



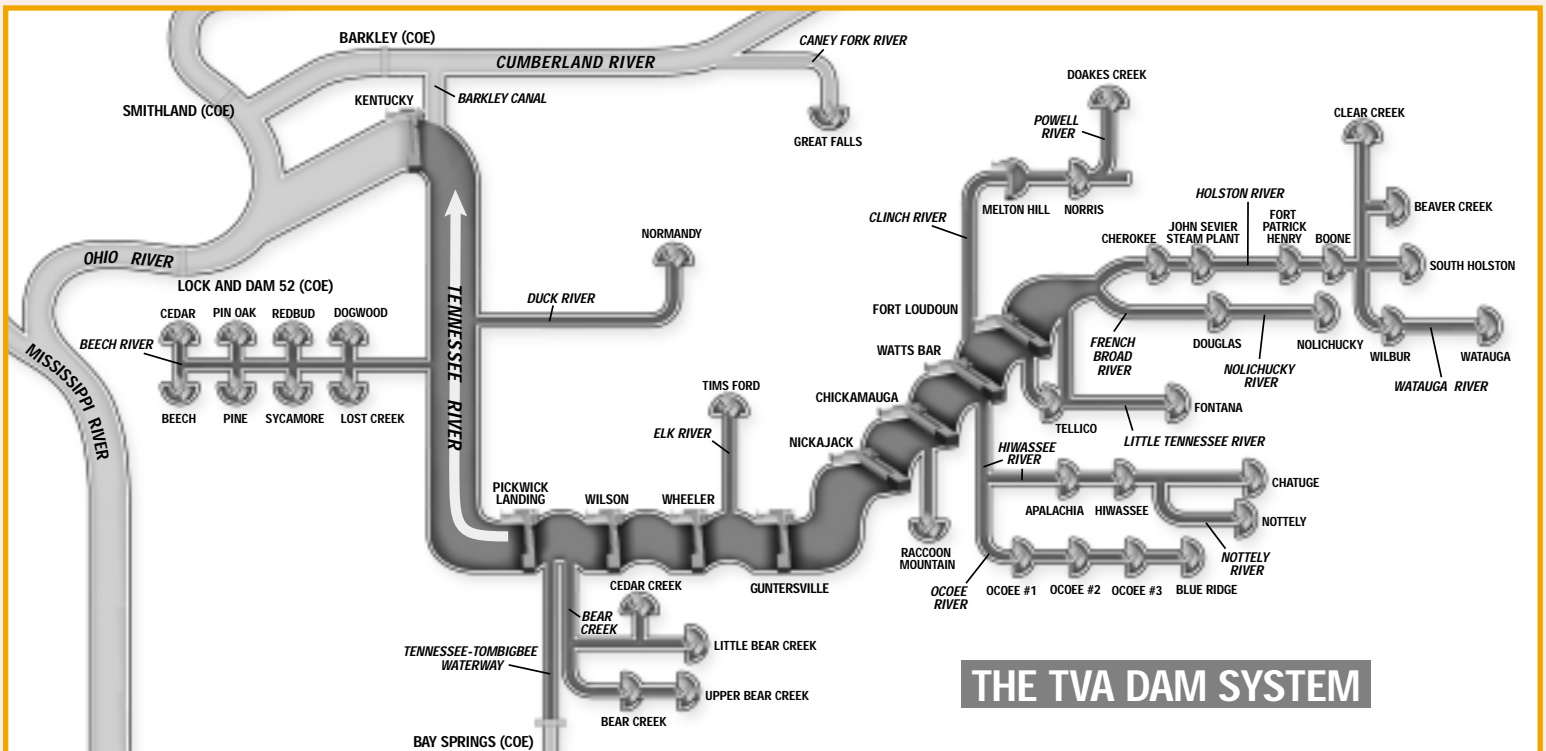
TVA River Neighbors Special Report

1999 River System Performance

The Tennessee River.

For many, it means fishing, swimming, boating, and scenic beauty. But it's also the backbone of a billion-dollar economy—indispensable to the daily lives of millions in the Tennessee Valley. We buy products shipped on the river, and we power our homes with the electricity it produces. We rely on the dams and reservoirs built along

its length for flood damage reduction, and we enjoy the recreational opportunities it provides. We count on it being clean enough to provide us with safe drinking water and a healthy environment for aquatic life. This report provides information on the value of these benefits to our region in 1999.



All of TVA's dams and reservoirs are part of a single system managed to fulfill separate but intertwined missions—navigation, flood damage reduction, power supply, water quality, recreation, water supply, and land use.

Navigation

Barges carried an estimated 50 million tons of goods up and down the Tennessee River during 1999, providing a major conduit for industrial growth throughout the Tennessee Valley. Shippers benefited directly from the availability of low-cost river transportation, saving anywhere from \$2 a ton on salt shipped from the Gulf Coast to \$19 a ton on coil steel originating in Pittsburgh. But there were also benefits to the everyday lives of

citizens throughout the Valley. Water transportation holds down the prices of all kinds of products made from commodities that are shipped in large quantities—for example, coal; grains; petroleum products; chemicals; iron and steel products; forest products; and stone, sand and gravel. It benefits our environment by reducing fuel consumption, air pollution, and the number of tires going to landfills. And it makes our highways safer by reducing the number of trucks on the road. The Tennessee River navigation system also provides passage between reservoirs for over 20,000 recreational boats each year.



The cargo capacity of a single barge is 15 times greater than one rail car, and 60 times greater than one semi-truck.

Hydroelectric Power

The summer of 1999 was the most challenging ever for TVA's power system. By summer's end, TVA's generating facilities met peak demands higher than the 1998 record of 27,253 megawatts on 16 days, including an all-time peak demand of 28,295 megawatts on July 30. TVA dams played a crucial role in this achievement—thanks to heavy rains in June and July which allowed generation of power at peak levels during the July and August heat wave.

Overall, however, hydroelectric power generation was down in calendar year 1999 due to the extended dry weather. TVA dams produced a total of 11.5 million megawatt hours from January through December, compared to a normal annual production of 14.5 million megawatt hours. Most of this power was produced in late summer and winter. TVA curtailed its hydroelectric generation during the spring months to allow the reservoirs to fill

toward their normal summer levels despite the dry weather.

Although hydroelectric power is a relatively small part of TVA's total generation capability—about 13 percent—its value can't be overstated. Hydropower is the least expensive form of electricity available in the TVA system, and it's extremely valuable in meeting rapid increases in electricity demand because hydropower projects can come on line nearly instantaneously. Plus, as a renewable and emissions-free source of energy, hydropower helps protect our environment.

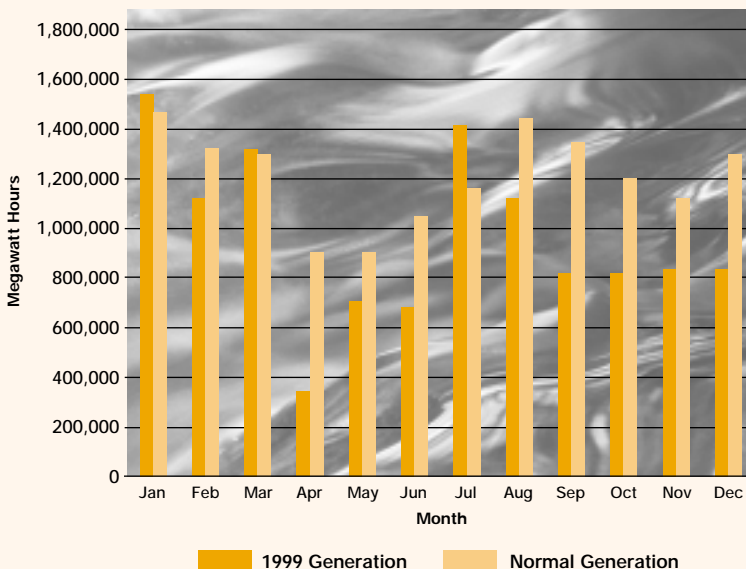
Recreation

Based on forecasts for a hot, dry summer, TVA started operating most of the tributary reservoirs for minimum flows in early February of 1999 with the goal of filling them as high as possible before the start of the summer recreation season. As much runoff as possible was stored, with releases restricted to providing a minimum flow for navigation, water supply, and water quality. This allowed all reservoirs to reach minimum summer target levels by June 1, except for Cherokee and Nottely which didn't get enough rain to fill. (Rainfall in the watersheds surrounding these reservoirs was significantly below normal, and much of the rain that did fall was quickly absorbed by the dry ground and thirsty vegetation.) However, restricting releases so early in the year helped to bring levels on these reservoirs up much higher than they would have been.

Reservoir levels receive the lion's share of attention, but the TVA system also provides other recreation benefits. During 1999, more than 300,000 people took advantage of water releases for paddling and rafting on the Ocoee River alone, pumping an estimated \$40 million annually into the local economy. TVA



1999 TVA Hydrogeneration



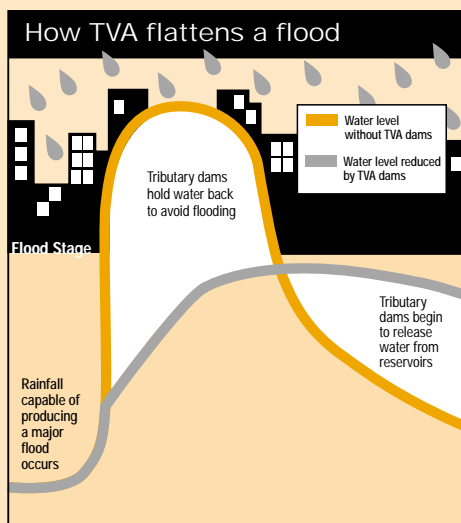
Flood Damage Reduction

The past 12 months don't really demonstrate the effectiveness of TVA's reservoir system with regard to flood damage reduction. Not because the system failed to work, but rather because conditions were so dry: there simply weren't any major flood-producing storms. Even in a dry year, however, there are usually some localized storms that require careful water management. For example, in April, we were able to help reduce flood damages on 2,500 acres of agricultural land around Savannah, Tennessee.

It's not a good idea to evaluate flood damage reduction benefits based on a single year, in any case—whether that year is extremely wet or very dry. You get a more accurate feel for the situation when you look at the “big picture.”

Over the years, TVA dams have helped to prevent over \$5 billion in flood damages in the Tennessee Valley and on the lower Ohio and Mississippi Rivers. That's an average annual flood reduction benefit of around \$173 million (based on 1999 dollars).

Chattanooga realizes most of this benefit. During the most recent flood-producing storm in April 1998, for example, operation of the TVA reservoir system for flood reduction helped save the city about \$450 million in damages.

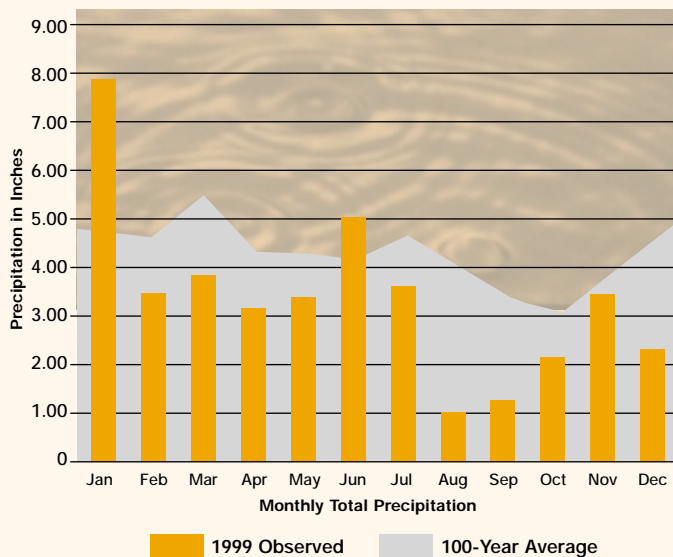


also provided special flows for whitewater sports on Bear Creek and the Hiwassee, Watauga, and Elk Rivers. Additional recreation benefits resulted from TVA's efforts to stabilize reservoir levels for fish spawning, to add oxygen to reservoir releases, and to enhance aquatic habitat by providing enough water to keep the riverbed below TVA dams from drying out.

In addition, TVA manages 11,000 miles of public shoreline and operates some 100 public recreation areas throughout the Tennessee Valley. Improvements to these areas are ongoing. In 1999, TVA constructed new courtesy piers at 12 boat ramps; improved restroom and parking facilities, built walking trails, installed new playground equipment, and added water and electric hook-ups at several campgrounds; restored 32 informal recreation sites; and conducted 78 special events to promote clean boating.



Precipitation for the Tennessee River Basin



Hot, dry weather in 1999 raised water temperatures and reduced flow through the TVA reservoir system, affecting a variety of physical, chemical, and biological processes.

Reservoir Health

TVA kept an especially close eye on water quality in 1999 because of the continued hot, dry weather. To help avoid stagnant conditions which can result from increased water temperatures and reduced flows, just enough water was released through the dams to keep some water moving through the system. Use of aeration equipment also was increased to keep dissolved oxygen problems from getting as bad as they could have been. This benefited aquatic life, as well as municipal and industrial water users.

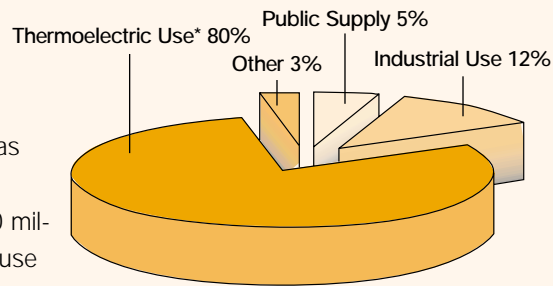
A good example of reservoir operations for water quality occurred on Melton Hill Reservoir in May 1999. We increased flows from Norris Dam (located upstream of Melton Hill) immediately after several problems were observed: warmer surface water, too much algae, and low levels of dissolved oxygen near bottom. When the situation didn't improve, we released an even greater amount of water from Norris for a short period to help cool, mix, and oxygenate the water in Melton Hill. This increased dissolved oxygen levels from below one part per million (ppm) to close to six ppm in just a few days. Dissolved oxygen remained at good levels for aquatic life throughout the summer.

To protect reservoir health, TVA also conducts a wide variety of monitoring activities each year. In 1999, TVA assessed ecological conditions at over 250 sites on Valley reservoirs, rivers, and streams; monitored bass populations in 18 reservoirs; checked fecal coliform bacteria levels at more than 135 recreation areas; and worked with State agencies to check fish for toxic contamination. (See the May 2000 issue of *TVA River Neighbors* for a summary of TVA's monitoring results.)

Water Supply

In 1995, when the most recent water use inventory was conducted, over four million people depended on the Tennessee River system for drinking water. Almost 450 million gallons were being withdrawn each day for public use and another eight billion gallons for industrial production and thermoelectric power generation. These numbers are certain to increase when the 2000 inventory is completed. TVA has issued permits for nine additional public water supply intakes in just the last two years—an indication of the continuing pressure on the region's reservoirs and other surface water supplies resulting from rapid economic and population growth.

During the hot, dry summer of 1999, TVA worked closely with municipal water suppliers across the Valley to deal with issues relating to both water quality and quantity. For example,



**Primarily cooling water used in the process of generating fossil and nuclear power and then returned to the river for re-use.*

Water Withdrawals from the Tennessee River System

Normandy Reservoir was operated to benefit municipal water supply, and Tims Ford was operated to alleviate problems with inadequate water depth at the intake pipe of a downstream public utility. Providing a minimum flow of water through TVA dams also helped to maintain good conditions for aquatic life, especially at Knoxville and Chattanooga where wastewater volumes are large in comparison to available streamflow.

Special Operations

In addition to the traditional purposes for which TVA operates the river system, Valley citizens also receive a variety of benefits from "special reservoir operations." This term refers to those occasions when reservoir levels are held steady or release schedules are modified to accommodate a specific request.

In 1999, TVA responded to over 500 requests—many to support special events and activities across the Valley. Special operations, for example, were conducted for Knoxville's "Boomsday" waterfront fireworks celebration and for various boat parades, regattas, rowing competi-



tions, and fishing tournaments throughout the Valley. Other special operations were put in place to help with clean-ups, to aid in stocking trout, to free a stranded barge, to install a water intake pipe for a local utility, to dilute runoff from fire-fighting activities, to conduct a sur-

vey of an endangered plant that grows along the water's edge, to recover drowning victims, to help control mosquito populations, to conduct fisheries research, and to facilitate everything from boat ramp construction to pier installation and shoreline stabilization.

Land Use and Watershed Protection

TVA's 11 Watershed Teams work to protect and improve resource conditions throughout the Tennessee Valley by building coalitions with community groups, business, industry, and government agencies. Their goal is to continually increase the number of subwatersheds that meet state water quality standards and provide the benefits important to local citizens. In 1999, these teams helped to improve or maintain conditions in 187 of the Valley's 603 subwatersheds. This was accomplished by working in partnership with 266 established and 160 new coalitions on a wide variety of activities, including:



DAVID LUTTRELL

- removing litter and debris from 1,823 sites
- conducting 194 pollution reduction projects
- protecting and restoring 324 acres of riparian habitat
- stabilizing 5.7 miles of reservoir shoreline at 31 sites
- processing 300 land use requests
- issuing 3,000 permits for shoreline alterations
- conducting 449 reviews to assess and reduce the environmental impacts of projects and activities

A major accomplishment in 1999 was the implementation of a new shoreline management policy aimed at balancing shoreline development, recreation use, and resource conservation. Watershed Teams also work with communities on aquatic plant and mosquito management programs; protect endangered species, wetlands, and forest resources; and preserve archaeological and historical artifacts on TVA-managed public land.