

**ECONOMIC ANALYSIS OF NON-
POWER VALUES OF SMITH LAKE**

Submitted to:

**Smith Lake Improvement and
Stakeholders Association (SLISA)
Arley, Alabama**

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Executive Summary

This report summarizes the findings of a study of the non-power economic values of Smith Lake undertaken by Resource Decisions on behalf of the Smith Lake Stakeholders and Improvement Association (SLISA). In addition to research into previous studies of Smith Lake, the present study included a survey of lakeshore property owners. The lake is currently the subject of a FERC relicensing application by Alabama Power Company (APC). The present study was conducted to provide quantitative information regarding the recreational benefits of Smith Lake to offer a comparison with the hydroelectric power values of Smith Lake. The Applicant Prepared Environmental Assessment did not include any economic assessment of these benefits.

In the past twelve years there has been a rapid growth of residential homes on the shores of Smith Lake due primarily to the lake's recreational values. The number of lakefront properties and homes has more than doubled since 1995, with constant dollar values increasing from \$0.7 billion to \$1.8 billion in 2007. Property taxes on these properties provide a significant source of revenues--\$5.8 million per year to Cullman, Walker and Winston counties.

Recreational benefits were estimated as part of the present study and derived from previous studies specific to Smith Lake. The SLISA Owners Survey placed the non-market value of recreation from private docks at \$71 million per year. A previous study of recreation from both private and public docks resulted in an estimated non-market benefit of \$172 million per year for lake user and preservation benefits at an additional \$47 million per year. In addition to these non-market benefits, Smith Lake provides an estimated \$88 in revenues to local businesses.

Under present FERC license conditions Smith Lake is presently required to be maintained at full pool only from April through June. Rigid adherence to these conditions, which has not occurred in recent years, would increase property values. In the past two years this effect has reduced property values by an estimated \$205 million. These departures from the rule curve also have reduced recreational usage by approximately 20% over the past nine years, causing a \$34 million per year reduction in recreation benefits. These effects have been even more pronounced in the past two years when water levels have been especially low, causing a 75% reduction in usage and \$129 million per year reduction in recreation benefits.

Under current license conditions Smith Lake is required to be maintained at its summer full pool elevation for only three months. Alternative management of Smith Lake extending the summer full pool period is demonstrated to offer significant increases in recreational and non-power values. For example, an alternative that maintained Smith Lake at full pool for 60 additional summer days would raise property values by \$342 million. An alternative that maintained a minimum pool elevation of 502 feet year-round would increase total property values by \$0.5 billion.

1 Introduction

1.1 Background

Resource Decisions was recently engaged by the Smith Lake Improvement and Stakeholders Association (SLISA) to advise the Association on economic issues related to the Warrior River Project relicensing (FERC Project 2165) and to evaluate the non-power benefits of the proposed and alternative license conditions. In particular, Resource Decisions was tasked with evaluating the recreation benefits, property value impacts, and municipal revenue impacts associated with the proposed license.

The Electric Consumers' Protection Act of 1986 (16 USC 791a 825r, as amended) requires the FERC to give "equal consideration" to power and non-power values when considering hydroelectric licensing alternatives. Based on a review of the Applicant Prepared Environmental Assessment (Applicant EA), other documents filed by FERC and fieldwork in the project area, Resource Decisions became aware that the docket to date has not included sufficient economic evaluation of non-power values associated with recreation and non-use values of the Warrior River. The Applicant Prepared Environmental Assessment of July 2005 (hereafter referred to as the APEA) has several deficiencies:

1. Recreation on Smith Lake, a major non-power benefit, was underestimated.
2. Effects of lake recreation expenditures on the local economy were not addressed.
3. The cost to Smith Lake residential owners for repairing erosion and dock damage due to lake level fluctuation was not addressed.
4. No value was assigned to non-market recreation use and to non-use values.
5. The impacts of alternative license conditions requiring that minimum lake elevation levels be maintained to support water-based recreation and property values were not evaluated.
6. The impact of project operations on municipal revenues was not adequately addressed.

The deficiencies noted above are further compounded by the absence of any evaluation of alternative license conditions including management of Smith Lake water elevations.

SLISA was formed in 2006 in response to many Smith Lake Owners dissatisfaction with the lake level fluctuations, notably the drawdown of lake levels during the late summer months. The drawdowns experienced in August and September seriously detracted from the usability of the docks and thus the ability of lakeshore users to access the lake for recreational uses such as swimming, boating and fishing. In addition, summer drawdowns were detrimental to the aesthetic enjoyment of the lake for scenic and lakeshore recreation because in many areas the drawdown exposes wide areas of lake bottom especially where shorelines are less steeply sloped. Furthermore, the large annual fluctuation of the shoreline is causing bank erosion damage and costly damage to docks. These owners only recently became aware of the ongoing FERC relicensing process and formed SLISA as a means of influencing this process.

1.2 Purpose of this report

The purpose of this report is to provide information to address the deficiencies in the record with regard to the economic issues raised above. Specifically, this report will provide new information in the following areas:

1. Revision of recreation use data to reflect the residential lakeshore development that has occurred in the past decade.
2. Estimation of the effects of Smith Lake residential development on local property values and local government revenues.
3. Estimation of non-market recreational use values and non-use values associated with the Warrior River Project water resources.
4. Estimation of how maintaining minimum Smith Lake water elevation, particularly in the summer months could enhance these values.

1.3 Analytic Approach

The economic evaluations in this report include the following analyses:

1. An estimate of the number and value of lakeshore residential properties, their current value and the impacts that these values have on local municipal revenues. Data for this estimate was gathered from the most current available assessor's office records in the three lake counties.
2. A comprehensive estimate of present recreational uses of Smith Lake including recreational use by private lakefront residential homeowners. Projection of future recreational uses. Data for this estimate was obtained from the APEA, refereed professional journals. These sources were augmented by an original mail survey of current Smith Lake residential property owners.
3. An estimate of the non-market value of recreational use, and non-use values of Smith Lake, based on the use data estimated in item 2 above, and user-day values obtained from an extensive review of professional literature.
4. An estimate of the costs that lake level fluctuations impose on residential property owners. This estimate was based on the SLISA Smith Lake Property Owners survey and interviews with construction contractors active in the Smith Lake area.
5. Calculation of the economic impacts of alternative license conditions that would maintain minimum lake water elevations through the summer months. This calculation was based on the Smith Lake owner survey augmented by information from professional publications.

1.3.1 SLISA Survey of Lakeshore Property Owners

A mail survey was administered to a random sample of Smith Lake property owners. The survey instrument was developed by Resource Decisions in consultation with Prof. John Loomis of the Colorado State University Agricultural and Resource Economic Department based on well-established survey design principles¹. The survey was designed to collect information on the characteristics of lakeshore properties as well as the recreational uses of the properties by the owners, their families and their guests. In addition, the survey requested information on the owners' attitudes toward the Smith Lake water conditions and the owners' participation in the FERC Alternative Relicensing Process presently underway. The owners were also queried as to the willingness to pay for water level stabilization improvements. The survey instrument is reproduced as Appendix A of this report.

From a list of more than 8,000 property owners compiled from public records, a sample of 4,000 owners was randomly selected². Surveys were mailed to known Smith Lake owners on 11/16/2007 the selected owners received the survey questionnaire plus a postage paid return envelope. A follow-up reminder postcard was sent to those surveyed on 11/30/2007.

1.3.2 Compilation and Analysis of Private Lakeshore Property Data

As of 12/20/07, 1,023 valid survey results had been received and tabulated. This represents a response rate of more than 27%.

Responses were compiled including the county in which the Smith Lake property is located, the permanent home zip code of the respondent, as well as characteristics of the property and improvements. Frequency of occupancy of the property, recreational use of the property, and the effects of lake water levels on recreational use of the property and Information on the respondents' participation in the FERC Alternative Licensing process was also compiled.

In order to estimate the behavior of the full population of Smith Lake property owners from the sample responses received, it was necessary to apply a scaling factor. This factor was based on the ratio of the number of properties from which responses were compiled to the known total number of properties reported in Assessors databases obtain from each of the lakeshore counties. Based on the Assessor Office data, 8,800 properties (properties with residences) are located on the shores of Smith Lake. Thus, the compiled sample of 1,023 represents approximately 12% of all known lakeshore properties. The results reported below are thus scaled up by this proportion³.

¹ Salant and Dillman, 1994.

² Of these 240 were returned for bad addresses or damaged, thus 3744 surveys are presumed to have reached their intended respondents.

³ This factor is slightly conservative because the ratio of improved Smith Lake properties sampled (those with residences) is approximately 11% of those from Assessors Office data. Using the scaling factor for improved residences would have resulted in slightly lower use estimates.

1.3.3 Application of Previously Published Research

Several published sources were used to augment the primary source data obtained from the Smith Lake Owners Survey and the Assessors' data. One highly relevant source was a study published in the August 2002 Journal of the America Water Resources Association, a highly respected refereed professional publication. This journal presented a major study by Hansen, Hatch and Clonts entitled "Reservoir Water Level Impacts on Recreation, Property and Non-User Values" (Hansen, Hatch and Clonts, 2002). This article was based on the same research that was used in the APEA and is referred to as ADECA/FIMS, 2002 in the EA. SLISA obtained a version of the ADECA/FIMS report dated 1997 from the Alabama Department of Economic and Community Affairs (ADECA). Smith Lake was one of the six reservoirs on which these studies were based. The results from these studies are referenced in the property value and recreation value sections of the present report. The ADECA/FIMS also provided estimates for Smith Lake user expenditures, revenues from commercial marina operations and for preservation values associated with Smith Lake. The ADECA/FIMS study also estimated the effects of Smith Lake level management alternatives on all of the recreation and property values. These estimates were not reported in the APEA but are highly relevant to balancing power and non-power values. As such, they are reported in the present report.

1.3.4 Other Original Analyses Conducted for the Present Study

User-day values for recreational activities were obtained from a comprehensive database of primary recreation valuation studies compiled by Prof. John Loomis. These user-day values are combined with the use data obtained from the SLISA Property Owners Survey to derive an estimate of the non-market Value of recreation. Evaluation of the effects of lake levels on recreational property values were obtained from primary hedonic pricing analysis based on information obtained from county assessors offices. Effects of lake level management alternatives on recreation values and visitation were estimated using the above studies as well.

1.4 Summary of Results

Property values: There are more than 8,800 privately owned properties on the shores of Smith Lake. More than 6,800 of these properties have either year-round or vacation residences and improvements worth in excess of \$560 million. Together with the land, valued at \$1.3 billion, the appraised value of privately owned lakeshore real estate exceeds \$1.8 billion. The primary reason for the location of these properties is the amenity value of Smith Lake. The Owners Survey results indicate that 93% of those surveyed felt that access to the lake was a very important factor in their decision to purchase their property. According to Hansen, Hatch and Clonts, 2002, the value of lakeshore property would increase by 19% if lake levels were maintained at full pool

levels for another 60 summer days. This would result in an additional property value of \$342 million. Additionally, adhering strictly to the currently effective rule curve and maintaining lake elevations at or above summer full pool would increase property values by an additional \$205 million. Under a Smith Lake level management regime that maintained a minimum pool elevation of 502 feet for the entire year, it is estimated that at least half the properties now considered seasonal waterfront would become year-round waterfront. This change would increase property values by approximately \$0.5 billion.

Recreational Use of Smith Lake: Smith Lake generates \$88 million per year in expenditures and revenues to local businesses. Smith Lake could create at least \$219 million per year in recreation benefits. Departures from the operating rule curve have had the effect of reducing recreational use and thus recreation benefits by 20%, with greater reduction in the past two years. Based on the SLISA property owners survey an estimated 2.5 million activity days of recreation take place annually from Smith Lake private residences. Recreation activities from these lakeshore residences add more than \$71 million per year in consumer surplus benefits. If full pool lake levels were maintained through August (as opposed to July as has been the case in the past few years), there would be an additional 12% increase in lake accessibility from private docks. This would likely result in additional recreation days with an aggregate increase in consumer surplus of over \$14 million per year.

Public Revenues and Other Impacts: Smith Lake property owners currently pay an estimated \$5.7 million in property taxes. If Smith Lake were maintained at full pool levels for an additional 60 summer days each year, appraised valuation of lakeshore properties would increase resulting in collection of an additional \$1.8 million in local property taxes. Similar revenue effects would occur if Smith Lake were maintained at a minimum pool elevation of 502 feet year-round. Under the present Smith Lake water level management regime, fluctuations in lake levels result in erosion damage and damage to private docks. The repairs necessitated by this damage cost Smith Lake homeowners an estimated \$9.7 million per year. Most of this cost would be unnecessary if stable lake levels were maintained.

1.5 Report Organization

Section 2.0 presents the analysis of property values and the resulting local tax revenues from residential development around Smith Lake. Section 3 estimates the recreation expenditures, non-market benefits, and non-use values associated with non-power uses of Smith Lake. Section 4 summarizes the economic analyses in this report in terms of the National Economic Development and Regional Economic Development Accounts as specified in the Federal Principles and Guidelines for Water Resource Project Evaluation⁴. Special consideration is given in Section 4 to highlighting the effects that alternative water level management license condition would have on the non-power economic benefits estimated in this report.

⁴ USWRC, 1983.

2

Property Values and Tax Revenues from Residential Development

Smith Lake covers an area of some 21,200 acres and has approximately 500 miles of shoreline⁵. Smith Lake covers parts of Cullman, Walker and Winston Counties. Residential development comprises the largest plurality of shoreline land use. According to the APEA, 44% of the lake shoreline (approximately 220 miles) was in residential development in 1995. According to more recent records obtained from the Assessors offices of the three lakeshore counties, private developments presently comprise approximately 433 miles of shoreline. This change is due primarily to sales of timberlands for residential development. There are approximately 6,800 residences on over 8,800 properties bordering Smith Lake. The total appraised value of these properties totals \$1.8 billion.

The value of these residential properties is closely tied to their proximity to Smith Lake and to the way in which Smith Lake water levels are managed. Lakeshore property values are described in Section 2.1. The impact of water levels on lakeshore residential values is discussed in Section 2.3. The property tax from these Smith Lake Properties is a major factor in the revenues of the three counties, as discussed in Section 2.3.

2.1 Smith Lake Property Values

The Assessors Offices from the three Smith Lake counties (Cullman, Walker and Winston) were contacted and were very helpful in provided information on lakefront properties. The two counties with the vast majority of Smith Lakeshore property, Cullman and Winston were able to provide detailed information on these properties. Walker County data were somewhat limited, but this is less critical to understanding the economic issues as Walker has only approximately 25 of the 500+ miles of Smith Lake Shoreline.

The number of properties and the appraised value of the land and improvements, the shoreline footage are summarized in Table 2-1. These data were compiled from listings for each lakeshore property provided by the Assessors Offices.

⁵ APEA, 2005, page 5-96

Table 2-1: 2007 Smith Lake Property Values

	Cullman	Walker	Winston	Smith Lake Total
Total # of Parcels	3,188	832	4,859	8,879
# of Improved properties	2,134	564	4,155	6,853
Appraised Value -- Improvements	\$200,279,300	\$84,359,300	\$276,433,200	\$561,071,800
Appraised Value--Land	\$374,624,580	\$97,055,300	\$819,597,160	\$1,291,277,040
Total Appraised Value	\$574,903,880	\$181,414,600	\$1,096,030,360	\$1,852,348,840
Property taxes assessed (2006)	\$1,766,808	\$555,129	\$3,436,104	\$5,758,041
lakeshore mileage in private ownership	108	25	300	433
Average valuation per lakeshore foot	\$654	\$744	\$517	\$564

Source: J. Robertson (Cullman and Winston) and R. Starnes (Walker County Assessor) personal communication to M. Feldman, November 2007.

As seen on table 2-1, there are more than 8,800 private properties on the shores of Smith Lake. These properties have a combined value in excess of \$1.8 billion. Appraised value of the land alone is \$1.3 billion.

2.1.1 Comparison with ADECA/FIMS Property Value Estimate

The ADECA/FIMS 1995 property value estimate provides a point of comparison that indicates the rapid growth of private ownership on Smith Lake. ADECA/FIMS, 1997 report total lakefront property value of \$415 million in 1995⁶. This is equivalent to \$669 in 2007 dollars⁷. Comparison with the appraised valuations compiled from current assessors office data indicates that aggregate lakeshore property values have increased by 169% between 1995 and 2007. ADECA/FIMS also estimates that there were 3,183 developed lots (with houses) in 1995. This compares with 6,853 such properties in current assessors office records. The number of homes on Smith Lake has more than doubled in the past 12 years (115%).

⁶ ADECA/FIMS, 1997, Vol.4, Table 4.3.10.

⁷ In all places in this report, ADECA/FIMS 1995 values are inflated to 2007 by dividing by a factor of 0.62, from the US Implicit Price Deflator for Gross Domestic Product.

2.2 Water Level Management Impacts on Property Values

2.2.1 Evaluation of Water Level Management Effects Based on ADECA/FIMS Analysis

According to Hansen, Hatch and Clonts, 2002, Smith Lake property values would increase by 10% if the lake were maintained at its summer full pool level for an additional 30 days per year and 19% if it were maintained at full pool for an additional 60 days. Given the \$1.8 billion property values noted above, an alternative including 30 additional summer full pool days would increase current property values by approximately \$180 million. An alternative that included 60 additional summer full pool days would increase current property values by \$342 million.

ADECA/FIMS, 1997 estimates the relationship between Smith Lake water levels and property values. According to ADECA/FIMS⁸, each foot below summer full pool that Smith Lake is permanently maintained at decreases property values by 6%.

Table 2-2 Average Smith Lake Levels by Month 1999-2007--Departure from Full Pool

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average 1999- 2005	Average 2006- 2007
Jan	-5.0	-15.2	-10.3	-7.8	-8.2	-13.7	-6.7	-11.2	-5.6	-9.5	-8.4
Feb	-0.1	-13.5	-3.6	-4.7	-5.8	-4.5	-8.7	-6.2	-6.6	-5.8	-6.4
Mar	-0.6	-7.5	0.5	-6.0	0.8	-0.6	-4.8	-3.5	-3.7	-2.6	-3.6
Apr	0.1	2.5	2.2	0.1	-1.2	-0.4	-0.2	-0.4	-2.3	0.4	-1.4
May	2.2	-0.5	0.4	1.0	2.5	-0.5	-0.7	-0.2	-1.8	0.6	-1.0
Jun	0.6	-3.1	0.5	-1.0	-0.4	-0.8	-0.6	-2.7	-4.3	-0.7	-3.5
Jul	-0.9	-6.6	-1.8	-3.3	-1.6	-1.3	-2.0	-6.9	-7.6	-2.5	-7.2
Aug	-5.6	-11.0	-5.7	-6.2	-5.0	-5.7	-5.7	-11.4	-12.1	-6.4	-11.8
Sep	-10.8	-16.2	-4.2	-10.3	-8.8	-10.2	-10.1	-15.7	-16.4	-10.1	-16.1
Oct	-14.3	-19.3	-5.4	-9.4	-10.0	-12.2	-12.7	-15.3	-17.8	-11.9	-16.5
Nov	-15.5	-18.2	-8.5	-6.8	-12.5	-8.0	-13.8	-9.1		-11.9	-9.1
Dec	-16.7	-14.6	-4.4	-9.6	-14.3	1.8	-14.1	-9.0		-10.3	-9.0
Ann. Average	-5.6	-10.3	-3.4	-5.3	-5.4	-4.7	-6.7	-7.6	-7.8	-6.3	-7.7
Apr-May-June Avg.	0.9	-0.4	1.0	0.0	0.3	-0.6	-0.5	-1.1	-2.8	-0.3	-1.9

Note: Departures from summer full pool rule curve are highlighted.

⁸ ADECA/FIMS, 1997, Vol. 9, page 52.

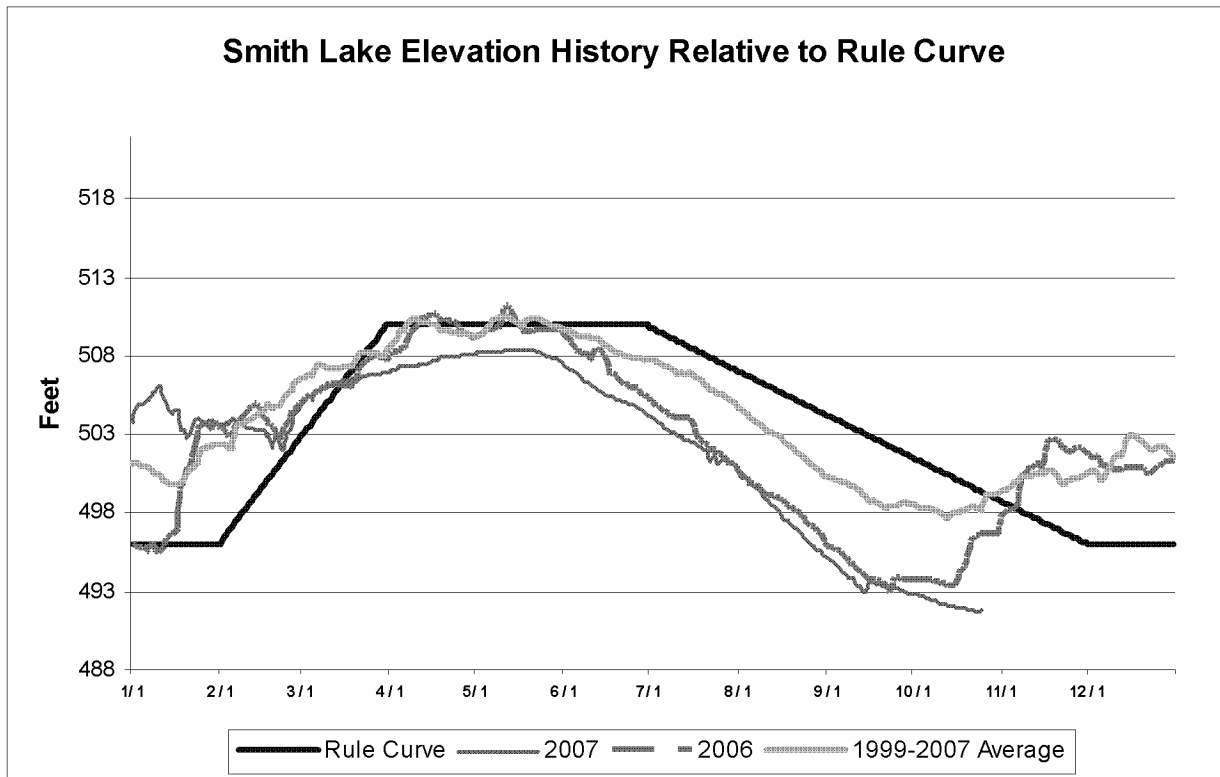


Figure 2-1

Table 2.2 shows the departure from full pool for the past nine years. Figure 2-1 illustrates the departures from the rule curve averaged over 1999-2007 and for the past two years. During the summer full pool months (April through the end of June) Smith Lake has been maintained at 0.3 feet below the full pool as required by the reservoir operation rule curve under the current FERC license. During the past two years (2006-2007) the summer pool has been maintained at an average of 1.9 feet below full pool. At 6% per foot, the current Smith Lake level management practice of failing to adhere to current FERC license conditions has resulted in a loss of property values of \$205 million based on the departures from the rule curve that occurred during the past two years.

Although the current FERC license conditions specify that the summer full pool period is April through the June, the most active recreation use period is from Memorial Day through Labor Day. Examining the actual historic 1999-2007 lake elevation records from June through the end of August reveals that the lake was operated on average 2.2 feet below the FERC rule curve during those months. During the past two years, lake elevations have averaged 5.6 feet below the FERC rule curve during these months. Although these months were not specifically factored into the ADECA/FIMS calculations, it is apparent that the \$205 million estimated above is a lower-bound estimate of the true cost of operating Smith Lake below the specified rule curve.

A Smith Lake water level management alternative that strictly maintained the summer full pool level at 510 feet (the level specified by the current rule curve), and also extended the full pool period by 60 days, would increase total property values by \$548 million.

2.2.2 Relationship between Appraised Property Values and Smith Lake Water Levels

Many properties on Smith Lake are considered seasonal rather than year-round lakefront because of the large water level fluctuation. If Smith Lake were managed to permanently maintain a minimum water elevation of 502 feet, approximately half of the seasonal properties would become year-round lakefront properties. The property appraisal data obtained from the Cullman and Winston assessors' offices allows the impact of this operational change to be calculated. For the large majority of lakeshore properties the appraised value of land is based on a price per lakefront foot. Seasonal lakefront is appraised at a lower value per front foot. Assuming that the cut-off between year-round and seasonal property is \$700, it is possible to calculate the effect of raising the average price per front foot of the seasonal properties to average of the year-round properties. The calculation is shown in Table 2-3.

Table 2-3: Impact of Maintaining Smith Lake at Full Pool thus Converting all Seasonal Lakefront Properties to Year-round Lakefront Properties

	Cullman	Winston	Total
# Of Seasonal lakeshore properties (appraisal basis <\$700/front foot)	1552	1869	3421
Value of Seasonal Properties	\$156,025,440	\$340,926,000	\$496,951,440
Front Footage of Seasonal Properties	394,735	1,181,409	1,576,144
Avg. \$/Front Foot for Seasonal Prop.	\$395	\$289	
# Of Year-round lakeshore (appraisal basis >=\$700/front foot)	1318	1680	2998
Value of Year-round Properties	\$160,527,200	\$370,606,600	\$711,532,600
Front Footage of year-round Properties	177,910	388,849	1,570,258
Avg. \$/Front Foot for Year-round Properties	902	953	
Increased value if half of the seasonal lakefront converts to year-round lakefront	\$100,070,702	\$392,528,714	\$492,599,416

As seen from Table 2-3, maintaining Smith Lake at full pool results in an increase in property values of \$493 million or 27% above current values. Note that this estimate is based only on land values, although the improvement values would also increase if properties were converted to year-round lakefront. Also note that no values are attributed to Walker County, because no data were available. Thus this is a conservative estimate of the benefits of permanently maintaining Smith Lake at full pool. It is interesting to note that the appraisal-based calculation above is quite close to the ADECA/FIMS calculation of the value of increasing the full pool period 60 days and closely following the rule curve. This supports the hypothesis that maintaining near full pool

throughout the most active recreation period would add approximately \$0.5 billion to property values on Smith Lake.

2.3 County Revenues from Smith Lake Residential Properties

Based on the valuations obtained by analyzing data from the county Assessors offices, it is estimated that the property tax revenues from Smith Lake shoreline properties totaled \$5.8 million in 2007. Broken out by county, the estimated 2007 revenues from Cullman County was approximately \$1.8 million, \$0.6 million from Walker County, and \$3.4 million from Winston County. These property tax revenues represent a significant portion of the total revenues received by these small rural counties.

As noted above, based on ADECA/FIMS, 1997, present operation of Smith Lake water levels has depressed the value of lake Properties by \$548 million. Thus if the lake were maintained at full pool for a 5-month summer period, property tax revenues would increase by 30.4% or \$1.8 million per year. The effect of maintaining Smith Lake at a minimum elevation of 502 feet would have a very similar effect.

3 Recreation Benefits

Smith Lake is a major recreation resource offering outstanding opportunities for recreational boating, fishing, swimming, and general lakeshore recreation. These recreational benefits are strongly affected by the management of lake levels for power generation. In the following section, recreational benefits and the impacts of lake levels are evaluated. Section 3.1 summarizes present and projected future Smith Lake recreation usage from both public and private faculties. Section 3.2 discusses how these recreational uses are affected by water levels fluctuations. Section 3.3 discusses expenditures by Smith Lake recreation users and its effects on the local economy. Section 3.4 evaluates non-market use values. Section 3.5 discusses non-use values associated with preservation of the lake environment. Smith Lake recreational benefits are summarized in Section 3.6.

The economic value addressed in this analysis fall into two categories: local economic effects and societal benefits. Values for both categories depend in part on visitation estimates. The first category relies on recreation expenditure data and effects on local lake-related businesses due to lake conditions. These benefits fall into the Regional Economic Development (RED) account as defined by USWRC, 1983.

The second category, societal benefits, includes consumer surplus, and preservation values. Consumer surplus is a non-market user value that reflects the amount of satisfaction that users obtain from the use of a recreation resource over and above the actual expenditures paid to engage in the activity. Another aspect of societal benefits is preservation values associated with the option, bequest and existence values of Smith Lake. These non-market values are not dependent on use. Both consumer surplus and preservation values add to the National Economic Development account (NED benefit) as defined by USWRC, 1983.

Both the local economic benefits and the societal benefits of Smith Lake Recreation are discussed in this Section. Data to estimate their values was obtained from the SLISA Property Owners Survey, the ADECA/FIMS study and other sources such as visitation counts.

3.1 Present and Projected Future Recreation Uses of Smith Lake

There are three major sources of information on recreational usage of Smith Lake:

- The APEA which is based on 1995 ADECA/FIMS baseline data.
- Actual usage counts provided by the concessionaire for the US Forest Service (USFS) concessionaire.
- Data based on the Smith Lake Property Owner survey conducted by SLISA.

Each of these data sources has strengths and limitations. The three recreation sources and their strengths and weaknesses are discussed below.

3.1.1 APEA Recreation Projections

The Applicant Prepared Environmental Assessment (APEA) Recreation Plan was based on three sources of information:

- A survey of recreation facilities.
- Potential Impacts of Water Diversion on Recreational Use and Economic Values Associated with Six Alabama Reservoir Systems developed by Fishery Information Management Systems, Inc. (ADECA/FIMS, 1997).
- Projections of Outdoor Recreation Participation to 2050, published by the United States Department of Agriculture (USDA) in 1999.

According to the APEA Recreation Plan:

Using local fishing guides, field surveys were conducted during September 2000, October 2000, June 2001, and September 2002 to collect data from every public and commercial recreation facility and access area to determine the amount of recreation access available at the Smith development. Facilities surveyed included campgrounds, picnic areas, boat launches, overlook sites, beaches, day-use areas, and informal access areas. Guides provided anecdotal information regarding the developments and current information on both formal and informal recreation facilities. Field crews also spoke with on-site facility owners, managers, and town officials associated with the facilities surveyed.

(Recreation Plan, Page 3-1)

*A survey of existing recreation facilities was conducted in 2000 and updated in 2001. Lewis Smith Lake has 34 formal recreation facilities, which provide boating, fishing, swimming, and/or camping opportunities. Twenty-four of the facilities are commercially operated, three are federally operated, one is state operated, two are county operated, one is APC operated, one is privately operated, one is operated by a local club, and one is operated by both the state (ADCNR) and APC. APC owns two of the above sites. There are 30 boat-launching facilities on the lake, which provide a variety of services including fuel, docking, and launching. **Other opportunities on Lewis Smith Lake are provided by informal bank fishing areas and hand carry-in launches.** (Emphasis added).*

(Recreation Plan, Page 4-1)

Thus, the survey of existing facilities does not mention the thousands of privately owned docks that already existed on the banks of Smith Lake, except in passing in the emphasized phrase.

The ADECA/FIMS data on which the projected recreation use was estimated was based on actual user surveys conducted in 1994-1995. These surveys included on-site surveys combined with telephone surveys. The results of these surveys were then projected to 2000, 2005, 2010 and 2015 using the USDA Outdoor Recreation Participation Projections. The results of the ADECA/FIMS and USDA methods were used to make the Recreation Plan usage projection (Table 4-1) reproduced below as Table 3-1:

Table 3-1: Reproduction of APEA Recreation Plan Projection Table 4-1
Table 4-1: Estimated and Projected Usage by Activity Type (Source: E/PRO, 2003)
(Reproduced from APC Recreation Plan Table 4-1)

	Note	1995	2000	2005	2010	2015
Smith Reservoir						
Total Trips	3	244,406	243,428	250,577	260,523	274,090
Recreational Boating²	4	461,928	457,308	459,612	461,928	466,524
Water Recreation	4	384,940	369,542	380,915	392,639	404,022
Land recreation	4	384,940	392,639	403,880	415,735	429,836
Boat fishing	4	261,759	266,994	284,095	315,345	362,428
Bank Fishing	4	46,193	47,117	50,134	55,649	63,958
Total recreation Hours	3	1,539,759	1,533,600	1,578,636	1,641,296	1,726,768
	a.		1539759	1585952	1647542	1724530
Avg. Growth Coefficient			1.00	1.03	1.07	1.12
Smith Tail water						
Total trips	5	10,700	10,914	11,354	11,813	12,228
Recreation Hours						
Bank Fishing	4	53,244	54,309	56,655	59,101	61,194
Land Recreation	4	13,480	13,749	14,143	14,558	15,052
Boat Fishing	4	674	687	717	748	775
Total Recr. Hours	4	67,398	68,745	71,515	74,407	77,021
	a.		68745.96	71441.88	74137.8	76833.72
Avg. Growth Coefficient.			1.02	1.06	1.1	1.14

1 Projections were calculated from growth coefficients.

2 Boating totals include the primary component of recreational boating. Boat fishing is considered a separate recreational use since the prime motive is to fish not boat use.

3. Source: Potential Impacts of Water Diversion on Recreational Use and Economic Values Associated with Six Alabama Reservoir Systems, Volume 4: The Smith Reservoir System. Page 12.

4. Calculated from percentages provided in Table 9.2.1 (page 45) of Potential Impacts of Water Diversion on Recreational Use and Economic Values Associated with Six Alabama Reservoir Systems, Volume 9: Study Overview.

5. Source: Potential Impacts of Water Diversion on Recreational Use and Economic Values Associated with Six Alabama Reservoir Systems, Volume 4: The Smith Reservoir System. Page 13.

The deficiency of the APEA projections is that they are based on 1995 observed participation data and thus do not reflect the extensive private development of the Smith Lake shoreline that occurred after 1995.

Furthermore, no attempt was made in the APEA Recreation Plan or elsewhere in the APEA to estimate the *economic* value of Smith Lake recreation participation. Yet these economic values

were estimated in the ADECA/FIMS study, although they were not reported in the APEA. The ADECA/FIMS results are incorporated in the remainder of this section.

3.1.2 Current USFS Area User Counts

In an effort to update the usage of the portion of the Smith Lake that is served by the USFS facilities, data were obtained from the USFS concessionaire that administers the campground and day use areas. The use data for the USFS areas are shown in Table 3-2.

Table 3-2: Clear Creek, Corinth, and Houston Recreation Areas

Month	Day Use: Number of Vehicles			Campground Use		
	2005	2006	2007	2005	2006	2007
January	-	-	-	-	-	-
February	-	-	-	-	-	-
March	497	376	725	902	726	1,685
April	1,099	1,386	977	1,192	1,432	1,339
May	2,550	3,244	3,341	2,571	2,606	3,276
June	3,450	4,754	3,728	3,687	3,661	3,186
July	3,864	3,611	2,476	2,838	3,157	2,749
August	1,454	959	1,101	1,383	1,426	1,336
September	1,125	746	577	1,668	1,381	1,065
October	679	428	317	1,695	1,079	1,513
November	-	134	-	-	382	-
December	-	-	-	-	-	-
Year Totals	14,718	15,638	13,242	15,936	15,850	16,149

Source: Andrea Komaridis, Campground Assistant, Cradle of Forestry Interpretive Association, personal communication to M. Feldman 11/28/07.

It should be emphasized that the use data in the above table is limited to only 3 of the 34 formal public recreation facilities on Smith Lake.

3.1.3 SLISA Smith Lake Property Owner Survey Data

The SLISA survey, sent to 4,000 randomly selected Smith Lake property owners, included a number of questions about recreational use from their lakeshore property. These questions included the length of stay at the property, the typical number of people participating in lake

related recreation activities and the typical proportion of days in which these activities were the primary recreational activity. To minimize avidity bias (the tendency for respondents to exaggerate activities that they favor) several conservative assumptions were used to limit responses. These included:

- Number of activity days were restricted to a maximum of 150 for full-time residents, 50 for those reporting occupancy for the entire summer, 20 for those reporting occupancy summer weekends.
- Respondents reporting only occasional recreational activity use were not counted; those reporting every day activity use were counted at 75% of the possible days.
- Number of activity participants was limited to the number of reported participants with a maximum of six participants, even if more were reported.
- The total of recreation-days from a given property was limited to the number of activity-days as restricted in the first bulleted item above. This is conservative because it is entirely possible that residents engaged in more than one primary activity on a given day (such as boating and swimming).

The surveyed frequency of recreational activities from private property in 2007 is reported in Table 3-3. The responses received reported more than 100,000 boating-days, nearly as many swimming days, almost 30,000 angling days and over 50,000 lakeshore picnicking days. Because the compiled sample represents only 11% of the total number of lakeshore properties, this implies that there were more than 2.6 million user-days of Smith Lake-related from private properties in 2007. This is more than 10 times the number of trips reported in the APEA (compared to Table 3-1 above). This is not surprising given the rapid growth of private Smith Lake property ownership in the past 12 years since the APEA baseline data were compiled.

Table 3-3: Surveyed and Scaled Smith Lake Water-Related Activity Days in 2007

	Boating	Swimming	Angling	Picnicking	Total	Source:
Activity-days in sample	100,746	96,373	29,015	51,910	278,044	SLISA survey
Activity-days in full population	938,060	897,345	270,158	483,343	2,588,907	

data compiled and analyzed by Resource Decisions and scaled to full sample based on Assessors Office data.

3.2 Effects of Lake Levels on Recreation Usage

There are three source of information on the effects of lake levels recreation usage of Smith Lake, the SLISA survey, the ADECA/FIMS analysis, and the USFS user counts. The effects derived from each of these sources are described below.

3.2.1 SLISA Property Owner Survey Analysis of Lake Level Impacts on Recreational Usage

Smith Lake water levels have a major impact on recreational usage because when water levels are more than a few feet below the nominal full pool elevation of 510 feet, many public and private docks become unusable. This severely limits recreational access to the lake.

The SLISA survey includes several questions that allow the effects of lake level on recreational use to be assessed. Question 4 asks for the last date when the dock was usable due to low water in 2007. 95% of the respondents reported that their dock was usable through July, while 83% reported that their dock was usable through August, an 11.7 percentage point difference. This indicates that during the prime recreation month of August approximately 1000 private docks become unusable.

Survey Question 16 asks whether the respondents' occupancy of their lake property was higher or lower in 2005, when the lake water levels were maintained at near full pool through August (504.3 feet). The reported average occupancy was 14.8 days longer in 2005 than in 2007, a 19% increase over the average 80 days of occupancy report for 2007. Expanding the survey result to the entire population of Smith Lake private dock users indicates that between 88,000 and 140,000 additional recreation-use days would have occurred if near full pool levels of 505.

3.2.2 ADECA/FIMS Analysis of Impact of Lake Levels on Recreational Usage

According to ADECA/FIMS 1997⁹, each one-foot drop in water level below the rule curve results in a decrease in recreational usage of 6.2% and 12.8% for the summer full pool and the fall pool periods, respectively. The relationship between the observed departures from the rule curve and recreation usage is shown in Table 3-4. Based on this relationship the departure from the rule curve during the past nine years has decreased the recreational usage by an average of 20%. In the past two years, when the departures from the rule curve have been more extreme, visitation is estimated to have been decreased by 75% due to low lake levels.

⁹ ADECA/FIMS Volume 4 Table 4.2.23.

Table 3-4: Effect of Departure from Rule Curve on Recreation Usage based on ADECA/FIMS

	Summer Full Pool 4/1--6/30	Falling Pool 7/1--11/30
	Observed Lake Level (feet)	
Rule Curve	510.0	502.0
Actual 1/99-12/07	509.7	500.6
Actual 1/2006-12/2007	508.1	498.0
	Observed Daily Departure from Rule Curve (feet)	
Actual 1/99-12/07	-0.3	-1.4
Actual 1/2006-12/2007	-1.9	-4.9
Change in visitation due to one foot drop in Seasonal water level	6.2%	12.8%
	Change in visitation Due to Negative Departure from Rule Curve	
1/99-12/07	-2.0%	-18.3%
1/2006-12/2007	-12.0%	-62.8%

3.2.3 USFS Public Facility Visitors

As noted in Table 3-2, there 13,000 to nearly 16,000 day use visitor vehicles to the Clear Creek, Corinth, and Houston Recreation Areas. Using the monthly data from March through October of 2005, 2006 and 2007 in Table 3-2, we conducted a multiple regression analysis of monthly visitation as a function of lake level. Table 3-5 presents the results, which indicate that lake level is very statistically significant. Each additional foot of lake elevation adds 147 more vehicles each month. The equation has good explanatory power with two-thirds of the monthly variation in car counts explained by monthly average lake level and monthly average temperature. Using the typical average of 2 visitors per car translates into nearly 300 more visitors each month with an additional one foot in lake elevation.

On a percentage basis, the observed statistical response to Smith Lake level changes corresponds to 10.9% more visitor days per foot increase in water level. If the lake had been maintained at full pool during March through October in 2005-7, as opposed to 6.5 feet below full pool as was the case; the statistical relationship indicates that there would have been 71% more visits to these USFS areas. This is a very plausible result as the analysis implicitly assumes equal probability of visitation in any of the six-month period. In actual fact, the August water levels during the three-

year period were especially low. Given that August is a prime recreation month, the statistical analysis probably underestimate the actual response to higher lake levels.

Although this analysis is specific to the USFS day-use areas, which are only 3 out of 34 public access areas, there is no a priori reason to believe that these areas are not representative of all public areas. Thus it is reasonable to infer that maintaining lake Levels at full pool would increase recreational visitation from all public areas by 71%.

Table 3-5. Regression of Relationship between Lake Level, Temperature and Recreational Use of USFS Public Access Areas

Dependent Variable: Day Use, Number of Vehicles (CARCOUNT)

Method: Least Squares

Date: 12/03/07 Time: 19:35

Sample: 1 24

Observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-80520.34	14767.39	-5.45257	0.0000
Monthly lake Level	146.9686	28.85054	5.09413	0.0000
Monthly Avg. Hi Temp	103.5787	20.18460	5.13156	0.0000
R-squared	0.694521	Mean dependent var		1811.000
Adjusted R-squared	0.665428	S.D. dependent var		1385.005
S.E. of regression	801.1175	F-statistic		23.87228
Sum squared residual	13477574	Prob(F-statistic)		0.000004
Log likelihood	-192.9163			

3.2.4 Summary of Impacts of Lake Levels on Recreation Usage

The current operating regime of maintaining Smith Lake levels on average of 1.9 feet below summer full pool in the past two years has had the effect of reducing recreational participation between 71% (USFS data) and 75% (ADECA/FIMS analysis). Based on the response to the SLISA survey, lowering the lake level from 504 feet (August 2005) to 498 feet (August 2007) in one summer month has reduced annual recreational use by 19%.

3.3 Recreation Expenditures

3.3.1 Recreation User Expenditures

There are no available current estimates of recreation expenditures for Smith Lake. However, ADECA/FIMS, 1997 reported¹⁰ Smith Lake annual recreation expenditures at \$54 million, which equates to \$87 million in 2007 dollars. By allowing Smith Lake levels to fall below the rule curve,

¹⁰ ADECA/FIMS, 1997, Vol. 4 page 70.

as occurred during the past nine years, recreation participation has fallen by 20% based on the estimates in Section 3.2.2. Over the past two years, higher departures from the rule curve have resulted in an estimated 75% decrease in participation. Thus the expenditures are estimated to have decreased by \$17 million per year during the past nine years and \$65 million per year in the past two years. This is probably a low estimate, as noted above; recreation use of Smith Lake has increased sharply in the past 12 years. In the U.S. Water Resources Council Principles and Guidelines¹¹, the recreation expenditures are counted as a contribution toward Regional Economic Development (RED Account).

3.3.2 Impact of Lake Level Management on Marina and Lakeshore Business

The expenditures reported in the above section were based on surveys of all Smith Lake users regardless of place of residence. These expenditures could have occurred outside of the immediate Smith Lake area. However ADECA/FIMS, 1997 also surveyed the Reservoir-Related gross sales and receipts specific to Smith Lake businesses and marinas¹². The annual \$12.8 million in local revenues equates to \$21 million in current dollars. Again it should be pointed out that these expenditures are probably underestimates due to the sharp increase in lake occupancy in the past 12 years. Based on the effects of departures from the rule curve on total expenditures, it can be inferred that 20% (75% in the past two years) or \$4 million per year (\$16 million in the past two years) in revenues has been lost to local businesses.

Smith Lake has traditionally been a trophy bass fishing destination. In the past year (2007) at least one major bass fishing tournament had to be cancelled due to low water and inaccessibility of launch facilities. Cancellation of this tournament resulted a significant loss to local businesses.

3.4 Non-Market Recreation Use Values

Non-market recreational benefits are a major economic value associated with the use of Smith Lake. Although these benefits do not appear on any businesses balance sheet or any individual's budget, they are nevertheless real economic values. From a national economic standpoint, consumer surplus and preservation values are net economic benefits that must be taken into account in evaluating water resource projects¹³ such as the instant relicensing proceeding. According to the Water Resources Council these benefits are part of the National Economic Development Account (NED benefit) in the same way as the hydroelectric power benefits contribute to the NED account.

¹¹ USWRC, 1983.

¹² Ibid. Page 177.

¹³ US Water Resources Council, 1983 and Executive Order 11747 (38 FR 30993).

By relying on user-day values for various uses from studies in other areas, and combining them with the number of user-days estimated for Smith Lake, it is possible to determine the non-market value of recreational use of Smith Lake.

3.4.1 User-Day Values

3.4.1.1 Benefit Transfer Methods

The benefit-transfer method is used by federal agencies such as the U.S. Forest Service (Rosenberger and Loomis, 2001) and the U.S. Environmental Protection Agency for valuing water resources (Iovanna and Griffiths, 2006).

Recreational Fishing Values: The most comprehensive analysis of recreational fishing values was prepared by Boyle, K., R. Bishop, J. Caudill, J. Charbonneau, D. Larson, M. Markowski, R. Unsworth, and R. Patterson.

It should be noted that not only was the study prepared for the US Fish and Wildlife Service, but also two of the authors were economists with USFWS (J. Caudill and J. Charbonneau). The other economists included well-known non-market valuation experts Kevin Boyle (the lead author), Richard Bishop of University of Wisconsin and Douglas Larson of University of California-Davis. One of the specific purposes of their report was for benefit transfer.

Based on that report, and updating their values to 2006 dollars, the mean estimate of a day of recreational fishing for warm water species in the Southeastern U.S. is \$55.88. This is based on an average of 63 individual value estimates in the Southeastern U.S.

USFWS National Survey also provides an estimate of the value per day for bass fishing in Alabama (Aiken and LaRouche, 2003). That value is \$31 per day in 2001 dollars or \$40.89 in 2007 dollars.

Other Recreational Use Values: Loomis (2005) provides the most recent agency published recreation values for benefit transfer for boating, swimming and lakeshore picnicking. These values are from a peer-reviewed report published by the U.S. Forest Service Pacific Northwest Research Station. The report values are in 2004 dollars, and have been updated to \$2007 dollars. The estimated user-day values for boating, swimming and picnicking are presented in Table 3-6.

Table 3-6: Southeastern U.S. Recreation Values per Visitor Day and Sample Size (\$2007)

Recreation Activity	Mean	Number of Estimates
Motor boating	\$64.42	13
Picnicking	\$40.04	2
Swimming	\$66.61	13

Given the limited number of picnicking studies in the southeastern U.S., we also looked at the national average of picnicking studies in the same report. The U.S. average is \$45.33 based on 13 estimates. The \$45 per day is only about 15% higher than the southeastern estimate.

3.4.1.2 User-Day Values From ADECA/FIMS Survey

ADECA/FIMS, 1997 surveyed Smith Lake recreational users to determine their consumer surplus¹⁴. Inflated to 2007 dollars, the surveyed values were motor boating \$20.08, fishing \$31.39, land recreation (picnicking, etc.) \$39.40, and water recreation (swimming, etc.) \$29.76. These values are lower than those derived from the benefit transfer method.

Although the user-day values obtained using the benefit transfer method are based on well-established methods, the lower values reported in the ADECA/FIMS study are used in the remainder of this report. This will further establish a conservative bias in the recreational benefit estimates.

3.4.2 Non-Market Economic Benefits of Recreational Use of Smith Lake

As noted above, the SLISA survey, ADECA/FIMS 1997 and Hanson et al, and the USFS use data each contribute to the understanding of recreation benefits issues. Non-market benefit estimate from these three sources are discussed below.

3.4.2.1 Consumer Surplus Benefits Based on SLISA Analysis

The SLISA Property owners Survey provides a detailed perspective on the use of Smith Lake recreation resources from private lakeshore residences. The respondents provided detailed information on their use by recreation type in the past year. They also compared their use last year with their use in 2005 when water levels were maintained at a higher level. The surveyed use rates were expanded into the full population of known lakeshore properties using comprehensive data provided by county assessors offices on all lakeshore properties. Then these use rates were

¹⁴ ADECA/ADECA/FIMS, 1997 Vol. 4, page 70.

combined with the user-day values for each activity provided by ADECA/FIMS to estimate the consumer surplus for each activity area. This information is summarized in Table 3-7.

Table 3-7: Estimated Annual Consumer Surplus From Smith Lake Recreation Activities from Private Residences

	Boating	Swimming	Angling	Picnicking	Total
Activity-days in sample	100,746	96,373	29,015	51,910	278,044
Activity-days in full population	912,779	873,162	262,877	470,317	2,519,135
Value per activity-day/a	\$20.08	\$29.76	\$31.39	\$39.40	
Total value	\$18,329,195	\$25,983,605	\$8,250,959	\$18,532,006	\$71,095,765
Effect of Water Level Management					
Change if near full pool levels maintained through August					
Change in Recreation user-days	173,428	165,901	49,947	89,360	478,636
Change in consumer surplus	\$3,482,547	\$4,936,885	\$1,567,682	\$3,521,081	\$13,508,195

Note a/ The ADECA/FIMS values were used rather than the higher benefits-transfer values.

Note that the resulting consumer surplus based on the relative low water levels experienced in 2007 nevertheless result in an estimated \$71 million in consumer surplus from recreation from private lakefront residences alone. The value of recreation from public docks and marinas is not included in this total, so this estimate is less comprehensive than that estimated by ADECA/FIMS in Section 3.4.4, which does include use from both public and private docks. Note also, that if water levels had been maintained at near full pool through August, the value of the recreation would have increased by an additional \$13.5 million per year.

3.4.3 USFS Visitation Non-Market Benefit,

The U.S. Forest Service data does not report the specific recreation activity. Only total vehicle counts. Using the typical two persons per vehicle, we can convert vehicle counts to visitors. If these public day use visitors engage in the same mix of activities in the same proportion as private visitors, the weighted average consumer surplus is \$28.22 per visitor-day. Given the annual day use vehicle counts from Table 3-2, times two persons per vehicle, yields an average 29,065 day use visitors. When multiplied by \$28.22 per day use visitor yields \$0.8 million annually in day use visitor benefits. This benefit only applies to the three USFS areas.

This partial result is only of interest in that it provides a basis for assessing changes in consumer surplus benefits due to changes in water levels. As noted in Section 3.2.3, visitation to USFS areas is quite sensitive to changes in Smith Lake water levels. It was noted that the because lake water levels have been maintained at an average of 7.7 feet below full pool during the past two

years during the months of March through October, the visitation is estimated to be 71% lower than it would have been at full pool.

3.4.4 ADECA/FIMS Consumer Surplus Benefit Analysis

ADECA/FIMS, 1997 reports that the annual consumer surplus for all recreation activities on Smith Lake totaled \$85 million in 1995¹⁵ (\$137 million in 2007\$). In order to reflect the effects of the 115% increase in the number of lakeshore properties, it is appropriate to back out the 22% of this value that was based on recreation by those who owned homes on Smith Lake (\$30 million) and to increase that value. This results in an additional \$35 million in consumer surplus for a total of \$172 million annually.

As discussed in Section 3.2.2, recent below rule curve water elevations have reduced recreational use by at least 20% (75% in the past two years). It can be inferred that there has been a corresponding proportional decrease in consumer surplus. Thus, there has been an estimated \$34 million (\$129 million per year in the past two years) annual reduction in consumer surplus due to current Smith Lake level operations. Other alternatives such as increasing the number of summer days at full pool would increase the consumer surplus to a lesser extent.

3.5 Preservation Benefits of Smith Lake

In addition to consumer surplus, ADECA/FIMS, 1997 reports the results of a telephone survey to assess Alabama resident's preservation values associated with Smith Lake. Preservation values include existence values, option values and bequest values. Unlike visitor consumer surplus, preservation values do not require that the respondent actually visit the lake, only that they consider its current condition (existence value), the option to use it (option value), and the ability to pass the resource on to future generations (bequest value) to be of some worth.

According to ADECA/FIMS¹⁶,

Preservation values are annual values and were determined by asking respondents about their hypothetical willingness to pay to protect the-site's current water level on the day of the survey. The preservation values addressed the continued personal use of the body of water (option value), the use of the resource by future generations (bequest value), and the existence of the resource as a-natural habitat (existence value).

For all Lewis Smith Reservoir users interviewed, the mean option value people were willing to pay was approximately \$98 per year (standard error = \$11.50; minimum= \$0; maximum = \$2,000). The mean bequest value was approximately \$83 per year (standard

¹⁵ ADECA/FIMS, 1997, Vol. 4, page 81.

¹⁶ Ibid. page 31.

error = \$8.65; minimum= \$0; maximum = \$1,000), and the mean existence value was approximately \$89 per year (standard error = \$9.34; minimum= \$0; maximum = \$1,000).

Inflating these to 2007 dollars, existence values averaged \$144, bequest values averaged \$134 and option values totaled \$158. Aggregated over the relevant population, preservation values totaled \$29 million per year, or \$47 million per year in 2007 dollars. ADECA/FIMS did not report how preservation values might vary with lake level management alternatives.

3.6 Summary of Recreation Benefits

The benefits associated with Smith Lake Recreation can be summarized in the nationally relevant NED account and the regionally relevant RED account. Within these accounts the effects of lake level management alternatives can be addressed.

3.6.1 Regional (RED) Recreation Benefits Summary

Expenditures and economic activity associated with Smith Lake falls in the Water Resource Council's Regional economic development (RED) account. They are important locally but as transfer among individuals they do not create new resources on a national level.

Based on ADECA/FIMS, 1997, the availability of Smith Lake as a recreation resource is associated with expenditures of \$67 million per year. By the current management practice of maintaining lake levels below the rule curve, potential expenditures have been reduced by \$17 million per year over the past nine years, and \$65 million per year in the past two years.

Marinas and lakeshore businesses generate \$21 million in revenues due to recreation activities associated with Smith Lake. By the current management practice of maintaining lake levels below full pool, potential revenues are reduced by \$4 million per year over the past nine years and \$16 million per year in the past two years.

In summary, Smith Lake generates \$88 million per year in expenditures and revenues to local businesses. This amount has been reduced by at least \$21 million per year due to below rule curve operations.

In addition to the above, current lake level management practices have been responsible for the cancellation of one or more bass tournaments result in additional lowered local revenues.

3.6.2 National (NED) Recreation Benefits Summary

Consumer surplus, and preservation values associated with Smith Lake are of national significance in that the availability of the Smith Lake Recreational resource contributes to net benefits to the nation as a whole.

Based on information developed from the SLISA survey, the availability of Smith Lake as a recreation resource creates a benefit of \$71 million per year for private lakeshore property owners and their guests under present lake level operation. If lake levels were maintained at near full pool through August, these benefits would increase by \$13.5 million per year.

Based on ADECA/FIMS, 1997 the availability of Smith Lake as a recreation resource could potentially create a benefit of \$172 million per year for public access recreation users and private lakeshore property owners combined. Departures from the rule curve have reduced this benefit by \$34 million per year over the past nine years, and as much as \$129 million in the past two years.

Preservation values associated with Smith Lake as a recreation resource create an additional \$47 million in NED benefits.

In summary, Smith Lake could provide at least \$219 million per year in NED recreation benefits. Departures from the rule curve over the past nine years have reduced this benefit by \$34 million per year and up to \$129 million in the past two years.

4 Summary of Non-Power Values of Smith Lake

As noted in the introduction to this report, the Electric Consumers' Protection Act of 1986 (16 USC 791a 825r, as amended) requires the FERC to give "equal consideration" to power and non-power values when considering hydroelectric licensing alternatives. The property values and recreation resources created by Smith Lake produce very significant non-power values. This report provides estimates of those non-power values. In addition, the economic benefits associated with project alternatives that reduce water level fluctuations have also been estimated. These benefits are summarized in Section 4.1 (Non-power Benefits of Smith Lake and Section 4.2 (Benefits of Reducing Water Level Fluctuations).

4.1 Non-Power Benefits of Smith Lake

Property values: There are more than 8,800 privately owned properties on the shores of Smith Lake. More than 6,800 of these properties have either year-round or vacation residences and improvements worth in excess of \$560 million. Together with the land, valued at \$1.3 billion, the appraised value of privately owned lakeshore real estate exceeds \$1.8 billion. The primary reason for the location of these properties is the amenity value of Smith Lake. The Owners Survey results indicate that 93% of those surveyed felt that access to the lake was a very important factor in their decision to purchase their property. The property values are NED benefits.

Public Revenues and Other Impacts: Smith Lake property owners currently pay an estimated \$5.8 million in local property taxes (RED Benefits).

Recreational Use of Smith Lake: Smith Lake generates \$88 million per year in expenditures and revenues to local businesses (RED Benefits). Smith Lake creates at least \$219 million per year in NED recreation benefits.

4.2 Non-Power Benefits of Reducing Water Level Fluctuations

Property values: Based on ADECA/FIMS 1997, a Smith Lake water level management alternative that strictly maintained the summer full pool level at 510 feet (the level specified by the current rule curve) and extended the full pool period by 60 days would result increasing total property values by \$548 million.

If Smith Lake were maintained at a minimum 502 foot elevation for the entire year, properties that are presently considered seasonal lakefront properties would be transformed into year-round lakefront properties. This would increase property values by approximately \$0.5 billion.

Public Revenues and Other Impacts: If Smith Lake were maintained at full pool levels for an additional 60 summer days each year, appraised valuation of lakeshore properties would increase resulting in collection of an additional \$1.8 million in local property taxes. If the lake were maintained at a minimum of 502 foot pool elevation year round, approximately the same tax revenue increases would occur. Under the present Smith Lake water level management regime, fluctuations in lake levels result in erosion damage and damage to private docks. The repairs necessitated by this damage cost Smith Lake homeowners an estimated \$9.7 million per year. Most of this cost would be unnecessary if stable lake levels were maintained. These impacts are RED benefits.

Recreational Use of Smith Lake: Departures from the rule curve have reduced recreation benefits by \$34 million per year over the past nine years, and as much as \$129 million in the past two years. These impacts are NED benefits.

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APPENDIX A: SLISA PROPERTY OWNER SURVEY

Instructions

Your responses will be compiled together with those of other property owners. Individual responses will be kept strictly confidential. If you don't have the exact answer, answer to the best of your recollection. But if it is strictly a guess, it is better to leave that answer blank.

IMPORTANT:

- Please indicate the county in which your Smith Lake property is located:

_____ Cullman _____ Walker _____ Winston

- Please provide the mailing Zip Code of your permanent home address _____

Property Information

1. Is your lake frontage property ___ Seasonal? ___ Year-round? ___ Not sure?
2. What is the approximate lakeshore frontage of your property _____ (feet).
3. Does the property have a dock? (circle one) Yes No

If no dock, skip to question 7

4. If your dock is NOT useable now due to low water, when was the last month that your dock was useable in 2007? _____ (month)
Or _____ It is currently useable (November 2007) (Check)
5. Was you dock useable on or around July 4, 2007? (circle one) **Yes** **No** **Not sure**

If there is no permanent residence on the property skip to question 8.

6. Residence characteristics:
 - a. Interior housing area footage including garage _____ (square feet).
 - b. Number of bedrooms _____ (number)
 - c. Number of bathrooms _____ (number)
 - d. Year built _____ (year)
 - e. Condition _____ (very good, fair, poor)

Purchase Information

7. When did you purchase your property _____ (Month) _____ (Year)
8. What was the approximate purchase price? \$ _____
9. Was the cost of the residence included in the purchase price? (circle one) Yes No
10. What was your approximate property tax payment last year? \$ _____

11. Approximately how much have you spent on property improvements (other than routine maintenance) in the past two years? \$ _____
12. Approximately how much have you spent on dock maintenance or repairs necessitated by lake level fluctuations in the past two years? \$ _____
13. Have you incurred expenses to repair lakeshore erosion damage in the past two years?
 No
 Yes If yes, approximately how much have you spent? \$ _____.
14. How important was lake access to your decision to purchase this particular property?
 Very Important Somewhat Important Not Important

Property Use & Your lake Activities

15. During 2007, approximately how often do you or others occupy your Smith Lake residence? (check one box)
- Year-round Every Weekend Every summer weekend
- Occasional weekends → Estimated # of weekend days _____ # weekend days
- Occasionally → Estimated # of days _____ # of days
16. In 2005, when the summer lake level was higher, did you or others occupy your Smith Lake residence more or less often than you occupied it in 2007?
- Occupied the residence _____ (total number **MORE** days in 2005 than in 2007)
- or** Occupied the residence _____ (total number **FEWER** days in 2005 than in 2007)
- or** (Check) No difference in occupancy due to lake Level
- or** (Check) I don't remember
17. If June's higher lake levels were maintained through Labor Day, how might this affect the time spent at your lake residence?
- It would not change the time we spend at my lake residence
- or** We would spend more time at my lake residence: (check the amount of time more):
- (+5%) (+10-25%) (+26-50%)
- (+51-75%) (more than +75% more time).
18. When you or others are using your lake residence, what is the average number of people staying at your home that recreate on the lake?
- _____ (average number of people visiting the lake).
19. Thinking about all the days you spent at your lake residence this year, how many days did you or your guests participate in pleasure boating or waterskiing as their primary activity that day?
- Rarely or never (*Skip to Question 20*)

One Quarter... One-half... Three-quarters or more...
...of the total days spent at the lake.

On the days spent boating or waterskiing, what was the average number of people participating in this activity from your lakeshore residence (average # including you)? _____.

20. Thinking about all the days you spent at your lake residence this year, how many days did you or your guests swim in Smith Lake as their primary activity that day?

Rarely or never (*Skip to Question 21*)

One Quarter... One-half... Three-quarters or more...
...of the total days spent at the lake.

Of the days spent swimming, what was the average number of people participating in this activity from your lakeshore residence (average # including you)? _____.

21. Thinking about all the days you spent at your lake residence this year, how many days did you or your guests go fishing in Smith Lake as their primary activity that day?

Rarely or never (*Skip to Question 21*)

One Quarter... One-half... Three-quarters or more...
...of the total days spent at the lake.

Of the days spent fishing, what was the average number of people participating in this activity from your lakeshore residence (average # including you)? _____.

22. Thinking about all the days you spent at your lake residence this year, how many days did you or your guests picnic or spend recreating at the lakeshore as their primary activity that day?

Rarely or never (*Skip to Question 21*)

One Quarter... One-half... Three-quarters or more...
...of the total days spent at the lake.

Of the days spent picnicking or recreating by the lakeshore, what was the average number of people participating in this activity from your lakeshore residence (average # including you)? _____.

Relicensing Issues

23. How would you rate the Smith Lake water levels this year (2007) in terms of how it affected your ability to enjoy lake-related recreation activities?

Totally Acceptable Moderately Acceptable Neutral
 Moderately Unacceptable Totally Unacceptable No Opinion

24. If you checked Moderately Unacceptable or Totally Unacceptable, would you pay an annual lake Water Fee into a Smith Lake Trust Fund to be used exclusively to purchase water rights to keep Smith Lake at its normal June level through Labor Day weekend?

Yes→ What is the maximum amount you would pay each year? \$ _____

No→, would not pay anything _____ (Check).

25. How would you rate the Smith Lake water levels two years ago (2005) in terms of how it affected your ability to enjoy lake-related recreation activities?

- Totally Acceptable Moderately Acceptable Neutral
 Moderately Unacceptable Totally Unacceptable Don't remember or was not at lake

26. Prior to last year, were you or others in your household aware that stakeholders had an opportunity to raise issues about Alabama Power's control of Smith Lake as part of the FERC hydro relicensing process?

- Yes, participated in the process Yes, knew about the process but chose not to participate
 Yes, was aware of the process but did not know there was an opportunity for stakeholder input.
 No, was unaware of the process Just bought lakeshore residence this year.

**Thank you for your response. Please return this survey in the postpaid envelope or mail it to SLISA,
PO Box 496,
Arley AL 35541**