Economic Effects of TVA Lake Management Policy in East Tennessee

A report prepared by the Center for Business and Economic Research at The University of Tennessee, with funding from the U.S. Department of Housing and Urban Development.

May 2003
Center for Business and Economic Research

College of Business Administration
The University of Tennessee
May 2003

Project Manager and Author: Matthew N. Murray
Contributing Authors: Karie Barbour, Brian Hill, Steven Stewart¹
Survey Coordinator: Yuki Takatsuka

Surveyors
Karie Barbour
Bedros Bozdogan
Kelley Clark
John Deskins
Dave Feather
Steven Fedorov
Candy Gamer
Ansley Haman
Kevin Krushenski
Michael Krochonis
Tobin MacDermott

Surveyors, continued
Mark Mundy
D.J. Preyer
William Alex Ransom
Tami Richards
Michael Rickman
Mary Ross
Ryan Russell
Joan Snoderly
Yuki Takatsuka
William Chandler Wilson
Gail Zasowski

Center for Business and Economic Research Staff

Director
William F. Fox

Associate Director
Matthew N. Murray

Research Assistant Professor
Donald Bruce

Research Associates
Vickie Cunningham
Julie Marshall
Joan Snoderly
Angela Thacker
Betty Vickers

Publications Specialist
Stacia Couch

Program Resource Specialist
Betty Drinnen

Graduate Research Assistants
Karie Barbour
John Deskins
Brian Hill
Tami Richards
Chandler Wilson
Lydia Zhang

Undergraduate Student Assistants
D.J. Preyer
William Ransom
Erin Read

¹Dr. Stewart is currently serving an appointment in the Department of Hydrology and Water Resources at the University of Arizona.
Economic Effects of TVA Lake Management Policy in East Tennessee

A report prepared by the Center for Business and Economic Research at The University of Tennessee, with funding from the U.S. Department of Housing and Urban Development.

May 2003

The authors would like to thank members of the Land Owners and Users of Douglas and the Cherokee Lake Users Association who provided input and information; area business establishments which allowed surveys to be administered at their facilities; TVA which provided data and other information; and Ken Cordell, John Bergstrom, Paul Jakus and Mike McKee for their time in discussing issues related to the project. All of the views expressed in this report are those of the authors.
Table of Contents

Executive Summary ................................................................................................................................................. 1

Section 1. Introduction ............................................................................................................................................. 3
  Economic Effects of TVA Lake Management Policy ....................................................................................... 3
  Regional Versus National Perspectives on Economic Effects ........................................................................ 6
    Economic Impact Analysis ................................................................................................................................. 6
    Economic Value Analysis ................................................................................................................................. 8
  A Roadmap of What Is to Come ......................................................................................................................... 9

Section 2. Placing the Lake Region in Context ................................................................................................. 11
  Population ............................................................................................................................................................ 12
  Income and Poverty ........................................................................................................................................... 13
  Employment and Earnings ................................................................................................................................. 16
  Impact of Tourism ............................................................................................................................................. 17

Section 3. Recreator and Household Surveys ................................................................................................. 19
  Survey of Recreators .......................................................................................................................................... 19
  Survey of Households ....................................................................................................................................... 26

Section 4. Economic Impacts Arising from Expenditures ................................................................................ 31
  Net Expenditure Impacts .................................................................................................................................. 32
    Net Economic Impacts: Lake Region .................................................................................................................. 32
    Net Economic Impacts: State of Tennessee ...................................................................................................... 37
  Gross Expenditure Impacts ................................................................................................................................. 38
    Gross Impacts for the Lake Region: Recreation Survey ................................................................................ 38
    Gross Economic Impacts from Recreation: Tennessee .................................................................................. 40
    Gross Impacts for the Lake Region: Property Owners .................................................................................. 40

Section 5. Economic Value Estimates for Recreators and Households ........................................................... 43
  Economic Valuation ............................................................................................................................................ 43
    Stated versus Revealed Preference .................................................................................................................. 44
    Choice Modeling Framework .......................................................................................................................... 45
    Contingent Valuation Framework .................................................................................................................. 47
  Estimation Results: Choice Model .................................................................................................................... 47
  Estimation Results: Contingent Valuation Model ........................................................................................... 50
  Estimation Results: Contingent Valuation Method for Households ............................................................... 51
  Weighted Measures of Welfare ......................................................................................................................... 52
  Hedonic Price Estimates of Value for Households ........................................................................................... 52
    Relevant Literature ......................................................................................................................................... 54
    Property Value Analysis .................................................................................................................................. 56
  Caveats ............................................................................................................................................................... 61

Section 6. Conclusion ............................................................................................................................................. 67
List of Tables and Figures

Executive Summary
Exhibit 1: Summary of Economic Impacts: Two Month Delay in Annual Drawdown ....................... 1
Exhibit 2: Net Gain in Economic Value to the Region as Estimated for Recreators ..................... 2

Section 1. Introduction
Table 1.1. Fall in Lake Levels, June to September 30th ................................................................. 5

Section 2. Placing the Lake Region in Context
Figure 2.1: Map of the East Tennessee Lake Region ........................................................................ 11
Table 2.1: Lake Statistics ................................................................................................................... 12
Table 2.2: Population Growth and Density ....................................................................................... 13
Table 2.3: Per Capita Personal Income (in Dollars) ......................................................................... 14
Table 2.4: Persons Below Poverty Level and Median Household Income, 1999 ............................. 15
Table 2.5: Employment and Earnings, 2000 .................................................................................... 16
Table 2.6: Travel Expenditures and Travel-Generated Local Tax Receipts and Employment .......... 18

Section 3. Recreator and Household Surveys
Table 3.1: Summary of Survey Activity by Lake .............................................................................. 20
Table 3.2: Survey Sites ...................................................................................................................... 21
Table 3.3: Participation in Lake Activities ......................................................................................... 21
Figure 3.1: Percent of Visitors by the Number of Days Spent at the Lake ......................................... 22
Figure 3.2: Percent of Visitors by the Number of Individuals in the Party ........................................ 22
Table 3.4: Characteristics of Recreation Survey Respondents ......................................................... 23
Figure 3.3: Average Number of Trips Taken to the Survey Lake Each Month .................................. 24
Figure 3.4: The Effects of Delaying Drawdown on Lake Visitation .................................................. 25
Table 3.5: Summary of Household Survey Responses ...................................................................... 27
Figure 3.5: Average Number of Times Per Month Lake is Accessed with a Watercraft by Property Owners .......................................................... 28
Table 3.6: The Effects of Delaying Drawdown on Lake Utilization by Property Owners ................ 28
Table 3.7: Characteristics of Household Survey Respondents ......................................................... 29

Section 4. Economic Impacts Arising from Expenditures
Table 4.1: Expenditures Per Person, Per Day ................................................................................... 32
Table 4.2: Number of Visitor-Days .................................................................................................. 33
Table 4.3: Increase in Trips due to Higher Lake Levels ................................................................. 34
Table 4.4: Increase in Expenditures due to Higher Lake Levels ...................................................... 35
Table 4.5: Summary of Increase in Net Expenditures and Visitor-Days ......................................... 35
Table 4.6: Estimated Net Economic Impacts from Recreators due to ............................................. 36
Table 4.7: Net Economic Impact Estimates for Fontana Lake (September 1) ................................. 37
List of Tables and Figures, continued

Table 4.8: Net Statewide Economic Impacts from Delayed Drawdown (October 1) ......................... 38
Table 4.9: Summary of Increase in Gross Expenditures and Visitor-Days ........................................ 38
Table 4.10: Estimated Gross Economic Impacts from Recreators due to Delayed Drawdown (October 1) .................................................................................. 39
Table 4.11: Gross Statewide Economic Impacts from Delayed Drawdown (October 1) .................... 40
Table 4.12: Expenditures of Property Owners .................................................................................... 41

Section 5. Economic Value Estimates for Recreators and Households
Figure 5.1: Conceptual Illustration of the Economic Value of Higher Lake Levels ......................... 44
Figure 5.2: Example Choice Question from the Recreation Survey .................................................. 46
Table 5.1: CM Welfare Results: Willingness to Pay, Full Pool to September 1 ................................. 48
Table 5.2: CM Welfare Results: Willingness to Pay, Full Pool to October 1 ..................................... 49
Table 5.3: CM Welfare Results: 10 Foot Increase in Pool to September 1 ........................................ 49
Table 5.4: CVM Results for Program to Keep Full Pool to October 1 .............................................. 50
Table 5.5: Household CVM Results for Program to Keep Full Pool to October 1 ............................ 51
Table 5.6: Net Gain in Economic Value for Current Recreators: Full Pool to September 1 .............. 52
Table 5.7: Net Gain in Economic Value for Current Recreators: Full Pool to October 1 ................... 55
Table 5.8: Recent Literature on the Impacts of Water Views, Water Levels and Proximity to Water on Property
Figure 5.3: Measuring Distance to Winter-Pool .................................................................................. 57
Table 5.9: Average Distance to Winter Pool by Appraisal Value ..................................................... 58
Table 5.10: Property Features Included in the Statistical Analysis .................................................. 59
Table 5.11: Effect of an Additional Foot to Winter Pool on Appraisal Value ................................... 59
Table 5.12: Estimated Effects of Drawdown on Individual Property Values for Various Distance to Pool Scenarios (Cherokee Lake) .......................................................... 62
Table 5.13: Estimated Effects of Drawdown on Individual Property Values for Various Distance to Pool Scenarios (Douglas Lake) .......................................................... 63