities at each tailwater and the recreational user’s principal recreation activity. Recreational use at each tailwater is briefly discussed below.

Figure 7-7 Falls Dam Photographs



Photo A: *Falls Dam as viewed from Falls Reservoir*



Photo B: *Falls Dam as viewed from west side of tailwater*

Figure 7-8 Falls Tailwater Photographs

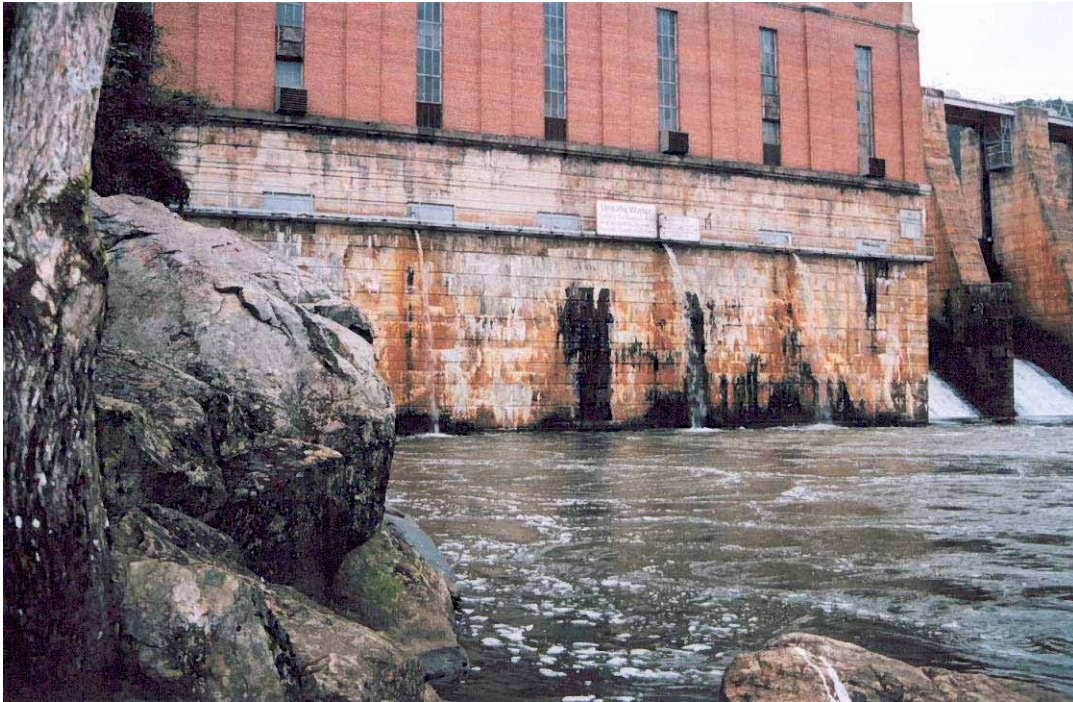


Photo A: Rocky shoreline along west side of Falls tailwater

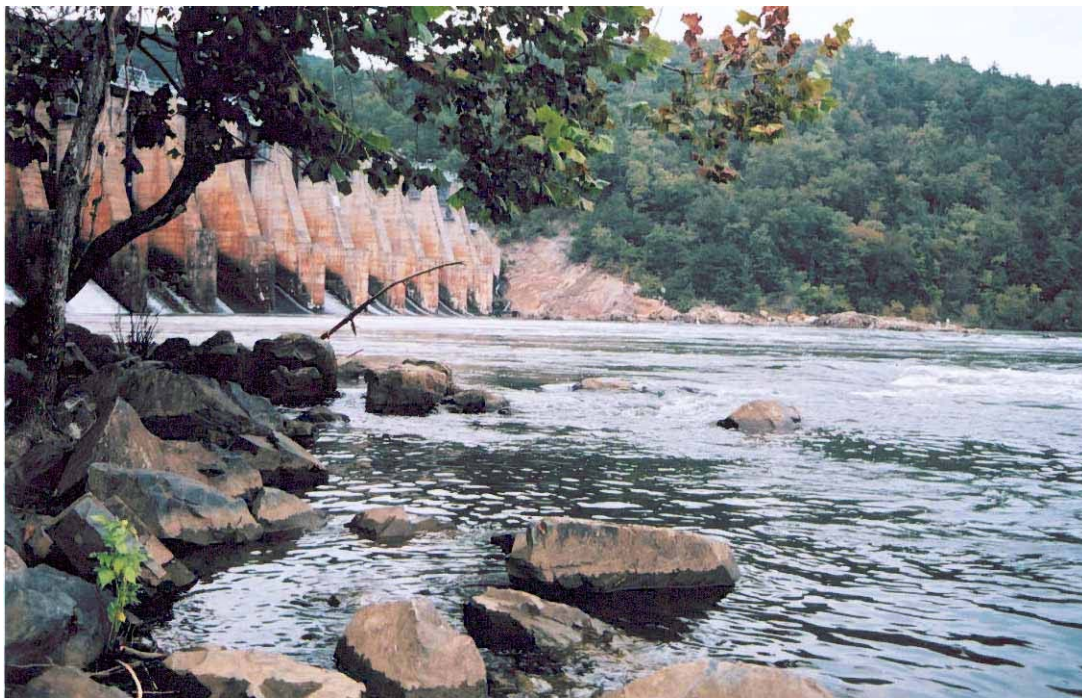


Photo B: Rocky shoreline along west side of Falls tailwater

Table 7-1 Tailwater Recreation Participation Rates

Activity	High Rock	Tuckertown	Narrows	Falls
Motor boating	1%	65%	18%	23%
Boat fishing	11%	18%	82%	92%
Bank fishing	89%	85%	18%	0%
Canoeing/Kayaking	0%	0%	9%	15%
Hiking	4%	1%	9%	8%
Swimming	1%	1%	9%	0%
Jet skiing	0%	0%	0%	0%
Waterskiing	0%	0%	0%	0%
Camping	3%	0%	27%	8%
Windsurfing	1%	0%	0%	0%
Picnicking	10%	1%	36%	8%
Sunbathing	4%	2%	0%	0%
Sailing	0%	0%	0%	0%
Hunting	1%	0%	18%	0%
Other	0%	1%	0%	0%

Table 7-2 Primary Tailwater Recreation Activity by Reservoir

Activity	High Rock	Tuckertown	Narrows	Falls
Motor boating	0%	0%	0%	0%
Boat fishing	10%	12%	75%	85%
Bank fishing	86%	86%	8%	0%
Canoeing/Kayaking	0%	0%	0%	15%
Hiking	1%	0%	0%	0%
Swimming	1%	0%	0%	0%
Jet skiing	0%	0%	0%	0%
Waterskiing	0%	0%	0%	0%
Camping	0%	0%	17%	0%
Windsurfing	0%	0%	0%	0%
Picnicking	1%	0%	0%	0%
Sunbathing	0%	0%	0%	0%
Sailing	0%	0%	0%	0%
Hunting	0%	0%	0%	0%
Other	0%	1%	0%	0%

High Rock Dam Tailwaters

Approximately 86 percent of recreational users indicated bank fishing and 10 percent boat fishing as their principal recreational activities while at the High Rock Dam tailwaters. A few other people were swimming, hiking, or picnicking.

It is assumed that nearly all on-shore recreational users access the High Rock Dam tailwater from either the High Rock Dam Picnic and Fishing Access or the High Rock Dam Tailrace Access, both of which are located approximately 1,500 feet downstream of High Rock Dam. About 88 percent of boaters in the tailwaters indicated that they used a public boat launch to access the tailwaters (primarily Bringle Ferry Boat Access). Recreational use at these three public access recreation areas was estimated at approximately 12,800 recreation days per year (see Section 4.3.3). This would represent an upper bound estimate of recreational use at the High Rock Dam tailwaters.

Tuckertown Dam Tailrace

Approximately 86 percent of recreational users indicated bank fishing, about 11 percent boat fishing, and 2 percent just general fishing as their principal recreational activities while at the Tuckertown Dam tailwaters.

It is assumed that nearly all on-shore recreational users access Tuckertown Dam tailwaters from the Tuckertown Dam Tailwater Access, since there really is no other convenient access to the tailwaters. About 88 percent of boaters in the tailwaters indicated that they used a public boat launch to access the tailwaters (primarily the Old Whitney and Garr Creek boat launches). Recreational use at the Tuckertown Dam Tailrace was estimated at approximately 7,200 recreation days per year (see Section 4.4.3). Assuming that a portion of the recreational use from Old Whitney and Garr Creek public access recreation areas also use the tailwaters for boat fishing, it is estimated that overall recreational use at the Tuckertown Dam tailrace is approximately 9,000 recreation days per year.

Narrows Dam Tailrace

While bank fishing is the primary recreational activity at the High Rock Dam and Tuckertown Dam tailraces, boat fishing is the primary activity at the Narrows Dam tailwaters. Approximately 82 percent of recreational users indicated boat fishing as their principal recreational activity, with a few indicating bank fishing and camping¹ while at the Narrows tailwaters. Many of these recreational users also indicated that they were picnicking, hunting, and motor boating. The Narrows tailwaters are difficult to access on foot, which explains the predominance of boat fishing.

In terms of estimating recreational use at the Narrows Dam tailwaters, it is assumed most of the recreational users at Falls Reservoir who indicated they were boat fishing used the tailwaters, which totals approximately 1,600 recreation days per year.

¹ Since there are no camping facilities in the Narrows tailrace area, and virtually no areas that would be appropriate for camping, it is assumed that Narrows tailwater users that indicated that they were camping were doing so at Uwharrie National Forest.

Falls Dam Tailrace

Approximately 80 percent of recreational users indicated bank fishing as their principal recreational activity while at Falls Dam Tailrace. About 10 percent each indicated bank fishing and canoeing. As with the Narrows Dam tailwaters, access to the Falls Dam tailwaters is difficult on foot. Bank anglers must either use the canoe portage trail to access the tailwaters from Falls Reservoir, or must hike approximately 1.5 miles from the parking lot at Morrow Mountain State Park to reach the tailwaters from downstream. For these reasons, most recreational users at the Falls Dam tailwaters are boaters.

Based on the surveys conducted for this study, it is not possible to accurately estimate recreational use levels at the Falls Dam tailrace. Little evidence of recreational use was observed along the tailrace shoreline during the site visit. There were few fishing lines, lures, trash, litter, or toilet paper observed along the shoreline. Based solely on the number of TUS responses, it appears that the use levels at the Falls Dam tailrace are similar to that at the Narrows Dam tailwaters, or approximately 1,600 recreation days per year.

7.3 Potential Recreational Issues

Respondents to the TUS were asked to rate 13 potential issues as to whether it is a big, moderate, slight, or not a problem. Most of these potential issues were discussed in Section 4.0, as they were compared with responses to identical questions on the VUS, RUS, and PCUS. Four of these potential issues were unique to the tailwaters and the TUS:

- Sudden changes in water levels in the tailwater;
- Poor water quality in the tailwater;
- Boating hazards (e.g., stumps, shallow areas); and
- Poor trail conditions

The responses to the four potential issues unique to the tailwaters are discussed below for each reservoir (Table 7-3). For purposes of this discussion, significant issues are identified, which are defined as > 10 percent of responses indicating a big problem or > 20 percent of responses indicating a big or moderate problem.

Table 7-3 Potential Tailwater Recreational Issues

Reservoir	Potential Issue	# of Responses	Avg. Score	% of Respondents			
				Big Problem	Moderate Problem	Slight Problem	Not a Problem
High Rock Tailwaters							
	Sudden Changes in Water Levels	71	3.9	0	1	6	93
	Poor Water Quality	70	3.9	0	0	6	94
	Boating Hazards	66	3.9	2	0	2	97
	Poor Trail Conditions	70	3.9	0	3	3	94
Tuckertown Tailwaters							
	Sudden Changes in Water Levels	80	3.9	0	1	8	91
	Poor Water Quality	80	3.8	1	1	10	88
	Boating Hazards	78	3.9	1	1	1	96
	Poor Trail Conditions	77	4.0	0	0	3	97
Narrows Tailwaters							
	Sudden Changes in Water Levels	12	3.7	0	8	17	75
	Poor Water Quality	11	3.8	0	9	11	82
	Boating Hazards	12	3.6	8	8	0	83
	Poor Trail Conditions	12	4.0	0	0	0	100
Falls Tailwaters							
	Sudden Changes in Water Levels	14	3.5	7	14	0	79
	Poor Water Quality	13	3.8	0	8	8	85
	Boating Hazards	14	3.4	7	7	21	64
	Poor Trail Conditions	10	3.9	0	0	10	90

7.3.1 High Rock Dam Tailwaters

The TUS respondents did not identify any significant problems with sudden changes in water levels, poor water quality, boating hazards, or poor trail conditions at High Rock Dam tailwaters. No more than 3 percent of respondents identified any of these four potential issues as a big or moderate problem.

7.3.2 Tuckertown Dam Tailwaters

The TUS respondents did not identify any significant problems with sudden changes in water levels, poor water quality, boating hazards, or poor trail conditions at the Tuckertown Dam tailwaters. No more than 2 percent of respondents identified any of these four potential issues as a big or moderate problem.

7.3.3 Narrows Dam Tailwaters

The TUS respondents did not identify any significant problems with sudden changes in water levels, poor water quality, boating hazards, or poor trail conditions at the Narrows Dam tailwaters. Approximately 16 percent of respondents did identify boating hazards as big or moderate problems at the Narrows Dam tailwaters, which was more than at the tailwaters of High Rock or Tuckertown dams. The Narrows powerhouse is the only powerhouse at the four Yadkin dams that is not integral with the dam. The Narrows powerhouse is oriented perpendicular to the dam and discharges water perpendicular to normal river flow, which can cause turbulent currents.

7.3.4 Falls Dam Tailwaters

The TUS respondents identified sudden changes in water levels (21 percent of respondents indicated that this was a big or moderate problem) as a significant problem at the Falls Dam tailwaters. In addition, approximately 14 percent of respondents identified boating hazards as a big and moderate problem at the Falls Dam tailwaters.

7.4 Effects of Project Operations

Respondents to the TUS were asked “Does the operation of the dam/powerhouse influence your decision to recreate in the tailwater?” Overall, 93 percent of respondents indicated that Project operations either have no effect on recreation or a positive effect (Table 7-4). Many respondents (over 20 percent) indicated that fishing was better when the powerhouses were generating power and discharging water.

Table 7-4 TUS Responses to Whether Project Operations Affect Recreation

Tailwater	Adversely Affects Recreation	No Effect	Positively Affects Recreation
High Rock Dam	6%	80%	14%
Tuckertown Dam	5%	69%	26%
Narrows Dam	0%	57%	43%
Falls Dam	33%	44%	22%

Those respondents who indicated that Project operations have an adverse effect on recreation (about 7 percent) identified the following concerns:

- When the Project is generating, water levels can be too high or the current too strong. This can adversely affect fishing and make boating dangerous, especially for canoeists.
- When the Project is spilling water, trash and woody debris tends to collect in the tailwaters, which can be dangerous for boaters.
- When the Project is not generating or the downstream reservoir is drawn down, water levels can be too low, exposing rocks and making boating unsafe.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

This section summarizes the findings and conclusions of this study.

8.1.1 Recreational Use Levels and Carrying Capacity

Recreational use for the entire Yadkin Project is estimated at over 2.4 million recreation days for the one year study period of May 10, 2003 to May 9, 2004. Recreational use is not evenly distributed among the four reservoirs, with High Rock and Narrows receiving the most use (53 percent and 45 percent, respectively). Tuckertown Reservoir receives about 2 percent of total project recreational use, and Falls Reservoir is lightly used (<1 percent of total project use). High Rock and Narrows reservoirs are the largest reservoirs and both have large resident populations, which are not found at the other two reservoirs.

There are several recreational user groups at the Project. For purposes of this study we identified five – visitors (i.e., people using the public access recreation areas), waterfront residents, non-waterfront residents living in private communities, various commercial businesses and private organizations, and paddlers using the canoe portages. Waterfront residents at High Rock and Narrows reservoirs are estimated to represent about 55 percent of the total recreation days at the Project. Non-waterfront residents (19 percent), commercial businesses and private organizations (15 percent), and visitors (11 percent) represent nearly all of the remaining use. The canoe registries that were established at the portage trails around the four dams receive very light use (estimated at 50 recreation days per year).

8.1.2 Recreational Activities

There are significant differences in recreational activities among the four reservoirs. At High Rock Reservoir, boating (including both motor boating and boat fishing) is the primary recreational activity representing approximately 38 percent of recreation days. Bank fishing represents about 15 percent of recreation days, with swimming and sunbathing also being popular.

Tuckertown Reservoir is primarily a fishing destination, with 59 percent of recreational users bank fishing and 36 percent boat fishing. Picnicking is also popular. Only 9 percent of respondents indicated that they were simply “motor boating” (note that these are participation rates and can total to over 100 percent).

Recreational use at Narrows Reservoir is the most diverse. Motor boating represents about 22 percent of recreation days, boat fishing and bank fishing each represent about 15 percent, swimming represents 14 percent, and sunbathing 7 percent.

At Falls Reservoir, nearly half of the recreational users are camping at Uwharrie National Forest. While camping, they also engage in bank fishing (47 percent participation rate), boat fishing (41 percent), and hiking, swimming, and picnicking (all 29 percent).

8.1.3 Seasonality of Recreational Use

The reservoirs differ very slightly in terms of the seasonality of recreational use, which is related to the primary type of recreational activities that occur at the reservoirs.

Recreational use at High Rock and Narrows reservoirs, with a large resident population that participates in a relatively diverse set of recreational activities, primarily occurs between Memorial Day and Labor Day, with still fairly high use during the May and September shoulder months. These five months (May through September) represents 75 percent of the total recreation days at High Rock Reservoir and 68 percent at Narrows Reservoir.

Tuckertown and Falls Reservoirs do not have any waterfront residents, are smaller, and are primarily destinations for fishing and camping. Recreational use at these reservoirs picks up earlier in the year (early April) than at High Rock and Narrows reservoirs (late May), which may be attributable to fishing and the generally mild temperatures that are conducive for camping. Recreational use also drops off earlier at Tuckertown and Falls reservoirs (August) than at High Rock or Narrows reservoirs (September or October), which may be attributable to a decline in fishing and hot temperatures for camping. These five months (April through August) account for 81 percent of the total recreation days at Tuckertown Reservoir and 69 percent at Falls Reservoir. Falls Reservoir also receives recreational hunting use during the winter, especially in November.

8.1.4 Recreational Issues

The VUS, RUS, PCUS, and TUS all asked recreational users about the magnitude of several potential recreational issues at the four reservoir. As is common at many recreational sites, some users (generally between 10 and 20 percent) complained about the availability of sanitary facilities and the improper disposal of litter, trash, and toilet paper at each of the four reservoirs. Low water levels was identified as a “big” or “moderate” problem by nearly 50 percent of waterfront and non-waterfront residents at High Rock Reservoir and approximately 40 percent at Narrows Reservoir, but was not an issue at Tuckertown and Falls reservoirs. On a related note, about 45 percent of waterfront and non-waterfront residents at High Rock Reservoir identified boating hazards (e.g., stumps, shallow water) as a big or moderate problem, which may be attributed to the more significant drawdown that occurs at that reservoir. Only about 20 percent of waterfront and non-waterfront residents identified boating hazards as a big or moderate problem at Narrows Reservoir, where the reservoir drawdown is usually much less.

Very few respondents (generally less than 5 percent) identified “Conflicts with other recreational users” or “Loud, rude, or inconsiderate behavior by other users” as big or moderate problems.

8.1.5 Resident versus Visitor Recreational Use

There are clear differences in opinion between waterfront residents and visitors regarding various potential issues at High Rock and Narrows reservoirs. Residents (including both waterfront and non-waterfront) are much more likely to rate potential issues as “big” or “moderate” problems than visitors. For example, only 9 percent of visitors consider “improper disposal of litter, trash, and toilet paper” as a big or moderate problem at High Rock Reservoir, while 40 percent of waterfront residents and 30 percent of non-waterfront residents consider it a “big” or “moderate” problem. In general, most visitors appear pleased with their trips to the reservoirs and raise few concerns, other than about the availability of toilets. On the other hand, residents have strong concerns about low water levels; improper disposal of litter, trash, and toilet paper; and boating hazards.

8.1.6 Recreational Facilities

The VUS and the TUS questioned recreational users about the condition of various recreational facilities. Overall most respondents indicated that the recreational facilities were in at least acceptable condition. In most cases when respondents indicated facilities were “mostly” or “totally” inadequate, it was because the facility (e.g., toilets) were lacking rather than not being in good condition. APCI has conducted a separate report, Recreation Facility Inventory and Condition Assessment, which evaluates facility condition in more detail.

Recreational facilities at the public access recreation areas were evaluated in terms of their capacity to meet recreational demand. The number of boat launch lanes and amount of parking generally appear adequate. Parking at 13 of the public access recreation areas exceeded parking capacity during the study period, but most only exceeded capacity once or twice during the study period, usually on holidays. Only three public access recreation areas were observed exceeded parking capacity more than twice:

- York Hill Boat Access at High Rock Reservoir – existing parking capacity is 20 vehicles, capacity exceeded 3 times with 27 as the maximum number of vehicles;
- Flat Creek Fishing Access at High Rock Reservoir – existing parking capacity is 12 vehicles, capacity exceeded 3 times with 23 as the maximum number of vehicles; and
- UNF Cove Boat Landing at Narrows Reservoir – existing parking capacity 30 vehicles, capacity exceeded 4 times with 42 as the maximum number of vehicles, site is under renovation by the USFS, but the number of parking spaces is proposed to be reduced to 23.

Parking capacity is not exceeded enough in terms of frequency or magnitude at these sites to warrant expansion at this time, but capacity should continue to be monitored.

In terms of boat launch lanes, most boat access areas appear adequate to accommodate even peak day boat launch demand. Tamarac Marina, which is privately-owned, is the

only boat launch where capacity was observed to be exceeded more than twice – capacity was observed to be exceeded 6 times during the study period. Additional launch lanes are currently not needed to satisfy demand.

The number of trash receptacles and toilets were also evaluated at public boat access areas (Table 8-1). This analysis indicated that several relatively heavily used recreation areas lacked any trash receptacles and toilets. Given the number of survey respondents who identified lack of sanitary facilities and improper disposal of litter and trash as big or moderate problems, additional trash receptacles and toilets are warranted. In our opinion, all public boat access areas should have trash receptacles and sites with recreational use over approximately 4,000 recreation days should have at least one toilet, and sites with recreational use over approximately 15,000 recreation days should have two toilets.

Table 8-1 Comparison of Public Boat Access Area Facilities

Reservoir	Site Name	Estimated Annual Use (Rec. days)	# of trash receptacles	# of toilets	# of boat launch lanes
High Rock	Southmont Boat Access	29,854	11	2	5
Narrows	Circle Drive Boat Access	27,858	0	2	3
Narrows	Old Whitney Boat Access	20,862	13	1	2
Narrows	Badin Boat Access	19,772	12	2	3
Tuckertown	Highway 49 Boat Access	16,798	5	2	3
High Rock	Dutch Second Creek Boat Access	14,680	0	0	2
Tuckertown	Flat Creek Boat Access	14,143	3	0	2
High Rock	Buddle Creek Boat Access	8,486	12	2	2
High Rock	Flat Swamp Boat Access	7,875	13	1	3
Narrows	UNF Cove Boat Landing	7,168	0	2	1
High Rock	York Hill Boat Access	6,400	2	0	2
Narrows	Lakemont Boat Access	5,652	0	0	2
Tuckertown	Bringle Ferry Boat Access	4,443	0	0	1
Narrows	Garr Creek Access	2,660	2	0	1
Falls	Falls Boat Access	2,629	4	0	1
Tuckertown	Newsome Road Access	1,211	3	0	2
High Rock	Rowan County Pump Station	873	0	0	1
Narrows	Palmerville	540	1	0	1
High Rock	Little Crane Creek	151	6	0	2
High Rock	Highway 601 Boat Access	116	4	0	1

Bold – indicates facilities that appear inadequate based on comparison with other sites and survey responses.

The number of trash receptacles and toilets were also evaluated at other public access areas (Table 8-2). Some of the picnic areas lack trash receptacles and toilets. In our opinion, all picnic areas should have both trash receptacles and at least one toilet. Several of the fishing access areas lack both trash receptacles and toilets. The recreational use at these fishing access areas is typically very dispersed, which makes conveniently locating toilets and trash receptacles so they will be used very challenging.

Provision of these facilities at fishing access areas needs to be made on a site-specific basis.

Table 8-2 Comparison of Other Public Access Area Facilities

Reservoir	Site Name	Estimated Annual Use (Rec. days)	# of trash receptacles	# of toilets	# of picnic tables
Narrows	UNF Badin Lake Campground	12,571	3	6	34
Narrows	Badin Lake Swim/Picnic Area	8,509	31	4	15
Narrows	Tuckertown Dam Tailrace Access	7,176	10	1	0
Narrows	Badin Lake Group Campground	5,429	9	4	18
Tuckertown	High Rock Dam Picnic and Fishing Access	4,653	14	1	4
Tuckertown	High Rock Dam Tailrace Access	4,121	4	0	0
Narrows	UNF Walk-in Fishing Pier	3,692	0	0	0
Tuckertown	Riles Creek Recreation Area	3,047	6	0	5
Tuckertown	Flat Creek Fishing Access Area	1,559	3	0	1
Falls	Deep Water Trail Access	1,529	2	0	0
Narrows	UNF Holt's Cabin Picnic Area	917	4	1	7
Tuckertown	Cedar Creek Fishing Pull-off	906	3	0	0
Tuckertown	Tuckertown Pull-off Fishing Accesses	633	7	0	0
High Rock	Abbotts Creek	464	0	0	0
Tuckertown	Lick Creek Fishing Pull-off	372	0	0	0
High Rock	Crane Creek Fishing Access	208	0	0	0
High Rock	Highway 47 Fishing Pull-off	204	0	0	0

Bold – indicates facilities that appear inadequate based on comparison with other sites and survey responses.

8.2 Recommendations

The following recommendations are made based on the results of this study:

- Efforts should be made to limit drawdown at High Rock Reservoir between approximately May through September to the extent possible. The data suggest that low water becomes a big or moderate problem at between 4 to 5 feet of drawdown.
- Boating hazards, especially at High Rock Reservoir, may need to be better marked to alert boaters.
- Recreation use projections indicate that the physical carrying capacity of High Rock and Narrows reservoirs may be exceeded prior to 2030. APCI should coordinate with the USFS, NCWRC, and other recreation providers at the reservoirs to determine the best way to manage recreational growth and to avoid the safety hazards associated with exceeding a reservoir's carrying capacity.
- Monitor parking at York Hill Boat Access, Flat Creek Fishing Access, and UNF Cove Boat Landing to determine whether parking capacity is being sufficiently exceeded to warrant an expansion of the parking area.
- Evaluate whether it is possible to create legal parking at several formerly used fishing pull-off areas (Crane Creek Fishing Access, Highway 47 Fishing Pull-off, Abbotts Creek/NC 8 Bridge Pull-off, and Lick Creek Fishing Pull-off) that are no longer used because of the lack of legal parking.
- Develop programs to improve trash and litter collection, especially at public access fishing areas
- Additional toilets and trash receptacles are warranted at the following public access recreation areas unless past vandalism problems pre-empt:

Reservoir	Public Access Recreation Areas	Additional Recreational Facilities
High Rock	Rowan County Pump Station	Add trash receptacles
High Rock	York Hill Boat Access	Add 1 toilet
High Rock	Dutch Second Creek Boat Access	Add 1 to 2 toilets
Tuckertown	Bringle Ferry Boat Access	Add 1 toilet and trash receptacles
Tuckertown	Flat Creek Boat Access	Add 1 toilet
Tuckertown	Flat Creek Fishing Access	Add 1 toilet
Tuckertown	Riles Creek Recreation Area	Add 1 toilet
Narrows	Circle Drive Boat Access	Add trash receptacles
Narrows	Old Whitney Boat Access	Add 1 toilet
Narrows	UNF Walk-in Fishing Pier	Add trash receptacles
Narrows	UNF Cove Boat Landing	Add trash receptacles

9.0 REFERENCES

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Appendix A
Spot Count Form

Date: _____
Interviewer: _____

**YADKIN RECREATION USE ASSESSMENT
SPOT COUNT FORM
GROUP 3 - Summer Season**

Starting Mileage: _____
Ending Mileage: _____

ACTIVITY	Site 49 Falls Boat	Site 45 Badin Boat	Site 44 Badin Lake	Site 43 Palmerville	Site 32/33 O. Whitney Boat
Time & Weather					
Total # of Vehicles					
No. of Boat Trailers					
No. of Jet Ski Trailers					
No. of Roof Top Carriers					
Bank Anglers					
Sun Bathers					
Swimmers					
Picnickers					
Water Skiers					
Campers					
Jet Skiers					
Canoeists/Kayaking					
Windsurfing					
Power Boaters					
Hunters					
Sailors					
Hikers					
Other					
Comments/Observations					
Number of Visitor Contact refusals (not interested/already surveyed)					

Appendix B
Survey Technician Instruction
Form

YADKIN RECREATION USE ASSESSMENT TYPICAL DAILY ROUTINE FOR SURVEY TECHNICIANS

1. Complete Vehicle Inspection Sheet
2. Make sure you have ERM badge and letter from Alcoa, Alcoa safety form, and a mobile phone with you in the car. Be sure you have a pencil with you so that in case it rains, recreation users can still fill out the Visitor contact form.
3. Proceed to recreation areas in accordance with schedule
4. At each recreation area complete Spot Count Form (once form is completed do not add or subtract anyone who is arriving or departing)
 - record number of vehicles
 - if you see any canoeists, ask whether they have used the canoe portages at any of the dams and if they registered
 - count people by recreational activity (only count boaters, jet skiers, water skiers if they are in the immediate area of the recreation area or anchored/docked at the recreation area)
 - note any observations (trouble using boat ramp, cars encroaching into road)
5. At each recreation area give Visitor Use Survey (explain what we are doing, this could be given to any adult present including those who may have arrived after you conducted the spot count, but only one survey per group – for example do not survey a husband and wife) – if you need to give survey verbally do so, but we prefer to have the user fill out the survey so you can survey more people
 - if less than 5 groups present, try to survey one adult from each group
 - if more than 5 groups, try to get a cross-section of groups participating in different recreational activities, but definitely try to target boaters
 - only survey boaters after they have been boating, not while they are putting in
 - **make sure that Questions 1 – 4 are filled out on the form**
 - **make sure you go up to the dam at sites 17, 18, and 29 and distribute the Tailwater Use Survey (not the Visitor Use Survey once you are out of the designated public access areas).**
 - if time permits, talk to some of the recreation users about their experience and make notes on the spot count form under “Comments”
 - keep track of number of people who refuse to take the survey and why (e.g., don’t want to, completed survey on another visit) on the Spot Count Form
 - **Please note that you no longer need to get any Visitor Use Surveys at the Rowan Pumping Station site because of safety concerns. Do you spot counts but do not feel that you need to get out of your vehicle or to do any contact surveys.**
6. Proceed to next recreation area
 - try to hit all sites once between 7 a.m. - 10 a.m. (could be earlier)

- try to hit all sites once between 11 a.m. - 2 p.m.
 - try to hit all sites once between 3 p.m. - 6 p.m. (could be later)
8. Return forms to Bill Ackerman
 9. Conduct weekly self audit
- NOTE: if sick or car problem, call Bill Ackerman (preferably the night before).

Appendix C
Visitor Use Survey

Date: _____
Time: _____

Gasoline (car/boat)	\$
Equipment Rental	\$
General merchandise stores (misc. supplies)	\$
Repair Service (car/boat)	\$
Other _____	\$

**THE FOLLOWING QUESTIONS RELATE TO YOUR GENERAL EXPERIENCE AT THIS RESERVOIR,
BUT ARE NOT LIMITED TO TODAY.**

8. Please evaluate the condition of each of the following facilities at this reservoir. (check appropriate box)

	Excellent	Very Good	Acceptable	Mostly inadequate	Totally Inadequate	Don't know/ Not applicable
Boat ramps/docks						
Parking areas						
Marinas						
Campgrounds						
Swimming beaches						
Toilets (Port-a-johns)						
Fishing Piers						
Lighting						
Informational Signage						
Picnic Tables/Grills						
Trash Receptacles						

If you feel any of the facilities at this reservoir are "mostly inadequate" or "totally inadequate", please explain why. _____

9. Are there any other activities or services that are currently not available, but that would improve your recreational experience?

10. How would you rate the scenic quality of this reservoir area? (circle answer below)

Very Unattractive Somewhat Unattractive Average Somewhat Attractive Very Attractive

11. Please circle any of the following that detract from the scenic quality of this area?

Project dams Waterfront housing Electric transmission lines Exposed lake bottom Reservoirs
Docks/piers Timber harvesting Floating debris/trash Bulkheads/rip rap Muddy water
Lack of landscaping at public access areas Roads Eroding shoreline Other _____ None

THE FOLLOWING ARE SOME GENERAL BACKGROUND QUESTIONS

12. What is the zip code of your primary residence? _____

13. Do you own waterfront property on any of the Yadkin Project reservoirs? No ()
Yes, at High Rock Reservoir () Yes, at Tuckertown Reservoir () Yes, at Narrows Reservoir/Badin Lake ()

15. Please circle below the type and number of watercraft that you brought with you to the reservoir today.

Powerboats 0 1 2 3 Jet skis 0 1 2 3 Canoe/kayaks 0 1 2 3 Sailboats/boards 0 1 2 3

16. What is your age? less than 16 ☐ 16-21 ☐ 22-45 ☐ 46-65 ☐ over 65 ☐

Are you male _____ or female _____?

17. Do you have any other comments regarding your recreation experience at this reservoir?

Thank you for taking the time to complete this survey!!!



Restaurantes y locales de beber	\$	Gasolina (auto/ bote)	\$
Tiendas de comida (comestibles)	\$	Alquiler de equipo	\$
Otros servicios de recreo		Tienda de mercancía	
(guía de pescar, tour en bote)	\$	general (provisiones misc.)	\$
Carnada / aparejo	\$	Reparaciones (auto/ bote)	\$
Hospedaje (hotel / alquiler casa)	\$	Otro	\$

**LAS SIGUIENTES PREGUNTAS ESTÁN RELACIONADAS A SU EXPERIENCIA GENERAL EN ESTA REPRESA,
PERO NO ESTÁN LIMITADAS A HOY**

8. Favor de evaluar la condición de cada una de las instalaciones en esta represa (marcar caja apropiada)

	Excelente	Muy bueno	Aceptable	Mayormente inadecuado	Totalmente inadecuado	No sé/ No aplica
Botaduras/ muelles						
Estacionamientos						
Marinas						
Áreas de acampar						
Playas de nadar						
Servicios sanitarios (letrinas portátiles)						
Muelles para pescar						
Alumbramiento						
Letreros de información						
Mesas de picnic/ parillas Receptáculos para basura						

Si usted opina que algunas de las instalaciones de esta represa están “mayormente inadecuadas” o “totalmente inadecuadas” favor de explicar porqué. _____

9. ¿Hay algunas actividades o servicios que no están actualmente disponible, pero que mejorarían su experiencia recreativa?

10. ¿Cómo calificaría usted la calidad pintoresca de esta área de represa? (favor de hacer un círculo a su contestación abajo)

Muy feo

Un poco feo

Promedio

Atractivo

Muy atractivo

11. Favor de marcar en las siguientes las cosas que quitan la calidad a las vistas del área.

Diques	Casas frente al agua	Líneas eléctricas	Fondo de lago expuesto	Represas
Muelles	Corte de árboles	Basura flotante	Mamparas / escollo	Agua fangosa
Falta de jardinería ornamental en áreas públicas	Carreteras	Erosión de orillas	Otro _____	

LAS SIGUIENTES SON ALGUNAS PREGUNTAS GENERALES

12. ¿Cuál es el código postal de su residencia principal? _____
13. ¿Es usted es dueño de alguna propiedad frente al agua de alguna represa del Proyecto Yarkin?
Sí en la Represa High Rock () Sí en la Represa Tuckertown () Sí en la Represa Narrows/ Lago Badin () No ()

15. Favor de marcar abajo el tipo y número de embarcaciones que usted trajo a la represa hoy.

Bote con motor 0 1 2 3 Jet ski 0 1 2 3 Canoa/ kayak 0 1 2 3 Velero/ tabla de vela 0 1 2 3

16. ¿Cuántos años tiene? Menos de 16 ☐ 16-21 ☐ 22-45 ☐ 46-65 ☐ Más de 65 ☐

Sexo: masculino _____ femenino _____

17. ¿Tiene algún otro comentario relacionado con su experiencia recreativa en esta represa?

¡Gracias por tomar el tiempo para completar esta encuesta!



Appendix D
Tailwater Use Survey

Interviewer: _____
 Location: _____

Date: _____
 Time: _____

YADKIN PROJECT TAILWATER USE SURVEY

The Yadkin Division of Alcoa Power Generating Inc. who manages this recreation area, has hired ERM to conduct a recreation use survey at the tailwater (i.e., the approximately 1,000 feet of river immediately downstream of each of the dams) of High Rock, Tuckertown, Narrows (Badin Lake), and Falls Reservoirs. This information will be used to help improve recreation opportunities. Please take a few minutes to answer these questions. Your experience and opinions are important to us.

1. Please check all of the activities that you have participated in, or will participate in, during your trip to the tailwater waters **today**.

motor boating	_____	swimming	_____	picnicking	_____
boat fishing	_____	jet skiing	_____	sun bathing	_____
bank fishing	_____	water skiing	_____	sailing	_____
canoeing/kayaking	_____	camping	_____	hunting	_____
hiking	_____	windsurfing	_____	other	_____

2. From the list above, which one was your primary activity (the main reason for your trip to the reservoir) **today**? _____

3. If you are boating in the tailwater, did you use a public boat launch? Yes () No (). If yes, which one? _____

4. If you are on foot, how did you access the tailwater area? _____

5. We would like to know whether you have encountered certain conditions at this tailwater that interfered with your recreation experience **today**. Please check whether each of the following was a big, moderate, slight, or not a problem on your trip **today**.

	Big Problem	Moderate Problem	Slight Problem	Not a Problem
Too many people along the shoreline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crowded conditions at boat launches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crowded parking conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too many watercraft in the tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low water levels at the tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sudden changes in water levels in the tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor water quality in the tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improper disposal of litter, trash, or toilet paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflicts with other recreational users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loud, rude or inconsiderate behavior by other users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boating hazards (e.g., stumps, shallow areas)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor trail conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of sanitary facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please evaluate the condition of each of the following facilities at this tailwater. (check appropriate box)

	Excellent	Very Good	Acceptable	Mostly inadequate	Totally Inadequate	Don't know/ Not applicable
Boat ramps convenient to tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parking areas convenient to tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Campgrounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trails to tailwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing access/facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Toilets (Port-a-johns)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informational/Warning Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you feel any of the facilities at this tailwater are “mostly inadequate” or “totally inadequate”, please explain why. _____

7. Does the operation of the dam/powerhouse influence your decision to recreate in the tailwater? If so, for what reason?

8. What is the zip code of your primary residence? _____
9. Do you own waterfront property on any of the Yadkin Project reservoirs? Yes () No ()
10. What is your age? less than 16 ☐ 16-21 ☐ 22-45 ☐ 46-65 ☐ over 65 ☐
Are you male _____ or female _____?
11. Do you have any other comments regarding your recreation experience at this tailwater area?

Thank you for taking the time to complete this survey!!!

Entrevistador: _____
Lugar: _____

Fecha: _____
Hora: _____

PROYECTO YADKIN
ENCUESTA DE USO PARA EL ÁREA DEL RÍO DEBAJO DE LA REPRESA

La División Yadkin de Alcoa Power Generating Inc., que maneja esta área de recreo, ha contratado a ERM para conducir una encuesta de uso de recreo en el área del río aproximadamente 1,000 pies inmediatamente debajo de las represas High Rock, Tuckertown, Narrows (Lago Badin) y Falls. Esta información será usada para ayudar a mejorar oportunidades de recreo. Favor de tomar unos minutos para contestar estas preguntas. Su experiencia y opiniones son importantes para nosotros.

1. Favor de marcar todas las actividades en las cuales usted ha participado o participará durante su visita al área de río debajo de la represa **hoy**.

correr bote de motor _____	nadar _____	picnic _____
pescar desde un bote _____	correr jet ski _____	tomar sol _____
pescar desde la orilla _____	esquiar sobre agua _____	navegar _____
pasear en canoa / kayak _____	acampar _____	cazar _____
caminar _____	otro _____	_____

2. De la lista anterior, ¿cuál fue su actividad primaria (la razón principal por su visita a la represa) **hoy**? _____

3. Si usted está navegando en el río, ¿cuál botadura usó? _____ Público _____ Privado _____.

4. Si usted anda a pie, ¿cómo llegó al área del río debajo de la represa? _____

5. Nos gustaría saber si usted ha encontrado ciertas condiciones en esta área del río que han interferido con su experiencia de recreo **hoy**. Favor de marcar si lo siguiente fue un problema mayor, moderado o menor, o ningún problema para su visita **hoy**.

	<u>Problema Mayor</u>	<u>Problema Moderado</u>	<u>Problema Menor</u>	<u>Ningún Problema</u>
Demasiadas personas en la orilla	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condiciones sobrecargadas en las botaduras de botes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demasiados botes en esta área del río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nivel de agua baja en esta área del río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cambios repentinos en niveles de agua en esta área del río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pobre calidad de agua en esta área del río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disposición inadecuada de basura o papel sanitario	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comportamiento alborotoso, ofensivo o desconsiderado de otros visitantes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peligros para botes (cepas, áreas de poca profundidad)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pobres condiciones de veredas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Áreas de estacionamiento sobrecargadas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Falta de instalaciones sanitarias	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Favor de evaluar la condición de cada una de las instalaciones en esta área del río (marcar caja apropiada)

	Excelente	Muy bueno	Aceptable	Mayormente inadecuado	Totalmente inadecuado	No sé/ No aplica
Botaduras convenientes al área de río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Áreas de estacionamiento convenientes al área del río	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Áreas de acampar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veredas al área debajo de la represa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Acceso / facilidades de pesca	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Servicios sanitarios (letrinas portátiles)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Letreros de información / avisos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Si usted opina que algunas de las instalaciones del área debajo de esta represa están “mayormente inadecuadas” o “totalmente inadecuadas” favor de explicar porqué. _____

7. ¿Cuál es el código postal de su residencia principal? _____
8. ¿Es usted dueño de alguna propiedad frente al agua de alguna represa del Proyecto Yadkin? Sí () No ()
9. ¿Cuántos años tiene? Menos de 16

 16-21

 22-45

 46-65

 Más de 65

- Sexo: masculino _____ femenino _____
10. ¿La operación de la represa / estación de fuerza, afecta su decisión de hacer recreación en el área del río debajo de la represa?
De ser así, ¿porqué?
11. ¿Tiene algún otro comentario relacionado con su experiencia recreativa en esta represa?

¡Gracias por tomar el tiempo para completar esta encuesta!

Appendix E
Tailwater Use Survey
Instructions

TAILWATER USE SURVEY INSTRUCTIONS

- This survey should only be distributed to recreational users in the tailwaters of the four dams (defined as within approximately 1,000 feet below each dam).
- Please focus on boaters in the tailwaters
- This survey should only be distributed to one person in each group (e.g., if there is a family of four in one boat – only have one person fill out the survey).
- Please distribute the survey to as many different groups as possible, without interfering with the work that you need to do.
- In approaching a recreational user, just tell them that Alcoa is conducting a survey to better understand recreational use at the Yadkin Project and will use this information to help improve recreational opportunities. Ask them if they would be willing to fill out the survey, you might mention that it will only take them a few minutes to fill out the survey
- Please ask the recreation user to fill out the survey and mail it back to ERM. All they need to do is fold the survey and tape or staple it closed. The survey is already stamped and addressed.
- If they want to give the survey back to you, that is fine if you are willing to accept them. All you would need to do is drop them in the mail. This is totally up to you if you are willing to take them back. Please do not let this interfere with the work you are doing.
- If you have any questions please call Dave Blaha at 410-266-0006.
- My email address is david.blaha@erm.com

Thanks!!!

Appendix F
Canoe Registry

YADKIN CANOE/KAYAK REGISTRY

The Yadkin Division of Alcoa Power Generating Inc. who manages this reservoir, has hired ERM to conduct a recreation use survey at High Rock Reservoir, Tuckertown Reservoir, Narrows Reservoir (Badin Lake) and Falls Reservoir. This information will be used to help improve recreation opportunities at the reservoirs. Please take a few minutes to answer these questions. Your experience and opinions are important to us.

[illegible]

Appendix G
Resident Use Survey Cover
Letter
and
Survey Form

PLEASE READ THIS IF YOU LIVE OR OWN PROPERTY ADJACENT TO A YADKIN PROJECT RESERVOIR (LAKE)

YADKIN HYDROELECTRIC PROJECT (FERC No. 2197) RESIDENT USE SURVEY

The Yadkin Division of Alcoa Power Generating Inc. (Yadkin), a subsidiary of Alcoa, has initiated the relicensing process for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC). This license expires in 2008 and Yadkin must file a new license application with FERC in 2006 to continue operation of the Project. The Yadkin Project consists of four reservoirs (lakes), dams, and powerhouses, High Rock Reservoir (High Rock Lake), Tuckertown Reservoir (Tuckertown Lake), Narrows Reservoir (Badin Lake), and Falls Reservoir (Falls Lake).

The relicensing process must consider a variety of resources, including recreational use of the Project lands and reservoirs (lakes). Yadkin has hired a consulting firm, ERM, to conduct a recreation use survey at the Yadkin Project. In order to better assess recreational use of the Project reservoirs (lakes), Yadkin permit holders will be sent this Resident Use Survey. This information will be used to help assess and possibly enhance recreational use and opportunities at the Yadkin Project.

In this survey, you are being asked to provide information on your recreational use of the Project reservoirs (lakes) *for just last month*. Yadkin permit holders will receive one of 12 monthly mailings asking about their recreational use of the Project reservoirs (lakes) for the past month. You have been randomly selected to receive this survey this month. Please do not be concerned if your neighbors did not also receive a survey this month. The intent is to try to survey all Yadkin permit holders, so eventually all permit holders should receive the survey, if they have not already.

The reason you are only being asked about recreational use for the past month is to help make this survey as accurate as possible. The accuracy of the survey is greatly enhanced using this approach, since it only requires the person answering the survey to recall one month's worth of recreational activity. The results of the survey responses will be used to estimate total annual recreational use for *all* Yadkin permit holders. Ultimately, recreation use estimates will be used by FERC to evaluate the recreational value of the Yadkin Project when considering a new license for the Project.

Please be as accurate as you can about your *actual* recreational use last month, even if it reflects more or less recreational use than normal. Your individual responses are important and will be kept completely confidential. If you have any questions regarding this survey, please do not hesitate to contact Karen Wilson at (410) 266-0006 during normal working hours or via email at karen.wilson@erm.com. *Please return this survey as soon as possible*. A stamped addressed return envelope has been provided for your convenience.

THANK YOU!!!!!!

David W. Blaha, AICP

ERM

200 Harry S. Truman Parkway, Annapolis, MD 21401

YADKIN PROJECT RESIDENT USE SURVEY

The Yadkin Division of Alcoa Power Generating Inc. has hired ERM to conduct a recreation use survey at High Rock, Tuckertown, Narrows (Badin Lake), and Falls Reservoirs (collectively the Yadkin reservoirs). This information will be used to help improve recreation opportunities. Please take a few minutes to answer these questions. Your experience and opinions are important to us.

- Check the reservoir on which you own waterfront property. () High Rock () Tuckertown () Narrows (Badin Lake)
- Approximately how many days during *March 2004* did you spend at your waterfront home?
_____ days (maximum of 31 days)
- How many people usually stayed at your waterfront home during *March 2004*?
Number of adults (16 years or older) _____
Number of children (less than 16 years) _____
Please also estimate the number of "visitor days" (the sum of each guest that you had times the number of days each guest stayed at your waterfront home and used the reservoir during *March 2004*).
Number of guests during *March 2004*: _____ guests. Total number of visitor days during *March 2004*: _____ "visitor days"
- Please have the adult and child (if applicable) in your household whose birthdays are closest to July 1st answer this survey question.** About how many days during *March 2004* did this adult and this child (together with other household members, or individually) participate in the following activities, as their *principal recreational activity*, on the reservoir? For example, let's say both the adult and child answering this question went motor boating on a Project reservoir about 21 times during *March 2004*. If fishing was their principal recreational activity (e.g., the reason they went out on their boat) 12 of these times, and the other 9 times they simply went boating, then you would write in "12" next to boat fishing and a "9" next to motor boating in both the adult and child columns below. ***Please estimate the number of days of participation in each recreational activity. Please always estimate a number – do not write in "a lot".***

Recreational Activity	Number of days the adult with the birthday closest to July 1 st participated in the following recreational activities during <i>March 2004</i> .	Number of days the child with the birthday closest to July 1 st participated in the following recreational activities during <i>March 2004</i> .
motor boating	_____	_____
boat fishing	_____	_____
bank fishing	_____	_____
canoeing/kayaking	_____	_____
swimming	_____	_____
jet skiing	_____	_____
water skiing	_____	_____
camping	_____	_____
windsurfing	_____	_____
picnicking	_____	_____
hiking	_____	_____
sun bathing	_____	_____
sailing	_____	_____
other	_____	_____
(please list)	_____	_____

- How crowded was the reservoir where you live on a typical Saturday or Sunday during *March 2004*? (circle number).

Not Crowded ←————→ Very Crowded
 1 2 3 4 5

- We would like to know whether you have encountered certain conditions at this reservoir that interfered with your recreation experience. Please check whether each of the following is a big, moderate, slight, or not a problem.

	<u>Big Problem</u>	<u>Moderate Problem</u>	<u>Slight Problem</u>	<u>Not a Problem</u>
Too many people along the shoreline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too many watercraft on this reservoir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low water levels at this reservoir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improper disposal of litter, trash, or toilet paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflicts with other recreation users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loud, rude or inconsiderate behavior by other users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boating hazards (e.g., stumps, shallow areas)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. If your waterfront home is your primary residence, please provide the information requested in section A. If you use this waterfront home for seasonal or weekend use, and it is not your primary residence, or if you are renting this home for the purpose of vacation or recreation, please provide the information requested in section B.

A. If your waterfront home is your primary residence, please estimate the total expenditures that were made by all members of your household during *March 2004* for the following recreational or entertainment activities that were conducted at the Yadkin Reservoirs. Please do **NOT** include normal household expenditures for daily activities that are not associated with recreation on the Yadkin reservoirs

Restaurants and drinking places (only if at a lakeview establishment)	\$ _____	Gasoline (boat)	\$ _____
Use fees (e.g., launch fees, slip rental)	\$ _____	Equipment Rental	\$ _____
Other reservoir-related recreation services (e.g., fishing guides, boat tours)	\$ _____	General merchandise stores (recreational supplies only)	\$ _____
Bait/Tackle/ammunition	\$ _____	Repair Service (boat)	\$ _____
Seasonal boat rental fee	\$ _____	Guide/Outfitters services	\$ _____
		Other	\$ _____

B. If you use your waterfront home for seasonal or weekend use, please estimate the total expenditures that were made by all members of your household during *March 2004*. Include all expenses incurred during your stay at your waterfront home during *March 2004*.

Restaurants and drinking places	\$ _____	Gasoline (car/boat)	\$ _____
Food stores (i.e., groceries)	\$ _____	Equipment Rental	\$ _____
Other recreation services (e.g., fishing guides, boat tours, movies)	\$ _____	General merchandise stores (misc. supplies)	\$ _____
Bait/Tackle/ammunition	\$ _____	Repair Service (car/boat)	\$ _____
Lodging	\$ _____	Guide/Outfitter services	\$ _____
Use fees (i.e., boat launch, slip rental)	\$ _____	Other _____	\$ _____

8. How often do you use any public boat launch areas? Frequently () Commonly () Occasionally () Rarely ()

9. Please circle below the type and number of watercraft that you keep at your waterfront home.

Powerboats 0 1 2 3 Jet skis 0 1 2 3 Canoe/kayaks 0 1 2 3 Sailboats/boards 0 1 2 3

10. How would you rate the scenic quality of this reservoir (circle answer below)?

Very Unattractive Somewhat Unattractive Average Somewhat Attractive Very Attractive

11. Please circle any of the following that detract from the scenic quality of this area. (circle answers below)

Project dams Waterfront housing Electric transmission lines Exposed lake bottom Reservoirs
Docks/piers Timber harvesting Floating debris/trash Bulkheads/rip rap Muddy water
Lack of landscaping at public recreation areas Roads Eroding shoreline None Other _____

12. What is your age? less than 16 ☐ 16-21 ☐ 22-45 ☐ 46-65 ☐ over 65 ☐
Are you male _____ or female _____?

Do you have any other comments regarding your recreation experiences at this reservoir?

Thank you for taking the time to complete this survey!!! Please return this survey in the enclosed stamped envelope.

If you have any questions regarding this survey, please contact Karen Wilson at karen.wilson@erm.com or (410) 266-0006.

Appendix H
Private Community Use Survey
Cover Letter
and
Survey Form

PLEASE READ THIS IF YOU LIVE OR OWN PROPERTY IN A WATERFRONT COMMUNITY ON A YADKIN PROJECT RESERVOIR (LAKE)

YADKIN HYDROELECTRIC PROJECT (FERC No. 2197) PRIVATE COMMUNITY RESIDENT USE SURVEY

The Yadkin Division of Alcoa Power Generating Inc. (Yadkin), a subsidiary of Alcoa, has initiated the relicensing process for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC). This license expires in 2008 and Yadkin must file a new license application with FERC in 2006 to continue operation of the Project. The Yadkin Project consists of four reservoirs (lakes), dams, and powerhouses, High Rock Reservoir (High Rock Lake), Tuckertown Reservoir (Tuckertown Lake), Narrows Reservoir (Badin Lake), and Falls Reservoir (Falls Lake).

The relicensing process must consider a variety of resources, including recreational use of the Project lands and reservoirs (lakes). Yadkin has hired a consulting firm, ERM, to conduct a recreation use survey at the Yadkin Project. In order to better assess recreational use of the Project reservoirs (lakes), residents in private communities will be sent this Waterfront Community Resident Use Survey. This information will be used to help assess and possibly enhance recreational use and opportunities at the Yadkin Project.

You have been randomly selected to receive this survey. Please do not be concerned if your neighbors did not also receive a survey. The intent is to survey a random sample of all private community residents.

In this survey, you are being asked to provide information on your recreational use of the Project reservoirs (lakes) for a three month period. The reason you are only being asked about recreational use for these three months is to help make this survey as accurate as possible. Studies show that people's recollections of activities over longer periods (for example an entire year) are not as accurate. The accuracy of the survey is greatly enhanced using this approach. The results of the survey responses will be used to estimate total annual recreational use for *all* Yadkin private community residents. Ultimately, recreation use estimates will be used by FERC to evaluate the recreational value of the Yadkin Project when considering a new license for the Project.

Please be as accurate as you can about your *actual* recreational use during these three months, even if it reflects more or less recreational use than normal. Your individual responses are important and will be kept completely confidential. If you have any questions regarding this survey, please do not hesitate to contact Karen Wilson at (410) 266-0006 during normal working hours or via email at karen.wilson@erm.com. *Please return this survey as soon as possible.* A stamped addressed return envelope has been provided for your convenience.

THANK YOU!!!!

David W. Blaha, AICP

ERM

200 Harry S. Truman Parkway, Annapolis, MD 21401

YADKIN PROJECT PRIVATE COMMUNITY RESIDENT USE SURVEY

The Yadkin Division of Alcoa Power Generating Inc. has hired ERM to conduct a recreation use survey at High Rock, Tuckertown, Narrows (Badin Lake), and Falls Reservoirs (collectively the Yadkin reservoirs). This information will be used to help improve recreation opportunities. Please take a few minutes to answer these questions. Your experience and opinions are important to us.

1. Please indicate the name of your community. _____
Please check which reservoir your community is on () High Rock () Tuckertown () Narrows (Badin Lake)

2. Do you own waterfront property on a Yadkin reservoir (lake)? Yes () No ()

3. Approximately how many days in March, April and May did you spend at your Yadkin reservoir home?
_____ days (maximum of 92 days)

If this is not your primary residence, please provide the zip code of your primary residence _____.

4. How many people usually stayed at your Yadkin reservoir home during March, April and May?

Number of adults (16 years or older) _____

Number of children (less than 16 years) _____

5. **Please have the adult and child (if applicable) in your household whose birthdays are closest to July 1st answer this survey question.** About how many days during March, April and May did this adult and this child (together with other household members, or individually) participate in the following activities, as their *principal recreational activity*, on the reservoir? For example, let's say both the adult and child answering this question went motor boating on a Project reservoir about 21 times during this period. If fishing was their principal recreational activity (e.g., the reason they went out on their boat) 12 of these times, and the other 9 times they simply went boating, then you would write in "12" next to boat fishing and a "9" next to motor boating in both the adult and child columns below. ***Please estimate the number of days of participation in each recreational activity. Please always estimate a number – do not write in "a lot".***

Recreational Activity	Number of days the adult with the birthday closest to July 1 st participated in the following recreational activities during March, April and May	Number of days the child with the birthday closest to July 1 st participated in the following recreational activities during March, April and May
motor boating	_____	_____
boat fishing	_____	_____
bank fishing	_____	_____
canoeing/kayaking	_____	_____
swimming	_____	_____
jet skiing	_____	_____
water skiing	_____	_____
camping	_____	_____
windsurfing	_____	_____
picnicking	_____	_____
hiking	_____	_____
sun bathing	_____	_____
sailing	_____	_____
other	_____	_____
(please list)	_____	_____

6. How crowded was the reservoir where you live on a typical Saturday or Sunday during the spring of 2004 (circle number).

Not Crowded ←—————→ Very Crowded
1 2 3 4 5

7. How often do you use any boat launches other than those in your waterfront community?

Frequently () Commonly () Occasionally () Rarely ()

8. Please circle below the type and number of watercraft that you keep at your Yadkin reservoir home.

Powerboats 0 1 2 3

Jet skis 0 1 2 3

Canoe/kayaks 0 1 2 3

Sailboats/boards 0 1 2 3

9. We would like to know whether you have encountered certain conditions at this reservoir that interfered with your recreation experience. Please check whether each of the following is a big, moderate, slight, or not a problem at this reservoir.

	<u>Big Problem</u>	<u>Moderate Problem</u>	<u>Slight Problem</u>	<u>Not a Problem</u>
Too many people along the shoreline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crowded conditions at boat launches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too many watercraft on this reservoir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low water levels at this reservoir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improper disposal of litter, trash, or toilet paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflicts with other recreational users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loud, rude or inconsiderate behavior by other users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boating hazards (e.g., stumps, shallow areas)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. If your Yadkin reservoir home is your primary residence, please provide the information requested in section A. If you use your Yadkin reservoir home for seasonal or weekend use, and it is not your primary residence, please provide the information requested in section B.

- A. If your Yadkin reservoir home is your primary residence,** please estimate the total expenditures that were made by all members of your household during *just* the month of April 2004 for the following recreational or entertainment activities that were conducted at the Yadkin Reservoirs. Please do **NOT** include normal household expenditures for daily activities that are not associated with recreation on the Yadkin reservoirs

Restaurants and drinking places (only if at a lakeview establishment)	\$ _____	Gasoline (boat)	\$ _____
Other reservoir-related recreation services (e.g., fishing guides)	\$ _____	General merchandise stores (recreational supplies only)	\$ _____
Bait/Tackle/ammunition	\$ _____	Equipment Rental	\$ _____
Use fees (i.e., boat launch, slip rental)	\$ _____	Repair Service (boat)	\$ _____
Guide/Outfitter services	\$ _____	Other _____	\$ _____

- B. If you use your Yadkin reservoir home for seasonal or weekend use,** please estimate the total expenditures that were made by all members of your household during *just* the month of April 2004 on the following items. Include all expenses incurred during your stay at your reservoir home during April 2004.

Restaurants and drinking places	\$ _____	Gasoline (car/boat)	\$ _____
Food stores (i.e., groceries)	\$ _____	Equipment Rental	\$ _____
Other recreation services (e.g., fishing guides, boat tours, movies)	\$ _____	General merchandise stores (misc. supplies)	\$ _____
Bait/Tackle/ammunition	\$ _____	Repair Service (car/boat)	\$ _____
Lodging	\$ _____	Guide/Outfitter services	\$ _____
Use fees (i.e., boat launch, slip rental)	\$ _____	Other	\$ _____

11. How would you rate the scenic quality of this reservoir (circle answer below)

Very Unattractive Somewhat Unattractive Average Somewhat Attractive Very Attractive

12. Please circle any of the following that you think detract from the scenic quality of this reservoir (circle answers below)

Project dams	Waterfront housing	Electric transmission lines	Exposed lake bottom	Reservoirs
Docks/piers	Timber harvesting	Floating debris/trash	Bulkheads/rip rap	Muddy water
Lack of landscaping at public recreation areas	Roads	Eroding shoreline	None	Other _____

13. What is your age? less than 16 ☐ 16-21 ☐ 22-45 ☐ 46-65 ☐ over 65 ☐
Are you male _____ or female _____?

14. Do you have any other comments regarding your recreation experiences at this reservoir?

Thank you for taking the time to complete this survey!!! Please return this survey in the enclosed stamped envelope.

If you have any questions regarding this survey, please contact Karen Wilson at karen.wilson@erm.com or (410) 266-0006.

Appendix I
Business and Organization
Phone Survey

PRIVATE ORGANIZATIONS/CLUBS PHONE SURVEY

ERM will conduct a phone survey with the designated contact person with each of the 16 private organizations/clubs with private boat launches and waterfront access at the Yadkin Project.

1. Confirm exact location of facility – which reservoir is it located on?
2. What recreational facilities do you have?
3. Are they functional at all water levels?
4. If not, which ones are affected, and at what water levels? (high, low)
5. What recreational activities occur at your facility
6. How many members do you have?
7. Are members allowed to bring guests and/or family members
8. Are you open year-round?
9. If not, when are you open?
10. What are your daily operating hours?
11. Do you allow overnight use (e.g., camping)
12. For each season (spring, summer, fall, winter)
 - How many people use your facility on a typical weekday?
 - How many people use your facility on a typical weekend day?
 - What is the largest number of people you would have at any one time?
13. Has your organization/clubs use of this reservoir changed in the past 5 years?
14. If yes, is it increasing or decreasing?
15. If so, why?

Commercial Marinas PHONE SURVEY

ERM will conduct a phone survey with the designated contact person with each of the 8 private organizations/clubs with private boat launches and waterfront access at the Yadkin Project.

1. Confirm exact location of facility – which reservoir is it located on?
2. What recreational facilities do you have? (Give Choices-boat ramp, fishing pier, boat pier, Swim Beach, hiking trails,)
3. How many permanent slips, and how many temporary tie-ups?
4. How many slips are rented?
5. Are rentals by the year season etc?
6. How often are all the slips/tieups full? When(season?)
7. Are they functional at all water levels?
8. If not, which ones are affected, and at what water levels? (high, low)
9. What recreational activities occur at your facility (give choices—camping, boat fishing, bank fishing, motor boating, sailing, windsurfing, canoing/kayaking, jet skiing, water skiing, swimming, sun bathing, picnicking, hiking, other)
10. Is use by membership only?
11. How many members do you have?
12. Are members allowed to bring guests and/or family members
13. Are you open year-round?
14. If not, when are you open?
15. What are your daily operating hours?
16. Do you allow overnight use (e.g., camping)

17. For each season

(spring, summer, fall, winter)

- How many people use your facility on a typical weekday?
- How many people use your facility on a typical weekend?
- What is the largest number of people you would have at any one time?

18. Has your organization/clubs use of this reservoir changed in the past 5 years?

19. If yes, is it increasing or decreasing?

20. If so, why?

Campgrounds PHONE SURVEY

ERM will conduct a phone survey with the designated contact person with each of the 8 private organizations/clubs with private boat launches and waterfront access at the Yadkin Project.

1. Confirm exact location of facility – which reservoir is it located on?
2. What recreational facilities do you have?(Give Choices-boat ramp, fishing pier, boat pier, Swim Beach, hiking trails,)
3. Are they functional at all water levels?
4. If not, which ones are affected, and at what water levels? (high, low)
5. What recreational activities occur at your facility(give choices—camping, boat fishing, bank fishing, motor boating, sailing, windsurfing, canoing/kayaking, jet skiing, water skiing, swimming, sun bathing, picnicking, hiking, other)
6. Are you open year-round?
7. If not, when are you open?
8. What are your daily operating hours?
9. Total # of campsites (tent and rv)
10. average # of people per campsite
11. Relative number of permanent (year round) and seasonal campsites as % or number
12. For each season (spring, summer, fall, winter)
 - How many people use your facility on a typical weekday?
 - How many people use your facility on a typical weekend day?
 - What is the largest number of people you would have at any one time?
13. Has your organization/clubs use of this reservoir changed in the past 5 years?

14. If yes, is it increasing or decreasing?

15. If so, why?

16.

Appendix J
Uwharrie National Forest
Recreation Survey

UWHARRIE NATIONAL FOREST RECREATION SURVEY

1. Which reservoir are you visiting? Narrows (Badin) _____ Falls _____

2. Which of the following most closely describes your normal recreation experience on the reservoir you selected above?
 - _____ a) - mostly natural appearing landscape, modifications evident but blend with nature
 - low to moderate concentration of users
 - opportunity for contact with others and isolation from others about equal

 - _____ b) - mostly natural appearing landscape, modifications not easily apparent
 - low concentration of users
 - opportunity for isolation from others more common than opportunity for contact with others

 - _____ c) - natural appearing landscape with no evidence of modification
 - very low concentration of users
 - opportunity for isolation from others occurs frequently
 - motorized use does not occur

 - _____ d) - landscape is not generally natural appearing and has been modified substantially
 - moderate to high concentration of users
 - opportunity for affiliation with others occurs frequently

 - _____ e) - landscape appears to be substantially urbanized
 - high concentration of users
 - opportunity for affiliation with others occurs frequently

3. Which of the above experiences most closely describes **the type of experience you would like to have at this reservoir?** (Circle one) (a) (b) (c) (d) (e)

4. For each of the questions below, please select one of the following distances to reflect your preferences:

20 feet (a car length)	50 feet (length of a garden hose)
80 feet (length of a tennis court)	125 feet (distance from home plate to second base)
225 feet (length of a 747 jet)	300 feet (length of a football field)
>300 feet (greater than the length of a football field)	

While boating, how far away from your boat are other boats before you begin to feel the following?

Crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Moderately crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Not crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Moderately isolated	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Isolated	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>

5. While camping, how far from your site are other campsites before you begin to feel the following?

Crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Moderately crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Not crowded	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Moderately isolated	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>
Isolated	20-ft	<input type="checkbox"/>	50-ft	<input type="checkbox"/>	80-ft	<input type="checkbox"/>	125-ft	<input type="checkbox"/>	225-ft	<input type="checkbox"/>	300-ft	<input type="checkbox"/>	>300-ft	<input type="checkbox"/>

6. Is your principal reason for recreating in this area to use/view the reservoir? (circle one) No Yes


7. If this reservoir were not available for use, what recreation area would you most likely visit instead?

ENCUESTA DE RECREACIÓN DEL BOSQUE NACIONAL UWHARRIE


1. ¿Cuál represa está usando usted? Narrows Represa Badin Falls
2. ¿Cuál de los siguientes se acerca más a su experiencia recreativa normal en la represa seleccionada por usted arriba?
- _____ a) - paisaje mayormente natural con modificaciones evidentes que armonizan con la naturaleza
- concentraciones bajas a moderadas de usuarios
- oportunidades para contacto con otras personas y aislamiento de otras personas casi iguales
- _____ b) - paisaje mayormente natural con modificaciones muy evidentes
- concentraciones bajas de usuarios
- oportunidades para aislamiento de otras personas más común que oportunidades para contacto con otras personas
- _____ c) - paisaje natural sin evidencia de modificaciones
- concentraciones muy bajas de usuarios
- oportunidades frecuentes para aislamiento de otras personas
- no hay uso de vehículos de motor
- _____ d) - paisaje generalmente no natural con modificaciones sustanciales
- concentraciones de usuarios moderadas a altas
- oportunidades para contacto con otras personas ocurren con frecuencia
- _____ e) - paisaje parece estar substancialmente urbanizado
- alta concentración de usuarios
- oportunidades para contacto con otras personas ocurren con frecuencia
3. ¿Cuál de los anteriores mejor describe **el tipo de experiencia que le gustaría tener en esta represa?**
(Marque uno con un círculo) (a) (b) (c) (d) (e)
4. Mientras está navegando, ¿cuán lejos están los otros botes antes de usted comenzar a sentir lo siguiente?
- | | | |
|-----------------------------|-------|------|
| a) abarrotado | _____ | pies |
| b) moderadamente abarrotado | _____ | pies |
| c) no abarrotado | _____ | pies |
| d) moderadamente aislado | _____ | pies |
| f) aislado | _____ | pies |
5. Mientras está acampando, ¿cuán lejos de su lugar de acampar se encuentran los otros lugares de acampar antes de usted comenzar a sentir lo siguiente?
- | | | |
|-----------------------------|-------|------|
| a) abarrotado | _____ | pies |
| b) moderadamente abarrotado | _____ | pies |
| c) no abarrotado | _____ | pies |
| d) moderadamente aislado | _____ | pies |
| f) aislado | _____ | pies |
6. ¿Es su motivo principal de recreación en esta área usar / ver la represa? (marque uno) No Sí
7. Si no estuviera disponible esta represa para su uso, ¿cuál área de recreación visitaría usted?
- _____

Appendix K
Public Access Recreation Area
Descriptions and Visitor Use
Survey Responses


Highway 601 Boat Access Area (#01)

Description																									
Reservoir	High Rock																								
Location	On Highway 601, State Route 6700, at the Davie County and Rowan County line																								
Existing Facilities	Boat ramp, shoreline access for 6 anglers Parking capacity: 10 vehicles with trailers Managed by Davie County Parks and Rec. Dept.																								
Survey Information																									
# of Spot Counts	165	# of Visitor Use Surveys	3																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													9	21	50	16	3	12	0	0	0	5	0	0	116
													Peak # of People				Date			# times parking capacity exceeded				0	
													Primary Recreation Activities:				Bank Fishing and Boat Fishing								
Recreation Problems																									
	Big Problem		Moderate Problem		Slight Problem		No Problem		No Response																
Too many people along shoreline	0%		0%		0%		100%		0%																
Crowded conditions at boat launch	0%		0%		0%		100%		0%																
Too many boats on this reservoir	0%		0%		0%		100%		0%																
Low water levels at this reservoir	0%		0%		33%		67%		0%																
Improper disposal of litter, trash, etc.	0%		33%		67%		0%		0%																
Conflicts with other recreational users	0%		0%		0%		100%		0%																
Inconsiderate behavior by other users	0%		0%		0%		100%		0%																
Boating hazards	0%		0%		33%		67%		0%																
Availability of sanitary facilities	0%		33%		33%		33%		0%																
Crowding																									
Not Crowded ←									→ Very Crowded		No Response														
1		2		3		4		5																	
100%		0%		0%		0%		0%		0%															
Facility Conditions																									
	Excellent		Very Good		Acceptable		Mostly Inadequate		Totally Inadequate		Not Applicable														
Boat ramps/docks	0%		33%		33%		0%		0%		33%														
Parking lots	0%		33%		67%		0%		0%		0%														
Marinas	0%		0%		0%		0%		0%		100%														
Campgrounds	0%		0%		0%		0%		0%		100%														
Swimming beaches	0%		0%		0%		0%		0%		100%														
Toilets (Port-a-john)	0%		0%		0%		0%		33%		67%														
Fishing piers	0%		0%		0%		0%		33%		67%														
Lighting	0%		0%		33%		0%		0%		67%														
Informational Signage	0%		0%		67%		0%		0%		33%														
Picnic Tables/Grills/Trash Cans	0%		0%		33%		33%		0%		33%														
General Comments																									
Remote site very distant from main reservoir																									


Rowan County Pump Station Boat Access Area (#02)

Description																									
Reservoir	High Rock																								
Location	Off Hannah Ferry Road, State Route 1926																								
Existing Facilities	Boat ramp, shoreline access for 4 anglers Parking capacity: 10 vehicles with trailers Managed by Rowan County Parks and Rec. Dept.																								
Survey Information																									
# of Spot Counts	165	# of Visitor Use Surveys	8																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													234	246	236	59	26	33	6	9	0	0	0	25	873
													Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:			Bank Fishing																						
Recreation Problems																									
			Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																		
Too many people along shoreline			0%	0%	0%	100%	0%																		
Crowded conditions at boat launch			0%	0%	0%	100%	0%																		
Too many boats on this reservoir			0%	0%	0%	100%	0%																		
Low water levels at this reservoir			0%	13%	0%	88%	0%																		
Improper disposal of litter, trash, etc.			25%	13%	25%	38%	0%																		
Conflicts with other recreational users			0%	0%	0%	100%	0%																		
Inconsiderate behavior by other users			0%	0%	0%	100%	0%																		
Boating hazards			0%	0%	13%	88%	0%																		
Availability of sanitary facilities			25%	0%	0%	75%	0%																		
Crowding																									
Not Crowded ←			→ Very Crowded						No Response																
1			2		3		4		5																
100%			0%		0%		0%		0%		0%														
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	0%	13%	13%	0%	13%	63%																			
Parking lots	0%	50%	50%	0%	0%	0%																			
Marinas	0%	0%	13%	0%	13%	75%																			
Campgrounds	0%	0%	38%	0%	0%	63%																			
Swimming beaches	0%	0%	13%	0%	0%	88%																			
Toilets (Port-a-john)	0%	0%	25%	13%	13%	50%																			
Fishing piers	0%	0%	13%	0%	13%	75%																			
Lighting	0%	0%	13%	0%	13%	75%																			
Informational Signage	0%	25%	50%	0%	13%	13%																			
Picnic Tables/Grills/Trash Cans	0%	25%	50%	0%	13%	13%																			
General Comments																									
Isolated area, some safety concerns																									

York Hill Boat Access Area (#03)

Description																									
Reservoir	High Rock																								
Location	Off of Old Salisbury Road, State Route 1163																								
Existing Facilities	Boat ramps (2), shoreline access for 16 anglers Parking capacity: 20 vehicles with trailers Managed by NC DOT																								
Survey Information																									
# of Spot Counts	165	# of Visitor Use Surveys	33																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													739	674	1,051	952	235	715	70	941	178	168	268	410	6,400
													Peak # of People		Date		# times parking capacity exceeded					3	Max – 27 vehicles 10/12/03		
													Primary Recreation Activities:				Boat Fishing and Bank Fishing								
Recreation Problems																									
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																	
Too many people along shoreline				0%	0%	3%	97%	0%																	
Crowded conditions at boat launch				0%	3%	12%	85%	0%																	
Too many boats on this reservoir				0%	3%	0%	97%	0%																	
Low water levels at this reservoir				0%	3%	3%	94%	0%																	
Improper disposal of litter, trash, etc.				3%	0%	12%	85%	0%																	
Conflicts with other recreational users				0%	0%	3%	97%	0%																	
Inconsiderate behavior by other users				0%	3%	0%	97%	0%																	
Boating hazards				0%	0%	0%	100%	0%																	
Availability of sanitary facilities				3%	0%	3%	94%	0%																	
Crowding																									
Not Crowded ←				→ Very Crowded					No Response																
1		2		3		4		5																	
73%		18%		6%		4%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	0%	12%	55%	3%	0%	30%																			
Parking lots	3%	33%	64%	0%	0%	0%																			
Marinas	0%	3%	48%	0%	0%	48%																			
Campgrounds	0%	0%	21%	0%	0%	79%																			
Swimming beaches	0%	0%	15%	0%	0%	85%																			
Toilets (Port-a-john)	0%	0%	24%	3%	3%	70%																			
Fishing piers	0%	0%	30%	9%	6%	55%																			
Lighting	0%	0%	73%	0%	0%	27%																			
Informational Signage	0%	3%	94%	0%	0%	3%																			
Picnic Tables/Grills/Trash Cans	0%	3%	91%	0%	0%	6%																			
General Comments																									

Crane Creek Fishing Pull-off Access Area (#04)


Description													
Reservoir	High Rock												
Location	Off Goodman Lake Road, State Route 2168, at the Crane Creek Bridge												
Existing Facilities	Shoreline access for 24 anglers Parking capacity: no legal parking												
Survey Information													
# of Spot Counts	165	# of Visitor Use Surveys	7										
Recreation Use													
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total	
69	87	19	19	1	0	0	0	0	0	0	12	208	
Peak # of People		Date		# times parking capacity exceeded								0	
Primary Recreation Activity:				Bank Fishing									
Recreation Problems													
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response					
Too many people along shoreline				0%	0%	0%	100%	0%					
Crowded conditions at boat launch				0%	0%	0%	100%	0%					
Too many boats on this reservoir				0%	0%	0%	100%	0%					
Low water levels at this reservoir				0%	0%	14%	86%	0%					
Improper disposal of litter, trash, etc.				0%	14%	14%	71%	0%					
Conflicts with other recreational users				0%	0%	0%	100%	0%					
Inconsiderate behavior by other users				0%	0%	0%	100%	0%					
Boating hazards				0%	0%	0%	100%	0%					
Availability of sanitary facilities				0%	0%	29%	71%	0%					
Crowding													
Not Crowded ←				→ Very Crowded				No Response					
1		2		3		4		5					
86%		14%		0%		0%		0%		0%			
Facility Conditions													
			Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable					
Boat ramps/docks			0%	0%	14%	0%	0%	86%					
Parking lots			0%	0%	100%	0%	0%	0%					
Marinas			0%	0%	0%	0%	0%	100%					
Campgrounds			0%	0%	29%	0%	0%	71%					
Swimming beaches			0%	0%	29%	0%	0%	71%					
Toilets (Port-a-john)			0%	0%	29%	29%	0%	43%					
Fishing piers			0%	0%	43%	14%	0%	43%					
Lighting			0%	0%	57%	0%	0%	43%					
Informational Signage			0%	0%	86%	14%	0%	0%					
Picnic Tables/Grills/Trash Cans			0%	0%	86%	0%	0%	14%					
General Comments													
No legal parking along causeway/bridge – Sheriff issuing tickets to cars parked along shoulder of road													

Little Crane Creek Fishing Access Area (#05)

Description												
Reservoir	High Rock											
Location	Off Providence Church Road, State Route 2134											
Existing Facilities	Boat ramps (2), shoreline access for 24 anglers Parking capacity: 8 vehicles or 4 vehicles with trailers											
Survey Information												
# of Spot Counts	165	# of Visitor Use Surveys	6									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
10	32	51	17	3	0	0	0	0	0	0	37	151
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:				Bank Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	17%	17%	67%	0%				
Crowded conditions at boat launch				0%	17%	17%	67%	0%				
Too many boats on this reservoir				0%	33%	0%	67%	0%				
Low water levels at this reservoir				17%	0%	17%	67%	0%				
Improper disposal of litter, trash, etc.				17%	0%	33%	50%	0%				
Conflicts with other recreational users				0%	0%	33%	67%	0%				
Inconsiderate behavior by other users				0%	17%	17%	67%	0%				
Boating hazards				0%	0%	33%	67%	0%				
Availability of sanitary facilities				33%	0%	17%	50%	0%				
Crowding												
Not Crowded ←									→ Very Crowded		No Response	
1		2		3		4		5				
67%		33%		0%		0%		0%		0%		
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	0%	17%	0%	17%	17%	50%						
Parking lots	0%	17%	67%	17%	0%	0%						
Marinas	0%	17%	0%	0%	0%	83%						
Campgrounds	0%	0%	17%	0%	0%	83%						
Swimming beaches	0%	0%	0%	17%	0%	83%						
Toilets (Port-a-john)	0%	0%	0%	17%	0%	83%						
Fishing piers	0%	0%	0%	17%	0%	83%						
Lighting	17%	0%	17%	0%	0%	67%						
Informational Signage	0%	0%	33%	0%	17%	50%						
Picnic Tables/Grills/Trash Cans	0%	0%	33%	17%	17%	33%						
General Comments												
Off road parking difficult												




Southmont Boat Access Area (#07)

Description													
Reservoir	High Rock												
Location	Off Wildlife Area Recreation Road, State Route 1300												
Existing Facilities	Boat launch lanes (5), boat dock, shoreline access for 50 anglers, picnic tables (3), portable toilets (2) Parking capacity: 200 vehicles and trailers												
Survey Information													
# of Spot Counts	189	# of Visitor Use Surveys	93										
Recreation Use													
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total	
5,368	4,113	4,937	4,528	3,747	2,241	643	344	556	259	336	2,781	29,854	
Peak # of People		Date		# times parking capacity exceeded						0			
Primary Recreation Activity:				Boat Fishing									
Recreation Problems													
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response					
Too many people along shoreline				1%	6%	5%	86%	1%					
Crowded conditions at boat launch				4%	9%	18%	68%	1%					
Too many boats on this reservoir				2%	8%	13%	74%	3%					
Low water levels at this reservoir				0%	4%	8%	85%	3%					
Improper disposal of litter, trash, etc.				4%	9%	8%	78%	1%					
Conflicts with other recreational users				0%	2%	10%	84%	4%					
Inconsiderate behavior by other users				1%	3%	5%	87%	3%					
Boating hazards				0%	4%	4%	88%	3%					
Availability of sanitary facilities				1%	4%	4%	86%	4%					
Crowding													
Not Crowded ←				→ Very Crowded						No Response			
1		2		3		4		5					
52%		22%		14%		6%		2%		4%			
Facility Conditions													
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable							
Boat ramps/docks	24%	31%	32%	0%	0%	13%							
Parking lots	13%	45%	38%	0%	1%	3%							
Marinas	2%	16%	35%	2%	0%	44%							
Campgrounds	0%	8%	25%	1%	0%	67%							
Swimming beaches	1%	8%	23%	0%	1%	68%							
Toilets (Port-a-john)	1%	5%	33%	4%	3%	53%							
Fishing piers	1%	6%	29%	3%	1%	59%							
Lighting	3%	9%	42%	1%	1%	44%							
Informational Signage	16%	24%	48%	1%	0%	11%							
Picnic Tables/Grills/Trash Cans	4%	15%	45%	1%	0%	34%							
General Comments													
Bassmaster's Fishing Tournament held here annually. Boat ramp is periodically closed due to low water levels.													

High Rock Marina and Campground (#08)

Description	
Reservoir	High Rock
Location	Off Wofford Road, State Route 2286 in the Cotton Grove Township, Davidson County, NC
Existing Facilities	Boat ramp, boat docks/wetslips, 106 campsites, shoreline access for 80 anglers, restrooms/bath facilities, 3 picnic tables, phone, restaurant/store Parking capacity: 100 vehicles
Survey Information	
# of Spot Counts	186
# of Visitor Use Surveys	8



Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
394	443	398	599	366	88	47	0	0	0	0	112	2,447
Peak # of People		Date		# times parking capacity exceeded					0			
Primary Recreation Activities:				Motor Boating, Camping, Bank Fishing, and Boat Fishing								


Recreation Problems					
	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response
Too many people along shoreline	0%	0%	0%	100%	0%
Crowded conditions at boat launch	0%	0%	13%	88%	0%
Too many boats on this reservoir	13%	0%	0%	75%	13%
Low water levels at this reservoir	0%	0%	0%	100%	0%
Improper disposal of litter, trash, etc.	0%	0%	0%	100%	0%
Conflicts with other recreational users	0%	0%	13%	88%	0%
Inconsiderate behavior by other users	0%	0%	13%	88%	0%
Boating hazards	0%	0%	0%	100%	0%
Availability of sanitary facilities	0%	0%	0%	100%	0%

Crowding						
Not Crowded ←				→ Very Crowded		No Response
1	2	3	4	5		
25%	38%	38%	0%	0%	0%	

Facility Conditions						
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable
Boat ramps/docks	13%	0%	50%	0%	0%	38%
Parking lots	13%	13%	63%	0%	0%	13%
Marinas	38%	25%	38%	0%	0%	0%
Campgrounds	38%	13%	50%	0%	0%	0%
Swimming beaches	0%	13%	25%	0%	0%	63%
Toilets (Port-a-john)	0%	38%	50%	0%	0%	13%
Fishing piers	0%	13%	63%	0%	0%	25%
Lighting	0%	13%	75%	0%	0%	13%
Informational Signage	13%	25%	50%	0%	0%	13%
Picnic Tables/Grills/Trash Cans	0%	25%	50%	0%	0%	25%

General Comments
Privately-owned business – not open year-round

Highway 47 Fishing Pull-off (#09)


Description																									
Reservoir	High Rock																								
Location	Highway 47																								
Existing Facilities	Shoreline access for 24 anglers Parking capacity: no legal parking																								
Survey Information																									
# of Spot Counts	183	# of Visitor Use Surveys								0															
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													44	6	25	3	2	0	0	0	0	0	0	124	204
													Peak # of People				Date			# times parking capacity exceeded				0	
Primary Recreation Activities:																									
Recreation Problems																									
					Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																
Too many people along shoreline					N/A	N/A	N/A	N/A	N/A																
Crowded conditions at boat launch					N/A	N/A	N/A	N/A	N/A																
Too many boats on this reservoir					N/A	N/A	N/A	N/A	N/A																
Low water levels at this reservoir					N/A	N/A	N/A	N/A	N/A																
Improper disposal of litter, trash, etc.					N/A	N/A	N/A	N/A	N/A																
Conflicts with other recreational users					N/A	N/A	N/A	N/A	N/A																
Inconsiderate behavior by other users					N/A	N/A	N/A	N/A	N/A																
Boating hazards					N/A	N/A	N/A	N/A	N/A																
Availability of sanitary facilities					N/A	N/A	N/A	N/A	N/A																
Crowding																									
Not Crowded ←					→ Very Crowded					No Response															
1		2		3		4		5																	
0%		0%		0%		0%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	N/A	N/A	N/A	N/A	N/A	N/A																			
Parking lots	N/A	N/A	N/A	N/A	N/A	N/A																			
Marinas	N/A	N/A	N/A	N/A	N/A	N/A																			
Campgrounds	N/A	N/A	N/A	N/A	N/A	N/A																			
Swimming beaches	N/A	N/A	N/A	N/A	N/A	N/A																			
Toilets (Port-a-john)	N/A	N/A	N/A	N/A	N/A	N/A																			
Fishing piers	N/A	N/A	N/A	N/A	N/A	N/A																			
Lighting	N/A	N/A	N/A	N/A	N/A	N/A																			
Informational Signage	N/A	N/A	N/A	N/A	N/A	N/A																			
Picnic Tables/Grills/Trash Cans	N/A	N/A	N/A	N/A	N/A	N/A																			
General Comments																									
There is no legal parking available at this site and the sheriff routinely tickets any vehicles parked on the shoulder of the road.																									

Buddle Creek Boat Access Area (#10)


Description												
Reservoir	High Rock											
Location	Off Holloway Church Road, State Route 2294											
Existing Facilities	Boat ramp (3 launch lanes), swimming area, beach area, shoreline access for 12 anglers, 7 picnic tables, 2 portable toilets Parking capacity: 100 vehicles and 50 trailers											
Survey Information												
# of Spot Counts	189	# of Visitor Use Surveys							75			
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
1,348	1,597	1,945	1,191	546	291	23	23	13	58	119	1,330	8,486
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Bank Fishing and Boat Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	0%	8%	89%	3%				
Crowded conditions at boat launch				0%	1%	12%	84%	3%				
Too many boats on this reservoir				1%	0%	12%	84%	3%				
Low water levels at this reservoir				1%	5%	5%	85%	3%				
Improper disposal of litter, trash, etc.				5%	5%	11%	77%	1%				
Conflicts with other recreational users				0%	4%	7%	87%	3%				
Inconsiderate behavior by other users				0%	5%	5%	87%	3%				
Boating hazards				1%	7%	1%	87%	4%				
Availability of sanitary facilities				7%	5%	5%	81%	1%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
48%		17%		19%		11%		4%		1%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				24%	23%	25%	1%	0%	27%			
Parking lots				27%	27%	40%	1%	0%	5%			
Marinas				7%	13%	32%	1%	0%	47%			
Campgrounds				1%	9%	20%	1%	0%	68%			
Swimming beaches				8%	15%	29%	1%	0%	45%			
Toilets (Port-a-john)				3%	8%	41%	8%	4%	36%			
Fishing piers				4%	4%	23%	7%	3%	60%			
Lighting				1%	5%	44%	8%	0%	41%			
Informational Signage				21%	15%	53%	3%	0%	8%			
Picnic Tables/Grills/Trash Cans				19%	11%	49%	3%	0%	19%			
General Comments												



Abbotts Creek Highway 8 Bridge Pull-off Fishing Area (#12)

Description																									
Reservoir	High Rock																								
Location	Off Highway 8 at the intersection with Abbotts Creek Bridge																								
Existing Facilities	Shoreline access for 200 anglers Parking capacity: no legal parking Managed by NC DOT																								
Survey Information																									
# of Spot Counts	189	# of Visitor Use Surveys	3																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													17	391	12	3	2	0	0	0	0	0	0	40	464
													Peak # of People			Date		# times parking capacity exceeded				1	Max – 23 vehicles on 6/23/03		
													Primary Recreation Activities:			Boat Fishing and Bank Fishing									
Recreation Problems																									
	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																				
Too many people along shoreline	0%	0%	0%	100%	0%																				
Crowded conditions at boat launch	0%	0%	0%	100%	0%																				
Too many boats on this reservoir	0%	0%	0%	100%	0%																				
Low water levels at this reservoir	0%	0%	0%	100%	0%																				
Improper disposal of litter, trash, etc.	0%	0%	33%	67%	0%																				
Conflicts with other recreational users	0%	0%	0%	100%	0%																				
Inconsiderate behavior by other users	0%	0%	0%	100%	0%																				
Boating hazards	0%	0%	0%	100%	0%																				
Availability of sanitary facilities	0%	0%	0%	100%	0%																				
Crowding																									
Not Crowded ←————→ Very Crowded No Response																									
1	2	3	4	5																					
33%	33%	33%	0%	0%	0%																				
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	0%	33%	67%	0%	0%	0%																			
Parking lots	0%	67%	33%	0%	0%	0%																			
Marinas	0%	0%	0%	33%	0%	67%																			
Campgrounds	0%	0%	0%	33%	0%	67%																			
Swimming beaches	33%	33%	0%	0%	0%	33%																			
Toilets (Port-a-john)	0%	0%	67%	0%	0%	33%																			
Fishing piers	0%	0%	0%	33%	0%	67%																			
Lighting	0%	0%	33%	0%	0%	67%																			
Informational Signage	0%	33%	33%	0%	0%	33%																			
Picnic Tables/Grills/Trash Cans	33%	0%	33%	0%	0%	33%																			
General Comments																									
No legal parking along road – Sheriff issuing tickets to cars parked along shoulder of road																									

Smiley's Tamarac Marina, Inc. (#13)

Description																									
Reservoir	High Rock																								
Location	On Bringle Ferry Road, State Route 1002																								
Existing Facilities	Boat ramp, boat dock, fishing pier, 3 picnic tables Parking capacity: 80 vehicles with trailers																								
Survey Information																									
# of Spot Counts	171	# of Visitor Use Surveys							33																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													1,993	2,230	2,251	1,363	774	781	53	403	16	197	484	546	11,091
													Peak # of People		Date		# times parking capacity exceeded					1	Max – 81 vehicles on 6/14/03		
													Primary Recreation Activities:				Boat Fishing and Motor Boating								
													Recreation Problems												
																		Big Problem	Moderate Problem	Slight Problem	No Problem	No Response			
													Too many people along shoreline					0%	9%	3%	88%	0%			
													Crowded conditions at boat launch					6%	9%	15%	70%	0%			
Too many boats on this reservoir					9%	15%	3%	73%	0%																
Low water levels at this reservoir					0%	0%	0%	100%	0%																
Improper disposal of litter, trash, etc.					0%	6%	9%	85%	0%																
Conflicts with other recreational users					0%	0%	3%	97%	0%																
Inconsiderate behavior by other users					0%	0%	6%	94%	0%																
Boating hazards					0%	0%	0%	97%	3%																
Availability of sanitary facilities					3%	0%	6%	91%	0%																
Crowding																									
Not Crowded ←					→ Very Crowded					No Response															
1		2		3		4		5																	
27%		33%		12%		6%		21%		0%															
Facility Conditions																									
					Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable															
Boat ramps/docks					3%	33%	36%	0%	0%	27%															
Parking lots					6%	36%	55%	0%	0%	3%															
Marinas					6%	36%	42%	0%	0%	15%															
Campgrounds					3%	3%	18%	0%	0%	76%															
Swimming beaches					3%	0%	15%	0%	0%	82%															
Toilets (Port-a-john)					0%	3%	30%	3%	3%	61%															
Fishing piers					0%	9%	33%	0%	0%	58%															
Lighting					0%	12%	52%	0%	0%	36%															
Informational Signage					0%	18%	76%	0%	0%	6%															
Picnic Tables/Grills/Trash Cans					0%	15%	58%	3%	0%	24%															
General Comments																									
Privately-owned business. Charges fee to use boat launch																									

Dutch Second Creek Public Access (#14)

Description												
Reservoir	High Rock											
Location	On Bringle Ferry Road, State Route 1002, in Rowan County, North Carolina											
Existing Facilities	Boat ramp (2 launch lanes), boat dock (2), shoreline access for 36 anglers Parking capacity: 120 vehicles with trailers Managed by NC WRC											
Survey Information												
# of Spot Counts	171	# of Visitor Use Surveys	70									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
2,671	2,502	2,403	2,016	1,334	1,010	88	457	42	256	790	1,111	14,680
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Boat Fishing and Motor Boating								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	3%	9%	87%	1%				
Crowded conditions at boat launch				7%	6%	17%	70%	0%				
Too many boats on this reservoir				6%	7%	19%	69%	0%				
Low water levels at this reservoir				0%	1%	1%	96%	1%				
Improper disposal of litter, trash, etc.				0%	6%	17%	77%	0%				
Conflicts with other recreational users				0%	0%	4%	94%	1%				
Inconsiderate behavior by other users				0%	1%	3%	94%	1%				
Boating hazards				0%	0%	1%	97%	1%				
Availability of sanitary facilities				1%	1%	6%	90%	1%				
Crowding												
Not Crowded ←————→ Very Crowded												
1		2		3		4		5		No Response		
49%		16%		13%		13%		7%		3%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				6%	30%	53%	1%	0%	10%			
Parking lots				3%	29%	69%	0%	0%	0%			
Marinas				3%	19%	73%	1%	0%	4%			
Campgrounds				1%	1%	31%	1%	0%	64%			
Swimming beaches				1%	0%	30%	1%	0%	67%			
Toilets (Port-a-john)				0%	3%	40%	0%	3%	54%			
Fishing piers				0%	7%	40%	0%	3%	50%			
Lighting				0%	7%	61%	1%	1%	29%			
Informational Signage				0%	17%	81%	0%	1%	0%			
Picnic Tables/Grills/Trash Cans				1%	13%	61%	3%	1%	20%			
General Comments												




Flat Swamp Access Area (#15)


Description												
Reservoir	High Rock											
Location	Off Highway 8											
Existing Facilities	Boat ramp (3 launch lanes), swim area, beach area, shoreline access for 26 anglers, 2 picnic tables, 1 portable toilet Parking capacity: 30 vehicles and 30 trailers											
Survey Information												
# of Spot Counts	189	# of Visitor Use Surveys	41									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
1,003	1,909	1,547	1,036	518	585	93	127	156	28	106	766	7,875
Peak # of People		Date		# times parking capacity exceeded					2	Max – 68 vehicles on 7/26/03		
Primary Recreation Activities:				Swimming, Boat Fishing and Sunbathing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				2%	2%	7%	88%	0%				
Crowded conditions at boat launch				2%	2%	15%	78%	2%				
Too many boats on this reservoir				2%	2%	12%	78%	5%				
Low water levels at this reservoir				5%	0%	15%	78%	2%				
Improper disposal of litter, trash, etc.				0%	5%	17%	76%	2%				
Conflicts with other recreational users				0%	5%	5%	88%	2%				
Inconsiderate behavior by other users				0%	2%	7%	88%	2%				
Boating hazards				0%	2%	10%	85%	2%				
Availability of sanitary facilities				2%	0%	10%	85%	2%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
49%		12%		32%		7%		0%		0%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				5%	15%	34%	2%	0%	44%			
Parking lots				5%	24%	61%	0%	0%	10%			
Marinas				2%	5%	29%	0%	0%	63%			
Campgrounds				0%	5%	15%	0%	0%	80%			
Swimming beaches				2%	17%	54%	7%	2%	17%			
Toilets (Port-a-john)				0%	5%	32%	15%	5%	44%			
Fishing piers				2%	2%	24%	2%	2%	66%			
Lighting				0%	7%	32%	2%	2%	56%			
Informational Signage				7%	12%	56%	2%	2%	20%			
Picnic Tables/Grills/Trash Cans				2%	10%	51%	0%	2%	34%			
General Comments												



High Rock Dam Picnic and Fishing Access Area (#17)


Description												
Reservoir	Tuckertown											
Location	Off Bringle Ferry Road, State Route 1002, in Rowan County, North Carolina.											
Existing Facilities	Shoreline access for 64 anglers, 4 picnic tables, 1 portable toilet Parking capacity: 40 vehicles											
Survey Information												
# of Spot Counts	163	# of Visitor Use Surveys	28									
												
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
1,056	927	957	441	160	140	204	31	0	0	75	662	4,653
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:				Bank Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	11%	18%	71%	0%				
Crowded conditions at boat launch				0%	0%	11%	86%	4%				
Too many boats on this reservoir				0%	0%	14%	82%	4%				
Low water levels at this reservoir				0%	0%	18%	79%	4%				
Improper disposal of litter, trash, etc.				11%	21%	18%	50%	0%				
Conflicts with other recreational users				0%	0%	7%	89%	4%				
Inconsiderate behavior by other users				0%	0%	7%	89%	4%				
Boating hazards				0%	0%	14%	82%	4%				
Availability of sanitary facilities				0%	4%	25%	71%	0%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
68%		14%		18%		0%		0%		0%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				7%	0%	7%	4%	0%	82%			
Parking lots				18%	18%	64%	0%	0%	0%			
Marinas				4%	4%	4%	0%	0%	89%			
Campgrounds				4%	0%	7%	0%	0%	89%			
Swimming beaches				4%	0%	4%	0%	0%	93%			
Toilets (Port-a-john)				7%	0%	50%	7%	0%	36%			
Fishing piers				4%	0%	4%	0%	0%	93%			
Lighting				4%	0%	14%	0%	0%	82%			
Informational Signage				4%	21%	61%	4%	0%	11%			
Picnic Tables/Grills/Trash Cans				7%	14%	39%	14%	4%	21%			
General Comments												

High Rock Dam Tailrace Access – Davidson County Side (#18)

Description													
Reservoir	Tuckertown												
Location	Off Bringle Ferry Road, State Route 1002, in Davidson County, North Carolina												
Existing Facilities	Tailrace fishing, shoreline access for 64 anglers Parking capacity: 15 vehicles												
Survey Information													
# of Spot Counts	163	# of Visitor Use Surveys	16										
Recreation Use													
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total	
870	727	934	531	194	422	86	6	18	0	0	334	4,123	
Peak # of People		Date		# times parking capacity exceeded							0		
Primary Recreation Activity:				Bank Fishing									
Recreation Problems													
				Big Problem	Moderate Problem	Slight Problem	No Problem		No Response				
Too many people along shoreline				13%	13%	6%	69%		0%				
Crowded conditions at boat launch				0%	13%	0%	81%		6%				
Too many boats on this reservoir				6%	0%	6%	81%		6%				
Low water levels at this reservoir				0%	13%	0%	88%		0%				
Improper disposal of litter, trash, etc.				19%	0%	13%	69%		0%				
Conflicts with other recreational users				0%	6%	13%	81%		0%				
Inconsiderate behavior by other users				6%	6%	13%	69%		6%				
Boating hazards				6%	6%	0%	81%		6%				
Availability of sanitary facilities				13%	13%	13%	63%		0%				
Crowding													
Not Crowded ←									→ Very Crowded		No Response		
1		2		3		4		5					
63%		19%		6%		6%		6%		0%			
Facility Conditions													
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable							
Boat ramps/docks	0%	6%	13%	0%	0%	81%							
Parking lots	0%	19%	69%	13%	0%	0%							
Marinas	0%	6%	0%	6%	0%	88%							
Campgrounds	0%	6%	0%	6%	0%	88%							
Swimming beaches	0%	6%	0%	6%	6%	81%							
Toilets (Port-a-john)	0%	6%	6%	6%	13%	69%							
Fishing piers	0%	13%	13%	6%	6%	63%							
Lighting	0%	13%	19%	0%	6%	63%							
Informational Signage	0%	31%	38%	13%	0%	19%							
Picnic Tables/Grills/Trash Cans	0%	13%	13%	13%	0%	63%							
General Comments													

Bringle Ferry Boat Access Area (#19)

Description			
Reservoir	Tuckertown		
Location	On Bringle Ferry Road, State Route 1004, in the Healing Springs Township, Rowan County, NC		
Existing Facilities	Boat ramp (1 launch lane), boat dock, shoreline access for 12 anglers, Parking capacity: 25 vehicles and trailers Managed by NC WRC		
Survey Information			
# of Spot Counts	170	# of Visitor Use Surveys	25



Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
776	903	1,029	484	258	282	156	36	0	45	102	352	4,443
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Boat Fishing and Bank Fishing								


Recreation Problems					
	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response
Too many people along shoreline	0%	0%	8%	92%	0%
Crowded conditions at boat launch	0%	4%	8%	88%	0%
Too many boats on this reservoir	0%	0%	16%	84%	0%
Low water levels at this reservoir	0%	0%	4%	96%	0%
Improper disposal of litter, trash, etc.	4%	4%	8%	84%	0%
Conflicts with other recreational users	0%	0%	4%	96%	0%
Inconsiderate behavior by other users	0%	0%	4%	96%	0%
Boating hazards	0%	4%	0%	96%	0%
Availability of sanitary facilities	0%	4%	0%	96%	0%

Crowding						
Not Crowded ←				→ Very Crowded		No Response
1	2	3	4	5		
72%	16%	8%	4%	0%	0%	


Facility Conditions						
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable
Boat ramps/docks	0%	12%	44%	4%	0%	40%
Parking lots	4%	16%	80%	0%	0%	0%
Marinas	0%	4%	44%	0%	0%	52%
Campgrounds	0%	4%	32%	0%	0%	64%
Swimming beaches	0%	4%	20%	0%	4%	72%
Toilets (Port-a-john)	0%	8%	24%	0%	0%	68%
Fishing piers	0%	8%	28%	0%	0%	64%
Lighting	0%	4%	48%	0%	0%	48%
Informational Signage	0%	20%	80%	0%	0%	0%
Picnic Tables/Grills/Trash Cans	0%	4%	48%	4%	4%	40%

General Comments

Cedar Creek Fishing Pull-off (#20)

Description												
Reservoir	Tuckertown											
Location	Off River Road, State Route 2152											
Existing Facilities	Shoreline access for 24 anglers Parking capacity: 12 vehicles Managed by NC DOT											
Survey Information												
# of Spot Counts	163	# of Visitor Use Surveys	4									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
58	219	44	276	4	43	0	0	0	0	26	236	906
Peak # of People		Date		# times parking capacity exceeded						1	Max – 17 vehicles on 8/3/03	
Primary Recreation Activities:				Bank Fishing and Boat Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	25%	25%	50%	0%				
Crowded conditions at boat launch				0%	25%	0%	75%	0%				
Too many boats on this reservoir				0%	25%	0%	75%	0%				
Low water levels at this reservoir				25%	0%	0%	75%	0%				
Improper disposal of litter, trash, etc.				25%	0%	0%	75%	0%				
Conflicts with other recreational users				0%	0%	25%	75%	0%				
Inconsiderate behavior by other users				0%	0%	25%	75%	0%				
Boating hazards				0%	0%	25%	75%	0%				
Availability of sanitary facilities				0%	0%	25%	75%	0%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
50%		25%		25%		0%		0%		0%		
Facility Conditions												
			Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable				
Boat ramps/docks			25%	0%	0%	0%	0%	75%				
Parking lots			0%	0%	25%	25%	0%	50%				
Marinas			0%	25%	0%	0%	0%	75%				
Campgrounds			0%	0%	25%	25%	0%	50%				
Swimming beaches			0%	0%	25%	0%	0%	75%				
Toilets (Port-a-john)			0%	0%	50%	0%	25%	25%				
Fishing piers			0%	0%	50%	25%	0%	25%				
Lighting			0%	0%	25%	50%	0%	25%				
Informational Signage			0%	0%	50%	25%	0%	25%				
Picnic Tables/Grills/Trash Cans			0%	0%	25%	0%	0%	75%				
General Comments												

Lick Creek Fishing Pull-off (#21)

Description																									
Reservoir	Tuckertown																								
Location	On Lick Creek Church Road, State Route 2501																								
Existing Facilities	Shoreline access for 8 anglers Parking capacity: no legal parking																								
Survey Information																									
# of Spot Counts	163	# of Visitor Use Surveys	2																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													14	0	119	0	0	37	15	0	0	0	102	85	372
													Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Bank Fishing, Boat Fishing, and Canoeing/kayaking																					
Recreation Problems																									
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																	
Too many people along shoreline				0%	0%	0%	100%	0%																	
Crowded conditions at boat launch				0%	0%	0%	100%	0%																	
Too many boats on this reservoir				0%	0%	0%	100%	0%																	
Low water levels at this reservoir				0%	0%	0%	100%	0%																	
Improper disposal of litter, trash, etc.				0%	0%	0%	100%	0%																	
Conflicts with other recreational users				0%	0%	0%	100%	0%																	
Inconsiderate behavior by other users				0%	0%	0%	100%	0%																	
Boating hazards				0%	0%	0%	100%	0%																	
Availability of sanitary facilities				0%	0%	0%	100%	0%																	
Crowding																									
Not Crowded ←									→ Very Crowded		No Response														
1		2		3		4		5																	
100%		0%		0%		0%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	0%	0%	0%	0%	0%	100%																			
Parking lots	0%	0%	50%	0%	0%	50%																			
Marinas	0%	0%	50%	0%	0%	50%																			
Campgrounds	0%	0%	0%	0%	0%	100%																			
Swimming beaches	0%	0%	0%	0%	0%	100%																			
Toilets (Port-a-john)	0%	0%	0%	0%	0%	100%																			
Fishing piers	0%	0%	0%	0%	0%	100%																			
Lighting	0%	0%	0%	0%	0%	100%																			
Informational Signage	0%	0%	50%	0%	0%	50%																			
Picnic Tables/Grills/Trash Cans	0%	0%	50%	0%	0%	50%																			
General Comments																									
Very shallow water																									


Flat Creek Boating Access Area (#22)

Description												
Reservoir	Tuckertown											
Location	In Morgan Township, Rowan County on Flat Creek, Tuckertown Reservoir, off Wildlife Access Road, State Route 2191											
Existing Facilities	Boat launch (2 launch lanes), boat dock, shoreline access for 56 anglers Parking capacity: 70 vehicles with trailers Managed by NC WRC											
Survey Information												
# of Spot Counts	164	# of Visitor Use Surveys	33									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
2,414	1,086	3,446	2,467	1,622	683	431	56	0	91	210	1,637	14,143
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:				Boat Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				3%	0%	15%	76%	6%				
Crowded conditions at boat launch				3%	9%	15%	64%	9%				
Too many boats on this reservoir				3%	6%	15%	70%	6%				
Low water levels at this reservoir				0%	9%	3%	85%	3%				
Improper disposal of litter, trash, etc.				6%	3%	6%	79%	6%				
Conflicts with other recreational users				3%	0%	3%	85%	9%				
Inconsiderate behavior by other users				6%	0%	0%	85%	9%				
Boating hazards				0%	9%	3%	82%	6%				
Availability of sanitary facilities				3%	3%	6%	79%	9%				
Crowding												
Not Crowded ←									→ Very Crowded		No Response	
1		2		3		4		5				
58%		12%		21%		3%		6%		0%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				27%	21%	21%	0%	0%	30%			
Parking lots				27%	30%	33%	0%	0%	9%			
Marinas				6%	9%	21%	0%	0%	64%			
Campgrounds				6%	3%	15%	0%	0%	76%			
Swimming beaches				3%	6%	18%	0%	3%	70%			
Toilets (Port-a-john)				0%	6%	12%	3%	3%	76%			
Fishing piers				0%	9%	18%	0%	3%	70%			
Lighting				3%	9%	18%	3%	3%	64%			
Informational Signage				9%	21%	48%	3%	3%	15%			
Picnic Tables/Grills/Trash Cans				6%	9%	33%	0%	0%	52%			
General Comments												



Flat Creek Fishing Access (#23)

Description			
Reservoir	Tuckertown		
Location	In Morgan County, Rowan County on Flat Creek, Tuckertown Reservoir, off River Road, State Route 2152		
Existing Facilities	Shoreline access for 64 anglers, 1 picnic table Parking capacity: 12 vehicles with additional parking along River Road at pull-off areas Managed by NC WRC		
Survey Information			
# of Spot Counts	164	# of Visitor Use Surveys	22



Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
69	240	358	125	25	38	141	0	0	0	0	563	1,559
Peak # of People		Date		# times parking capacity exceeded						3	Max – 23 vehicles 7/27/03	
Primary Recreation Activity:				Bank Fishing								


Recreation Problems					
	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response
Too many people along shoreline	0%	0%	0%	95%	5%
Crowded conditions at boat launch	5%	0%	9%	86%	0%
Too many boats on this reservoir	0%	0%	0%	95%	5%
Low water levels at this reservoir	0%	5%	0%	91%	5%
Improper disposal of litter, trash, etc.	0%	5%	5%	86%	5%
Conflicts with other recreational users	0%	5%	0%	91%	5%
Inconsiderate behavior by other users	0%	0%	0%	95%	5%
Boating hazards	0%	5%	5%	86%	5%
Availability of sanitary facilities	5%	0%	0%	91%	5%

Crowding					
Not Crowded ←————→ Very Crowded					No Response
1	2	3	4	5	
91%	0%	0%	9%	0%	0%

Facility Conditions						
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable
Boat ramps/docks	5%	9%	0%	0%	0%	86%
Parking lots	5%	9%	82%	5%	0%	0%
Marinas	5%	0%	5%	0%	5%	86%
Campgrounds	0%	0%	9%	0%	0%	91%
Swimming beaches	0%	0%	18%	0%	0%	82%
Toilets (Port-a-john)	0%	0%	9%	0%	5%	86%
Fishing piers	5%	0%	9%	5%	0%	82%
Lighting	0%	0%	5%	5%	5%	86%
Informational Signage	5%	5%	77%	5%	0%	9%
Picnic Tables/Grills/Trash Cans	0%	0%	5%	5%	5%	86%

General Comments

Newsome Road Access Area (#24)


Description																									
Reservoir	Tuckertown																								
Location	Off Newsome Road, State Route 2538																								
Existing Facilities	Boat ramp (2 launch lanes), shoreline access for 40 anglers, 6 picnic tables Parking capacity: 20 vehicles																								
Survey Information																									
# of Spot Counts	163	# of Visitor Use Surveys	7																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													207	235	59	82	5	66	56	31	0	0	50	420	1,211
Peak # of People				Date			# times parking capacity exceeded				0														
Primary Recreation Activity:					Bank Fishing																				
Recreation Problems																									
					Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																
Too many people along shoreline					0%	0%	0%	100%	0%																
Crowded conditions at boat launch					0%	0%	0%	100%	0%																
Too many boats on this reservoir					0%	0%	0%	100%	0%																
Low water levels at this reservoir					0%	0%	0%	100%	0%																
Improper disposal of litter, trash, etc.					0%	0%	0%	100%	0%																
Conflicts with other recreational users					0%	0%	0%	100%	0%																
Inconsiderate behavior by other users					0%	0%	0%	100%	0%																
Boating hazards					0%	0%	0%	100%	0%																
Availability of sanitary facilities					0%	0%	0%	100%	0%																
Crowding																									
Not Crowded ←					→ Very Crowded					No Response															
1		2		3		4		5																	
86%		0%		14%		0%		0%		0%															
Facility Conditions																									
					Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable															
Boat ramps/docks					0%	0%	14%	14%	0%	71%															
Parking lots					0%	0%	86%	0%	0%	14%															
Marinas					0%	0%	14%	0%	0%	86%															
Campgrounds					0%	0%	14%	0%	0%	86%															
Swimming beaches					0%	0%	14%	0%	0%	86%															
Toilets (Port-a-john)					0%	0%	14%	0%	0%	86%															
Fishing piers					0%	0%	14%	0%	0%	86%															
Lighting					0%	0%	14%	0%	0%	86%															
Informational Signage					0%	0%	43%	0%	14%	43%															
Picnic Tables/Grills/Trash Cans					0%	0%	57%	0%	0%	43%															
General Comments																									
Good spring fishing, little use otherwise																									

Riles Creek Recreation Area (#25)


Description												
Reservoir	Tuckertown											
Location	On Stokes Ferry Road, State Road 1004											
Existing Facilities	Shoreline access for 52 anglers, trail from parking to picnic area and fishing, 5 picnic tables Parking capacity: 15 vehicles											
Survey Information												
# of Spot Counts	163	# of Visitor Use Surveys	40									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
473	795	717	345	68	88	70	0	32	0	50	409	3,047
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:				Bank Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				3%	3%	15%	78%	3%				
Crowded conditions at boat launch				0%	0%	8%	90%	3%				
Too many boats on this reservoir				0%	0%	10%	88%	3%				
Low water levels at this reservoir				3%	3%	8%	80%	8%				
Improper disposal of litter, trash, etc.				5%	10%	10%	75%	0%				
Conflicts with other recreational users				0%	3%	8%	90%	0%				
Inconsiderate behavior by other users				0%	3%	8%	90%	0%				
Boating hazards				0%	5%	5%	88%	3%				
Availability of sanitary facilities				5%	8%	15%	73%	0%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
65%		10%		10%		5%		10%		0%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				3%	3%	15%	0%	0%	80%			
Parking lots				5%	5%	73%	8%	5%	5%			
Marinas				5%	0%	28%	0%	0%	68%			
Campgrounds				0%	5%	18%	0%	3%	75%			
Swimming beaches				3%	0%	23%	3%	0%	73%			
Toilets (Port-a-john)				0%	3%	18%	13%	3%	65%			
Fishing piers				0%	3%	15%	5%	5%	73%			
Lighting				0%	8%	33%	0%	3%	58%			
Informational Signage				3%	8%	73%	3%	0%	15%			
Picnic Tables/Grills/Trash Cans				5%	15%	58%	0%	0%	23%			
General Comments												
Swimming is not a designated use, but popular at this site during summer												




Highway 49 Boat Access Area (#26)

Description																									
Reservoir	Tuckertown																								
Location	Highway 49																								
Existing Facilities	Boat ramp (3 launch lanes), boat dock, shoreline access for 12 anglers, 2 portable toilets Parking capacity: 60 vehicles with trailers																								
Survey Information																									
# of Spot Counts	181	# of Visitor Use Surveys							31																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													2,611	3,281	3,099	2,762	413	395	602	720	48	209	1,013	1,645	16,798
													Peak # of People		Date		# times parking capacity exceeded							0	
													Primary Recreation Activity:				Boat Fishing								
													Recreation Problems												
																	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
													Too many people along shoreline				0%	3%	13%	81%	3%				
													Crowded conditions at boat launch				6%	13%	13%	61%	6%				
Too many boats on this reservoir				3%	10%	13%	65%	10%																	
Low water levels at this reservoir				0%	6%	10%	74%	10%																	
Improper disposal of litter, trash, etc.				3%	6%	10%	74%	6%																	
Conflicts with other recreational users				0%	10%	3%	81%	6%																	
Inconsiderate behavior by other users				6%	3%	3%	81%	6%																	
Boating hazards				6%	3%	10%	74%	6%																	
Availability of sanitary facilities				10%	6%	6%	74%	3%																	
Crowding																									
Not Crowded ←————→ Very Crowded																									
1		2		3		4		5		No Response															
45%		19%		16%		6%		13%		0%															
Facility Conditions																									
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																
Boat ramps/docks				0%	29%	55%	6%	0%	10%																
Parking lots				3%	16%	74%	0%	0%	6%																
Marinas				0%	13%	23%	0%	3%	61%																
Campgrounds				0%	6%	6%	0%	0%	87%																
Swimming beaches				0%	6%	10%	0%	0%	84%																
Toilets (Port-a-john)				3%	3%	16%	6%	3%	68%																
Fishing piers				0%	3%	13%	0%	6%	77%																
Lighting				0%	6%	19%	0%	6%	68%																
Informational Signage				0%	29%	52%	0%	3%	16%																
Picnic Tables/Grills/Trash Cans				0%	10%	16%	3%	0%	71%																
General Comments																									


Tuckertown Pull-off Fishing Areas (#27)

Description																									
Reservoir	Tuckertown																								
Location	Along Tuckertown Reservoir off Tuckertown Road, State Route 1164, off Highway 49																								
Existing Facilities	Shoreline access for 24 anglers Parking capacity: 24 vehicles																								
Survey Information																									
# of Spot Counts	174	# of Visitor Use Surveys							10																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													106	63	211	0	0	10	0	72	0	63	9	99	633
													Peak # of People		Date		# times parking capacity exceeded					0			
Primary Recreation Activity:				Bank Fishing																					
Recreation Problems																									
		Big Problem		Moderate Problem		Slight Problem		No Problem		No Response															
Too many people along shoreline		0%		10%		0%		90%		0%															
Crowded conditions at boat launch		0%		0%		10%		70%		20%															
Too many boats on this reservoir		0%		0%		20%		60%		20%															
Low water levels at this reservoir		0%		10%		20%		60%		10%															
Improper disposal of litter, trash, etc.		20%		20%		10%		40%		10%															
Conflicts with other recreational users		0%		0%		0%		90%		10%															
Inconsiderate behavior by other users		0%		10%		0%		80%		10%															
Boating hazards		0%		0%		20%		70%		10%															
Availability of sanitary facilities		20%		10%		20%		40%		10%															
Crowding																									
Not Crowded ←									→ Very Crowded		No Response														
1		2		3		4		5																	
90%		10%		0%		0%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	0%	30%	10%	0%	0%	60%																			
Parking lots	10%	30%	60%	0%	0%	0%																			
Marinas	0%	20%	30%	0%	0%	50%																			
Campgrounds	0%	30%	0%	10%	0%	60%																			
Swimming beaches	0%	20%	10%	0%	10%	60%																			
Toilets (Port-a-john)	0%	10%	20%	0%	20%	50%																			
Fishing piers	0%	20%	10%	0%	10%	60%																			
Lighting	0%	10%	20%	0%	10%	60%																			
Informational Signage	20%	30%	10%	0%	0%	40%																			
Picnic Tables/Grills/Trash Cans	0%	20%	50%	0%	0%	30%																			
General Comments																									
Remote area – receives light use																									

Tuckertown Dam Tailrace Access Area (#29)

Description																									
Reservoir	Narrows																								
Location	Off Tuckertown																								
Existing Facilities	Shoreline access for 48 anglers, 1 portable toilet Parking capacity: 44 vehicles																								
Survey Information																									
# of Spot Counts	171	# of Visitor Use Surveys							28																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													1,493	1,003	1,678	876	266	421	216	91	30	8	285	809	7,176
													Peak # of People		Date		# times parking capacity exceeded						0		
													Primary Recreation Activity:				Bank Fishing								
													Recreation Problems												
																	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
													Too many people along shoreline				4%	0%	21%	71%	4%				
													Crowded conditions at boat launch				0%	4%	11%	68%	18%				
Too many boats on this reservoir				0%	0%	7%	89%	4%																	
Low water levels at this reservoir				0%	0%	14%	82%	4%																	
Improper disposal of litter, trash, etc.				14%	14%	4%	64%	4%																	
Conflicts with other recreational users				0%	0%	7%	86%	7%																	
Inconsiderate behavior by other users				4%	0%	7%	86%	4%																	
Boating hazards				0%	0%	11%	71%	18%																	
Availability of sanitary facilities				11%	4%	7%	71%	7%																	
Crowding																									
<div style="display: flex; justify-content: space-between; align-items: center;"> Not Crowded ← → Very Crowded No Response </div>																									
1		2		3		4		5																	
64%		18%		4%		4%		4%		7%															
Facility Conditions																									
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																
Boat ramps/docks				11%	21%	14%	0%	0%	54%																
Parking lots				14%	39%	46%	0%	0%	0%																
Marinas				7%	11%	11%	0%	0%	71%																
Campgrounds				4%	14%	18%	4%	0%	61%																
Swimming beaches				0%	14%	14%	0%	0%	71%																
Toilets (Port-a-john)				4%	11%	18%	0%	4%	64%																
Fishing piers				7%	7%	11%	4%	0%	71%																
Lighting				0%	7%	32%	7%	0%	54%																
Informational Signage				4%	32%	50%	0%	0%	14%																
Picnic Tables/Grills/Trash Cans				4%	7%	18%	0%	4%	68%																
General Comments																									

Garr Creek Access Area (#30)


Description														
Reservoir	Narrows													
Location	On Tuckertown Road, State Route 1164													
Existing Facilities	Boat ramp (1 launch lane), shoreline access for 8 anglers Parking capacity: 6 vehicles with trailers													
Survey Information														
# of Spot Counts	181	# of Visitor Use Surveys	14											
Recreation Use														
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total		
362	596	285	193	432	192	16	0	26	15	187	356	2,660		
Peak # of People		Date		# times parking capacity exceeded						2		Max – 8 vehicles 4/24/04		
Primary Recreation Activities:				Bank Fishing and Boat Fishing										
Recreation Problems														
				Big Problem	Moderate Problem	Slight Problem		No Problem		No Response				
Too many people along shoreline				0%	7%	21%		64%		7%				
Crowded conditions at boat launch				0%	7%	21%		64%		7%				
Too many boats on this reservoir				0%	0%	21%		71%		7%				
Low water levels at this reservoir				0%	7%	7%		79%		7%				
Improper disposal of litter, trash, etc.				14%	7%	21%		57%		0%				
Conflicts with other recreational users				0%	0%	21%		71%		7%				
Inconsiderate behavior by other users				0%	0%	21%		71%		7%				
Boating hazards				0%	7%	29%		57%		7%				
Availability of sanitary facilities				7%	7%	14%		64%		7%				
Crowding														
Not Crowded ←				→ Very Crowded						No Response				
1		2		3		4		5						
43%		29%		21%		0%		7%		0%				
Facility Conditions														
				Excellent	Very Good	Acceptable	Mostly Inadequate		Totally Inadequate		Not Applicable			
Boat ramps/docks				7%	14%	64%	0%		7%		7%			
Parking lots				7%	21%	50%	14%		7%		0%			
Marinas				7%	7%	36%	7%		0%		43%			
Campgrounds				7%	14%	36%	0%		7%		36%			
Swimming beaches				7%	7%	36%	0%		0%		50%			
Toilets (Port-a-john)				0%	7%	21%	7%		14%		50%			
Fishing piers				0%	14%	29%	0%		0%		57%			
Lighting				0%	14%	29%	7%		0%		50%			
Informational Signage				0%	14%	43%	0%		7%		36%			
Picnic Tables/Grills/Trash Cans				0%	7%	29%	0%		0%		64%			
General Comments														

Old Whitney Fishing Pier and Public Boat Access (#32/33)


Description												
Reservoir	Narrows											
Location	On Old Whitney Road, State Route 1521, located in Harris Township, Stanly County, NC											
Existing Facilities	Fishing pier, boat ramp (2 launch lanes), boat dock, shoreline access for 24 anglers, 6 picnic tables, portable toilet Parking capacity: 65 vehicles and trailers Managed by NC WRC											
Survey Information												
# of Spot Counts	197	# of Visitor Use Surveys	54									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
3,800	4,234	3,129	3,065	1,365	1,320	857	227	67	424	1,003	1,372	20,862
Peak # of People		Date		# times parking capacity exceeded					1	Max – 70 vehicles 5/24/03		
Primary Recreation Activity:				Boat Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				4%	4%	2%	87%	4%				
Crowded conditions at boat launch				2%	4%	11%	80%	4%				
Too many boats on this reservoir				2%	2%	7%	83%	6%				
Low water levels at this reservoir				2%	2%	6%	87%	4%				
Improper disposal of litter, trash, etc.				7%	4%	7%	78%	4%				
Conflicts with other recreational users				4%	2%	2%	89%	4%				
Inconsiderate behavior by other users				2%	2%	2%	89%	6%				
Boating hazards				4%	2%	4%	85%	6%				
Availability of sanitary facilities				7%	2%	6%	80%	6%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
59%		17%		19%		4%		0%		2%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				6%	35%	44%	0%	2%	13%			
Parking lots				6%	41%	54%	0%	0%	0%			
Marinas				0%	9%	39%	2%	0%	50%			
Campgrounds				2%	4%	24%	0%	0%	70%			
Swimming beaches				0%	4%	19%	0%	2%	76%			
Toilets (Port-a-john)				0%	6%	31%	6%	0%	57%			
Fishing piers				0%	11%	22%	4%	4%	59%			
Lighting				0%	6%	33%	6%	6%	50%			
Informational Signage				2%	26%	52%	0%	2%	19%			
Picnic Tables/Grills/Trash Cans				0%	13%	41%	2%	4%	41%			
General Comments												



Lake Forest Campground/Fish Tales Marina (#34/35)

Description																									
Reservoir	Narrows																								
Location	Off Lake Forest Drive, State Route 1169																								
Existing Facilities	Boat ramp (1 launch lane), boat dock, food, bait & tackle, gasoline sales Parking capacity: 30 vehicles with trailers																								
Survey Information																									
# of Spot Counts	198	# of Visitor Use Surveys								4															
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													782	575	879	389	458	714	200	0	0	15	213	507	4,731
													Peak # of People		Date		# times parking capacity exceeded						1	Max – 70 vehicles 5/24/03	
Primary Recreation Activities:				Boat Fishing, Motor Boating and Personal Watercraft Use																					
Recreation Problems																									
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response																	
Too many people along shoreline				0%	25%	0%	75%	0%																	
Crowded conditions at boat launch				0%	25%	0%	75%	0%																	
Too many boats on this reservoir				0%	25%	0%	75%	0%																	
Low water levels at this reservoir				25%	0%	25%	50%	0%																	
Improper disposal of litter, trash, etc.				0%	25%	0%	75%	0%																	
Conflicts with other recreational users				0%	25%	0%	75%	0%																	
Inconsiderate behavior by other users				0%	25%	0%	75%	0%																	
Boating hazards				0%	25%	0%	75%	0%																	
Availability of sanitary facilities				25%	0%	0%	75%	0%																	
Crowding																									
Not Crowded ←									→ Very Crowded		No Response														
1		2		3		4		5																	
50%		25%		25%		0%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	25%	25%	25%	0%	0%	25%																			
Parking lots	0%	50%	25%	0%	0%	25%																			
Marinas	25%	50%	0%	0%	0%	25%																			
Campgrounds	0%	0%	25%	0%	0%	75%																			
Swimming beaches	0%	0%	0%	0%	0%	100%																			
Toilets (Port-a-john)	0%	25%	25%	0%	0%	50%																			
Fishing piers	0%	0%	0%	0%	0%	100%																			
Lighting	0%	0%	25%	0%	0%	75%																			
Informational Signage	25%	25%	25%	0%	0%	25%																			
Picnic Tables/Grills/Trash Cans	0%	25%	0%	0%	0%	75%																			
General Comments																									
Privately-owned business – charges fee to use boat launch																									

Circle Drive Boat Access Area (#37)

Description																									
Reservoir	Narrows																								
Location	Off Shoreline Drive Road, State Route 2551, in Eldorado Township, Davidson County, NC																								
Existing Facilities	Boat ramp (3 launch lanes), boat docks, shoreline access for 24 anglers, 2 portable toilet Parking capacity: 70 vehicles with trailers Managed by NC WRC																								
Survey Information																									
# of Spot Counts	180	# of Visitor Use Surveys	46																						
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													4,016	4,197	3,900	3,050	1,583	1,767	1,332	749	705	397	2,911	3,274	27,858
													Peak # of People		Date		# times parking capacity exceeded					0			
Primary Recreation Activity:				Boat Fishing																					
Recreation Problems																									
	Big Problem		Moderate Problem		Slight Problem		No Problem		No Response																
Too many people along shoreline	2%		4%		9%		85%		0%																
Crowded conditions at boat launch	7%		4%		20%		70%		0%																
Too many boats on this reservoir	0%		7%		13%		80%		0%																
Low water levels at this reservoir	0%		4%		9%		87%		0%																
Improper disposal of litter, trash, etc.	0%		9%		7%		85%		0%																
Conflicts with other recreational users	0%		4%		11%		85%		0%																
Inconsiderate behavior by other users	0%		4%		7%		89%		0%																
Boating hazards	2%		4%		9%		83%		2%																
Availability of sanitary facilities	4%		4%		9%		83%		0%																
Crowding																									
Not Crowded ←————→ Very Crowded																									
1		2		3		4		5		No Response															
50%		30%		15%		4%		0%		0%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	33%	52%	7%	4%	0%	4%																			
Parking lots	9%	46%	33%	4%	4%	4%																			
Marinas	9%	17%	7%	7%	0%	61%																			
Campgrounds	4%	2%	9%	0%	2%	83%																			
Swimming beaches	2%	2%	7%	2%	2%	85%																			
Toilets (Port-a-john)	0%	2%	15%	13%	7%	63%																			
Fishing piers	4%	4%	9%	2%	2%	78%																			
Lighting	0%	11%	20%	4%	0%	65%																			
Informational Signage	9%	35%	37%	7%	0%	13%																			
Picnic Tables/Grills/Trash Cans	2%	13%	7%	2%	2%	74%																			
General Comments																									


Lakemont Access Area (#38)

Description												
Reservoir	Narrows											
Location	Off Strand Road, State Route 1158											
Existing Facilities	Boat ramp (2 launch lanes) Parking capacity: 50 vehicles with trailers , shoreline access for 6 anglers, Managed by NC WRC											
Survey Information												
# of Spot Counts	180	# of Visitor Use Surveys	13									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
560	813	1,292	599	435	105	41	115	134	370	349	839	5,652
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activity:				Boat Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	15%	0%	85%	0%				
Crowded conditions at boat launch				0%	8%	15%	77%	0%				
Too many boats on this reservoir				0%	8%	0%	92%	0%				
Low water levels at this reservoir				0%	0%	15%	77%	8%				
Improper disposal of litter, trash, etc.				8%	0%	15%	77%	0%				
Conflicts with other recreational users				0%	8%	8%	85%	0%				
Inconsiderate behavior by other users				0%	0%	15%	85%	0%				
Boating hazards				0%	8%	8%	85%	0%				
Availability of sanitary facilities				23%	8%	8%	62%	0%				
Crowding												
<div style="display: flex; justify-content: space-between; align-items: center;"> Not Crowded ← → Very Crowded No Response </div>												
1		2		3		4		5				
77%		8%		8%		0%		0%		8%		
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	8%	0%	46%	23%	23%	0%						
Parking lots	0%	15%	54%	23%	8%	0%						
Marinas	0%	8%	54%	0%	0%	38%						
Campgrounds	15%	31%	31%	0%	8%	15%						
Swimming beaches	15%	8%	23%	0%	8%	46%						
Toilets (Port-a-john)	8%	8%	15%	15%	15%	38%						
Fishing piers	8%	8%	15%	15%	15%	38%						
Lighting	15%	0%	38%	8%	0%	38%						
Informational Signage	15%	8%	62%	0%	0%	15%						
Picnic Tables/Grills/Trash Cans	0%	0%	15%	0%	38%	46%						
General Comments												
Boat launch is steep and in poor condition												



Holt's Cabin Picnic Area (#39)

Description	
Reservoir	Narrows
Location	In the Uwharrie National Forest off Uwharrie National Forest Road 597
Existing Facilities	7 picnic tables, 1 portable toilet Parking capacity: 12 vehicles Managed by US Forest Service
Survey Information	
# of Spot Counts	195
# of Visitor Use Surveys	12



Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
211	122	45	203	7	17	0	0	0	0	222	90	917
Peak # of People		Date		# times parking capacity exceeded						1	Max – 15 vehicles 3/7/04	
Primary Recreation Activity:				Bank Fishing								


Recreation Problems					
	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response
Too many people along shoreline	0%	0%	0%	92%	8%
Crowded conditions at boat launch	0%	0%	0%	92%	8%
Too many boats on this reservoir	0%	0%	0%	100%	0%
Low water levels at this reservoir	0%	0%	8%	83%	8%
Improper disposal of litter, trash, etc.	8%	0%	25%	67%	0%
Conflicts with other recreational users	8%	0%	0%	83%	8%
Inconsiderate behavior by other users	8%	0%	0%	83%	8%
Boating hazards	8%	0%	0%	83%	8%
Availability of sanitary facilities	8%	8%	0%	75%	8%

Crowding						
Not Crowded ←					→ Very Crowded	No Response
1	2	3	4	5		
75%	25%	0%	0%	0%	0%	

Facility Conditions						
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable
Boat ramps/docks	17%	0%	17%	0%	0%	67%
Parking lots	8%	42%	50%	0%	0%	0%
Marinas	8%	0%	0%	0%	8%	83%
Campgrounds	17%	8%	8%	0%	0%	67%
Swimming beaches	8%	8%	0%	0%	8%	75%
Toilets (Port-a-john)	17%	25%	42%	8%	0%	8%
Fishing piers	17%	0%	8%	0%	0%	75%
Lighting	17%	0%	8%	0%	0%	75%
Informational Signage	17%	17%	42%	0%	0%	25%
Picnic Tables/Grills/Trash Cans	17%	58%	17%	0%	0%	8%

General Comments

Uwharrie National Forest Walk-in Fishing Pier (#40)

Description																									
Reservoir	Narrows																								
Location	Off Uwharrie National Forest Road 597A																								
Existing Facilities	Fishing Pier, shoreline access for 8 anglers Parking capacity: 15 vehicles Managed by NC WRC																								
Survey Information																									
# of Spot Counts	185	# of Visitor Use Surveys							24																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													810	626	1,140	454	237	232	8	0	0	0	103	82	3,692
													Peak # of People		Date		# times parking capacity exceeded					2	Max – 41 vehicles 7/6/03		
													Primary Recreation Activities:				Camping and Bank Fishing								
													Recreation Problems												
																	Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
													Too many people along shoreline				0%	0%	0%	88%	13%				
													Crowded conditions at boat launch				0%	0%	0%	88%	13%				
Too many boats on this reservoir				0%	0%	4%	83%	13%																	
Low water levels at this reservoir				0%	0%	0%	83%	17%																	
Improper disposal of litter, trash, etc.				0%	13%	17%	63%	8%																	
Conflicts with other recreational users				0%	0%	0%	88%	13%																	
Inconsiderate behavior by other users				0%	0%	8%	79%	13%																	
Boating hazards				0%	4%	0%	83%	13%																	
Availability of sanitary facilities				17%	8%	8%	58%	8%																	
Crowding																									
Not Crowded ←									→ Very Crowded		No Response														
1		2		3		4		5																	
79%		8%		4%		8%		0%		0%															
Facility Conditions																									
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																
Boat ramps/docks				0%	13%	17%	0%	0%	71%																
Parking lots				8%	21%	58%	0%	4%	8%																
Marinas				4%	13%	17%	0%	0%	67%																
Campgrounds				8%	25%	58%	0%	0%	8%																
Swimming beaches				4%	4%	13%	8%	4%	67%																
Toilets (Port-a-john)				4%	13%	25%	17%	0%	42%																
Fishing piers				13%	33%	25%	0%	0%	29%																
Lighting				0%	8%	33%	0%	0%	58%																
Informational Signage				8%	21%	54%	0%	0%	17%																
Picnic Tables/Grills/Trash Cans				8%	21%	29%	8%	0%	33%																
General Comments																									

UNF Badin Lake Campground (#41)

Description												
Reservoir	Narrows											
Location												
Existing Facilities	Shoreline access for ~50 anglers, 34 picnic tables, 6 toilets, 34 camp sites Parking capacity: 68 vehicles.											
Survey Information												
# of Spot Counts	185	# of Visitor Use Surveys							24			
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
2,948	2,687	2,828	1,854	445	726	66	0	0	60	472	485	12,571
Peak # of People		Date		# times parking capacity exceeded						Date		
Primary Recreation Activities:				Camping, Bank Fishing and Picnicking								
Recreation Problems												
	Big Problem		Moderate Problem		Slight Problem		No Problem		No Response			
Too many people along shoreline	0%		13%		4%		75%		8%			
Crowded conditions at boat launch	4%		0%		4%		75%		17%			
Too many boats on this reservoir	0%		4%		13%		71%		13%			
Low water levels at this reservoir	0%		0%		4%		79%		17%			
Improper disposal of litter, trash, etc.	4%		4%		17%		67%		8%			
Conflicts with other recreational users	0%		0%		8%		79%		13%			
Inconsiderate behavior by other users	0%		0%		13%		75%		13%			
Boating hazards	4%		0%		4%		79%		13%			
Availability of sanitary facilities	13%		4%		4%		71%		8%			
Crowding												
<div style="display: flex; justify-content: space-between; align-items: center;"> Not Crowded ← → Very Crowded No Response </div>												
1	2	3	4	5								
67%	25%	4%	0%	4%					0%			
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	8%	17%	17%	4%	0%	54%						
Parking lots	13%	17%	42%	0%	0%	29%						
Marinas	4%	8%	8%	0%	0%	79%						
Campgrounds	25%	58%	8%	0%	0%	8%						
Swimming beaches	4%	13%	17%	4%	4%	58%						
Toilets (Port-a-john)	4%	4%	38%	13%	8%	33%						
Fishing piers	4%	8%	13%	8%	0%	67%						
Lighting	4%	13%	29%	0%	0%	54%						
Informational Signage	4%	29%	38%	4%	0%	25%						
Picnic Tables/Grills/Trash Cans	13%	50%	25%	0%	0%	13%						
General Comments												



Cove Boat Landing (#42)

Description												
Reservoir	Narrows											
Location	In the Uwharrie National Forest off Uwharrie National Forest Road 597 B, Eldorado Township, Montgomery County, NC											
Existing Facilities	Boat ramp (1 launch lane), boat dock, shoreline access for 32 anglers, 16 picnic tables, 2 toilets Parking capacity: 23 vehicles with trailers											
Survey Information												
# of Spot Counts	183	# of Visitor Use Surveys	33									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
1,506	1,492	1,840	1,214	676	235	200	0	0	0	0	5	7,168
Peak # of People		Date		# times parking capacity exceeded						4		Max – 42 vehicles 5/24/03
Primary Recreation Activities:				Bank Fishing, Swimming, Picnicking, Camping, and Sunbathing								
Recreation Problems												
	Big Problem		Moderate Problem		Slight Problem		No Problem		No Response			
Too many people along shoreline	0%		6%		0%		91%		3%			
Crowded conditions at boat launch	0%		6%		6%		82%		6%			
Too many boats on this reservoir	3%		3%		9%		85%		0%			
Low water levels at this reservoir	0%		6%		3%		85%		6%			
Improper disposal of litter, trash, etc.	0%		6%		24%		67%		3%			
Conflicts with other recreational users	0%		3%		3%		88%		6%			
Inconsiderate behavior by other users	3%		3%		12%		76%		6%			
Boating hazards	9%		0%		12%		73%		6%			
Availability of sanitary facilities	3%		6%		6%		82%		3%			
Crowding												
Not Crowded ←					→ Very Crowded					No Response		
1		2		3		4		5				
70%		6%		15%		0%		0%		9%		
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	15%	21%	27%	0%	0%	36%						
Parking lots	15%	21%	52%	0%	0%	12%						
Marinas	6%	3%	12%	3%	0%	76%						
Campgrounds	15%	36%	15%	0%	3%	30%						
Swimming beaches	12%	6%	30%	6%	0%	45%						
Toilets (Port-a-john)	9%	18%	36%	6%	9%	21%						
Fishing piers	9%	9%	15%	3%	6%	58%						
Lighting	6%	15%	12%	9%	3%	55%						
Informational Signage	12%	24%	30%	6%	0%	27%						
Picnic Tables/Grills/Trash Cans	15%	24%	30%	6%	3%	21%						
General Comments												
Boat ramp closed for reconstruction from September 3, 2003 through the end of the study period												




Palmerville Access Road (#43)

Description												
Reservoir	Narrows											
Location	On Palmerville Road, State Route 1566											
Existing Facilities	Boat ramp (1 launch lane), 1 picnic table Parking capacity: 13 vehicles											
Survey Information												
# of Spot Counts	181	# of Visitor Use Surveys	2									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
72	240	131	52	14	0	0	0	0	15	15	0	540
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Boat Fishing, Motor Boating and Windsurfing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	0%	0%	100%	0%				
Crowded conditions at boat launch				0%	0%	0%	100%	0%				
Too many boats on this reservoir				0%	0%	0%	100%	0%				
Low water levels at this reservoir				0%	0%	0%	100%	0%				
Improper disposal of litter, trash, etc.				0%	0%	0%	100%	0%				
Conflicts with other recreational users				0%	0%	0%	100%	0%				
Inconsiderate behavior by other users				0%	0%	0%	100%	0%				
Boating hazards				0%	0%	0%	100%	0%				
Availability of sanitary facilities				0%	0%	0%	100%	0%				
Crowding												
Not Crowded ←									→ Very Crowded		No Response	
1		2		3		4		5				
100%		0%		0%		0%		0%		0%		
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	0%	50%	0%	0%	50%	0%						
Parking lots	0%	0%	50%	50%	0%	0%						
Marinas	0%	0%	0%	0%	0%	100%						
Campgrounds	0%	0%	0%	0%	0%	100%						
Swimming beaches	0%	0%	0%	0%	0%	100%						
Toilets (Port-a-john)	0%	0%	0%	0%	0%	100%						
Fishing piers	0%	0%	0%	0%	0%	100%						
Lighting	0%	0%	0%	50%	0%	50%						
Informational Signage	0%	0%	50%	0%	0%	50%						
Picnic Tables/Grills/Trash Cans	0%	0%	0%	0%	0%	100%						
General Comments												



Badin Lake Swim and Picnic Area (#44)


Description																									
Reservoir	Narrows																								
Location	Off Highway 740 in Badin, North Carolina																								
Existing Facilities	Beach, 15 picnic tables, shoreline access for 130 anglers, 4 portable toilets Parking capacity: 175 vehicles with trailers																								
Survey Information																									
# of Spot Counts	181	# of Visitor Use Surveys							55																
																									
													Recreation Use												
													May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
													1,363	2,232	2,279	1,654	441	98	50	40	0	15	255	82	8,509
													Peak # of People		Date		# times parking capacity exceeded					1		Max – 200 vehicles 7/4/03	
													Primary Recreation Activities:				Swimming, Picnicking, Sunbathing and Bank Fishing								
Recreation Problems																									
	Big Problem		Moderate Problem		Slight Problem		No Problem		No Response																
Too many people along shoreline	2%		5%		5%		85%		2%																
Crowded conditions at boat launch	0%		5%		5%		87%		2%																
Too many boats on this reservoir	2%		4%		7%		85%		2%																
Low water levels at this reservoir	0%		2%		4%		91%		4%																
Improper disposal of litter, trash, etc.	4%		2%		18%		73%		4%																
Conflicts with other recreational users	0%		2%		4%		93%		2%																
Inconsiderate behavior by other users	0%		0%		2%		95%		4%																
Boating hazards	0%		0%		2%		87%		11%																
Availability of sanitary facilities	5%		5%		4%		82%		4%																
Crowding																									
Not Crowded ←————→ Very Crowded																									
1		2		3		4		5		No Response															
60%		20%		11%		4%		4%		2%															
Facility Conditions																									
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable																			
Boat ramps/docks	9%	13%	7%	0%	0%	71%																			
Parking lots	15%	29%	40%	0%	0%	16%																			
Marinas	9%	5%	5%	0%	0%	80%																			
Campgrounds	7%	7%	9%	0%	0%	76%																			
Swimming beaches	9%	35%	29%	2%	2%	24%																			
Toilets (Port-a-john)	5%	4%	27%	13%	2%	49%																			
Fishing piers	7%	5%	2%	7%	5%	73%																			
Lighting	7%	13%	16%	0%	2%	62%																			
Informational Signage	16%	29%	31%	0%	0%	24%																			
Picnic Tables/Grills/Trash Cans	16%	27%	18%	0%	4%	35%																			
General Comments																									

Badin Lake Boat Access Area (#45)

Description												
Reservoir	Narrows											
Location	Off Highway 740 in Badin, North Carolina											
Existing Facilities	Boat ramp (3 launch lanes), boat docks (2), picnic tables (9), shoreline access for 28 anglers, 2 portable toilets Parking capacity: 75 vehicles with trailers											
Survey Information												
# of Spot Counts	176	# of Visitor Use Surveys	29									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
2,296	4,432	4,234	5,047	842	306	599	160	36	285	1,111	424	19,772
Peak # of People		Date		# times parking capacity exceeded					0			
Primary Recreation Activities:				Boat Fishing and Motor Boating								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	3%	10%	83%	3%				
Crowded conditions at boat launch				0%	3%	24%	66%	7%				
Too many boats on this reservoir				0%	7%	7%	83%	3%				
Low water levels at this reservoir				0%	7%	10%	79%	3%				
Improper disposal of litter, trash, etc.				7%	3%	0%	86%	3%				
Conflicts with other recreational users				0%	3%	3%	90%	3%				
Inconsiderate behavior by other users				3%	0%	3%	90%	3%				
Boating hazards				3%	7%	0%	86%	3%				
Availability of sanitary facilities				10%	3%	0%	76%	10%				
Crowding												
Not Crowded ←				→ Very Crowded					No Response			
1		2		3		4		5				
52%		17%		21%		7%		3%		0%		
Facility Conditions												
	Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable						
Boat ramps/docks	10%	55%	21%	7%	0%	7%						
Parking lots	10%	48%	41%	0%	0%	0%						
Marinas	10%	3%	14%	0%	0%	72%						
Campgrounds	3%	7%	7%	0%	0%	83%						
Swimming beaches	14%	10%	10%	0%	0%	66%						
Toilets (Port-a-john)	3%	7%	17%	10%	7%	55%						
Fishing piers	3%	10%	14%	7%	0%	66%						
Lighting	3%	7%	38%	3%	7%	41%						
Informational Signage	3%	41%	38%	7%	0%	10%						
Picnic Tables/Grills/Trash Cans	7%	7%	24%	3%	0%	59%						
General Comments												



Badin Lake Group Camp (#47)

Description																							
Reservoir	Narrows																						
Location																							
Existing Facilities	18 picnic tables, 4 toilets, camping for 75 people Parking capacity: 60 vehicles																						
Survey Information																							
# of Spot Counts	167	# of Visitor Use Surveys					3																
Recreation Use																							
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total											
78	567	314	51	3,470	493	225	0	0	0	93	139	5,429											
Peak # of People		Date		# times parking capacity exceeded						Date													
Primary Recreation Activity:				Camping																			
Recreation Problems																							
				Big Problem		Moderate Problem		Slight Problem		No Problem		No Response											
Too many people along shoreline				0%		0%		0%		100%		0%											
Crowded conditions at boat launch				0%		0%		0%		100%		0%											
Too many boats on this reservoir				0%		0%		0%		100%		0%											
Low water levels at this reservoir				0%		0%		0%		100%		0%											
Improper disposal of litter, trash, etc.				0%		0%		0%		100%		0%											
Conflicts with other recreational users				0%		0%		0%		100%		0%											
Inconsiderate behavior by other users				0%		0%		0%		100%		0%											
Boating hazards				0%		0%		0%		100%		0%											
Availability of sanitary facilities				0%		0%		0%		100%		0%											
Crowding																							
Not Crowded ←										→ Very Crowded		No Response											
1		2		3		4		5															
67%		33%		0%		0%		0%		0%													
Facility Conditions																							
		Excellent		Very Good		Acceptable		Mostly Inadequate		Totally Inadequate		Not Applicable											
Boat ramps/docks		0%		0%		33%		0%		0%		67%											
Parking lots		0%		0%		100%		0%		0%		0%											
Marinas		0%		0%		0%		0%		0%		100%											
Campgrounds		0%		100%		0%		0%		0%		0%											
Swimming beaches		0%		0%		67%		0%		0%		33%											
Toilets (Port-a-john)		0%		0%		100%		0%		0%		0%											
Fishing piers		0%		0%		33%		0%		0%		67%											
Lighting		0%		33%		33%		0%		0%		33%											
Informational Signage		0%		33%		67%		0%		0%		0%											
Picnic Tables/Grills/Trash Cans		0%		33%		33%		0%		0%		33%											
General Comments																							
Gate closed for much of the year																							

Deep Water Trail Access (#48)

Description												
Reservoir	Falls											
Location	Off Deep Water Trail Road (USFS # 6560) in Montgomery County, Eldorado Township, NC											
Existing Facilities	1 dirt boat launch, shoreline access for 20 anglers, primitive campsites Parking capacity: 6 vehicles with trailers Managed by US Forest Service											
Survey Information												
# of Spot Counts	188	# of Visitor Use Surveys	8									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
337	97	157	72	270	107	231	0	0	0	90	168	1,529
Peak # of People		Date		# times parking capacity exceeded						1	Max – 14 vehicles 4/25/04	
Primary Recreation Activities:				Camping and Bank Fishing								
Recreation Problems												
				Big Problem	Moderate Problem	Slight Problem	No Problem	No Response				
Too many people along shoreline				0%	0%	13%	75%	13%				
Crowded conditions at boat launch				0%	0%	13%	75%	13%				
Too many boats on this reservoir				0%	13%	13%	63%	13%				
Low water levels at this reservoir				0%	13%	25%	63%	0%				
Improper disposal of litter, trash, etc.				0%	25%	25%	38%	13%				
Conflicts with other recreational users				0%	0%	13%	75%	13%				
Inconsiderate behavior by other users				0%	25%	13%	63%	0%				
Boating hazards				0%	13%	25%	63%	0%				
Availability of sanitary facilities				0%	0%	50%	50%	0%				
Crowding												
Not Crowded ←									→ Very Crowded		No Response	
1		2		3		4		5				
63%		13%		13%		13%		0%		0%		
Facility Conditions												
				Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable			
Boat ramps/docks				13%	13%	25%	13%	0%	38%			
Parking lots				13%	13%	50%	13%	0%	13%			
Marinas				13%	13%	13%	0%	0%	63%			
Campgrounds				13%	13%	63%	0%	0%	13%			
Swimming beaches				13%	0%	25%	25%	0%	38%			
Toilets (Port-a-john)				13%	0%	38%	13%	0%	38%			
Fishing piers				13%	13%	38%	13%	0%	25%			
Lighting				13%	0%	25%	13%	0%	50%			
Informational Signage				13%	13%	75%	0%	0%	0%			
Picnic Tables/Grills/Trash Cans				13%	0%	25%	0%	0%	63%			
General Comments												
Remote site, access road in poor condition and very steep												



Falls Boat Access (#49)

Description												
Reservoir	Falls											
Location	Off Falls Road, State Route 1719, Stanly County, NC											
Existing Facilities	Boat ramp (1 launch lane), shoreline access for 2 anglers Parking capacity: 8 vehicles with trailers											
Survey Information												
# of Spot Counts	181	# of Visitor Use Surveys	9									
Recreation Use												
May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	Annual Total
269	572	455	460	72	107	119	93	17	76	150	240	2,629
Peak # of People		Date		# times parking capacity exceeded						0		
Primary Recreation Activities:				Boat Fishing and Bank Fishing								
Recreation Problems												
			Big Problem	Moderate Problem	Slight Problem	No Problem	No Response					
Too many people along shoreline			11%	11%	0%	78%	0%					
Crowded conditions at boat launch			11%	0%	11%	78%	0%					
Too many boats on this reservoir			0%	0%	56%	44%	0%					
Low water levels at this reservoir			11%	11%	11%	67%	0%					
Improper disposal of litter, trash, etc.			11%	22%	22%	44%	0%					
Conflicts with other recreational users			0%	22%	11%	67%	0%					
Inconsiderate behavior by other users			0%	11%	22%	56%	11%					
Boating hazards			11%	11%	22%	56%	0%					
Availability of sanitary facilities			22%	11%	0%	67%	0%					
Crowding												
Not Crowded ←			→ Very Crowded						No Response			
1		2		3		4		5				
33%		44%		11%		0%		0%		11%		
Facility Conditions												
			Excellent	Very Good	Acceptable	Mostly Inadequate	Totally Inadequate	Not Applicable				
Boat ramps/docks			22%	11%	44%	0%	0%	22%				
Parking lots			11%	33%	22%	11%	0%	22%				
Marinas			11%	11%	33%	0%	0%	44%				
Campgrounds			0%	11%	33%	0%	0%	56%				
Swimming beaches			11%	11%	33%	0%	0%	44%				
Toilets (Port-a-john)			0%	11%	22%	11%	11%	44%				
Fishing piers			0%	22%	22%	11%	0%	44%				
Lighting			0%	11%	11%	11%	0%	67%				
Informational Signage			11%	22%	22%	11%	0%	33%				
Picnic Tables/Grills/Trash Cans			0%	22%	22%	0%	11%	44%				
General Comments												
Isolated area, some reports of vandalism												

