

4.25 Social and Economic Resources

4.25.1 Introduction

This section considers the potential social and economic effects in the ROS analysis area resulting from alternative reservoir operations policies.

Economic impacts in the ROS analysis area were assessed quantitatively. Changes to the existing reservoir operations policy would result in direct economic effects in five pathways: navigation, power, water supply, recreation, and property values. The direct effects of changes in reservoir operations may stimulate changes in the existing regional economy. Changes to the regional economy are the key issues in this section and are measured as changes in:

- Population;
- Employment; and,
- Economic activity measures—total personal income (PI) and gross regional product (GRP).

Resource Issues

- ▶ Population
- ▶ Employment
- ▶ Economic activity measures—total personal income and gross regional product

This section presents the existing conditions of the five pathways and the four regional economic variables in the ROS analysis area, as well as their trend projections through 2030. Existing conditions and the trends through 2030 were forecasted by TVA, using a system of models and forecasting processes of which the Regional Economic Model, Inc. (REMI) model is an integral part. The forecast process uses over 30 years of historical data, taking into account national economic and demographic trends as well as region specific conditions. The process incorporates plant announcements and other recent data to capture new and upcoming trends in the forecast. The navigation, power, water supply, and recreation pathways are discussed in their respective sections (Sections 4.21, 4.23, 4.5, and 4.24).

The geographic scope of this study consists of the 201-county area bounded by the TVA Power Service Area and the Tennessee River watershed. The economic effects on this area were represented by the use of an existing model that includes 191 of these counties. The economic effects on the 10 counties not included in the modeling work would be similar to those that were included. These 191 counties have been aggregated into nine sub-regions, and the aggregate of these nine sub-regions constitutes what is referred to as the ROS analysis area. For a breakdown of the individual counties that make up each sub-region, refer to Appendix D10.

The potential social impacts of changes to the existing reservoir operations policy would take place at local scales (e.g., at the county level or smaller). For example, changes in the existing reservoir operations policy may place pressure on the provision of local community public services and infrastructure to meet the demands of population changes. Such effects are typically associated with rapid population movements into or out of local communities. These

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and other social parameters usually considered in EISs are realized at the local level. Because this programmatic EIS addresses broad socioeconomic effects in the ROS analysis area as a whole, social effects in local communities are not addressed further in this EIS.

4.25.2 Regulatory Programs and TVA Management Activities

TVA's operating priorities are governed by policies established in the 1991 Lake Improvement Plan, and in general by the priorities listed in the TVA Act (1933). Sections 22 and 23 of the TVA Act include language that directs the agency to focus on economic development and the economic well being of the people living in the ROS analysis area. TVA manages and operates 49 projects on the Tennessee River and its tributaries. The existing reservoir operations policy provides multiple public benefits—navigation, flood control, power supply, water quality/supply, and recreation.

4.25.3 Population

Existing Conditions

During the 1980s, the population of the ROS analysis area increased at an average annual rate of 0.6 percent, adding on average more than 42,000 people annually, to a level of almost 8 million residents by 1990. The regional population increase was lower than the United States as a whole, which increased at an average annual rate of 0.9 percent over the same period (Table 4.25-01). Between 1990 and 2000, the population of the ROS analysis area increased at a rate greater than that for the United States, averaging over 120,000 residents annually, to a level of just over 9 million. This represents an average annual increase in the regional population of 1.4 percent, compared to 1.2 percent for the United States over the same period.

In both decades, the Nashville sub-region had the largest population growth rate across the TVA sub-regions. Other than Nashville, the Chattanooga, Knoxville, and North Carolina non-Power Services Area sub-regions also had strong growth in the 1990s.

Future Trends

Table 4.25-02 presents the trend in projected population increases across the ROS analysis area between 2004 and 2030. The projected increase in population of the ROS analysis area follows the trend of the last decade, whereby it will exceed that of the United States as a whole. Over the 27-year period, the population of the ROS analysis area is forecast to rise at an annual rate of 1.1 percent, reaching a level of approximately 12 million by 2030. The projected annual increase in the national population is roughly 1.0 percent over the same period. The greatest rate of population growth is expected to occur in the North Carolina, Nashville, and Knoxville sub-regions.

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Table 4.25-01 Population in the ROS Analysis Area (1980–2000) (thousands)

Sub-Region	1980	1990	2000	Average Annual Rate for 1980–1990 (%)	Average Annual Rate for 1990–2000 (%)
Alabama	777.9	844.2	964.5	0.8	1.3
Chattanooga	813.5	853.7	988.6	0.5	1.5
Knoxville	864.3	913.7	1,074.8	0.6	1.6
Mississippi	695.0	706.9	780.0	0.2	1.0
Nashville	1,772.1	1,956.6	2,385.5	1.0	2.0
North Carolina non-Power Service Area	430.8	469.1	558.6	0.9	1.8
Tri-cities	524.0	528.6	584.6	0.1	1.0
Virginia non-Power Service Area	257.6	239.9	244.2	-0.7	0.2
Western	1,400.4	1,447.2	1,593.9	0.3	1.0
Region total	7,535.5	7,960.0	9,174.7	0.6	1.4
U.S. total	226,546.0	248,791.0	281,421.9	0.9	1.2

Source: U.S. Department of Commerce, Bureau of the Census.

4.25.4 Employment

Existing Conditions

Between 1980 and 1990, employment levels in the ROS analysis area increased at an average annual rate of approximately 2.1 percent—exceeding the national growth rate, which was 2.0 percent over the same period (Table 4.25-03). Over the next ten years, the average annual growth rate of the region was roughly 2.1 percent, again exceeding the national average. By 2000, regional employment reached a level of 5 million. The regional unemployment rate at this time was 4.1 percent, slightly above the national average of 4.0 percent (Table 4.25-04). The Virginia non-Power Service Area sub-region experienced the highest unemployment rate (5.9 percent) in the region, and the North Carolina non-Power Service Area region the lowest (3.1 percent).

Table 4.25-02 Population Forecast for the ROS Analysis Area (2004 to 2030) (thousands)

Sub-Region	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Alabama	1,007.2	1,018.1	1,028.8	1,039.5	1,050.2	1,061.0	1,071.8	1.0	1,305.4	1.0
Chattanooga	1,030.2	1,040.5	1,050.7	1,060.8	1,070.9	1,081.2	1,091.5	1.0	1,321.3	1.0
Knoxville	1,137.3	1,152.9	1,168.4	1,183.8	1,199.2	1,214.8	1,230.4	1.3	1,532.8	1.1
Mississippi	803.7	810.0	816.0	821.9	828.1	834.3	840.5	0.8	997.9	0.9
Nashville	2,533.7	2,570.6	2,607.0	2,643.4	2,679.7	2,716.4	2,753.0	1.4	3,450.1	1.1
North Carolina non-Power Service Area	589.2	596.8	604.4	611.9	619.4	627.1	634.6	1.2	795.3	1.1
Tri-cities	599.6	603.6	607.5	611.5	615.4	619.4	623.5	0.7	734.0	0.8
Virginia non-Power Service Area	247.4	248.3	249.2	250.1	251.0	251.9	252.8	0.4	273.7	0.4
Western	1,647.0	1,660.8	1,674.5	1,688.0	1,701.5	1,715.3	1,729.1	0.8	2,065.8	0.9
Region total	9,595.4	9,701.5	9,806.4	9,911.0	10,015.4	10,121.4	10,227.2	1.1	12,476.3	1.0
U.S. total	293,347.0	296,254.0	299,053.0	301,940.0	304,834.0	307,726.0	310,644.0	1.0	375,948.0	1.0

Source: U.S. Department of Commerce, Bureau of the Census.

Table 4.25-03 Employment in the ROS Analysis Area (1980 to 2000) (thousands)

Sub-Region	1980	1990	2000	Average Annual Rate for 1980–1990 (%)	Average Annual Rate for 1990–2000 (%)
Alabama	351.5	463.4	548.4	2.9	1.7
Chattanooga	383.6	468.2	581.5	2.0	2.2
Knoxville	393.7	499.1	624.0	2.4	2.3
Mississippi	304.6	339.0	397.7	1.1	1.6
Nashville	886.5	1,135.5	1,510.9	2.5	2.9
North Carolina non-Power Service Area	201.2	254.2	321.1	2.4	2.4
Tri-cities	238.9	280.1	321.3	1.6	1.4
Virginia non-Power Service Area	94.7	101.5	108.0	0.7	0.6
Western	710.0	843.0	1,003.1	1.7	1.8
Region total	3,564.8	4,381.9	5,416.0	2.1	2.1
U.S. total	114,231.2	139,426.9	166,168.4	2.0	1.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis, establishment data.

Compared to the United States as a whole, the ROS analysis area has a higher share of its workers employed in the goods-producing sectors (Table 4.25-05). The manufacturing sector accounts for 17.0 percent of the region’s employment compared to 11.4 percent nationwide. The share of workers in the mining and construction sector is also slightly above the national average. Conversely, the region’s share of workers in the service sector is below the national average. The service sector and the government sector provide 26.7 and 13.3 percent, respectively, of the region’s employment compared to 31.8 and 13.6 percent, respectively, nationwide.

Future Trends

Employment in the ROS analysis area through 2010 is forecast to continue its trend of increasing at a rate above the national average (Table 4.25-06). The number of jobs in the region is forecast to increase by an average annual rate of 1.6 percent between 2004 and 2010, compared to 1.2 percent nationwide. Between 2010 and 2030, the average annual employment growth rate in the ROS analysis area is forecast to be 1.0 percent, increasing regional employment to a level of 8 million. The average annual employment growth rate of the nation is also forecast to be 1.0 percent over this period. The Nashville and Knoxville sub-regions are expected to experience the greatest rate of employment growth.

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Table 4.25-04 Labor Force and Unemployment in the ROS Analysis Area (2000) (average annual in thousands)

Sub-Region	Civilian Labor Force	Unemployed	Unemployment Rate (%)
Alabama	482.5	20.1	4.2
Chattanooga	482.3	17.3	3.6
Knoxville	531.9	19.5	3.7
Mississippi	358.2	20.7	5.8
Nashville	1,201.5	44.6	3.7
North Carolina non-Power Service Area	262.6	8.0	3.1
Tri-cities	275.4	12.1	4.4
Virginia non-Power Service Area	106.0	6.2	5.9
Western	771.3	34.8	4.5
Region total	4,471.6	183.4	4.1
U.S. total	140,863.0	5,655.0	4.0

Source: Tennessee Department of Labor and Workforce Development Employment Security Division, Research and Statistics, household data.

Table 4.25-05 Employment by Economic Sector in the ROS Analysis Area (2000) (thousands)

Sub-Region	Total Employment	Mining and Construction (%)	Manufacturing (%)	Services (%)	Wholesale and Retail (%)	Government (%)
Alabama	548.4	6.2	20.5	24.3	20.5	15.9
Chattanooga	581.5	6.1	24.4	22.9	20.0	11.3
Knoxville	624.0	7.2	14.3	28.1	22.7	12.9
Mississippi	397.7	5.9	25.7	20.6	18.1	15.2
Nashville	1,510.9	6.3	15.2	29.1	20.3	12.8
North Carolina non-Power Service Area	321.1	8.8	12.9	30.5	21.8	13.3
Tri-cities	321.3	7.0	18.6	25.2	21.3	12.0
Virginia non-Power Service Area	108.0	9.5	14.1	22.3	20.5	17.2
Western	1,003.1	5.6	13.0	28.0	21.7	13.0
Region total	5,416.0	6.5	17.0	26.7	20.8	13.3
U.S. total	166,168.4	6.2	11.4	31.8	20.8	13.6

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Table 4.25-06 Employment Forecast in the ROS Analysis Area (2004 to 2030) (thousands)

Sub-Region	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004–2010 (%)	2030	Average Annual Rate for 2010–2030 (%)
Alabama	563.0	572.6	580.6	588.6	598.0	606.8	616.3	1.5	718.6	0.8
Chattanooga	594.9	604.7	612.4	620.4	629.3	637.2	644.9	1.4	805.3	1.1
Knoxville	646.3	658.6	668.9	679.7	692.1	703.7	715.8	1.7	894.9	1.1
Mississippi	402.5	409.2	413.7	417.6	422.3	426.3	430.6	1.1	507.0	0.8
Nashville	1,559.9	1,589.5	1,616.2	1,644.8	1,677.2	1,708.2	1,740.0	1.8	2,183.9	1.1
North Carolina non-Power Service Area	329.9	335.8	340.9	346.6	353.2	359.4	365.8	1.7	441.2	0.9
Tri-cities	327.3	332.6	336.9	341.5	347.2	352.5	357.9	1.5	439.8	1.0
Virginia non-Power Service Area	109.3	110.5	111.3	112.2	113.5	114.6	115.8	1.0	132.3	0.7
Western	1,020.7	1,034.8	1,046.8	1,060.3	1,076.7	1,091.8	1,108.0	1.4	1,359.9	1.0
Region total	5,553.8	5,648.3	5,727.8	5,811.8	5,909.4	6,000.4	6,095.2	1.6	7,483.0	1.0
U.S. total	172,010.0	174,162.1	175,959.2	177,922.2	180,145.8	182,211.4	184,701.8	1.2	224,923.4	1.0

Source: TVA file data.

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4.25.5 Total Personal Income

Existing Conditions

Over the 10-year period leading up to 2000, PI (wages and salary income, including transfer payments, dividend interest, and rent less personal social security payments) in the ROS analysis area increased by an average annual rate of 3.0 percent to a level of \$235 billion (Table 4.25-07). This compares to the national growth rate of 2.7 percent. Foremost in driving this increase were PI increases in the Nashville and Knoxville sub-regions, and North Carolina non-Power Service Area sub-region.

**Table 4.25-07 Total Personal Income in the ROS Analysis Area
(2002 dollars in billions)**

Sub-Region	Total Personal Income 1980	Total Personal Income 1990	Total Personal Income 2000	Average Annual Rate for 1980–1990 (%)	Average Annual Rate for 1990–2000 (%)
Alabama	\$13.5	\$19.4	\$23.9	3.7	2.1
Chattanooga	\$14.1	\$18.7	\$24.7	2.9	2.8
Knoxville	\$14.2	\$19.2	\$26.5	3.1	3.3
Mississippi	\$9.8	\$12.1	\$15.8	2.1	2.7
Nashville	\$32.0	\$44.8	\$65.5	3.4	3.9
North Carolina non-Power Service Area	\$7.3	\$10.5	\$14.4	3.7	3.2
Tri-cities	\$8.5	\$10.9	\$13.5	2.5	2.2
Virginia non-Power Service Area	\$4.6	\$4.4	\$4.8	-0.4	0.9
Western	\$26.1	\$34.2	\$44.9	2.7	2.8
Region total	\$130.1	\$175.1	\$234.6	3.0	3.0
U.S. total	NA	\$6,747.5	\$8,784.3	NA	2.7

Notes:

NA = Not applicable.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Future Trends

Table 4.25-08 provides forecasts of total PI changes in the region. The forecast increase in PI for the ROS analysis area follows the historical trend of exceeding the national increase.

Table 4.25-08 Total Income Forecast in the ROS Analysis Area (2004 to 2030) (2002 dollars in billions)

Sub-Region	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004–2010 (%)	2030	Average Annual Rate for 2010–2030 (%)
Alabama	\$25.7	\$26.3	\$27.1	\$27.8	\$28.6	\$29.5	\$30.3	2.8	\$49.0	2.4
Chattanooga	\$26.9	\$27.6	\$28.5	\$29.3	\$30.3	\$31.3	\$32.2	3.0	\$57.3	2.9
Knoxville	\$29.8	\$30.7	\$31.7	\$32.7	\$33.8	\$35.0	\$36.1	3.3	\$63.7	2.9
Mississippi	\$16.9	\$17.3	\$17.8	\$18.2	\$18.7	\$19.2	\$19.7	2.6	\$33.1	2.6
Nashville	\$71.4	\$73.5	\$75.9	\$78.4	\$81.3	\$84.3	\$87.2	3.4	\$157.6	3.0
North Carolina non-Power Service Area	\$15.7	\$16.1	\$16.6	\$17.1	\$17.7	\$18.3	\$18.9	3.1	\$31.8	2.6
Tri-cities	\$14.6	\$15.0	\$15.5	\$15.9	\$16.4	\$17.0	\$17.5	3.1	\$30.4	2.8
Virginia non-Power Service Area	\$5.2	\$5.3	\$5.4	\$5.6	\$5.7	\$5.9	\$6.0	2.4	\$10.0	2.6
Western	\$47.7	\$48.6	\$49.8	\$51.0	\$52.5	\$54.0	\$55.4	2.5	\$96.9	2.8
Region total	\$253.8	\$260.5	\$268.3	\$276.1	\$285.1	\$294.4	\$303.3	3.0	\$529.8	2.8
U.S. total	\$9,328.6	\$9,508.7	\$9,738.1	\$9,986.3	\$10,277.8	\$10,584.7	\$10,926.5	2.7	\$18,602.4	2.7

Source: TVA file data.

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Between 2004 and 2010, the forecast average annual rate of growth for the region is 3.0 percent compared to a rate of 2.7 percent for the nation. Between 2010 and 2030, regional PI (2.8 percent) is forecast to continue to increase at a greater annual rate than that of the nation (2.7 percent). The Nashville sub-region will experience the fastest rate of growth in PI, followed by the Knoxville and Chattanooga sub-regions.

4.25.6 Gross Regional Product

Existing Conditions

Gross regional product (GRP) is the sum dollar value of goods and services created in the region. Because the GRP measures the sum of wages income and corporate profit, it is a broad measure of full economic effects. Between 1990 and 2000, GRP in the ROS analysis area rose at an average annual rate of 4.1 percent, to a level of \$274 billion (Table 4.25-09). This growth rate exceeded that of the national gross domestic product (GDP) (a corresponding national measure of final goods and services production).

**Table 4.25-09 Gross Regional Product in the ROS Analysis Area
(2002 dollars in billions)**

Gross Product	1990	2000	Average Annual Rate for 1990–2000 (%)
Gross regional product	\$183.6	\$273.8	4.1
U.S. gross domestic product	\$7,427.9	\$10,178.0	3.2

Future Trends

This trend is forecast to continue through 2030 (Table 4.25-10). Between 2004 and 2010, the forecast rate of growth for regional GRP is 3.6 percent, compared to a 3.2-percent growth rate for the national GDP. Between 2010 and 2030, the regional growth rate is forecast to fall to 3.2 percent, to a level of \$695 billion—still representing a growth in regional value of production at a rate above the national average.

4.25.7 Environmental Justice

TVA addresses environmental justice in its environmental reviews. For the ROS, the primary issue was to determine whether an alternative reservoir operations policy could result in adverse environmental or human health impacts that would disproportionately affect minority or low-income populations.

Table 4.25-10 Gross Regional Product Forecast (2004 to 2030)
 (2002 dollars in billions)

Region	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Gross regional product	\$301.3	\$312.0	\$322.4	\$333.3	\$345.4	\$358.6	\$372.7	3.6	\$694.7	3.2
U.S. gross domestic product	\$11,121.9	\$11,422.9	\$11,749.6	\$12,104.4	\$12,512.1	\$12,951.4	\$13,444.8	3.2	\$24,724.5	3.1

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As indicated in Table 4.25-11, the ROS analysis area has a smaller percentage of the population considered minority (nonwhite and Hispanic—19.5 percent) than the United States (30.9 percent). Only two of the nine sub-regions within the ROS analysis area have a higher minority population than the United States: the Mississippi (34.6 percent) and Western (39.2 percent) sub-regions. The poverty rate for the ROS analysis area (14.0 percent) is slightly higher than the national rate (12.4 percent). All the sub-regions except the Nashville sub-region and the North Carolina non-Power Service Area sub-region exceed the national poverty rate, although Mississippi (19.8 percent) is the only one that exceeds it by a substantial margin.

4.25.8 Direct Economic Drivers

This section provides a description of the existing conditions of the direct effects in the economic sectors corresponding to the five economic drivers as well as trends through 2030.

Power Supply

With a generating capacity of over 31,000 MW—TVA provides wholesale power to 158 distributors and directly serves 61 large industrial and federal customers. In partnership with the distributors, the TVA power system serves more than 8 million people in an 80,000-square-mile area that covers parts of seven Southeastern states. TVA currently dispatches its diverse mix of power generating resources—fossil-fired (coal, oil and gas), nuclear, hydro, and pumped storage to minimize the cost of power. Changes in this reservoir operations policy that changes the amount or timing of water releases may affect TVA's ability to provide hydropower during periods of peak demand when it is most valuable. The implementation of an alternative reservoir operations policy may also affect the use or operation of TVA's non-hydropower generating resources, and energy customers in the TVA Power Service Area may be affected (see Section 4.23, Power). To the extent that the alternatives change the amount and timing of either hydropower or non-hydropower generation, the mix of generating resources used to meet the power demand would change and the cost of power would change. Because power costs affect the cost of living and working in the Tennessee Valley, this change in power cost would affect the regional economy. Based on the 2002 data, TVA's energy generation revenues totaled \$6,835 million. Based on TVA's January 2003 forecast, and the existing reservoir operations policy, total energy generation revenues are expected to increase by an average annual rate of approximately 2.9 percent between 2004 and 2010, and then by 3.3 percent between 2010 and 2030—to a level of \$16,111 million (Table 4.25-12).

Navigation

Many industries in the ROS analysis area use waterborne transportation. As this analysis is interested in the economic impacts in the ROS analysis area, only movements that originate or terminate on the Tennessee or Cumberland River systems or their tributaries were considered. In 2000, 58.7 million tons of commerce moved on the system, of which 48.6 million tons either originated or terminated on the Tennessee or Cumberland River systems (Table 4.25-13). Changes in channel depths can result in potential impacts on regional industries and their options for alternative modes of transport, as described in Section 4.21, Navigation.

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Table 4.25-11 Environmental Justice Populations in the ROS Analysis Area (thousands)

Sub-Region	Total Population 2000	Nonwhite Population 2000	White Hispanic Population 2000	Percent Minority Population 2000 (%)	Percent of Population below Poverty 2000 (%)
Alabama	964.5	154.7	11.9	17.3	13.0
Chattanooga	988.6	122.3	15.3	13.9	12.8
Knoxville	1,074.8	74.4	7.7	7.6	14.0
Mississippi	780.0	265.3	4.6	34.6	19.8
Nashville	2,385.5	386.2	31.5	17.5	12.1
North Carolina non-Power Service Area	558.6	46.1	7.9	9.7	12.4
Tri-cities	584.6	22.2	3.5	4.4	14.8
Virginia non-Power Service Area	244.2	9.1	1.1	4.1	15.9
Western	1,593.9	609.8	14.6	39.2	15.5
Region total	9,174.7	1,690.1	98.1	19.5	14.0
U.S. total	281,421.9	69,961.3	16,907.9	30.9	12.4

Source: U.S. Department of Commerce, Bureau of the Census.

Table 4.25-12 Total Power Sales Revenue in the TVA Power Service Area (2004 to 2030)
 (2002 dollars in millions)

Revenue	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Total power sales revenue	\$7,106.5	\$7,294.8	\$7,427.8	\$7,596.0	\$7,925.1	\$8,111.9	\$8,416.4	2.9	\$16,110.8	3.3

Table 4.25-13 Tennessee River Tonnage That Originated and Terminated on the Tennessee or Cumberland River Systems (1980 to 2000)

Commodity	1980 (millions of tons)	1990 (millions of tons)	2000 (millions of tons)	Average Annual Rate for 1980–1990 (%)	Average Annual Rate for 1990–2000 (%)
Aggregates	3.2	10.6	12.2	12.7	1.4
All other	2.1	3.1	3.9	4.0	2.3
Chemicals	2.5	2.1	2.7	-1.7	2.5
Coal and coke	15.5	21.6	18.6	3.4	-1.5
Grains	2.9	4.0	3.3	3.2	1.9
Iron and steel	0.8	1.2	3.3	4.2	10.5
Ores and minerals	1.1	1.3	2.7	1.7	7.5
Petroleum fuels	1.4	1.6	1.8	1.4	1.2
Total	29.3	45.6	48.6	4.6	0.6

Direct economic benefits resulting from the system include income, employment and ongoing investments in commercial enterprises producing and transporting commercial goods on the waterway. For purposes of this analysis, economic effects were characterized by costs per ton of cargo, with the economic costs to shippers expressed in dollars per ton shipped. Shipper savings (the difference between barge and the next least-costly mode of transport) vary by commodity, but the average shipper savings for 2000 is valued at \$9.24 per ton. Based on the 2000 traffic, total shipper savings to industry was about \$355 million. The greatest savings across the ROS analysis area involve the transportation of coal and coke and aggregates. Based on the existing reservoir operations policy, regional traffic on the Tennessee and Cumberland River systems is expected to increase at an average annual rate of 2.0 and approximately 1.7 percent (Table 4.25-14) over the forecast period. Regional shipper savings are also expected to increase over the forecast period, rising by an average annual rate of 2.0 percent between 2004 and 2020, and then by 1.7 percent between 2020 and 2030—reaching a level of \$597.1 million by 2030 (Table 4.25-15).

Water Supply

The TVA reservoir system provides a key function for public water supply and private/commercial water intake. Section 4.5, Water Supply, provides a detailed description of these functions. There are potentially two direct effects of changes to the existing reservoir operations policy in the water supply pathway. The first is the impact on intake costs. If changes in the existing reservoir operations policy reduce the minimum reservoir elevations below the level necessary for water intake, direct costs would be incurred in providing the required water supply. Estimated intake costs would be a one-time mitigation outlay for affected industries, as discussed in Section 5.25.

Table 4.25-14 Total Traffic on the Tennessee and Cumberland River Systems Less Through-Movement (2004 to 2030) (millions of tons)

Traffic	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Total traffic	51.6	52.6	53.7	54.8	55.9	57.0	58.1	2.0	81.4	1.7

Table 4.25-15 Total Shipper Savings by Commodity for the TVA Region under Existing Conditions and Future Trends (2002 dollars in millions)

Commodity	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Aggregates	\$108.5	\$110.7	\$112.9	\$115.1	\$117.4	\$119.8	\$122.2	2.0	\$171.2	1.7
All other	\$18.7	\$19.1	\$19.5	\$19.8	\$20.2	\$20.6	\$21.1	2.0	\$29.5	1.7
Chemicals	\$56.9	\$58.0	\$59.2	\$60.4	\$61.6	\$62.8	\$64.1	2.0	\$89.8	1.7
Coal and coke	\$106.1	\$108.2	\$110.4	\$112.6	\$114.8	\$117.1	\$119.5	2.0	\$167.4	1.7
Grains	\$29.4	\$30.0	\$30.6	\$31.2	\$31.8	\$32.5	\$33.1	2.0	\$46.4	1.7
Iron and steel	\$26.2	\$26.7	\$27.3	\$27.8	\$28.4	\$28.9	\$29.5	2.0	\$41.3	1.7
Ores and minerals	\$19.7	\$20.1	\$20.5	\$20.9	\$21.3	\$21.8	\$22.2	2.0	\$31.1	1.7
Petroleum fuels	\$13.0	\$13.3	\$13.5	\$13.8	\$14.1	\$14.4	\$14.6	2.0	\$20.5	1.7
Total	\$378.5	\$386.1	\$393.8	\$401.7	\$409.7	\$417.9	\$426.3	2.0	\$597.1	1.7

The second potential impact would relate to industries directly dependent on river flows in order to discharge wastewater. When river flow is low, some industries must store some or all of their wastewater and hold it until river flow is sufficiently high to be able to release discharges. The implication of this impact is that the affected industries would need to shut down their facilities until discharges were possible, incurring lost days of production.

Recreation

Recreational opportunities in the ROS analysis area are associated with the existing reservoir operations policy, as discussed in Section 4.24, Recreation. Changes in the reservoir operations policy may potentially affect water-based recreational opportunities and therefore expenditures in the ROS analysis area. For instance, delaying the late-summer unrestricted drawdown potentially would extend the availability of water-based recreational opportunities in the region, potentially generating additional expenditures. Recreational expenditures are categorized in five broad areas: lodging, food and beverages, transportation, activities, and miscellaneous.

The total current expenditures by recreation users of the TVA reservoir system who come from outside the ROS analysis area (i.e., external expenditures) were estimated for the August through October period. During this period, the existing reservoir operations policy alternatives would result in their greatest effects on spending for recreational activities. Recreation spending by local residents was not considered in this analysis, as any change would merely represent a re-distribution of expenditures within the ROS analysis area, resulting in zero net benefit to the region. External recreation expenditures resulting from use of the TVA reservoir system during August through October totaled about \$61 million in 2003 under the existing reservoir operations policy. External recreation expenditures are forecast to increase by an average annual rate of approximately 1.0 percent per year, reaching a level of about \$80 million by 2030 (Table 4.25-16).

The majority of external recreation expenditures are associated with commercial providers use (Figure 4.25-01), such as marinas, rental companies, and outfitters that provide direct access to the water. In 2003, 73 percent of recreation expenditures from all types of use (public reservoir use, public tailwater use, commercial reservoir use, commercial tailwater use, and private recreation use) were from commercial reservoir use. Private recreation use accounts for 17 percent of total expenditures, followed by commercial tailwater use at 5 percent, public reservoir use at 4 percent, and public tailwater use at 1 percent. Similar breakdowns across types of use, plus or minus 1 percent, were evident for total expenditures projected for 2030. The dominance of commercial use expenditures reflects a similar dominance in commercial recreation use (user days) as discussed in Section 4.24, Recreation.

Table 4.25-16 Annual Expenditures within TVA Economic Sub-Regions (2004 to 2030)
(2002 dollars in millions)

Sub-Region	2004	2005	2006	2007	2008	2009	2010	Average Annual Rate for 2004-2010 (%)	2030	Average Annual Rate for 2010-2030 (%)
Alabama	\$14.9	\$15.1	\$15.3	\$15.5	\$15.7	\$15.9	\$16.1	1.3	\$20.4	1.2
Chattanooga	\$11.9	\$12.0	\$12.1	\$12.2	\$12.3	\$12.4	\$12.5	0.8	\$15.1	1.0
Knoxville	\$27.0	\$27.3	\$27.6	\$27.8	\$28.1	\$28.4	\$28.7	1.0	\$35.0	1.0
Nashville	\$3.4	\$3.4	\$3.4	\$3.5	\$3.5	\$3.5	\$3.6	1.0	\$4.2	0.8
North Carolina non-Power Service Area	\$1.0	\$1.0	\$1.0	\$1.0	\$1.8	\$1.8	\$1.8	10.3	\$1.9	0.3
Tri-cities	\$1.8	\$1.8	\$1.8	\$1.8	\$1.0	\$1.0	\$1.0	-9.3	\$1.3	1.3
Western	\$1.4	\$1.4	\$1.4	\$1.4	\$1.4	\$1.4	\$1.4	0.0	\$1.7	1.0
Region total	\$61.2	\$61.9	\$62.5	\$63.1	\$63.8	\$64.5	\$65.1	1.0	\$79.6	1.0

Note: Expenditures reflect those made by recreation users coming from outside the TVA region during August through October.

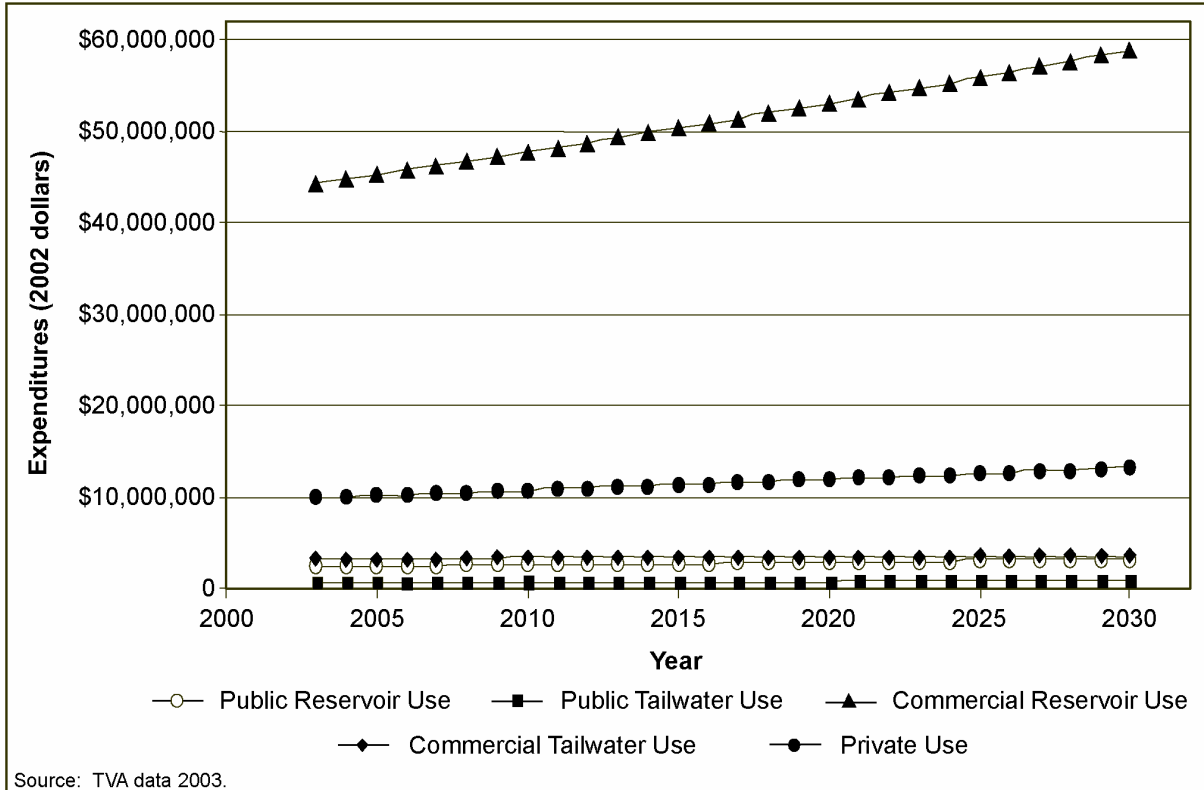


Figure 4.25-01 Projected External Recreation Expenditures during August through October across the TVA System under the Existing Reservoir Operations Policy

Property Values

Values of waterfront properties on TVA reservoirs are potentially affected by the seasonal variation in reservoir pool levels. Changes in the existing reservoir operations policy that expose less (more) area between the summer high pool and winter low pool elevations would potentially increase (decrease) the value of property adjacent to the water, as the value of these properties reflect the recreational and aesthetic benefits of living by the reservoir. The direct effects associated with increases in property values are additional expenditures on durable goods as residents respond to their increased wealth.

Data for shoreline property values adjacent to the reservoirs are not available; however, 2000 Census Bureau data do provide information on the median property values for the specified owner occupied housing units from census block groups adjacent to reservoirs considered in the ROS (Table 4.25-17). The table shows a range of median values from \$144,000 for properties in block groups adjacent to Fort Loudoun Reservoir to \$65,000 for properties in block groups on Watauga Reservoir. Across all the reservoirs considered in the study, the average property value is approximately \$92,000. Section 4.15, Land Use, provides a more detailed description of existing and future conditions related to land use.

4.25 Social and Economic Resources

Table 4.25-17 Average Median Home Values for Census Block Groups Adjacent to ROS Reservoirs (thousands)

Reservoir	Average Home Value
Fort Loudoun	\$143.9
Chatuge	\$129.0
Nickajack	\$114.8
Nottely	\$107.5
Chickamauga	\$104.5
Blue Ridge	\$103.3
Tellico	\$102.6
Wheeler	\$92.6
Fontana	\$89.1
Cherokee	\$88.5
Douglas	\$88.2
Tims Ford	\$85.8
Watts Bar	\$85.7
Hiwassee	\$83.1
Guntersville	\$83.0
South Holston	\$80.7
Norris	\$76.7
Pickwick	\$75.4
Kentucky	\$71.7
Great Falls	\$67.4
Watauga	\$65.0
Average value	\$92.3

Source: U.S. Department of Commerce, Bureau of the Census, 2000 Census data.