

*Final Programmatic
Environmental Impact Statement*

Future Water Supply Needs
in the
Upper Duck River Basin

*Extract:
Executive Summary, Summary Tables,
and Composite Alternatives Map*



DECEMBER 2000

EXECUTIVE SUMMARY

The Tennessee Valley Authority (TVA), Tennessee Duck River Development Agency (DRDA), Tennessee Department of Environment and Conservation (TDEC), U.S. Army Corps of Engineers (USACE), and U.S. Fish and Wildlife Service have cooperated to prepare this analysis and programmatic Environmental Impact Statement (EIS). Members of the public and various other agencies have participated in this process by attending public meetings and providing comments on the scope of the EIS. TVA is the lead agency in the preparation of this document.

This document has three related purposes. It evaluates the need for water in the upper Duck River watershed over a 50-year planning period (to the year 2050), identifies potential ways to meet any identified water need in part or all of this river basin, and evaluates the environmental and socioeconomic impacts of several possible ways to meet the future water needs within the basin. The project area includes parts of Bedford, Marshall, Maury, and Williamson counties in southern middle Tennessee.

In an initial step, TVA worked with the local water utilities, the TDEC Divisions of Water Supply and Water Pollution Control, DRDA, USACE, and the U.S. Geological Survey to analyze the water supply needs in the Bedford, Marshall, and Maury/southern Williamson County water service areas. That Needs Analysis Report, issued in August 1998, described the present level of water use in the area, the water sources involved, and up-to-date projections of water supply demand for these three water service areas through the year 2050. The needs analysis indicated that the minimum flow being provided by Normandy Dam is expected to meet the water supply and water quality control needs of the Bedford County and Marshall County water service areas during worst case flow conditions throughout the study period (to the year 2050). The minimum flow being provided by Normandy Dam, accompanied by anticipated future return flows from wastewater treatment plants in the area, can be expected to supply up to 40 cubic feet per second (cfs) for water supply use to the Maury/southern Williamson County Water Service Area. Future demand above 40 cfs (increasingly likely to occur in the years after 2015) would have to be met from other water supply sources. By the year 2050, those other sources would have to be able to supply as much as 22 cfs.

The four action alternatives developed to meet the water supply need in the Maury/southern Williamson County Water Service Area include two which could be implemented within the service area (a reservoir on Fountain

Creek, and a downstream intake on the Duck River), one that would affect other parts of the Duck River watershed (raise the Normandy pool level), and one that would affect an area outside of the Duck River basin (a pipeline from Tims Ford Reservoir). These alternatives would provide water at different locations along the length of the Duck River. Each of these action alternatives assumes that future water demand in these water service areas would not adversely affect the flow projections in the river made in the Needs Analysis; assumes that Normandy Dam would continue to discharge up to 165 cfs for water quality control and water supply use in the Bedford County Water Service Area; and assumes that no new, large, water-consuming industries would locate in any of the water service areas in the upper Duck River basin.

In this programmatic EIS, these action alternatives have been generally described in light of their conceptual nature at this early stage. If and when a decision is made to provide some additional water for the Maury/southern Williamson County Water Service Area, the sponsors would determine the specific purposes of each project and would develop site-specific plans for the various facilities. As those plans are developed and proposals are made, detailed, site-specific evaluations of environmental effects would be conducted, if required and as appropriate, under the National Environmental Policy Act.

Adoption of **Alternative A** would mean that no new source of water would be developed to meet the projected future needs of the Maury/southern Williamson County Water Service Area. More than likely, the Spring Hill and Columbia water treatment plants would be expanded to withdraw and treat as much water from the river as possible; however, the worst case needs of this water service area are projected to exceed the available flow in the river during drought conditions some time after 2015. As the demand for water approached the available supply, treatment of area wastewater would become more difficult and expensive, and economic growth in the area probably would slow or stop. If the demand for water continued to rise and no additional water supply source for the area was developed, drought conditions probably would bring the imposition of water conservation measures and pleas to TDEC for permission to withdraw more water from the river. Large withdrawals from the river during drought conditions would result in adverse effects to aquatic life and recreational use of the river for several miles downstream from the Columbia water supply intake. Eventually, the increasing demand is likely to lead to the development of one or more additional water sources for the Columbia area.

Adoption of **Alternative B** would result in the construction of a water supply reservoir in the downstream part of the Fountain Creek watershed and an approximate 5-mile pipeline to transport water from this reservoir to a new treatment plant and on to the existing water distribution system. If this reservoir was built with a full pool at elevation 629 feet and if it included all of the adjacent land up to the probable maximum flood level, the project would affect approximately 3,600 acres, of which 800 acres is not already in public ownership and would have to be acquired. Construction of this project would create a relatively small, nutrient-rich reservoir which would have to be grouted to avoid significant leakage into the ground water. The reservoir would substantially change aquatic habitats, terrestrial habitats, land use, visual character, and recreational activities in the immediate area; however, the nature and extent of some of those changes would depend on how the reservoir and surrounding land were managed. The reservoir would support much lower diversity of aquatic life than the existing creeks; however, some species capable of living in standing-water habitats would be more abundant in the area than they are now. Construction of the reservoir could result in a net loss in local wetland functions and significant adverse effects on the extensive archaeological resources that are likely to be present in the area. If all of the future water demands of the Columbia area were to be met from the Fountain Creek reservoir, the flow not withdrawn from the river would help maintain acceptable water quality conditions for fish and aquatic life and recreational uses downstream from the water intake, as well as provide more initial dilution for the Columbia wastewater treatment plant discharge. If constructed and operated appropriately, this reservoir could meet all of the projected water supply needs of the Maury/southern Williamson County Water Service Area through at least 2050 and would not impede the anticipated level of local economic growth.

Adoption of **Alternative C** would lead to the construction of a water supply intake and pumping station on the Duck River downstream from the mouth of Catheys Creek (possibly near River Mile 104) and an associated 13-mile pipeline and booster station to transport water to a new treatment plant and to the existing water distribution system. If this project was constructed as described, it would have only short-term and minor effects on ground water, wetlands, floodplains, terrestrial life, endangered species, land use, visual character, natural areas, and cultural resources. Operation of the project would not be likely to cause any adverse effects on water quality or aquatic life at the intake site and the flow not withdrawn from the river would help maintain aquatic life and recreation downstream from the Columbia water intake during drought conditions. If withdrawals from the river between

Normandy and the Columbia area did not exceed present projections, this intake and pipeline could provide enough additional water to meet the anticipated water supply needs of the Maury/southern Williamson County Water Service Area through 2050 and would not impede the anticipated level of local economic growth.

Adoption of **Alternative D** would result in raising the pool level on Normandy Reservoir and increasing the minimum discharge from Normandy Dam. If this project was constructed as described, it would have only short-term and minor effects on terrestrial life, endangered species, and land use, and could result in minor beneficial effects on water quality and aquatic life in the Duck River downstream from Normandy Dam. Raising the pool level in Normandy Reservoir is likely to result in minor adverse effects on wetlands and cultural resources around the reservoir and significant adverse effects on visual character, existing recreation facilities around the reservoir, and on three acres supporting important features in the Short Springs State Natural Area. If constructed and operated appropriately, these modifications to Normandy Reservoir and its discharge could make additional water available in the Duck River. If withdrawals from the river between Normandy and the Columbia area did not exceed present projections, the augmented minimum flow in the river would provide up to 56 cfs for water supply to the Maury/southern Williamson County Water Service Area, enough to meet the water demand estimated to occur in that area around the year 2035. Water conservation and/or some other supply source would be required to meet the projected additional 6 cfs of demand by 2050 without impeding the anticipated level of local economic growth.

Adoption of **Alternative E** would lead to the construction of a water supply intake and pumping station on a northern embayment of Tims Ford Reservoir and an associated 20-mile pipeline and booster station to transport water to a discharge point on the Duck River near Shelbyville. If this project was constructed and operated as described, it would have only short-term and minor effects on ground water, wetlands, floodplains, terrestrial life, endangered species, land use, visual character, recreation, natural areas, and cultural resources. When this water transfer system was operating (only during drought conditions), it could have beneficial effects on surface water quality and aquatic life in the Duck River downstream from the discharge point. If withdrawals from the river between the discharge point and the Maury/southern Williamson County Water Service Area did not exceed present projections, this alternative would provide enough additional water to meet drought-condition needs of the service area

through 2050 without impeding the anticipated level of local economic growth.

In general, the extent of potential environmental effects of the four action alternatives seem to be related to the amount of land area that would be modified or disturbed. The two alternatives which would involve the least amount of land disturbance (Alternative C: Downstream Water Intake, and Alternative E: Tims Ford Pipeline) also appear likely to have the least potential for adverse effects on the environment (almost exclusively short-term effects associated with construction of the pipelines and other facilities). Both of the other alternatives (Alternative B: Fountain Creek Reservoir, and Alternative D: Raise Normandy Pool Level) would involve modifications in much larger areas and would have substantially more potential for adverse environmental effects. Each of the action alternatives also would result in some level of benefits to water quality, aquatic life, and recreation on parts of the Duck River where at least the minimum flow would be higher than under the No Action alternative.

TVA has concluded that one or more action alternatives should be pursued to meet the future water needs in the Maury/southern Williamson County Water Service Area. This is the TVA preferred alternative in this programmatic EIS. TVA is not proposing to design or construct any of these facilities; however as a regional water resource agency, TVA can assist in evaluating available alternatives and encourage cooperation among all communities that are dependent on common water resources. Local utilities, government agencies in the upper Duck River watershed, and other interested parties will be the ones to actually decide which water supply alternative(s) should be pursued. Those local agencies and the publics they serve must determine how they want to address water needs in this river basin and how those systems will be operated.

Table 6. Summary comparison of the five water supply alternatives being evaluated in detail. Table entries are derived from information presented in Sections 3.3 through 3.7.

Components	A: Use Present Sources (No Action)	B: Fountain Creek Reservoir	C: Downstream Water Intake	D: Raise Normandy Pool Level	E: Tims Ford Pipeline
Basic Concept	No new source	Build a water supply reservoir	Add another Duck River intake	Augment minimum river flow	Augment minimum river flow
Additional Water Source	None	Fountain Creek Reservoir	Duck River ~ River Mile 100	Enlarged Normandy Reservoir	Tims Ford Reservoir
Additional Water Volume	None	74 cfs	46 cfs	16 cfs	22 cfs
Would Meet Water Needs Through	2015	2050 +	2050 +	2035	2050
New Treatment Capacity Required?	Yes	Yes	Yes	Yes	Yes
Estimated Pipeline Length	None	5 miles	13 miles	None	20 miles
Additional Land Required	None	800 acres (+ 2,800 acres already in public ownership); also 50 acres of easements along pipeline route	2 acres; also 130 acres of easements along pipeline route	None (affected areas already in public ownership)	1 acre (+ 1 acre already in public ownership); also 200 acres of easements along pipeline route
Order of Magnitude Construction Cost (FY 2000 \$)	None	\$ 50 Million	\$ 11 Million	\$ 8 Million	\$ 13 Million
Estimated Added Cost to Operate	None	Not Determined	Not Determined	None	Not Determined

Table 7. Summary of the potential environmental effects of the five water supply alternatives being evaluated in detail. Table entries are derived from the identified sections in Chapter 5.

Resource Areas	A: Use Present Sources (No Action)	B: Fountain Creek Reservoir	C: Downstream Water Intake	D: Raise Normandy Pool Level	E: Tims Ford Pipeline
Ground Water (Section 5.3)	No immediate effects	Higher local ground water; lower quality	Probably minimal construction effects	Probably minimal effects	Probably minimal construction effects
Surface Water (Section 5.4)	No immediate effects; potential drought impacts	Nutrient-rich small reservoir; need to protect supply use	Probably minimal construction effects; flow benefits	Probably minimal construction effects; flow benefits	Probably minimal construction effects; flow benefits
Aquatic Life (Section 5.5)	No immediate effects; potential drought impacts	Species diversity in reservoir would be lower than streams	Probably minimal construction effects; some flow benefits	Possible community changes in reservoir and downstream	Probably minimal construction effects; flow benefits
Wetlands (Section 5.6)	No effects	Net loss in wetland areas and functions	Probably minimal construction effects	Possible changes in wetland sites	Probably minimal construction effects
Floodplains (Section 5.7)	No effects	Higher upstream flood levels; lower levels downstream	Probably minimal construction effects	Probably minor changes in flood elevations	Probably minimal construction effects
Terrestrial Life (Section 5.8)	No immediate effects	Significant change in area habitats	Probably minimal construction effects	Some local changes in area effects	Probably minimal construction effects
Endangered and Threatened Species (Section 5.9)	No immediate effects	Possible effects related to changes in area habitats	Probably minimal construction and operational effects	Probably minimal construction and habitat effects	Probably minimal construction effects
Land Use/ Prime Farmland/ Community Noise (Section 5.10)	No immediate effects	Approx. 800 acres would be acquired; major changes in use on 3,600 acres	Probably minimal construction and operational effects	Only local changes in use would occur	Probably minimal construction and operational effects
Visual/Recreation/ Natural Areas (Section 5.11)	No immediate effects	Significant local changes in character and use	Probably minimal construction and operational effects	Significant changes in character, facilities and a natural area	Probably minimal construction and operational effects
Cultural Resources (Section 5.12)	No immediate effects	Potential for significant effects at sites on 3,600 acres	Probably minimal construction effects	Potential for adverse effects at sites on 230 acres	Probably minimal construction effects
Socioeconomics (Section 5.13)	Potential future limit on economic growth	Most construction employment benefit	Minor construction employment benefit	Some construction employment benefit	Minor construction employment benefit