Alcoa Power Generating Inc.
Yadkin Division

Yadkin Project Relicensing (FERC No. 2197)

Recreation Economic Impact Study

Draft Report

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Prepared by
ERM and Global Insight

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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 evaluate the effects of the Project on a variety of resources, including the effects of recreational spending on the regional economy.

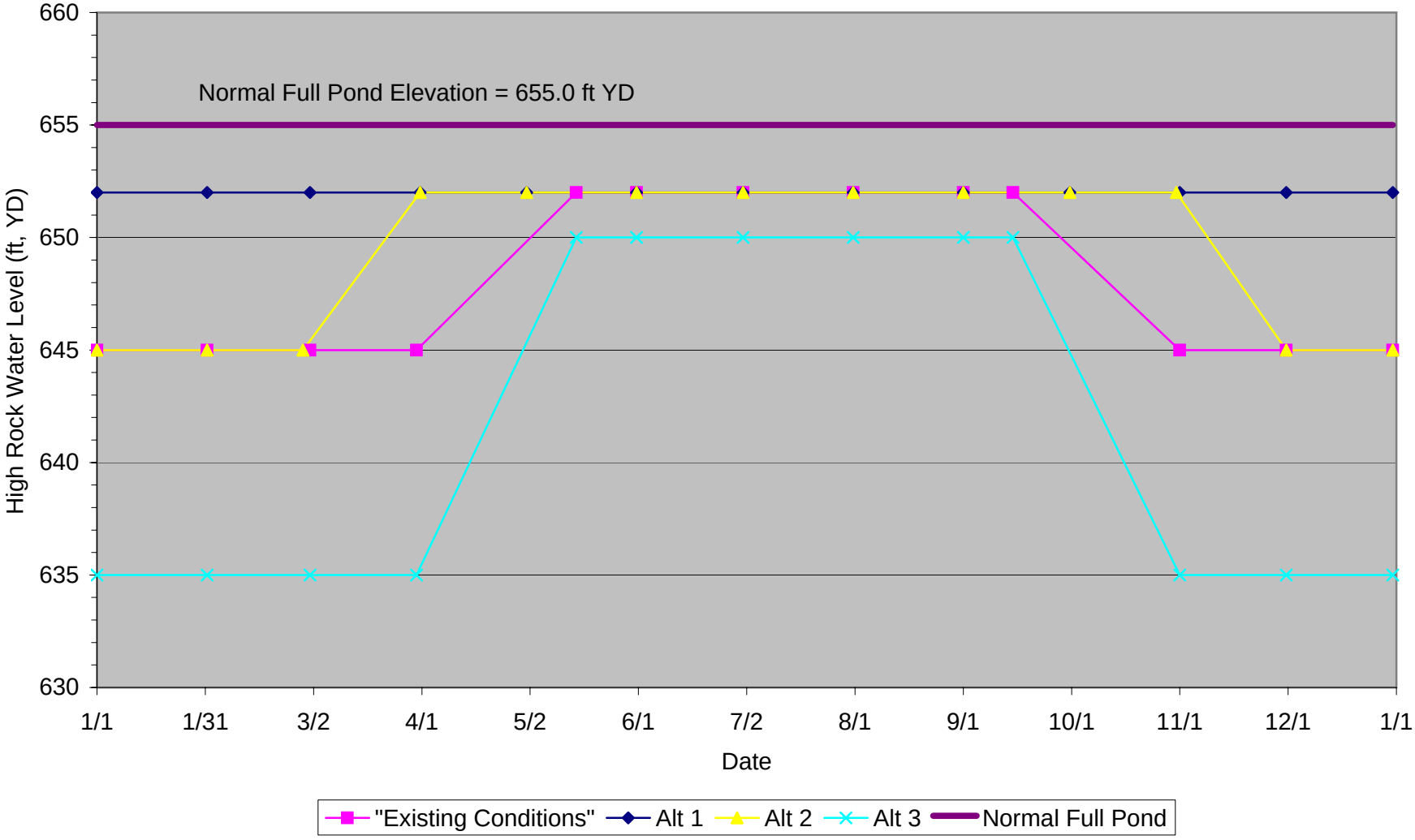
The purpose of this study is to quantify the economic contribution of recreational use at the Yadkin Project to the five county region surrounding the Project (includes Rowan, Davidson, Davie, Montgomery and Stanly counties). The study uses the U.S. Forest Service's IMpact analysis for PLANning (IMPLAN) model to estimate the economic effects of recreational use at the Yadkin Project. IMPLAN uses the latest national input-output tables from the Bureau of Economic Analysis, secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for the study area.

This study quantifies the regional economic effects of current facility operations and recreational use, as well as evaluates the economic effects of various water level management alternatives at High Rock Reservoir.

High Rock Reservoir is currently operated in a store and release mode that results in reservoir drawdown, especially during the fall and winter, with a typical annual drawdown of approximately 12 feet. This drawdown affects recreation use. To evaluate the effect of alternative Project operations on recreational spending, and ultimately the regional economy, ERM examined three different water level alternatives for High Rock Reservoir. Water levels at or near full pond usually encourages recreational use while lower water levels discourage recreational use. Figure ES-1 presents the three alternative water level alternatives in comparison with "existing conditions" and normal full pond. These alternatives were selected to represent a range of potential operating options to be considered in the relicensing process.

As Figure ES-1 indicates, High Rock Alternative 1 (HR1) would maintain relatively high water levels year-round at approximately 3 feet below normal full pond. High Rock Alternative 2 (HR2) would result in higher water levels in March, April, October, and November than existing conditions. Conversely, High Rock Alternative 3 (HR3) would result in lower water levels all year in comparison with existing conditions and the winter drawdown would be approximately 10-foot lower than existing conditions.

Figure ES-1
High Rock Water Level Alternatives



Methodology

A three-step process was used to evaluate the economic effects of recreational spending at the Yadkin Project:

1. Evaluate the effect of the three water level alternatives on recreational use, as measured in annual recreation days.
2. Estimate recreational spending per recreation day.
3. Input recreational spending into the IMPLAN model to estimate the effects of Project-related recreational expenditures on the regional economy for each alternative.

The effects of the three water level alternatives were estimated by comparing existing recreational use at High Rock Reservoir by month with recreational use at other reservoirs in the southeast that have similar operations to the three alternatives. Recreational spending per recreation day was estimated based on user responses to the Visitor Use Survey, Resident Use Survey, and Private Community Use Survey. These data were entered into the IMPLAN model, which estimated the overall economic effect of the Project and the three water level alternatives on the five-county regional economy.

Results

Under Existing Conditions, the IMPLAN model results show that the four reservoirs generate approximately $9.6 million in economic output and support approximately 175 jobs. Although important, these values only represent approximately 0.04 percent of the 5-county region's economic output and 0.12 percent of the region's employment.

In terms of the economic effects of the three water level alternatives for High Rock Reservoir, the IMPLAN model results show that Alternative HR1 (maintain near full pond water elevation year-round) would generate the most economic benefits, resulting in increases in spending, employment, taxes, and total economic output. Alternative HR2 would generate more modest economic benefits. Alternative HR3 would result in a reduction in spending, employment, taxes, and total economic output relative to existing conditions (see Table ES-1).

Table ES-1 Comparison of High Rock Water Level Alternatives to Existing Conditions (in terms of percent change from Existing Conditions)

	Existing Conditions	**HR1**	**HR2**	**HR3**
Spending	$5.3 million	+23%	+10%	-39%
Employment	82 jobs	+17%	+5%	-40%
State Taxes	$230,000	+17%	+5%	-40%
Total Economic Output	$4.6 million	+18%	+5%	-40%

1.0 INTRODUCTION

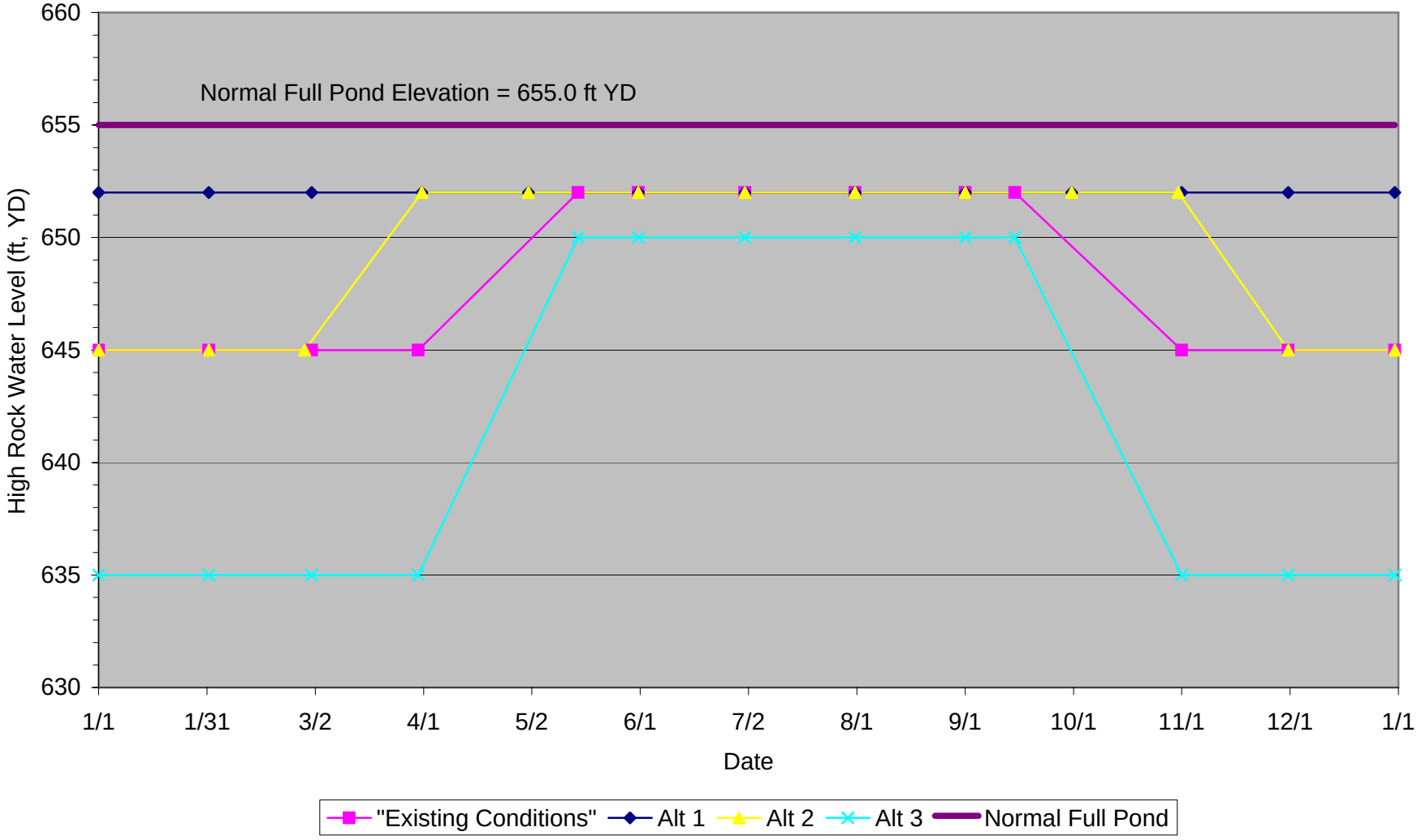
The Yadkin Hydroelectric Project (Project) is located along a 38-mile stretch of the Yadkin-Pee Dee River, in Montgomery, Stanly, Davidson, Davie, and Rowan counties, North Carolina. The Project consists of four developments: High Rock, Tuckertown, Narrows, and Falls. Alcoa Power Generating Inc. (APGI) 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. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

The purpose of this study is to quantify the economic contribution of recreational use at the Yadkin Project to the five county region surrounding the Project. The study will estimate both direct economic impacts as well as indirect and induced effects (i.e., multiplier effects) of Project-related recreational spending that occurs within the five county region. The study will use the U.S. Forest Service's IMpact analysis for PLANning (IMPLAN) model to estimate the economic effects of recreational use at the Yadkin Project. IMPLAN uses the latest national input-output tables from the Bureau of Economic Analysis, secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for the study area.

High Rock Reservoir is currently operated in a store and release mode that results in reservoir drawdowns, especially during the fall and winter, with a typical annual drawdown of approximately 12 feet. This drawdown affects recreation use. To evaluate the effect of alternative Project operations on recreational spending, and ultimately the regional economy, ERM examined three different water level alternatives for High Rock Reservoir. Water levels at or near full pond usually encourages recreational use while lower water levels generally discourage recreational use. Figure 1-1 presents the three alternative water level alternatives in comparison with "existing conditions" and normal full pond. These alternatives were selected to represent a range of potential operating options to be considered in the relicensing process.

As Figure 1-1 indicates, High Rock Alternative 1 (HR1) would maintain relatively high water levels year-round at approximately 3 feet below normal full pond. High Rock Alternative 2 (HR2) would result in higher water levels in March, April, October, and November than existing conditions. Conversely, High Rock Alternative 3 (HR3) would result in lower water levels than existing conditions all year and the winter drawdown would be approximately 10 feet lower than existing conditions.

Figure 1-1
High Rock Water Level Alternatives



2.0 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 Economic Impact Study. Based on written comments and the discussions at the IAG meeting, the study objectives were identified for this Recreation Economic Impact Study. In addition, the study plan was reviewed, revised and finalized, incorporating comments and input from the April 10, 2003 IAG meeting. The final study plan for the Recreation Economic Impact Study was dated June 23, 2003 (Appendix A).

The Recreation, Aesthetics, and Shoreline Management IAG received updates on the Recreation Economic Impact Study at meetings on February 4, 2004 and May 4, 2004.

3.0 METHODOLOGY

This section describes the methodology used to estimate the total change in economic activity that would be produced by the recreation spending associated with each of the four alternatives (e.g., existing conditions, High Rock 1, High Rock 2, and High Rock 3). In other words, the only factor that produced changes in total recreational spending across the four alternatives being evaluated in this study is the annual level of recreation activity that would occur at High Rock Reservoir under the different operating curves.

3.1 IMPLAN Overview

The IMPLAN input/output (I/O) model has been developed by Minnesota Implan Group (MIG) and is widely used for economic impact assessment to estimate changes in regional economic activity (e.g., employment, output, and income) due to a change in final demand – in this case by the local direct spending of recreational users.

IMPLAN data files are compiled from a wide variety of sources, including:

- US Bureau of Economic Analysis Benchmark I/O Accounts of the US
- US Bureau of Economic Analysis Output Estimates
- US Bureau of Economic Analysis REIS Program
- US Bureau of Labor Statistics Covered Employment and Wages (ES202) Program
- US Bureau of Labor Statistics Consumer Expenditure Survey
- US Census Bureau County Business Patterns
- US Census Bureau Decennial Census and Population Surveys
- US Census Bureau Economic Censuses and Surveys
- US Department of Agriculture Crop and Livestock Statistics

These data files include information on:

- Employment
- Industry Output
- Value Added
    - Employee Compensation
    - Proprietary Income
    - Other Property Type Income
    - Indirect Business Taxes
- Institutional Demands
    - Personal Consumption Expenditures (PCE) - three income levels
    - Federal Government Military Purchases
    - Federal Government Non-Military Purchases
    - State and Local Government Non-Education Purchases
    - State and Local Government Education Purchases
    - Commodity Credit Corporation
    - Inventory Purchases

    - Capital Formation
    - Foreign Exports
    - State and Local Government Sales
    - Federal Government Sales
    - Inventory Sales
- National Structural Matrices
    - Use
    - Make
- Inter-Institutional Transfers (SAM)

The IMPLAN model uses regionalized versions of the benchmark input-output (I/O) accounts published every five years (e.g., 1992, 1997, and 2002) by the Bureau of Economic Analysis (BEA). An I/O model presents the inter-industry transactions matrix for an economy, which is a detailed accounting of the flow of shipments to consuming industries (i.e., the value of shipments that a producer obtains from within the regional economy from each of the sectors that provides it with inputs) and from producing industries (i.e., the value of shipments producer sends to other industries in the regional economy who use its outputs to produce their own goods and services).

The input/output coefficients measure the extent to which a region can obtain most of the inputs that it needs to produce goods and services from within the regional economy, or must purchase inputs from outside the regional economy. It the former case, there is said to be less "leakage" of the direct expenditures out of the regional economy as most of the inputs can be obtained locally, so the round by round spending or economic multiplier effect is higher and the total increase in regional activity is greater. The reverse is true for a more "open" regional economy where inputs have to be obtained from outside the region, resulting in more "leakage" from the regional economy and lower economic multiplier effects. Since the study area for this analysis consists of five predominately rural counties in North Carolina, there is likely to be a significant degree of leakage of the direct tourism expenditures out of the regional economy, resulting in lower multiplier effects. This issue is discussed below in Section 4.0.

The IMPLAN model was chosen to estimate the changes in regional activity that would be produced by the four alternatives evaluated by this study for several reasons:

- Its wide use and high level of acceptance in performing similar impact studies (i.e., it was originally developed for use by the US Forest Service in evaluating the economic impacts of recreational activity in National Forecast); and
- The high level of sector disaggregation in the IMPLAN model makes it especially well suited for use in studies with unique patterns such as tourism spending. The current version of the IMPLAN model has 509 economic sectors where final demand change, such an increase in tourism spending, can be assigned to estimate economic impacts.

The study area was defined to consist of the following counties in North Carolina: Davidson, Davie, Montgomery, Rowan, and Stanly. The IMPLAN data files were

obtained for 2002 for these five counties and the IMPLAN software then created the I/O model used in this analysis.

A key step in using the IMPLAN model is to assign the final demand changes – in this case direct recreational expenditures produced by each alternative – to the appropriate final demand sectors. Various recreational surveys provided information on the amount of expenditures per recreation day for 11 different types of recreational goods and services made by each of seven types of recreational users:

- Visitors using public use areas,
- Year-round waterfront residents (referred to as primary waterfront residents),
- Seasonal waterfront residents,
- Year-round non-waterfront residents (referred to as primary non-waterfront residents),
- Seasonal non-waterfront residents,
- Customers of waterfront businesses and members of waterfront clubs, and
- Canoeists/kayakers.

Since each of the 509 final demand sectors has its own set of multipliers that derive the indirect and induced effects, the selection of the final demand sectors ultimately determines the level of the economic impacts. We assigned the 11 types of expenditures to IMPLAN sectors in the retail trade and services sectors as appropriate. The direct expenditures by type of good and service for each of the three alternatives are presented below in Section 3.2.2.

3.2 Model Input

The IMPLAN model requires three primary data inputs:

- Recreation use estimates for existing conditions and the three water level alternatives, since changes in recreational use levels is the primary driver affecting recreational spending.
- Recreational spending estimates for each user group measured in terms of recreational dollars spent per recreation day.
- Study area multipliers for each industrial (expenditure) sector

The source of each of these model inputs is discussed below.

3.2.1 Recreation Use Estimates

Existing Project Recreational Use Estimate

Existing Project recreational use was estimated based on the results of the *Yadkin Hydroelectric Project Recreational Use Assessment* (ERM, 2005). Table 3-1 presents the total annual recreation use in terms of annual recreation days for each of the seven

recreational user types. Total existing annual recreation use is estimated as 2,561,575 recreation days.

Table 3-1 Annual Recreation Days by Reservoir (Existing Conditions)

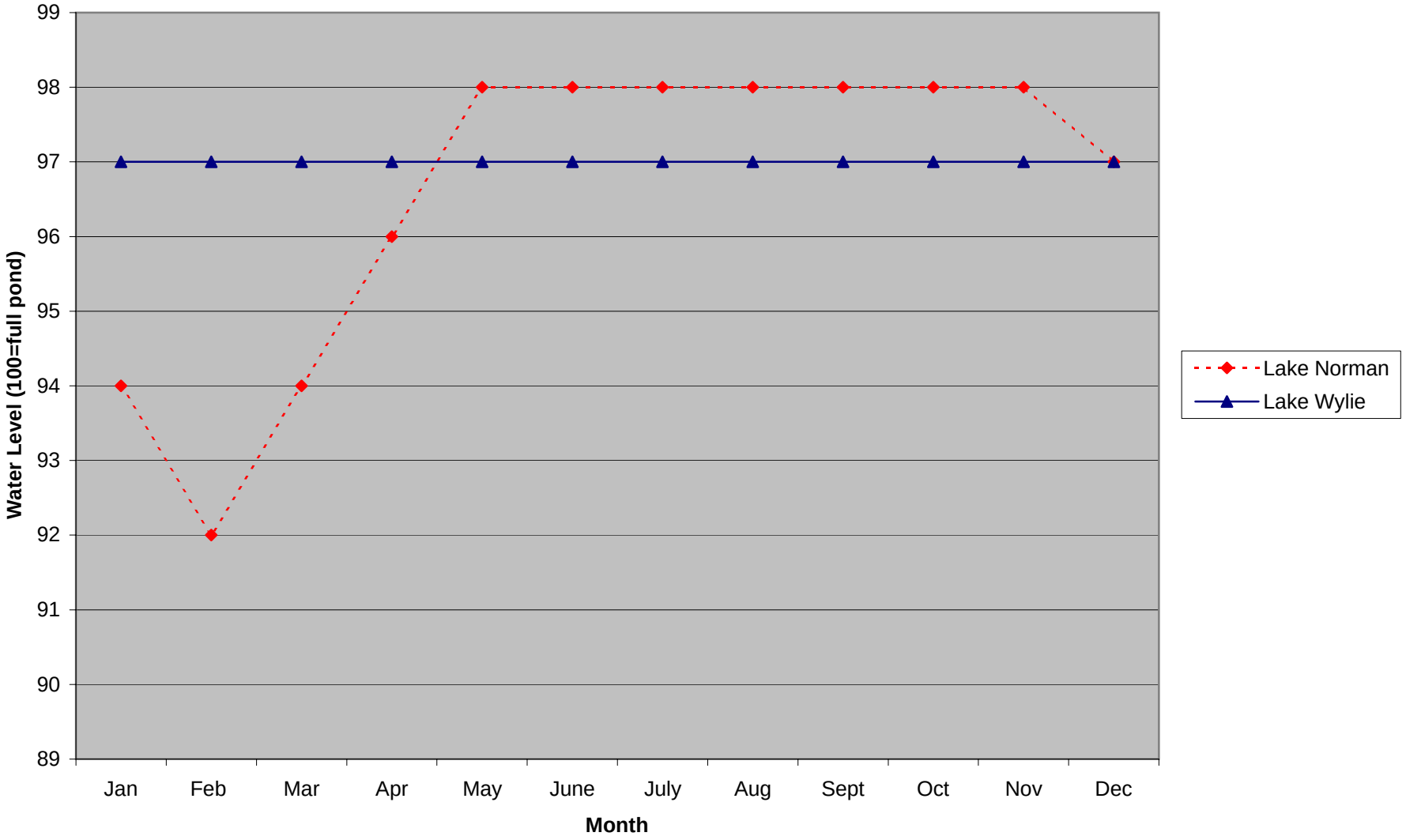
Visitor Type	High Rock Reservoir	Tuckertown Reservoir	Narrows Reservoir	Falls Reservoir	Total
Public Areas (Visitors)	**82,846**	**51,887**	**127,561**	**4,159**	**266,453**
Waterfront Residents - Primary	582,222	0	228,794	0	811,016
Waterfront Residents - Seasonal	476,363	0	57,199	0	533,562
Waterfront Residents	**1,058,585**	**0**	**285,993**	**0**	**1,344,578**
Non-waterfront residents - Primary	134,724	0	225,005	0	359,729
Non-waterfront residents - Seasonal	134,724	0	225,005	0	359,729
Non-waterfront residents	**269,448**	**0**	**450,009**	**0**	**719,457**
Businesses and clubs	**132,982**	**2,465**	**95,570**	**0**	**231,017**
Canoe/kayak	**30**	**0**	**20**	**20**	**70**
Total	**1,543,891**	**54,352**	**959,153**	**4,179**	**2,561,575**

High Rock Recreational Use for the Three Water Level Alternatives

In order to estimate changes in recreational use at High Rock Reservoir for the three water level alternatives, ERM researched available recreational use data at other similar reservoirs in the Southeast. In order for these data to be useable, monthly recreational use, preferably broken down by user group, was needed. The research revealed that there was relatively little available useable data at reservoirs that had a significant waterfront residential population. Useable data was collected for three reservoirs:

- Narrows Reservoir – Narrows Reservoir is very close geographically to High Rock Reservoir and a very similar number of acres of water surface per waterfront residence (5.3 acres/waterfront residence at Narrows Reservoir as compared with 5.6 acres/waterfront residence at High Rock Reservoir). Narrows Reservoir is currently operated in a manner similar to High Rock Alternative 1.
- Lake Norman – is located northwest of Charlotte and has a surface area at full pond of 32,475 acres. It has the most waterfront residences of the reservoirs in the Catawba-Wateree Project, although an exact number of waterfront residences was not available. Lake Norman maintains water levels within approximately 2 feet of normal maximum water elevation from June through November, with a drawdown of approximately 4 to 8 feet between January and April (Duke Power Company, 2005; see Figure 3-1)
- Lake Wylie – is located southwest of Charlotte and has a surface area at full pond of 13,433 acres. It has the second highest number of waterfront residences of the reservoirs in the Catawba-Wateree Project. Lake Wylie maintains water levels within approximately 2.5 feet of normal maximum water elevation year round (Duke Power Company, 2005; see Figure 3-1).

Figure 3-1. Monthly Average Water Levels at Lake Norman and Lake Wylie



In order to compare these three reservoirs with High Rock Reservoir, all monthly recreational use estimates were converted into percent of maximum month recreational use.

Table 3-2 Existing Recreational Use by Month (in percent of maximum month)

Month	High Rock	Narrows Reservoir	Lake Wylie	Lake Norman
May	65	32	100	100
June	96	72	73	75
July	100	100	92	84
August	100	70	70	67
September	75	52	67	75
October	58	37	48	49
November	17	28	35	48
December	11	17	30	34
January	10	17	34	46
February	10	17	27	38
March	25	16	40	51
April	45	24	69	73

HR1 Alternative (Maintain Near Full Pond Water Levels Year Round)

The HR1 Alternative (see Figure 1-1) would maintain water levels within 3 feet of the normal full pond elevation year-round. This alternative is similar to the operations of Lake Wylie and Narrows Reservoir. The following assumptions were used in estimating the effects on recreational use of converting High Rock Reservoir water levels to Alternative HR1:

- June through August - Maintain current monthly recreational use levels during peak use months at High Rock Reservoir when they are higher than Lake Wylie and Narrows Reservoir.
- November through April - Use Lake Wylie recreational use estimates during months when High Rock Reservoir is normally drawn down.
- May – recreational use at High Rock Reservoir should increase, but should remain less than the 100% of maximum at Lake Wylie since use at High Rock appears to be more summer oriented. In April, recreational use at High Rock Reservoir was 24% less than at Lake Wylie. We assumed the same differential for May (Lake Wylie was at 100% in May minus 24% would equal 76% for High Rock Reservoir).
- September and October - existing use level at High Rock Reservoir is already higher than at Narrows Reservoir and Lake Wylie during these months, but an increase in recreational use would be expected if recreational users were confident that water levels would remain high in September and October. A 5% increase in recreational use at High Rock Reservoir is assumed for these two months.

HR2 Alternative (Raise Water Levels Earlier in Spring and Maintain Them Later in Fall)

The HR2 Alternative (see Figure 1-1) would raise water levels to near full pond approximately 1.5 months earlier in the spring and maintain them at near full pond about 1.5 months later in the fall, such that High Rock Reservoir would only be drawn down from November through March. This alternative is similar to the operations of Lake Norman, which is drawn down from January through March. The following assumptions were used in estimating the effects on recreational use of converting High Rock Reservoir water levels to Alternative HR2:

- April through October – assume same use levels as HR1 Alternative for those months when the water levels are the same under these two alternatives.
- December through February – assume same use levels as Existing Conditions for those months when water levels are the same under these two alternatives.
- March and November – for months when water levels are being raised (March) or drawn down (November), use the average of the recreational use under Existing Conditions and HR1.

HR3 Alternative (Lower Water Levels For All Months Relative to Existing Conditions)

The HR3 Alternative (see Figure 1-1) would lower water levels by approximately 2 feet from May to October and by approximately 10 feet for the remainder of the year relative to existing conditions. The following assumptions were used in estimating the effects on recreational use of converting High Rock Reservoir water levels to Alternative HR3:

- November through March – assume minimal use because water levels would be drawn down approximately 20 feet from the normal full pond elevation.
- October and April – assume slightly higher use than during the winter as water levels are raised.
- May through September – water levels could be two feet lower than under existing conditions, and the water levels would be at approximately the level (5 feet below normal full pond) that the Recreation Use Assessment (ERM, 2005) identified as a "moderate to a big problem." Use levels were assumed to be reduced by 20 percent relative to Existing Conditions for each of these months.

Summary

Table 3-3 summarizes the projected effects of the High Rock Reservoir water level alternatives on recreational use in terms of percent of existing maximum month use.

Table 3-3 Projected High Rock Reservoir Recreational Use by Alternative (in percent of maximum month)

Month	Existing Condition	HR1	HR2	HR3
May	65	76	76	52
June	96	96	96	77
July	100	100	100	80
August	100	100	100	80
September	75	80	80	67
October	58	63	63	10
November	17	35	26	5
December	11	30	11	5
January	10	34	10	5
February	10	27	10	5
March	25	40	33	5
April	45	69	69	10

Table 3-4 converts these projected use levels from "percent of maximum month" to actual use in recreation days by recreation user group.

Table 3-4 Recreation Days by Alternative for High Rock Reservoir

Visitor Type	Existing Conditions	High Rock Alternative 1	High Rock Alternative2	High Rock Alternative 3
Public Areas (Visitors)	**82,846**	**102,097**	**91,737**	**54,565**
Waterfront Residents - Primary	582,222	712,313	640,038	380,694
Waterfront Residents - Seasonal	476,363	582,801	523,667	311,477
Waterfront Residents	**1,058,585**	**1,295,114**	**1,163,705**	**692,170**
Non-waterfront residents - Primary	134,724	164,489	147,799	87,911
Non-waterfront residents - Seasonal	134,724	164,489	147,799	87,911
Non-waterfront residents	**269,448**	**328,978**	**295,598**	**175,821**
Businesses and clubs	**132,982**	**162,598**	**146,100**	**86,900**
Canoe/kayak	**30**	**1,891**	**1,699**	**1,010**
Total	**1,543,891**	**1,890,678**	**1,698,840**	**1,010,468**

3.2.2 Recreational Spending by User Group

Recreational spending at the Yadkin Project was estimated based on a series of user surveys – the Visitor Use Survey (VUS – see Appendix B), the Waterfront Resident Use Survey (RUS – see Appendix C), and the Private Community Use Survey (PCUS – see Appendix D). The VUS was conducted at public access recreation areas and primarily captured "visitors" to the Project area who do not have private waterfront access. For the RUS and PCUS, two separate surveys were conducted. The first one was for users whose reservoir/waterfront homes were their primary residence and the second one was for users whose homes were for seasonal or weekend use only.

Recreational users were asked to estimate the total household expenses incurred on itemized options while recreating in the Project area. There were ten to twelve itemized options (depending on the user group) to choose from including an "other" option, which allowed a respondent to identify other expenditures not in the list provided. Responses to the question were used to calculate the average per capita expenditures per recreation-day based on the total household expenditures, the total number of respondents at each of the four reservoirs, the total number of persons (adult and children) per household, and the total number of recreation-days per household. The total household expenditures for all the reservoirs were also calculated to determine the total average per capita expenditures per recreation-day by user group. The total household expenditure range for the reservoirs was also evaluated.

Visitor Use Surveys

A total of 863 VUS respondents estimated the total expenses incurred from the purchases of goods and services associated with recreational activities (Table 3-5). Expenses incurred for gasoline (for cars or boats), food, and bait/tackle represented 78 percent of the total average per capita expenditures per recreation-day in this survey.

As expected, the average per capita VUS expenditures per recreation-day for all the reservoirs at the VUS was quite high when compared to other user groups because the users were visitors who typically incurred travel and food expenses.

Table 3-5 Average Per Capita Expenditures and Household Range for the Visitor Use Survey

HIGH ROCK RESERVOIR				
Items	**Respondents**	**Household Expenditures ($)**	**Avg. Daily Exp./ House-hold ($)**	**Avg. Per Capita Expenditures/ Recreation-Day ($)**
Restaurants & Drinking Places	333	1,212.00	3.64	1.21
Food Stores (i.e., groceries)	333	1,498.00	4.50	1.50
Other Recreation Services	333	89.00	0.27	0.09
Bait/Tackle	333	905.60	2.72	0.91
Lodging (Motel/House Rental)	333	328.00	0.98	0.33
Gasoline (car/boat)	333	4,656.00	13.98	4.66
Equipment Rental	333	105.00	0.32	0.11
General Merchandise Stores	333	136.00	0.41	0.14
Repair Service (Car/Boat)	333	4.00	0.01	0.00
Other	333	11.00	0.03	0.01
Total Expenditure	**333**	**8,944.60**	**26.86**	**8.96**
TUCKERTOWN RESERVOIR				
Items	**Respondents**	**Household Expenditures ($)**	**Avg. Daily Exp./ House-hold ($)**	**Avg. Per Capita Expenditures/ Recreation-Day ($)**
Restaurants & Drinking Places	205	479.00	2.34	0.78
Food Stores (i.e., groceries)	205	1,046.00	5.10	1.70
Other Recreation Services	205	121.00	0.59	0.20
Bait/Tackle	205	696.50	3.40	1.13
Lodging (Motel/House Rental)	205	24.00	0.12	0.04
Gasoline (car/boat)	205	1,836.00	8.96	2.99
Equipment Rental	205	-	-	-
General Merchandise Stores	205	180.00	0.88	0.29
Repair Service (Car/Boat)	205	-	-	-
Other	205	50.00	0.24	0.08
Total Expenditure	**205**	**4,432.50**	**21.62**	**7.21**

NARROWS RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	309	1,836.00	5.94	1.19
Food Stores (i.e., groceries)	309	5,295.50	17.14	3.43
Other Recreation Services	309	407.50	1.32	0.26
Bait/Tackle	309	2,154.36	6.97	1.39
Lodging (Motel/House Rental)	309	475.00	1.54	0.31
Gasoline (car/boat)	309	4,835.00	15.65	3.13
Equipment Rental	309	398.00	-	0.26
General Merchandise Stores	309	734.00	2.38	0.48
Repair Service (Car/Boat)	309	-	-	-
Other	309	60.00	0.19	0.04
Total Expenditure	**309**	**16,195.36**	**51.12**	**10.48**

FALLS RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	16	82.00	5.13	1.28
Food Stores (i.e., groceries)	16	452.00	28.25	7.06
Other Recreation Services	16	65.00	4.06	1.02
Bait/Tackle	16	46.00	2.88	0.72
Lodging (Motel/House Rental)	16	-	-	-
Gasoline (car/boat)	16	267.00	16.69	4.17
Equipment Rental	16	36.00	-	0.56
General Merchandise Stores	16	150.00	9.38	2.34
Repair Service (Car/Boat)	16	-	-	-
Other	16	10.00	0.63	0.16
Total Expenditure	**16**	**1,108.00**	**67.00**	**17.31**

ALL RESERVOIRS

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	863	3,609.00	4.18	1.10
Food Stores (i.e., groceries)	863	8,291.50	9.61	2.34
Other Recreation Services	863	682.50	0.79	0.19
Bait/Tackle	863	3,802.46	4.41	1.13
Lodging (Motel/House Rental)	863	827.00	0.96	0.25
Gasoline (car/boat)	863	11,594.00	13.43	3.71
Equipment Rental	863	539.00	0.12	0.14
General Merchandise Stores	863	1,200.00	1.39	0.34
Repair Service (Car/Boat)	863	4.00	-	-
Other	863	131.00	0.15	0.04
Total Expenditure	**863**	**30,680.46**	**35.04**	**9.24**

Note:
1. Average number of persons per household is 3 for High Rock, 3 for Tuckertown, 5 for Narrows, and 4 for Falls Reservoir.
2. Average per capita expenditures for the VUS are based on the weighted averages from each reservoir because the total number of respondents for each reservoir varied.
3. The VUS is based on one recreation-day

Resident Use Survey (Primary Residence)

The RUS was conducted at High Rock and Narrows reservoirs. The responses were disaggregated into users who used their waterfront house as their primary residence (P) and those that used their waterfront house as a second home for seasonal use (S).

A total of 653 respondents, who used their houses at High Rock and Narrows reservoirs as their primary residence, estimated their total household expenses incurred while recreating from their primary waterfront residents (Table 3-6). Expenses primarily included expenses at Project-related (i.e., waterfront or waterview) restaurants and drinking places, repair services for boats, and gasoline for boats. Normal living expenses (mortgages or rents, food, entertainment) were not included because they were not Project-related.

Table 3-6 Average Per Capita Expenditures per Recreation Day for Waterfront Residents (Primary Residence)

HIGH ROCK RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	535	69,311.00	38,630.00	0.53
Use Fees (e.g., launch fees, slip rental)	535	2,105.00	38,630.00	0.02
Other Recreation Services	535	1,563.00	38,630.00	0.01
Bait/Tackle/Ammunition	535	16,747.00	38,630.00	0.13
Seasonal Boat Rental Fee	535	1,202.00	38,630.00	0.01
Gasoline (boat)	535	56,433.00	38,630.00	0.43
Equipment Rental	535	870.00	38,630.00	0.01
General Merchandise Stores	535	25,315.00	38,630.00	0.19
Repair Service (Boat)	535	65,245.00	38,630.00	0.49
Guide/Outfitters Services	535	710.00	38,630.00	0.01
Other	535	25,446.00	38,630.00	0.19
Total	**599**	**264,947.00**	**424,930.00**	**2.02**

NARROWS RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	118	11,701.00	2.00	0.67
Use Fees (e.g., launch fees, slip rental)	118	525.00	0.09	0.03
Other Recreation Services	118	350.00	0.06	0.02
Bait/Tackle/Ammunition	118	2,750.00	0.47	0.16
Seasonal Boat Rental Fee	118	15.00	0.00	0.00
Gasoline (boat)	118	8,027.00	1.37	0.46
Equipment Rental	118	-	-	-
General Merchandise Stores	118	4,875.00	0.83	0.28
Repair Service (Boat)	118	12,356.00	2.11	0.71
Guide/Outfitters Services	118	-	-	-
Other	118	1,353.00	0.23	0.08
Total Expenditures ($)	**131**	**41,952.00**	**7.17**	**2.41**

ALL RESERVOIRS				
Items	**Respondents**	**Household Expenditures ($)**	**Avg. Daily Exp./ Household ($)**	**Avg. Per Capita Expenditures/ Recreation-Day ($)**
Restaurants & Drinking Places	653	81,012.00	31,649.75	0.55
Use Fees (e.g., launch fees, slip rental)	653	2,630.00	31,649.40	0.02
Other Recreation Services	653	1,913.00	31,649.40	0.01
Bait/Tackle/Ammunition	653	19,497.00	31,649.47	0.13
Seasonal Boat Rental Fee	653	1,217.00	31,649.39	0.01
Gasoline (boat)	653	64,460.00	31,649.64	0.43
Equipment Rental	653	870.00	31,649.39	0.01
General Merchandise Stores	653	30,190.00	31,649.54	0.21
Repair Service (Boat)	653	77,601.00	31,649.77	0.53
Guide/Outfitters Services	653	710.00	31,649.39	0.00
Other	653	26,799.00	31,649.43	0.17
Total Expenditures ($)	**730**	**306,899.00**	**348,144.56**	**2.07**

Note:
1. Average number of persons per household is 3.4 for High Rock, and 3 for Narrows Reservoir.
2. Average per capita expenditures for the RUS (P) are based on the weighted averages from each reservoir because the total number of respondents for each reservoir varied.
3. The RUS (P) is based on total recreation-days of 38,630 for High Rock and 5,849 for Narrows Reservoir.

Resident Use Surveys (Seasonal Residents)

A total of 617 households at High Rock and Narrows reservoirs estimated their total household expenses incurred while recreating from their seasonal waterfront residences (Table 3-7). Expenses incurred for food stores, restaurants and drinking places, gasoline for cars or boats, and repair services for cars or boats accounted for 82 percent of the total average per capita expenditures per recreation-day in this survey.

Table 3-7 Average Per Capita Expenditure per Recreation Day for Waterfront Residents (Seasonal Residence)

HIGH ROCK RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	379	61,984.00	2.39	0.48
Food Stores (i.e., Groceries)	379	85,289.00	3.29	0.66
Other Recreation Services	379	4,061.00	0.16	0.03
Bait/Tackle/Ammunition	379	9,013.50	0.35	0.07
Lodging	379	8,957.00	0.35	0.07
Use Fees (e.g., launch fees, slip rental)	379	1,466.00	0.06	0.01
Gasoline (Car/Boat)	379	46,885.00	1.81	0.36
Equipment Rental	379	1,100.00	0.04	0.01
General Merchandise Stores	379	20,893.00	0.81	0.16
Repair Service (Car/Boat)	379	23,197.00	0.90	0.18
Guide/Outfitters Services	379	26.00	0.00	0.00
Other	379	10,546.00	0.41	0.08
Total Expenditures ($)		**273,417.50**	**10.55**	**2.11**

NARROWS RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	238	33,922.00	2.84	0.59
Food Stores (i.e., Groceries)	238	39,550.00	3.31	0.68
Other Recreation Services	238	2,366.00	0.20	0.04
Bait/Tackle/Ammunition	238	2,674.00	0.22	0.05
Lodging	238	1,471.00	0.12	0.03
Use Fees (e.g., launch fees, slip rental)	238	637.00	0.05	0.01
Gasoline (Car/Boat)	238	22,513.00	1.89	0.39
Equipment Rental	238	275.00	0.02	0.00
General Merchandise Stores	238	7,506.00	0.63	0.13
Repair Service (Car/Boat)	238	16,455.00	1.38	0.28
Guide/Outfitters Services	238	1.00	0.00	0.00
Other	238	1,543.00	0.13	0.03
Total		**128,913.00**	**10.79**	**2.23**

ALL RESERVOIRS

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp./ Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	617	95,906.00	2.56	0.52
Food Stores (i.e., Groceries)	617	124,839.00	3.30	0.67
Other Recreation Services	617	6,427.00	0.17	0.04
Bait/Tackle/Ammunition	617	11,687.50	0.30	0.06
Lodging	617	10,428.00	0.26	0.05
Use Fees (e.g., launch fees, slip rental)	617	2,103.00	0.06	0.01
Gasoline (Car/Boat)	617	69,398.00	1.84	0.37
Equipment Rental	617	1,375.00	0.03	0.01
General Merchandise Stores	617	28,399.00	0.74	0.15
Repair Service (Car/Boat)	617	39,652.00	1.08	0.22
Guide/Outfitters Services	617	27.00	0.00	0.00
Other	617	12,089.00	0.30	0.06
Total	**748**	**402,330.50**	**10.64**	**2.16**

Note:
1. Average number of persons per household is 5 for High Rock, and 4.8 for Narrows Reservoir.
2. Average per capita expenditures for the RUS (P) are based on the weighted averages from each reservoir because the total number of respondents for each reservoir varied.
3. The RUS (S) is based on total recreation-days of 25,916 for High Rock and 11,943 for Narrows Reservoir.

Private Communities Use Survey (Primary Residence)

The PCUS was conducted at High Rock and Narrows reservoirs. As with the RUS, the PCUS responses were disaggregated into primary (P) and seasonal residences (S).

For the PCUS (P), the responses for the two reservoirs were lumped because of the small number of responses (n=18). The respondents estimated their total household expenses incurred while recreating at the Project (Table 3-8).

Table 3-8 Average Per Capita Expenditure per Recreation Day for Non-Waterfront Residents (Primary Residence)

HIGH ROCK & NARROWS RESERVOIR

Items	Respondents	Household Expenditures ($)	Avg. Daily Exp. / Household ($)	Avg. Per Capita Expenditures/ Recreation-Day ($)
Restaurants & Drinking Places	18	1,275.00	1.96	0.80
Other Recreation Services	18	335.00	0.51	0.21
Bait/Tackle/Ammunition	18	915.00	1.40	0.57
Use Fees (e.g., launch fees, slip rental)	18	177.00	0.27	0.11
Guide/Outfitters Services	18	100.00	0.15	0.06
Gasoline (boat)	18	1,069.00	1.64	0.67
General Merchandise Stores	18	265.00	0.41	0.17
Equipment Rental	18	-	-	-
Repair Service (Boat)	18	335.00	0.51	0.21
Other	18	33.00	0.05	0.02
Total	**25**	**4,504.00**	**6.91**	**2.82**

Note:
1. Average number of persons per household is 2.4 for High Rock and Narrows Reservoirs.
2. Average per capita expenditures for the PCUS (P) are for both High Rock and Narrows Reservoirs because respondents were too small and separating the reservoirs would not give a good statistical analysis.
3. The PCUS (S) is based on total recreation-days of 652 for High Rock and Narrows Reservoirs.

Private Communities Use Survey (Seasonal Residence)

The PCUS (S) responses for High Rock and Narrows reservoirs were lumped because of the small number of responses. A total of 39 respondents at the High Rock and Narrows Reservoirs estimated their total household expenses incurred while recreating from their non-waterfront seasonal residences (Table 3-9).

Table 3-9 Average Per Capita Expenditure per Recreation Day for Non-Waterfront Residents (Seasonal Residence)

HIGH ROCK & NARROWS RESERVOIR				
Items	**Respondents**	**Household Expenditures ($)**	**Avg. Daily Exp. / Household ($)**	**Avg. Per Capita Expenditures/ Recreation-Day ($)**
Restaurants & Drinking Places	39	4,610.00	5.01	0.65
Food Stores (i.e., Groceries)	39	6,655.00	7.23	0.94
Other Recreation Services	39	465.00	0.50	0.07
Bait/Tackle/Ammunition	39	1,062.00	1.15	0.15
Lodging	39	200.00	0.22	0.03
Use Fees (e.g., launch fees, slip rental)	39	-	-	-
Gasoline (boat)	39	4,190.00	4.55	0.59
Equipment Rental	39	30.00	0.03	0.00
General Merchandise Stores	39	1,035.00	1.12	0.15
Repair Service (Car/Boat)	39	942.00	1.02	0.13
Guide/Outfitters Services	39	-	-	-
Other	39	188.00	0.20	0.03
Total Expenditures ($)		**19,377.00**	**21.04**	**2.74**

Note:
1. Average number of persons per household is 7.7 for High Rock and Narrows Reservoirs.
2. Average per capita expenditures for the PCUS (S) are for both High Rock and Narrows Reservoirs because respondents were too small and separating the reservoirs would not give a good statistical analysis.
3. The PCUS (S) is based on total recreation-days of 921 for High Rock and Narrows Reservoirs.

Businesses and Clubs

Recreational spending associated with recreational use at businesses and clubs was estimated as follows:

- Businesses – based on a phone survey of several businesses, recreational spending was estimated as visitor spending plus $10.00 per recreational day. The visitor spending captures the costs associated with food, bait, gas, and other expenses (see Table 3-5). The additional $10 per recreational day includes campground and slip fees and other expenses associated with the campgrounds or marinas.
- Clubs – recreational spending associated with recreational use at clubs was assumed to be the same as for visitors.

The recreational spending per recreation day at businesses and clubs for each reservoir was calculated using the above assumptions proportionately for businesses and clubs.

Canoes and Kayaks

Recreational spending by canoeists and kayakers were assumed to be the same as the average of all reservoirs for visitors.

Summary of Recreational Spending

Table 3-10 summarizes the recreational spending per recreation day by the various user groups that was incorporated into the IMPLAN model.

Table 3-10 Summary of Recreational Spending per Recreation Day by User Group

Visitor Type	High Rock Reservoir	Tuckertown Reservoir	Narrows Reservoir	Falls Reservoir	All Reservoirs
Public Areas (Visitors) – VUS	$8.96	$7.21	$10.48	$17.31	$9.24
Waterfront Residents – Primary – RUS(P)	$2.02	NA	$2.41	NA	$2.07
Waterfront Residents – Seasonal – RUS(S)	$2.11	NA	$2.23	NA	$2.16
Non-waterfront Residents – Primary – PCUS(P)	NA	NA	NA	NA	$2.82
Non-waterfront Residents – Seasonal – PCUS(S)	NA	NA	NA	NA	$2.74
Businesses and Clubs	$16.26	$17.21	$20.28	$--	$17.91
Canoe/kayak	$--	$--	$--	$--	$9.24

Tables 3-11 through 3-14 present the estimates of direct recreational spending under each of the four alternatives. These estimates are the product of the number of estimated recreation days by user group under each alternative (see section 3.1) times the recreational spending by user group per recreation day. Total annual direct spending under the existing condition and the three alternatives was estimated to be:

Existing Conditions: $11,419,147
HR1: $12,618,300 (+10.5% from Existing Conditions)
HR2: $11,960,408 (+4.7% from Existing Conditions)
HR3: $ 9,599,697 (-15.9% from Existing Conditions)

Table 3-11 Estimate of Total Direct Recreational Expenditures at High Rock Reservoir (Existing Conditions)

Type of Good or Service	Public Area Visitors - All Reservoirs	Waterfront Residents - Primary	Waterfront Residents - Seasonal	Non-waterfront residents - Primary	Non-waterfront residents - Seasonal	Business/Clubs	Canoe/Kayaking	Total
Bait/Tackle	$315,014	$112,296	$36,205	$471,244	$410,090	$30,032	$79	$1,374,962
Equipment Rental	$44,313	$5,822	$4,764	$-	$-	$2,310	$10	$57,219
Food Stores (I.e., groceries)	$679,067	$-	$353,295	$-	$611,538	$-	$164	$1,644,064
Gasoline (car/boat)	$957,511	$355,601	$193,798	$161,878	$489,231	$99,337	$259	$2,257,615
General Merchandise Stores	$97,134	$174,685	$83,654	$143,891	$82,738	$48,514	$23	$630,639
Guide/Outfitters Services	$-	$5,822	$96	$-	$-	$-	$-	$5,919
Lodging (Motel/House Rental)	$68,582	$-	$35,061	$-	$816,584	$-	$17	$920,244
Other	$10,651	$128,926	$39,825	$43,167	$-	$39,273	$3	$261,844
Other Recreation Services	$55,534	$10,398	$16,579	$43,167	$-	$2,310	$14	$128,002
Repair Service (Car/Boat)	$-	$447,733	$101,761	$420,882	$-	$122,439	$-	$1,092,815
Restaurants & Drinking Places	$297,572	$461,870	$262,402	$453,258	$1,187,104	$127,059	$77	$2,789,342
Seasonal Boat Rental Fee	$-	$5,822	$-	$-	$-	$2,310	$-	$8,132
Use Fees	$-	$29,751	$5,336	$208,643	$-	$4,620	$-	$248,350
Total Expenditures	$2,525,377	$1,738,726	$1,132,776	$1,946,131	$3,597,285	$478,205	$647	$11,419,147

Table 3-12 Estimate of Total Direct Recreational Expenditures for the HR1 Alternative

Type of Good or Service	Public Area Visitors - All Reservoirs	Waterfront Residents - Primary	Waterfront Residents - Seasonal	Non-waterfront residents - Primary	Non-waterfront residents – Seasonal	Business/Clubs	Canoe/Kayaking	Total
Bait/Tackle	$332,531.6	$129,208	$43,656	$510,236	$444,023	$33,882	$2,184	$1,495,721
Equipment Rental	$46,429.9	$7,123	$5,828	$-	$-	$2,606	$277	$62,265
Food Stores (I.e., groceries)	$707,926.1	$-	$423,544	$-	$662,139	$-	$4,519	$1,798,128
Gasoline (car/boat)	$1,047,214.3	$411,540	$232,116	$175,272	$529,711	$112,072	$7,154	$2,515,080
General Merchandise Stores	$99,827.1	$199,402	$100,684	$155,797	$89,584	$54,733	$648	$700,675
Guide/Outfitters Services	$-	$7,123	$118	$-	$-	$-	$-	$7,241
Lodging (Motel/House Rental)	$74,934.5	$-	$42,512	$-	$884,150	$-	$475	$1,002,072
Other	$10,842.9	$153,643	$48,340	$46,739	$-	$44,308	$78	$303,951
Other Recreation Services	$57,265.1	$11,699	$19,772	$46,739	$-	$2,606	$375	$138,457
Repair Service (Car/Boat)	$-	$511,477	$120,920	$455,707	$-	$138,136	$-	$1,226,240
Restaurants & Drinking Places	$320,864.2	$530,818	$313,492	$490,762	$1,285,328	$143,348	$2,128	$3,086,741
Seasonal Boat Rental Fee	$-	$7,123	$-	$-	$-	$2,606	$-	$9,729
Use Fees	$-	$34,482	$6,400	$225,906	$-	$5,213	$-	$272,001
Total Expenditures	$2,697,835.7	$2,003,639	$1,357,382	$2,107,160	$3,894,935	$539,511	$17,839	$12,618,300

Table 3-13 Estimate of Total Direct Recreational Expenditures for the HR2 Alternative

Type of Good or Service	Public Area Visitors - All Reservoirs	Waterfront Residents - Primary	Waterfront Residents - Seasonal	Non-waterfront residents - Primary	Non-waterfront residents - Seasonal	Business/Clubs	Canoe/Kayaking	Total
Bait/Tackle	$323,104.7	$119,812	$39,517	$488,373	$424,996	$31,738	$1,967	$1,429,507
Equipment Rental	$45,290.4	$6,400	$5,237	$-	$-	$2,441	$249	$59,618
Food Stores (I.e., groceries)	$692,392.4	$-	$384,516	$-	$633,766	$-	$4,070	$1,714,744
Gasoline (car/boat)	$998,940.2	$380,462	$210,828	$167,762	$507,013	$104,978	$6,443	$2,376,425
General Merchandise Stores	$98,376.8	$185,670	$91,223	$149,121	$85,745	$51,268	$584	$661,987
Guide/Outfitters Services	$-	$6,400	$106	$-	$-	$-	$-	$6,506
Lodging (Motel/House Rental)	$71,516.0	$-	$38,373	$-	$846,264	$-	$428	$956,581
Other	$10,739.3	$139,911	$43,609	$44,736	$-	$41,503	$70	$280,569
Other Recreation Services	$56,332.7	$10,976	$17,998	$44,736	$-	$2,441	$338	$132,823
Repair Service (Car/Boat)	$-	$476,063	$110,276	$436,180	$-	$129,392	$-	$1,151,910
Restaurants & Drinking Places	$308,329.5	$492,512	$285,108	$469,732	$1,230,252	$134,274	$1,917	$2,922,125
Seasonal Boat Rental Fee	$-	$6,400	$-	$-	$-	$2,441	$-	$8,842
Use Fees	$-	$31,854	$5,809	$216,226	$-	$4,883	$-	$258,771
Total Expenditures	$2,605,021.9	$1,856,460	$1,232,597	$2,016,867	$3,728,036	$505,360	$16,066	$11,960,408

Table 3-14 Estimate of Total Direct Recreational Expenditures for the HR3 Alternative

Type of Good or Service	Public Area Visitors - All Reservoirs	Waterfront Residents - Primary	Waterfront Residents - Seasonal	Non-waterfront residents - Primary	Non-waterfront residents - Seasonal	Business/Clubs	Canoe/Kayaking	Total
Bait/Tackle	$289,285.3	$86,097	$24,663	$390,023	$339,410	$24,042	$1,189	$1,154,709
Equipment Rental	$41,203.0	$3,807	$3,115	$-	$-	$1,849	$150	$50,124
Food Stores (I.e., groceries)	$636,671.8	$-	$244,470	$-	$506,137	$-	$2,459	$1,389,737
Gasoline (car/boat)	$825,734.0	$268,944	$134,439	$133,977	$404,910	$79,522	$3,892	$1,851,419
General Merchandise Stores	$93,175.2	$136,394	$57,272	$119,091	$68,477	$38,836	$353	$513,599
Guide/Outfitters Services	$-	$3,807	$63	$-	$-	$-	$-	$3,870
Lodging (Motel/House Rental)	$59,251.0	$-	$23,519	$-	$675,842	$-	$258	$758,871
Other	$10,367.8	$90,635	$26,634	$35,727	$-	$31,439	$42	$196,668
Other Recreation Services	$52,988.6	$8,383	$11,632	$35,727	$-	$1,849	$204	$112,606
Repair Service (Car/Boat)	$-	$348,984	$72,081	$348,341	$-	$98,016	$-	$885,192
Restaurants & Drinking Places	$263,357.6	$355,060	$183,256	$375,137	$982,501	$101,714	$1,158	$2,331,433
Seasonal Boat Rental Fee	$-	$3,807	$-	$-	$-	$1,849	$-	$5,656
Use Fees	$-	$22,423	$3,687	$172,682	$-	$3,699	$-	$211,299
Total Expenditures	$2,271,978.6	$1,328,341	$784,832	$1,692,871	$3,129,152	$382,816	$9,706	$9,599,697

3.2.3 Study Area Multipliers

The IMPLAN model uses changes in final demand as inputs in a regional economy by economic sectors. Final demand in this context is a net increase in demand for goods and services produced by the regional economy; for this study the final demand changes were the levels of direct tourism spending that would occur under each alternative. The IMPLAN model then estimates the total increases in economic activity in each individual sectors that would be produced by change in final demand. The changes in regional economic activity are presented for employment, output, value added, and with value added for income. The direct, indirect (e.g., purchases of inputs by the businesses who receive the initial change in final demand from other industries located in the region), induced (e.g., increase in local spending by the new workers hired by both the industries receiving the initial change in final demand and by the supplying industries), and total changes are presented for each of these measures.

IMPLAN uses 509 industrial sectors based on the 5 digit North American Industrial Classification System (NAICS, which is an updated version of the Standard Industrial Classification or SIC codes). IMPLAN "regionalizes" the national input/output coefficients through the use of regional purchase coefficients which estimate, for each industry, the share of its inputs than can be purchased from within the regional economy, and the share of its outputs that are sold to other firms in the region. The regionalized coefficients in the transactions matrix are inverted to obtain the economic multipliers for each industry; the multipliers translate a final demand change, such as additional tourism spending, into a total increase in the level regional economic activity as indicated by changes in employment, output, value added, and income. Table 3-15 shows the multipliers associated with each industrial sector.

Table 3-15 Study Area Multipliers by Type of Expenditure

Type of Good or Service	IMPLAN Sector	Employment	Output	Proprietors Income	Employee Compensation
Bait/Tackle	409 Sporting Goods, Etc.	1.17	1.34	1.12	1.29
Equipment Rental	435 General Goods Rental	1.30	1.47	1.27	1.30
Food Stores (I.e., groceries)	405 Food and Bev. Stores	1.20	1.35	1.48	1.23
Gasoline (car/boat)	407 Gasoline Stations	1.22	1.35	1.13	1.34
General Merchandise Stores	410 General Merchandise	1.15	1.33	1.85	1.21
Guide/Outfitters Services	490 Other Personal Ser.	1.53	1.38	1.23	1.71
Lodging (Motel/House Rental)	479 Hotel and motel	1.14	1.26	1.20	1.22
Other	490 Other Personal Ser.	1.53	1.38	1.23	1.71
Other Recreation Services	478 Other Amusement	1.29	1.38	1.83	1.36
Repair Service (Car/Boat)	483 Auto. Repair	1.31	1.45	1.16	1.42
Restaurants & Drinking Places	481 Food and Drink Places	1.17	1.41	3.21	1.31
Seasonal Boat Rental Fee	432 Auto. Rental	1.85	1.45	1.45	1.66
Use Fees	478 Other Amusement	1.29	1.38	1.83	1.36

4.0 RESULTS

This section describes the employment, tax, income and output impacts of the various alternatives on the study area. Table 4-1 shows a detailed description of the existing condition and three alternatives on the study area. Overall, the economic activity generated by the recreational activity and spending under the existing condition and three alternatives is not a significant part of the study area's economy as the percent contributions to current levels of regional employment, output, value added, and income are approximately 0.1 to 0.2% of the study area economy.

4.1 Entire Project - Existing Conditions

The IMPLAN model was used to estimate the amount of economic activity in the 5-county study area that is generated by the existing mix of recreational activity at the High Rock, Tuckertown, Narrows, and Falls reservoirs. A total of 2,561,575 activity days of recreational use occurs at the four reservoirs, with High Rock accounting for 1,543,891 (60.3%) of these days. The total direct recreation spending of $11,419,147 results in an increase in employment of 174.9 jobs in the study area, consisting of 146.6 direct jobs, 12.6 indirect jobs, and 15.7 induced jobs. The employment impacts account for 0.12% of the study area's employment in 2005. Recreational activities at the four reservoirs contribute $3.55 million dollars in earnings to the local economy and $514,262 in state and local taxes as well. Output attributed to the recreational activity occurring on the four reservoirs under Existing Conditions totals $9.65 million.

4.2 High Rock Reservoir

4.2.1 Existing Conditions

Under existing conditions, a total of 1,543,891 annual recreation days occur at High Rock Reservoir. The total direct recreation spending of $5,284,742 at this reservoir results in an increase in employment of 81.5 jobs in the study area, consisting of 68 direct jobs, 6.2 indirect jobs, and 7.3 induced jobs. The employment impacts account for 0.04% of the study area's employment in 2005. Recreational activities at High Rock Reservoir contribute $1.67 million dollars in earnings to the local economy and $232,311 in state and local taxes as well. Output attributed to the recreational activity occurring at High Rock Reservoir under Existing Conditions totals $4.58 million.

Table 4-1 Comparison of Existing Conditions Versus High Rock Water Levels Alternatives

	Project Wide Existing Conditions	High Rock Existing Conditions	HR1 Alternative	HR2 Alternative	HR3 Alternative
Direct Effects					
Activity Days	2,561,575	1,543,891	1,890,678	1,698,840	1,010,468
Spending	$11,419,147	$5,284,742	$6,483,959	$5,592,020	$3,231,309
Employment					
Direct	146.6	68	79.3	70.9	40.7
Indirect	12.6	6.2	7.4	6.6	3.9
Induced	15.7	7.3	8.6	7.7	4.3
Total	174.9	81.5	95.3	85.2	48.9
Multiplier	1.19	1.20	1.20	1.20	1.20
% of Study Area 2005 Employment	0.12%	0.04%	0.05%	0.05%	0.03
Labor Income					
Employee Compensation	$2,997,813	$1,402,064	$1,649,032	$1,474,731	$849,291
Proprietor's Income	$555,491	$269,070	$318,101	$284,649	$164,607
Total Earnings	$3,553,304	$1,671,134	$1,967,133	$1,759,379	$1,013,696
% of Study Area 2005 Wage Income	0.08%	0.02%	0.02%	0.02%	0.01%
% of Study Area 2005 Personal Income	0.03%				
State and Local Taxes					
Personal Income taxes	$88,267	$41,528	$48,885	$43,725	$25,197
Sales Taxes	$294,906	$131,610	$154,210	$137,836	$79,083
Other Taxes	$131,089	$59,173	$69,358	$61,995	$35,586
Total State Taxes	$514,262	$232,311	$272,454	$243,556	$139,866
Output					
Direct	$6,992,495	$3,303,020	$3,885,979	$3,475,400	$2,002,120
Indirect	$1,255,828	$611,024	$719,785	$643,855	$371,389
Induced	$1,406,152	$661,593	$778,824	$696,573	$401,443
Total	$9,654,474	$4,575,637	$5,384,588	$4,815,828	$2,774,952
% of Study Area Output	0.04%	0.02%	0.02%	0.02%	0.01%

4.2.2 HR1 Alternative

Under this alternative, the High Rock Reservoir would support 1,890,678 annual recreation days, the highest total among the four alternatives and 22 percent more than under Existing Conditions. The increase in annual recreation days would increase the annual expenditures to $6,483,959, 23 percent more than under Existing Conditions. These expenditures would lead to an increase of approximately 14 jobs relative to Existing Conditions. The employment impact would account for 0.05% of the study area's employment in 2005. Given the higher level of visitation and spending that would occur under this alternative compared to Existing Conditions, this alternative would generate $1.97 million in earnings and $272,454 in state and local tax revenue. Output attributed to the recreational activity occurring at High Rock Reservoir under this alternative totals $5.4 million.

4.2.3 HR2 Alternative

Under this alternative, the High Rock Reservoir would support 1,698,840 annual recreation days, 10 percent more than under Existing Conditions. The increase in annual recreation days would increase the annual expenditures to $5,592,020, 6 percent more than under Existing Conditions. These expenditures would lead to an increase of approximately 4 jobs relative to existing conditions. The employment impact would account for 0.05% of the study area's employment in 2005. Given the higher level of visitation and spending that would occur under this alternative compared to Existing Conditions, this alternative would generate $1.76 million in earnings and $243,556 in state and local tax revenue. Output attributed to the recreational activity occurring at High Rock Reservoir under this alternative totals $4.8 million.

4.2.4 HR3 Alternative

Under this alternative, the High Rock Reservoir would support only 1,010,468 annual recreation days, resulting in the lowest total among the four alternatives and 35 percent less than under Existing Conditions. The decrease in annual recreation days would reduce the annual expenditures to $3,231,309, 39 percent less than under Existing Conditions. These expenditures would lead to the loss of approximately 33 jobs relative to existing conditions. The employment impact would account for 0.03% of the study area's employment in 2005. Given the lower level of visitation and spending that would occur under this alternative, this alternative would generate only $1.0 million in earnings and $139,866 in state and local tax revenue. Output attributed to the recreational activity occurring at High Rock Reservoir under this alternative totals $2.8 million.

4.2.5 Comparison of Alternatives

This section compares the results of the existing condition and three alternatives. When compared with the Existing Conditions, Alternative HR1 would have a 22% increase in activity days compared to Existing Conditions that will lead to a 23% increase in spending. Alternative HR2 would have a 10% increase in activity days that would

generate a 6% increase in spending over Existing Conditions. Finally, Alternative HR3 would result in a 35% decrease in activity days that would result in 39% less expenditures compared to Existing Conditions. The following table shows the results of the various alternatives.

5.0 CONCLUSIONS

Under Existing Conditions, the four reservoirs generate approximately $9.6 million in economic output and support approximately 175 jobs. Although important, these values only represent approximately 0.04 percent of the 5-county region's economic output and 0.12 percent of the region's employment.

In terms of the economic effects of the three water level alternatives for High Rock Reservoir, Alternative HR1 (maintain near full pond water elevation year-round) would generate the most economic benefits, resulting in increases in spending, employment, taxes, and total economic output. Alternative HR2 would generate more modest economic benefits. Alternative HR3 would result in a reduction in spending, employment, taxes, and total economic output relative to existing conditions. Table 5-1 compares the each of the alternatives with existing conditions in terms of percent change.

Table 5-1 Comparison of High Rock Water Level Alternatives to Existing Conditions (in terms of percent change from Existing Conditions)

	Existing Conditions	HR1	HR2	HR3
Spending	$5.3 million	+23%	+10%	-39%
Employment	82 jobs	+17%	+5%	-40%
State Taxes	$230,000	+17%	+5%	-40%
Total Economic Output	$4.6 million	+18%	+5%	-40%

6.0 REFERENCES

Appalachian State University, 1999. North Carolina's Central Park: Assessing Tourism and Outdoor Recreation in the Uwharrie Lakes Region, September 1999.

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Appendix A
Recreation Economic Impact Study, June 23, 2003

RECREATION ECONOMIC IMPACT STUDY
Yadkin Hydroelectric Project

Final Study Plan
June 23, 2003

Background

Alcoa Power Generating Inc. (APGI) is the licensee for the Yadkin Hydroelectric Project. The Yadkin Project is currently licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2197. This license expires in 2008 and APGI must file a new license application with FERC on or before April 30, 2006 to continue operation of the Project.

The Yadkin Project consists of four reservoirs, dams, and powerhouses (High Rock, Tuckertown, Narrows, and Falls) located on a 38-mile stretch of the Yadkin River in central North Carolina. The Project generates electricity to support the power needs of Alcoa's Badin Works, to support its other aluminum operations, or is sold on the open market.

As part of the relicensing process, APGI prepared and distributed, in September 2002, an Initial Consultation Document (ICD), which provides 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 are 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. IAGs will also have the opportunity to review and comment on Draft Study Plans. This Draft Study Plan has been developed in response to comments on the ICD and through discussions with the Recreation, Aesthetics, and Shoreline Management IAG, to provide additional necessary information for consideration in the relicensing process.

1.0 Study Objectives

The purpose of this study is to quantify the economic contribution of recreational use at the Yadkin Project to the five county region surrounding the Project. The study will estimate both direct economic impacts as well as indirect and induced effects (i.e., multiplier effects) of Project-related recreational spending that occurs within the five county region. The study will use the U.S. Forest Service's IMpact analysis for PLANning (IMPLAN) model to estimate the economic effects of recreational use at the Yadkin Project. IMPLAN uses the latest national input-output tables from the Bureau of Economic Analysis, secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for the study areas.

2.0 Technical Approach

This study will evaluate the economic effect on the five county, Yadkin Project region associated with recreational use of the Project under both existing Project operations and alternative Project operations.

2.1 Existing Project Operations and Current Recreational Use

This analysis will use the information collected in the Recreation Use Assessment Study to estimate total existing recreational use and recreational spending patterns. Development of direct impact estimates will involve allocating expenditures across the 528 industrial sectors within the IMPLAN model using the Bureau of Economic Analysis' Commodity Composition of Personal Consumption Expenditures published in the Survey of Current Business. Only within region spending will be considered. As the expenditures are allocated to IMPLAN industries, local purchase coefficients will be used to estimate portions of those expenditures that immediately leak from the economy.

Indirect and induced impacts represent the so-called multiplier effects of the recreational spending that occur across the regional economy when they are set in motion by the direct spending. These indirect and induced impacts typically are calculated using input-output multipliers. The latest IMPLAN data will be used to develop these estimates. Impacts will be measured in terms of total industry output, personal and total income, value added, and employment.

The economic effects associated with recreational use of the Project would be disaggregated into a resident component and a visitor component.

2.2 Future Project Operations and Recreational Use

This analysis requires two major inputs:

- Description of the future continued and alternative Project operations to be studied
- Estimate of the effects of these alternative Project operations on recreational use

Description of Future Continued and Alternative Project Operations

This description will be provided to ERM by APGI based on consultation with the Recreation, Aesthetics, and Shoreline Management IAG. ERM assumes that this will include at least continued Project operations and two alternative Project operations scenarios. Potential future operational scenarios that could be considered in the analysis include extending the recreation level of High Rock Reservoir into the spring and fall shoulder seasons, operating High Rock Reservoir with a reduced winter drawdown, and additional utilization of available storage at Narrows Reservoir.

Effects of Alternative Project Operations on Recreational Use

This analysis will use as a baseline the future recreational use estimates from the Recreational Use Assessment Study. These estimates reflect a continuation of existing Project operations. These estimates must be adjusted to reflect the effects alternative Project operations may have on recreational use. ERM proposes to apply "adjustment factors" to the baseline future use estimates to reflect the effects of alternative Project operations on recreational use. These "adjustment factors" will be developed based on recreational use patterns at "surrogate" reservoirs. These surrogate reservoirs will be identified using the following screening criteria:

- Proximity to the study area (preferably all the reservoirs would at least be located in the Piedmont region of the southeast)
- Similar to the Project reservoirs in terms of surrounding land use (e.g., significant waterfront residential population)
- Similar operations to the proposed alternative Project operations at Yadkin
- Reasonably accurate and current recreational use data are available

The proposed surrogate reservoirs will be reviewed with the Recreation, Aesthetics, and Shoreline Management IAG. Once a surrogate reservoir has been selected for each alternative Project operating scenario, ERM will compare monthly recreational use levels to develop monthly adjustment factors for the Yadkin Project. These adjustment factors will be applied to the baseline future recreational use estimates for each alternative scenario.

Future Project Operations Economic Effects

Estimates of future economic effects from recreation at the Yadkin Project will be developed for each scenario, including:

- Continuation of existing Project operations and reservoir fluctuations
- Altered operations and reservoir fluctuations

These estimates will be developed using IMPLAN as described above. The only modifications to the model will be changes in the level of recreational use and associated changes in recreational spending. The continuation of existing Project operations scenario will use the estimate of future recreational use and the recreational spending per recreation day estimate developed from the Recreation Use Assessment Study. The alternative Project operations scenarios will use the adjusted future recreational use (as described above) and the recreational spending per recreation day estimate developed from the Recreation Use Assessment Study. Each of these scenarios will also include a breakdown of the residential and visitor contributions to overall regional economics.

As part of this analysis, EMR will also consider information contained in the following two studies in evaluating the economic impact associated with recreational use of the Yadkin Project on the surrounding region:

- North Carolina's Central Park: The Economic Impact of an Alternative Economic Development Strategy on the Central Park Region of North Carolina (UNC Charlotte – December 1999)
- North Carolina's Central Park: Assessing Tourism and Outdoor Recreation in the Uwharrie Lakes Region (Appalachian State University – September 1999)

3.0 Reporting

3.1 Draft Study Report and IAG Meetings

ERM will prepare a Draft Study Report. The Draft Study Report will be provided to APGI and the IAG for review and comment. ERM will attend up to 4 meetings with the IAG to review the study plan, discuss results, and comment on the draft report.

3.2 Final Study Report

ERM will address the comments received on the Draft Study Report and prepare a Final Study Report.

4.0 Proposed Project Schedule

This study should take approximately 6 months (after the data from the Recreation Use Assessment Study is available) to complete the draft report.

Appendix B
Visitor Use Survey

Interviewer: _____
Location: _____

YADKIN PROJECT
VISITOR USE SURVEY

Date: _____
Time: _____

The Yadkin Division of Alcoa Power Generating Inc., which manages this reservoir, has hired ERM to conduct a recreation use survey at 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.

THE FOLLOWING QUESTIONS RELATE TO YOUR TRIP TO THE RESERVOIR *TODAY*.

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

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

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

3. How many people came in your vehicle to the reservoir ***today***, including yourself?
   Number of adults (16 years or older) _____
   Number of children (less than 16 years) _____

4. How long will you be staying at the reservoir ***today***?
   _____ Day Trip – How many hours do you plan to spend at the reservoir today? _____ hours
   _____ Overnight – How many nights do you plan to stay at the reservoir on this trip? _____ nights

   If you are staying overnight, please indicate below where you are staying:

Staying at my house	_____	Local hotel/motel	_____
Staying at my vacation home	_____	Tent camping	_____
Staying at a friend's house	_____	Trailer or RV camping	_____
Renting a house near the reservoir	_____	Other	

5. We would like to know whether you have encountered certain conditions at this reservoir 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	☐	☐	☐	☐
Crowded conditions at boat launches	☐	☐	☐	☐
Crowded parking conditions	☐	☐	☐	☐
Too many watercraft on this reservoir	☐	☐	☐	☐
Low water levels at this reservoir	☐	☐	☐	☐
Improper disposal of litter, trash, or toilet paper	☐	☐	☐	☐
Conflicts with other recreational users	☐	☐	☐	☐
Loud, rude or inconsiderate behavior by other users	☐	☐	☐	☐
Boating hazards (e.g., stumps, shallow areas)	☐	☐	☐	☐
Lack of sanitary facilities (Port-a-johns)	☐	☐	☐	☐

6. How crowded was this reservoir ***today***? (circle number)

Not Crowded				Very Crowded
1	2	3	4	5

7. Please estimate the total expenditures that will be made by all members of your group ***today***, or will be made before you get home, on the following items. Include all expenses incurred for the purposes of making this trip.

Restaurants and drinking places	$ _____	Gasoline (car/boat)	$ _____
Food stores (i.e., groceries)	$ _____	Equipment Rental	$ _____
Other recreation services (e.g., fishing guide, boat tour)	$ _____	General merchandise stores (misc. supplies)	$ _____
Bait/Tackle	$ _____	Repair Service (car/boat)	$ _____
Lodging (motel/house rental)	$ _____	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!!!

ALCOA

Appendix C
Waterfront Resident Use Survey

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.

1. Check the reservoir on which you own waterfront property. ( ) High Rock ( ) Tuckertown ( ) Narrows (Badin Lake)

2. Approximately how many days during *March 2004* did you spend at your waterfront home?
   _____ days (maximum of 31 days)

3. 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"

4. **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 1st participated in the following recreational activities during *March 2004*.	Number of days the **child** with the birthday closest to July 1st participated in the following recreational activities during *March 2004*.
motor boating		
boat fishing		
bank fishing		
canoeing/kayaking		
swimming		
jet skiing		
water skiing		
camping		
windsurfing		
picnicking		
hiking		
sun bathing		
sailing		
other (please list)		

5. 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

6. 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.

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

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 D
Private Community Use Survey

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 1st participated in the following recreational activities during March, April and May	Number of days the **child** with the birthday closest to July 1st 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.

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

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.