



TACIR

The Tennessee Advisory Commission
on Intergovernmental Relations



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MEMORANDUM

TO: TACIR Commission Members

FROM: Harry A. Green
Executive Director

DATE: June 30, 2011

SUBJECT: Water Supply in Tennessee—Continued Potential for Shortages

The sufficiency of Tennessee's water supply has been a particular concern of the Commission and its staff since the 2007-2008 drought. The concern continues despite successive Mays characterized by extreme flooding. These floods remind us that Tennessee is generally a water rich state, but we know, too, that water isn't always there where you need it and when you need it. Rainfall is seasonal, and the seasons of late have become more variable than most of us have experienced in our lifetimes. This means that floods and shortages may occur in the same part of the state in a single year.

As the state's population grows, the threat of shortages becomes more common. We are beginning to recognize that water supply can be a limiting factor for further growth and development. As you know, the Tennessee Department of Environment and Conservation is investing considerable resources in developing a framework for regional water supply. The Commission has a position on its Water Resources Technical Advisory Committee and has provided research and editorial support to that committee's water supply planning pilots.

The U.S. Army Corps of Engineers is also playing a major role in assessing water supply needs and finding ways to meet them. The Corps' effort to determine who's using how much water and from where in the Cumberland River System has received considerable attention in Middle Tennessee because of the suggestion that the Corps may need to charge utilities drawing water from the river's main stem for storage in the tributary reservoirs. The attached document from the Corps describes their work, the reasons for it, and some of the challenges they face.

We will hear an overview and an update from staff on water supply sufficiency issues and have an opportunity to discuss the Commission's concerns at this meeting.



**US Army Corps
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Nashville District

Water Supply in Tennessee

Tennessee is a water rich state with rainfall averaging between 47 and 53 inches per year. However, water is not evenly distributed and every year is not average. Population and migration patterns have shifted straining existing supplies resulting in water shortages during drought. Lack of water has also become a major factor limiting growth in certain areas. The drought of 2007-2008 exacerbated the situation and highlighted the problem state wide. No longer is the traditional independent utility focus adequate. The state must look toward regional evaluations and solutions. Individual communities and utilities are being encouraged by the state to work cooperatively with neighbors and other partners to more efficiently and effectively deliver water to residents and businesses.

Part of the complexity of the problem is due to the geography and geology of the state. In West Tennessee, sand aquifers underlay the region and supply drinking water to virtually everyone. Middle and East Tennesseans use on both underground and surface sources, but the vast majority relies on surface sources and both distance and elevation limit the efficient transportation of water. Communities along the Tennessee and Cumberland Rivers and their major tributaries would seem to have unlimited access to water but as proven in the drought of 2007-2008, this is not the case because the water is used for many purposes, not just for drinking. The federal projects constructed on the rivers have legal restrictions and limitations on withdrawals. In 2007, both the Corps of Engineers and Tennessee Valley Authority (TVA) modified project operations to adequately meet multiple demands including water quality, drinking and cooling water. While Knoxville, Nashville and Chattanooga have always had adequate supplies of clean water from the Tennessee and Cumberland Rivers up till now, this may not always be the case. A more complete understanding of the competing demands on the rivers is needed. TVA completed a study of the competing demands on the Tennessee in 2006, but the Corps has not had adequate funding for the Cumberland. Many of our smaller cities such as Murfreesboro, Franklin, Maryville, Columbia, and McMinnville that rely on tributaries also face shortages. Streams such as the Little Tennessee and the Duck Rivers were once able to supply all the needs of the communities along them, but, as the communities have grown, these streams are stressed and unable to meet the increasing demands. Many of our smaller communities are on creeks or at the headwaters of the streams at higher elevations. These smaller water sources were adequate for many years, but are now inadequate and limiting growth.

The Corps of Engineers is working with Tennessee Department of Environment and Conservation (TDEC) and others to develop a strategy for comprehensive water planning in Tennessee. This comprehensive evaluation is currently focused in 3 areas: two regional evaluations of supply and demand, an evaluation of current water use and availability beginning at Old Hickory Lake on the main stem of the Cumberland River and the reallocation of storage for water supply on a tributary project the first of which is on J. Percy Priest Lake. A description of each of these evaluations follows.

Regional Water Supply Evaluations

The TDEC in partnership with The Nature Conservancy (TNC), The US Geological Survey (USGS) and other state agencies and associations are developing pilot studies in 2 critical areas: North Central Tennessee and the South Cumberland Plateau. Although these studies are still in process, we know that additional water supply infrastructure such as new source development or additional connection and sharing among utilities; will be needed for both areas. Many other areas in Tennessee also require water and wastewater infrastructure improvements.

The North Central focus area includes Portland, Westmoreland, Gallatin, White House and Castilian Springs/Bethpage, and the South Cumberland Plateau includes Tracy City, Monteagle, and Sewanee, and Big Creek, Cagle/Fredonia, Griffith Creek, and Foster Falls Utility district. The ultimate outcome will be a comparison of proposed alternatives for each focus area and methodology for other regions to use. Corps participation is under the Planning Assistance to States (PAS) program and is being conducted in multiple phases. PAS funding is cost shared 50/50 with the state providing matching funds. With additional funding, the Corps could complete plans for other regions. With additional authority and funding the Corps could assist with design and implementation of measures for the North Central and South Cumberland Plateau pilot areas.

Cumberland River Main Stem Issues

Background/Water Supply Concerns

All the projects on the Cumberland River serve multiple purposes such as navigation, flood damage reduction, hydropower, recreation, fish and wildlife and water supply. Each project was authorized for specific purposes with some purposes added after project construction. Water supply was not an original project purpose for any of the projects in the Cumberland River System. The cost of the project's construction, operation, and maintenance is spread across project purposes. Funds to operate and maintain the project are allocated by project purpose. Hydropower and water supply which generate revenue also repay a portion of the original construction costs. As dictated by the Water Supply Act of 1958, these costs are assigned to water supply in proportion to the amount of storage dedicated to water supply. Thus, studies must be done to determine how much storage can be re-allocated to water supply and how much to charge for the water supply storage at each project. A further complication is the two types of projects in the Cumberland River System.

Projects on the main stem including Old Hickory, Cheatham, Barkley and Cordell Hull have **no** storage. In other words, these projects are operated so that outflows of the projects equal the inflows. Water is stored only in tributary projects such as Wolf Creek, Center Hill, Dale Hollow and J. Percy Priest Reservoirs. Because there is no storage on the main stem, water may be withdrawn without charge as long as authorized project purposes are not impacted. However, when water withdrawals impact authorized project purposes and stored water must be released from upstream tributary projects to mitigate those impacts, then Water Supply Act of 1958 dictates that a reallocation of storage at tributary projects sufficient to meet those needs is required. Water withdrawal charges are required with the reallocation.

Water Availability Study

Due to current withdrawals for water supply, there is a strong need for a Water Availability Study on the Cumberland River Main Stem. We believe that withdrawals from Old Hickory may be already greater than inflows and authorized project purposes are being impacted. The Water Availability Study will determine the following: who is using the water; where is water going (Inter-basin transfers); how much is being used; how much water can be used from each Cumberland River main stem pool without significant impacts to authorized purposes and finally, if other purposes are impacted, how should storage be reallocated from upstream tributary reservoirs and what will the cost be?

Until the Water Availability Studies are complete, there is a moratorium on permitting new water intakes or increases in withdrawals from existing intakes on Old Hickory. Also, there is a moratorium on the permitting of new intakes or increases in withdrawals from existing intakes on Old Hickory. Also there is a moratorium on the permitting of new intakes or increases in withdrawals from existing intakes where water is being distributed outside the Cumberland River. In addition, the current policy of providing water to private individuals along the Cumberland River through minor use licenses associated with Shoreline Management Plans will be examined.

If the Water Availability Study confirms there is no more water available from Old Hickory Lake, requests for new or additional withdrawals would be dependent on reallocation of storage from one or all the tributary projects upstream. A reallocation requires a reallocation study in accordance with the Water Supply Act of 1958. The Chief of Engineers may approve a reallocation up to 15 percent of the total storage capacity or 50,000 acre feet, whichever is less. If the reallocation would seriously affect other purposes or involve major structural or operational changes at a project, Congressional approval would be required.

Water Reallocation Studies

Reallocated storage costs are repaid by users over time and are established during the reallocation study. The storage costs are the higher of the benefits or revenues foregone (based on the impacts to other project purposes normally hydropower), the cost to replace the storage, or the updated cost of storage in the Federal project. The charges also include a share of the annual costs including operation, maintenance, repair, replacement and rehabilitation (OMRR&R) costs.

Reallocation studies typically have two phases: Reconnaissance and Feasibility. The Reconnaissance Phase normally uses O&M funds under the authority of the original project. Use of Section 216 or specific authorities combined with specific appropriations are also options. The Feasibility Phase is normally cost-shared under Section 216 or a specific authority and funded from specific appropriations. The Nashville District has historically received minimal funding through the Water Supply Business Line budget process, which has hampered our ability to evaluate water supply requests. Most of our reallocation studies have been Congressional adds. The current study at J. Percy Priest was court ordered at 100% Federal costs. The entity requesting the storage must provide the Corps with demands and alternative analyses. The Corps will derive user costs (higher of benefits or revenues foregone, replacement cost, or the updated cost of storage), a test of financial feasibility, and NEPA documentation.

Additional Challenges

An additional challenge is created by an annual legislative prohibition on the Corps spending federal dollars for reallocation studies for Lake Cumberland (Wolf Creek Dam). Lake Cumberland accounts for the vast majority of storage on the Cumberland River. System and along with the tributary projects, Dale Hollow and Center Hill, provide for nearly all of the flow in the Cumberland River (especially during droughts). This legal prohibition would in effect prevent the Corps from reallocating any water from the storage projects to supply users on the main stem projects (Barkley, Cheatham, Old Hickory, and Cordell Hull Lakes) without a significant change in all project operations. In addition, the dam safety major rehabilitation pool restrictions on the Wolf Creek and Center Hill pools prevent a reallocation of storage from them until the restrictions are lifted.

Funding Needs:

1. **\$200,000 is needed in FY 11** in the Operations Account to complete the **Water Availability Studies** for Barkley, Cheatham and Cordell Hull Lakes. (Old Hickory will be completed this year).
2. **\$200,000 is needed in FY 11** to update the **Water Control Manuals** for the Projects in the Cumberland River System
3. Funding will be needed the next 4 years to complete **Reallocation Studies** to meet the needs of those that have made requests for water to date.

FY 11 - \$250,000 on Lake Laurel (There is an existing request for storage)

FY 12 - \$250,000 on Dale Hollow Lake or Wolf Creek or Center Hill Lakes
(the reallocation ban must not be in existence also the dam safety corrections should be complete)

FY 13 - \$250,000 on Dale Hollow Lake or Wolf Creek or Center Hill Lakes
(the reallocation ban must not be in existence also the dam safety corrections should be complete)

FY 14 - \$250,000 Dale Hollow Lake or Wolf Creek or Center Hill Lakes (the reallocation ban must not be in existence also the dam safety corrections should be complete)

Communication needs

Tennessee and Kentucky need to be briefed on their interactions in the Cumberland River Watershed and how change or lack of change could impact communities in both states.

Environmental Infrastructure

State-wide environmental infrastructure authority

Point of Contact

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